130 ENVIRONMENTAL PARK
CALDWELL COUNTY, TEXAS
TCEQ PERMIT APPLICATION NO. MSW 2383

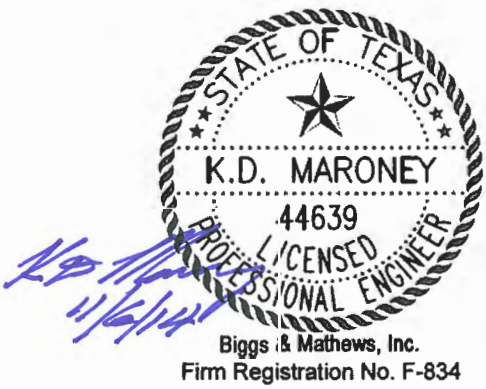
TYPE I PERMIT APPLICATION

VOLUME 4 OF 5

Prepared for

130 ENVIRONMENTAL PARK, LLC

Technically Complete October 28, 2014



Biggs & Mathews, Inc.
Firm Registration No. F-834

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11/6/14

130 ENVIRONMENTAL PARK
CALDWELL COUNTY, TEXAS
TCEQ PERMIT APPLICATION NO. MSW 2383

TYPE I PERMIT APPLICATION

PART III – FACILITY INVESTIGATION AND DESIGN

ATTACHMENT E
GEOLOGY REPORT

Prepared for

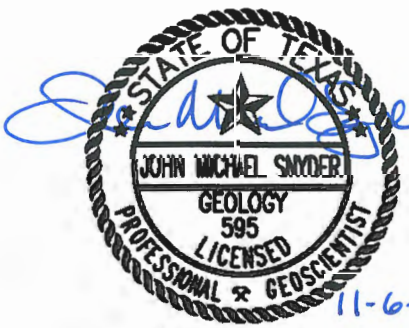
130 ENVIRONMENTAL PARK, LLC

Technically Complete October 28, 2014

Biggs & Mathews Environmental, Inc.
Firm Registration No. F-256

Sections 2.3, 5.1, and 5.2

11-6-2014



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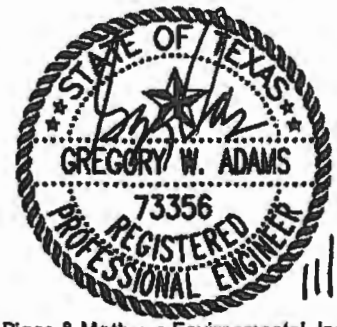

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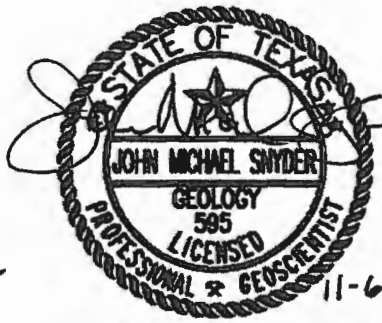

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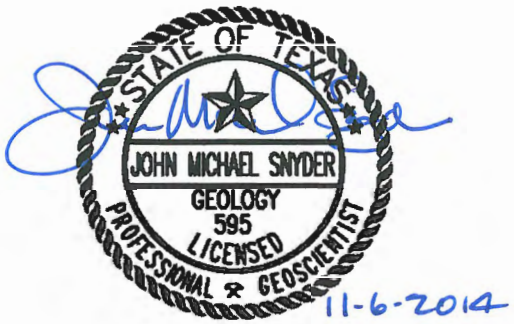

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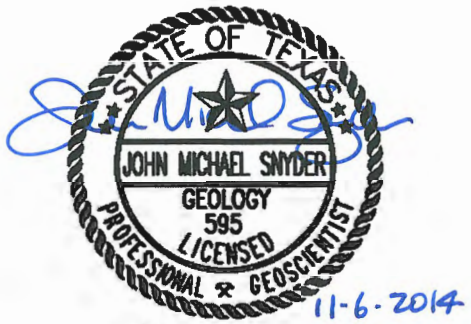

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CONTENTS (CONTINUED)

TABLES

1 REGIONAL GEOLOGIC/HYDROGEOLOGIC INFORMATION

30 TAC §§330.57(f)(2), 330.63(e)(1)

This geology and hydrogeology portions of this attachment have been prepared by Michael Snyder, P.G., a qualified groundwater scientist, for 130 Environmental Park, consistent with 30 Texas Administrative Code (TAC) §§330.57(f)(2) and 330.63(e).

1.1 Regional Physiography and Topography

The project site is located in the regional physiographic subdivision known as the Blackland Prairie. This north-south trending belt is underlain by Paleocene/Eocene age deposits of the Midway and Wilcox Groups and Cretaceous age sediments of Navarro Group and Eagle Ford Group. These formations consist primarily of fine-grained materials deposited in ancient oceans. In addition, according to the Geologic Atlas Sheets of Texas (1974 and 1994), the Leona Formation, a Quaternary fluviatile terrace deposit, is present at the surface in a narrow deposit trending northwest to southeast along the Plum Creek Valley beginning in the northwest portion of Caldwell County and extending to the central portion of the county. Topography of the Blackland Prairie is typically flat to rolling and has a gentle slope to the southeast (Nordstrom, 1982).

The nearest surface water body in the area, Soil Conservation Service Reservoir 21, is located several hundred feet south of the site. Dry Creek is located east of the site and unnamed tributaries of Dry Creek cross the site from the west and join Dry Creek south of the site, within the limits of the reservoir. Dry Creek and its tributaries are considered ephemeral streams.

1.2 Regional Stratigraphy and Lithology

Formations of the Cretaceous System were deposited by northward advancing seas over extensively eroded Paleozoic strata. The Gulf Series of the Cretaceous System represents one of the major Cretaceous sea advancements. The project site is underlain by strata deposited during the late Cretaceous Gulf and the Paleocene/Eocene Series. The Eocene Series strata were deposited once marine deposition ceased and after a general uplift to the west resulted in regression of the seas gulfward. Subsequent erosion of the Cretaceous deposits continued through the Cenozoic Era to the present.

Regional stratigraphy includes geologic units of the Cretaceous Gulf Series Navarro Group, the Paleocene Midway and Eocene Wilcox Group and Quaternary deposits of the Leona Formation. Stratigraphic positions of these groups, along with lithologic characteristics and approximate depths to formations, are presented in Table E-1. The site is located on an outcrop of the Midway. Although the geologic map (Figure E1-1) shows the Leona Formation outcropping on the site, actual field investigations, including borings show only discontinuous remnant pebbles and cobbles of terrace deposits imbedded in the top two to six feet of the weathered Midway. Figure E1-1 shows that the contact between the Midway and overlying Wilcox is east of the site. Regional cross

sections show that the geologic formations form a southeastward thickening wedge extending into the Gulf of Mexico structural feature. A generalized regional geologic cross section is shown on Figure E1-3.

Table E-1
130 Environmental Park
General Regional Stratigraphic Column

System	Series	Group	Formation	Maximum Thickness (ft)
Quaternary	Pleistocene	Leona Formation[1]		40
Tertiary	Eocene	Queen City Sand		500
		Reklaw Formation		400
		Carrizo Sand		400
		Wilcox Group		2,000
	Paleocene	Midway Group		600
Cretaceous	Gulf	Navarro Group		600
		Taylor Marl, Austin Chalk and Eagle Ford Shale, undifferentiated.		1,200

Sources: Follett, 1966 and Barnes, 1974.
[1] Leona is an alluvial deposit that overlies Queen City Sand, Reklaw Formation, Carrizo Sand, Wilcox Group and the Midway Group in parts of Caldwell County.

2 GEOLOGIC PROCESSES

30 TAC §§330.63(e)(2), 330.61(j)(2)

A discussion of the geologic processes in the vicinity of the landfill follows.

2.1 Fault Areas

Consistent with §330.61(j)(2) and §330.555, a fault evaluation was prepared as part of this application to demonstrate that the 130 Environmental Park site meets the location restriction for fault areas.

TCEQ regulations state that new MSWLF units or lateral expansions shall not be located within 200 feet of a fault that has had displacement in Holocene time unless the owner or operator demonstrates to the executive director that an alternative setback distance of less than 200 feet will prevent damage to the structural integrity of the landfill unit and will be protective of human health and the environment.

The area of the 130 Environmental Park site was examined for the presence of faulting according to §330.555 criteria. A fault study was conducted that included reviewing aerial photographs and available geologic literature and maps of the area, conducting on-the-ground reconnaissance, and examining the subsurface boring data from the site.

The site and the immediate area were investigated for:

- Structural damage to constructed facilities (roadways, railways, and buildings).
- Scarps in natural ground.
- Presence of surface depressions (sag ponds and ponded water).
- Presence of lineations on aerial maps and topographic sheets. The following historical aerial photographs from Google Earth were reviewed:

8/1/2012
10/17/2011
3/9/2011
11/24/2009
10/30/2008
2/28/2008
4/29/2006
10/21/2005
8/12/2003
12/30/2002
12/30/1997
1/27/1995

- Structural control of natural streams.
- Vegetation changes.
- Crude oil and natural gas accumulations.
- References to published geological literature pertaining to area conditions.

A walkover was conducted by John Michael Snyder, P.G., who is an experienced licensed professional geoscientist familiar with faulting and solid waste disposal facilities to identify possible physical evidence caused by faulting. No unusual scarps or topographic breaks were observed or interpreted within 200 feet of the site. No evidence of faulting was found associated with formation outcrops; no evidence of faulting was found by examination of area roadways; no structural influence of stream courses was found; and no unusual relief or topographic features (such as sag ponds or truncated alluvial spurs) were observed. No evidence of structural damage to buildings was identified.

In summary, no fault scarps were observed at the surface within 200 feet of the site and there was no evidence of vertical subsidence on any outcrops of geologic materials. No vertical displacement or stratigraphic offset indicative of faults was observed in outcrops. There was no presence of lineation, fault scarps, vertical displacement or offset observed in the aerial photographs. There is no known accumulation of oil and natural gas beneath the facility (see Drawing E4-2 – Locations of Oil and Gas Wells). There is no known active faulting in the Holocene Epoch, the most recent 11,700 years, within a half mile of the site.

Many faults are located in the area and are related to the Balcones Fault Zone and Mexia-Luling Talco Fault Zone. The Balcones Fault Zone faults last moved during the Miocene Epoch (Garner and Young, 1976; Young and Jordan, 1977; and Grimshaw and Woodruff, 1986), while movement along the Mexia-Luling Talco Fault Zone occurred in the Eocene Epoch (Jackson, 1982; Culotta et al., 1992; Sellards & Baker, 1934; and Weeks, 1945). Consistent with §330.555(a), the faults located in the area of the facility are documented to have last moved 5 to 56 million years ago; therefore, they pre-date the Holocene Epoch. Also, the mapped faults in the area are all located farther than 200 feet from the proposed waste management unit boundary.

2.2 Seismic Impact Zones

Consistent with §330.61(j)(3) and §330.557, seismic impact zones documentation was prepared as part of this application and demonstrates that the 130 Environmental Park site meets the location restriction for seismic impact zones.

TCEQ regulations state that no new MSWLF units or lateral expansions shall be located in seismic impact zones unless the owner or operator demonstrates that all containment structures, including liners, leachate collection systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site.

A seismic impact zone as defined by §330.557 is an area with a 10 percent or greater probability that the maximum horizontal acceleration in lithified earthen material, expressed as a percentage of the earth's gravitational pull, will exceed 0.10g in 250 years. Appendix E4, Figure E4-1 shows the site location on the seismic impact zone map for Texas. The proposed 130 Environmental Park is not located within a seismic impact zone (Petersen, 2008).

2.3 Unstable Areas

Consistent with §330.61(j)(4) and §330.559, unstable areas documentation was prepared as part of this application and demonstrates that the 130 Environmental Park site meets the location restriction for unstable areas.

An unstable area is defined by the TCEQ as a location that is susceptible to natural or human-induced events or forces capable of impairing the integrity of some or all of the landfill's structural components responsible for preventing releases from a landfill. An unstable area can exhibit poor foundation conditions, areas susceptible to mass movement, and karst terrains.

The evaluation of potential unstable areas at the site is based on the following observations, analyses and reviews of site specific information.

- The boring logs and laboratory data did not indicate the presence of poor foundation conditions such as soft clay or loose sand beneath the landfill. The hand penetrometer values and unit dry weight results indicate that the clays are hard.

- The settlement and heave analyses presented in Part III, Attachment D, Appendix D5-A show that the landfill components will not undergo detrimental differential settlement.

- The slope stability analyses presented in Part III, Attachment D, Appendix D5-B show that landfill components will be stable.

- Evidence of mass movement of natural formations of earthen material on or in the vicinity of this site was not observed at the site, in the borings or on the geologic maps.

- Evidence of karst terrain was not observed at the site, in the borings or on the geologic maps.

Based on this evaluation, the site is not located in an unstable area and thus meets the location restriction.

3 REGIONAL AQUIFERS

30 TAC §330.63(e)(3)

3.1 Regional Hydrogeology

Regional Tertiary and Quaternary aquifers that supply groundwater to wells in Caldwell County are the Carrizo-Wilcox and the Leona formations, respectively. The Carrizo-Wilcox is characterized by the Texas Water Development Board (TWDB) as a major aquifer. The Leona Formation is not characterized by the TWDB as either a major or minor aquifer. Most groundwater produced in northern Caldwell County is from wells tapping the Carrizo-Wilcox Formation, east of the site. The outcrop of the Leona Formation, from which some groundwater is produced, is located several miles south of the site.

3.2 Leona Aquifer

The Leona Formation outcrops in a narrow plain in the center of Caldwell County, as shown in Figure E1-1. In Caldwell County, the Leona Formation thickness ranges from a few feet at its margins to more than 40 feet in the center of the plain. The Leona yields small to moderate amounts of groundwater to domestic wells in the primary deposits that occur along Plum Creek near Lockhart; none are in the vicinity of the 130 Environmental Park site. In the past, groundwater from the Leona has been used for domestic use, watering livestock, irrigation, and public supply. However, today most public water supply is from the Carrizo-Wilcox, and the Leona Aquifer has limited capacity to produce groundwater (Hemphill, 2005). The geologic map (Figure E1-1) shows that the Leona Formation outcrops at the site. However, field investigation of the site including borings show only remnant pebbles and cobbles of an apparent Leona terrace deposit that have settled down into the underlying Midway clays.

3.3 Carrizo-Wilcox Aquifer

The Wilcox Formation crops out east of the site and in a northeast trending belt across Caldwell County. The Wilcox dips to the southeast at an average of about 150 feet per mile and increases in thickness in the direction of dip. The Carrizo Formation occurs east and southeast of the outcrop of the Wilcox, approximately 12 miles southeast of the site. The aquifer portions of these two formations is collectively known as the Carrizo-Wilcox (Thorkildsen and Price, 1991). Fresh to slightly saline water is found in the Carrizo-Wilcox at depths ranging from about 50 feet near the outcrop to about 2,800 feet near the southeast corner of the county. The Carrizo-Wilcox yields small to large quantities of water to many wells for domestic and stock purposes, public supply, and some irrigation.

Table E-2
130 Environmental Park
Hydraulic Properties of Regional Aquifers
Compiled from TWDB, 1966, TWDB, 1991

Parameters	Leona	Carrizo-Wilcox Formation
Composition	Gravel, pebbles with sand	Sand interbedded with gravel, silt, and clay
Transmissivity	0.35 (Specific Yield)	2,425 – 18,027 ft^2/day
Hydraulic Conductivity	37 – 317 ft/day	26 – 40 ft/day
Water Table/Confined	Unconfined	Unconfined locally, confined downdip
Groundwater Flow Rate	75 – 400 ft/year	10 – 100 ft/year
Water Quality: Total Dissolved Solids Chlorides	 120 – 1500 ppm 15 – 1000 ppm	 41 – 6700 mg/L 3 – 4000 mg/L
Recharge Zones	Outcrop of Leona	Outcrop of Carrizo-Wilcox
Regional Water Table	Not Available	See Figure E1-4
Present Use of Water	Limited irrigation and limited household use due to high nitrates.	Municipal & irrigation
Water Wells Within One Mile	None	See Table E-3 and Appendix E1, Figure E1-5

* Regional groundwater potentiometric surface map for the Carrizo-Wilcox is included in Appendix E-1, Figure E1-4.

3.4 Area Water Wells

A water well search was conducted for a one-mile radius around the site. The search identified five wells within one mile of the site. The water well search included a review of the interactive map and well records available on the Texas Water Development Board (TWDB) website *www.twdb.state.tx.us* in the Water Information Integration and Dissemination (WIID) ArcIMS mapping application. The Texas Commission on Environmental Quality (TCEQ) website *www.tceq.state.tx.us* and the Plum Creek Conservation District website www.pccd.org were also reviewed for water well records. The U.S. Geological Society database (URL: *maps.waterdata.usgs.gov/mapper/*) was checked for groundwater sites on which it collects data that might be in the vicinity but no additional wells were found. The TCEQ Water Utility Database (*www.tceq.state.tx.us/permitting/-water_supply/ud/iwud.html*) was also consulted to determine if there were any public water utility wells in the area. The Polonia Water Supply Corporation serves residences near the site but all of its listed wells are more than one mile east and south of the site. The water wells within one mile of the site are shown on the USGS topographic map in Appendix E1, Figure E1-5. As shown on Table E-3, the wells in the area are completed in the Carrizo-Wilcox located east of the site. East of the site the Carrizo-Wilcox Formation outcrops and is approximately 700 feet

thick and found at depths ranging from the surface to 950 feet below ground surface (BGS).

An attempt was also made to locate wells visible from nearby roads and streets and confirm water well locations. Within the one-mile radius, no obvious water well production equipment, such as well houses, pump handles, windmills, or pressure tanks was identified from the roadway. However, some residences in this area may have water wells associated with them, especially where no public water supply is available.

A total of five water wells were identified within a one-mile radius of the site (all east or south of the site). The information about each of the wells is summarized in Table E-3.

