Prepared for

Lower Colorado River Authority (LCRA)
P.O. Box 220
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LOCATION RESTRICTIONS CERTIFICATION REPORT

COMBUSTION BYPRODUCT LANDFILL
FAYETTE POWER PROJECT
FAYETTE COUNTY, TEXAS

Beth Ann Gross 1/21/2022

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1. INTRODUCTION

1.1 Purpose

This report presents an evaluation of the proposed lateral expansion (Subcells 2A, 2B, 2C and Cell 3) of the Combustion Byproduct Landfill (CBL) at the Lower Colorado River Authority (LCRA) Fayette Power Project (FPP) with respect to compliance with the Texas Commission on Environmental Quality's (TCEQ's) location restriction regulations for lateral expansions of coal combustion residuals (CCR) landfills, in accordance with Chapter 352, Subchapter E of Title 30 of the Texas Administrative Code (TAC) (i.e., 30 TAC 352, Subchapter E). These regulations were adopted by reference to Sections 257.60 to 257.64 of Part 257, Subpart D of Title 40 of the Code of Federal Regulations (CFR) (i.e., 40 CFR §257.60 to §257.64).

Geosyntec Consultants (Geosyntec) previously evaluated the compliance of the existing CBL (Cell 1 and Subcell 2D) with respect to 40 CFR §257.60 to §257.64. Of these location restrictions, the only one applicable to the existing CBL is the one related to unstable areas (40 CFR §257.64). Geosyntec (2017) demonstrated that the existing CBL is not situated in an unstable area is therefore in compliance with that location restriction.

This report also presents an evaluation of the CBL with respect to compliance with the 40 CFR 257, Subpart A for floodplains (40 CFR §257.3-1), endangered species (40 CFR §257.3-2), and surface water (40 CFR §257.3-3).

A certification by a Qualified Professsional Engineer that the location restriction demonstrations presented herein are appropriate for evaluating the the CBL and that the demonstrations meet the requirements of 40 CFR §§257.60(a), 257.61(a), 257.62(a), and 257.63(a) is presented in **Appendix A**.

1.2 Background

The FPP is a coal-fired power plant located east of La Grange in Fayette County, Texas (FPP site). CCR generated at the FPP site are disposed in the CBL, a CCR landfill located south of the power plant and north of the railroad that borders FPP (**Drawing 1**).

At final buildout, the CBL will consist of up to three cells, Cells 1 to 3 (**Drawing 2**). Cell 1 was constructed in 1988 at natural grade with a recompacted clay liner. From October 2014 to May 2015, Subcell 2D was constructed below grade with a compacted clay liner. The remainder of Cells 2 and 3 will be constructed with a liner system that includes a geomembrane/compacted clay composite liner and leachate collection system.

1.3 Organization of Report

The remainder of this report is organized as follows:

- Section 2 presents an evaluation of the proposed CBL lateral expansion with respect to compliance with 30 TAC 352 Subchapter E, including placement above the uppermost aquifer (30 TAC §352.601), wetlands (30 TAC §352.611), fault areas (30 TAC §352.621), seismic impact zones (30 TAC §352.631), and unstable areas (30 TAC §352.641);

- Section 3 presents an evaluation of the CBL with respect to compliance with 40 CFR Subpart A for floodplains (40 CFR §257.3-1), endangered species (40 CFR §257.3-2), and surface water (40 CFR §257.3-3); and

- Section 4 provides a list of references cited in the report.

2. EVALUATION OF PROPOSED CBL LATERAL EXPANSION WITH RESPECT TO COMPLIANCE WITH 30 TAC 352, SUBCHAPTER E

2.1 Placement Above the Uppermost Aquifer (30 TAC §352.601)

2.1.1 Location Restriction

In accordance with 30 TAC §352.601, which adopts by reference 40 CFR §257.60, a lateral expansion of a CCR unit (landfill) must be constructed with a base that is located no less than five feet above the upper limit of the uppermost aquifer, or must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR landfill and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high water table). "Uppermost aquifer" is defined in in 30 TAC §352.3(a), which adopts by reference 40 CFR §257.53, as "the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary." "Aquifer" is defined as "the geologic formation, group of formations, or portion of a formation capable of yielding usable quantities of groundwater to wells or springs".

2.1.2 Uppermost Aquifer

The information presented below on FPP site geology was developed from historical soil boring and groundwater elevation data, Geosyntec (2013), and AMEC Environmental & Infrastructure, Inc. (AMEC) (2013).

The FPP site is located on the uppermost section of the Miocene-age Oakville Formation, with topographically high portions of the site capped by Pleistocene-age Willis Formation sands, silts, and gravels. The Oakville Formation regionally dips to the southeast, varies in thickness from 200 to 500 feet, and consists of calcareous fine- to medium-grained sand/sandstones and interbedded silt and clay units.

Locally the Oakville was formed in a fluvial environment characterized by small local streams. Sand bodies were deposited as channel-fill units ranging from 10 to 25 feet in thickness and overbank units of limited extent and thickness deposited during flood events. Three groundwater bearing units, designated at the site as the Upper Sand, Intermediate Sand, and Middle Sand, are present in the interval from the surface to a depth of approximately 100 feet. A fourth unit, the Lower Sand, is locally present at a depth greater than 100 feet. Each of these units is separated by low-permeability clays.

The Upper Sand is a low-yielding, laterally discontinuous, unconfined groundwater bearing unit present only at the topographically highest portions of the CBL area. It has been reported as dry at many locations in historical geotechnical studies and is not considered the uppermost aquifer for

location restrictions or groundwater monitoring purposes. In September 2013, TCEQ approved a Class 3 groundwater designation for the Upper Sand (AMEC, 2013).

The Intermediate Sand is a laterally discontinuous unit apparently present beneath the majority of the CBL. It appears to be enveloped by low permeability clays and largely isolated from the overlying Upper Sand and underlying Middle Sand, except towards the south of the FPP site where the Intermediate Sand may stratigraphically merge with the Middle Sand. The Intermediate Sand is considered the uppermost aquifer beneath the CBL. Groundwater is present in the Intermediate Sand under confined/semi-confined conditions, except where the unit is present near the surface towards the southwest of the CBL area.

2.1.3 Compliance Assessment

To comply with the location restriction for placement above the uppermost aquifer, the proposed lateral expansion (Subcells 2A to 2C and Cell 3) of the CBL must be constructed with base that is located no less than 5 feet above the upper limit of uppermost aquifer. At the FPP site, the Intermediate Sand is the uppermost aquifer. “Base” refers to the bottom of the compacted clay component of the landfill liner system.

The top of the clay liner elevations for the lateral expansion area are shown in **Figure 1** along with the locations of hydrogeologic Cross-Sections A-A’ to E-E.’ These cross sections, detailed in **Figure 2 to 6**, show the site stratigraphy in the vicinity of the base of the expansion area, the top of the of the clay liner, the top of the subgrade, and the top of the Intermediate Sand.

The groundwater elevations in monitor wells completed in the Intermediate Sand are typically above the elevation of the top of the Intermediate Sand in the proposed CBL expansion area, confirming confined conditions. Therefore, the elevation of the top of the Intermediate Sand strata should be used for the purpose of determining compliance with 30 TAC 352.601 and 40 CFR §257.60 in areas where groundwater is under confined conditions. Seasonal high water table conditions are applicable to an unconfined aquifer scenario and are not relevant to the Intermediate Sand where it occurs under confined conditions. In the southwest corner of CBL in the footprint of proposed Subcell 3C (**Figure 6**), the Intermediate Sand is present near the surface and groundwater is unconfined. However, historical groundwater elevations in the Intermediate Sand monitor well in this area have been more than 5 feet below the proposed base of the Subcell 3C. The logs for the borings included in the cross sections are provided in **Appendix B**.

As shown in **Figures 2 to 6**, the base of the clay liner is closest to the upper limit of the Intermediate Sand in the central part of the CBL where the liner grades approach the bottom of the central drainage corridor in the CBL and the Intermediate Sand extending from the east pinches out. However, because the proposed expansion area will be constructed with at least 5 feet separation from the Intermediate Sand, the CBL is in compliance with the location restriction for placement above the uppermost aquifer specified in 30 TAC §352.601.

2.2 Wetlands (30 TAC §352.611)

2.2.1 Location Restriction

In accordance with 30 TAC §352.611, which adopts by reference 40 CFR §257.61, a lateral expansion of a CCR landfill must not be located in wetlands unless it is demonstrated that the landfill meets certain requirements, as specified in paragraphs §257.61(a)(1) through §257.61(a)(5).

2.2.2 Wetlands Information

The CBL was sited in accordance with Texas Water Commission (TWC) Technical Guideline No. 2 (issued 1976). The design and location of the CBL was reviewed and approved by TCEQ in a letter dated January 18, 1988.

In 2006, Ecological Communications Corporation (ECC) conducted a wetlands assessment of the FPP site (**Appendix C**) . Wetlands were not identified in the CBL area (ECC, 2006).

Geosyntec queried the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) [http://www.fws.gov/wetlands/Data/Mapper.html] (USFWS, 2021) for wetlands in the vicinity of the CBL. Two manmade features were identified as freshwater ponds (**Figure 7**): (i) the existing runoff retention pond; and (ii) a manmade isolated topographic depression located in uplands along the east boundary of Subcell 2C. These features do not meet the definition of "Waters of the United States" in 40 CFR §120.2 and are not considered jurisdictional wetlands.

2.2.3 Compliance Assessment

Based on review of wetlands data for the CBL, the CBL is not located in jurisdictional wetlands. Therefore, the CBL is in compliance with the location restriction for wetlands specified in 30 TAC §352.611.

2.3 Fault Areas (30 TAC §352.621)

2.3.1 Location Restriction

In accordance with 30 TAC §352.621, which adopts by reference 40 CFR §257.62, a lateral expansion of a CCR landfill must not be located within 200 feet of the outermost damage zone of a fault that has had displacement in Holocene time unless it is demonstrated that a lesser setback distance will prevent damage to the structural integrity of the CCR landfill. "Holocene" is defined is defined in 30 TAC §352.3(a), which adopts by reference 40 CFR §257.53, as "the most recent epoch of the Quaternary period, extending from the Pleistocene Epoch, at 11,700 years before present, to present."

2.3.2 Fault Areas Information

Geosyntec queried the U.S Geological Survey (USGS) Quaternary Fault and Fold Database of the United States [https://www.usgs.gov/natural-hazards/earthquake-hazards/faults] (USGS, 2021a) for faults in the vicinity of the CBL. The database contains information on faults and associated folds that are believed to the sources of earthquakes with a magnitude greater than 6. No faults or folds were identified near the site. While normal, en echelon faults associated with the Mexia-Luling-Talco regional fault system are found regionally, most faults associated with that system are located west of Fayette County and the limited number identified in the County are located west of the FPP (Caran et al., 1982). Further, faults were not identified along the north-south regional geologic cross section that passes through the FPP site (Rogers, 1967) or shown within one mile of the site in the on-line geologic atlas of Texas using the USGS Texas Geology Web Map Viewer [https://txpub.usgs.gov/txgeology/] (USGS, 2021b).

In addition to a desktop study, Geosyntec also reviewed the current topographic map for the FPP, historical aerial photographs of the FPP from December 1997, December 2002, February 2008, May 2014, April 2017, and January 2018 available on Google Earth Pro, and historical soil boring information in the CBL area for evidence of surficial expression of faults. The occurrence of linear surface features or displacement through the surficial sediments could indicate recent activity associated with a fault. No such features were observed.

2.3.3 Compliance Assessment

Based on review of fault information for the CBL, the CBL is not located within 200 feet of the outermost damage zone of a fault that has had displacement in Holocene time. Therefore, the CBL is in compliance with the location restriction for fault areas specified in 30 TAC §352.621.

2.4. Seismic Impact Zones (30 TAC §352.631)

2.4.1 Location Restriction

In accordance with 30 TAC §352.631, which adopts by reference 40 CFR §257.63, a lateral expansion of a CCR landfill must not be located in seismic impact zones unless it is demonstrated that all structural components, including liners, leachate collection systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material from a probable earthquake. “Seismic impact zone” is defined in 30 TAC §352.3(a), which adopts by reference 40 CFR §257.53, as “an area having a 2% or greater probability that the maximum expected horizontal acceleration, expressed as a percentage of the earth’s gravitational pull (g), will exceed 0.10 g in 50 years.” “Maximum horizontal acceleration in lithified earth material” is defined as “the maximum expected horizontal acceleration at the ground surface as depicted on a seismic hazard map, with a 98% or greater probability that the acceleration will not be exceeded in 50 years, or the maximum expected horizontal acceleration based on a site-

specific seismic risk assessment. This requirement translates to a 10% probability of exceeding the maximum horizontal acceleration in 250 years".

2.4.2 Seismic Impact Zone Information

Seismic zones, which represent areas with the greatest seismic risk, are mapped by the USGS and readily available for all of the United States (https://www.usgs.gov/programs/earthquake-hazards/maps). The 2014 USGS National Seismic Hazard Map for the Conterminous U.S presenting the peak ground acceleration with a 2% or greater probability of exceedance in 50 years indicates that the maximum expected horizontal acceleration at the site for this event is between 0.02 and 0.04 g (Shumway, 2019).

The Unified Hazard Tool for the Conterminous U.S on the USGS website (USGS, 2021c) was used to determine the peak ground acceleration for the CBL. The CBL is approximately located at 29.91° latitude, -96.76° longitude. The peak ground acceleration with a 2% or greater probability of exceedance in 50 years for 29.90° latitude, -96.75° longitude was estimated to be approximately 0.029 g. This peak ground acceleration is less than the acceleration defining a seismic impact zone (i.e., > 0.10 g).

2.4.3 Compliance Assessment

Based on the information provided in this section, the CBL is not situated in a seismic impact zone and is therefore in compliance with the requirements of the location restriction for seismic impact zones, specified in 30 TAC §352.631.

2.5 Unstable Areas (30 TAC §352.641)

2.5.1 Location Restriction

In accordance with 30 TAC §352.641, which adopts by reference 40 CFR §257.63, an existing CCR landfill or the lateral expansion of a CCR landfill must not be located in an unstable area unless it is demonstrated that recognized and generally accepted good engineering practices have been incorporated into the design of the landfill to ensure that the integrity of the structural components of the landfill will not be disrupted. To assess whether an area is unstable, the following factors must be considered:

- on-site or local soil conditions that may result in significant differential settlement;
- on-site or local geologic or geomorphologic features; and
- on-site or local human-made features or events (both surface and subsurface).

"Unstable area" is defined in 30 TAC §352.3(a), which adopts by reference 40 CFR §257.53, as "a location that is susceptible to natural or human-induced events or forces capable of impairing the integrity, including structural components of some or all of the CCR unit that are responsible for preventing releases from such unit. Unstable areas can include poor foundation conditions, areas susceptible to mass movements, and karst terrains." "Structural components" refers to "liners, leachate collection and removal systems, final covers, run-on and run-off systems, inflow design flood control systems, and any other component used in the construction and operation of the CCR unit that is necessary to ensure the integrity of the unit and that the contents of the unit are not released into the environment."

2.5.2 Unstable Areas Information

2.5.2.1 Geotechnical Investigations

Geotechnical investigations were conducted at the CBL site by McClelland Engineers, Inc. (1983), Brytest, Inc. (1984), Jones and Neuse, Inc. (1992), and Geosyntec [2011, 2013]. The investigations included logging soil borings, conducting standard penetration tests, and collecting soil samples for geotechnical laboratory testing. Based on the results of the geotechnical investigations, soils within the upper 100 feet of the subsurface are predominantly classified as clay (CL or CH) and clayey sand (SC and SM) in accordance with the Unified Soil Classification System (USCS). The logs for the borings included in the hydrogeologic cross sections presented in **Figures 2 to 6** are provided in **Appendix B**. Natural water contents of clays were generally near the plastic limits, and consequently the clays are characterized as stiff to hard. Sands were generally characterized as medium to very dense.

Based on the low compressibility of the site soils, these soils provide adequate foundation for the liner system construction and can support the load of the CBL without significant differential settlement.

2.5.2.2 CBL Slope Stability

The slope stability of the CBL and associated perimeter berm at final grade was evaluated for a critical cross section through Cells 1 to 3 at the center of landfill. This cross section has the tallest slopes. The materials in this section were conceptualized as CCR on a geosynthetic liner system underlain by a clay subgrade and abutted on the north by a perimeter berm. The near surface soils and perimeter berm material are predominantly classified as high plasticity clays (CH).

For long-term (drained) slope stability analyses of soil slopes in high plasticity clays, analyses using fully-softened strength parameters are recommended (e.g., Skempton, 1970; Wright, 2005). The fully-softened strength parameters of the subgrade, liner system, and perimeter berm soils were estimated based on the site-specific geotechnical data and, as applicable, the correlations presented in Wright (2005). The shear strength of the CCR were estimated based on the results of consolidated undrained triaxial compression tests conducted on CCR from FPP and on published

data (e.g., Kim et al., 2005). Geotechnical properties used in the slope stability evaluation are summarized in **Table 1**.

Table 1. Geotechnical Properties Used in Slope Stability Analysis.

Material	Unit Weight γ (lbs/ft^3)	Fully-Softened Effective Stress Friction Angle ϕ (°)
Subgrade Clay	105	20
CCR	105	30
Liner System	105	15
Perimeter Berm	120	24

The slope stability of the critical section was analyzed using a method of slices coded in the computer program SLIDE®, Version 6.029 [Rocscience, 2014]. SLIDE® is a two-dimensional slope stability program that can be used to evaluate the factor of safety of circular and non-circular (block-type) slip surfaces using the simplified Bishop's (1955) and Spencer's (1967) methods, respectively. The simplified Bishop procedure satisfies moment equilibrium conditions only, which is suitable for circular slip surfaces. For non-circular slip surfaces, the Spencer method was used because it satisfies both force and moment equilibrium in each slice of the sliding mass.

Four slope stability scenarios were considered: (i) potential circular slip surfaces through the CCR at the south landfill slope; (ii) potential non-circular slip surfaces along the liner system at the south landfill slope; (iii) potential circular slip surfaces through the CCR and underlying liner system and subgrade clay at the south landfill slope; and (iv) potential circular slip surfaces through the perimeter berm and into the subgrade clay on the north landfill slope. The results of SLIDE analysis for each of the critical cross-sections are summarized in **Table 2** and in **Appendix D**. **Table 2** also lists the minimum slope stability factor of safety recommended by TCEQ for CCR landfills (TCEQ, 2020).

Table 2. Results of Slope Stability Analysis.

Scenario	Factor of Safety	
	SLIDE Analysis	TCEQ Guideline
Circular Slip Surface Through CCR	1.73	1.5
Block-Type Slip Surface Through Liner System	1.53	
Circular Slip Surface Into Subgrade Clay	1.69	
Circular Slip Surface Through North Perimeter Berm	1.54	

For the conditions analyzed, the critical slip surface is a non-circular surface passing along the liner system at the south side of the landfill. The calculated slope stability factor of safety for this scenario is 1.53 using fully-softened strengths. All of the calculated factor of safety values exceed the minimum value of 1.5 recommended by TCEQ for CCR landfills under typical conditions.

2.5.2.3 Local Geologic Features

There are no known local geologic features that would classify the CBL site as an unstable area. Such features include active faults, seismic events, landslides, debris slides, karst terrain, and erosion by rivers. Further, the CBL is not located within the 500-year floodplain (FEMA FIRM 48149C0270C, October 2006).

2.5.2.4 Local Manmade Features or Events

There are no known local manmade features or events that would classify the CBL site as an unstable area. Such features and events include mining, cut and fill activities during construction, excessive drawdown of groundwater, and construction over fill.

2.5.3 Compliance Assessment

Based on the information provided in this section, the CBL is not situated in an unstable area and is therefore in compliance with the requirements of the location restriction for unstable areas specified in 30 TAC §352.641.

3. EVALUATION OF CBL WITH RESPECT TO COMPLIANCE WITH 40 CFR SUBPART A, §257-1 TO §257-3

3.1 Floodplains (40 CFR §257.3-1)

3.1.1 Location Restriction

In accordance with 40 CFR §257.3-1, solid waste facilities in floodplains shall not restrict the flow of the base flood, reduce the temporary water storage capacity of the floodplain, or result in washout of solid waste, so as to pose a hazard to human life, wildlife, or land or water resources. "Base flood" is defined in 40 CFR §257.3-1(b)(1) as "a flood that has a 1 percent or greater chance of recurring in any year or a flood of a magnitude equaled or exceeded once in 100 years on the average over a significantly long period". "Floodplain" is defined in 40 CFR §257.3-1(b)(2) as "the lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands, which are inundated by the base flood".

3.1.2 Floodplains Information

Geosyntec queried the latest Flood Insurance Rate Map (FIRM) for Fayette County, Texas and incorporated areas prepared by the Federal Emergency Management Agency (FEMA) to identify floodplains in the CBL. The map indicated that the CBL is not located within any special flood hazard areas (SFHAs) subject to inundation by the 1 percent annual chance flood. Specifically, the existing CBL is located within "ZONE X" defined as "Areas determined to be outside the 0.2% annual chance floodplain" meaning that it is not located within the mapped 500-year floodplain.

3.1.2 Compliance Assessment

Based on review of the floodplain information data, the operation and expansion of the CBL will not restrict the flow of the base flood and are therefore in compliance with the requirements of location restriction for floodplains specified in 40 CFR §257.3-1.

3.2 Endangered Species (40 CFR §257.3-2)

3.2.1 Location Restriction

In accordance with 40 CFR §257.3-2, solid waste facilities or practices shall not cause or contribute to the taking of any endangered or threatened species of plants, fish, or wildlife; and shall not result in the destruction or adverse modification of the critical habitat of endangered or threatened species as identified in 50 CFR Part 17.

3.2.2 Endangered Species Information

A Protected Species Habitat Assessment (PSHA) for the CBL was prepared by Blanton and Associates, Inc. (B&A) (B&A, 2021) is attached to this report as **Appendix E** of this Report. The

PSHA evaluates the potential for federally listed threatened, endangered, or other protected species (e.g., eagles) to occur in the project area and potential for those species to be impacted by the project.

B&A (2021) completed a literature, database, and desktop review for federally listed protected species potentially occurring in Fayette County and the project area. The purpose of the review was to assess habitats and resources within the project area; to determine protected species of known or potential occurrence within Fayette County and the project vicinity; to evaluate the life history and ecology of these species in relation to the habitats and resources present in the project area; and to ultimately determine the potential for each protected species to occur in the project area. The review of background information was accompanied by a field investigation performed on November 23, 2021. During the field investigation, the project area was evaluated to verify information attained in the background review and to assess the potential for federally protected species to occur on the site. Additionally, a presence/absence survey for Navasota ladies'-tresses (NLT) (*Spiranthes parksii*) was conducted by two B&A biologists. B&A did not identify habitat for federally listed endangered or threatened species was not identified through desktop review or field reconnaissance.

3.2.3 Compliance Assessment

Based on the results of the PSHA (**Appendix E**) the operation and expansion of the CBL is not expected to cause or contribute to the taking of any endangered or threatened species of plants, fish, or wildlife or the destruction or adverse modification of the critical habitat of endangered or threatened species as identified in 50 CFR Part 17. Therefore, the CBL in compliance with the requirements of location restrictions for endangered species specified in 40 CFR §257.3-2.

3.3 Surface Water (40 CFR §257.3-3)

3.3.1 Location Restrictions

In accordance with 40 CFR §257.3-3, a facility shall comply with the following requirements:

- A facility shall not cause a discharge of pollutants into waters of the United States that is in violation of the requirements of the National Pollutant Discharge Elimination System (NPDES) under section 402 of the Clean Water Act, as amended.

- A facility shall not cause a discharge of dredged material or fill material to waters of the United States that is in violation of the requirements under section 404 of the Clean Water Act, as amended.

- A facility or practice shall not cause non-point source pollution of waters of the United States that violates applicable legal requirements implementing an areawide or Statewide

water quality management plan that has been approved by the Administrator under section 208 of the Clean Water Act, as amended.

In the above paragraphs, "discharge" is a term that includes, but is not limited to any spilling, leaking, pumping, pouring, emitting, emptying or dumping.

3.3.2 Surface Water Information

The information presented in this section is based on the Run-On and Run-Off Control System Plan (Plan) for the CBL (Geosyntec, 2021). The Plan describes how the run-on and run-off control systems were designed and constructed to prevent, collect and control flow onto and from the active portion of the CBL during the peak discharge of a 100-year, 24-hour storm event. The CBL run-on and run-off control systems meet and exceed the design requirements of 40 CFR §257.81(a) and 30 TAC §352.821 (i.e., 25-year, 24-hour storm event). Additional information regarding surface water management of the active portion of the CBL is summarized below.

Run-off from areas of Cell 1 that have not been covered with intermediate cover or final cover could have potentially come in contact with CCR. Therefore, this run-off and is managed as contact water. Contact water collected in Cell 1 is conveyed in the runoff channel to the Runoff Retention Pond (**Drawing 2**), as authorized under the Texas Pollutant Discharge Elimination System (TPDES) Permit No. WQ0002105000 and designated as the "CBL Pond" in the permit. The perimeter and interim berms of Cell 1, as well as the underlying recompacted clay liner, keep run-off that has contacted CCR within the CBL until it flows to the runoff channel. CCR is placed in Cell 1 in a manner that directs this runoff in Cell 1 to the channel. Until an intermediate or final cover is placed over the CCR slopes, run-off from the CCR slopes will continue to be collected and directed to the runoff channel. Run-off from areas of the CBL with intermediate or final cover has not contacted CCR and can be directed into a stormwater channel and conveyed away from the CBL rather than being conveyed to the Runoff Retention Pond.

Contact water from the Subcell 2D Contact Water Retention Pond is managed through a pumping system which routes water collected in the pond to the runoff channel.

In general, water run-on to active areas of the CBL and Subcell 2D is controlled by topography and by the landfill perimeter berm. The north side of the CBL is on a topographic high, and the ground surface around the CBL primarily slopes to the south, and also towards two the central stormwater channels (**Drawing 2**). In addition, the perimeter berm of the CBL deflects stormwater run-on, and this potential run-on is collected in a stormwater channel at the toe of the outboard side slope of the berm.

As described in the Plan, as new subcells are developed, run-on will continue to be controlled by berms and adjacent stormwater channels located at the outboard toe of the berms. In addition, the

Plan will be revised whenever there is a change in conditions that would substantially affect the Plan in effect.

3.3.3 Compliance Assessment

Based on the engineering controls for surface water incorporated into the CBL design and the operational procedures employed at the landfill (Geosyntec, 2021), the operation and expansion of the CBL is not expected to cause discharge of pollutants into waters of the United States or a non-point source pollution of waters of the United States that is in violation of the requirements of the National Pollutant Discharge Elimination System (NPDES) under section 402 of the Clean Water Act, as amended. Therefore, the existing CBL is in compliance with location restriction requirements for surface water specified in 40 CFR §257.3-3.

4. REFERENCES

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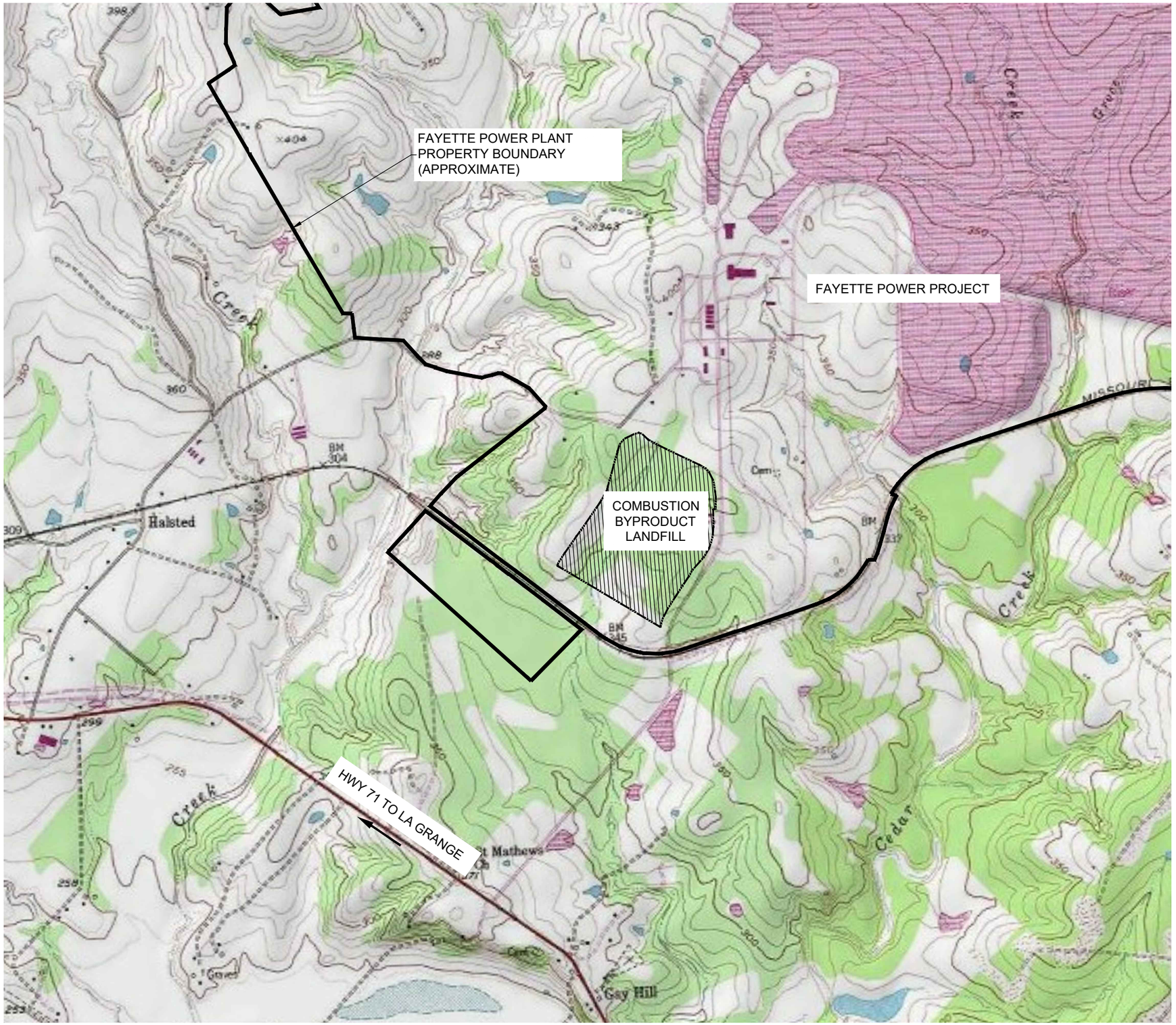
DRAWINGS



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NOTE:

BASE MAP SOURCE: UNITED STATES GEOLOGIC SURVEY (USGS), 7.5 MINUTE SERIES QUADRANGLE (TOPOGRAPHIC) MAP OF LA GRANGE EAST, TEXAS 1957, REVISED 1981 AND FAYETTEVILLE, TEXAS 1958, REVISED 1981

0 800 1600
SCALE IN FEET

REV	DATE	DESCRIPTION	DRN	APP

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LOWER COLORADO RIVER AUTHORITY
3700 LAKE AUSTIN BLVD.
AUSTIN, TEXAS 78703
PHONE: 512.473.3200

Geosyntec consultants
GEOSYNTEC CONSULTANTS, INC.
TEXAS ENG. FIRM REGISTRATION NUMBER 1182
8217 SHOAL CREEK BLVD, SUITE 200
AUSTIN, TEXAS 78757
PHONE: 512.451.4003

TITLE:
OVERALL SITE PLAN

PROJECT:
RUN-ON AND RUN-OFF CONTROL SYSTEM PLAN

SITE:
FAYETTE POWER PROJECT
COMBUSTION BYPRODUCT LANDFILL

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

Beth Gross
SIGNATURE

10.13.2016
DATE

STATE OF TEXAS
BETH ANN GROSS
79864
LICENSED PROFESSIONAL ENGINEER

DESIGN BY:	BG	DATE:	OCTOBER 2016
DRAWN BY:	JJV	PROJECT NO:	TXL0225.04
CHECKED BY:	BG	FILE:	TXL0225CCRR1
REVIEWED BY:	BG	DRAWING NO:	1 OF 8
APPROVED BY:	BG		

P:\CADD PROJECTS F\FAYETTE POWER PLANT\ENG DESIGN CCR RULE COMPLIANCE (TXL0225.04)\RUN-ON-OFF CONTROL PLANS\DRAWINGS\TXL0225CCRR1

EXISTING COMBUSTION WASTE FORCE MAIN (NOTE 3)

EXISTING STORMWATER CHANNEL CENTERLINE

BYPRODUCTS ROAD

SUBCELL 2D CONTACT WATER RETENTION POND

SUBCELL 3C

SUBCELL 2D (WASTE STORAGE / PRODUCT PREPARATION AREA)

PROPOSED CELL 3

EXISTING RUNOFF RETENTION POND

EXISTING STORMWATER CHANNEL CENTERLINE

EXISTING RUNOFF CHANNEL CENTERLINE

APPROXIMATE LOCATION OF CELL 1 FINAL COVER LIMITS

EXISTING FINAL COVER

EXISTING CELL 1

APPROXIMATE LOCATION OF CELL 1 LIMITS

AUSTIN LOOP

SUBCELL 3B

SUBCELL 3A

SUBCELL 2C

SUBCELL 2B

SUBCELL 2A

PROPOSED CELL 2

POWER PLANT ROAD

EXISTING STORMWATER CHANNEL CENTERLINE

ENTRANCE / EXIT GUARD GATE

100' ELECTRICAL EASEMENT

N 9947000

N 9948000

N 9949000

E 3428000

E 3430000

E 3431000

N 9946000

LEGEND

- EXISTING GROUND ELEVATION (FT,MSL) (NOTES 1,2)
- EXISTING TOP OF CLAY LINER ELEVATION (FT,MSL) (NOTE 2)
- EXISTING ROAD
- EXISTING BUILDING
- EXISTING RAILROAD
- EXISTING VEGETATION / TREE
- COORDINATE GRID (NOTE 2)
- EXISTING FENCE
- EXISTING LIMIT OF LANDFILL
- EXISTING LIMIT OF FINAL COVER
- EXISTING POWER POLE AND OVERHEAD POWER LINE
- EXISTING COMBUSTION WASTE FORCE MAIN
- PROPOSED PHASE BOUNDARY
- PROPOSED LIMIT OF WASTE

NOTES:

1. THE EXISTING CONTOUR BASE MAP SHOWN ON THIS DRAWING WAS COMPILED USING AN AERIAL SURVEY BASED ON PHOTOGRAPHY PERFORMED ON 23 NOVEMBER 2020 BY SKYVEYOR.
2. ELEVATIONS ARE IN FEET (FT) AS DEFINED BY THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. STATE PLANE COORDINATE GRID CORRESPONDS TO TEXAS STATE PLANE COORDINATE SYSTEM, TEXAS CENTRAL ZONE (4203), NORTH AMERICAN DATUM 83 (NAD-83) 1983.
3. EXISTING COMBUSTION WASTE FORCE MAIN CONVEYS WATER FROM EXISTING RUNOFF RETENTION POND TO RECLAIM POND.