Table E-3
130 Environmental Park
Water Wells Within One Mile

Well ID No.	Depth (ft)	Completion Date	Completion Formation	Well Use	Longitude	Latitude	Source(s)
6703301	20	6/11/1946	Carrizo-Wilcox	Stock	97° 38' 39"	29° 58' 20"	1, 3
6703302	41	1/9/1964	Carrizo-Wilcox	Stock	97° 38' 40"	29° 58' 22"	1, 3
6703305	1855	1948	Not Determined	Unused, was an oil/gas test well	97° 38' 10"	29° 57' 56"	1, 3, 4
6703601	49	4/12/1946	Carrizo-Wilcox	Domestic	97° 38' 43"	29° 57' 25"	1, 3
6703603	26	1925	Carrizo-Wilcox	Domestic	97° 39' 05"	29° 57' 11"	1, 3

Sources:
1. Texas Water Development Board website, WIID database, *www.twdb.state.tx.us*
2. Texas Commission on Environmental Quality website *www.tceq.state.tx.us*
3. Plum Creek Conservation District website www.pccd.org
4. U.S. Geological Society database (URL: *maps.waterdata.usgs.gov/mapper/*)

4 SUBSURFACE INVESTIGATION REPORT

30 TAC §330.63(e)(4)(A)-(H)

The site was evaluated with an investigation of the geology, geotechnical properties, and hydrogeology of the site in a total of 32 borings and 17 piezometers. Based on the site characterization, a sufficient number of borings were drilled to establish subsurface site stratigraphy and to determine the geotechnical properties of the soils beneath the site. Geologic strata have been characterized to depths of more than 100 feet (bgs) deep and up to approximately 45 feet below the elevation of the deepest excavation. Based on correlation of strata identified in the borings, the uppermost aquifer and lower confining unit were identified.

Borings were drilled in accordance with the TCEQ-approved boring plan and established field exploration methods. Installation, abandonment, and plugging of borings were performed in accordance with the TCEQ rules.

4.1 Drilling Activities

4.1.1 Soil Boring Plan

A boring plan for 130 Environmental Park was approved in compliance with 30 TAC §330.63(e)(4) by a letter dated October 10, 2013 from the TCEQ (Appendix E2, Figure E2-1). A plan of the borings is shown in Appendix E2, Figure E2-2. Subsurface conditions were evaluated by examination of logs from the recent site investigation. The depths of borings range from 48 to 130 feet. In addition several shallow trenches were excavated to evaluate the shallow soil profile at the site. These excavations were backfilled immediately following observations to confirm the occurrence of pebbles and cobbles within the Stratum I clays. Descriptions of the strata encountered based on these observations and samples recovered from borings drilled on the site are included in Section 4.2.

4.1.2 Site Exploration

Borings

Field exploration activities were conducted in August and September of 2013. As a part of this investigation, 32 borings were drilled using rotary methods and sampled using Shelby tubes and split spoon samplers where appropriate Logs of borings are provided in Appendix E2, beginning on page E2-6. Sampling was continuous to depths of about 50 feet, then intermittent to the total depth of the boring. At each boring location an initial attempt was made to push Shelby tubes. In some cases where cobbles and pebbles were present it was not possible to push tubes. In those cases the material was augered through the cobble and pebble interval; usually two to four feet, but in a few borings up to six feet. Shelby tubes were pushed to the total depth of the boring or until refusal. In more than half of the borings Shelby tubes were pushed to total depth of the

boring. At refusal, split spoons were used to obtain samples. In those borings where Shelby tubes reached refusal, the depths ranged from two feet to as deep as 44 feet. Two drilling rigs were utilized and in some cases depth of refusal may have been influenced by the power of the individual rig. Groundwater was not observed in any of the borings prior to introduction of drilling fluid. All borings were drilled in accordance with the approved soil boring plan. On completion boreholes were pressure-grouted from the bottom up with bentonite grout using the tremie method where no piezometer was installed. All drilling operations were supervised by John Michael Snyder, P.G., a professional geoscientist who is familiar with the geology of the area and is licensed to practice in the state of Texas. Moisture contents and other geotechnical information for samples from these borings are included in Appendix E5.

Piezometer Installation

Seventeen piezometers were installed adjacent to 15 boring locations: BME-1, BME-4(2), BME-7(2), BME-9, BME-14, BME-16, BME-18, BME-19, BME-22, BME-24, BME-26, BME-27, BME-28, BME-31, and BME-32. Typical piezometer construction details are shown on Appendix E2, Figure E2-5. Four piezometers (P1, P9, P27 and P28) were installed using wet rotary methods. The remaining piezometers were installed using air rotary methods. Piezometer logs are provided in Appendix E2, beginning on page E2-82. Drillers reports were submitted to TDLR in accordance with the requirements of 16 TAC §76.70.

The piezometers were installed within ten feet of the corresponding boring number (e.g., P7 was installed adjacent to Boring BME-7). The original borehole was sampled and logged, then the boring was plugged and pressure grouted for the full length of the borehole, in accordance with TCEQ rules. Once piezometer screened intervals were selected, the piezometer borings were drilled and samples were observed to confirm consistency with the original boring lithologies.

Table E-4
130 Environmental Park
Summary of Borings

Boring ID	Date	Northing	Easting	Surface Elevation	Depth	Elevation at Total Depth	Above or Below (-) EDE (501 ft msl)	Page No. Appendix E2
BME Borings								
BME-01	8/26/2013	13905309.997	2392400.016	577.91	118.0	459.91	-41.09	E2-6
BME-02	8/27/2013	13905399.988	2393000.020	586.30	102.0	484.30	-16.70	E2-9
BME-03	9/5/2013	13905400.007	2393600.009	589.87	130.0	459.87	-41.13	E2-12
BME-04	9/11/2013	13905399.991	2394200.016	572.13	90.0	482.13	-18.87	E2-15
BME-05	9/10/2013	13904800.027	2391799.998	551.06	92.0	459.06	-41.94	E2-17
BME-06	9/11/2013	13904799.999	2392399.982	573.30	88.0	485.30	-15.70	E2-19
BME-07	9/7/2013	13904800.029	2392999.981	585.95	127.0	458.95	-42.05	E2-21
BME-08	8/23/2013	13904800.006	2393599.986	585.43	102.0	483.43	-17.57	E2-24

Boring ID	Date	Northing	Easting	Surface Elevation	Depth	Elevation at Total Depth	Above or Below (-) EDE (501 ft msl)	Page No. Appendix E2
BME-09	8/27/2013	13904799.985	2394199.986	569.19	110.0	459.19	-41.81	E2-27
BME-10	9/10/2013	13904199.985	2391800.017	544.19	60.0	484.19	-16.81	E2-30
BME-11	9/9/2013	13904200.029	2392400.000	561.59	102.0	459.59	-41.41	E2-32
BME-12	9/11/2013	13904199.996	2393000.023	578.89	95.0	483.89	-17.11	E2-35
BME-13	9/4/2013	13904200.019	2393600.010	571.25	112.0	459.25	-41.75	E2-37
BME-14	9/3/2013	13904200.027	2394199.984	560.99	103.0	457.99	-43.01	E2-40
BME-15	9/9/2013	13903599.996	2392399.994	560.48	77.0	483.48	-17.52	E2-43
BME-16	9/6/2013	13903599.989	2393000.008	576.02	117.0	459.02	-41.98	E2-45
BME-17	9/5/2013	13903599.999	2393600.025	571.80	90.0	481.80	-19.20	E2-48
BME-18	8/30/2013	13902999.987	2392400.021	568.07	109.0	459.07	-41.93	E2-50
BME-19	8/30/2013	13902999.992	2393000.007	573.41	89.0	484.41	-16.59	E2-53
BME-20	9/12/2013	13902999.980	2393600.004	571.35	112.0	459.35	-41.65	E2-55
BME-21	9/6/2013	13903000.000	2394200.015	554.19	70.0	484.19	-16.81	E2-58
BME-22	9/7/2013	13902399.994	2392400.022	555.51	75.0	480.51	-20.49	E2-60
BME-23	8/28/2013	13902399.987	2392999.977	565.01	106.0	459.01	-41.99	E2-62
BME-24	8/22/2013	13902399.965	2393600.026	561.86	80.0	481.86	-19.14	E2-65
BME-25	9/11/2013	13902399.988	2394200.006	547.86	89.0	458.86	-42.14	E2-67
BME-26	8/31/2013	13902399.962	2394800.006	532.72	48.0	484.72	-16.28	E2-69
BME-27	8/21/2013	13901899.990	2393000.019	549.95	92.0	457.95	-43.05	E2-70
BME-28	8/20/2013	13901900.011	2393600.016	554.73	96.0	458.73	-42.27	E2-72
BME-29	9/3/2013	13901900.027	2394199.983	536.92	54.0	482.92	-18.08	E2-74
BME-30	9/4/2013	13901899.990	2394799.988	525.19	70.0	455.19	-45.81	E2-76
BME-31	9/6/2013	13901300.002	2393600.012	543.25	85.0	458.25	-42.75	E2-78
BME-32	8/29/2013	13901299.985	2394199.984	526.12	67.0	459.12	-41.88	E2-80
Piezometers								
P-01	9/27/2013	13905309.997	2392400.016	577.91	51.0	526.91	25.91	E2-82
P-04	9/26/2013	13905399.991	2394200.016	572.13	60.5	511.63	10.63	E2-84
P-04S	9/26/2013	13905399.991	2394200.016	572.13	35.5	536.63	35.63	E2-86
P-07	9/28/2013	13904800.029	2392999.981	585.95	60.5	525.45	24.45	E2-87
P-07S	9/28/2013	13904800.029	2392999.981	585.95	35.5	550.45	49.45	E2-89
P-09	9/27/2013	13904799.985	2394199.986	569.19	48.5	520.69	19.69	E2-90
P-14	9/28/2013	13904200.027	2394199.984	560.99	86.5	474.49	-26.51	E2-91
P-16	10/2/2013	13903599.989	2393000.008	576.02	55.5	520.52	19.52	E2-93
P-18	9/26/2013	13902999.987	2392400.021	568.07	40.5	527.57	26.57	E2-95
P-19S	10/3/2013	13902999.992	2393000.007	573.41	30.5	542.91	41.91	E2-96
P-22S	10/3/2013	13902399.994	2392400.022	555.51	40.5	515.01	14.01	E2-97

Boring ID	Date	Northing	Easting	Surface Elevation	Depth	Elevation at Total Depth	Above or Below (-) EDE (501 ft msl)	Page No. Appendix E2
P-24S	10/3/2013	13902399.965	2393600.026	561.86	41.0	520.86	19.86	E2-98
P-26	10/3/2013	13902399.962	2394800.006	532.72	43.5	489.22	-11.78	E2-99
P-27	9/27/2013	13901899.990	2393000.019	549.95	48.0	501.95	.95	E2-100
P-28	9/27/2013	13901900.011	2393600.016	554.73	47.5	507.23	6.23	E2-101
P-31	10/4/2013	13901300.002	2393600.012	543.25	80.5	462.75	-38.25	E2-102
P-32	10/4/2013	13901299.985	2394199.984	526.12	49.0	477.12	-23.88	E2-104

4.2 Site Stratigraphy

The site is located on the outcrop of the Midway Group. The Midway in the area consists primarily of dense, silty, fat clay (high plasticity inorganic clay, CH), and, based on published literature, is between 400 and 600 feet thick beneath the site. The Texas Geologic Map (Figure E1-1, Barnes, 1992) shows outcropping of the Leona Formation on the site. However, the field investigation of the site, including borings, found only remnant pebbles and cobbles of an apparent alluvial terrace deposit. Within the upper two to six feet of the site borings, pebbles and cobbles and some scattered occurrences of gravel were identified near the top of the clay. These large granular materials, which appear to be remnants of a terrace deposit that has been largely eroded, have settled down into the upper clays. There are no continuous strata of cobbles, pebbles, or gravels and no occurrences of sand were observed.

The following paragraphs present the interpretation of the stratigraphy beneath the site. Eight geologic cross sections are presented in Appendix E3. These sections illustrate the stratigraphy and lithology present beneath the site. Detailed descriptions of these strata are included in the following sections.

4.2.1 Stratum I –Soil Profile – Silty Fat Clay with Pebbles and Cobbles

This stratum ranges from two to six feet thick and consists primarily of brown to tan, silty fat clay (high plasticity inorganic clay, CH) with occasional discontinuous occurrence of cobbles, pebbles and some gravel. This stratum represents the weathered clay and Leona terrace deposits that have settled into the underlying Midway clay. Granular materials occur sporadically and are not part of continuous strata, but rather appear to be a remnant veneer of a terrace deposit that has been mostly eroded and individual cobbles or pebbles have settled down into the upper parts of the clay. A horizontal laboratory permeability test (Appendix E5, page E5-21a) showing permeability of 5.9×10^{-8} cm/sec is included in Table E-11 in Section 5.6.2. Over parts of the site, the surface was disturbed as a part of the terracing constructed for erosion control by the Soil Conservation Service in approximately 1961.

4.2.2 Stratum II – Weathered Midway – Silty Fat Clay

Stratum II ranges in thickness from about 30 to 60 feet and consists of weathered silty fat clay. This clay is very hard and dense. Weathering decreases with depth. Weathering effects are indicated primarily by color from tan near the upper parts to tan

and gray and eventually to gray as it transitions to the unweathered dark gray clay below. While evidence of fracturing was not observed, evidence of slickensides was observed in only one boring, BME-24. Laboratory permeability tests indicate both horizontal and vertical permeability in Stratum II are approximately 3.7×10^{-8} cm/sec. Laboratory hydraulic conductivity worksheets for Stratum II are included in Appendix E5, as Figures E5-19, E5-22, E5-24, and E5-25.

4.2.3 Stratum III – Unweathered Midway – Silty Dark Gray Clay

Stratum III consists of hard, dense, dark gray silty fat clay. Drilling progressed slowly due to the extreme dense nature of the unweathered clay. All thirty-two borings were drilled into this clay that exists across the entire site. Up to 77 feet of the clay was encountered in borings. Laboratory permeability tests ranged from 1.1×10^{-8} cm/sec to 2.1×10^{-8} cm/sec. The arithmetic mean of permeability results in Stratum III is 1.47×10^{-8} cm/sec. Laboratory hydraulic conductivity worksheets are included in Appendix E5 as Figures E5-20, E5-21, and E5-23. Published literature (Follet, 1966 and Rasmussen, 1947) states that the Midway is 400 to 600 feet thick beneath the site. Literature also states that beneath the Midway are several hundred feet of low permeability clays, marls, and limestones of the Navarro, Taylor, Eagle Ford, and Austin formations.

Evidence of fractures or slickensides was not observed in Stratum III.**Table E-5**
130 Environmental Park
Generalized Site Stratigraphy

Geologic Unit	Lithology	Average Depth to Top of Unit (ft)	Average Thickness of Unit (ft)	Hydrogeologic Unit
Stratum I	Silty clay soil	Outcrops at Surface	4	Surficial soil
Stratum II	Weathered silty clay	4	48	Uppermost aquifer*
Stratum III	Unweathered silty dark gray clay	50	400 – 600	Aquiclude

*While not recognized as an aquifer by the Texas Water Development Board, this zone satisfies the TCEQ criteria as the uppermost aquifer for purposes of groundwater monitoring.

5 GEOTECHNICAL DATA

30 TAC §330.63(e)(5)(A)-(F)

The geotechnical properties of the subsurface materials were determined from the subsurface investigations that are described in Section 4 of this attachment. All geotechnical tests were performed by an independent third party laboratory in accordance with the industry standard practices and recognized procedures at the time the testing was performed. The geotechnical tests are described in Section 5.1 and the suitability of the soils for the intended uses is discussed in Section 5.2. The geotechnical testing was performed in accordance with 30 TAC §330.63(e)(5)(A)-(B) and is presented on the boring logs in Appendix E2 – Site Exploration Data, and in Appendix E5 – Laboratory Test Results. The groundwater data required by 30 TAC §330.63(e)(5)(C)-(E) and cross sections required by 30 TAC §330.53(e)(4)(G) are presented in Attachment E, Section 5.5, Table E-10, Table E-11, Appendix E2 – Boring Logs, and Appendix E3 – Cross Sections.

5.1 Laboratory Tests

Representative samples of each material encountered in the borings were selected for laboratory testing. A summary of the number and types of laboratory tests that were performed is shown in Table E-6.

Table E-6
130 Environmental Park
Laboratory Test Summary

Test Description	Test Method	Number of Tests
Sieve Analysis	ASTM D 1140	16
Atterberg Limits	ASTM D 4318	68
Moisture Content	ASTM D 2216	62
Unit Dry Weight	ASTM D 2937	21
Hydraulic Conductivity	ASTM D 5084	12
Consolidation	ASTM D 2435	3
Moisture Density Relationship	ASTM D 698	4
Triaxial Shear Strength	ASTM D 4767	3

Atterberg limits and sieve analyses tests were performed to classify the soils according to the Unified Soil Classification System (USCS) and to evaluate the engineering properties of the soils.

Moisture content tests were performed to develop a moisture profile and for use in the evaluation of slope stability and in the settlement and heave analysis. Unit dry weight

tests were performed on undisturbed samples for use in the evaluation of slope stability and in the settlement and heave analysis.

Hydraulic conductivity tests were performed on samples from the stratum that will form the bottom and sides of the proposed excavations and a composite sample of the probable earthfill materials. The results were used to evaluate the hydrogeologic parameters of the site and the hydraulic conductivity of compacted soil liners constructed from on-site materials.

Triaxial shear strength tests were performed on samples from the stratum that will form the bottom and sides of excavations. The results were used in the evaluation of slope stability.

5.2 Material Characteristics

The results of the laboratory tests were reviewed along with the boring logs to develop the general soil properties of the subsurface materials that will be encountered in the excavations and provide the foundation for the landfill. As shown on the cross sections in Appendix E3 of this attachment, the excavation will encounter silty clay. Material properties are provided in Appendix E5 on pages E5-1, and E5-2 and are summarized in Table E-7.

Table E-7
130 Environmental Park
Average Properties of On-Site Materials

Stratum	USCS Class	Liquid Limit %	Plastic Limit %	Plasticity Index %	Passing #200 %	Moisture Content %	Unit Dry Weight (lb/ft^3)	In situ Perm cm/sec
I	CH	68	22	46	90	NA	NA	5.9×10^{-8}
II	CH	72	28	44	95	23.9	99.7	3.8×10^{-8}
III	CH	70	28	42	96	24.8	97.8	1.5×10^{-8}

The geotechnical design calculations that are presented in Attachment D5 – Geotechnical Design, show that the in situ soils will provide adequate support for the proposed landfill. The factors of safety against slope failure exceeded the recommended factors of safety for all conditions that were analyzed.

5.3 Material Requirements

Soils will be required for construction of the soil liner and protective cover components of the liner system, and the infiltration layer and erosion layer components of the final cover system. Soils will also be required for operational cover (daily and intermediate) and general earthfill. Typical material requirements for the various landfill components are summarized in Table E-8.

The soil liner and final cover infiltration layer must be constructed from soils that can be compacted to form a low hydraulic conductivity barrier. The classification and hydraulic

conductivity test results indicate that the clayey and silty soils excavated from the site should be satisfactory for use as compacted soil liner and infiltration layer material.

Protective cover and the erosion layer soils should not contain large rocks or boulders. Operational cover soils shall not have been previously mixed with waste materials and erosion layer material shall be capable of sustaining vegetation. The test results and boring logs show that any of the soil material excavated from the site should be suitable for use as operational and protective cover, and that the surface soils should be suitable for use as the upper layer of the final cover system erosion layer.

Table E-8
130 Environmental Park
Typical Soil Requirements for Landfill Construction

Landfill Component	LL	PI	% - 200	Remolded Hydraulic Conductivity cm/sec	Material Source
Soil Liner	30 min	15 min	30 min	1×10^{-7} max	On-site
Infiltration Layer	30 min	15 min	30 min	1×10^{-5} max	
Protective Cover	No large rocks				
Erosion Layer	Suitable to support plant growth				
Operational Cover (Daily Cover, Intermediate Cover)	Not mixed with waste				
General Fill	NA	5 min	15 min	NA	

5.4 Groundwater Occurrence

5.4.1 Groundwater Observation Points – Piezometers

Groundwater observation points are summarized in Table E-9. Fifteen piezometers were installed in Stratum II weathered clay. Two piezometers were installed in the Stratum III unweathered Midway. Data from 17 piezometers and the information from borings were used to characterize site hydrogeology (see Appendix E3 for cross sections). Groundwater occurs at the interface of the Stratum II (weathered Midway) and lower permeability Stratum III (unweathered Midway). Shallow groundwater occurs as a result of infiltrating precipitation.

Details of piezometers are summarized in Table E-9. Piezometer locations are shown on Figure E2-2 of this attachment.

Table E-9
130 Environmental Park
Piezometer Well Details

Well Name	Install Date	Total Depth (ft)	Surface Elev. (ft/msl)	Top of Casing Elevation (ft msl)	Filter Pack (ft msl)		Well Screen (ft msl)		Lithology Screened
					Top El.	Bottom El.	Top El.	Bottom El.	
P1	9/27/2013	51.0	577.91	581.84	543.91	526.91	537.91	527.91	Stratum II – Clay
P4	9/26/2013	60.5	572.13	582.68	534.13	511.63	532.13	512.13	Stratum II – Clay
P4-S	9/26/2013	35.5	572.13	581.69	554.13	536.63	552.13	537.13	Stratum II – Clay
P7	9/28/2013	60.5	585.95	589.07	547.95	525.45	545.95	525.95	Stratum II – Clay
P7-S	9/28/2013	35.5	585.95	589.06	573.95	550.45	570.95	550.95	Stratum II – Clay
P9	9/27/2013	48.5	569.19	572.13	537.69	520.69	531.69	521.69	Stratum II – Clay
P14	9/28/2013	86.5	560.99	567.32	496.99	474.49	494.99	474.99	Stratum III – Clay
P16	10/2/2013	55.5	576.02	579.48	543.02	520.52	541.02	521.02	Stratum II – Clay
P18	9/26/2013	40.5	568.07	571.12	540.07	527.57	538.07	528.07	Stratum II – Clay
P19-S	10/3/2013	30.5	573.41	576.86	560.41	542.91	558.41	543.41	Stratum II – Clay
P22-S	10/3/2013	40.5	555.51	559.89	537.51	515.01	535.51	515.51	Stratum II – Clay
P24-S	10/3/2013	41.0	561.86	564.19	543.86	520.86	541.86	521.86	Stratum II – Clay
P26	10/3/2013	43.5	532.72	536.15	511.72	489.22	509.72	489.72	Stratum II – Clay
P27	9/27/2013	48.0	549.95	553.92	524.45	501.95	522.45	502.45	Stratum II – Clay
P28	9/27/2013	47.5	554.73	558.79	524.23	507.23	518.23	508.23	Stratum II – Clay
P31	10/4/2013	80.5	543.25	546.34	485.25	462.75	483.25	463.25	Stratum III – Clay
P32	10/4/2013	49.0	526.12	529.70	500.12	477.12	498.12	478.12	Stratum II - Clay

5.4.2 Water Level Measurements

Groundwater was not observed in any boring or piezometer during drilling prior to introduction of drilling fluid. Groundwater has been observed in three Stratum II piezometers (P-1, P-4 and P-32). Water level elevation data is included in Table E-10.

Table E-10
130 Environmental Park
Water Level Elevation Table – Piezometers

Date	P-1	P-4	P-4S	P-7	P-7S	P-9	P-14D	P-16	P-18	P-19S	P-22S	P-24S	P-26	P-27	P-28	P-31D	P-32
10/05/13	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
10/19/13	Dry	520.34	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	484.15
10/25/13	Dry	520.29	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	483.10
10/31/13	Dry	520.12	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	484.38
11/08/13	Dry	520.08	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	484.05
11/22/13	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	484.02
12/05/13	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	484.27
01/03/13	534.14	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	483.84
01/18/14	533.73	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	484.12
02/02/14	533.04	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	484.11
03/14/14	532.36	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	483.95
04/17/14	531.85	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	483.84
05/15/14	531.56	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	482.70
06/27/14	531.24	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	483.70
07/18/14	531.97	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	483.65
08/22/14	530.69	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	483.50
09/18/14	530.44	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	483.60
10/17/14	530.16	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	483.35

5.5 Groundwater Analytical Data

Because this site is not permitted and thus has no existing groundwater monitoring wells, there is no existing analytical data.

5.6 Site Hydrogeology

5.6.1 Hydrogeologic Units

The site is founded on the outcrop of the Midway Group. The Midway in the area consists primarily of dense, silty, fat clay (high plasticity, inorganic clay, (CH)) and based on published literature is between 400 and 600 feet thick beneath the site. Published literature shows no aquifers located beneath the site (Ashworth and Hopkins, 1995 [updated 2007]). Groundwater was observed in only three site piezometers; all screened at the interface between Stratum II and Stratum III.

Uppermost Aquifer - Stratum II – Weathered Silty Fat Clay

Groundwater occurs at the site in shallow weathered silty fat clay (Stratum II), just above its interface with the underlying Stratum III unweathered Midway, under unconfined, water table conditions. Shallow groundwater occurs in this unit from precipitation infiltration. Weathering in the clay decreases with depth, as shown on the boring logs. The lack of weathering effects in the deeper, unweathered clay (Stratum III) results in Stratum III functioning as an aquitard or lower confining unit to the groundwater in the above weathered clay, thus creating a pathway for groundwater to move at the interface of Stratum II and Stratum III. This zone of groundwater occurrence at the site is not characterized as a major or minor aquifer by the Texas Water Development Board and there are no known wells completed in this zone within one mile of the site. Groundwater in this zone does not occur in sufficient amounts to supply usable quantities to wells that could support industrial, irrigation, domestic, or livestock use. However, the volume of water observed in piezometers on the site would be sufficient for sampling and analysis in accordance with TCEQ Municipal Solid Waste rules. As a result, this zone satisfies the criteria used by the TCEQ Municipal Solid Waste Permits Section for characterization of an aquifer pursuant to those rules and, based on those criteria and rule, this zone is the uppermost aquifer at the site.

Lower Confining Unit – Stratum III

Due to the lack of weathering and the resulting lower hydraulic conductivity, as described in Section 4.2, the unweathered clay is the lower confining unit to the overlying weathered clay.

5.6.2 Hydraulic Conductivity

Limited groundwater prohibited conducting field permeability tests in site piezometers. However, flexible wall permeability tests were conducted as part of the laboratory

geotechnical tests and are included in Appendix E5 – Laboratory Tests. The calculated permeability for Stratum I is 5.9 x 10^{-8} cm/sec. Calculated permeabilities from the boring samples ranged from 5.2 x 10^{-8} cm/sec in the Stratum II weathered clay to 1.1 x 10^{-8} cm/sec in the Stratum III unweathered clay, with respective arithmetic means of 3.84 x 10^{-8} cm/sec and 1.47 x 10^{-8} cm/sec (see Table E-11).

Table E-11
130 Environmental Park
Permeability Laboratory Tests

Stratum I (cm/sec)		**Page No. in Appendix E5**
BME-3	5.9 x 10^{-8}	E5-21A
Stratum II (cm/sec)		**Page No. in Appendix E5**
BME-1	3.00 x 10^{-8}	E5-19
BME-5	2.7 x 10^{-8}	E5-22
BME-27	4.40 x 10^{-8}	E5-24
BME-28	5.20 x 10^{-8}	E5-25
Geometric Mean	3.7 x 10^{-8}	
Arithmetic Mean	3.84 x 10^{-8}	
Stratum III (cm/sec)		**Page No. in Appendix E5**
BME-2	2.10 x 10^{-8}	E5-20
BME-2	1.10 x 10^{-8}	E5-21
BME-9	1.20 x 10^{-8}	E5-23
Geometric Mean	1.4 x 10^{-8}	
Arithmetic Mean	1.47 x 10^{-8}	

Note: Permeability laboratory samples were all oriented vertically except for BME-1, which was oriented horizontally.

5.6.3 Groundwater Flow Direction and Rate

Groundwater Flow Direction

Groundwater occurs at the site at the interface of weathered clay (Stratum II) and unweathered clay (Stratum III). The groundwater monitoring network (Attachment F, Appendix F1, Figure F1-1) is designed to monitor the interface of the weathered and unweathered clay. Groundwater flow direction is influenced by the depth of weathering and the unweathered surface, which is influenced by the topography. Permeability in the clay of the Midway Group is related to the depth of weathering and is thus related to the surface topographic expression. The structural contour map of the top of the Stratum III (Figure E3-10) shows a strong resemblance to the surface topography. Groundwater flow from the site may occur to the northwest, west, southwest, south, southeast, and east.

Groundwater Flow Rate

Groundwater flow velocity, estimated by using an arithmetic mean for hydraulic conductivity from laboratory test results and site wide gradients, are estimated at approximately 0.01 to 0.04 feet per year in Stratum II. Gradient used in the velocity calculations is estimated from the Stratum III structural contour map (Figure E3-10). All input values and calculations to determine groundwater velocity are shown on the groundwater velocity calculation sheet in Appendix E6 on Figure E6-1.

5.6.3.1 Groundwater Gradient Evaluation

The facility was evaluated for site-wide groundwater gradient occurrence. The evaluation was conducted using, the Top of Stratum III Structural Contour Map. This represents the weathered-unweathered Midway interface. Due to the limited occurrence of groundwater at the site, a potentiometric surface does not exist. The Stratum III surface is used as a proxy for a groundwater surface (See Figure E3-10). Based on this evaluation, eight separate flowlines were identified that are representative of the range of gradient variability throughout the site. These flowlines are shown on new Figure E6-2. Each gradient that was determined from each of the eight flowlines is shown in Table E-12. The calculated groundwater velocities are shown in the groundwater flow velocity calculation sheet (Figure E6-1) and added to Table E-13.

Table E-12
130 Environmental Park
Hydraulic Gradient (feet/feet)

Line 1	Line 2	Line 3	Line 4	Line 5	Line 6	Line 7	Line 8
0.042	0.026	0.017	0.025	0.021	0.050	0.013	0.019

Table E-13
130 Environmental Park
Groundwater Velocity (feet/year)

Line 1	Line 2	Line 3	Line 4	Line 5	Line 6	Line 7	Line 8
0.03	0.02	0.01	0.02	0.02	0.04	0.01	0.02

6 ARID EXEMPTION

30 TAC §330.63(e)(6)

The applicant is not seeking an arid exemption for the landfill unit; therefore, 30 TAC §330.63(e)(6) is not applicable to this application.

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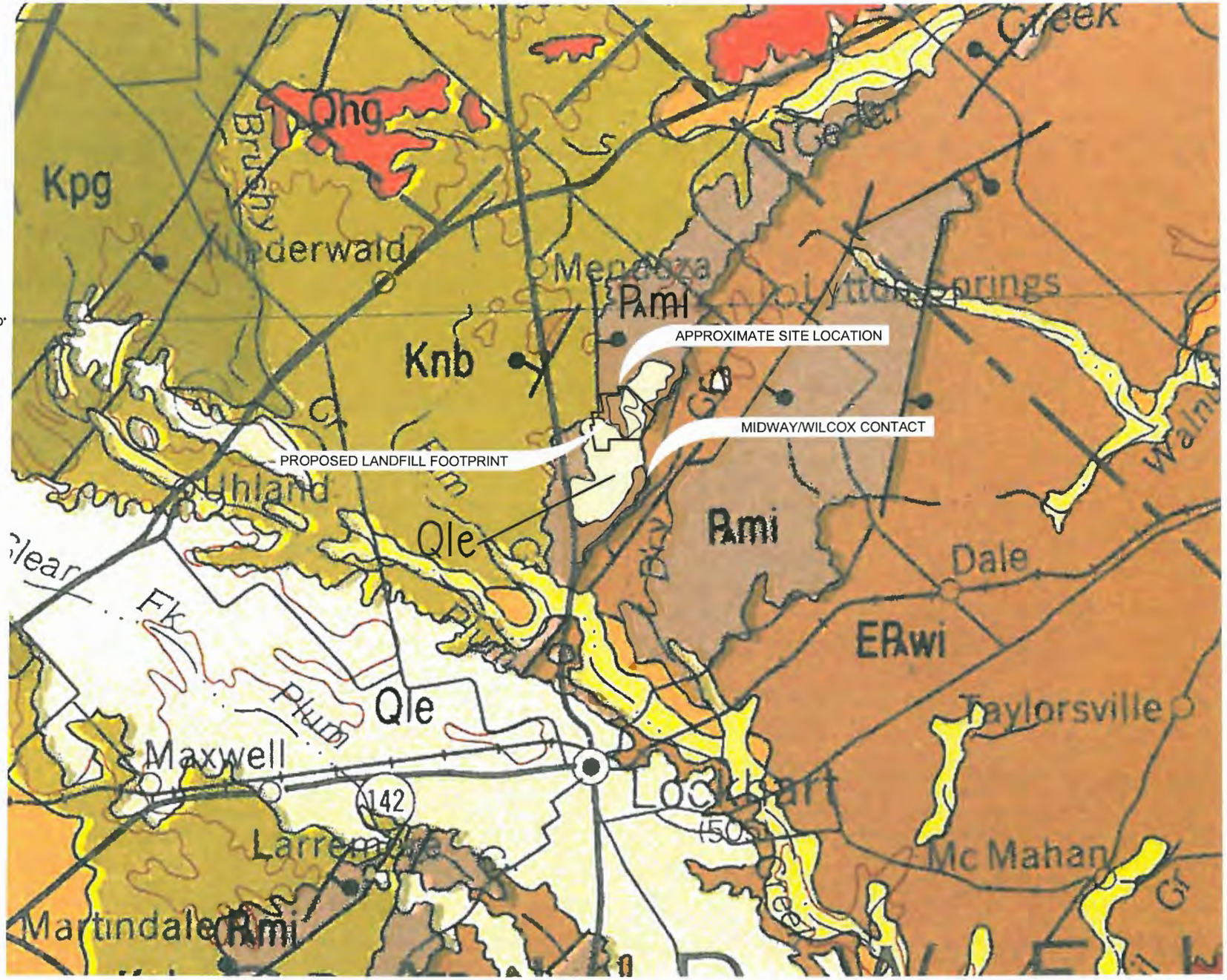
APPENDIX E1

REGIONAL GEOLOGIC/HYDROGEOLOGIC DATA

Technically Complete October 28, 2014



97°45'

DATUM IS MEAN SEA LEVEL
CONTOUR INTERVAL 200 FEET
SUPPLEMENTAL 100-FOOT CONTOUR IN COASTAL REGION

GEOLOGIC MAP OF TEXAS

1992

REFERENCE:
BARNES, V.E., 1992, GEOLOGIC MAP OF TEXAS, BUREAU OF ECONOMIC GEOLOGY, UNIVERSITY OF TEXAS, AUSTIN, TEXAS.

0 1 2
SCALE IN MILES

NOTE:

1. FOR GEOLOGIC LEGEND, SEE DRAWING E1-2 AND E1-2A.
2. MODIFIED FROM BARNES, 1992 BY ADDING:
   A. APPROXIAMTE SITE LOCATION.
   B. PROPOSED LANDFILL FOOTPRINT.
   C. MIDWAY/WILCOX CONTACT.
   D. LABELED THE PLEISTOCENE LEONA FORMATION.
   E. LABELED THE PALEOCENE MIDWAY GROUP.