0 140 280
SCALE IN FEET

REV	DATE	DESCRIPTION	DRN	APP

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TEXAS ENG. FIRM REGISTRATION NUMBER 1182
8217 SHOAL CREEK BLVD, SUITE 200
AUSTIN, TEXAS 78757
PHONE: 512.451.4003

TITLE: EXISTING SITE CONDITIONS

PROJECT: RUN-ON AND RUN-OFF CONTROL SYSTEM PLAN

SITE: FAYETTE POWER PROJECT
COMBUSTION BYPRODUCT LANDFILL

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

Beth Ann Gross
SIGNATURE

8/11/2021
DATE

STATE OF TEXAS
BETH ANN GROSS
79864
LICENSED PROFESSIONAL ENGINEER

DESIGN BY:	BG	DATE:	JULY 2021
DRAWN BY:	JJV	PROJECT NO.:	TXL0225.04
CHECKED BY:	BG	FILE:	TXL0225CCRR2
REVIEWED BY:	BG	DRAWING NO.:	2 OF 8
APPROVED BY:	BG		

ENGINEERING DESIGN DRAWING

P:\CADD\PROJECTS\F\FAYETTE POWER PLANT\ENG DESIGN\CCR RULE COMPLIANCE (TXL0225.08)\RUNON-OFF CONTROL PLANS\DRAWINGS\TXL0225CCRR2

FIGURES

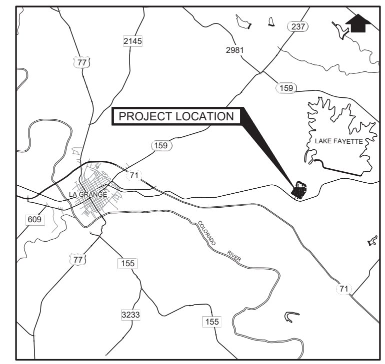
LEGEND

- EXISTING GROUND ELEVATION CONTOUR (FT, MSL)(NOTE 1)
- EXISTING ROAD
- EXISTING FENCE
- EXISTING BUILDING
- COORDINATE GRID
- SUBCELL BOUNDARY
- PROPOSED TOP OF LINER (FT, MSL) (NOTE 2)
- LANDFILL LIMIT
- 1983 McCLELLAND ENGINEERS, INC. BORINGS
- 1992 JONES AND NEUSE, INC. BORINGS
- 2011 AMEC GEOMATRIX BORINGS
- 2012 AMEC GEOMATRIX DPT BORINGS
- 2013 GEOSYNTEC DPT BORINGS

0 150' 300'
SCALE IN FEET

NOTES:

1. THE EXISTING CONTOUR BASE MAP SHOWN ON THIS DRAWING WAS COMPILED USING AN AERIAL SURVEY BASED ON PHOTOGRAPHY PERFORMED ON 23 OCTOBER 2013 BY SURDEX CORPORATION AND LIDAR DATA PUBLISHED DECEMBER 2008 AND PROVIDED BY LCRA SURVEYING, MAPPING, AND GIS.
2. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL (FT, MSL) AS DEFINED BY THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. STATE PLANE COORDINATE GRID CORRESPONDS TO TEXAS STATE PLANE COORDINATE SYSTEM, TEXAS CENTRAL ZONE (4203), NORTH AMERICAN DATUM 1983 (NAD-83).
3. SUBCELL 2D WAS PREVIOUSLY CONSTRUCTED WITH A LINER SYSTEM AND IS CURRENTLY BEING USED AS A WASTE STORAGE / PRODUCT PREPARATION AREA.



MAP SOURCE: TXDOT URBAN COUNTY MAP

LOCATION MAP
0 2 MILES
APPROXIMATE SCALE

REV	DATE	DESCRIPTION	DRN	APP

LCRA
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8217 SHOAL CREEK BLVD., SUITE 200
AUSTIN, TEXAS 78757
PHONE: 512.451.4003

TITLE: CROSS SECTION LOCATION MAP

PROJECT: LOCATION RESTRICTIONS CERTIFICATION REPORT

SITE: FAYETTE POWER PROJECT
COMBUSTION BYPRODUCT LANDFILL

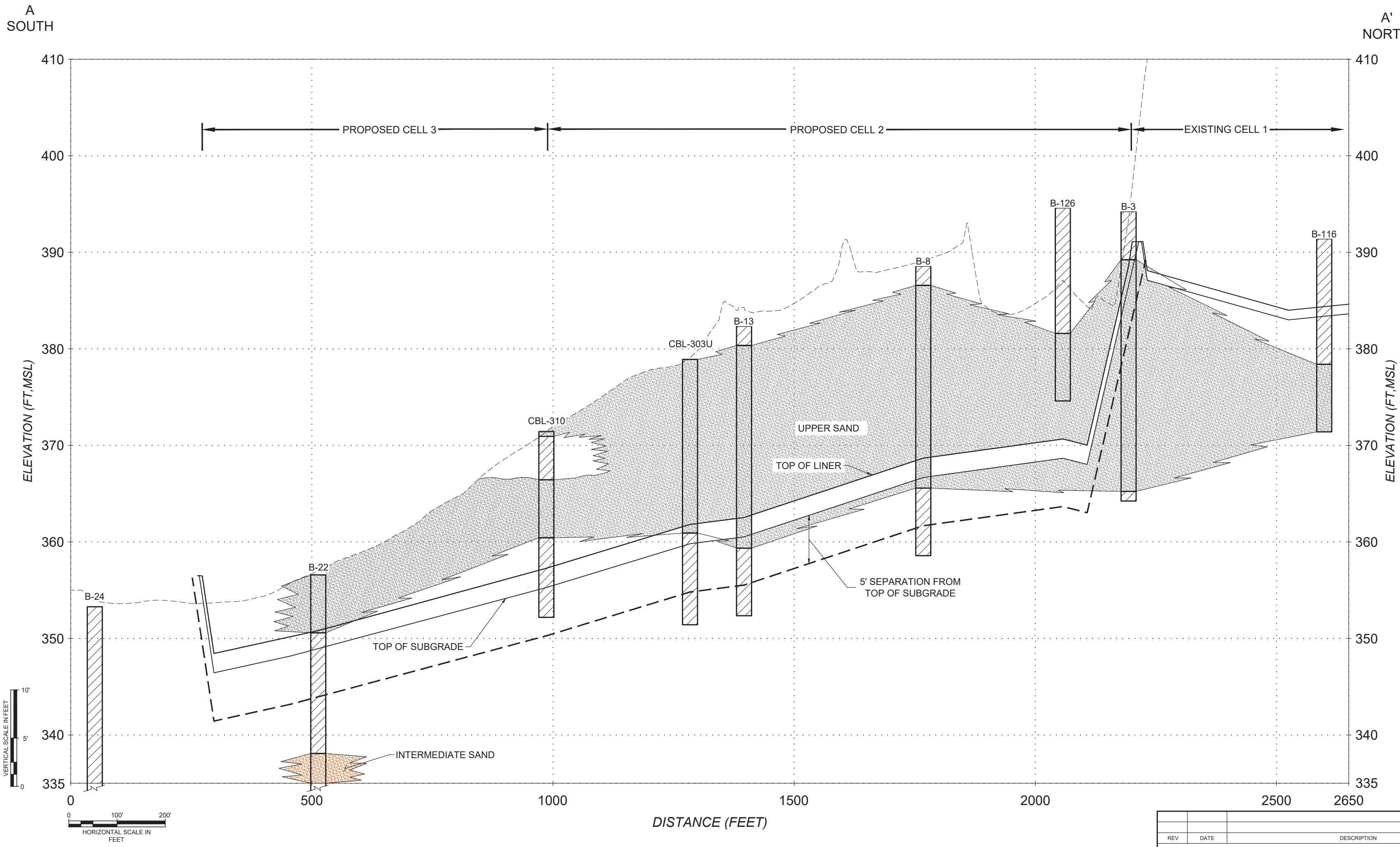
DESIGN BY:	MZI	DATE:	JANUARY 2022
DRAWN BY:	JJV/KH	PROJECT NO.:	FL8518.01
CHECKED BY:	MZI	FILE:	TXL022508F01
REVIEWED BY:	BG	FIGURE NO.:	1
APPROVED BY:	BG		

STATE OF TEXAS
BETH ANN GROSS
79864
LICENSED PROFESSIONAL ENGINEER
FOR PERMIT PURPOSES ONLY

Beth Ann Gross
SIGNATURE
1/21/2022
DATE

CCR RULE COMPLIANCE DRAWING

DRAWING: P:\CADD\Projects\Fayette power plant\eng design\ccr rule compliance (txl0225.08)\DRAWINGS\TXL022508F01.dwg PLOTTED: Jan 21, 2022 - 6:44pm



LEGEND

- SURFACE TOPOGRAPHY
- UPPER SAND
- INTERMEDIATE SAND (SATURATED ZONE)
- INTERMEDIATE SAND (UNSATURATED ZONE)
- — ? — ? — INFERRED STRATA LAYER

B-13

- CONFINING STRATA (CLAY, SILTY CLAY, SANDY CLAY, OR GRAVELLY CLAY)
- TRANSMISSIVE STRATA (GRAVEL SAND, SILTY SAND, OR CLAYEY SAND)

BORING

SECT A
HORIZONTAL: 1" =100'
VERTICAL: 1" =5'

NOTE:

1. SLOPES AND LAYER THICKNESS MAY APPEAR DISTORTED ON THESE CROSS SECTIONS DUE TO THE EXAGGERATED VERTICAL SCALE AND THE SKEWED ANGLE AT WHICH THE SECTIONS WERE CUT COMPARED TO THE THREE-DIMENSIONAL SLOPE DIRECTIONS.

CCR RULE COMPLIANCE DRAWING

REV	DATE	DESCRIPTION	DRN	APP

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ENERGY WATER COMMUNITY SERVICES
LOWER COLORADO RIVER AUTHORITY
3700 LAKE AUSTIN BLVD.
AUSTIN, TEXAS 78703
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TEXAS ENG. FIRM REGISTRATION NO. 1182
8217 SHOAL CREEK BLVD., SUITE 200
AUSTIN, TEXAS 78757
PHONE: 512.451.4003

TITLE: CROSS-SECTION A-A'

PROJECT: LOCATION RESTRICTIONS CERTIFICATION REPORT

SITE: FAYETTE POWER PROJECT
COMBUSTION BYPRODUCT LANDFILL

Beth Ann Gross
SIGNATURE
1/21/2022
DATE

STATE OF TEXAS
BETH ANN GROSS
79864
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DESIGN BY:	MZI	DATE:	JANUARY 2022
DRAWN BY:	JJV/KH	PROJECT NO.:	FL8518.01
CHECKED BY:	MZI/BD	FILE:	TXL022508F02
REVIEWED BY:	BG	FIGURE NO.:	2
APPROVED BY:	BG		

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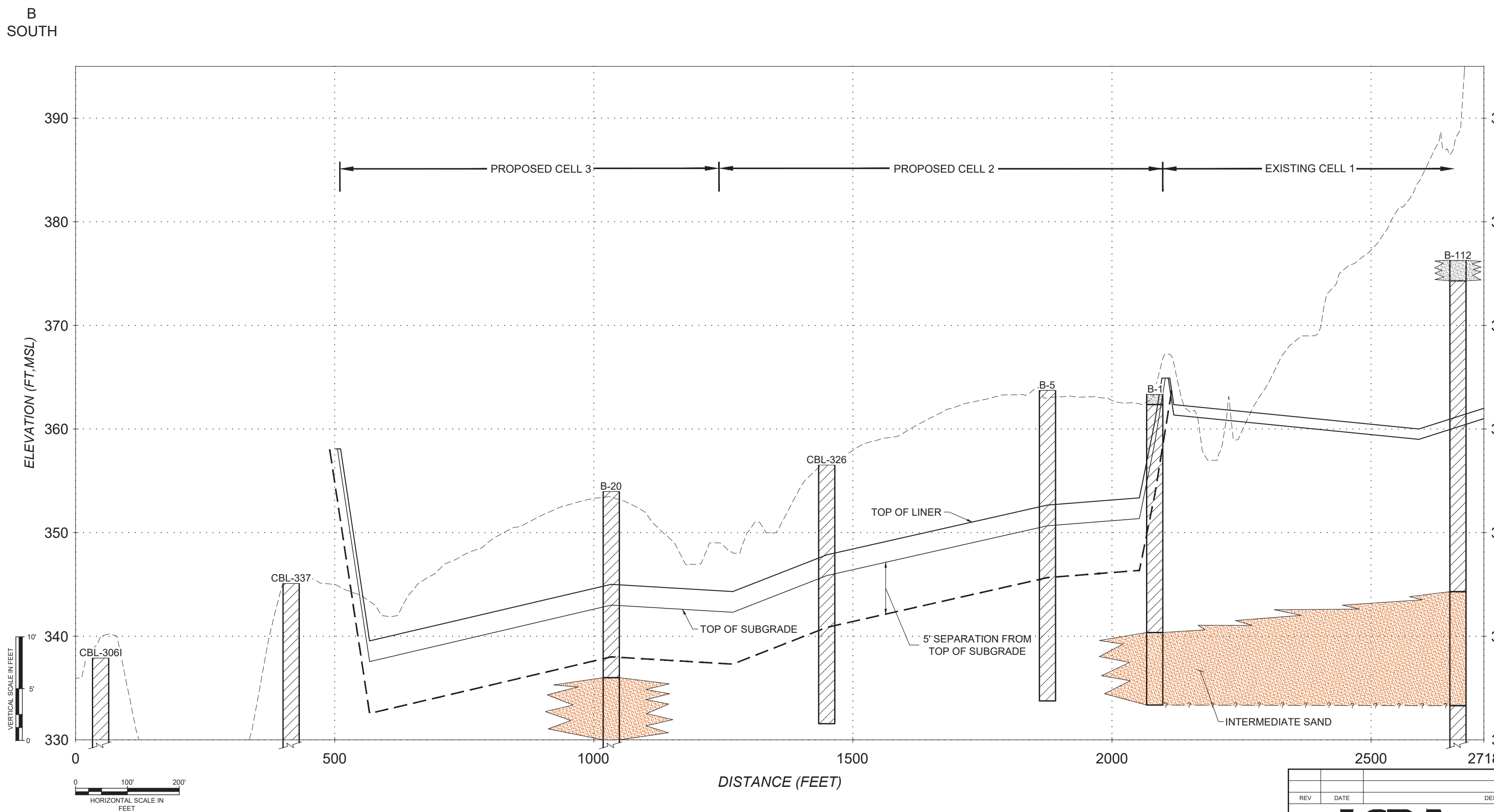

SECT B
HORIZONTAL: 1" =100'
VERTICAL: 1" =5'

LEGEND

- — — — SURFACE TOPOGRAPHY
- UPPER SAND
- INTERMEDIATE SAND (SATURATED ZONE)
- INTERMEDIATE SAND (UNSATURATED ZONE)
- — ? — ? — INFERRED STRATA LAYER

B-13

- CONFINING STRATA (CLAY, SILTY CLAY, SANDY CLAY, OR GRAVELLY CLAY)
- TRANSMISSIVE STRATA (GRAVEL, SAND, SILTY SAND, OR CLAYEY SAND)

BORING

NOTE:

1. SLOPES AND LAYER THICKNESS MAY APPEAR DISTORTED ON THESE CROSS SECTIONS DUE TO THE EXAGGERATED VERTICAL SCALE AND THE SKEWED ANGLE AT WHICH THE SECTIONS WERE CUT COMPARED TO THE THREE-DIMENSIONAL SLOPE DIRECTIONS.

CCR RULE COMPLIANCE DRAWING

REV	DATE	DESCRIPTION	DRN	APP

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AUSTIN, TEXAS 78757
PHONE: 512.451.4003

TITLE: CROSS-SECTION B-B'

PROJECT: LOCATION RESTRICTIONS CERTIFICATION REPORT

SITE: FAYETTE POWER PROJECT
COMBUSTION BYPRODUCT LANDFILL

Beth Ann Gross
SIGNATURE
1/21/2022
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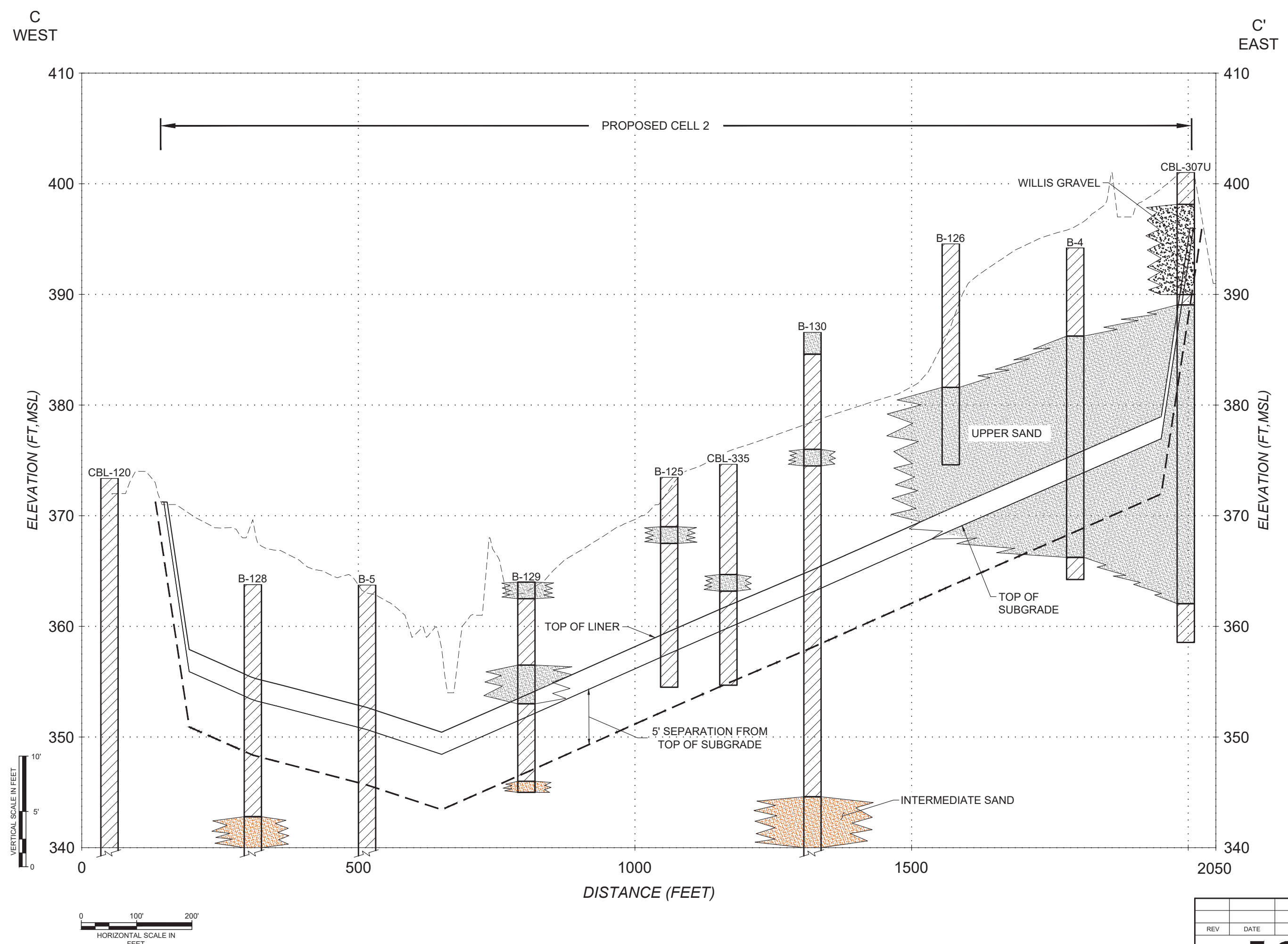
DESIGN BY:	MZI	DATE:	JANUARY 2022
DRAWN BY:	JJV/KH	PROJECT NO.:	FL8518.01
CHECKED BY:	MZI/BD	FILE:	TXL022508F02A
REVIEWED BY:	BG	FIGURE NO.:	
APPROVED BY:	BG		3

DRAWING: P:\CADD\Projects\F\fayette power plant\eng design\ccr rule compliance (fs0225.08)\DRAWINGS\TXL022508F02A.dwg PLOTTED: Jan 21, 2022 - 6:47pm



SECT C
HORIZONTAL: 1" =100'
VERTICAL: 1" =5'

LEGEND

- - - SURFACE TOPOGRAPHY
UPPER SAND
INTERMEDIATE SAND (SATURATED ZONE)
INTERMEDIATE SAND (UNSATURATED ZONE)
— ? — ? — INFERRED STRATA LAYER

B-13
CONFINING STRATA (CLAY, SILTY CLAY, SANDY CLAY, OR GRAVELLY CLAY)
TRANSMISSIVE STRATA (GRAVEL, SAND, SILTY SAND, OR CLAYEY SAND)
BORING

NOTE:

1. SLOPES AND LAYER THICKNESS MAY APPEAR DISTORTED ON THESE CROSS SECTIONS DUE TO THE EXAGGERATED VERTICAL SCALE AND THE SKEWED ANGLE AT WHICH THE SECTIONS WERE CUT COMPARED TO THE THREE-DIMENSIONAL SLOPE DIRECTIONS.

CCR RULE COMPLIANCE DRAWING

REV	DATE	DESCRIPTION	DRN	APP

LCRA
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3700 LAKE AUSTIN BLVD.
AUSTIN, TEXAS 78703
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TEXAS ENG. FIRM REGISTRATION NO. 1182
8217 SHOAL CREEK BLVD., SUITE 200
AUSTIN, TEXAS 78757
PHONE: 512.451.4003

TITLE: CROSS-SECTION C-C'

PROJECT: LOCATION RESTRICTIONS CERTIFICATION REPORT

SITE: FAYETTE POWER PROJECT
COMBUSTION BYPRODUCT LANDFILL

Beth Ann Gross
SIGNATURE
1/21/2022
DATE

STATE OF TEXAS
BETH ANN GROSS
79864
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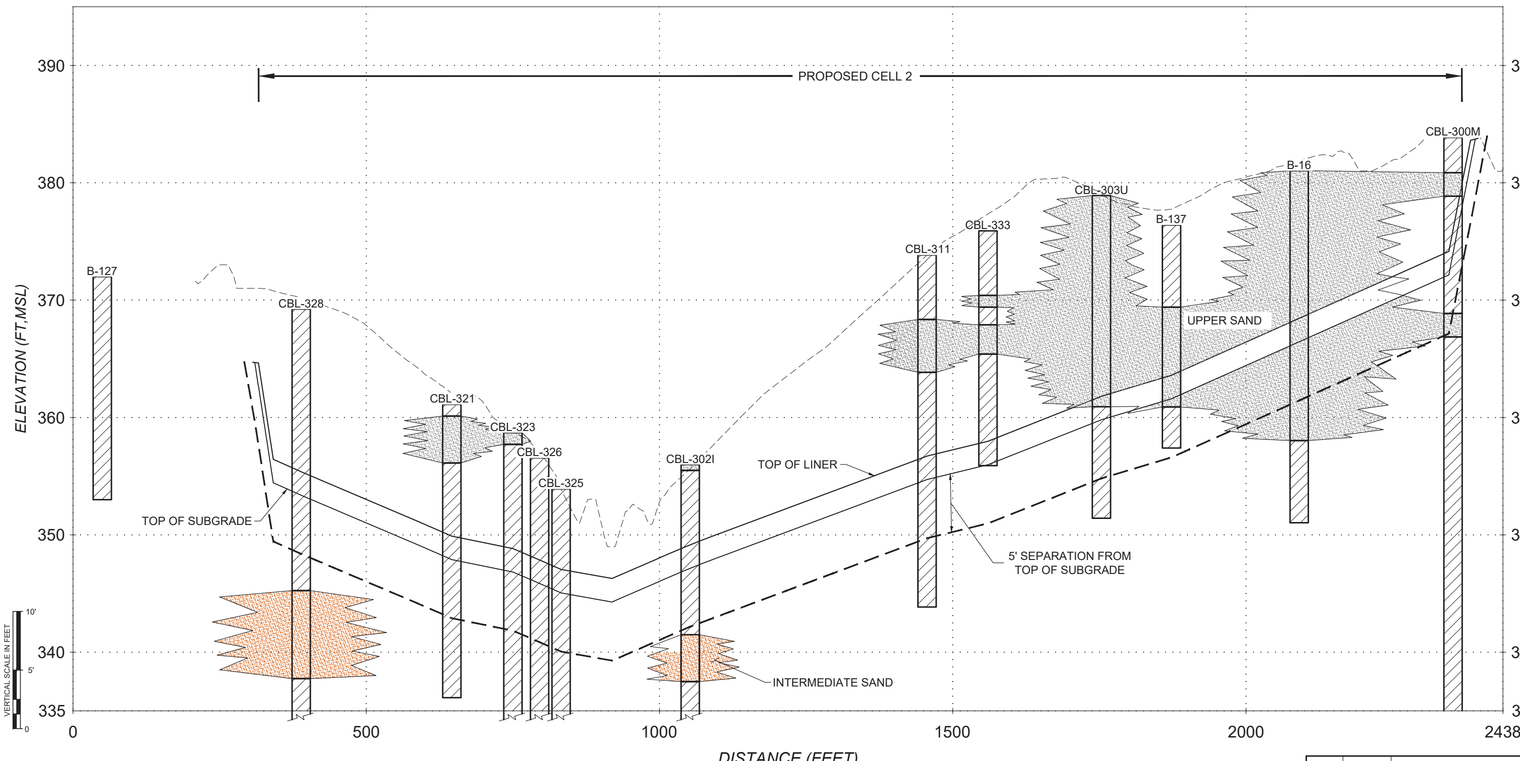
DESIGN BY:	MZI	DATE:	JANUARY 2022
DRAWN BY:	JJV/KH	PROJECT NO.:	FL8518.01
CHECKED BY:	MZI/BD	FILE:	TXL022508F02B
REVIEWED BY:	BG	FIGURE NO.:	4
APPROVED BY:	BG		

D
WEST

D'
EAST



0 100' 200'
HORIZONTAL SCALE IN FEET

SECT D
HORIZONTAL: 1" =100'
VERTICAL: 1" =5'

LEGEND

- SURFACE TOPOGRAPHY
- UPPER SAND
- INTERMEDIATE SAND (SATURATED ZONE)
- INTERMEDIATE SAND (UNSATURATED ZONE)
- — ? — ? — INFERRED STRATA LAYER

B-13
- CONFINING STRATA (CLAY, SILTY CLAY, SANDY CLAY, OR GRAVELLY CLAY)
- TRANSMISSIVE STRATA (GRAVEL, SAND, SILTY SAND, OR CLAYEY SAND)

BORING

NOTE:

1. SLOPES AND LAYER THICKNESS MAY APPEAR DISTORTED ON THESE CROSS SECTIONS DUE TO THE EXAGGERATED VERTICAL SCALE AND THE SKEWED ANGLE AT WHICH THE SECTIONS WERE CUT COMPARED TO THE THREE-DIMENSIONAL SLOPE DIRECTIONS.