STATE OF TEXAS
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REVISIONS						
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
-	10/28/14	TECHNICALLY COMPLETE	GLW	ESF	JMS	JMS

GEOLOGIC VICINITY MAP
CALDWELL COUNTY

130 ENVIRONMENTAL PARK, LLC
130 ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
MANSFIELD • WICHITA FALLS
817-563-1144
TBPE FIRM NO. F-256 TBPG FIRM NO. 50222

DSN. ESF	DATE : 6/13	FIGURE	
DWN. GLW	SCALE : GRAPHIC	E1-1	
CHK. JMS	DWG : E1_1_GenVin.dwg		

J:\129\06 130 Park\101\Att\E1_1_GenVin.dwg Layout: E1-1 User: scundiff

QUATERNARY

Holocene

Qs | Qds | Qsd | Qsu

Sand sheet, Qs ; dune sand sheet, Qds ; sand dune, Qsd ; and sand deposits, undivided, Qsu

Qal | Qaf

Alluvium, Qal ; and alkali flat deposits, Qaf

Holocene & Pleistocene

Qt | Qf | Qc | Qgy | Qls | Qb | Qp | Qu

Terrace, Qt , alluvial fan, Qf , caliche, Qc , gypsite, Qgy , land slide, Qls bolson, Qb , and playa, Qp , deposits; and Quaternary deposits, undivided, Qu

Pleistocene

Qle | Qo | Qse | Qli | Qg | Qt | Qbd | Qta | Qdl | Qtu | Qun | Qao | Qhg

Leona Formation, Qle ; Onion Creek Marl, Qo ; Seymour, Qse , *Lingos, Qli , and Gatuna, Qg , Formations; Toy Limestone, Qtl , Blackwater Draw, Qbd , Tahoka, Qta , Double Lakes, Qdl , and Tule, Qtu , Formations; pond, Qun , older alluvial, Qao , and high gravel, Qhg , deposits

QTb | QT | QTu

Quaternary-Tertiary bolson deposits, QTb ; Quaternary-Tertiary deposits, undivided, QT ; and Uvalde Gravel, QTu

Pliocene

Pob | Por | Pou

Blanco, Pob , and Rita Blanca, Por , Formations; and unnamed Pliocene deposits, Pou

Pogl

Ogallala Formation

Miocene

Mg

Goliad Formation

TERTIARY

Fill and spoil

Qs | Qds | Qsd | Qsi | Qcd

Sand sheet, Qs ; dune sand sheet, Qds ; sand dune, Qsd ; silt sheet, Qsi ; and clay dune, Qcd

Qal | Qac | Qas | Qbr

Alluvium, Qal , subdivided in Rio Grande delta into areas predominantly clay, Qac , and areas predominantly sand, Qas ; and beach-ridge and barrier-flat sand deposits, Qbr

Qt | Qd | Qd?

Terrace deposits, Qt ; and Deweyville Formation, Qd , with higher level, Qd?

Qbc | Qbs | Qbv | Qbb

Beaumont Formation subdivided into areas predominantly clay, Qbc , areas predominantly sand, Qbs , in the Rio Grande delta area clay veneer over meanderbelt sand, Qbv , and barrier island deposits, Qbb

Ql

Lissie Formation

Qhg

High gravel deposits

Pow

Willis Formation

Mg

Goliad Formation

TERTIARY

Miocene

M-fo

Fleming Formation and Oakville Sandstone, undivided

Oligocene

Øcf | Øc | Øf

Catahoula Formation and Frio Clay, undivided, Øcf , Catahoula Formation, Øc ; and Frio Clay, Øf

Eocene

ØEj | ØEw | Ejl | Em | Ewb | Eca

Jackson Group, undivided, ØEj ; Whitsett Formation, ØEw ; Manning, Wellborn, and Cadell Formations, undivided, Ejl; Manning, Em , Wellborn, Ewb , and Cadell, Eca , Formations

Ey

Yegua Formation

Ecm | Es

Laredo Formation, El ; Cook Mountain Formation, Ecm ; and Sparta Sand, Es

Eep | Ew | Eqc

El Pico Clay, Eep ; Weches Formation, Ew ; and Queen City Sand, Eqc

Eb | Er

Bigford, Eb , and Reklaw, Er , Formations

TERTIARY

M-fo | M-f

Fleming Formation and Oakville Sandstone, undivided, M-fo ; Fleming Formation, M-f ; and Oakville Sandstone, M-o

Øc

Catahoula Formation

ØEw | Øn

Whitsett, ØEw , and Nash Creek, Øn , Formations

Em | Eya | Ewb

Manning, Em , Wellborn, Ewb , and Yazoo, Eya , Formations

Eca | Emb

Cadell, Eca , and Moodys Branch, Emb , Formations

Ey

Yegua Formation

Ecm

Cook Mountain Formation

Es

Sparta Sand

Ew

Weches Formation

Eqc

Queen City Sand

REFERENCE:
BARNES, V.E., 1992, GEOLOGIC MAP OF TEXAS, BUREAU OF ECONOMIC GEOLOGY, UNIVERSITY OF TEXAS, AUSTIN, TEXAS.

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REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
–	10/28/14	TECHNICALLY COMPLETE	GLW	ESF	JMS	JMS

GEOLOGIC VICINITY MAP LEGEND

130 ENVIRONMENTAL PARK, LLC
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CONSULTING ENGINEERS
MANSFIELD • WICHITA FALLS
817–563–1144

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DSN. ESF | DATE : 6/13
DWN. GLW | SCALE : GRAPHIC
CHK. JMS | DWG : E1_1_GenVin.dwg

FIGURE E1–2

J:\129\06 130 Park\101\Ath\E\E1_1_GenVin.dwg Layout: E1–2 User: scundiff

Eocene

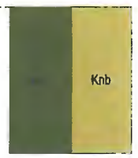
Paleocene

Upper Cretaceous

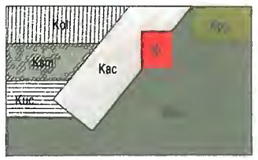
Carrizo Sand

Indio Formation, ERin ; and Wilcox Group, undivided, ERwi

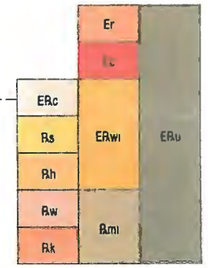
Kincaid Formation, Rk ; and Midway Group, undivided, Rmi



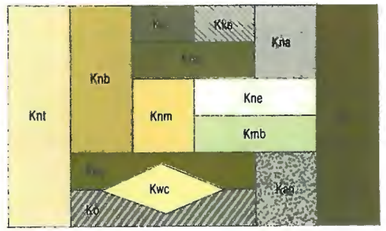
Escondido Formation, Kes ; and Navarro Group and Marlbrook Marl, undivided, Knb



Olmos, Kol , and San Miguel, Ksm , Formations; Upson Clay, Kuc; Anacacho Limestone, Kac; Pecan Gap, Kpg, and Austin, Kau, Chalks; and igneous rocks of Austin age, Ki



Reklaw Formation, Er; Carrizo Sand, Ec; Calvert Bluff, ERc , Simsboro, Rs , and Hooper, Rh , Formations; Wilcox Group, undivided, ERwi ; Wills Point, Rw , and Kincaid, Rk , Formations; Midway Group, undivided, Rmi ; and Reklaw Formation, Carrizo Sand, and Wilcox and Midway Groups, undivided, ERu



Navarro and Taylor Groups, undivided, Knt; Navarro Group and Marlbrook Marl, undivided, Knb ; Kemp Clay and Corsicana Marl, undivided, Kkc ; Kemp Clay, Kke ; Nacatoch Sand, Kns ; Navarro Group, undivided, Kna ; Neylandville and Marlbrook Marls, undivided, Knm ; Neylandville Marl, Kne ; Marlbrook Marl, Kmb ; Pecan Gap Chalk, Kpg ; Wolfe City Sand, Kwc ; Ozan Formation, Ko ; Annona Chalk, Kan ; and Upper Cretaceous rocks, undivided, Ku

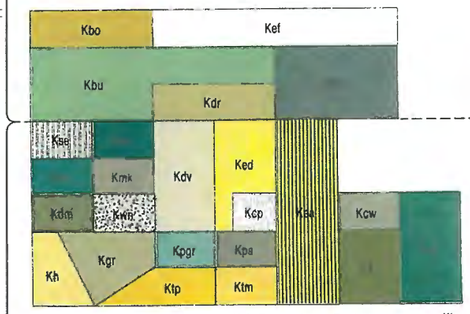
Austin Chalk, Kau ; Gober Chalk and Roxton Limestone, Kgc ; Brownstown Marl, Kbr ; Blossom Sand, Kbl ; Bonham Formation, Kbn ; Ector Chalk, Ker ; and Upper Cretaceous rocks, undivided, Ku

Upper Cretaceous

TERTIARY

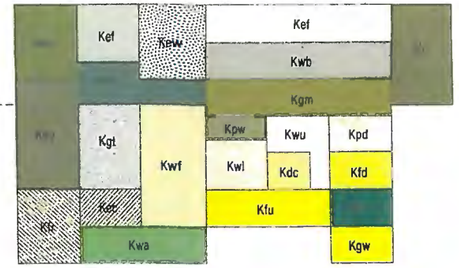
Lower Cretaceous

CRETACEOUS

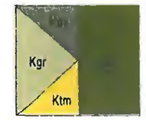


Boquillas, Kbo , and Eagle Ford, Kef, Formations; Buda Limestone, Kbu; Del Rio Clay, Kdr ; Buda Limestone and Del Rio Clay, undivided, Kbd; Santa Elena Limestone, Kse ; Salmon Peak Limestone, Ksa ; Sue Peaks Formation, Ksu ; McKnight Formation, Kmk ; Del Carmen Limestone, Kdm; West Nueces Formation, Kwn ; Devils River, Kdv , Edwards, Ked , and Comanche Peak, Kcp , Limestones; Hensell Sand, Kh; Glen Rose Limestone, Kgr ; Paluxy Sand and Glen Rose Limestone, undivided, Kpgr; Paluxy Sand, Kpa ; Travis Peak Formation, Ktp ; Twin Mountains Formation, Ktm ; Edwards Limestone and Antlers Sand, undivided, Kea ; Comanche Peak Limestone and Walnut Clay, undivided, Kcw ; Antlers Sand, Ka ; and Comanche Peak Limestone, Walnut Clay, and Antlers Sand, undivided, Kca

Cow Creek Limestone, Hammett Shale, and Sycamore Sand, undivided



Eagle Ford Formation and Buda Limestone, undivided, Keb ; Eagle Ford Formation, Kef ; Eagle Ford and Woodbine Formations, undivided, Kew ; Woodbine Formation, Kwb ; Del Rio Clay and Georgetown Limestone, undivided, Kdg ; Buda Limestone and Del Rio Clay, undivided, Kbd ; Grayson Marl and Main Street Limestone, undivided, Kgm ; Georgetown Limestone, Kgt ; Pawpaw Formation and upper limestone unit of Weno Limestone, undivided, Kpw ; lower part of Washita Group, Kwl ; undivided part of Washita Group, Kwu ; Duck Creek Limestone, Kdc ; Pawpaw Formation, Weno Limestone, and Denton Clay, undivided, Kpd ; Fort Worth Limestone and Duck Creek Formation, undivided, Kfd ; Fredericksburg Group, Kfr ; Edwards and Comanche Peak Limestones, undivided, Kec ; Walnut Clay, Kwa ; undivided parts of Washita and Fredericksburg Groups, Kwf ; undivided part of Fredericksburg Group, Kfu , Kiamichi Formation, Kki ; Goodland Limestone and Walnut Clay, undivided, Kgw ; and Upper Cretaceous rocks, undivided, Ku



Paluxy Sand, Kpa ; Glen Rose Limestone, Kgr ; Twin Mountains Formation, Ktm ; and Antlers Sand, Ka

Fault

Ball shows downthrown side

GEOLOGIC MAP OF TEXAS

1992

REFERENCE:
BARNES, V.E., 1992, GEOLOGIC MAP OF TEXAS, BUREAU OF ECONOMIC GEOLOGY, UNIVERSITY OF TEXAS, AUSTIN, TEXAS.

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REVISIONS						
–	10/28/14	TECHNICALLY COMPLETE	GLW	ESF	JMS	JMS
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

GEOLOGIC VICINITY MAP LEGEND

130 ENVIRONMENTAL PARK, LLC
130 ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
MANSFIELD • WICHITA FALLS
817–563–1144
TBPE FIRM NO. F–256 | TBPG FIRM NO. 50222

DSN. ESF	DATE : 6/13	FIGURE
DWN. GLW	SCALE : GRAPHIC	E1–2A
CHK. JMS	DWG : E1_1_GenVin.dwg	

A

A'

BU-67-02-508

BU-67-03-704

APPROXIMATE SITE LOCATION (PROJECTED INTO LINE OF SECTION)

BU-67-12-109

BU-67-12-201

BU-67-12-310

BU-67-13-104

BU-67-13-610

BU-67-13-611

Caldwell Co.

Gonzales Co.

W. V. Hardin
S. T. Robinson No. 1

Leona Formation

Approximate Land Surface

Weches Greensand

Navarro Group

Midway Group

Wilcox Group

Carrizo Sand

Queen City Sand

Reklaw Formation

Taylor Marl, Austin Chalk, and Eagle Ford Shale, undifferentiated

Washita Group

Edwards Limestone

Taylor Marl, Austin Chalk, and Eagle Ford Shale, undifferentiated

Taylor Marl, Austin Chalk, and Eagle Ford Shale, undifferentiated

Midway Group

Navarro Group

Sea Level

600
400
200
200
400
600
800
1000
1200
1400
1600
1800
2000
2200

Altitude, in feet

APPROXIMATE SITE LOCATION

A

A'

0 1 2 3 4 miles

For location of section see Plate 1

CALWELL COUNTY

REFERENCE:
C.R. FOLLET, 1975, GROUND-WATER RESOURCES OF CALDWELL COUNTY, TEXAS, TEXAS WATER DEVELOPMENT BOARD REPORT 12

Plate 2

Geologic Section A-A'

U.S Geological Survey in cooperation with the Texas Water Development Board, Caldwell County Commissioners' Court and Guadalupe-Blanco River Authority

STATE OF TEXAS
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REVISIONS						
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
–	10/28/14	TECHNICALLY COMPLETE	GLW	ESF	JMS	JMS

GENERALIZED REGIONAL GEOLOGIC CROSS SECTION

130 ENVIRONMENTAL PARK, LLC
130 ENVIRONMENTAL PARK
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CONSULTING ENGINEERS
MANSFIELD • WICHITA FALLS
817-563-1144

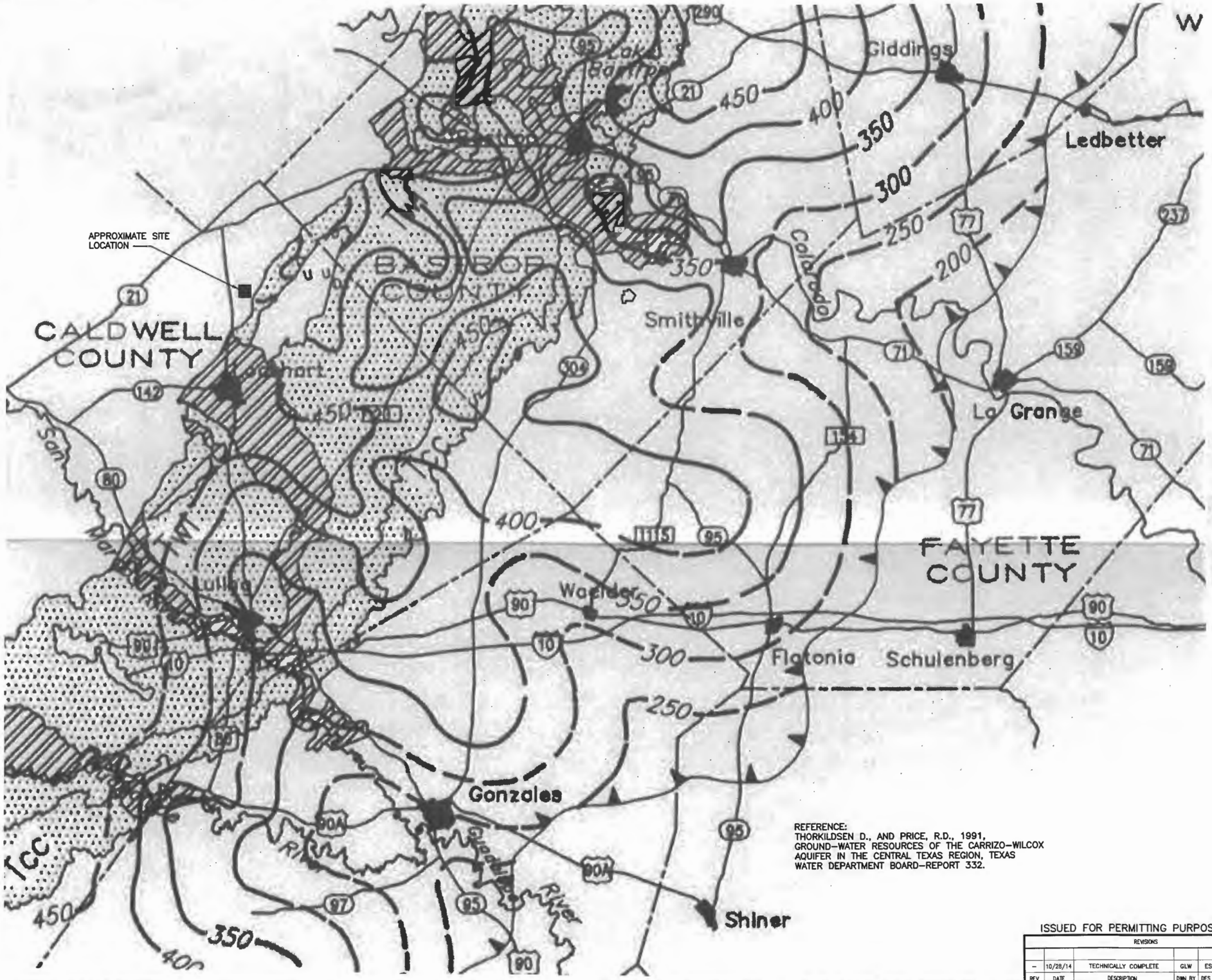
TBPE FIRM NO. F-256 | TBPG FIRM NO. 50222

DSN. ESF | DATE : 10/13 | FIGURE E1-3

DWN. GLW | SCALE : GRAPHIC

CHK. JMS | DWG : E1_3_GenCS.dwg

J:\129\06 130 Park\101\Atte\E1_3_GenCS.dwg Layout: E1-3 User: scundiff



0 3 6
SCALE IN MILES

EXPLANATION

- Quaternary to Recent alluvial and fluviatile deposits (shown only in areas near the outcrop trend of the Carrizo Formation and Wilcox Group)
- Tcz — Carrizo Formation
- Twlc — Calvert Bluff Formation of the Wilcox Group
- Twls — Simsboro Formation of the Wilcox Group
- Twlh — Hooper Formation of the Wilcox Group
- Twl — Wilcox Group undifferentiated
- U/D — Fault, dashed where approximate; U, upthrown side; D, downthrown side
- Approximate downdip limit of slightly saline water (less than 3,000 milligrams per liter dissolved solids) in the Carrizo–Wilcox aquifer.
- 400 — Line showing approximate altitude of water levels in the Carrizo–Wilcox aquifer. Dashed where control is absent or limited. (interval is 50 feet)

REFERENCE:
THORKILDSEN D., AND PRICE, R.D., 1991, GROUND–WATER RESOURCES OF THE CARRIZO–WILCOX AQUIFER IN THE CENTRAL TEXAS REGION, TEXAS WATER DEPARTMENT BOARD–REPORT 332.

STATE OF TEXAS
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11-6-2014

REIGIONAL POTENTIOMETRIC SURFACE MAP OF THE CARRIZO–WILCOX AQUIFER

130 ENVIRONMENTAL PARK, LLC
130 ENVIRONMENTAL PARK
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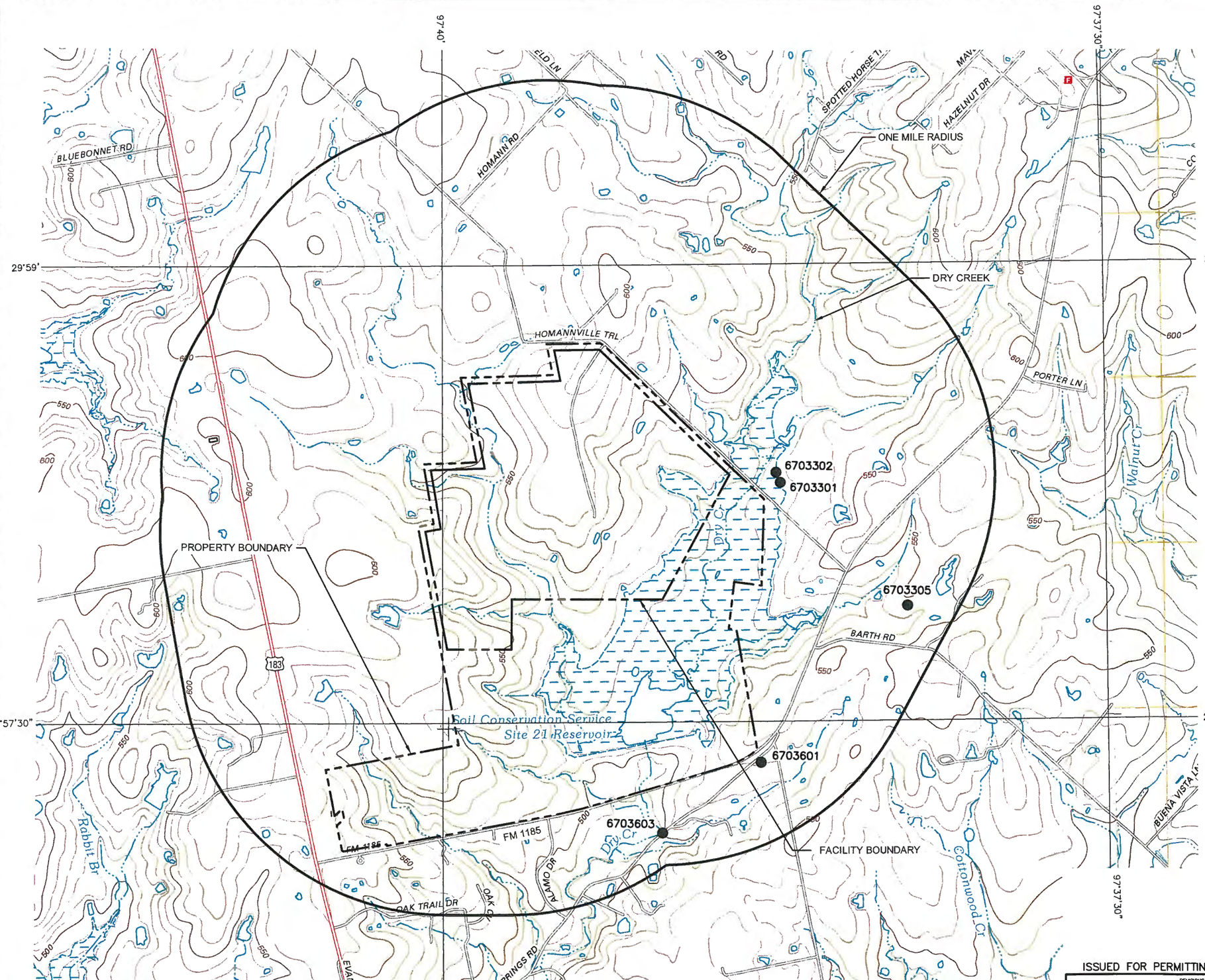
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
–	10/28/14	TECHNICALLY COMPLETE	GLW	ESF	JMS	JMS

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
MANSFIELD • WICHITA FALLS
817–563–1144
TBPE FIRM NO. F–256 TBPG FIRM NO. 50222

DSN. ESF DATE : 10/13
DWN. GLW SCALE : GRAPHIC
CHK. JMS DWG : E1_4_CarWil.dwg

FIGURE E1–4

J:\129\06 130 Park\101\Att\E1_4_CarWil.dwg Layout: E1–4 User: scundiff



0 1000 2000
SCALE IN FEET

LEGEND

- PROPERTY BOUNDARY
- FACILITY BOUNDARY
- ONE MILE RADIUS
- SURFACE WATER BODY OR OTHER WATER
- 6703301 WATER WELL

NOTES:

1. TOPOGRAPHIC BASE MAP IS US TOPO 2013 OF 7.5 MINUTE QUADRANGLE LOCKHART NORTH, TX AND DALE, TX DOWNLOADED FROM USGS WEBSITE ON JUNE 10, 2013. IMAGERY DATE IS MAY 2010.
2. THERE ARE NO SPRINGS LOCATED WITHIN ONE MILE OF THE FACILITY BOUNDARY.
3. WATER WELLS IDENTIFIED FROM ONLINE STATE RECORDS INCLUDING TEXAS WATER DEVELOPMENT BOARD, TEXAS COMMISION ON ENVIRONMENTAL QUALITY, PLUM CREEK CONSERVATION DISTRICT AND U.S. GEOLOGICAL SOCIETY.

WATER WELLS WITHIN ONE MILE	
MAP ID	STATE ID
6703301	6703301
6703302	6703302
6703305	6703305
6703601	6703601
6703603	6703603

STATE OF TEXAS
JOHN MICHAEL SNYDER
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ISSUED FOR PERMITTING PURPOSES ONLY

REVISIONS						
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
–	10/28/14	TECHNICALLY COMPLETE	GLW	ESF	JMS	JMS

WATER WELL LOCATION MAP

130 ENVIRONMENTAL PARK, LLC
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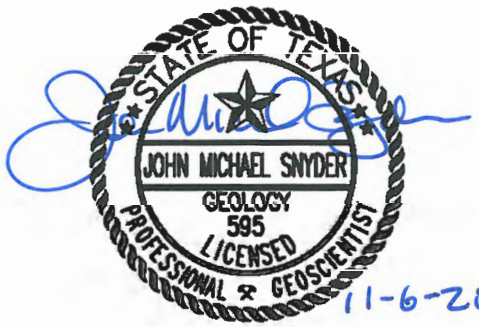
DSN.	ESF	DATE : 10/13	FIGURE
DWN.	GLW	SCALE : GRAPHIC	E1–5
CHK.	JMS	DWG : E1_5WatWells.dwg	

J:\129\06 130 Park\101\Atte\E1_5WatWells.dwg Layout: E1-5 User: scundiff

APPENDIX E2

SITE EXPLORATION DATA



11-6-2014

Biggs & Mathews Environmental, Inc.
Firm Registration No. 50222

Technically Complete October 28, 2014

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

October 10, 2013

Mr. Ernest Kaufmann
President and Manager
130 Environmental Park, LLC
132Riverstone Terrace, Suite 103
Canton, Georgia 30114-1703

Re: Proposed 130 Environmental Park Type I MSW Facility – Caldwell County
Municipal Solid Waste
Proposed Site Investigation
Tracking Nos. 17451139, 17476013, 17481154, and 17488682

Dear Mr. Kaufmann:

On September 4, 2013, we received a soil boring plan (SBP) dated August 30, 2013, for the proposed municipal solid waste landfill facility referenced above. On September 19, 2013, September 24, 2013, and September 26, 2013, we received revisions to the SBP dated September 16, 2013, September 23, 2013, and September 25, 2013, respectively, in response to our letter dated September 13, 2013. The original SBP and revisions were submitted on your behalf by Mr. Michael Snyder, P.G., of Biggs & Mathews Environmental, Mansfield, Texas.

The SBP proposes 32 borings to characterize an anticipated 208-acre landfill area. Seventeen borings will be drilled to an elevation at least 30 feet deeper than the elevation of the deepest excavation (EDE, anticipated to be 493 feet above mean sea level, in a leachate sump). The other 15 borings will be drilled to an elevation at least 5 feet deeper than the EDE. Our review of the revised plan indicates that it complies with the municipal solid waste (MSW) regulations. This letter constitutes approval of your plan.

Please be advised that under Title 30 Texas Administrative Code, Chapter 330, Section 330.63(e)(4)(B), borings must be deep enough to identify the uppermost aquifer and underlying hydraulically interconnected aquifers, as well as the aquiclude at the lower boundary. It is anticipated that this SBP, when implemented, will accurately characterize the in-situ geologic, hydrologic, and engineering properties of the surface and subsurface strata at this site. Although this plan appears to comply with the MSW regulations concerning site investigations, additional soil borings and piezometers could be required if the data generated by this SBP is inconclusive.

If you should find it necessary to modify this approved plan, another plan detailing the proposed modifications must be submitted for approval before implementing the modifications.

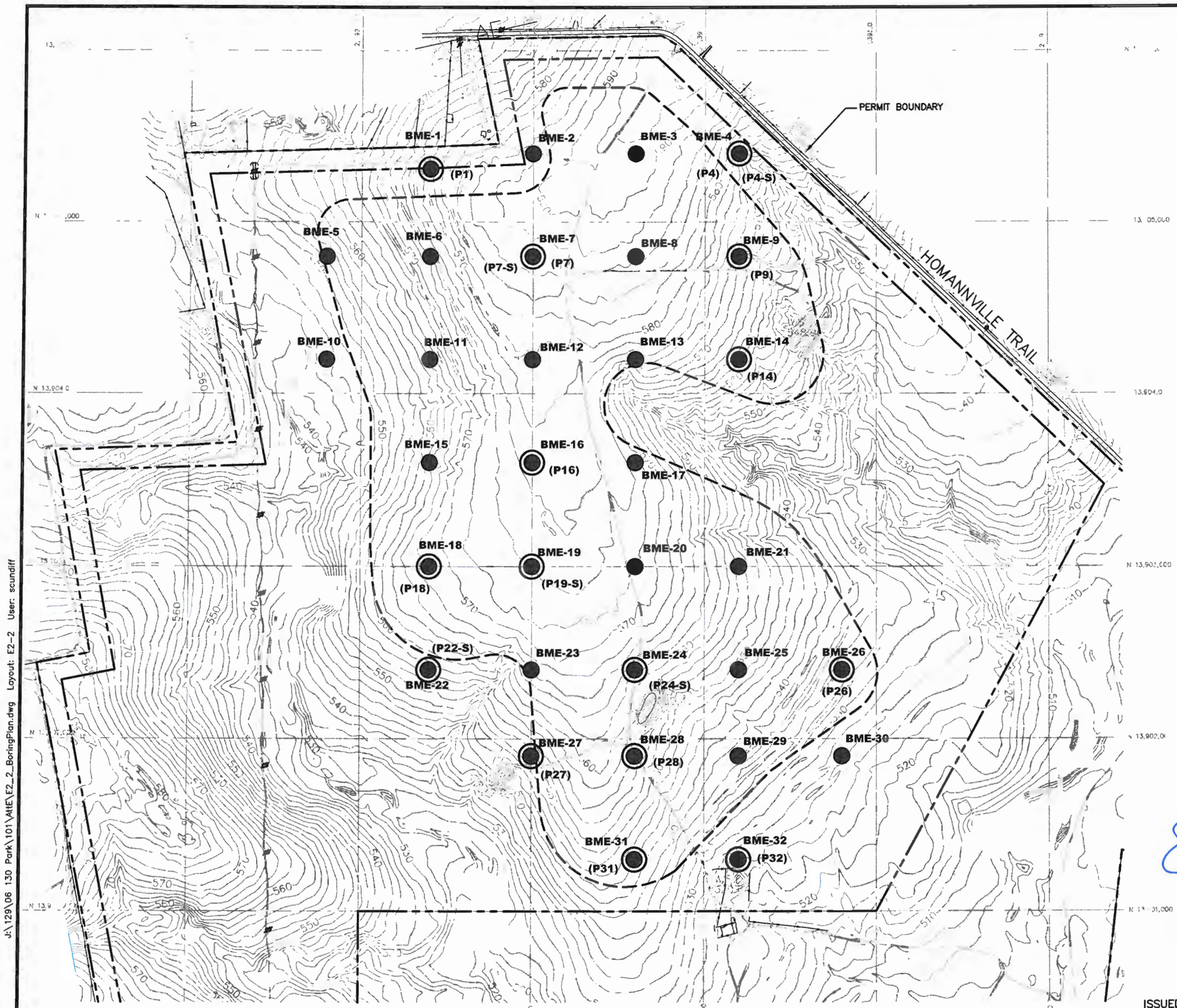
If you have questions regarding this letter, please contact me by telephone at (512) 239-4419, or in writing at the address on our letterhead (please include mail code MC 124 on the first line of our address).

Sincerely,

Arten J. Avakian, P.G., Project Manager
Municipal Solid Waste Permits Section
Waste Permits Division

AJA/dp

cc: Mr. Michael Snyder, P.G., Biggs & Mathews Environmental, Mansfield



LEGEND

- PROPERTY BOUNDARY
- FACILITY BOUNDARY
- LANDFILL FOOTPRINT
- 5' CONTOUR INTERVAL
- BME-12 — BORING
- BME-9 (P9) — BORING AND PIEZOMETER
- BME-19 (P19-S) — BORING AND PIEZOMETER (SCREENED SHALLOW WITHIN STRATUM II)

NOTES:

1. CONTOURS AND ELEVATIONS PROVIDED BY DALLAS AERIAL SERVICE FROM AERIAL PHOTOGRAPHY FLOWN MAY 13, 2013. HORIZONTAL DATUM IS TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE (NAD 83). ELEVATIONS ARE RELATIVE TO NAVD88 – GEOID 12A.
2. A PIEZOMETER WITH AN "S" DESIGNATION INDICATES A PIEZOMETER WITH A "SHALLOW" SCREEN (HIGHER IN THE SECTION) WITHIN STRATUM II THAN THE TYPICAL STRATUM II PIEZOMETERS, WHICH ARE SCREENED IN THE LOWER PART OF THE STRATUM II SECTION AT THE INTERFACE OF STRATA II AND III.

STATE OF TEXAS
JOHN MICHAEL SNYDER
GEOLOGY
595
LICENSED
PROFESSIONAL GEOSCIENTIST

11-6-2014

ISSUED FOR PERMITTING PURPOSES ONLY

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
–	10/28/14	TECHNICALLY COMPLETE	GLW	ESF	JMS	JMS

BORING AND PIEZOMETER LOCATION PLAN

130 ENVIRONMENTAL PARK, LLC
130 ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
MANSFIELD • WICHITA FALLS
817-563-1144

TBPE FIRM NO. F-256 | TBPG FIRM NO. 50222

DSN. JMS	DATE : 11/13	FIGURE	
DWN. GLW	SCALE : GRAPHIC	E2-2	
CHK. ESF	DWG : E2_2_BoringPlan.dwg		

J:\129\06 130 Park\101\Attl\E2_2_BoringPlan.dwg Layout: E2-2 User: scundiff

UNIFIED SOIL CLASSIFICATION SYSTEM CHART

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)			
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)	GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)	SW	Well-graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)			
SILTS AND CLAYS Liquid limit less than 50%		ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils

LABORATORY CLASSIFICATION CRITERIA

GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limits above "A" line with P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.
SC	Atterberg limits above "A" line with P.I. greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than Nc. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent ..... GW, GP, SW, SP
More than 12 percent ..... GM, GC, SM, SC
5 to 12 percent ..... Borderline cases requiring dual symbols

PLASTICITY CHART

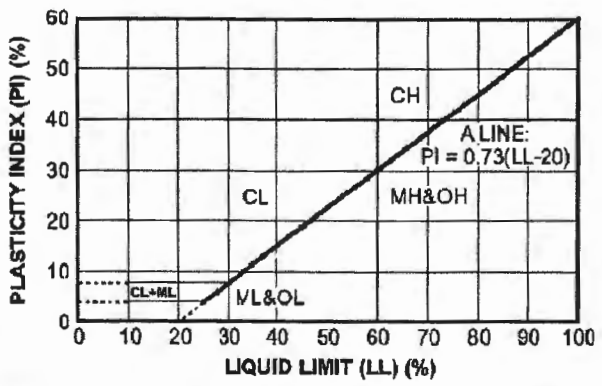
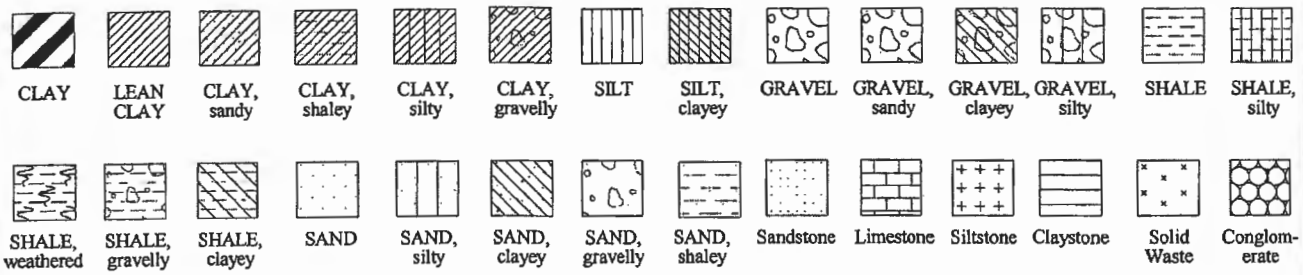


Figure E2-3
Technically Complete October 28, 2014

KEY TO SOIL CLASSIFICATION TERMS AND SYMBOLS

SOIL OR ROCK TYPES (shown in symbols column)



DRILLING AND SAMPLING SYMBOLS:

A	Auger Sample
C	Double Tube Core Barrel
D	Denison Sample
S	Split Barrel Sampler - 2" O.D., unless otherwise noted Example: 25 = 25 blows/12" after 6" seating interval; 50/7 = 50 blows per 7" after 6" seating interval; REF = 50 blows <6"
T	THD Cone Penetrometer Example: T60 = 60 blows per 12" T4.5" = 100 blows per 4.5"
U	Thin-walled Tube - 3" O.D., unless otherwise noted
W	Wash Sample
PB	Pitcher Barrel

RELATIVE DENSITY OF COARSE-GRAINED SOILS

Penetration Resistance Blows/foot	Relative Density
0 - 4	Very loose
4 - 10	Loose
10 - 30	Medium dense
30 - 50	Dense
Over 50	Very dense

CONSISTENCY OF FINE-GRAINED SOILS

Unconfined Compressive Strength, Qu, tsf	Consistency
Less than 0.25	Very soft
0.25 to 0.50	Soft
0.50 to 1.00	Firm
1.00 to 2.00	Stiff
2.00 to 4.00	Very stiff
4.00 and higher	Hard

TERMS CHARACTERIZING SOIL STRUCTURE:

Slickensided:	Having inclined planes of weakness that are slick and glossy in appearance.
Fissured:	Containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical.
Laminated:	Composed of thin layers of varying color and texture.
Interbedded:	Composed of alternate layers of different soil types.
Calcareous:	Containing appreciable quantities of calcium carbonate.
Well graded:	Having wide range in grain sizes and substantial amounts of all intermediate particle sizes.
Poorly graded:	Predominantly of one grain size, or having a range of sizes with some intermediate size missing.