CCR RULE COMPLIANCE DRAWING

REV	DATE	DESCRIPTION	DRN	APP

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PHONE: 512.473.3200

Geosyntec consultants
GEOSYNTEC CONSULTANTS, INC.
TEXAS ENG. FIRM REGISTRATION NO. 1182
8217 SHOAL CREEK BLVD., SUITE 200
AUSTIN, TEXAS 78757
PHONE: 512.451.4003

TITLE: CROSS-SECTION D-D'

PROJECT: LOCATION RESTRICTIONS CERTIFICATION REPORT

SITE: FAYETTE POWER PROJECT
COMBUSTION BYPRODUCT LANDFILL

Beth Ann Gross
SIGNATURE
1/21/2022
DATE

STATE OF TEXAS
BETH ANN GROSS
79864
LICENSED
PROFESSIONAL ENGINEER
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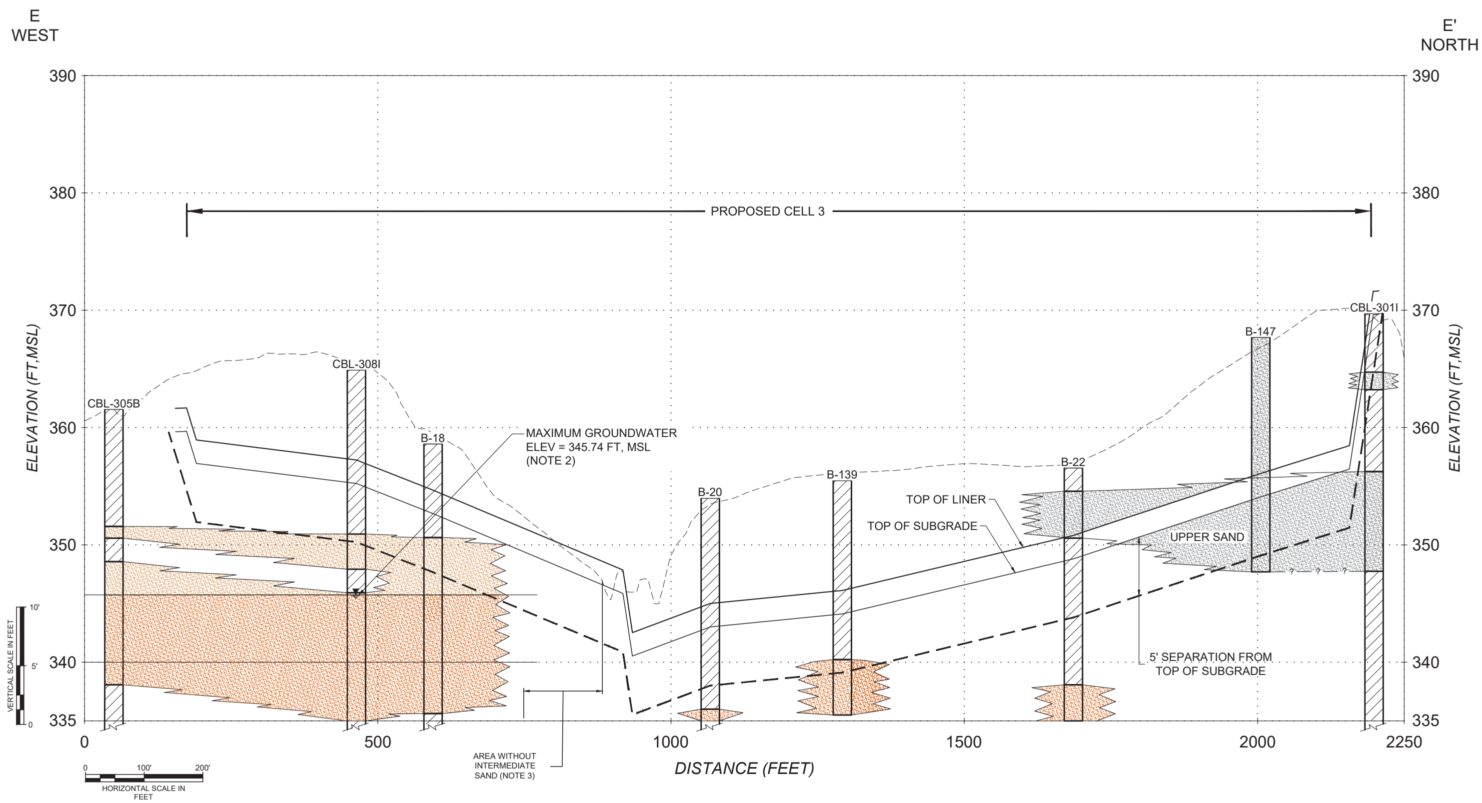
DESIGN BY:	MZI	DATE:	JANUARY 2022
DRAWN BY:	JJV/KH	PROJECT NO.:	FL8518.01
CHECKED BY:	MZI/BD	FILE:	TXL022508F02C
REVIEWED BY:	BG	FIGURE NO.:	5
APPROVED BY:	BG		

DRAWING: P:\CADD\Projects\F\fayette power plant\eng design\ccr rule compliance (fs8225.08)\DRAWINGS\TXL022508F02C.dwg PLOTTED: Jan 21, 2022 - 8:49pm



SECT E
HORIZONTAL: 1" =100'
VERTICAL: 1" =5'

LEGEND

- SURFACE TOPOGRAPHY
- UPPER SAND
- INTERMEDIATE SAND (SATURATED ZONE)
- INTERMEDIATE SAND (UNSATURATED ZONE)
- — ? — ? — INFERRED STRATA LAYER

B-13
- CONFINING STRATA (CLAY, SILTY CLAY, SANDY CLAY, OR GRAVELLY CLAY)
- TRANSMISSIVE STRATA (GRAVEL, SAND, SILTY SAND, OR CLAYEY SAND)

BORING

NOTES:

1. SLOPES AND LAYER THICKNESS MAY APPEAR DISTORTED ON THESE CROSS SECTIONS DUE TO THE EXAGGERATED VERTICAL SCALE AND THE SKEWED ANGLE AT WHICH THE SECTIONS WERE CUT COMPARED TO THE THREE-DIMENSIONAL SLOPE DIRECTIONS.
2. MAXIMUM WATER LEVEL ELEVATION RECORDED IN CBL-308I WAS ASSUMED TO APPLY TO BORINGS CBL-305B AND B-18.
3. BASED ON FIGURE 1 IN AMEC, "COMBUSTION BYPRODUCTS LANDFILL - COAL COMBUSTION RESIDUALS RULE GROUNDWATER MONITORING WELL SYSTEM," LETTER REPORT TO LCRA, OCT 2017.

CCR RULE COMPLIANCE DRAWING

REV	DATE	DESCRIPTION	DRN	APP

LCRA
ENERGY • WATER • COMMUNITY SERVICES
LOWER COLORADO RIVER AUTHORITY
3700 LAKE AUSTIN BLVD.
AUSTIN, TEXAS 78703
PHONE: 512.473.3200

Geosyntec consultants
GEOSYNTEC CONSULTANTS, INC.
TEXAS GEOSCIENCE FIRM REGISTRATION NO. 50256
8217 SHOAL CREEK BLVD., SUITE 200
AUSTIN, TEXAS 78757
PHONE: 512.451.4003

TITLE: CROSS-SECTION E-E'

PROJECT: LOCATION RESTRICTIONS CERTIFICATION REPORT

SITE: FAYETTE POWER PROJECT
COMBUSTION BYPRODUCT LANDFILL

Beth Ann Gross
SIGNATURE
1/21/2022
DATE

STATE OF TEXAS
BETH ANN GROSS
79864
LICENSED
PROFESSIONAL ENGINEER
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DESIGN BY:	MZI	DATE:	JANUARY 2022
DRAWN BY:	JJV/KH	PROJECT NO.:	FL8518.01
CHECKED BY:	MZI/BD	FILE:	TXL022508F02D
REVIEWED BY:	BG	FIGURE NO.:	
APPROVED BY:	BG		6

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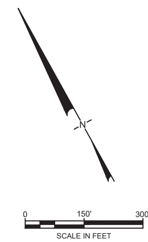


LEGEND

- EXISTING GROUND ELEVATION CONTOUR (FT, MSL)(NOTE 1)
- EXISTING ROAD
- EXISTING FENCE
- EXISTING BUILDING
- COORDINATE GRID
- LIMIT OF WASTE
- SUBCELL BOUNDARY
- PROPOSED TOP OF LINER (FT, MSL) (NOTE 2)
- LIMIT OF LINER CONSTRUCTION
- FRESHWATER POND (NOTE 3)

NOTES:

1. THE EXISTING CONTOUR BASE MAP SHOWN ON THIS DRAWING WAS COMPILED USING AN AERIAL SURVEY BASED ON PHOTOGRAPHY PERFORMED ON 23 OCTOBER 2020 BY SKYVEYOR AND LIDAR DATA PUBLISHED DECEMBER 2008 AND PROVIDED BY LCRA SURVEYING, MAPPING, AND GIS.
2. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL (FT, MSL) AS DEFINED BY THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. STATE PLANE COORDINATE GRID CORRESPONDS TO TEXAS STATE PLANE COORDINATE SYSTEM, TEXAS CENTRAL ZONE (4203), NORTH AMERICAN DATUM 1983 (NAD-83).
3. MANMADE FEATURES IDENTIFIED AS FRESHWATER PONDS ON THE U.S. FISH AND WILDLIFE SERVICE NATIONAL WETLANDS INVENTORY (ACCESSED NOVEMBER 2015). THESE FEATURES DO NOT MEET THE DEFINITION OF WETLANDS AS DEFINED IN 40 CFR § 232.2.

REV	DATE	DESCRIPTION	DRN	APP

LCRA
ENERGY • WATER • COMMUNITY SERVICES
LOWER COLORADO RIVER AUTHORITY
3700 LAKE AUSTIN BLVD.
AUSTIN, TEXAS 78703
PHONE: 512.473.3200

Geosyntec consultants
GEOSYNTEC CONSULTANTS, INC.
TEXAS ENG. FIRM REGISTRATION NO. 1182
8217 SHOAL CREEK BLVD., SUITE 200
AUSTIN, TEXAS 78757
PHONE: 512.451.4003

TITLE: WETLANDS INVENTORY MAP

PROJECT: LOCATION RESTRICTIONS CERTIFICATION REPORT

SITE: FAYETTE POWER PROJECT
COMBUSTION BYPRODUCT LANDFILL

Beth Ann Gross
SIGNATURE
1/21/2022
DATE

STATE OF TEXAS
BETH ANN GROSS
79864
LICENSED
PROFESSIONAL ENGINEER
FOR PERMIT PURPOSES ONLY

DESIGN BY:	MZI	DATE:	JANUARY 2022
DRAWN BY:	JJV/KH	PROJECT NO.:	FL8518.01
CHECKED BY:	MZI	FILE:	TXL022508F03
REVIEWED BY:	BG	FIGURE NO.:	7
APPROVED BY:	BG		

CCR RULE COMPLIANCE DRAWING

DRAWING: P:\CADD\Projects\Fayette power plant\eng design\ccr rule compliance (fx0225.08\DRAWINGS\TXL022508F03.dwg PLOTTED: Jan 21, 2022 - 6:51pm

APPENDICES

APPENDIX A

Certification by a Qualified Professional Engineer

CERTIFICATION BY A QUALIFIED PROFESSIONAL ENGINEER

The report was prepared by Geosyntec under the direction of Dr. Beth Ann Gross, P.E., a qualified professional engineer, in accordance with 30 TAC §352.231(d) and 30 TAC §352.4.

I certify that location restriction demonstrations presented herein are appropriate for evaluating the the the Combustion Byproduct Landfill at the Fayette Power Project (FPP) and that the demonstrations meet the requirements of 40 CFR 257.60(a), 40 CFR 257.61(a), 40 CFR 257.62(a), and 40 CFR 257.63(a).

Beth Ann Gross
Printed Name of Licensed Professional Engineer

Beth Ann Gross
Signature

January 21, 2022
Date

Geosyntec Consultants, Inc.
Texas Registered Engineering Firm
No. F-1182

APPENDIX B

Boring Logs

Log of Boring

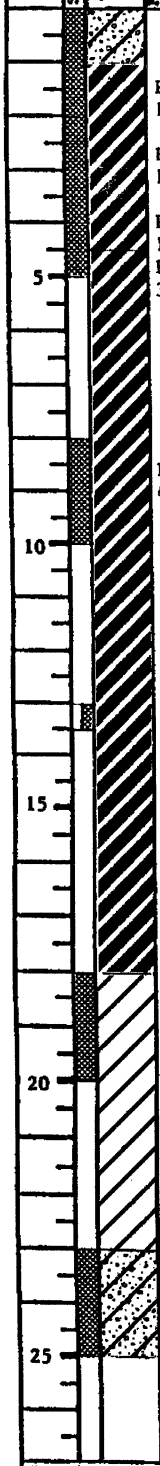
Number B-1

Location N 760,940 E 2,710,330

Project Fayette Power Plant Disposal Area LaGrange, Texas JN026412.1

Type Intermittent

Surface Elevation 363.36



Depth	Samples	Symbol	Penetrometer Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (RQD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Tsps/Sq. Ft.
				CLAYEY SAND WITH GRAVEL, Dark Brown, Moist to Wet (SC) with organics									
			P.P. 1.3	SANDY FAT CLAY, Stiff, Dark Grayish Brown and Reddish Brown, Moist (CH) with scattered gravel			31.9		92	71	65.3		
			P.P. 1.5										
			P.P. 1.9										
5			P.P. 3.1	SANDY FAT CLAY, Very Stiff to Hard, Light Gray and Red, Dry (CH)			18.0		53	37	53.7		
			P.P. 4.3										
10													
15													
20				SANDY LEAN CLAY, Light Gray, Moist (CL) with calcium deposits			20.4		41	26	55.3		
			P.P. 2.3	CLAYEY SAND, Medium Dense, Light Gray, Wet to Moist (SC)			22.5		35	16	32.0		
25				Continued on next page									

Completion Depth 30' Date 4-9-92

Water Observations WATER ENCOUNTERED AT 26' DURING DRILLING / WATER AT 9' AFTER 24 HOURS

JONES AND NEUSE, INC.

153702

Log of Boring

Number B-1

Location N 760,940 E 2,710,330

Project Fayette Power Plant Disposal Area LaGrange, Texas JN026412.1

Type Intermittent

Surface Elevation 363.36

Depth Feet	Samples	Symbol	Penetrometer Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (RQD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Kips/Sq. Ft.
			P.P. 2.6	CLAYEY SAND, Medium Dense, Light Gray, Wet to Moist (SC)									
30									48	29			
				P.P. = Pocket Penetrometer S.P.T. = Standard Penetration Test Boring grouted with bentonite/grout mix									

Completion Depth 30' Date 4-9-92

Water Observations

JONES AND NEUSE, INC.

153702

Log of Boring

Number B-3 | Location N 760,854 E 2,711,162

Project: Fayette Power Plant Disposal Area — LaGrange, Texas — JN026412.1

Type: Intermittent

Surface Elevation: 394.23

Depth (Feet)	Samples	Symbol	Penetrometer Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (RQD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Kips/Sq. Ft.
				FAT CLAY WITH GRAVEL, Dark Grayish Brown (CH)									
				SANDY FAT CLAY, Light Gray and Brown, Dry (CH)									
5			P.P. 4.5+	CLAYEY SAND, Dense, Light Gray and Very Pale Brown, Dry (SC)									
			P.P. 4.5+				10.9		36	20	37.2		
10													
			P.P. 4.5+										
15													
				POORLY GRADED SAND WITH SILT, Very Dense, Gray, Dry (SP-SM)									
20			SPT 18 25 47				3.7				9.8		
25				Continued on next page									

Completion Depth: 30' — Date: 3-31-92

Water Observations: NO WATER ENCOUNTERED DURING DRILLING / NO 24 HOUR READINGS OBTAINED

JONES AND NEUSE, INC.

153702

Log of Boring

Number: B-3

Location: N 760,854 E 2,711,162

Project: Fayette Power Plant Disposal Area — LaGrange, Texas — JN026412.1

Type: Intermittent

Surface Elevation: 394.23

Depth Feet	Samples	Symbol	Penetrometer Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (RQD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Kips/Sq. Ft.
			SPT 20 22 39	SILTY SAND, Very Dense, Light Yellowish Brown and Light Gray, Dry to Wet (SM)			16.8				13.6		
30				FAT CLAY, Light Gray and Olive Yellow, Moist (CH) with calcium deposits			27.8		59	32	86.2		

P.P. = Pocket Penetrometer
S.P.T. = Standard Penetration Test

Boring grouted with bentonite/grout mix

Completion Depth: 30' — Date: 3-31-92

Water Observations

JONES AND NEUSE, INC.

153702

Log of Boring

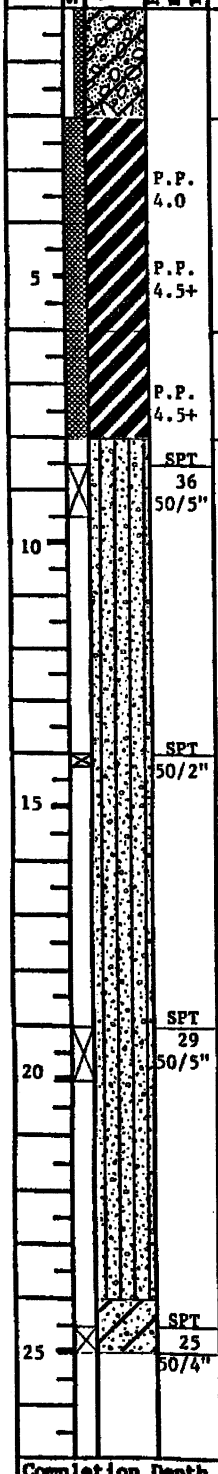
Number B-4

Location N 760,720 E 2,711,473

Project Fayette Power Plant Disposal Area LaGrange, Texas JN026412.1

Type Intermittent

Surface Elevation 394.23



Depth Feet	Samples	Symbol	Penetrometer Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (RQD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Kips/Sq. Ft.
				CLAYEY GRAVEL, Light Gray, Moist (GC)									
			P.P. 4.0	FAT CLAY WITH SAND, Hard, Light Gray and Yellow Moist (CH) with calcium deposits and scattered gravel			31.8		75	46	82.8		
5			P.P. 4.5+										
			P.P. 4.5+	SANDY FAT CLAY, Hard, Light Gray, Olive Yellow, and White, Moist (CH) with calcium deposits and calcareous particles			12.7		57	38	59.9		
			SPT 36 50/5"	SILTY SAND, Very Dense, Light Gray, Dry (SM)			6.4		18	1	23.5		
10													
15			SPT 50/2"										
20			SPT 29 50/5"										
25			SPT 25 50/4"	CLAYEY SAND, Very Dense, Light Gray and Olive Yellow, Moist (SC)			19.3		37	23	34.6		
				Continued on next page									

Completion Depth 30' Date 3-31-92

Water Observations

WATER ENCOUNTERED AT 24' DURING DRILLING / NO 24 HOUR READINGS OBTAINED

JONES AND NEUSE, INC.

153702

Log of Boring

Number B-4

Location N 760,720 E 2,711,473

Project

Fayette Power Plant Disposal Area LaGrange, Texas JN026412.1

Type: Intermittent

Surface Elevation: 394.23

Depth (Feet)	Sample	Symbol	Penetrometer Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (RQD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Kips/Sq. Ft.
				CLAYEY SAND, Very Dense, Light Gray and Olive Yellow, Moist (SC)									
			P.P. 4.5+	FAT CLAY, Hard, Pale Yellow and Brownish Yellow, Moist (CH)									
30							27.1		71	47	95.5		

P.P. = Pocket Penetrometer
S.P.T. = Standard Penetration Test

Boring grouted with bentonite/grout mix

Completion Depth 30' Date 3-31-92

Water Observations

JONES AND NEUSE, INC.

153702

Log of Boring

Number B-5 | Location N 760,775 E 2,710,205

Project: Fayette Power Plant Disposal Area | LaGrange, Texas | JN026412.1

Type: Intermittent

Surface Elevation: 363.76

Depth (Feet)	Samples	Symbol	Penetrometer Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (RQD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Kips/Sq. Ft.
				SANDY FAT CLAY, Stiff, Very Dark Gray, Moist (CH) with organics and silty sand seams									
			P.P. 1.6				22.9		61	41	50.2		
5			P.P. 1.8										
			P.P. 1.5										
			P.P. 2.5	LEAN CLAY, Very Stiff, Light Gray and White, Moist (CL) with calcium deposits									
			P.P. 2.5										
10													
			P.P. 2.7	LEAN CLAY WITH SAND, Very Stiff, Pale Yellow, Dry (CL) with calcium deposits			21.9		42	24	81.8		
15													
			P.P. 2.3										
20													
				SANDY LEAN CLAY, Very Stiff, Light Gray and Olive Yellow, Moist (CL)			19.7		41	26	51.4		
25													
				Continued on next page									

Completion Depth: 30' | Date: 4-9-92

Water Observations: WATER ENCOUNTERED AT 24' DURING DRILLING / WATER AT 9' AFTER 24 HOURS

JONES AND NEUSE, INC.

153702

Log of Boring

Number B-5

Location N 760,775 E 2,710,205

Project Fayette Power Plant Disposal Area LaGrange, Texas JN026412.1

Type Intermittent

Surface Elevation 363.76

Depth Feet	Samples	Symbol	Penetrometer Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (RQD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Kips/Sq. Ft.
				SANDY LEAN CLAY, Very Stiff, Light Gray and Olive Yellow, Moist (CL)									
			P.P. 3.3										
30				P.P. = Pocket Penetrometer S.P.T. = Standard Penetration Test Boring grouted with bentonite/grout mix									

Completion Depth 30' Date 4-9-92

Water Observations

JONES AND NEUSE, INC.

153702

Log of Boring

Number B-8

Location N 760,467 E 2,711,190

Project Fayette Power Plant Disposal Area — LaGrange, Texas — JN026412.1

Type: Intermittent

Surface Elevation: 388.57

Depth (Feet)	Sample Symbol	Penetrometer Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (RQD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Kips/Sq. Ft.
		P.P. 2.8	GRAVELLY FAT CLAY WITH SAND, Very Stiff, Reddish Brown, Moist (CH)									
		P.P. 2.8	CLAYEY GRAVEL, Very Dense, Light Gray and Red, Dry (GC)									
		P.P. 4.5+				7.2		66	51	27.6		
5		SPT 50/4"										
			CLAYEY SAND, Very Dense, Reddish Yellow, Dry (SC)									
10		SPT 29 34 37										
						6.0		54	39	20.3		
15												
		SPT 30 36 31										
20												
		P.P. 2.3	SANDY FAT CLAY, Very Stiff, White, Moist (CH)			29.7		70	45	68.8		
25			Continued on next page									

Completion Depth 30' — Date 3-30-92

Water Observations: NO WATER ENCOUNTERED DURING DRILLING / NO 24 HOUR READINGS OBTAINED

JONES AND NEUSE, INC.

153702

Log of Boring

Number B-8

Location N 760,467 E 2,711,190

Project Fayette Power Plant Disposal Area LaGrange, Texas JN026412.1

Type Intermittent

Surface Elevation 388.57

Depth Feet	Samples	Symbol	Penetrometer Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (ROD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Kips/Sq. Ft.
				SANDY FAT CLAY, Very Stiff, White, Moist (CH)									
			P.P. 4.5+	LEAN CLAY WITH SAND, Hard, Light Gray, Dry (CL)									
30							14.1		39	25	82.4		

P.P. = Pocket Penetrometer
S.P.T. = Standard Penetration Test

Boring grouted with bentonite/grout mix

Completion Depth 30' Date 3-30-92

Water Observations

JONES AND NEUSE, INC.

153702

Log of Boring

Number: B-13

Location: N 760,190 E 2,710,942

Project: Fayette Power Plant Disposal Area — LaGrange, Texas — JNO26412.1

Type: Intermittent

Surface Elevation: 382.35

Depth (Feet)	Samples	Symbol	Penetrometer Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (RQD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Kips/Sq. Ft.
			P.P. 1.9	SANDY FAT CLAY WITH GRAVEL, Stiff, Yellowish Red and Yellowish Brown, Moist to Wet (CH) with organics									
			P.P. 4.5+	CLAYEY SAND, Dense, Red, Light Gray, and Gray, Dry (SC) with scattered gravel			15.4		61	41	32.3		
5			P.P. 4.5+										
			P.P. 4.5+										
			SPT 18 17 25				17.5		65	46	37.4		
10													
15				CLAYEY SAND, Dense, Light Gray, Moist (SC)									
20			P.P. 3.7				15.2		50	34	25.7		
25			P.P. 4.5+	LEAN CLAY, Hard, Light Gray and Brownish Yellow, Dry (CL)			16.0		42	23	94.4		
				Continued on next page									

Completion Depth: 30'

Date: 3-30-92

Water Observations: NO WATER ENCOUNTERED DURING DRILLING / NO 24 HOUR READINGS OBTAINED

JONES AND NEUSE, INC.

153702

Log of Boring

Number B-13

Location N 760,190 E 2,710,942

Project

Fayette Power Plant Disposal Area LaGrange, Texas JN026412.1

Type: Intermittent

Surface Elevation: 382.35

Depth Feet	Sample	Symbol	Penetrometer Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (RQD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Tsf/Sq. Ft.
				LEAN CLAY, Hard, Light Gray and Brownish Yellow, Dry (CL)									
			P.P. 4.5+	FAT CLAY, Hard, Pale Yellow, Moist to Dry (CH)			22.0		62	41	93.6		

P.P. = Pocket Penetrometer
S.P.T. = Standard Penetration Test

Boring grouted with bentonite/grout mix

Completion Depth 30' Date 3-30-92

Water Observations

JONES AND NEUSE, INC.

153702

Log of Boring

Number B-16

Location N 760,002.708 E 2,711,227.595

Project Fayette Power Plant Disposal Area LaGrange, Texas JN026412.1

Type Intermittent

Surface Elevation 381.03

Depth Feet	Samples	Symbol	Penetrometer Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (ROD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Kips/Sq. Ft.
				SILTY SAND WITH GRAVEL, Loose, Yellowish Brown, Moist to Dry (SM) with organics									
			P.P. 2.1	CLAYEY GRAVEL WITH SAND, Medium Dense, Light Brownish Gray and Yellowish Brown, Moist to Dry (GC)			16.8		75	56	41.8		
5			P.P. 2.7										
			P.P. 4.5+ SPT 40 50/4"	CLAYEY SAND, Very Dense, Light Gray, Dry (SC)			12.5		66	43	36.8		
10			P.P. 1.8 SPT 20 32 48	SILTY SAND, Very Dense, Light Gray, Moist to Dry (SM)									
15													
			P.P. 2.8	CLAYEY SAND, Medium Dense, Light Gray, Wet (SC)			24.3		46	32	48.9		
20													
			P.P. 4.3	FAT CLAY, Hard, Light Gray and Brownish Yellow, Moist (CH)			31.5		69	40	94.9		
25													
				Continued on next page									

Completion Depth 30' Date 3-31-92

Water Observations NO WATER ENCOUNTERED DURING DRILLING / DRY AFTER 24 HOURS

JONES AND NEUSE, INC.

153702

Log of Boring

Number B-16 | Location N 760,002.708 E 2,711,227.595

Project Fayette Power Plant Disposal Area | LaGrange, Texas | JN026412.1

Type Intermittent

Surface Elevation 381.03

Depth	Samples	Symbol	Penetrometer Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (ROD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Kips/Sq. Ft.
				FAT CLAY, Hard, Light Gray and Brownish Yellow, Moist (CH)									
			P.P. 4.5+	LEAN CLAY, Hard, Light Gray, Dry (CL)			15.5		40	25	93.7		
30				P.P. = Pocket Penetrometer S.P.T. = Standard Penetration Test Boring grouted with bentonite/grout mix									

Completion Depth 30' | Date 3-31-92 | Water Observations

JONES AND NEUSE, INC.

153702

Log of Boring

Number B-18

Location N 760,180 E 2,709,758

Project Fayette Power Plant Disposal Area LaGrange, Texas JN026412.1

Type Intermittent

Surface Elevation 358.63

Depth Feet	Samples	Symbol	Penetrometer Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (RQD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Kips/Sq. Ft.
			P.P. 0.6	FAT CLAY WITH SAND, Firm, Gray, Wet (CH) with scattered gravel									
			P.P. 1.3	SANDY FAT CLAY, Stiff to Hard, Light Brownish Gray, Moist (CH) with calcareous particles			27.5		68	50	69.4		
			P.P. 4.4										
			P.P. 4.3	FAT CLAY, Hard to Very Stiff, Pale Yellow, Moist (CH) with calcium									
5			P.P. 2.4				21.6		62	42	89.0		
			P.P. 4.2										
			SPT 14 17 31	CLAYEY SAND, Dense, Light Gray, Moist (SC)									
10													
15			P.P. 3.1				19.0		35	18	43.1		
			SPT 50/3"	CLAYEY SAND, Very Dense, Light Gray, Moist (SC) with cemented seams									
20													
			P.P. 4.5+	FAT CLAY, Hard, Pale Yellow and Strong Brown, Dry (CH)									
25				Continued on next page									

Completion Depth 30' Date 4-9-92

Water Observations NO WATER ENCOUNTERED DURING DRILLING / WATER AT 15' AFTER 24 HOURS

JONES AND NEUSE, INC.

153702

Log of Boring

Number B-18

Location N 760,180 E 2,709,758

Project

Fayette Power Plant Disposal Area LaGrange, Texas JNO26412.1

Type: Intermittent

Surface Elevation: 358.63

Depth	Sample	Symbol	Penetrometer Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (RQD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Kips/Sq. Ft.
			P.P. 4.5+	FAT CLAY, Hard, Pale Yellow and Strong Brown, Dry (CH)									
30				P.P. = Pocket Penetrometer S.P.T. = Standard Penetration Test Boring grouted with bentonite/grout mix									

Completion Depth: 30'

Date: 4-9-92

Water Observations:

JONES AND NEUSE, INC.

153702

Log of Boring

Number B-20

Location N 759,963.3649 E 2,710,187.172

Project Fayette Power Plant Disposal Area LaGrange, Texas JN026412.1

Type: Intermittent

Surface Elevation: 354.00

Depth Feet	Samples	Symbol	Penetrometer Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (RQD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Kips/Sq. Ft.
			P.P. 1.8	FAT CLAY, Stiff, Very Dark Grayish Brown, Wet to Moist (CH) with organics									
			P.P. 2.2	FAT CLAY WITH SAND, Very Stiff, Gray, Moist (CH)									
			P.P. 2.4				24.1		65	46	75.9		
			P.P. 2.4										
5			P.P. 3.7	LEAN CLAY, Very Stiff to Hard, Pale Yellow, Light Gray, and White, Moist (CL) with calcium deposits									
			P.P. 3.1										
			P.P. 4.5+										
			P.P. 2.5										
10													
			P.P. 3.8										
			P.P. 4.5+	LEAN CLAY WITH SAND, Hard, Light Gray, Dry (CL)			12.4		32	15	75.7		
15													
			P.P. 3.7	CLAYEY SAND, Very Dense, Light Gray, Moist (SC) with some calcium deposits									
20													
	X		SPT 50/3"										
				FAT CLAY, Light Gray, Dry (CH)			19.8		56	36	97.8		
25				Continued on next page									

Completion Depth 30' Date 4-2-92

Water Observations: WATER ENCOUNTERED AT 21' DURING DRILLING / WATER AT 6.5' AFTER 24 HOURS

JONES AND NEUSE, INC.

153702

Log of Boring

Number B-20

Location N 759,963.3649 E 2,710,187.172

Project Fayette Power Plant Disposal Area LaGrange, Texas JN026412.1

Type Intermittent

Surface Elevation 354.00

Depth (Feet)	Samples	Symbol	Penetrometer Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (RQD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Kips/Sq. Ft.
				FAT CLAY, Light Gray, Dry (CH)									
			P.P. 4.5+	FAT CLAY, Hard, Olive Yellow and Pale Yellow, Moist (CH) with calcium deposits									
30							21.9		60	38	99.6		

P.P. = Pocket Penetrometer
S.P.T. = Standard Penetration Test

Boring grouted with bentonite/grout mix

Completion Depth 30' Date 4-2-92

Water Observations

JONES AND NEUSE, INC.

153702

Log of Boring

Number B-22 | Location N 759,440 E 2,710,493

Project Fayette Power Plant Disposal Area | LaGrange, Texas | JN026412.1

Type Intermittent

Surface Elevation 356.58

Depth Feet	Samples	Symbol	Penetration Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (RQD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Kips/Sq. Ft.
				SILTY SAND, Very Dark Grayish Brown, Wet (SM)									
			P.P. 0.8	SILTY SAND, Yellowish Brown, Wet (SM)									
			P.P. 0.8	CLAYEY SAND, Loose, Gray, Yellowish Brown, and Red, Moist (SC)									
5			SPT 16 16 16				19.7		52	35	42.0		
			P.P. 4.1	FAT CLAY, Hard, Light Gray and Pale Yellow, Dry to Moist (CH)									
10			P.P. 4.5+	LEAN CLAY, Hard, Pale Yellow and Light Gray, Dry (CL) with calcium deposits									
15			P.P. 4.5+										
20			SPT 24 38 50	CLAYEY SAND, Very Dense, Light Gray, Moist to Wet (SC)									
25							27.7				24.7		
				Continued on next page									

Completion Depth 30' | Date 4-2-92

Water Observations: WATER ENCOUNTERED AT 22' DURING DRILLING / WATER AT 1' AFTER 24 HOURS

JONES AND NEUSE, INC.

153702

Log of Boring

Number B-22

Location N 759,440 E 2,710,493

Project Fayette Power Plant Disposal Area LaGrange, Texas JN026412.1

Type Intermittent

Surface Elevation 356.58

Depth Feet	Samples	Symbol	Penetrometer Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (RQD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Kips/Sq. Ft.
			P.P. 1.6	CLAYEY SAND, Very Dense, Light Gray, Moist to Wet (SC)									
30				P.P. = Pocket Penetrometer S.P.T. = Standard Penetration Test Boring grouted with bentonite/grout mix									

Completion Depth 30' Date 4-2-92

Water Observations

JONES AND NEUSE, INC.

153702

Log of Boring

Number B-24

Location N 759,015.2632 E 2,710,307.930

Project Fayette Power Plant Disposal Area LaGrange, Texas JN026412.1

Type Intermittent

Surface Elevation 353.28

Depth Feet	Samples	Symbol	Penetrometer Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (RQD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Kips/Sq. Ft.
			P.P. 1.3	FAT CLAY WITH SAND, Stiff, Dark Grayish Brown, Moist (CH) with organics and calcareous particles			25.4		59	40	70.6		
			P.P. 1.4										
5			P.P. 2.4	FAT CLAY, Very Stiff to Hard, Pale Yellow and Light Gray, Moist to Dry (CH)			23.2		71	49	97.4		
			P.P. 4.5+										
			P.P. 4.5+										
10			P.P. 4.5+										
15			P.P. 4.5+	LEAN CLAY, Hard, Pale Yellow, Dry (CL)									
			SPT 50/2"										
20			SPT 24 33 50/4"	CLAYEY SAND, Very Dense, Light Gray, Moist (SC) with calcium deposits and calcareous nodules			17.8		36	20	26.3		
25				Continued on next page									

Completion Depth 28.5' Date 4-3-92

Water Observations WATER ENCOUNTERED AT 23' DURING DRILLING / DRY AFTER 24 HOURS

JONES AND NEUSE, INC.

153702

Log of Boring

Number B-24

Location N 759,015.2632 E 2,710,307.930

Project Fayette Power Plant Disposal Area — LaGrange, Texas — JN026412.1

Type Intermittent

Surface Elevation 353.28

Depth	Samples	Symbol	Penetrometer Blows/Foot or Tons/Sq. Ft.	STRATUM DESCRIPTION	OSHA Type	Core Drilled/ Recovered Ft. (RQD %)	Moisture Content %	Unit Dry Weight Lbs./Cu. Ft.	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Angle of Internal Friction	Unconfined Compression Kips/Sq. Ft.
				CLAYEY SAND, Very Dense, Light Gray, Moist (SC) with calcium deposits and calcareous particles									
	X		SPT 50/4"										
30				P.P. = Pocket Penetrometer S.P.T. = Standard Penetration Test Boring grouted with bentonite/grout mix									

Completion Depth 28.5' Date 4-3-92

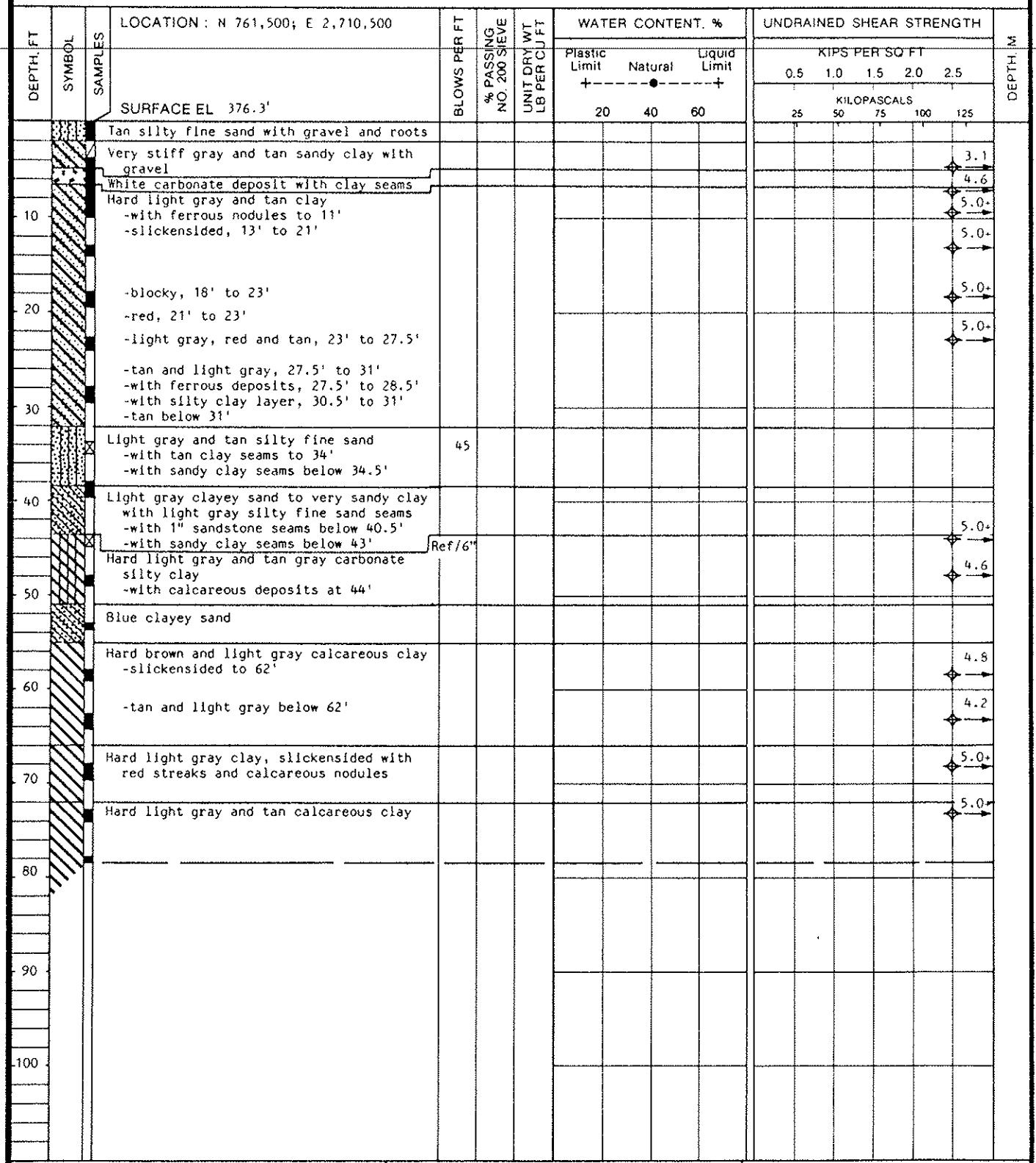
Water Observations

JONES AND NEUSE, INC.

153702

LOG OF BORING NO. 112

ASH AND SLUDGE DISPOSAL AREA
FAYETTE POWER PROJECT
LAGRANGE, TEXAS



JOB NO. : 0183-0071
COMPLETION DEPTH : 78.5'
DATE : April 22, 1983

SAMPLER : 3" thin-walled tube and 2" split-barrel

DRILLING METHOD : Wet Rotary

STRENGTH LEGEND
- ● Unconfined Compression
- ▲ Unconsolidated-Undrained Triaxial Compression
- ✦ Miniature Vane
- *(open symbols above indicate remolded tests)*
- ⊕ Torvane
- ⊠ Hand Penetrometer

McCLELLAND ENGINEERS

PLATE 13

LOG OF BORING NO. 116

ASH AND SLUDGE DISPOSAL AREA
FAYETTE POWER PROJECT
LAGRANGE, TEXAS

LOCATION : N 761,250; E 2,711,250

SURFACE EL 391.4'

DEPTH, FT	SYMBOL	SAMPLES		BLOWS PER FT	% PASSING NO. 200 SIEVE	UNIT DRY WT LB PER CU FT	WATER CONTENT, % (Plastic Limit — Natural — Liquid Limit; 20 40 60)	UNDRAINED SHEAR STRENGTH KIPS PER SQ FT (0.5 1.0 1.5 2.0 2.5) KILOPASCALS (25 50 75 100 125)	DEPTH, M
0			Brown and gray sandy clay						
5									
10									
15			-with sand layers below 13'						
20									
25									
30									
35									
40									
45									
50									

JOB NO. : 0183-0071
COMPLETION DEPTH : 20.0'
DATE : April 27, 1983

SAMPLER : Auger

DRILLING METHOD : Auger

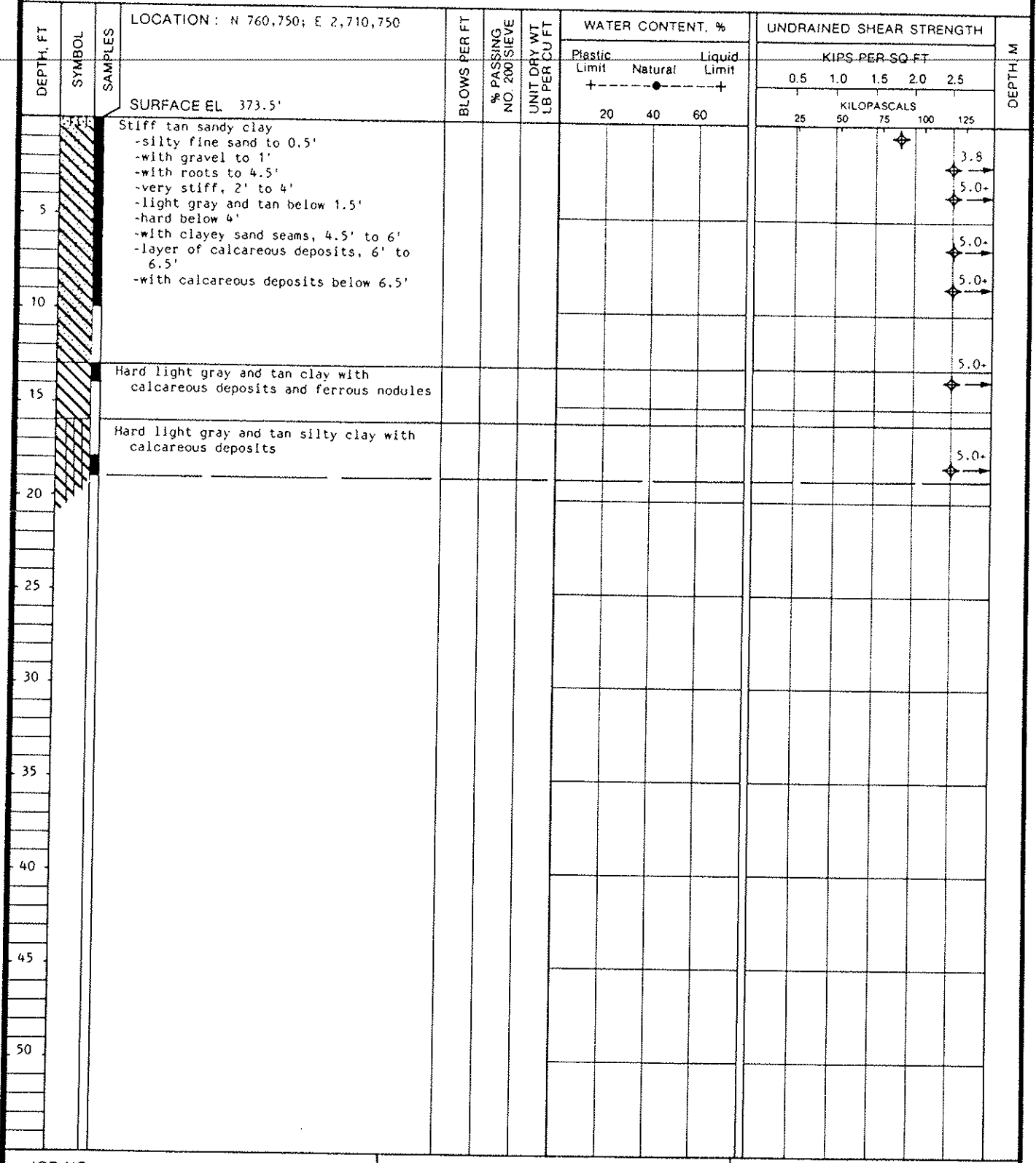
STRENGTH LEGEND
- ● Unconfined Compression
- ▲ Unconsolidated-Undrained Triaxial Compression
- ✦ Miniature Vane
- *(open symbols above indicate remolded tests)*
- ✣ Torvane
- ⊠ Hand Penetrometer

McCLELLAND ENGINEERS

PLATE 17

LOG OF BORING NO. 125

ASH AND SLUDGE DISPOSAL AREA
FAYETTE POWER PROJECT
LAGRANGE, TEXAS



JOB NO. : 0183-0071
COMPLETION DEPTH : 19.0'
DATE : April 25, 1983

SAMPLER : 3" thin-walled tube

DRILLING METHOD : Wet Rotary

STRENGTH LEGEND
- ● Unconfined Compression
- ▲ Unconsolidated-Undrained Triaxial Compression
- ✦ Miniature Vane

(open symbols above indicate remolded tests)

- ⊕ Torvane
- ⊠ Hand Penetrometer

McCLELLAND ENGINEERS

PLATE 26

LOG OF BORING NO. 126

ASH AND SLUDGE DISPOSAL AREA
FAYETTE POWER PROJECT
LAGRANGE, TEXAS

LOCATION : N 760,750; E 2,711,250

SURFACE EL 394.6'

DEPTH, FT	SYMBOL	SAMPLES		BLOWS PER FT	% PASSING NO. 200 SIEVE	UNIT DRY WT LB PER CU FT	WATER CONTENT, % (Plastic Limit + Natural ● Liquid Limit; 20 40 60)	UNDRAINED SHEAR STRENGTH KIPS PER SQ FT (0.5 1.0 1.5 2.0 2.5) KILOPASCALS (25 50 75 100 125)	DEPTH, M
0			Coarse gravel and sandy clay						
5									
10			Gray and brown sandy clay						
15			-with sand layers below 13'						
20									
25									
30									
35									
40									
45									
50									

JOB NO. : 0183-0071
COMPLETION DEPTH : 20.0'
DATE : April 27, 1983

SAMPLER : Auger

DRILLING METHOD : Auger

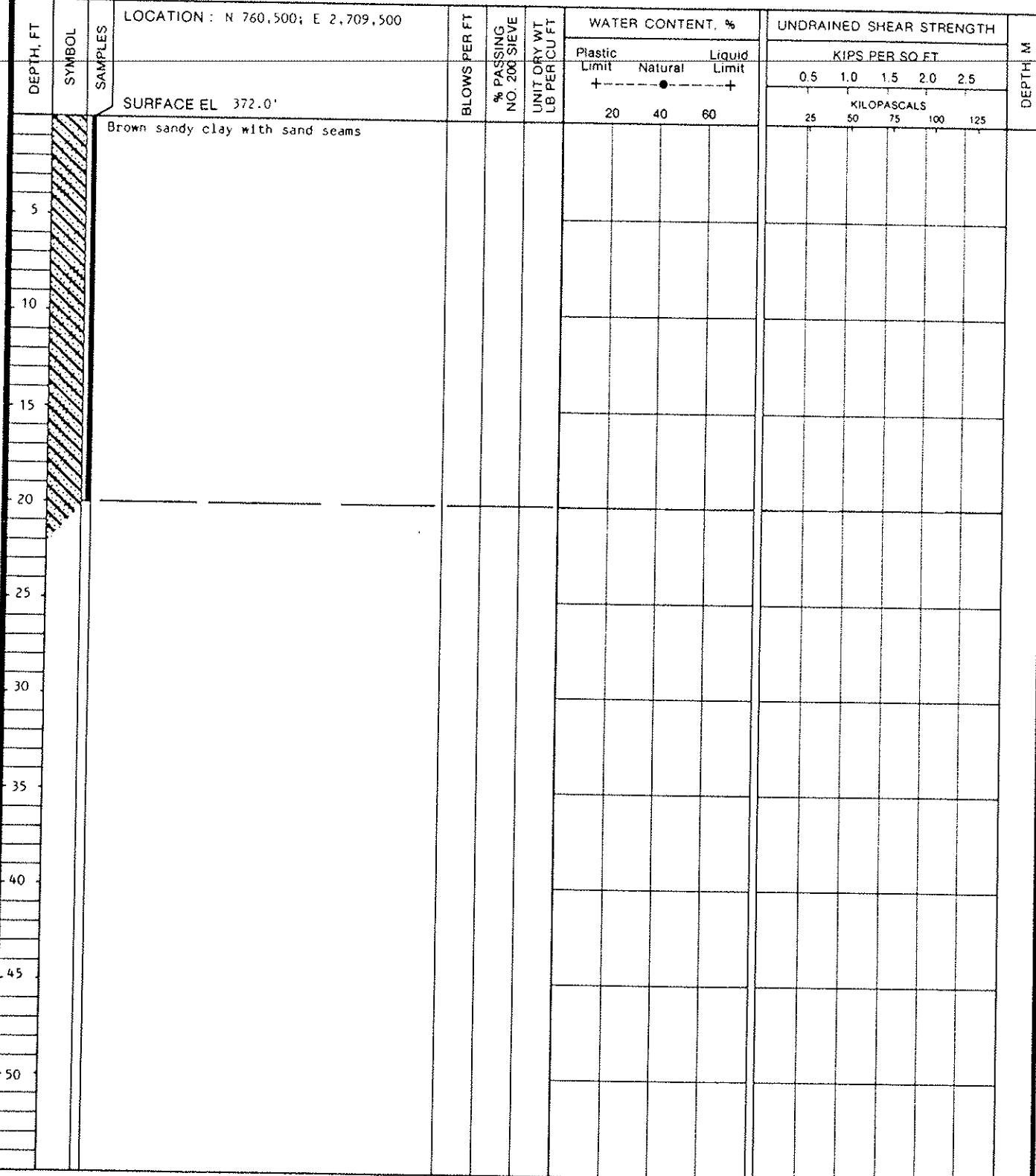
STRENGTH LEGEND
- ● Unconfined Compression
- ▲ Unconsolidated-Undrained Triaxial Compression
- ✦ Miniature Vane
- *(open symbols above indicate remolded tests)*
- ✣ Torvane
- ⊠ Hand Penetrometer

McCLELLAND ENGINEERS

PLATE 27

LOG OF BORING NO. 127

ASH AND SLUDGE DISPOSAL AREA
FAYETTE POWER PROJECT
LAGRANGE, TEXAS



JOB NO. : 0183-0071
COMPLETION DEPTH : 20.0'
DATE : April 27, 1983

SAMPLER : Auger

DRILLING METHOD : Auger

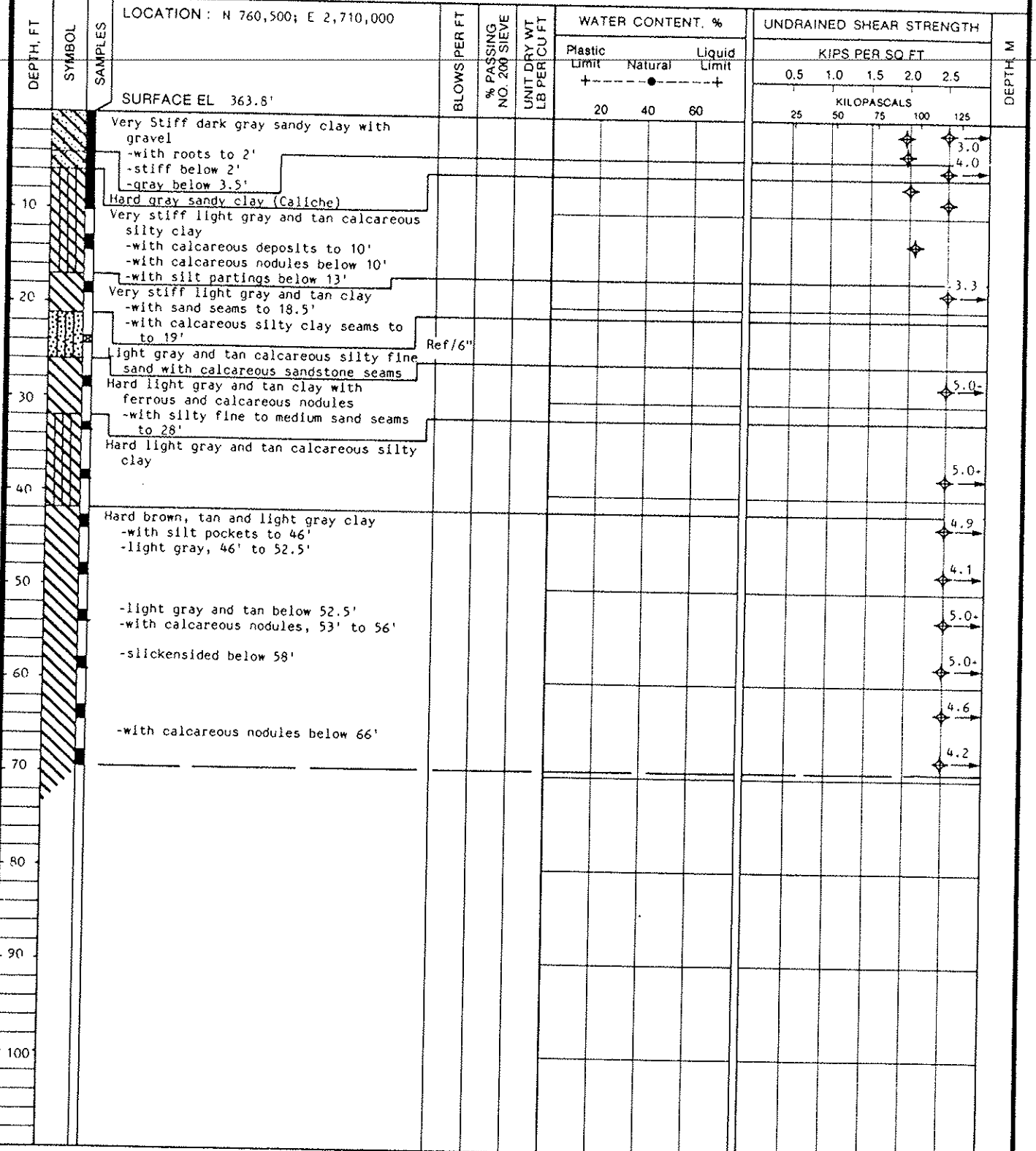
STRENGTH LEGEND
- ● Unconfined Compression
- ▲ Unconsolidated-Undrained Triaxial Compression
- ✦ Miniature Vane
- *(open symbols above indicate remolded tests)*
- ✧ Torvane
- ⊠ Hand Penetrometer

McCLELLAND ENGINEERS

PLATE 28

LOG OF BORING NO. 128

ASH AND SLUDGE DISPOSAL AREA
FAYETTE POWER PROJECT
LAGRANGE, TEXAS



JOB NO. : 0183-0071
COMPLETION DEPTH : 69.5'
DATE : April 22, 1983

SAMPLER : 3" thin-walled tube and 2" split-barrel

DRILLING METHOD : Wet Rotary

STRENGTH LEGEND
- ● Unconfined Compression
- ▲ Unconsolidated-Undrained Triaxial Compression
- ✦ Miniature Vane

(open symbols above indicate remolded tests)

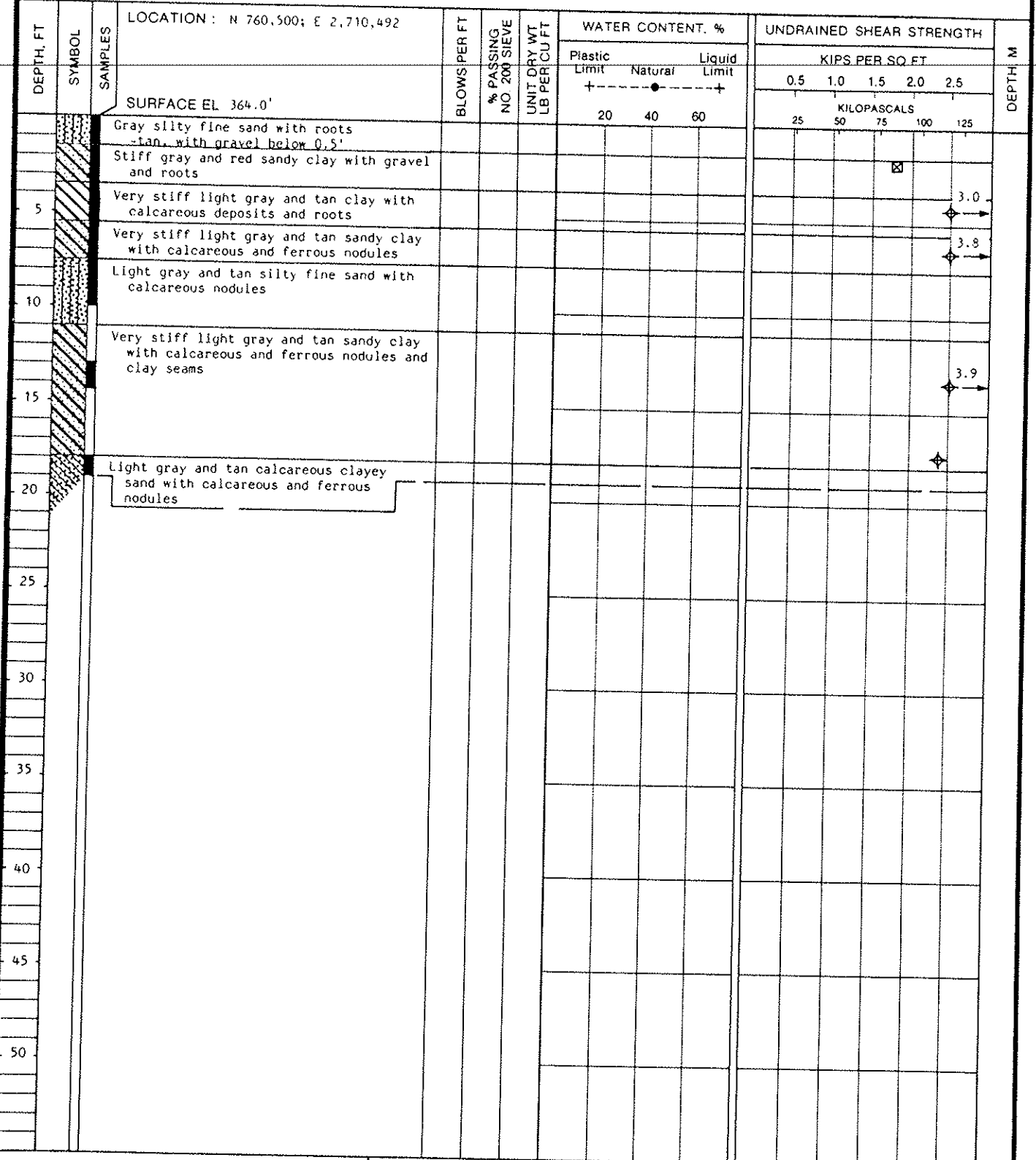
- ✣ Torvane
- ⊠ Hand Penetrometer

McCLELLAND ENGINEERS

PLATE 29

LOG OF BORING NO. 129

ASH AND SLUDGE DISPOSAL AREA
FAYETTE POWER PROJECT
LAGRANGE, TEXAS



JOB NO. : 0183-0071
COMPLETION DEPTH : 19.0'
DATE : April 28, 1983

SAMPLER : 3" thin-walled tube

DRILLING METHOD : Wet Rotary

STRENGTH LEGEND
- ● Unconfined Compression
- ▲ Unconsolidated-Undrained Triaxial Compression
- ✦ Miniature Vane

(open symbols above indicate remolded tests)