DEGREE OF WEATHERING:

Unweathered:	Rock in its natural state before being exposed to atmospheric agents.
Slightly weathered:	Noted predominantly by color change with no disintegrated zones.
Weathered:	Complete color change with zones of slightly decomposed rock.
Severely weathered:	Complete color change with consistency, texture, and general appearance approaching soil.

SUBSURFACE CONDITIONS:

Soil and rock descriptions on the boring logs are a compilation of field data as well as from laboratory testing of samples on those strata for which laboratory classification test results are presented on the boring logs. These classifications are based only on the actual samples tested, and the classification is then assigned to the remainder of the stratum interval based on visual classification. If laboratory classification test results are not presented on the boring log for a particular stratum, then that stratum was classified by visual-manual procedures only. The stratification lines represent the approximate boundary between materials and the transition can be gradual.

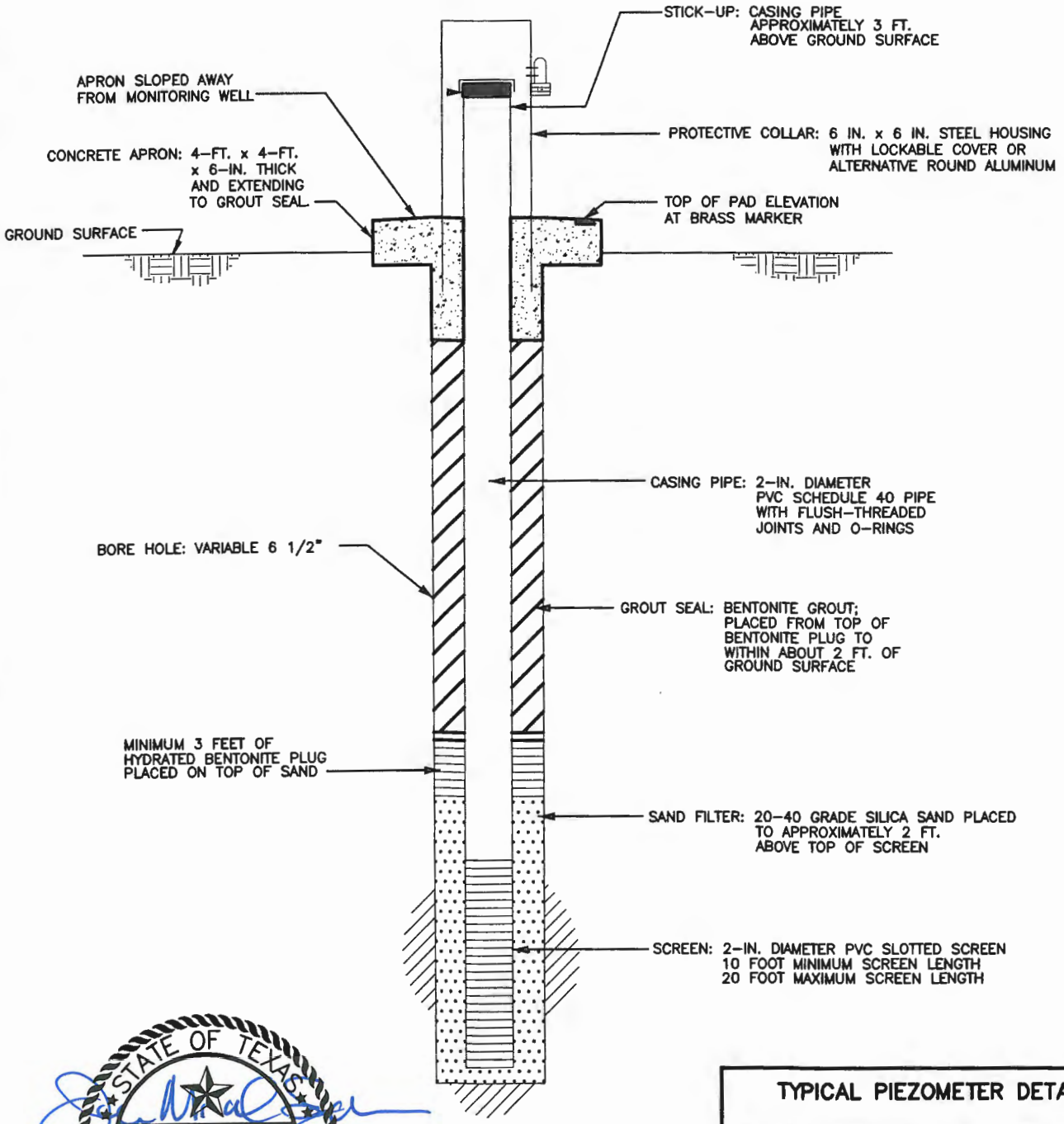
Classification of soils based upon visual-manual procedures was performed in general accordance with ASTM Standard D 2488. Classification of soils based upon laboratory test results was performed in general accordance with ASTM Standard D 2487.

Water-level observations have been made in the borings at the times indicated. It must be noted that fluctuations in the groundwater level may occur due to variations in rainfall, hydraulic conductivity of soil strata, construction activity, and other factors.

ELEVATIONS:

Elevation of contact or bottom of borings/piezometers is shown on the right side of the material description column.

Figure E2-4
Technically Complete October 28, 2014



STATE OF TEXAS
JOHN MICHAEL SNYDER
GEOLOGY
595
LICENSED
PROFESSIONAL GEOSCIENTIST

11-6-2014

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TYPICAL PIEZOMETER DETAIL

130 ENVIRONMENTAL PARK, LLC
130 ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
MANSFIELD • WICHITA FALLS
817-563-1144

REVISIONS						
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
–	10/28/14	TECHNICALLY COMPLETE	GLW	ESF	JMS	JMS

DSN. ESF	DATE : 11/13	FIGURE
DWN. GLW	SCALE : GRAPHIC	E2-5
CHK. JMS	DWG : E2-5_PiezDe.dwg	

LOG OF BORING NO. BME-01

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392400.016 N 13905309.997**

Surface El.: **577.91 ft. msl**
Completion Depth: **118.0 ft.**
Date Boring Started: **8/26/13**
Date Boring Completed: **8/26/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)							
	A2									
5	A3		571.91							
	A4		CLAY, SILTY, tan and brown, hard, w/ferrous stains and calcareous nodules, moist, (CH)							
	U5			4.5+						
10	U6			4.5+	28.6	88.9	75	32	43	96
	U7			4.5+						
	U8			4.5+						
15	U9			4.5+						
	U10			4.5+	28.3	94.0	72	31	41	81
20	U11			4.5+						
	U12			4.5+						
25	U13			4.5+						
	U14			4.5+	24.9	98.8	70	29	41	87
	U15			4.5+						
30	U16		- w/silt partings	4.5+						
	U17		543.91	4.5+						
35	U18		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH)	4.5+						
	U19			4.5+	28.9	95.8	74	31	43	92
	U20			4.5+						
40	U21			4.5+						
	U22			4.5+						
45	U23			4.5+						
	U24			4.5+	32.9	85.7	84	36	48	85
	U25		528.91	4.5+						
50			CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)							

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

Continued Next Page

LOG OF BORING NO. BME-01

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392400.016 N 13905309.997**

Surface El.: **577.91 ft. msl**
Completion Depth: **118.0 ft.**
Date Boring Started: **8/26/13**
Date Boring Completed: **8/26/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH) *(continued)*							
	U26			4.5+						
55										
	U27			4.5+						
60										
	U28			4.5+						
65										
	U29			4.5+						
70										
	U30			4.5+						
75										
	U31			4.5+						
80										
	U32		- w/silt partings	4.5						
85										
	U33			4.5+						
90										
	U34			4.5+						
95										
	U35			4.5+						
100										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

Continued Next Page

LOG OF BORING NO. BME-01

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392400.016 N 13905309.997**

Surface El.: **577.91 ft. msl**
Completion Depth: **118.0 ft.**
Date Boring Started: **8/26/13**
Date Boring Completed: **8/26/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH) *(continued)*							
	S36			4.5+						
105										
	S37			4.5+						
110										
115										
	S38			4.5+						
			459.91							
120										
125										
130										
135										
140										
145										
150										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

LOG OF BORING NO. BME-02

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393000.020 N 13905399.988**

Surface El.: **586.30 ft. msl**
Completion Depth: **102.0 ft.**
Date Boring Started: **8/27/13**
Date Boring Completed: **8/27/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)							
	A2		582.30							
5	U3		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH)	4.5+						
	U4			4.5+						
	U5			4.5+						
10	U6			4.5+						
	U7			4.5+						
15	U8			4.5+						
	U9			4.5+						
	U10			4.5+						
20	U11			4.5+						
	U12			4.5+						
25	U13			4.5+						
	U14			4.5+						
	U15			4.5+						
30	U16			4.5+						
	U17			4.5+						
35	U18			4.5+						
	U19			4.5+						
	U20			4.5+						
40	U21			4.5+						
	U22			4.5+						
45	U23			4.5+						
	U24			4.5+						
50	U25			4.5+						

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 60'.

BME LOG_FORMATED FOR 130 EP_130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

LOG OF BORING NO. BME-02
PAGE 1 OF 3

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

Continued Next Page

LOG OF BORING NO. BME-02

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393000.020 N 13905399.988**

Surface El.: **586.30 ft. msl**
Completion Depth: **102.0 ft.**
Date Boring Started: **8/27/13**
Date Boring Completed: **8/27/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	U26		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH) *(continued)*							
	U27			4.5+						
55	U28									
	U29									
	U30			4.5+						
60										
	U31			4.5+						
65										
	U32			4.5+						
70			516.30 CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)							
	U33			4.5+						
75										
	U34			4.5+	23.6	90.1	86	37	49	98
80										
	U35			4.5+						
85										
	U36			4.5+						
90										
	U37			4.5+						
95										
	U38			4.5+	24.7	103.0	70	32	38	89
100										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 60'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

Continued Next Page

LOG OF BORING NO. BME-02

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393000.020 N 13905399.988**

Surface El.: **586.30 ft. msl**
Completion Depth: **102.0 ft.**
Date Boring Started: **8/27/13**
Date Boring Completed: **8/27/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	U38		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH) *(continued)* 484.30	4.5+						
105										
110										
115										
120										
125										
130										
135										
140										
145										
150										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 60'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

LOG OF BORING NO. BME-03

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393600.009 N 13905400.007**

Surface El.: **589.87 ft. msl**
Completion Depth: **130.0 ft.**
Date Boring Started: **9/5/13**
Date Boring Completed: **9/5/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	U1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)	4.5+						
	U2		585.87	4.5+			62	16	46	
5	U3		CLAY, SILTY, tan and brown, hard, w/ferrous stains and calcareous nodules, moist, (CH)	4.5+						
	U4			4.5+						
	U5			4.5+						
10	U6			4.5+						
	U7			4.5+						
15	U8			4.5+						
	U9			4.5+						
	U10			4.5+						
20	U11			4.5+						
	U12			4.5+						
25	U13			4.5+						
	U14			4.5+	24.6	96.8	75	28	47	97
	U15		559.87	4.5+						
30	U16		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH)	4.5+						
	U17			4.5+						
	U18			4.5+						
35	U19			4.5+						
	U20			4.5+						
40	U21		- w/small shell fragments	4.5+						
	U22			4.5+						
45	U23			4.5+						
	U24			4.5+						
50	U25			4.5+						

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

LOG OF BORING NO. BME-03

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393600.009 N 13905400.007**

Surface El.: **589.87 ft. msl**
Completion Depth: **130.0 ft.**
Date Boring Started: **9/5/13**
Date Boring Completed: **9/5/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH) *(continued)*							
			536.87							
55	U26		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)	4.5+						
60	U27			4.5+						
65	U28			4.5+						
70	U29				27.2	91.6	67	32	35	95
75	U30									
80	U31			4.5+						
85	U32			4.5+						
90	U33			4.5+						
95	U34			4.5+						
100	U35			4.5+						

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-03

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393600.009 N 13905400.007**

Surface El.: **589.87 ft. msl**
Completion Depth: **130.0 ft.**
Date Boring Started: **9/5/13**
Date Boring Completed: **9/5/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH) *(continued)*							
105	U36			4.5+						
110	U37			4.5+						
115	U38			4.5+	23.6		57	28	29	92
120	U39			4.5+						
125	U40			4.5+						
130	U41		459.87	4.5+						
135										
140										
145										
150										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

LOG OF BORING NO. BME-04

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2394200.016 N 13905399.991**

Surface El.: **572.13 ft. msl**
Completion Depth: **90.0 ft.**
Date Boring Started: **9/11/13**
Date Boring Completed: **9/11/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)							
			570.13							
	U2		CLAY, SILTY, tan and brown, hard, w/ferrous stains and calcareous nodules, moist, (CH)	4.5+						
5	U3			4.5+						
	U4			4.5+						
	U5			4.5+						
10	U6			4.5+						
	U7			4.5+						
15	U8		- w/trace gypsum	4.5+						
	U9			4.5+						
	U10			4.5+						
20	U11			4.5+						
	U12			4.5+						
25	U13		- w/trace gypsum	4.5+						
	U14			4.5+						
	U15		- w/trace gypsum	4.5+						
30	U16			4.5+						
	U17			4.5+						
			538.13							
35	U18		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH)	4.5+						
	U19			4.5+						
	U20		- w/small shell fragments	4.5+						
40	U21			4.5+						
	U22			4.5+						
45	U23			4.5+						
	U24		- w/small shell fragments	4.5+						
	U25			4.5+						
50										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

Continued Next Page

LOG OF BORING NO. BME-04

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2394200.016 N 13905399.991**

Surface El.: **572.13 ft. msl**
Completion Depth: **90.0 ft.**
Date Boring Started: **9/11/13**
Date Boring Completed: **9/11/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH) *(continued)*							
55	U26			4.5+						
	U27			4.5+						
60			511.13							
			CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)							
	U28			4.5+						
65										
	U29			4.5+						
70										
	U30			4.5+						
75										
	U31		- w/trace silt partings	4.5+						
80										
	U32									
85										
	U33									
90			482.13							
95										
100										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

LOG OF BORING NO. BME-05

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2391799.998 N 13904800.027**

Surface El.: **551.06 ft. msl**
Completion Depth: **92.0 ft.**
Date Boring Started: **9/10/13**
Date Boring Completed: **9/10/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)							
			549.06							
	U2		CLAY, SILTY, tan and brown, hard, w/ferrous stains and calcareous nodules, moist, (CH)	4.5+						
5	U3			4.5+						
	U4			4.5+						
	U5			4.5+						
10	U6		- w/trace gypsum	4.5+						
	U7			4.5+						
15	U8			4.5+						
	U9			4.5+						
	U10		- w/silt partings	4.5+	31.5		87	36	51	97
20	U11			4.5+						
	U12			4.5+						
			527.06							
25	U13		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH)	4.5+						
	U14			4.5+						
	U15			4.5+						
30	U16			4.5+						
	U17			4.5+						
35	U18			4.5+	28.6	95.9	75	34	41	97
	U19			4.5+						
	U20			4.5+						
40	U21			4.5+						
	U22			4.5+						
45	U23			4.5+						
	U24			4.5+						
			502.06							
	U25		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)	4.5+						
50										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Spilt Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-05

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2391799.998 N 13904800.027**

Surface El.: **551.06 ft. msl**
Completion Depth: **92.0 ft.**
Date Boring Started: **9/10/13**
Date Boring Completed: **9/10/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH) *(continued)*							
55	U26		- w/silt partings	4.5+						
60	U27			4.5+						
65	U28			4.5+						
70	U29			4.5+						
75	U30			4.5+						
80	U31			4.5+						
85	U32			4.5+						
90	U33		- w/silt partings	4.5+						
			459.06							
95										
100										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Spilt Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

LOG OF BORING NO. BME-06

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392399.982 N 13904799.999**

Surface El.: **573.30 ft. msl**
Completion Depth: **88.0 ft.**
Date Boring Started: **9/10/13**
Date Boring Completed: **9/11/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)							
	S2		570.30	4.5+						
			CLAY, SILTY, tan and brown, hard, w/ferrous stains, moist, (CH)							
5	S3			4.5+						
	S4			4.5+						
	S5			4.5+						
			563.30							
10	S6		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH)	4.5+						
	S7			4.5+						
15	S8			4.5+						
	S9			4.5+						
	S10			4.5+						
20	S11			4.5+						
	S12			4.5+						
25	S13			4.5+						
	S14			4.5+						
	S15			4.5+						
30	S16			4.5+						
	S17			4.5+						
35	S18			4.5+						
	S19			4.5+						
	S20			4.5+						
40	S21			4.5+						
	S22			4.5+						
45	S23		- w/small shell fragments	4.5+						
	S24			4.5+						
	S25			4.5+						
50										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-06

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392399.982 N 13904799.999**

Surface El.: **573.30 ft. msl**
Completion Depth: **88.0 ft.**
Date Boring Started: **9/10/13**
Date Boring Completed: **9/11/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH) *(continued)*							
			520.30							
55	S26		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)	4.5+						
60	S27			4.5+						
65	S28			4.5+						
70	S29			4.5+						
75	S30			4.5+						
80	S31			4.5+						
85	S32									
			485.30							
90										
95										
100										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries.
In situ, the transition may be gradual.