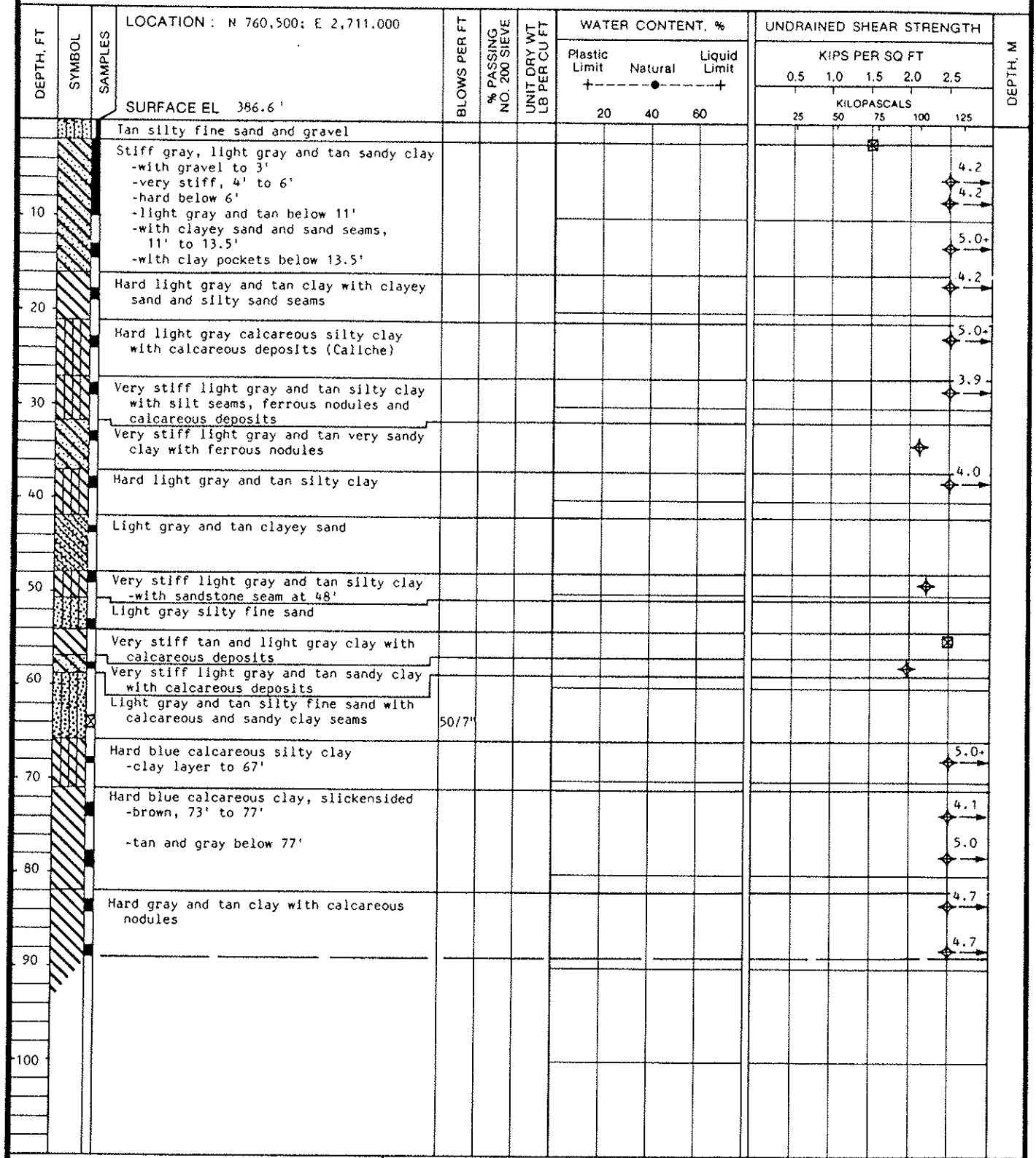
- ✣ Torvane
- ⊠ Hand Penetrometer

McCLELLAND ENGINEERS

PLATE 30

LOG OF BORING NO. 130

ASH AND SLUDGE DISPOSAL AREA
FAYETTE POWER PROJECT
LAGRANGE, TEXAS



JOB NO. : 0183-0071
COMPLETION DEPTH : 89.0'
DATE : April 25, 1983

SAMPLER : 3" thin-walled tube and 2" split-barrel

DRILLING METHOD : Wet Rotary

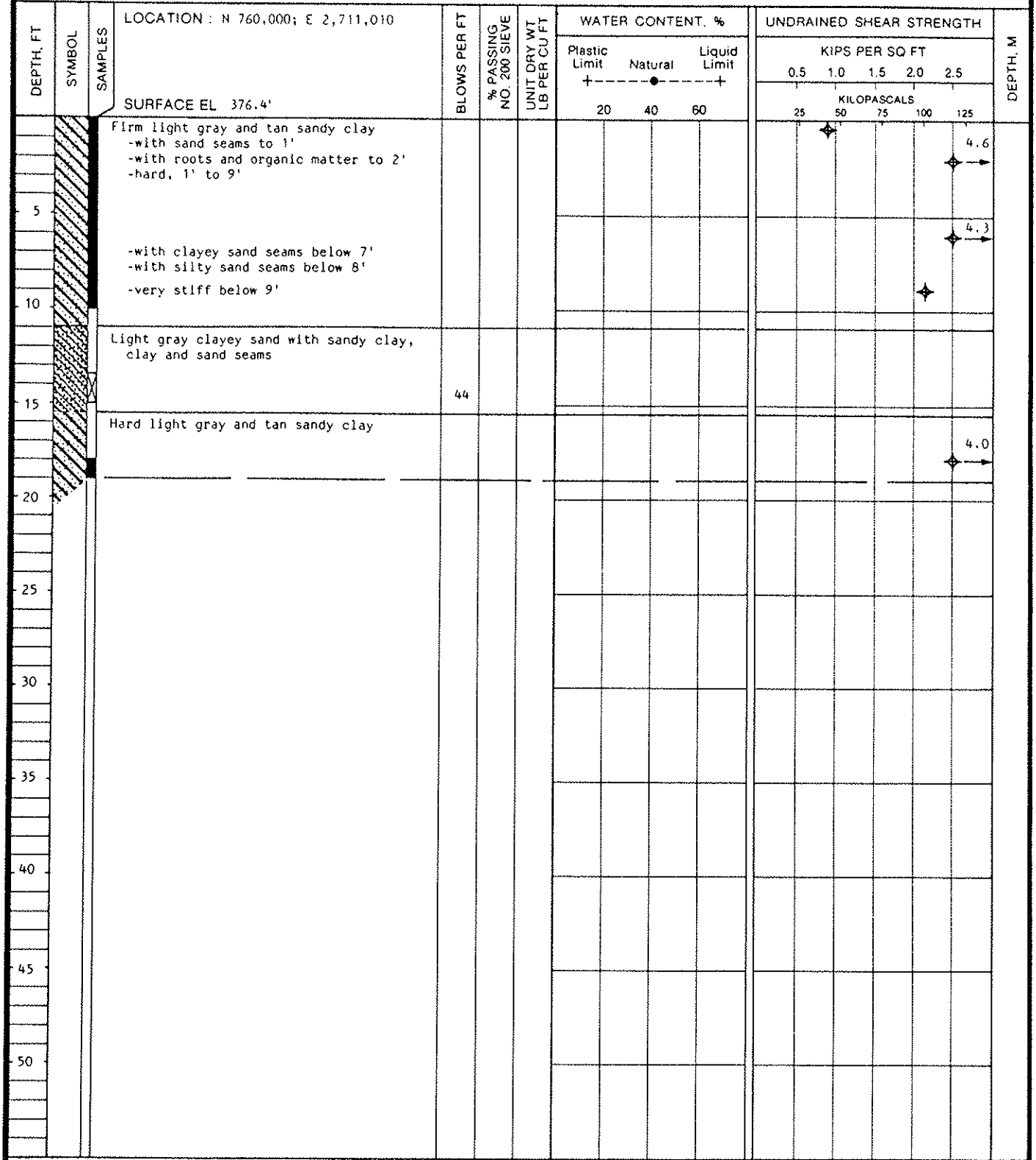
STRENGTH LEGEND
- ● Unconfined Compression
- ▲ Unconsolidated-Undrained Triaxial Compression
- ✦ Miniature Vane
- *(open symbols above indicate remolded tests)*
- ✧ Torvane
- ⊠ Hand Penetrometer

McCLELLAND ENGINEERS

PLATE 31

LOG OF BORING NO. 137

ASH AND SLUDGE DISPOSAL AREA
FAYETTE POWER PROJECT
LAGRANGE, TEXAS



JOB NO. : 0183-0071
COMPLETION DEPTH : 19.0'
DATE : April 28, 1983
DEPTH TO WATER IN BORING :
CAVED AT :
DATE :

SAMPLER : 3" thin-walled tube
2" split-barrel

DRILLING METHOD : Wet Rotary

STRENGTH LEGEND
- ● Unconfined Compression
- ▲ Unconsolidated-Undrained Triaxial Compression
- ✦ Miniature Vane

(open symbols above indicate remolded tests)

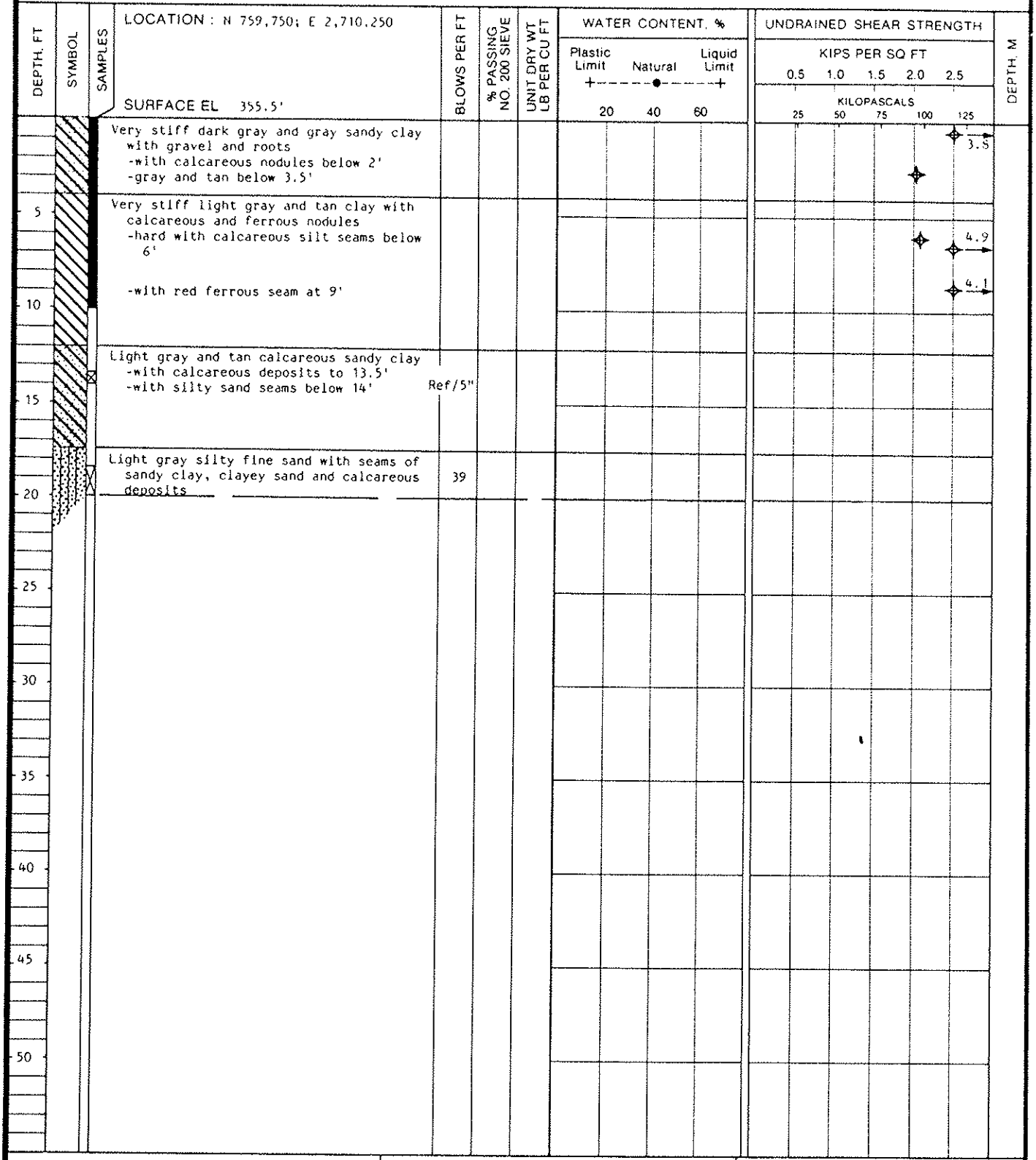
- ✧ Torvane
- ⊠ Hand Penetrometer

McCLELLAND ENGINEERS

PLATE 38

LOG OF BORING NO. 139

ASH AND SLUDGE DISPOSAL AREA
FAYETTE POWER PROJECT
LAGRANGE, TEXAS



JOB NO. : 0183-0071
COMPLETION DEPTH : 20.0'
DATE : April 28, 1983

SAMPLER : 3" thin-walled tube
2" split-barrel

DRILLING METHOD : Wet Rotary

STRENGTH LEGEND
- ● Unconfined Compression
- ▲ Unconsolidated-Undrained Triaxial Compression
- ✦ Miniature Vane

(open symbols above indicate remolded tests)

- ✣ Torvane
- ⊠ Hand Penetrometer

McCLELLAND ENGINEERS

PLATE 40

LOG OF BORING NO. 147

ASH AND SLUDGE DISPOSAL AREA
FAYETTE POWER PROJECT
LAGRANGE, TEXAS

LOCATION : N 759,250; E 2,710,750

SURFACE EL 367.7'

DEPTH, FT	SYMBOL	SAMPLES	Brown and gray sandy clay with sand layers	BLOWS PER FT	% PASSING NO. 200 SIEVE	UNIT DRY WT LB PER CU FT	WATER CONTENT, % (Plastic Limit / Natural / Liquid Limit; 20 40 60)	UNDRAINED SHEAR STRENGTH KIPS PER SQ FT (0.5 1.0 1.5 2.0 2.5) KILOPASCALS (25 50 75 100 125)	DEPTH, M
5									
10									
15									
20									
25									
30									
35									
40									
45									
50									

JOB NO. : 0183-0071
COMPLETION DEPTH : 20.0'
DATE : April 27, 1983

SAMPLER : Auger

DRILLING METHOD : Auger

STRENGTH LEGEND
- ● Unconfined Compression
- ▲ Unconsolidated-Undrained Triaxial Compression
- ✦ Miniature Vane
- *(open symbols above indicate remolded tests)*
- ⌖ Torvane
- ⊠ Hand Penetrometer

McCLELLAND ENGINEERS

PLATE 48

SUBSURFACE EXPLORATION LOG

PROJECT Groundwater Monitor Wells
Contract EPC-211
Fayette Power Plant
TYPE OF BORING Auger/Sample

BORING NO. CBL-120
DATE 7/1/88
JOB NO. 0188-1070
SURFACE ELEV.

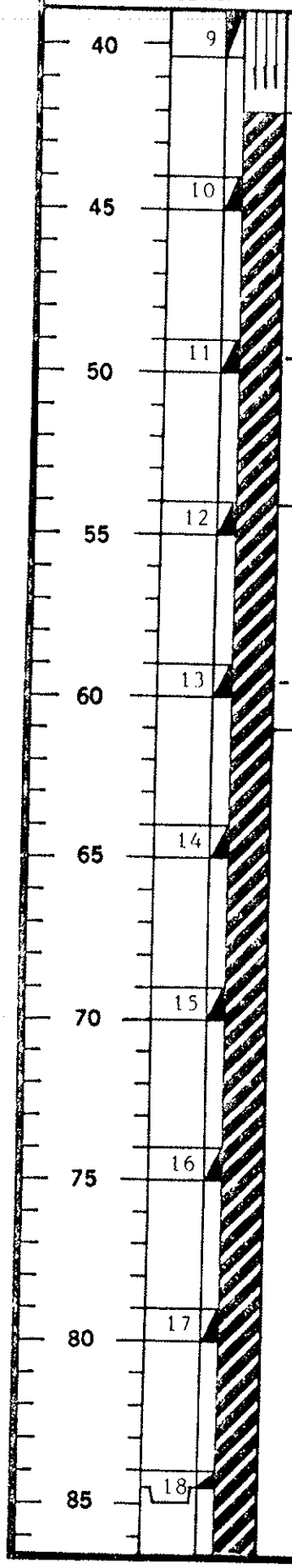
LEGEND — sample type
- thin-walled tube
- double tube core barrel
- water surface
- penetration test
- disturbed
- no recovery

DEPTH FT. (ELEV.)	SAMPLE NO. & TYPE	SYMBOL	DESCRIPTION OF STRATA	N—blows / ft. R—recovery % P—pock. pen. tsf RQD—rock qual. desig.
	1		Black, fat CLAY, very stiff, w/roots. CH	P3.25
5	2		Tan and light brown, fat CLAY, hard, w/numerous calcareous deposits and iron stains. CH	P4.5+
10	3		Light gray, lean CLAY w/sand, very stiff, w/ numerous calcareous deposits, more sand w/depth. CL	P3.75
15	4			P4.5+
20	5			P4.5+
25	6			P3.75
30	7			N20-34-50/5"
35	8		Tan and gray, fat CLAY, hard, blocky, calcareous. CH	N47
40	9		Light gray, sandy SILT, very dense, slightly calcareous. ML	N53

Bryant-McClelland consultants

SUBSURFACE EXPLORATION LOG

JOB NO. 0188-1070 DATE 7/1/88 BORING NO. CBL-120

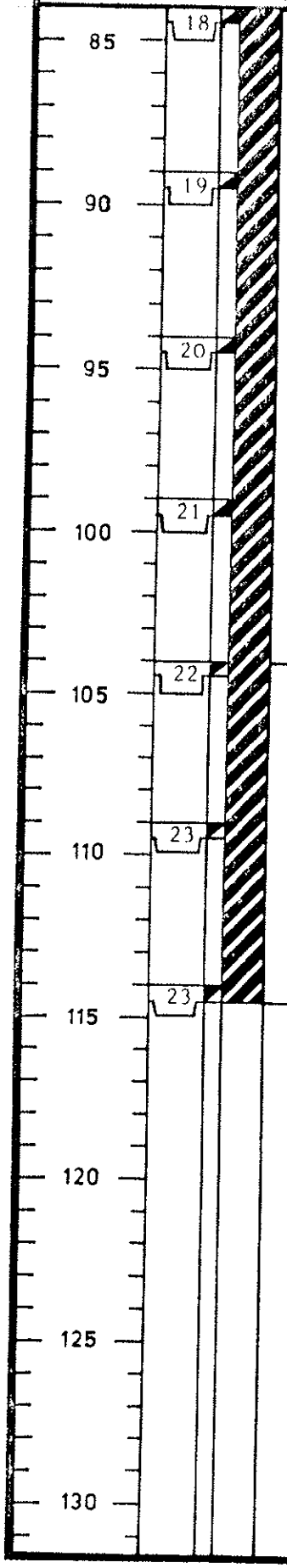


Light gray, sandy SILT, very dense, slightly calcareous. ML (Continued)	N53
Tan and light gray, fat CLAY, hard, blocky, w/ scattered calcareous deposits. CH	P4.5+
gray, slickensided below 49.5 ft.	P4.5+
Gray, fat CLAY, hard, blocky, slickensided, w/red stains. CH	P4.5+
moist, w/gray and red streaks below 59.5 ft.	P4.5+
Tan and gray, fat CLAY, hard, blocky, slickensided. CH	P4.5+
	P4.5+
	P4.5+
	P4.5+
	P4.5+
	P4.5+

Bryant-McClelland consultants

SUBSURFACE EXPLORATION LOG

JOB NO. 0188-1070 DATE 7/6/88 BORING NO. CBL-120



Tan and gray, fat CLAY, hard, blocky, slickensided. CH (Continued)	P4.5+
	P4.5+
	P4.5+
	P4.5+
Gray, fat CLAY, hard, blocky, calcareous. CH	N50/4"
	N50/5"
	N50/4"
Total depth of boring, 114.5 ft.	
NOTE: Drilling fluid was used in advancing the boring between sampling depths.	

Bryant-McClelland consultants

PROJECT: LCRA FPP Combustion Byproducts Landfill (CBL) Expansion Area	**Log of Well No. CBL - 300 M**
BORING LOCATION: Near Guard Station	GROUND SURFACE ELEVATION AND DATUM:
DRILLING CONTRACTOR: Vortex Drilling, Inc.	DATE STARTED: 5/19/11 / DATE FINISHED: 5/20/11
DRILLING METHOD: Hollow Stem Auger	TOTAL DEPTH (ft.): 93.0 / SCREEN INTERVAL (ft.): 83-93'(M)
DRILLING EQUIPMENT: B-59 Mobile Drill	DEPTH TO WATER ATD: / CASING: 0-93' (M)
SAMPLING METHOD: 2.5' Split Spoon	LOGGED BY: Mike Schofield, P.G.
HAMMER WEIGHT: 140 lbs / DROP: 18"	RESPONSIBLE PROFESSIONAL: Mike Schofield, P.G. / REG. NO. 10666

DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/ Foot	OVM Reading	DESCRIPTION: NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
					Surface Elevation:	
		NR	10 11		NR	Concrete
			50/3 11		SILT (ML): brown, with trace fine-grained sand, dry, no plasticity	
		NR	6 7		SANDY GRAVEL (SP): pink to tan, graded, dry Large cobbles (2" diameter)	
5	Grab Sample 6'-7'		12 13 16		SANDY CLAY (CL): gray with red, fine-grained, well sorted, some organic matter, medium stiff Stiffens at 10', grades to medium-grained	
			10 12 16			
10	Grab Sample 11.5'-12'		20 40 40		Iron oxide stains at 12'	2" Sch-40 PVC Riser
			8 16		Moisture at 13'	
			27		CLAY (CL): gray, high plasticity, stiff	
15			17 30 21		SAND (SC): gray, trace clay, fine- to medium-grained, well sorted, wet	
			22 14 15		CLAY (CL): gray, high plasticity, stiff Lenses (1.5") of moist sand at 18.5' - 19'	
20	Shelby Tube Sample 20'-22'		ST		Shelby tube sample	Grout
			10 17 29		CLAY (CL): light gray with tan, high plasticity, stiff	
25			22 25 39		SANDY CLAY (CL): gray and tan, calcareous, very stiff	
	Shelby Tube Sample 28'-30'				Shelby tube sample	
30						

WELL3

PROJECT: LCRA FPP Combustion Byproducts Landfill (CBL) Expansion Area

Log of Well No. CBL - 300 M (cont'd)

DEPTH (feet)	SAMPLES Sample No.	SAMPLES Sample	SAMPLES Blows/ Foot	OVM Reading	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
35	Grab Sample 36'-38'	Shelby Tube Sample			SILTY CLAY (CL): gray and tan, iron oxide and calcareous nodules, stiff, dry	
					Shelby tube sample	
40	Grab Sample 38'-40'		30 21 50		CLAY (CL): tan, iron oxide stains, high plasticity, very stiff, dry,	
45			16 23 28			Grout
50	Grab Sample 52.5'-56'				SILTY CLAY (CL): tan, blocky cleavage, low plasticity, trace moisture Red/gray striations beginning at 48.5'	
55			21 40 41		SANDY CLAY (CL): tan, slight moisture, high plasticity, fine-grained, well sorted	
			NR		SAND with CLAY (SC): greenish gray, trace Fe stains,medium plasticity, fine-grained, well sorted	
60					CLAY (CL): dark green, blocky cleavage, low plasticity, dry, very stiff Transition to dark reddish brown with green mottles at 62.5'	
65	Grab Sample 62'-68'		28 24			

WELL3

PROJECT: LCRA FPP Combustion Byproducts Landfill (CBL) Expansion Area

Log of Well No. CBL - 300 M (cont'd)

DEPTH (feet)	SAMPLES Sample No.	SAMPLES Sample	SAMPLES Blows/ Foot	OVM Reading	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
70		NR	50		Same low plasticity clay, dark green with well mottled green/red calcareous nodules	
75			36 38 40		CLAY (CL): hard blue, high plasticity, very stiff, dry	
		NR				Bentonite
80						
	Grab Sample 82'-86'				SILTY SAND (SM): blue-green, medium dense, some moisture, very fine, well sorted ~50% silt	20/40 Grade Silica Sand
85			50/3		Local cemented lenses (1/4") at 86'	2" Sch-40 PVC 0.010" Slotted Screen
		NR				
		NR				
90					SANDY CLAY (CL): blue-green, moist, very fine, well sorted, stiff	
		NR				
					SAND (SW): loose, saturated, fine-grained. Poor recovery	
					SANDY CLAY (CL): fine-grained, stiff	
95					Total Depth: 93'	
100						

WELL3

PROJECT: LCRA FPP Combustion Byproducts Landfill (CBL) Expansion Area	**Log of Well No. CBL - 301 I**
BORING LOCATION: West of Plant Entrance Road	GROUND SURFACE ELEVATION AND DATUM:
DRILLING CONTRACTOR: Vortex Drilling, Inc.	DATE STARTED: 5/23/11 / DATE FINISHED: 5/23/11
DRILLING METHOD: Hollow Stem Auger	TOTAL DEPTH (ft.): 52.5 / SCREEN INTERVAL (ft.): 41'-51'
DRILLING EQUIPMENT: B-59 Mobile Drill	DEPTH TO WATER ATD: / CASING: 0-51'
SAMPLING METHOD: 2.5' Split Spoon, Continuous	LOGGED BY: Randy Beyer, P.G.
HAMMER WEIGHT: 140 lbs / DROP: 18"	RESPONSIBLE PROFESSIONAL: Randy Beyer, P.G. / REG. NO. 5468

DEPTH (feet)	SAMPLES Sample No.	SAMPLES Sample	SAMPLES Blows/ Foot	OVM Reading	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
					Surface Elevation:	
0			8		SAND (SC): light gray to brown, dry, loose, moderately well sorted, some gravel, medium-grained, ~90% sand, ~10% gravel	Concrete
			10			
			11			
			8		SILTY CLAY (CL): light gray, red mottling, ~90% sand, ~10% silt	
			8			
			11		CLAYEY SAND (SC): light gray, red mottling, stiff, dry, quartz, ~90% sand, ~10% clay	
5			25			
			14			
	Grab Sample 6.4'-8.4'		13		SANDY CLAY (CL): pale greenish gray, interbedded with spans of light gray sand, ~50% clay, ~50% sand	
			18			
			17		SAND (SM): light gray, fine-grained sand, loose, dry, quartz, ~95% sand, ~5% clay	
	Grab Sample 9.5'-12'		12		SANDY CLAY (CL): light gray, some reddish yellow seams, ~75% clay, ~25% sand	
10			9			
			11		CLAY (CL): light gray, iron oxide staining, silt partings, moist, stiff, low plasticity, ~95% clay	
			18			
			13			
			15		CLAYEY SAND (SC): light gray to red sand, medium-grained, moist, ~75% sand, ~25% clay	
			16			
15			9			
			12			
			27		Black organic seams in clay at 14.5' 15', moist, yellowish red to gray	
			50			
			50/2		Increase of sand content, dry, ~75% clay, ~25% sand	Bentonite Pellets
20			21			
	Grab Sample 20'-22.5'		50\1			
			14		CLAY (CL): yellowish red to gray mottled clay, stiff to very stiff, moist	
			22			
			25			
25			15			
			25			
			27			
			19			
			21			
			26		Slickensides at 29', 45% fractured plane	
30						

WELL3

PROJECT: LCRA FPP Combustion Byproducts Landfill (CBL) Expansion Area

Log of Well No. CBL - 301 I (cont'd)

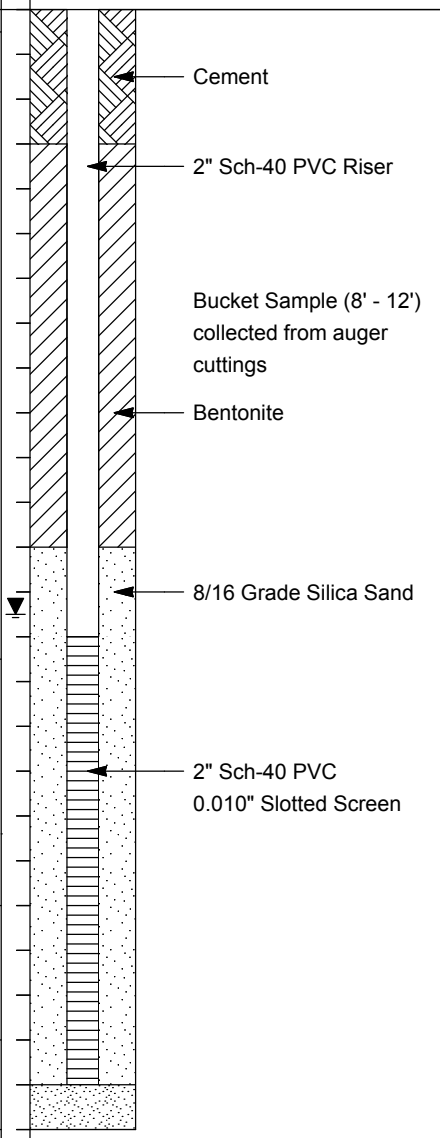
DEPTH (feet)	SAMPLES Sample No.	SAMPLES Sample	SAMPLES Blows/ Foot	OVM Reading	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
35	Sample 30'-32.5'				Same clay as above Increase silt at 32' ~85% clay, ~15% sand Same, dry, blocky with increased silt Same silt seam at 37' (1" thick), dry, soft	2" Sch-40 PVC Riser
40	Sample 37.5'- 40'		39 39 27		SILTY SAND (SM): light gray, quartz, soft, moderately well sorted, moist, medium-grained, minor black grains, 100% sand	20/40 Grade Silica Sand
45					Increase clay at 44' to 45' Moist at 45'	2" Sch-40 PVC 0.010" Slotted Screen
50	Sample 48'-50'				CLAY (CL): yellow red to gray, wet, stiff SAND (SW): gray, medium-grained, moist to damp Wet at 49'	
	Sample 50.5'-52.5'		50/5"		CLAY (CL): yellow to gray, wet, stiff Total Depth: 52.5'	
55						
60						
65						

WELL3

PROJECT: LCRA FPP Combustion Byproducts Landfill (CBL) Expansion Area	**Log of Well No. CBL - 302 I**
BORING LOCATION: South of CBL, West of ditch line	GROUND SURFACE ELEVATION AND DATUM:
DRILLING CONTRACTOR: Vortex Drilling, Inc.	DATE STARTED: 5/24/11 / DATE FINISHED: 5/24/11
DRILLING METHOD: Hollow Stem Auger	TOTAL DEPTH (ft.): 25.0 / SCREEN INTERVAL (ft.): 14'-24'
DRILLING EQUIPMENT: B-59 Mobile Drill	DEPTH TO WATER ATD: / CASING: 0-14'
SAMPLING METHOD: 2.5' Split Spoon	LOGGED BY: Randy Beyer, P.G.
HAMMER WEIGHT: 140 lbs / DROP: 18"	RESPONSIBLE PROFESSIONAL: Randy Beyer, P.G. / REG. NO. 5468

DEPTH (feet)	SAMPLES Sample No.	Sample	Blows/ Foot	OVM Reading	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.
					Surface Elevation:
0			15		CLAYEY SAND (SC): gray, medium gray, dry, loose, medium-grained
			16		
			17		SANDY CLAY (CL): medium brown to gray with iron oxide stain (red), mottled, dry from gravel at 30', same sandy clay, ~80% clay, ~15% sand, ~15% gravel, moist roots
			50/3"		
5	Grab Sample 5'-7.5'		10		
			12		
			15		
			5		Color change to light gray to white, calcareous white with green mottling, moist, plastic, organic material, increasing clay with depth
			7		
			9		
10			20		
			15		
			13		
			8		
			9		
	Grab Sample 14.5'-16.5'		14		CLAYEY SAND (SC): light green, ~80% sand, ~20% clay, dry to moist
15			4		
			9		
			14		Increasing clay content with depth
			32		
			50/5		SANDY CLAY (CL): light gray with white mottling calcareous
20			36		SILT (ML): light gray, dry, loose to firm, moist, ~90% silt, ~10% clay
			50.2.5		
	Grab Sample 23'-25'		50/5"		SANDY CLAY (CL): ~50% clay, ~50 sand, moist, plasticity
25					Total Depth: 25 feet
30					

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS

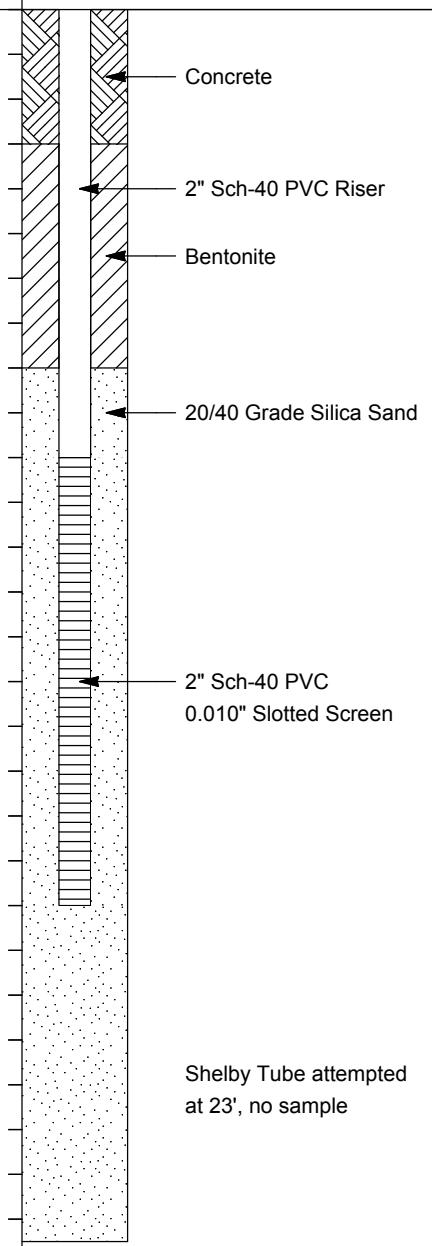


WELL3

PROJECT: LCRA FPP Combustion Byproducts Landfill (CBL) Expansion Area		**Log of Well No. CBL - 303 U**
BORING LOCATION: South of CBL		GROUND SURFACE ELEVATION AND DATUM:
DRILLING CONTRACTOR: Vortex Drilling, Inc.	DATE STARTED: 5/24/11	DATE FINISHED: 5/24/11
DRILLING METHOD: Hollow Stem Auger	TOTAL DEPTH (ft.): 27.5	SCREEN INTERVAL (ft.): 10'-20'
DRILLING EQUIPMENT: B-59 Mobile Drill	DEPTH TO WATER ATD:	CASING: 0-10'
SAMPLING METHOD: 2.5' Split Spoon	LOGGED BY: Randy Beyer, P.G.	
HAMMER WEIGHT: 140 lbs DROP: 18"	RESPONSIBLE PROFESSIONAL: Randy Beyer, P.G.	REG. NO. 5468

DEPTH (feet)	SAMPLES Sample No.	SAMPLES Sample	SAMPLES Blows/ Foot	OVM Reading	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.
					Surface Elevation:
			14		GRAVELLY SAND (SP): tan, dry, 1-2" diameter gravel
			7		
			17		
			11		CLAYEY SAND (SC): light gray, iron oxide staining, dry, firm medium-grained sand, ~75% sand, ~25% clay
	Bag sample 2.5-7.5		14		
5			15		
			16		
			16		Increasing sand content to ~90%, ~10% clay, some white grains and organic matter
			20		
			18		
			21		
			21		
10			14		
			9		SAND (SM): light brown, loose, 100% quartz sand, moist
			9		
			18		Damp to slightly wet at 13' - 14'
	Bag sample 12.5-17.5		26		
			26		
15			36		
			42		
			42		Increase clay content to 10% with depth
			8		
			14		SILTY CLAY (CL): light gray with iron oxide/Red mottling, plastic, moist, soft, ~90% clay, ~10% silt, interbedded with layers of higher sand content (25%)
			17		
20			8		
			9		
			11		
			ST		
25			18		
			21		
			29		
					Total Depth: 27.5'
30					

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



WELL3

PROJECT: LCRA FPP Combustion Byproducts Landfill (CBL) Expansion Area	**Log of Boring No. CBL - 305 B**
BORING LOCATION: West of Cell Expansion Area	ELEVATION AND DATUM:
DRILLING CONTRACTOR: Vortex Drilling, Inc.	DATE STARTED: 5/26/11 / DATE FINISHED: 5/31/11
DRILLING METHOD: Hollow Stem Auger	TOTAL DEPTH (ft.): 0.0 / MEASURING POINT:
DRILLING EQUIPMENT: B-59 Mobile Drill / B6I HDX	DEPTH TO WATER / FIRST / COMPL. / 24 HRS.
SAMPLING METHOD: 2.5' Split Spoon	LOGGED BY: Randy Beyer, P.G.
HAMMER WEIGHT: 140 lbs / DROP: 18"	RESPONSIBLE PROFESSIONAL: Randy Beyer, P.G. / REG. NO. 5468

DEPTH (feet)	SAMPLES Sample No.	Sample	Blows/ Foot	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.	PID READING (ppm)	REMARKS
				Surface Elevation:		
1			15	Caliche Road base		
2			13 6			
3			22	CLAY (CL): TOPSOIL, dark brown, sandy clay		
4			22 32			
5			11	SILTY CLAY (CL): yellow to gray, iron oxide staining, hard, dry, low plasticity, homogenous, ~95% clay, ~5% silt		
6			12			
7			12			
8			15			
9			20			
10			9			
11			12	CLAYEY SAND (SC): light gray, firm, moist, minor iron oxide staining, moderately cementation, homogenous, very fine-grained, quartz, ~90% sand, ~10% clay		
12			17			
13	Grab Sample 13'-17'			SILTY CLAY (CL): same as 5.0' - 10.8'		
14			50/2	SANDY with CLAY (SC): yellow to tan, dry hard cementation, homogenous, very fine-grained, ~95% sand, ~5% clay		
15			40	Loose at 15' -16.5'		
16			50/5			
17				Firm at 16.5' - increasing clay to ~20%, moist, iron oxide stains		
18			18			
19			31 18			
20			14	Trace limestone fragments 20' - 22'		
21			22			
22			32			
23				Abundant limestone fragments at 22.5-23.5', coarse gravel, dry, loose, poorly sorted		
24			50/5	CLAY with SAND (CL): yellowish tan, very stiff, homogenous, iron oxide staining, ~95% clay, ~5% silt		
25			31			
26			34			
27			50/4			
28			36			
29			40 50/5			
30						

RMRK3

Log of Boring No. CBL - 305 B (cont'd)

DEPTH (feet)	SAMPLES Sample No.	SAMPLES Sample	SAMPLES Blows/ Foot	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.	PID READING (ppm)	REMARKS
31				Increase in silt content to ~20% at 29.5'		
32				Silty seam at 32'		
33						
34				Calcite and iron nodules in fracture at 34'		
35						
36				Increasing calcite/iron nodules in seams at 36' - 37.5'		
37						
38				45% fractures, few slickensides, calcite in fractures		
39						
40	Sample 40'-42'		13			
41			19			
42			21	Color changes to light greenish gray		
43				CLAY (CL): light greenish gray clay, moist very stiff, homogenous, fractured, 100% clay, medium plasticity		
44						
45						
46						
47				Abundant fractures, trace pyrite (47.5'-48')		
48						
49						
50			15			
51			17			
52			24	Color changes to light gray		
53						
54						
55				Abundant fractures (55'-56')		
56			60			
57				Color changes to light gray/light tan		
58			66			
59						
60	Grab Sample 60'-62'		30	Local increase in silt content (10%) from 60-61.5'		
61			50/6			
62						
63			Hard			
64						
65						
66			Hard			

RMRK3

PROJECT: LCRA FPP Combustion Byproducts Landfill (CBL) Expansion Area

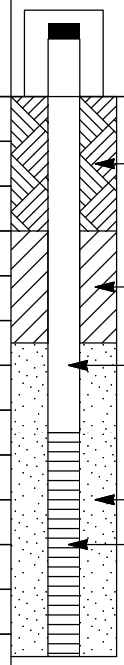
Log of Boring No. CBL - 305 B (cont'd)

DEPTH (feet)	SAMPLES Sample No.	SAMPLES Sample	SAMPLES Blows/ Foot	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.	PID READING (ppm)	REMARKS
67				Trace moisture, trace limestone pebbles		
68			Hard			
69						
70			12			
71			18	Abundant limestone pebbles at 72-74'		
72			25			
73						
74			Hard			
75						
76			Hard			
77						
78						
79			Hard			
80	Sample 78' - 82.5		12			
81			34	Localized silt as high as 30%		
82			50/4			
83						
84			Hard			
85						
86			Hard			
87				SILT (ML): light gray, ~10% clay, dry		
88						
89			Hard			
90			21	Increased clay (40%) at 90', trace moisture, less stiff		
91	Sample 90' - 92'		25			
92			30			
93						
94			Hard			
95				CLAY (CL): light gray, calcareous nodules, blocky, very stiff, hard, dry		
96			Hard			
97						
98			Hard			
99						
100						
101			Hard			
102				Total Depth: 102' Hollow Stem Auger refusal at 102'		

RMRK3

PROJECT: LCRA FPP Combustion Byproducts Landfill (CBL) Expansion Area	**Log of Well No. CBL - 306 B/I**
BORING LOCATION: South of CBL Leachate Pond	GROUND SURFACE ELEVATION AND DATUM:
DRILLING CONTRACTOR: Vortex Drilling, Inc.	DATE STARTED: 6/1/11 / DATE FINISHED: 6/3/11
DRILLING METHOD: Hollow Stem Auger	TOTAL DEPTH (ft.): 12.5 / SCREEN INTERVAL (ft.): 7.5'-12.5'
DRILLING EQUIPMENT: B-61 HDX	DEPTH TO WATER ATD: / CASING: 0-12.5'
SAMPLING METHOD: 2.5' Split Spoon	LOGGED BY: Mike Schofield, P.G.
HAMMER WEIGHT: 140 / DROP: 18"	RESPONSIBLE PROFESSIONAL: Mike Schofield, P.G. / REG. NO. 10666

DEPTH (feet)	SAMPLES Sample No.	Sample	Blows/ Foot	OVM Reading	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.
					Surface Elevation:
0	Grab Sample 2'-6'		5		CLAY (CL): black , trace moisture, stiff, organic matter
			7		
			7		
			7		
5			7		
			7		
			6		
			6		CLAY with SAND: gray, fine-grained, trace moisture, medium stiff
			7		
			9		
			14		
10			9		SAND (SW): tan/gray, iron oxide staining, fine-grained, loose, large calcareous nodules
			8		
	Shelby Sample 12'-14'		50/3		CLAY (CL): gray with tan, localized, stiff, silt as high as 25%, blocky leavage, stiff
			ST		
15			10		
			15		
			16		
			10		
			13		
			16		
20			50/5.5		
	Shelby Sample 22'-24'		ST		
	Grab Sample 26'-28'		7		
25			15		26' onward, no silt (100% clay)
			9		
			13		Red mottling at 28'
			12		
30			17		



WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS

Bucket sample collected for (5'-9') interval from auger cuttings

WELL3

PROJECT: LCRA FPP Combustion Byproducts Landfill (CBL) Expansion Area

Log of Well No. CBL - 306 B/I (cont'd)

DEPTH (feet)	SAMPLES Sample No.	SAMPLES Sample	SAMPLES Blows/ Foot	OVM Reading	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
					Same stiff clay, light gray to tan	
35					Clear crystals at 34', not HCL reactive 45º fractures, 34' - 38'	
40	Grab Sample 40'-43'		14 12 17		Same, all light gray	
45						
50	Grab Sample 50'-53'		10 15 18		Same, some tan mottling	
55						
60			13 16 32		Same, calcareous nodules at 29'	
65	Grab Sample 63'-67'					

WELL3

PROJECT: LCRA FPP Combustion Byproducts Landfill (CBL) Expansion Area

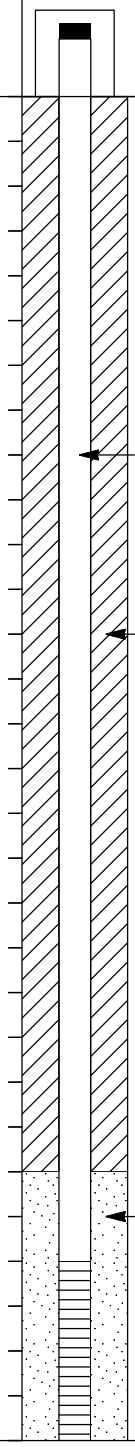
Log of Well No. CBL - 306 B/I (cont'd)

DEPTH (feet)	SAMPLES Sample No.	SAMPLES Sample	SAMPLES Blows/ Foot	OVM Reading	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.		WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
					Large calcareous seam at 65.5, some limestone pebbles starting at 66'		
70			50/3		Same, slight greenish gray color, calcareous, clay, stiff, localized silt (~15-20%) in pockets, dry		
75							
80					Total Depth: 80', Hollow Stem Auger refusal at 80'.		
85							
90							
95							
100							

WELL3

PROJECT: LCRA FPP Combustion Byproducts Landfill (CBL) Expansion Area	**Log of Well No. CBL - 307 U**
BORING LOCATION: West of Trees 10'	GROUND SURFACE ELEVATION AND DATUM:
DRILLING CONTRACTOR: Vortex Drilling, Inc.	DATE STARTED: 12/21/11 / DATE FINISHED: 12/21/11
DRILLING METHOD: Hollow Stem Auger	TOTAL DEPTH (ft.): 42.5 / SCREEN INTERVAL (ft.): 26'-41'
DRILLING EQUIPMENT: Mobile Drill B-59	DEPTH TO WATER ATD: 33.90 / CASING: 0'-41'
SAMPLING METHOD: Continous-Split Spoon	LOGGED BY: Randy Beyer, P.G.
HAMMER WEIGHT: / DROP:	RESPONSIBLE PROFESSIONAL: Randy Beyer, P.G. / REG. NO. 5468

DEPTH (feet)	SAMPLES Sample No.	SAMPLES Sample	SAMPLES Blows/ Foot	OVM Reading	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.
					Surface Elevation:
					TOPSOIL/GRAVEL (GP): brown to reddish-brown, moist clayey gravel
					CLAY with Gravel (CH): light brown to reddish-brown, moist, medium plasticity 80% clay/20% gravel
5					SANDY GRAVEL (GP): light gray, dry, 60% gravel/40% sand, minor clay, blocky, loose
10					SILTY CLAY (CL): light gray, iron oxide staining, moist, firm, high plasticity, 99% clay/1% silt calcareous clay layer, white
15					SAND (SW): light gray, iron oxide staining, dry, firm, medium-grained, quartz, mafics, - calcareous CLAYEY SAND, white, dry Clay content up to 30%, firm, dry, (SC)
20					Cemented SANDSTONE, (21'-21.5') dry
25					
30					



WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS

WELL3

PROJECT: LCRA FPP Combustion Byproducts Landfill (CBL) Expansion Area

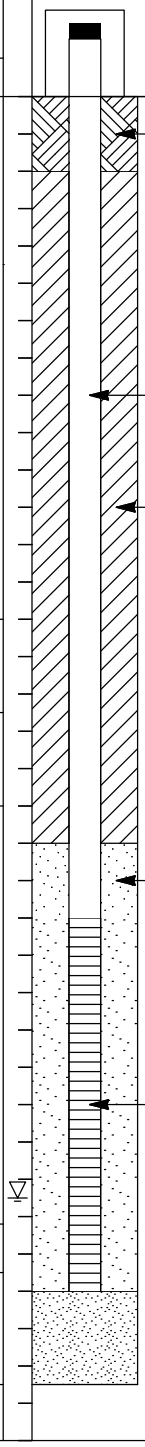
Log of Well No. CBL - 307 U (cont'd)

DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/ Foot	OVM Reading	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
35					CLAYEY SAND (SC): moist, firm, non plastic 50% sand/50% clay Sand - saturated at 32' coarse-grained at 35'	2" Sch-40 PVC 0.010" Slotted Screen
					CLAY (CH): orange to light tan	
40					GRAVELLY SAND (GC): medium gray, wet, 80% sand/20% gravel, coarse sand CLAY (CH): yellow to tan, moist, high plasticity -sand layer 40'-40.5'	
					Total Depth = 42.5	
45						
50						
55						
60						
65						

WELL3

PROJECT: LCRA FPP Combustion Byproducts Landfill (CBL) Expansion Area	**Log of Well No. CBL - 308 I**
BORING LOCATION:	GROUND SURFACE ELEVATION AND DATUM:
DRILLING CONTRACTOR: Vortex Drilling, Inc.	DATE STARTED: 12/20/11 / DATE FINISHED: 12/20/11
DRILLING METHOD: Hollow Stem Auger	TOTAL DEPTH (ft.): 34.5 / SCREEN INTERVAL (ft.): 22'-32'
DRILLING EQUIPMENT: Mobile Drill B-59	DEPTH TO WATER ATD: 29.5 / CASING: 0'-22'
SAMPLING METHOD: Continous-Split Spoon	LOGGED BY: Charlie Macon, P.G.
HAMMER WEIGHT: / DROP:	RESPONSIBLE PROFESSIONAL: Charlie Macon, P.G. / REG. NO. 1301

DEPTH (feet)	SAMPLES Sample No.	SAMPLES Sample	SAMPLES Blows/ Foot	OVM Reading	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.
					Surface Elevation:
					FAT CLAY (CH) with GRAVEL: light gray and tan, moist, iron oxide staining, stiff
5					becomes FAT CLAY (CH): pale yellow-tan, moist, stiff, blocky
10					iron and manganese oxide staining, increasing calcium carbonate
					grades to tan, decreasing calcium carbonate cementation
15					CLAYEY SAND (SC): very light gray, dry,
					sand seam at 16', increasing calcium carbonate
					CLAYEY SILT (ML): tan and gray with iron oxide mottling, stiff, dry
20					SILTY CLAY (CL): tan and gray with iron oxide mottling, stiff, dry
					CLAYEY SAND (SC): gray, moist, firm, iron oxide staining, moist, lenses of calcuim carbonate
25					Tan and gray blocky clay seam, dry
					very light gray sand, less calcium carbonate, dry
					SAND (SC): tan, soft, medium-grained, saturated
30					SANDY CLAY (CL): mottled tan-gray, iron oxide staining, dry, blocky, saturated sand lens
					FAT CLAY (CH): tan and gray, hard, mottled, iron oxided staining, blocky
35					Total Depth = 34.5



WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS

WELL3

Log of Boring: CBL-310

Lower Colorado River Authority

Fayette Power Plant
La Grange, TX

PBW Project No. 1650

Completion Date:	1/18/2012	Drilling Method:	Geoprobe DPT
Drilling Company:	Vortex	Borehole Diameter (in.):	2.25
Driller:	Robert Joiner	Total Depth (ft):	27.5
Driller's License:	54776M	Northing:	9947254.0686'
Field Supervisor:	Roberta McClure	Easting:	3429686.7216'
Sampling Method:	1 3/4" x 5' sample tube	Ground Elev. (ft AMSL):	371.434'

Depth (ft)	Recovery (ft/ft)	USCS	Lithologic Description
0		SM	(0.0 - 0.5) Silty SAND, reddish-brown, very moist, very soft.
	2.0/5.0	CH	(0.5 - 5.0) CLAY, gray, moist, hard, high plasticity.
5	5.0/5.0	SC	(5.0 - 11.0) Clayey SAND, light gray, some orange staining, moist to very moist, slightly firm.
10	5.0/5.0	CH	(11.0 - 17.0) CLAY, gray, some orange staining, moist, hard, high plasticity.
15	5.0/5.0	CL	(17.0 - 19.0) Silty CLAY, gray, some orange staining, friable, moist, hard, low plasticity.
20		CH	(19.0 - 21.0) CLAY, gray, some orange staining, moist, hard, high plasticity.
	3.0/5.0	CL	(21.0 - 27.5) Silty CLAY, gray, some orange staining, high plasticity clay lens at 21.0-22.0', very hard from 22.0-27.5', very moist, soft to very hard, low plasticity. Refusal at 27.5'
25	2.5/2.5		

PBW
Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

Notes:
Refusal at 27.5'.
Ground elevation is approximate.

Lower Colorado River Authority

Log of Boring: CBL-311

Fayette Power Plant
La Grange, TX

PBW Project No. 1650

Completion Date:	1/18/2012	Drilling Method:	Geoprobe DPT
Drilling Company:	Vortex	Borehole Diameter (in.):	2.25
Driller:	Robert Joiner	Total Depth (ft):	30
Driller's License:	54776M	Northing:	9947643.2586'
Field Supervisor:	Roberta McClure	Easting:	3429616.1129'
Sampling Method:	1 3/4" x 5' sample tube	Ground Elev. (ft AMSL):	373.847'

Depth (ft)	Recovery (ft/ft)	USCS	Lithologic Description
0		SM	(0.0 - 0.5) Silty SAND with gravel, dark reddish brown, very moist, soft.
	3.5/5.0	CH	(0.5 - 5.5) CLAY, gray, some orange staining, calcareous nodules at 4.5-5.0', calcareous clay and weak cementation from 5.0-5.5', dry to moist, hard, low to high plasticity.
5	5.0/5.0	SC	(5.5 - 10.0) Clayey SAND, gray to reddish-gray, moist, slightly firm.
10		CH	(10.0 - 11.0) CLAY, gray, some orange staining, moist, firm, high plasticity.
	5.0/5.0	CL	(11.0 - 19.0) Silty CLAY, gray, some orange staining, abundant orange staining at 15.0-19.0', very moist, firm, low plasticity.
15	5.0/5.0		
20		CH	(19.0 - 21.5) CLAY, gray, abundant orange staining, very moist, hard, high plasticity.
	5.0/5.0	CL	(21.5 - 25.5) Silty CLAY, gray, abundant orange staining, moist, hard, low plasticity.
25		CH	(25.5 - 27.5) CLAY, gray, abundant orange staining, moist, hard, high plasticity.
	5.0/5.0	CL	(27.5 - 30.0) Silty CLAY, gray, abundant orange staining, moist, hard, low plasticity.
30			

PBW
Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

Notes:

Ground elevation is approximate.

Project: **LCRA Fayette Power Project** Project Location: **6549 Power Plant Rd, La Grange, TX 78945** Project Number: **TXL0225-05**	Log of Boring CBL-321 **Sheet 1 of 1**

Date(s) Drilled **7/30/2013**	Logged By **Ed Jones**	Checked By **M. Zahirul Islam, Ph.D., P.E.**
Drilling Method **Geoprobe DPT**	Drill Bit Size/Type **2.25 in**	Total Depth of Borehole **25 feet bgs**
Drill Rig Type **Geoprobe**	Drilling Contractor **Vortex Drilling, Inc.**	Approximate Surface Elevation **361 ft, MSL**
Groundwater Level and Date Measured **Not Recorded**	Sampling Method(s) **1 3/4" x 5' sample tube**	Hammer Data **n/a**
Borehole Backfill **Cement-bentonite grout**	Approximate Location **N 9947764, E 3428880**	

Depth (feet)	Sample Number	Sample Type	Recovery/Attempted	Graphic Log	MATERIAL DESCRIPTION
0					TOPSOIL: black, moist, hard, trace organics.
			3.0/5.0		Well-graded GRAVEL with sand (GW): light gray to pink, loose, fine, angular, trace organics.
5	CBL-321 5'-10'		5.0/5.0		Sandy CLAY (CL): light pink to gray, dry, low plasticity, soft. - Trace fine angular gravel at 8.5'-8.8'.
10			5.0/5.0		CLAY (CL): light gray to pink, dry, loose to hard, low plasticity, mottling, iron oxide staining, some sand, trace silt. - Moist, stiff at 13'.
15			3.0/3.0		Sandy CLAY (CL): light gray to orange, moist, low plasticity, stiff. - Light gray, trace silt at 16.5'. - Loose and crumbly, iron oxide staining, and trace gravels at 18'-18.5'.
20			5.0/5.0		
25			2.0/2.0		CLAY (CH): light gray, moist, hard, iron oxide staining, refusal at 25'. Total Depth: 25'
30					

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Project: **LCRA Fayette Power Project** Project Location: **6549 Power Plant Rd, La Grange, TX 78945** Project Number: **TXL0225-05**	Log of Boring CBL-323 **Sheet 1 of 1**

Date(s) Drilled **7/30/2013**	Logged By **Ed Jones**	Checked By **M. Zahirul Islam, Ph.D., P.E.**
Drilling Method **Geoprobe DPT**	Drill Bit Size/Type **2.25 in**	Total Depth of Borehole **30 feet bgs**
Drill Rig Type **Geoprobe**	Drilling Contractor **Vortex Drilling, Inc.**	Approximate Surface Elevation **359 ft, MSL**
Groundwater Level and Date Measured **Not Recorded**	Sampling Method(s) **1 3/4" x 5' sample tube**	Hammer Data **n/a**
Borehole Backfill **Cement-bentonite grout**	Approximate Location **N 9947794, E 3428980**	

Depth (feet)	Sample Number	Sample Type	Recovery/Attempted	Graphic Log	MATERIAL DESCRIPTION
0					Well-graded GRAVEL with sand (GW): brown to orange, moist, loose, fine, angular.
					CLAY (CL): dark brown, dry, hard, trace fine angular gravel.
			4.0/5.0		
5					Sandy CLAY (CL): light brown, dry, low plasticity, medium stiff.
			5.0/5.0		- Light gray to orange, some mottling at 7'.
10					- Light gray to brown at 10'.
			3.0/5.0		Sandy CLAY (CL): light gray to brown, dry to moist, hard, trace angular fine gravel.
15					- White to gray, crumbly, iron oxide staining at 16'.
			5.0/5.0		Sandy CLAY (CL): light brown, moist, hard.
20	CBL-323 21'-25'				Lean CLAY with sand (CL): light gray to white, moist to dry, low plasticity, loose and crumbly.
			5.0/5.0		Lean CLAY with sand (CL): light brown, low plasticity, hard, trace iron oxide staining.
25					CLAY (CL): light gray and brown, moist to wet, low to medium plasticity, stiff.
			5.0/5.0		- Reddish brown to pink, moist to dry, mottled at 27'.
30					Total Depth: 30'

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Project: **LCRA Fayette Power Project** Project Location: **6549 Power Plant Rd, La Grange, TX 78945** Project Number: **TXL0225-05**	Log of Boring CBL-325 **Sheet 1 of 2**

Date(s) Drilled **7/29/2013**	Logged By **Ed Jones**	Checked By **M. Zahirul Islam, Ph.D., P.E.**
Drilling Method **Geoprobe DPT**	Drill Bit Size/Type **2.25 in**	Total Depth of Borehole **34 feet bgs**
Drill Rig Type **Geoprobe**	Drilling Contractor **Vortex Drilling, Inc.**	Approximate Surface Elevation **354 ft, MSL**
Groundwater Level and Date Measured **Not Recorded**	Sampling Method(s) **1 3/4" x 5' sample tube**	Hammer Data **n/a**
Borehole Backfill **Cement-bentonite grout**	Approximate Location **N 9947750, E 3429049**	

Depth (feet)	Sample Number	Sample Type	Recovery/Attempted	Graphic Log	MATERIAL DESCRIPTION
0					TOPSOIL: dark brown, hard, trace angular fine gravel and organics.
					Sandy CLAY (CL): dark brown to gray, dry, low plasticity, hard, trace sand.
			4.0/5.0		
5					Sandy CLAY (CL): light gray to brown, dry, low plasticity, hard.
					- Light brown to white at 6'.
			5.0/5.0		
					- Light brown at 8'.
10					Sandy CLAY (CL): light gray to light brown, moist, low plasticity, compact.
			5.0/5.0		
					- Iron oxide staining at 13.5'.
15					Sandy CLAY (CL): white, dry, loose and crumbly.
			5.0/5.0		
					Sandy CLAY (CL): light gray, moist, low plasticity, compact.
20					
			4.5/5.0		- Light brown, dry, loose and crumbly at 22'.
					Sandy CLAY (CL): light gray to brown, moist, low plasticity, firm.
25					- Light brown to brown at 25'.
			5.0/5.0		CLAY (CL): reddish brown to brown, low plasticity, hard, some mottling, trace iron oxides.
					- Trace sand at 29'.
30					

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Project: **LCRA Fayette Power Project**

Project Location: **6549 Power Plant Rd, La Grange, TX 78945**

Project Number: **TXL0225-05**

Log of Boring CBL-325

Sheet 2 of 2

Depth (feet)	Sample Number	Sample Type	Recovery/Attempted	Graphic Log	MATERIAL DESCRIPTION
30			2.5/4.0		- Dark gray to reddish brown, mottled, low plasticity, hard, refusal at 34'.
					Total Depth: 34'
35					
40					
45					
50					
55					
60					
65					

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Project: **LCRA Fayette Power Project** Project Location: **6549 Power Plant Rd, La Grange, TX 78945** Project Number: **TXL0225-05**	Log of Boring CBL-326 **Sheet 1 of 1**

Date(s) Drilled **7/31/2013**	Logged By **Ed Jones**	Checked By **M. Zahirul Islam, Ph.D., P.E.**
Drilling Method **Geoprobe DPT**	Drill Bit Size/Type **2.25 in**	Total Depth of Borehole **25 feet bgs**
Drill Rig Type **Geoprobe**	Drilling Contractor **Vortex Drilling, Inc.**	Approximate Surface Elevation **357 ft, MSL**
Groundwater Level and Date Measured **Not Recorded**	Sampling Method(s) **1 3/4" x 5' sample tube**	Hammer Data **n/a**
Borehole Backfill **Cement-bentonite grout**	Approximate Location **N 9947771, E 3429019**	

Depth (feet)	Sample Number	Sample Type	Recovery/Attempted	Graphic Log	MATERIAL DESCRIPTION
0					Sandy CLAY (CL): black, dry, hard.
					- Trace angular fine gravel and organics at 0'-2'.
			4.0/5.0		
5					Sandy CLAY (CL): light gray to white, dry to moist, slight plasticity, stiff to firm, some mottling.
			5.0/5.0		
10					- Trace iron oxides at 9.5'.
					CLAY (CL): light gray to orange, dry to moist, low plasticity, firm, mottling, some sand.
			5.0/5.0		- Loose and crumbly at 11.5'.
					- Loose and crumbly at 14'.
15					Lean CLAY with sand (CL): light gray to brown, moist, slight to low plasticity, soft to firm.
	CBL-326 15'-20'		5.0/5.0		- Trace iron oxide staining at 17.5'.
20					Sandy CLAY (CL): light gray to black, moist, hard, mottled, trace iron oxides, refusal at 25'.
			5.0/5.0		
25					Total Depth: 25'
30					

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Project: **LCRA Fayette Power Project** Project Location: **6549 Power Plant Rd, La Grange, TX 78945** Project Number: **TXL0225-05**	Log of Boring CBL-328 **Sheet 1 of 2**

Date(s) Drilled **7/30/2013**	Logged By **Ed Jones**	Checked By **M. Zahirul Islam, Ph.D., P.E.**
Drilling Method **Geoprobe DPT**	Drill Bit Size/Type **2.25 in**	Total Depth of Borehole **43 feet bgs**
Drill Rig Type **Geoprobe**	Drilling Contractor **Vortex Drilling, Inc.**	Approximate Surface Elevation **369 ft, MSL**
Groundwater Level and Date Measured **Not Recorded**	Sampling Method(s) **1 3/4" x 5' sample tube**	Hammer Data **n/a**
Borehole Backfill **Cement-bentonite grout**	Approximate Location **N 9947890, E 3428656**	

Depth (feet)	Sample Number	Sample Type	Recovery/Attempted	Graphic Log	MATERIAL DESCRIPTION
0					TOPSOIL: dark brown to black, soft, trace organics.
					Sandy CLAY (CL): light brown to gray, moist, low plasticity, stiff.
			4.5/5.0		
					Sandy CLAY (CL): light orange to light gray, dry, crumbly, trace gravel.
5					
			5.0/5.0		- Trace iron oxides at 7.5'.
10					
					Sandy CLAY (CL): white to light gray, crumbly, iron oxide staining.
			5.0/5.0		- Light gray, compact, fine, iron oxide staining at 13'.
15					Sandy CLAY (CL): light brown, dry, loose and crumbly, iron oxide staining.
			5.0/5.0		- Hard from 17'-20'.
20					Sandy CLAY (CL): light brown to light gray, moist to dry, low plasticity, stiff.
					- Crumbly at 21'.
			5.0/5.0		
25					Clayey SAND (SC): light brown to gray, moist, compact, iron oxide staining.
			4.5/5.0		
30					

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Project: **LCRA Fayette Power Project**
Project Location: **6549 Power Plant Rd, La Grange, TX 78945**
Project Number: **TXL0225-05**

Log of Boring CBL-328

Sheet 2 of 2

Depth (feet)	Sample Number	Sample Type	Recovery/Attempted	Graphic Log	MATERIAL DESCRIPTION
30					Clayey SAND (SC): light brown to gray, moist, compact, iron oxide staining.
			4.0/5.0		Sandy CLAY (CL): white to light brown, compact to crumbly from 31.5' to 33'.
					Sandy CLAY (CL): light brown, moist, compact, iron oxide staining.
35					Sandy CLAY (CL): light brown to gray, moist to dry, compact, some mottling, trace iron oxide staining.
			4.0/5.0		- Some light brown to orange sand at 37'.
					CLAY (CL): reddish brown to light brown, moist, hard, mottling, iron oxide staining, refusal at 43'.
40			3.0/3.0		
					Total Depth: 43'
45					
50					
55					
60					
65					