LOG OF BORING NO. BME-07

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392999.981 N 13904800.029**

Surface El.: **585.95 ft. msl**
Completion Depth: **127.0 ft.**
Date Boring Started: **9/6/13**
Date Boring Completed: **9/7/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	U1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)	4.5+						
	U2		581.95	4.5+						
5	U3		CLAY, SILTY, tan and brown, hard, w/ferrous stains, calcareous nodules and traces of gypsum, moist, (CH)	4.5+						
	U4			4.5+						
	U5			4.5+						
10	U6			4.5+						
	U7			4.5+						
15	U8			4.5+						
	U9			4.5+						
	U10			4.5+	27.5		84	32	52	99
20	U11			4.5+						
	U12			4.5+						
25	U13			4.5+						
	U14			4.5+						
	U15			4.5+						
30	U16			4.5+						
	U17		- w/silt partings	4.5+						
35	U18			4.5+						
	U19			4.5+						
	U20			4.5+						
40	U21			4.5+						
	U22		- w/small shell fragments	4.5+						
45	U23			4.5+						
	U24			4.5+						
50	U25			4.5+						

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-07

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392999.981 N 13904800.029**

Surface El.: **585.95 ft. msl**
Completion Depth: **127.0 ft.**
Date Boring Started: **9/6/13**
Date Boring Completed: **9/7/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
55	U26		CLAY, SILTY, tan and brown, hard, w/ferrous stains, calcareous nodules and traces of gypsum, moist, (CH) *(continued)*	4.5+						
			530.95							
			CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH)							
60	U27			4.5+						
			524.95							
			CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)							
65	U28			4.5+						
70	U29			4.5+						
75	U30			4.5+						
80	U31			4.5+						
85	U32			4.5+						
90	U33			4.5+						
95	U34			4.5+						
100	U35			4.5+						

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-07

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392999.981 N 13904800.029**

Surface El.: **585.95 ft. msl**
Completion Depth: **127.0 ft.**
Date Boring Started: **9/6/13**
Date Boring Completed: **9/7/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH) *(continued)*							
	U36			4.5+						
105										
	U37			4.5+						
110										
	U38			4.5+						
115										
	U39			4.5+						
120										
	U40			4.5+						
125	U41			4.5+						
			458.95							
130										
135										
140										
145										
150										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

LOG OF BORING NO. BME-08

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393599.986 N 13904800.006**

Surface El.: **585.43 ft. msl**
Completion Depth: **102.0 ft.**
Date Boring Started: **8/22/13**
Date Boring Completed: **8/23/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)	4.5+						
	A2			4.5+						
			581.43							
5	A3		CLAY, SILTY, tan and brown, hard, w/ferrous stains, moist, (CH)	4.5+						
	S4			4.5+						
	S5			4.5+						
			575.43							
10	S6		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH)	4.5+	28.3		83	34	49	100
	S7			4.5+						
15	S8			4.5+						
	S9			4.5+						
	S10			4.5+	28.5		78	32	46	100
20	S11			4.5+						
	S12			4.5+						
25	S13			4.5+						
	S14			4.5+						
	S15			4.5+						
30	S16			4.5+	30.3		81	29	52	99
	S17			4.5+						
35	S18			4.5+						
	S19			4.5+						
	S20			4.5+						
40	S21			4.5+	28.9		79	28	51	99
	S22			4.5+						
45	S23			4.5+						
	S24			4.5+						
50	S25			4.5+	28.9		70	26	44	94

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Spilt Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 54'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

Continued Next Page

LOG OF BORING NO. BME-08

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393599.986 N 13904800.006**

Surface El.: **585.43 ft. msl**
Completion Depth: **102.0 ft.**
Date Boring Started: **8/22/13**
Date Boring Completed: **8/23/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	S26		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH) *(continued)* 533.43	4.5+						
	S27		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)	4.5+	26.2		77	27	50	99
55										
	S28			4.5+						
60										
	S29			4.5+						
65										
	S30			4.5+						
70										
	S31			4.5+						
75										
	S32			4.5+						
80										
	S33			4.5+						
85										
	S34			4.5+						
90										
	S35			4.5+						
95										
	S36			4.5+						
100										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Spilt Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 54'.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-08

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393599.986 N 13904800.006**

Surface El.: **585.43 ft. msl**
Completion Depth: **102.0 ft.**
Date Boring Started: **8/22/13**
Date Boring Completed: **8/23/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	S37		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH) *(continued)* 483.43	4.5+						
105										
110										
115										
120										
125										
130										
135										
140										
145										
150										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Spilt Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 54'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

LOG OF BORING NO. BME-09

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2394199.986 N 13904799.985**

Surface El.: **569.19 ft. msl**
Completion Depth: **110.0 ft.**
Date Boring Started: **8/27/13**
Date Boring Completed: **8/27/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)							
	A2									
5	A3		564.19							
	U4		CLAY, SILTY, tan and brown, hard, w/ferrous stains, moist, (CH)	4.5+						
	U5			4.5+						
10	U6			4.5+						
	U7			4.5+						
15	U8			4.5+						
	U9			4.5+						
	U10			4.5+	25.2		75	30	45	98
20	U11			4.5+						
	U12		545.19	4.5+						
25	U13		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH)	4.5+						
	U14			4.5+						
	U15			4.5+						
30	U16			4.5+						
	U17			4.5+						
35	U18			4.5+						
	U19			4.5+						
	U20			4.5+	23.2	102.7	76	27	49	99
40	U21			4.5+						
	U22			4.5+						
45	U23			4.5+						
	U24			4.5+						
50	U25		519.19	4.5+						

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG_FORMATED FOR 130 EP_130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-09

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2394199.986 N 13904799.985**

Surface El.: **569.19 ft. msl**
Completion Depth: **110.0 ft.**
Date Boring Started: **8/27/13**
Date Boring Completed: **8/27/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
55	U26		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)	4.5+						
	U27									
60	U28									
	U29									
65	U30									
70	U31									
75	U32			4.5+						
80	U33			4.5+						
85	U34			4.5+						
90	U35			4.5+						
95	U36			4.5+	22.4	100.2	65	28	37	87
100										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-09

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2394199.986 N 13904799.985**

Surface El.: **569.19 ft. msl**
Completion Depth: **110.0 ft.**
Date Boring Started: **8/27/13**
Date Boring Completed: **8/27/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
105	U37		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH) *(continued)*	4.5+						
	U38			4.5+						
110			459.19							
115										
120										
125										
130										
135										
140										
145										
150										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries.
In situ, the transition may be gradual.

LOG OF BORING NO. BME-10

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Project Description: **130 Environmental Park**
Lockhart, Texas

Location: **E 2391800.017 N 13904199.985**

Surface El.: **544.19 ft. msl**
Completion Depth: **60.0 ft.**
Date Boring Started: **9/10/13**
Date Boring Completed: **9/10/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)							
	U2			4.5+						
5	S3			4.5+						
			538.19							
	S4		CLAY, SILTY, gray and tan mottled, hard, limonitic, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH)	4.5+						
	S5			4.5+						
10	S6			4.5+						
	S7			4.5+						
15	S8			4.5+						
	S9			4.5+						
	S10			4.5+						
20	S11			4.5+						
	S12			4.5+						
25	S13			4.5+						
	S14			4.5+						
	S15			4.5+						
30	S16			4.5+						
	S17			4.5+						
35	S18			4.5+						
	S19			4.5+						
	S20			4.5+						
40	S21			4.5+						
	S22			4.5+						
			499.19							
45	S23		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)	4.5+						
	S24			4.5+						
50	S25			4.5+						

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Spilt Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed during the drilling of this boring and no water was added during drilling.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-10

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2391800.017 N 13904199.985**

Surface El.: **544.19 ft. msl**
Completion Depth: **60.0 ft.**
Date Boring Started: **9/10/13**
Date Boring Completed: **9/10/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
55	S26		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH) *(continued)*	4.5+						
60	S27		484.19	4.5+						
65										
70										
75										
80										
85										
90										
95										
100										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Spilt Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed during the drilling of this boring and no water was added during drilling.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

LOG OF BORING NO. BME-11

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392400.000 N 13904200.029**

Surface El.: **561.59 ft. msl**
Completion Depth: **102.0 ft.**
Date Boring Started: **9/9/13**
Date Boring Completed: **9/9/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)							
	U2		557.59	4.5+						
5	U3		CLAY, SILTY, tan and brown, hard, w/ferrous stains, moist, (CH)	4.5+						
	U4			4.5+	21.9					
	U5			4.5+						
10	U6			4.5+						
	U7			4.5+						
15	U8		- w/silt partings	4.5+						
	U9			4.5+						
	U10			4.5+						
20	U11			4.5+						
	U12			4.5+						
25	U13			4.5+						
	U14			4.5+						
	U15		531.59	4.5+						
30	U16		CLAY, SILTY, gray and tan mottled, hard, limonitic, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH)	4.5+						
	U17			4.5+						
35	U18		- w/small shell fragments	4.5+	27.6		80	32	48	98
	U19			4.5+						
	U20			4.5+						
40	U21			4.5+						
	U22			4.5+						
45	U23			4.5+						
	U24									
	U25									
50										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 60 feet.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

LOG OF BORING NO. BME-11
PAGE 1 OF 3

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-11

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392400.000 N 13904200.029**

Surface El.: **561.59 ft. msl**
Completion Depth: **102.0 ft.**
Date Boring Started: **9/9/13**
Date Boring Completed: **9/9/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	U26		CLAY, SILTY, gray and tan mottled, hard, limonitic, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH) *(continued)*	4.5+						
	U27			4.5+						
55	U28		506.59 CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)	4.5+						
	U29			4.5+	23.8		62	29	33	89
	U30			4.5+						
60										
	U31			4.5+						
65										
	U32			4.5+						
70										
	U33			4.5+						
75										
	U34			4.5+						
80										
	U35			4.5+						
85										
	U36			4.5+						
90										
	U37			4.5+						
95										
	U38			4.5+						
100										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 60 feet.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-11

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392400.000 N 13904200.029**

Surface El.: **561.59 ft. msl**
Completion Depth: **102.0 ft.**
Date Boring Started: **9/9/13**
Date Boring Completed: **9/9/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	U39		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH) *(continued)* 459.59	4.5+						
105										
110										
115										
120										
125										
130										
135										
140										
145										
150										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 60 feet.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

LOG OF BORING NO. BME-12

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393000.023 N 13904199.996**

Surface El.: **578.89 ft. msl**
Completion Depth: **95.0 ft.**
Date Boring Started: **9/11/13**
Date Boring Completed: **9/11/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)							
	A2									
5	U3		572.89	4.5+						
	U4		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains, calcareous nodules, and traces of gypsum, slightly blocky, moist, (CH)	4.5+						
	U5			4.5+						
10	U6			4.5+						
	U7			4.5+						
15	U8			4.5+						
	U9			4.5+						
	U10			4.5+						
20	U11			4.5+						
	U12			4.5+						
25	U13									
	U14		- limonitic	4.5+						
	U15			4.5+	24.8	102.8				
30	U16									
	U17			4.5+						
35	U18		- w/shell fragments	4.5+						
	U19			4.5+						
	U20		- w/shell fragments	4.5+						
40	U21			4.5+						
	U22			4.5+						
45	U23			4.5+						
	U24			4.5+						
	U25			4.5+						
50										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-12

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393000.023 N 13904199.996**

Surface El.: **578.89 ft. msl**
Completion Depth: **95.0 ft.**
Date Boring Started: **9/11/13**
Date Boring Completed: **9/11/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains, calcareous nodules, and traces of gypsum, slightly blocky, moist, (CH) *(continued)*							
55	U26			4.5+						
60	U27		- w/small shell fragments	4.5+						
65	U28			4.5+						
			512.39							
70	U29		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)	4.5+						
75	U30			4.5+						
80	U31			4.5+						
85	U32		- w/silt partings	4.5+						
90	U33			4.5+						
95	U34			4.5+						
			483.89							
100										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

LOG OF BORING NO. BME-13

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393600.010 N 13904200.019**

Surface El.: **571.25 ft. msl**
Completion Depth: **112.0 ft.**
Date Boring Started: **9/4/13**
Date Boring Completed: **9/4/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)	4.5+						
			569.25							
	A2		CLAY, SILTY, tan and brown, hard, w/ferrous stains and calcareous nodules, moist, (CH)	4.5+						
5	U3			4.5+						
	U4			4.5+						
	U5			4.5+	23.4	95.7	86	29	57	100
10	U6			4.5+						
	U7			4.5+						
			557.25							
15	U8		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH)	4.5+						
	U9			4.5+						
	U10			4.5+						
20	U11			4.5+						
	U12			4.5+						
25										
	U14		- w/small shell fragments	4.5+						
	U15			4.5+						
30	U16			4.5+						
	U17			4.5+						
35	U18			4.5+						
	U19			4.5+						
	U20			4.5+						
40	U21		- w/small shell fragments	4.5+						
	U22			4.5+						
45	U23			4.5+						
	U24		- w/small shell fragments	4.5+						
	U25			4.5+						
50										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-13

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393600.010 N 13904200.019**

Surface El.: **571.25 ft. msl**
Completion Depth: **112.0 ft.**
Date Boring Started: **9/4/13**
Date Boring Completed: **9/4/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH) *(continued)*							
55	U26			4.5+						
60	U27		- w/small shell fragments	4.5+						
			509.25							
			CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)							
65	U28			4.5+						
70	U29			4.5+						
75	U30			4.5+						
80	U31			4.5+						
85	U32			4.5+						
90	U33			4.5+						
95	U34			4.5+						
100	U35			4.5+						

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-13

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393600.010 N 13904200.019**

Surface El.: **571.25 ft. msl**
Completion Depth: **112.0 ft.**
Date Boring Started: **9/4/13**
Date Boring Completed: **9/4/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH) *(continued)*							
105	U36			4.5+						
110	U37			4.5+						
			459.25							
115										
120										
125										
130										
135										
140										
145										
150										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

LOG OF BORING NO. BME-14

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2394199.984 N 13904200.027**

Surface El.: **560.99 ft. msl**
Completion Depth: **103.0 ft.**
Date Boring Started: **9/3/13**
Date Boring Completed: **9/3/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	U1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)	4.5+						
	U2		556.99	4.5+						
5	U3		CLAY, SILTY, tan and brown, hard, w/ferrous stains and calcareous nodules, moist, (CH)	4.5+						
	U4			4.5+						
	U5			4.5+						
10	U6			4.5+						
	U7			4.5+						
15	U8			4.5+						
	U9			4.5+						
	U10			4.5+						
20	U11			4.5+						
	U12			4.5+						
	U13		535.99	4.5+						
25	U14		CLAY, SILTY, gray and tan mottled, hard, limonitic, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH)	4.5+						
	U15			4.5+						
30	U16			4.5+						
	U17			4.5+						
35	U18			4.5+						
	U19			4.5+						
	U20			4.5+						
40	U21			4.5+						
	U22			4.5+						
45	U23			4.5+						
	U24			4.5+						
50	U25			4.5+						

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

LOG OF BORING NO. BME-14

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2394199.984 N 13904200.027**

Surface El.: **560.99 ft. msl**
Completion Depth: **103.0 ft.**
Date Boring Started: **9/3/13**
Date Boring Completed: **9/3/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			CLAY, SILTY, gray and tan mottled, hard, limonitic, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH) *(continued)*							
55	U26			4.5+						
			503.99							
			CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)							
60	U27			4.5+						
	U28			4.5+						
65										
	U29			4.5+						
70										
	U30			4.5+	21.8	104.1	68	24	44	97
75										
	U31			4.5+						
80										
	U32			4.5+						
85										
	U33			4.5+						
90										
	U34			4.5+						
95										
	U35			4.5+						
100										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

LOG OF BORING NO. BME-14

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2394199.984 N 13904200.027**

Surface El.: **560.99 ft. msl**
Completion Depth: **103.0 ft.**
Date Boring Started: **9/3/13**
Date Boring Completed: **9/3/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	U36		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH) *(continued)*	4.5+						
			457.99							
105										
110										
115										
120										
125										
130										
135										
140										
145										
150										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

LOG OF BORING NO. BME-15

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392399.994 N 13903599.996**

Surface El.: **560.48 ft. msl**
Completion Depth: **77.0 ft.**
Date Boring Started: **9/9/13**
Date Boring Completed: **9/9/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)	4.5+						
			558.48							
	U2		CLAY, SILTY, tan and brown, hard, w/ferrous stains and calcareous nodules, moist, (CH)	4.5+						
5	S3			4.5+						
	U4			4.5+						
			552.48							
	U5		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains, calcareous nodules and traces of gypsum, slightly blocky, moist, (CH)	4.5+						
10	U6			4.5+						
	U7			4.5+						
15	U8			4.5+						
	U9			4.5+						
	U10			4.5+						
20	U11			4.5+						
	U12			4.5+						
25										
	S14			4.5+						
	S15			4.5+						
30	S16			4.5+						
	S17		- w/shell fragments	4.5+						
35	S18			4.5+						
	S19			4.5+						
	S20			4.5+						
40	S21			4.5+						
	S22			4.5+						
45	S23			4.5+						
	S24		- w/silt partings	4.5+						
50	S25			4.5+						