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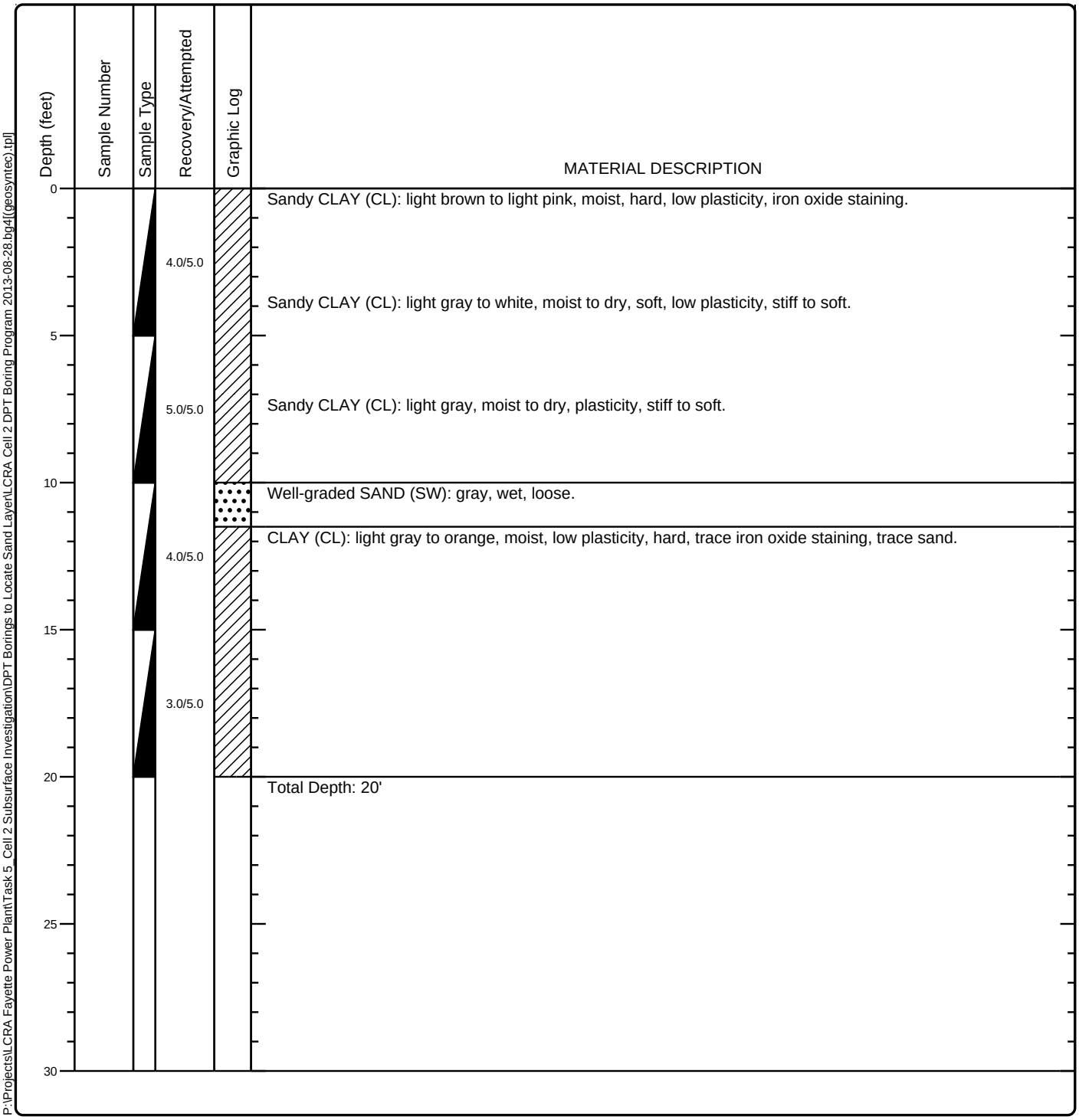
Project: **LCRA Fayette Power Project** Project Location: **6549 Power Plant Rd, La Grange, TX 78945** Project Number: **TXL0225-05**	Log of Boring CBL-335 **Sheet 1 of 1**

Date(s) Drilled **7/31/2013**	Logged By **Ed Jones**	Checked By **M. Zahirul Islam, Ph.D., P.E.**
Drilling Method **Geoprobe DPT**	Drill Bit Size/Type **2.25 in**	Total Depth of Borehole **20 feet bgs**
Drill Rig Type **Geoprobe**	Drilling Contractor **Vortex Drilling, Inc.**	Approximate Surface Elevation **375 ft, MSL**
Groundwater Level and Date Measured **Not Recorded**	Sampling Method(s) **1 3/4" x 5' sample tube**	Hammer Data **n/a**
Borehole Backfill **Cement-bentonite grout**	Approximate Location **N 9948197, E 3429784**	



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Project: **LCRA Fayette Power Project** Project Location: **6549 Power Plant Rd, La Grange, TX 78945** Project Number: **TXL0225-05**	Log of Boring CBL-337 **Sheet 1 of 1**

Date(s) Drilled **7/31/2013**	Logged By **Ed Jones**	Checked By **M. Zahirul Islam, Ph.D., P.E.**
Drilling Method **Geoprobe DPT**	Drill Bit Size/Type **2.25 in**	Total Depth of Borehole **25 feet bgs**
Drill Rig Type **Geoprobe**	Drilling Contractor **Vortex Drilling, Inc.**	Approximate Surface Elevation **345 ft, MSL**
Groundwater Level and Date Measured **Not Recorded**	Sampling Method(s) **1 3/4" x 5' sample tube**	Hammer Data **n/a**
Borehole Backfill **Cement-bentonite grout**	Approximate Location **N 9946807, E 3428861**	

Depth (feet)	Sample Number	Sample Type	Recovery/Attempted	Graphic Log	MATERIAL DESCRIPTION
0					TOPSOIL: black, stiff, trace organics.
					CLAY (CL): light gray to brown, dry, hard, trace angular gravel.
			4.0/5.0		
5					CLAY (CL): dark brown to black, moist, plasticity, stiff, trace sand.
			5.0/5.0		
					- Light brown at 9'-10'.
10					Lean CLAY (CL): light gray to light brown, dry, low to medium plasticity, soft and crumbly, trace iron oxides.
	CBL-337 10'-13'		5.0/5.0		
					CLAY (CL): light gray to green, moist, low plasticity, hard, iron oxides.
15					
			5.0/5.0		
					- Medium stiff at 18'-18.5'.
20					- Light gray to green at 20'-25'.
			5.0/5.0		
25					Total Depth: 25'
30					

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APPENDIX C

Wetlands Assessment

WETLAND ASSESSMENT

for

Fayetteville Power Plant Complex
La Grange, Fayette County, Texas

Prepared by:
Ecological Communications Corporation

August 8, 2006

INTRODUCTION

Ecological Communications Corporation (EComm) was contracted by RMT, Inc. to conduct a wetlands assessment on the grounds of the Fayetteville Power Plant (FPP) outside of La Grange, TX. EComm performed an on-site visit on July 20, 2006 in order to identify any potentially occurring Waters of the United States (U.S.), including wetlands, as defined by the U.S. Army Corps of Engineers (USACE), evaluate the existing methods of protecting sensitive areas and to identify ways to further protect those areas. Additional information regarding experience and capabilities for EComm firm and staff can be found in Appendix A of this document.

This report presents the findings that were concluded as a result of observations made during an on-site visit conducted July 20, 2006, and information gathered from aerial photographs and vegetation surveys as provided by the Texas Parks and Wildlife Department (TPWD), and topographic maps.

REGULATORY GUIDANCE

All Waters of the U.S. are considered jurisdictional by the USACE. The dredging or filling of more than a standard acreage or distance (depending on the activity) of these waters at an individual project site requires a specific permit, under Section 404 of the Clean Water Act.

Waters of the U.S. include, with some exemptions:

- All waters which are currently used, or were used in the past, or may be susceptible to use, in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
- All interstate waters including interstate wetlands;
- All other waters such as interstate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds; the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
    1. which are or could be used by interstate or foreign travelers for recreational or other purposes; or
    2. from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
    3. which are used or could be used for industrial purpose by industries in interstate commerce;
- All impoundments of waters otherwise defined as Waters of the U.S. under the definition;
- Tributaries of waters identified in all sections above;
- The territorial seas;
- Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in all sections above. The term "adjacent" means bordering, contiguous, or neighboring. Wetlands separated from other Waters of the U.S. by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent wetlands."

Waters of the U.S. typically do not include:

- Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the Clean Water Act;
- Abandoned stock ponds (in certain circumstances);
- Road-side ditches;
- Mined areas (until they assume characteristics of Waters of the U.S.); or
- Agricultural areas.

Of the jurisdictional waters included in the above definition, some are considered special aquatic sites by the U.S. Environmental Protection Agency (USEPA) and require specific conditions in order to be classified. One special aquatic site that pertains to areas within the subject property is a wetland. Wetlands are areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Any activity involving the dredging or filling of wetlands of any size requires a permit by the USACE.

SITE INVESTIGATION METHODS

A windshield survey was performed along the boundaries of the property. A pedestrian survey was performed along the unnamed tributary of Cedar Creek, a spring fed ephemeral stream that crosses the property, northwest to southeast. The tributary traverses the southern half of the property, and flows into Cedar Creek in the southeast corner of the property (Figure 1). The channel and confluence of the stream were examined, as well as the hydrology and morphology of the stream to determine the tributary's status as jurisdictional waters of the U.S. Dominant vegetation along the tributaries and their impoundments were also identified, to determine the possibility of wetlands.

SITE EVALUATION RESULTS

The unnamed tributary of Cedar Creek originates approximately 3300 feet south of the southwest corner of the Fayette Reservoir (Photo 1), joining Cedar Creek approximately 4300 feet downstream, southeast of the FPP property. This tributary, as shown on the 1981 U.S. Geological Survey (USGS) Fayetteville, TX topographic map, flows through the property and the FPP complex located there. The tributary channels are clearly defined, and contain a significant amount of wetland vegetation within or near the channel (Photos 3 through 7).

The tributaries maintain defined ordinary high water marks throughout most of its course within the property (Photo 8). A significant amount of unmaintained riparian vegetation grows along the banks of the tributary. Vegetation within the riparian areas are dominated by American elm (*Ulmus americana*), mesquite (*Prosopis glandulosa*), cypress (*Taxodium distichum*), hackberry (*Celtis laevigata*), eastern cottonwood (*Poplusus deltoides*), ashe juniper (*Juniperus ashei*), greenbriar (*Smilax bona-nox*), poison ivy (*Toxicodendron radicans*), and other herbaceous vegetation. Once the tributary exits the property, it flows southeast into Cedar Creek.

This tributary is considered a jurisdictional water of the U.S., and has several wetlands present. A small wetland area (approximately 200 square feet) is located at the beginning of the tributary, a sizable wetland area along the northern bank of the tributary where it flows between the FPP's rail loop (approximately 0.20 acre), and a small wetland area within the channel of the tributary as it flows southeast past the eastern portion of the rail loop (approximately 200 square feet). The wetland area within the rail loop and

the surrounding riparian area have been previously surrounded by three foot high orange geotextile fence, silt fence, and straw barriers, by FPP personnel, to avoid vehicle and drainage impacts. The wetland areas at the streams origin and southeast of the culvert under the eastern section of the rail loop have not been fenced off. Signs noting the sensitive areas' presence have been posted to inform people of their locations.

CONCLUSIONS

The unnamed tributary of Cedar Creek that traverses the FPP property is jurisdictional. Any disturbance to the wetland areas or disturbance of greater than a minimum acreage or linear feet limit (depending on the activity) will require coordination with USACE. In the event of a catastrophic oil spill, additional silt fencing around the key wetland areas can be implemented, and a USACE Nationwide Permit 20, Oil Spill Cleanup, can be obtained. If vehicles or heavy machinery are needed, a USACE Nationwide Permit 14, Linear Transportation, would be necessary. While this stream is the main tributary within the FPP property, other sources of riparian and special vegetative areas could exist within the property boundaries and were not surveyed as part of this report.

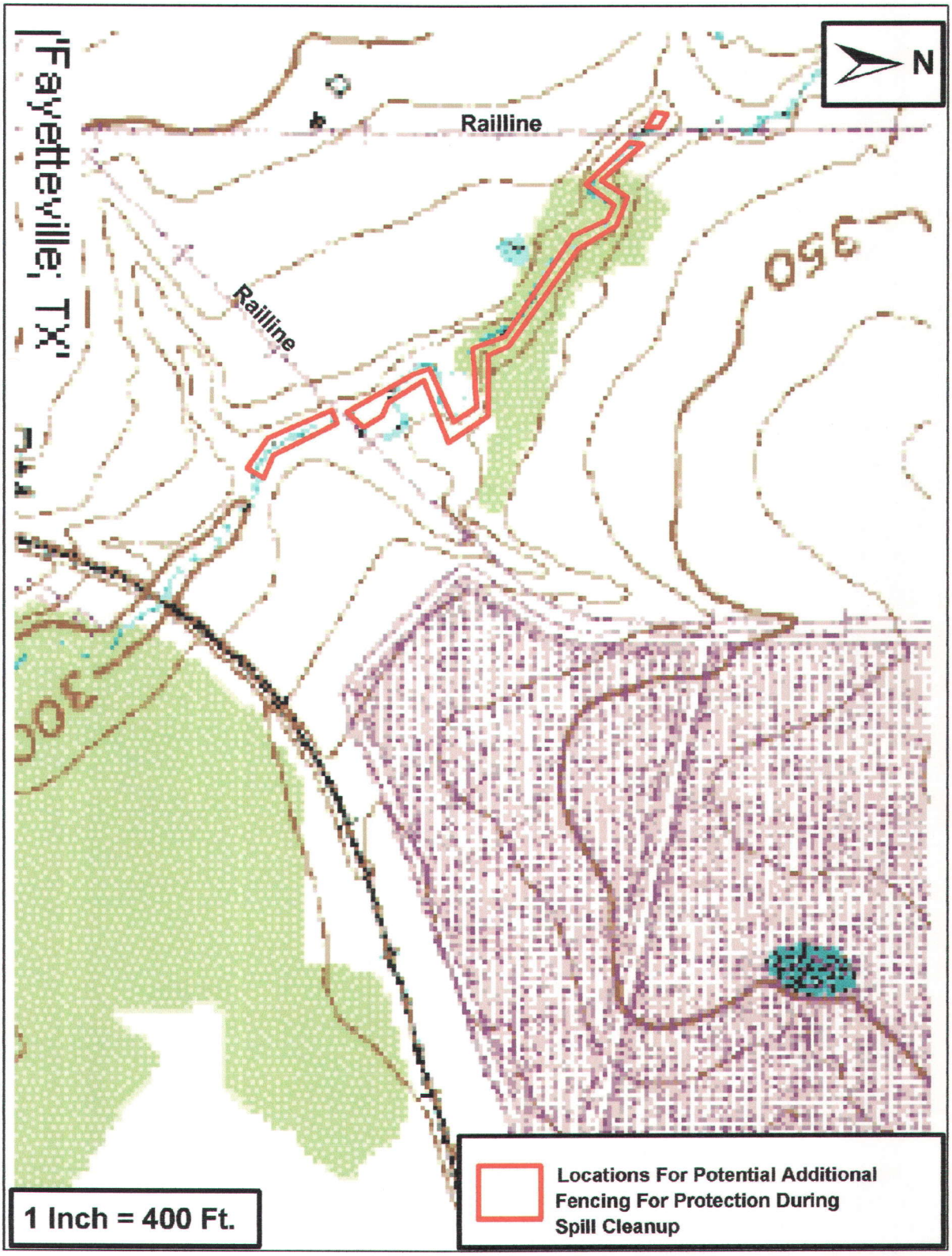

Fayetteville, TX
N
Railline
Railline
350
300
1 Inch = 400 Ft.
Locations For Potential Additional Fencing For Protection During Spill Cleanup

FIGURE 1: USGS FAYETTEVILLE, TX TOPOGRAPHIC MAP

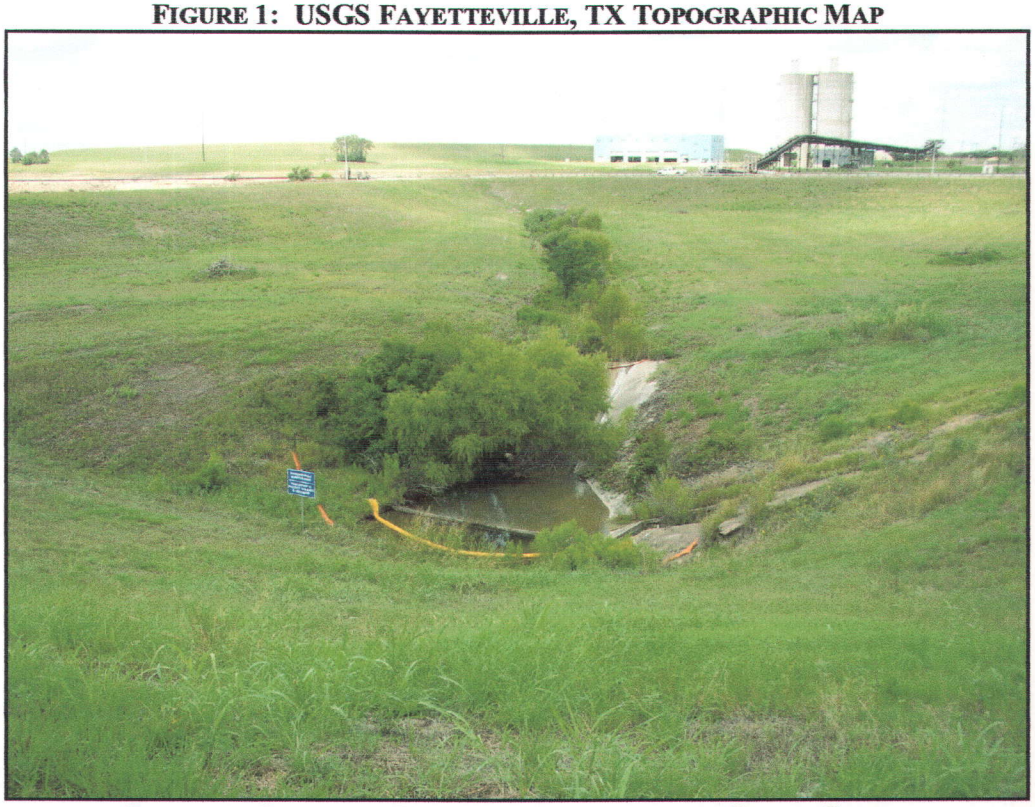


PHOTO 1: ORIGIN OF UNNAMED TRIBUTARY OF CEDAR CREEK

PHOTO 2: RIPARIAN AREA INSIDE FAYETTEVILLE POWER PLANT COMPLEX

PHOTO 3: WETLAND VEGETATION ALONG THE NORTHERN BANK OF TRIBUTARY

PHOTO 4: RIPARIAN AND WETLAND VEGETATION WITH PROTECTIVE FENCE

PHOTO 5: RIPARIAN AND WETLAND VEGETATION WITH PROTECTIVE FENCE AND SIGN

PHOTO 6: RAIL LINE CULVERT WITH WETLAND VEGETATION

PHOTO 7: WETLAND VEGETATION SOUTHEAST OF RAIL LINE CULVERT

PHOTO 8: TRIBUTARY UPSTREAM WITH WETLAND VEGETATION

REFERENCES

NATURAL RESOURCES CONSERVATION SERVICE. 1980. *Soil Survey of Fayette County, Texas.* U.S. Department of Agriculture, Texas Agriculture Experiment Station.

U.S. ARMY CORPS OF ENGINEERS. 1987. *Corps of Engineers Wetland Delineation Manual.* Wetlands Research Program Technical Report, Y-87-1. Washington D.C.

U.S. GEOLOGICAL SURVEY. 1981. *7.5 Topographic Quad Map of Fayetteville, Texas.*

U.S. GEOLOGICAL SURVEY. 1981. *7.5 Topographic Quad Map of La Grange East, Texas*

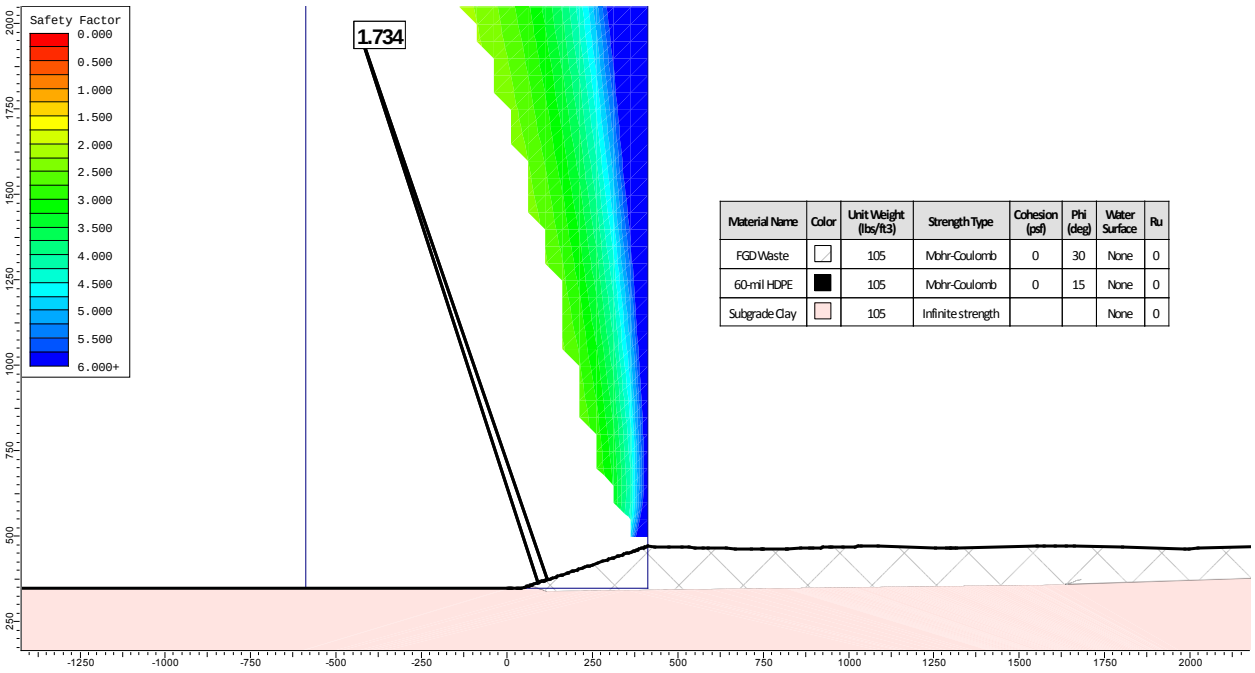
U.S. GEOLOGICAL SURVEY. 1995. *Aerial Photograph, Fayetteville, Texas.* DOQQ Program.

U.S. DEPARTMENT OF ENERGY. 2006. *DOE Environmental Policy and Guidance.*

APPENDIX D

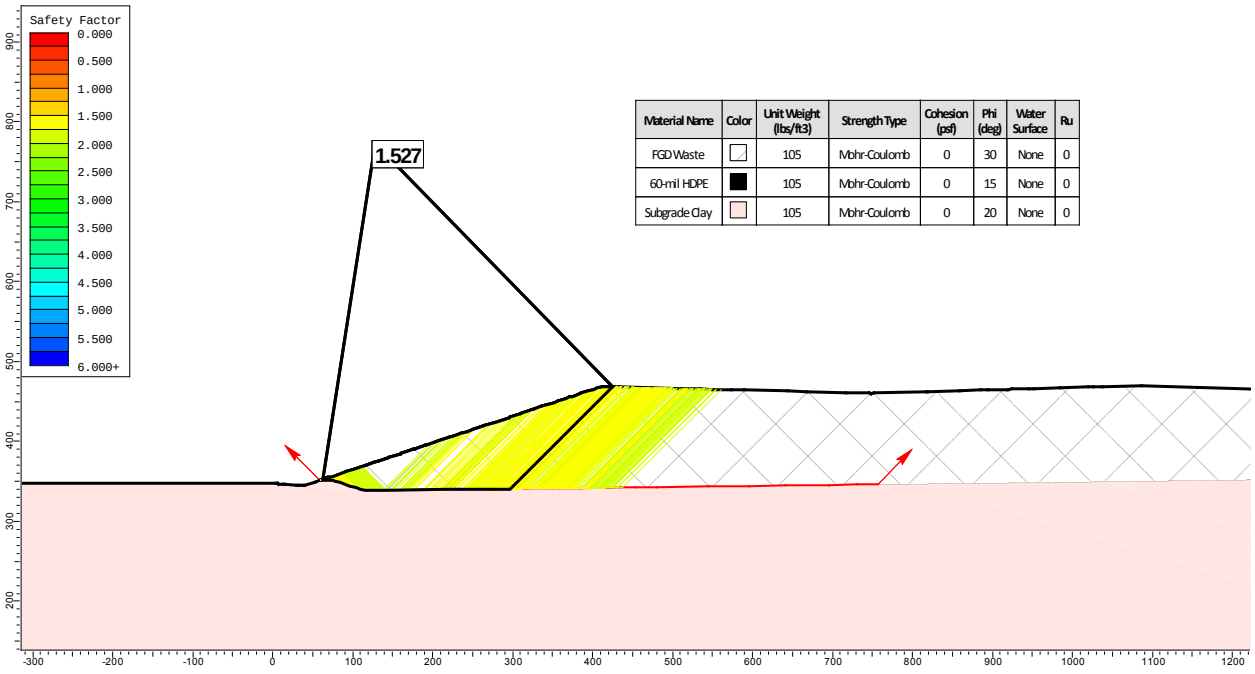
Slope Stability Analyses Results

Circular Slip Surface Through CCR Material



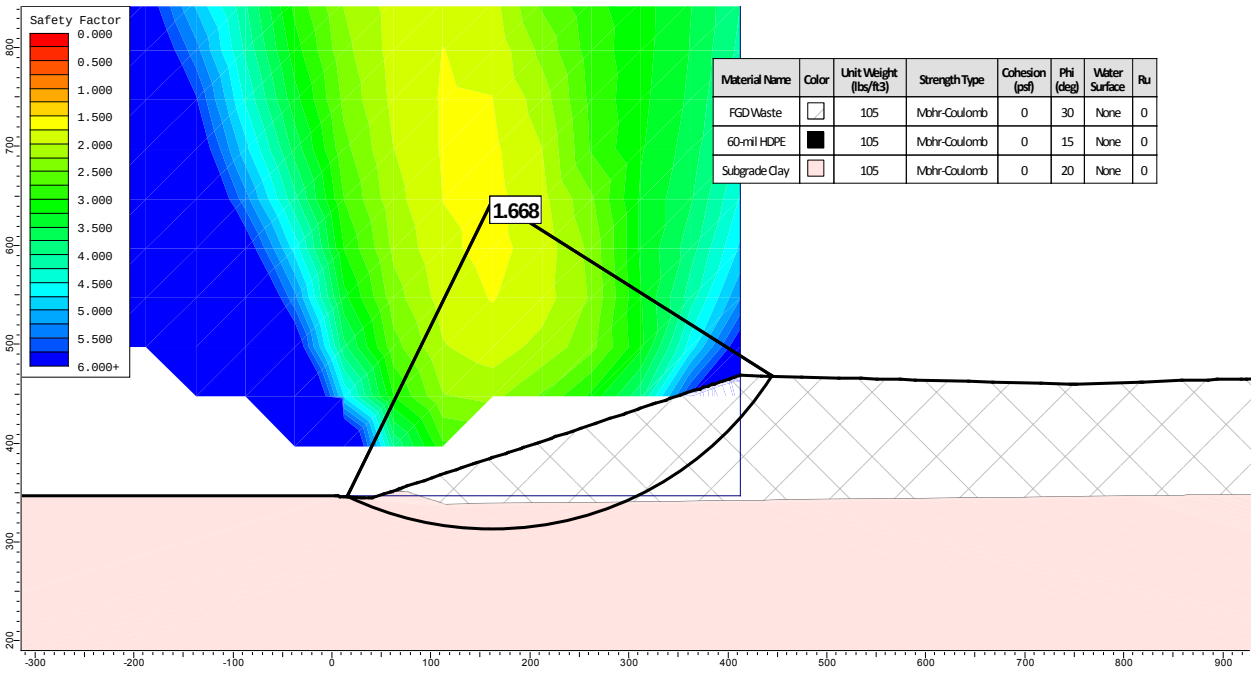
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Ru
FGD Waste		105	Mohr-Coulomb	0	30	None	0
60-mil HDPE		105	Mohr-Coulomb	0	15	None	0
Subgrade Clay		105	Infinite strength			None	0

Block-Type Slip Surface Through Liner System



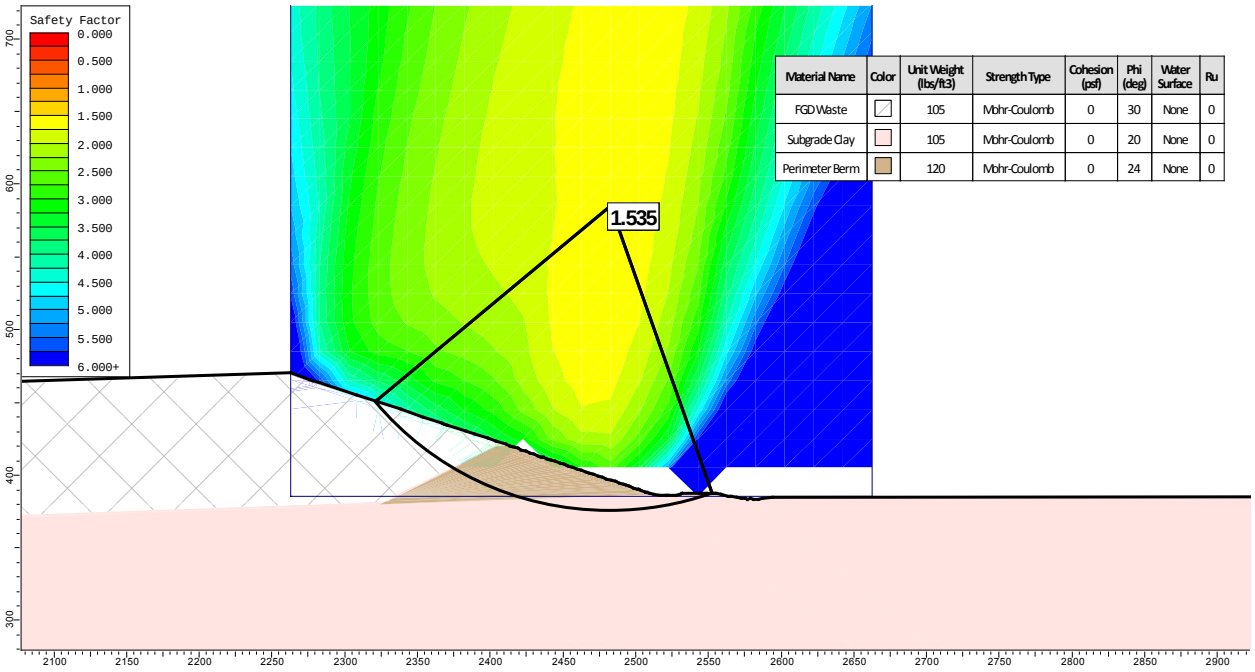
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Ru
FGD Waste		105	Mohr-Coulomb	0	30	None	0
60-mil HDPE		105	Mohr-Coulomb	0	15	None	0
Subgrade Clay		105	Mohr-Coulomb	0	20	None	0

Circular Slip Surface Into Subgrade Clay



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Ru
FGD Waste		105	Mohr-Coulomb	0	30	None	0
60-mil HDPE		105	Mohr-Coulomb	0	15	None	0
Subgrade Clay		105	Mohr-Coulomb	0	20	None	0

Circular Slip Surface Through North Perimeter Berm



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Ru
FGD Waste		105	Mohr-Coulomb	0	30	None	0
Subgrade Clay		105	Mohr-Coulomb	0	20	None	0
Perimeter Berm		120	Mohr-Coulomb	0	24	None	0

APPENDIX E

Protected Species Habitat Assessment

PROTECTED SPECIES HABITAT ASSESSMENT FOR THE FAYETTE POWER PROJECT COAL COMBUSTION BYPRODUCT LANDFILL

FAYETTE COUNTY, TEXAS

Prepared for

LCRA
ENERGY • WATER • COMMUNITY SERVICES

Prepared by

Blanton & Associates, Inc.
Environmental Consulting • Planning • Project Management
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December 2021

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1.0 INTRODUCTION

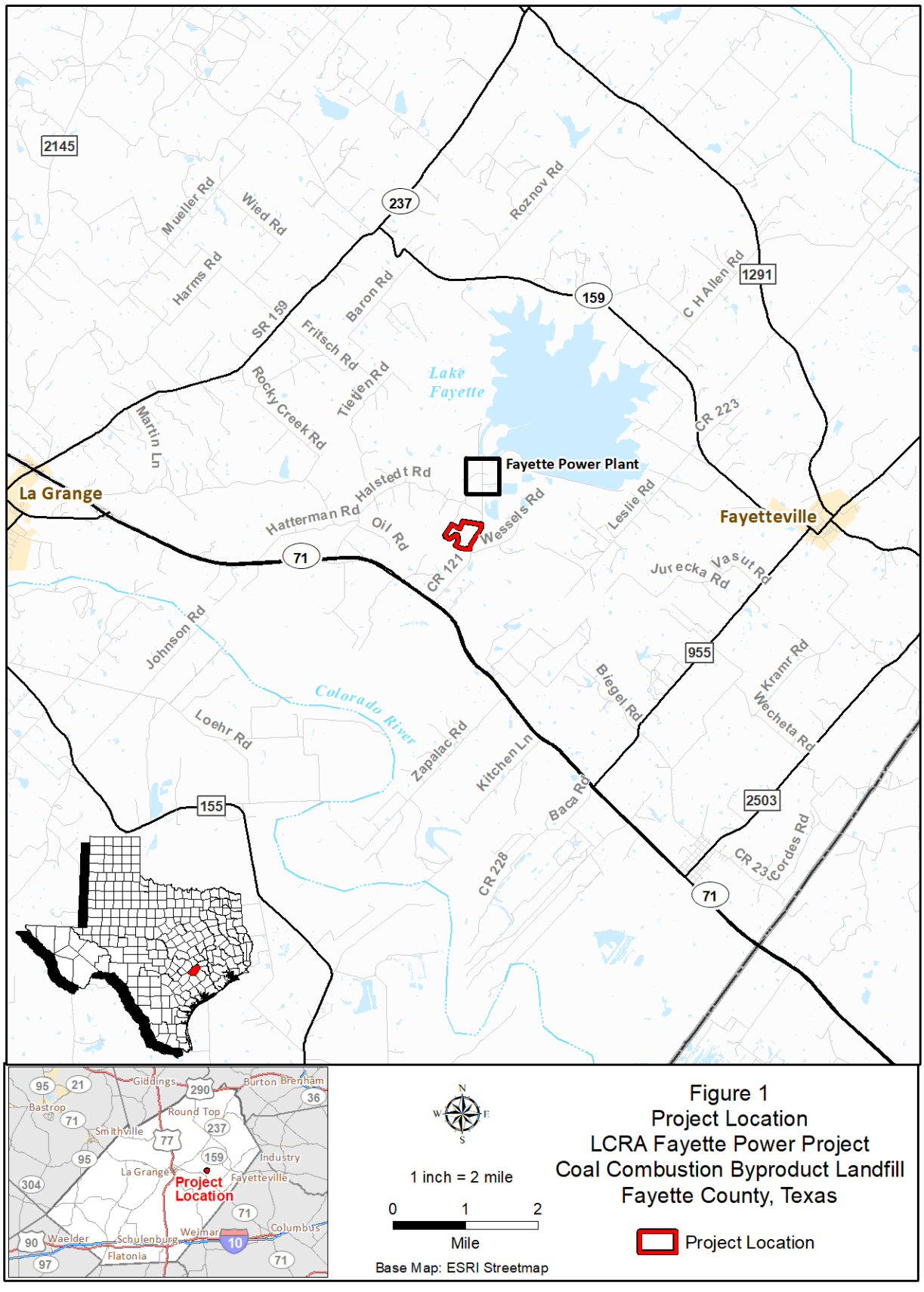
The Lower Colorado River Authority (LCRA) is preparing an application for the registration of its Fayette Power Project (FPP) Coal Combustion Byproduct Landfill under the Coal Combustion Residual Rules of the Texas Commission on Environmental Quality (TCEQ). Blanton and Associates, Inc. (B&A) was contracted by LCRA to conduct a protected species habitat assessment on approximately 70 acres of land (herein referred to as the project area) which is a portion of the 123-acre deed recorded Class 2 landfill solid waste management unit for the FPP. The 70-acre project area is designated for the development of future landfill cells and is shown in **Figure 1**. Site preparation for future cells would include the removal of all current vegetation.