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-15

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392399.994 N 13903599.996**

Surface El.: **560.48 ft. msl**
Completion Depth: **77.0 ft.**
Date Boring Started: **9/9/13**
Date Boring Completed: **9/9/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			509.48							
			CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)							
55	S26			4.5+						
60	S27			4.5+						
65	S28			4.5+						
70	S29			4.5+						
75	S30			4.5+						
			483.48							
80										
85										
90										
95										
100										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

LOG OF BORING NO. BME-15
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The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

LOG OF BORING NO. BME-16

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393000.008 N 13903599.989**

Surface El.: **576.02 ft. msl**
Completion Depth: **117.0 ft.**
Date Boring Started: **9/6/13**
Date Boring Completed: **9/6/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)							
			574.02							
	U2		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH)	4.5+						
5	U3			4.5+						
	U4			4.5+						
	U5			4.5+						
10	U6			4.5+						
	U7			4.5+						
15	U8			4.5+	25.8	99.8	84	29	55	97
	U9			4.5+						
	U10			4.5+						
20	U11			4.5+						
	U12			4.5+						
25	U13			4.5+						
	U14			4.5+						
	U15			4.5+						
30	U16		- limonitic	4.5+						
	U17			4.5+						
35	U18			4.5+						
	U19			4.5+						
	U20			4.5+						
40	U21		- w/silt partings	4.5+						
	U22			4.5+						
45	U23			4.5+						
	U24			4.5+						
50	U25			4.5+						

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

LOG OF BORING NO. BME-16

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393000.008 N 13903599.989**

Surface El.: **576.02 ft. msl**
Completion Depth: **117.0 ft.**
Date Boring Started: **9/6/13**
Date Boring Completed: **9/6/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH) *(continued)*							
55	U26			4.5+						
			519.02							
			CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)							
60	U27			4.5+						
	U28			4.5+						
65										
	U29			4.5+	24.0		70	28	42	99
70										
	U30			4.5+						
75										
	U31		- w/silt partings	4.5+						
80										
	U32			4.5+						
85										
	U33			4.5+						
90										
	U34			4.5+						
95										
	U35			4.5+						
100										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-16

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393000.008 N 13903599.989**

Surface El.: **576.02 ft. msl**
Completion Depth: **117.0 ft.**
Date Boring Started: **9/6/13**
Date Boring Completed: **9/6/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH) *(continued)*							
	U36			4.5+						
105										
	U37			4.5+						
110										
115	U38			4.5+						
			459.02							
120										
125										
130										
135										
140										
145										
150										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries.
In situ, the transition may be gradual.

LOG OF BORING NO. BME-17

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393600.025 N 13903599.999**

Surface El.: **571.80 ft. msl**
Completion Depth: **90.0 ft.**
Date Boring Started: **9/5/13**
Date Boring Completed: **9/5/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)							
	A2									
5	U3		565.80	4.5+						
	U4		CLAY, SILTY, tan and brown, hard, w/ferrous stains and calcareous nodules, moist, (CH)	4.5+						
	U5			4.5+						
10	U6			4.5+						
	S7			4.5+						
15	S8			4.5+						
	S9			4.5+						
	S10			4.5+						
20	S11		549.80	4.5+						
	S12		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains, slightly blocky, moist, (CH)	4.5+						
25	S13			4.5+						
	S14			4.5+						
	S15			4.5+						
30	S16			4.5+						
	S17			4.5+						
35	S18			4.5+						
	S19			4.5+						
	S20			4.5+						
40	S21			4.5+						
	S22			4.5+						
45	S23		- w/small shell fragments	4.5+						
	S24			4.5+						
	S25			4.5+						
50										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

LOG OF BORING NO. BME-17
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The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-17

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393600.025 N 13903599.999**

Surface El.: **571.80 ft. msl**
Completion Depth: **90.0 ft.**
Date Boring Started: **9/5/13**
Date Boring Completed: **9/5/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
55	S26		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains, slightly blocky, moist, (CH) *(continued)*	4.5+						
60	S27		511.80	4.5+						
65	S28		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)	4.5+						
70	S29			4.5+						
75	S30			4.5+						
80	S31			4.5+						
85	S32			4.5+						
90	S33		481.80	4.5+						
95										
100										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

LOG OF BORING NO. BME-18

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392400.021 N 13902999.987**

Surface El.: **568.07 ft. msl**
Completion Depth: **109.0 ft.**
Date Boring Started: **8/29/13**
Date Boring Completed: **8/30/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)							
	A2									
5	A3		562.07							
	U4		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and calcareous nodules, slightly blocky, moist, (CH)	4.5+						
	U5			4.5+						
10	U6			4.5+						
	U7			4.5+						
15	U8			4.5+						
	U9			4.5+						
	U10			4.5+						
20	U11			4.5+						
	U12			4.5+						
25	U13		- limonitic	4.5+						
	U14			4.5+						
	U15			4.5+						
30	U16			4.5+						
	U17			4.5+						
35	U18		532.07	4.5+						
	U19		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)	4.5+						
	U20			4.5+						
40	U21			4.5+						
	U22			4.5+						
45	U23			4.5+						
	U24			4.5+						
50	U25			4.5+						

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

LOG OF BORING NO. BME-18

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392400.021 N 13902999.987**

Surface El.: **568.07 ft. msl**
Completion Depth: **109.0 ft.**
Date Boring Started: **8/29/13**
Date Boring Completed: **8/30/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH) *(continued)*							
55	S26			4.5+						
60	S27			4.5+						
65	S28			4.5+						
70	S29			4.5+						
75	S30			4.5+						
80	S31			4.5+						
85	S32			4.5+						
90	S33			4.5+						
95	S34			4.5+						
100	S35			4.5+						

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-18

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392400.021 N 13902999.987**

Surface El.: **568.07 ft. msl**
Completion Depth: **109.0 ft.**
Date Boring Started: **8/29/13**
Date Boring Completed: **8/30/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
105	S36		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH) *(continued)*							
	S37		459.07							
110										
115										
120										
125										
130										
135										
140										
145										
150										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

LOG OF BORING NO. BME-19

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Project Description: **130 Environmental Park**
Lockhart, Texas

Location: **E 2393000.007 N 13902999.992**

Surface El.: **573.41 ft. msl**
Completion Depth: **89.0 ft.**
Date Boring Started: **8/29/13**
Date Boring Completed: **8/30/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)							
	A2		569.41							
5	S3		CLAY, SILTY, tan and brown, hard, w/ferrous stains and calcareous nodules, moist, (CH)	4.5+						
	S4			4.5+						
	S5		563.41	4.5+						
10	S6		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains, slightly blocky, moist, (CH)	4.5+						
	S7			4.5+						
15	S8			4.5+						
	U9			4.5+			88	26	62	98
	S10			4.5+						
20	S11			4.5+			78	28	50	99
	S12			4.5+						
25	S13			4.5+						
	S14		- limonitic	4.5+						
	S15			4.5+						
30	S16			4.5+						
	S17			4.5+			92	26	66	100
35	S18			4.5+						
	S19			4.5+						
	S20			4.5+						
40	S21			4.5+			86	29	57	99
	S22			4.5+						
45	S23			4.5+						
	S24			4.5+						
50	S25		- w/gypsum	4.5+						

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-19

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393000.007 N 13902999.992**

Surface El.: **573.41 ft. msl**
Completion Depth: **89.0 ft.**
Date Boring Started: **8/29/13**
Date Boring Completed: **8/30/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains, slightly blocky, moist, (CH) *(continued)*							
			520.41							
55	S26		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)	4.5+			65	27	38	100
60	S27			4.5+						
65	S28			4.5+						
70	S29			4.5+						
75	S30			4.5+						
80	S31			4.5+						
85	S32			4.5+						
	S33			4.5+						
			484.41							
90										
95										
100										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries.
In situ, the transition may be gradual.

LOG OF BORING NO. BME-20

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393600.004 N 13902999.980**

Surface El.: **571.35 ft. msl**
Completion Depth: **112.0 ft.**
Date Boring Started: **9/12/13**
Date Boring Completed: **9/12/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)							
	U2		567.35	4.5+						
5	U3		CLAY, SILTY, tan and brown, hard, w/ferrous stains and calcareous nodules, moist, (CH)	4.5+						
	U4			4.5+						
	U5			4.5+						
10	U6		559.35	4.5+						
	U7		CLAY, SILTY, gray and tan mottled, hard, limonitic, w/ferrous stains, slightly blocky, moist, (CH)	4.5+						
15	U8			4.5+						
	U9			4.5+						
	U10			4.5+						
20	U11			4.5+						
	U12			4.5+						
25	U13			4.5+						
	U14			4.5+						
	U15			4.5+						
30	U16			4.5+						
	U17			4.5+						
35	U18			4.5+						
	U19			4.5+						
	U20			4.5+						
40	U21			4.5+						
	U22			4.5+						
45	U23			4.5+						
	U24			4.5+						
	U25			4.5+						
50										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-20

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393600.004 N 13902999.980**

Surface El.: **571.35 ft. msl**
Completion Depth: **112.0 ft.**
Date Boring Started: **9/12/13**
Date Boring Completed: **9/12/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			CLAY, SILTY, gray and tan mottled, hard, limonitic, w/ferrous stains, slightly blocky, moist, (CH) *(continued)*							
			518.85							
			CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)							
55	U26			4.5+						
60	U27			4.5+						
65	U28			4.5+						
70	U29			4.5+						
75	U30			4.5+						
80	U31			4.5+						
85	U32			4.5+						
90	U33			4.5+						
95	U34			4.5+						
100	U35			4.5+						

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

LOG OF BORING NO. BME-20

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393600.004 N 13902999.980**

Surface El.: **571.35 ft. msl**
Completion Depth: **112.0 ft.**
Date Boring Started: **9/12/13**
Date Boring Completed: **9/12/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH) *(continued)*							
105	U36			4.5+						
110	U37			4.5+						
			459.35							
115										
120										
125										
130										
135										
140										
145										
150										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

LOG OF BORING NO. BME-21

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2394200.015 N 13903000.000**

Surface El.: **554.19 ft. msl**
Completion Depth: **70.0 ft.**
Date Boring Started: **9/6/13**
Date Boring Completed: **9/6/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, dry, (CH)	4.5+						
	U2		550.19	4.5+						
5	U3		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains, slightly blocky, moist, (CH)	4.5+						
	U4			4.5+						
	U5			4.5+						
10	U6			4.5+						
	U7			4.5+						
15	U8			4.5+						
	U9			4.5+						
	U10			4.5+						
20	U11			4.5+						
	U12			4.5+						
25	U13			4.5+						
	S14			4.5+						
	S15			4.5+						
30	S16		- w/silt partings	4.5+						
	S17			4.5+						
35	S18			4.5+						
	S19			4.5+						
	S20			4.5+						
40	S21			4.5+						
	S22			4.5+						
45	S23			4.5+						
	S24			4.5+						
	S25			4.5+						
50										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed during the drilling of this boring and no water was added during drilling.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

LOG OF BORING NO. BME-21

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2394200.015 N 13903000.000**

Surface El.: **554.19 ft. msl**
Completion Depth: **70.0 ft.**
Date Boring Started: **9/6/13**
Date Boring Completed: **9/6/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			503.19							
			CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)							
55	S26			4.5+						
60	S27			4.5+						
65	S28			4.5+						
70	S29		484.19	4.5+						
75										
80										
85										
90										
95										
100										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed during the drilling of this boring and no water was added during drilling.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

LOG OF BORING NO. BME-22

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392400.022 N 13902399.994**

Surface El.: **555.51 ft. msl**
Completion Depth: **75.0 ft.**
Date Boring Started: **9/4/13**
Date Boring Completed: **9/7/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)							
	A2		551.51							
5	U3		CLAY, SILTY, tan and brown, hard, w/ferrous stains and calcareous nodules, moist, (CH)	4.5+						
	U4			4.5+						
	U5			4.5+						
10	U6			4.5+						
	S7			4.5+						
15	S8			4.5+						
	S9		537.51	4.5+						
	S10		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains, slightly blocky, moist, (CH)	4.5+						
20	S11			4.5+						
	S12		- w/silt partings	4.5+						
25	S13									
	S14			4.5+						
	S15			4.5+						
30	S16			4.5+						
	S17		- limonitic	4.5+						
35	S18		- w/silt partings	4.5+						
	S19			4.5+						
	S20			4.5+						
40	S21			4.5+						
	S22			4.5+						
45	S23			4.5+						
	S24			4.5+						
50	S25			4.5+						

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed during the drilling of this boring and no water was added during drilling.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-22

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392400.022 N 13902399.994**

Surface El.: **555.51 ft. msl**
Completion Depth: **75.0 ft.**
Date Boring Started: **9/4/13**
Date Boring Completed: **9/7/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
55	S26		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains, slightly blocky, moist, (CH) *(continued)*	4.5+						
			498.51							
60	S27		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)	4.5+						
65	S28			4.5+						
70	S29			4.5+						
75	S30			4.5+						
			480.51							
80										
85										
90										
95										
100										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed during the drilling of this boring and no water was added during drilling.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

LOG OF BORING NO. BME-23

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392999.977 N 13902399.987**

Surface El.: **565.01 ft. msl**
Completion Depth: **106.0 ft.**
Date Boring Started: **8/28/13**
Date Boring Completed: **8/28/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)							
	A2									
5	A3		559.01							
	U4		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH)	4.5+						
	U5			4.5+						
10	U6			4.5+						
	U7			4.5+						
15	U8			4.5+						
	U9			4.5+						
	U10			4.5+						
20	U11			4.5+						
	U12			4.5+						
25	U13			4.5+						
	U14		- limonitic	4.5+						
	U15			4.5+						
30	U16			4.5+						
	U17			4.5+						
35	U18			4.5+						
	U19			4.5+						
	U20			4.5+						
40	U21			4.5+						
	U22			4.5+						
45	U23			4.5+						
	U24			4.5+						
	U25			4.5+						
50										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

LOG OF BORING NO. BME-23
PAGE 1 OF 3

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-23

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392999.977 N 13902399.987**

Surface El.: **565.01 ft. msl**
Completion Depth: **106.0 ft.**
Date Boring Started: **8/28/13**
Date Boring Completed: **8/28/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
55	U26		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH) *(continued)*	4.5+						
			508.01							
60	U27		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)	4.5+						
65	U28			4.5+						
70	U29			4.5+						
75	U30			4.5+						
80	U31			4.5+						
85	U32			4.5+						
90	S33			4.5+						
95	S34			4.5+						
100	S35			4.5+						

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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LOG OF BORING NO. BME-23

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392999.977 N 13902399.987**

Surface El.: **565.01 ft. msl**
Completion Depth: **106.0 ft.**
Date Boring Started: **8/28/13**
Date Boring Completed: **8/28/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
105	S36		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH) *(continued)*							
			459.01							

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries.
In situ, the transition may be gradual.

LOG OF BORING NO. BME-24

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393600.026 N 13902399.965**

Surface El.: **561.86 ft. msl**
Completion Depth: **80.0 ft.**
Date Boring Started: **8/21/13**
Date Boring Completed: **8/22/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles and cobbles, dry, (CH)							
	A2		557.36							
5	U3		CLAY, SILTY, tan and brown, hard, w/ferrous stains and calcareous nodules, moist, (CH)	4.5+						
	U4			4.5+						
	U5		551.86	4.5+						
10	U6		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains, slightly blocky, moist, (CH)	4.5+						
	U7			4.5+						
15	U8			4.5+						
	U9			4.5+						
	U10			4.5+	21.9		67	26	41	97
20	U11			4.5+						
	U12			4.5+						
25										
	U13		- slickensides	4.5+						
	U14			4.5+						
30	U15			4.5+						
	U16			4.5+						
35	U17			4.5+						
	U18			4.5+						
	U19		- w/silt partings	4.5+	24.1		73	26	47	97
40	U20			4.5+						
	U21			4.5+						
45	U22		- w/silt partings	4.5+						
			515.36							
	U23		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)	4.5+						
50	U24			4.5+						

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

LOG OF BORING NO. BME-24

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2393600.026 N 13902399.965**

Surface El.: **561.86 ft. msl**
Completion Depth: **80.0 ft.**
Date Boring Started: **8/21/13**
Date Boring Completed: **8/22/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH) *(continued)*							
55	U25			4.5+	24.7		76	27	49	97
60	U26			4.5+						
	U27			4.5+						
65	U28			4.5+						
70	U29			4.5+	33.5		79	29	50	99
75	U30			4.5+	25.7		70	30	40	97
80			481.86							
85										
90										
95										
100										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

LOG OF BORING NO. BME-25

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Project Description: **130 Environmental Park**
Lockhart, Texas

Location: **E 2394200.006 N 13902399.988**

Surface El.: **547.86 ft. msl**
Completion Depth: **89.0 ft.**
Date Boring Started: **9/11/13**
Date Boring Completed: **9/11/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)	4.5+						
	S2			4.5+						
5	S3		541.86	4.5+						
	S4		CLAY, SILTY, tan and brown, hard, w/ferrous stains and calcareous nodules, moist, (CH)	4.5+						
	S5			4.5+						
10	S6		535.86	4.5+						
	S7		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH)	4.5+						
15	S8			4.5+						
	S9			4.5+						
	S10			4.5+						
20	S11			4.5+						
	S12			4.5+						
25	S13			4.5+						
	S14			4.5+						
	S15			4.5+						
30	S16			4.5+						
	S17			4.5+						
35	S18			4.5+						
	S19			4.5+						
	S20			4.5+						
40	S21		- w/shell fragments	4.5+						
	S22			4.5+						
45	S23			4.5+						
	S24		- w/shell fragments	4.5+						
50	S25			4.5+						

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

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