This document assesses the potential for federally listed threatened, endangered, or other protected species (e.g., eagles) to occur in the project area and potential for those species to be impacted by the project. Subsequent sections provide the methods used in the analysis (**Section 2.0**); a description of vegetation, water resources, and soils within the project area (**Section 3.0**); a discussion of federal regulations that address protected species as well as identification and description of protected species of potential occurrence in the project area (**Section 4.0**); and a summary of the evaluation results and consequent recommendations (**Section 5.0**). Representative photographs of the project area are presented in **Appendix A**.

2.0 METHODS

B&A ecologists completed a literature, database, and desktop review for federally listed protected species potentially occurring in Fayette County and the project area. The purpose of the review was to assess habitats and resources within the project area; to determine protected species of known or potential occurrence within Fayette County and the project vicinity; to evaluate the life history and ecology of these species in relation to the habitats and resources present in the project area; and to ultimately determine the potential for each protected species to occur in the project area. Information reviewed included, but was not limited to the following:

- the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) Trusted Resource List for Fayette County, Texas (USFWS 2021a)
- the USFWS Environmental Conservation Online System (ECOS) Species by County Report for Fayette County, Texas (USFWS 2021b)
- the USFWS Critical Habitat online mapper (USFWS 2021c)
- the USFWS National Wetlands Inventory (USFWS 2021d) the Texas Parks and Wildlife Department (TPWD) Annotated County List of Rare Species for Fayette County, Texas (TPWD 2021a)
- the U.S. Geological Survey (USGS) National Land Cover Database (Multi-Resolution Land Characteristics Consortium [MRLC])
- the TPWD Texas Natural Diversity Database (TXNDD 2021)
- the Cornell Lab of Ornithology's eBird Database (eBird 2021)


2145
237
159
1291
71
955
2503
155
Mueller Rd
Wied Rd
Harms Rd
SR 159
Baron Rd
Fritsch Rd
Tiegen Rd
Rocky Creek Rd
Martin Ln
Roznov Rd
C H Allen Rd
CR 223
Lake Fayette
Fayette Power Plant
La Grange
Fayetteville
Halsted Rd
Hatterman Rd
Oil Rd
CR 121
Wessels Rd
Leslie Rd
Jurecka Rd
Vasut Rd
Johnson Rd
Colorado River
Loehr Rd
Zapalac Rd
Kitchen Ln
Biegel Rd
Baca Rd
Kramr Rd
Wechsta Rd
CR 228
CR 233
Cordes Rd
Giddings
Burton
Brenham
Bastrop
Round Top
Smithville
Industry
Project Location
Weimar
Columbus
Waelder
Schulenburg
Flatonia
1 inch = 2 mile
0 1 2
Mile
Base Map: ESRI Streetmap
Figure 1
Project Location
LCRA Fayette Power Project
Coal Combustion Byproduct Landfill
Fayette County, Texas
Project Location

- the California Academy of Sciences and National Geographic Society's iNaturalist Database (iNaturalist 2021)
- the USGS National Hydrography Dataset (USGS 2021a)
- USGS 7.5-minute La Grange East topographic quadrangle map (USGS 2019)
- the Geologic Atlas of Texas, Seguin Sheets (Bureau of Economic Geology [BEG] 1979)
- the USDA-Natural Resource Conservation Service (NRCS) Soils Survey Geologic Database (SSURGO) (USDA-NRCS 2021), and
- photointerpretation of historical and contemporary natural color aerial imagery for the project area (Google Earth Pro 2021)

Of note, the eBird (2021) and iNaturalist (2021) databases include self-reported species sightings by citizens that are unverified, and as such, provide a general reference but inherently exhibit a level of uncertainty. Additionally, eBird does not depict observation locations, but rather only frequency of observation within a larger region, for some sensitive species. Likewise, iNaturalist sightings for some sensitive species (e.g., bald eagle [*Haliaeetus leucocephalus*] nests) provide proximal locations that have been randomly repositioned in the vicinity of their reported location.

The review of background information was accompanied by a field investigation on November 23, 2021. During the field investigation, the project area was evaluated to verify information attained in the background review and to assess the potential for federally protected species to occur on the site. Additionally, a presence/absence survey for Navasota ladies'-tresses (NLT) (*Spiranthes parksii*) was conducted by two B&A biologists.

3.0 PROJECT AREA DESCRIPTION

The project area is located approximately seven miles east of the City of La Grange and encompasses approximately 70 acres on the south side of the FPP (**Figure 1**). The project lies within the Texas Blackland Prairies Level III ecoregion and Southern Blackland/Fayette Prairie Level IV ecoregion (Griffith et al 2007). The Texas Blackland Prairies form a disjunct ecological region, distinguished from surrounding regions by fine-textured, clayey soils and predominantly prairie natural vegetation (Griffith et al 2007).

The project area is humid sub-tropical, with an average annual rainfall of approximately 39.63 inches (National Oceanic and Atmospheric Administration [NOAA 2021]). Monthly average precipitation ranges from 4.27 inches in October (historically the wettest month) to 2.06 inches in July (historically the driest month) (NOAA 2021).

3.1 Land Cover and Vegetation Communities

The project area lies is within the Blackland Prairie vegetational area (Gould et. al 1960), which generally corresponds with the Texas Blackland Prairies (Level III) ecoregion previously described. Based on the 2016 National Land Cover Database (NLCD) (Multi-Resolution Land Characteristics Consortium [MRLC] 2016), mapped land cover classes for the project area are provided below on **Figure 2** and **Table 1**.

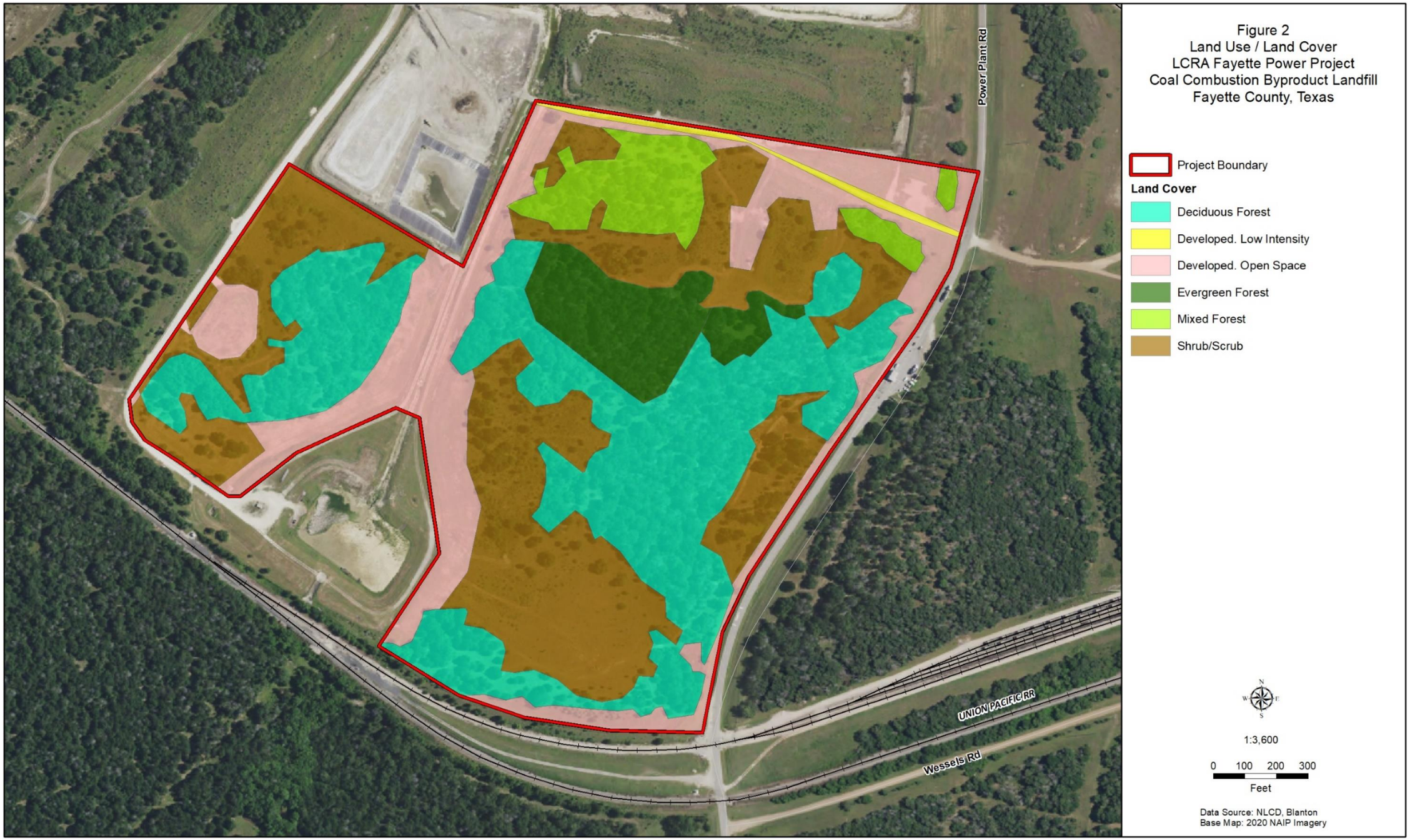

Power Plant Rd
UNION PACIFIC RR
Wessels Rd
Figure 2
Land Use / Land Cover
LCRA Fayette Power Project
Coal Combustion Byproduct Landfill
Fayette County, Texas
Project Boundary
Land Cover
Deciduous Forest
Developed. Low Intensity
Developed. Open Space
Evergreen Forest
Mixed Forest
Shrub/Scrub
N
W
E
S
1:3,600
0 100 200 300
Feet
Data Source: NLCD, Blanton
Base Map: 2020 NAIP Imagery

Table 1. Land Cover Classification for the Project Area

Land Cover Class	Acres*	Percent
Shrub/Scrub	24	34.3
Deciduous Forest	22	31.4
Developed, Open Space	14	20.0
Evergreen Forest	5	7.1
Mixed Forest	4	5.8
Developed, Low Intensity	1	1.4
TOTAL	**70**	**100**

Most of the project area consists of shrub/scrub, deciduous forest, and developed land (with open space). Minor land cover types occurring in the project area include evergreen forest, mixed forest and developed land (low intensity).

Based on the field investigations, vegetation within the project area was consistent with the NLCD mapping. Land use is variable with regard to browsing and mowing regimen, affecting vegetative communities present and their structure. Browsing pressure was evident throughout the project area. Common grassland/herbaceous species included yellow bluestem (*Bothriochloa ischaemum*), broomsedge bluestem (*Andropogon virginicus*), woolly croton (*Croton capitatus*), slender threeseed mercury (*Acalypha gracilens*), silver bluestem (*Bothriochloa laguroides*), rosette-panicgrass (*Dichanthelium* sp.), narrowleaf marshelder (*Iva angustifolia*), Bermudagrass (*Cynodon dactylon*), western ragweed (*Ambrosia psilostachya*), splitbeard bluestem (*Andropogon ternarius*), low prickly pear (*Opuntia humifusa*), southern dewberry (*Rubus trivialis*), St. Andrew's cross (*Hypericum hypericoides*), sneezeweed (*Helenium amarum*), and gaping grass (*Steinchisma hians*). Shrubs noted within the project area included coralberry (*Symphoricarpos orbiculatus*), farkleberry (*Vaccinium arboreum*), groundseltree (*Baccharis halimifolia*), retama (*Parkinsonia aculeata*), and yaupon (*Ilex vomitoria*).

Woodlands in the project area primarily consisted of post oak (*Quercus stellata*), southern live oak (*Quercus virginiana*), blackjack oak (*Quercus marilandica*), eastern redcedar (*Juniperus virginiana*), and few scattered loblolly pines (*Pinus taeda*). The understory was typically composed of dense yaupon and eastern redcedar, with occasional coralberry and farkleberry shrubs. Vines observed in the subcanopy primarily were saw greenbriar (*Smilax bona-nox*) and mustang grape (*Vitis mustangensis*). These wooded areas generally exhibited dense canopy and understory coverage as well as dense leaf litter such that the herb stratum was typically absent, with the exception of a small patch of open woodlands in which three nodding ladies'-tresses (*Spiranthes cernua*) individuals were observed (see **Section 4.2.3**).

A small pond in the northeast part of the project area exhibited some standing water but appeared to be drying out at the time of the survey. Vegetation in and around this feature included bushy bluestem (*Andropogon glomeratus*), Chinese tallow (*Triadica sebifera*), black willow (*Salix nigra*), gaping grass, floating primrose-willow (*Ludwigia peploides*), wingleaf primrose-willow (*Ludwigia decurrens*), southern cattail (*Typha domingensis*), crowngrass (*Paspalum* sp.), annual marshelder (*Iva annua*), western ragweed, and southern dewberry.

Representative photographs of land cover types/vegetative communities in the project area are depicted in **Appendix A**.

3.2 Water Resources

The project lies within the Lower Colorado-Cummins (Hydrologic Unit Code [HUC] 12090301) watershed (USGS 2021b). A review of National Wetland Inventory (NWI) data (USFWS 2021d), USGS topographic maps (USGS 2019), the National Hydrography Dataset (NHD) (USGS 2021a), and aerial imagery (Google Earth Pro 2021) revealed that the project area is drained by Cedar Creek. During the field investigation, B&A identified one small pond and the existing runoff channel in the project area.

3.3 Soils

According to USDA-NRCS (2021), five soil types are mapped within the project area (**Table 2)**. Approximately 49 percent of the project area contains sandy soils (Straber soils), 43 percent of the project area contains clay soils (Frelsburg and Latium soils), and 8 percent contains sandy loam soils (Rek soils) (YSDA-NRCS 2021). None of the soils within the project area contain hydric soil components (**Table 2**). Mapped soils within the project area are depicted on **Figure 3**.

Table 2. Soils Mapped in the Project Area

Soil Series (Map Symbol)	Hydric	Hydric Rating (Percent)	Acres	Percent of Project Area
Frelsburg clay, 3 to 5 percent slopes (FrC, 32)	No	0	15	22
Latium gravelly clay, 5 to 12 percent slopes (LgD)	No	0	15	21
Rek extremely gravelly course sandy loam 2 to 5 percent slopes (RkC)	No	0	6	8
Straber loamy fine sand, 1 to 5 percent slopes (SwC)	No	0	<1	<1
Straber gravelly loamy fine sand, 2 to 5 percent slopes (SxC)	No	0	34	49
TOTAL	-	-	**70**	**100**

Source: USDA-NRCS 2021

4.0 PROTECTED SPECIES ASSESSMENT

This section discusses federal regulations that address threatened, endangered, proposed and candidate species; identifies and describes protected species of potential occurrence in the project area; and provides an assessment of the potential impacts of the project on protected species, as well as potential regulatory implications.

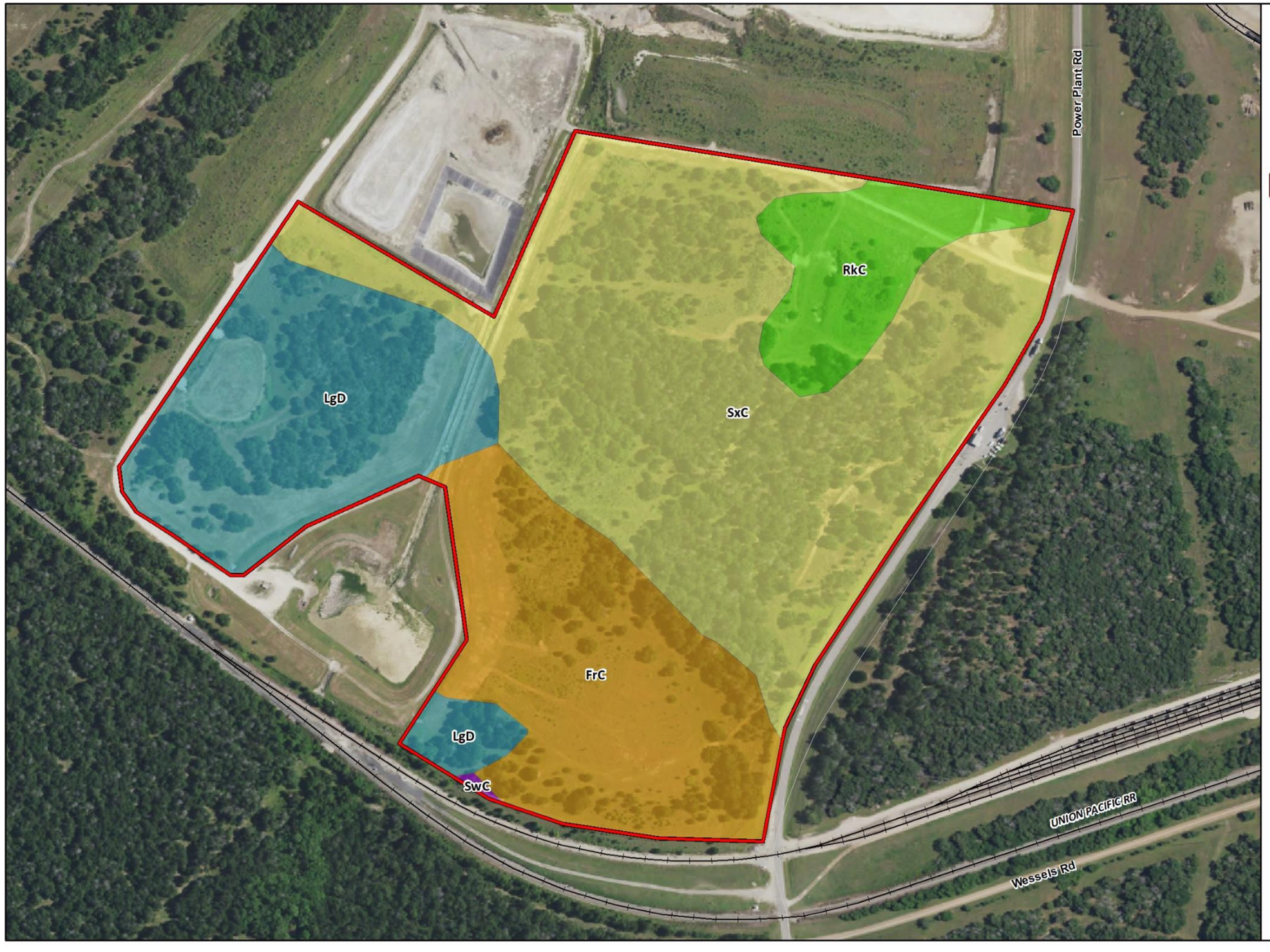


Figure 3
Soils
LCRA Fayette Power Project
Coal Combustion Byproduct Landfill
Fayette County, Texas

Project Boundary

Soil Unit

- Frelsburg clay, 3 to 5 percent slopes (FrC)
- Latium gravelly clay, 5 to 12 percent slopes (LgD)
- Rek extremely gravelly coarse sandy loam, 2 to 5 percent slopes (RkC)
- Straber gravelly loamy fine sand, 2 to 5 percent slopes (SxC)
- Straber loamy fine sand, 1 to 5 percent slopes (SwC)

1:3,600

0 100 200 300
Feet

Data Source: NRCS
Base Map: 2020 NAIP Imagery

4.1.1 Endangered Species Act

Animal species listed as threatened or endangered by the USFWS are provided full protection under the Endangered Species Act (ESA). This protection not only prohibits the direct take of a protected species, but also includes a prohibition of indirect take, such as destruction of designated critical habitat. Listed plants are not protected from "take" on private lands, although on federal land it is illegal to collect or maliciously harm federally listed plant species.

The federal listing process ranks potential candidates for listing based upon the species' biological vulnerability. The vulnerability decision is based upon many factors affecting the species within its range and is linked to the best scientific data available to the USFWS at the present time. Candidate species and species under review are not afforded statutory protection under ESA, although USFWS encourages conservation measures for these species as they may soon be warrant full protection. Species proposed for federal listing are likely to become endangered or threatened in the foreseeable future throughout all or a significant portion of their range, as determined by USFWS. However, species proposed for listing are not protected under the ESA until a final rule to list is published in the Federal Register.

4.1.2 Bald and Golden Eagle Protection Act

Within the U.S. or anywhere within its jurisdiction, the bald eagle and the golden eagle (*Aquila chrysaetos*) are protected by the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668–668d). Provisions of the act state that, unless otherwise permitted to do so, no person "shall knowingly, or with wanton disregard for the consequences of his act take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or in any manner, any bald eagle . . . or golden eagle, alive or dead, or any part, nest, or egg thereof." The BGEPA defines the take of an eagle to include a broad range of actions, including to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb. Based on regulations found at 50 CFR 22.3, the term "disturb" means to "agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." The act imposes criminal and civil penalties on anyone, including associations, partnerships, and corporations that violate the act.

4.1.3 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, import, and export of migratory birds, their eggs, parts, and nests without a USFWS permit or other regulatory authorization. The MBTA protects most native bird species occurring in the wild in the United States except for gallinaceous birds (upland game birds such as turkeys and quail) that are not considered migratory. In addition, the MBTA does not protect some non-native species such as the house sparrow (*Passer domesticus*), European starling (*Sturnus vulgaris*), rock pigeon (*Columba livia*), and any recently listed unprotected species in the Federal Register (FR) (70 FR 12710, 50 CFR 10.13).

Federal courts as well as previous presidential administrations have had conflicting interpretations of the MBTA's intent, particularly regarding incidental take of migratory birds. On January 7, 2021, the USFWS published a final rule in the Federal Register defining the scope of the MBTA as it pertains to death or injury ("take") of migratory birds (86 FR 1134). On October 4, 2021, the USFWS revoked that rule and published a final rule which will implement the MBTA as prohibiting incidental take and applying enforcement discretion, consistent with judicial precedent and longstanding agency practice prior to 2017 (86 FR 54642).

4.2 Assessment of Protected Species Occurrence

Protected species of known or potential occurrence in Fayette County are listed below in **Table 3** (USFWS 2021a, 2021b; TPWD 2021a). No designated critical habitat for federally listed species occurs in the project area or vicinity (USFWS 2021c). For each of the species listed in **Table 3**, the following paragraphs discuss their ecology, including habitat preferences and distribution, and provide an evaluation of their potential to occur in the project area.

Table 3. Federally Protected Species Potentially Occurring in Fayette County, Texas

Species		Conservation Status[1]		Potential to Occur in Project Area	
Common Name	**Scientific Name**	**Federal**	**State**	**Habitat**	**Species**
BIRDS					
Attwater's Prairie-chicken	*Tympanuchus cupido attwateri*	E	E	None	None
Bald Eagle	*Haliaeetus leucocephalus*	BGEPA	–	None	Likely migrant, potential breeder in project vicinity
Eastern Black Rail	*Laterallus jamaicensis*	T	T	None	Unlikely migrant
Piping Plover	*Charadrius melodus*	T	T	None	Unlikely migrant
Rufa Red Knot	*Calidris canutus rufa*	T	T	None	Unlikely migrant
Whooping Crane	*Grus americana*	E	E	None	Unlikely migrant
MOLLUSKS					
False Spike	*Fusconaia mitchelli*	PE	T	None	None
Guadalupe Orb	*Cyclonaias necki*	PE	T	None	None
Texas Fawnsfoot	*Truncilla macrodon*	PT	T	None	None
Texas Pimpleback	*Quadrula petrina*	PE	T	None	None
INSECTS					
Monarch Butterfly	*Danaus plexippus*	C	--	Migratory habitat present	Likely
PLANTS					
Navasota Ladies'-tresses	*Sprianthes parksii*	E	E	Low quality habitat	Unlikely

[1]E = Endangered; T = Threatened; PE = Proposed Endangered; PT = Proposed Threatened; C = Candidate for listing as threatened or endangered; BGEPA = Protected under the Bald and Golden Eagle Protection Act
Sources: USFWS 2021a, 2021b and TPWD 2021a.

4.2.1 Birds

Attwater's Prairie-chicken (Endangered)

The southernmost subspecies of the greater prairie-chicken, Attwater's prairie-chicken (*Tympanuchus cupido attwateri*) was federally listed as endangered in 1967. Its historic range extended from southwest Louisiana to possibly near Brownsville, Texas; however, the subspecies currently occurs in the wild at only three locations: the Attwater Prairie-Chicken National Wildlife Refuge in Colorado County, Texas; the Texas City Prairie Preserve in Galveston County, Texas; and at a private ranch in Goliad County, Texas (USFWS 2010). Preferred habitat includes coastal prairie described as well-drained grassland that supports some weeds or shrubs as well as grasses, with cover varying from light to heavy in density. Both diversification within the grassland type and presence of available surface water in the summer are essential (USFWS 2010).

The project area is outside the current range of Attwater's prairie-chicken and there are no records of the species from the project area or immediate vicinity (TXNDD 2021, eBird 2021, iNaturalist 2021). Field survey of the project area did not identify suitable habitat for Attwater's prairie-chicken and the species does not occur within the project area or vicinity. The proposed project activities will have no impact on the species.

Bald Eagle (protected under BGEPA)

The bald eagle is the second largest bird of prey in North America, with a wingspan of 5.5 to 8 feet. In adult plumage, the species exhibits a distinguishable white head and tail with dark brown body and wings, a yellow hooked beak, and yellow feet. In 2007, the USFWS removed the bald eagle from the list of endangered and threatened wildlife (72 FR 37346), and TPWD recently removed the species from the state list of threatened species (45 Texas Register 2188, effective March 30, 2020). However, the species receives federal protection under provisions of the BGEPA, as previously discussed.

The bald eagle is a widespread migratory species, ranging over much of the U.S. and Canada. Primarily foraging on fish and occasionally waterfowl and other prey, including carrion, bald eagles prefer habitats associated with large bodies of water where prey is readily available (USFWS 1989). In Texas, the bald eagle is present year-round and may be found during breeding and wintering seasons as well as during migration. It is a rare summer resident, primarily in the eastern third of the state, but is found more widely throughout most of the state during migration and winter (Oberholser 1974, Lockwood and Freeman 2014). In the winter, bald eagles are locally common only on large reservoirs in the eastern third of Texas (Lockwood and Freeman 2014). Breeding populations generally occur in the eastern half of the state along the Gulf Coast and on major inland lakes and reservoirs, while nonbreeding birds (i.e., migrants and winter residents) can occur throughout the state (USFWS 1993, Campbell 2003).

Migrating eagles generally arrive in Texas between September and October, with nesting typically occurring from October through June (USFWS 1993, Campbell 2003). Nesting sites often include tall trees or cliffs located along river systems or within one to two miles of some other large body of water (e.g., reservoirs) where they forage. In these areas, nests are often located on ecotones in areas where forest, marsh, and water converge. Mature trees taller than the surrounding forest (approximately 40 to 120 feet tall) that provide an unobstructed flight path are typically used for nesting and roosting. Common nest tree species in Texas include loblolly pine, bald cypress (*Taxodium distichum*), oaks, eastern cottonwood

(*Populus deltoides*), and American sycamore (*Platanus occidentalis*). Mating bald eagle pairs exhibit high site fidelity to nesting territories and often rebuild in the same location or vicinity of a fallen nest (USFWS 2007).

No bald eagle nests occur in the project area; however, one bald eagle nest is located approximately 1.75 miles south of the dam on Fayette County Reservoir (Barron 2021). A query of TXNDD reported a bald eagle territory in the vicinity of the project, generally centered on Fayette County Reservoir and including the project area (TXNDD 2021) (**Figure 4**). A query of eBird (2021) and iNaturalist (2021) reported no observations of bald eagles within one mile of the project area, although a number of sightings have been reported from the north side of Fayette County Reservoir approximately three miles north of the project area. No bald eagle nests were observed in the project area during field surveys by B&A on November 23, 2021. While bald eagles may occur in proximity to the project area, the proposed activities are not expected to adversely affect the species.

Eastern Black Rail (Threatened)

The eastern black rail (*Laterallus jamaicensis jamaicensis*) was listed by USFWS as threatened in 2020 (85 FR 63764). It is a slight rail between five and six inches tall that is very secretive and rarely observed. The subspecies generally occurs in salt, brackish, and freshwater marshes, on pond borders, and in wet meadows and grassy swamps (TPWD 2021a; Eddleman et al. 1994). The rail nests in high portions of salt marshes, shallow freshwater marshes, wet meadows, and flooded grassy vegetation, nesting in or along the edge of marshes, sometimes on damp ground, but usually on a mat of the previous year's dead grasses and often hidden in marsh grass or at the base of pickleweed (*Salicornia* spp.) plants (TPWD 2021a, Eddleman et al. 1994). In Texas, the species is a rare migrant in the eastern third of the state, east of the Balcones Escarpment, and a rare to locally uncommon resident on the upper and central coasts of Texas, where it has been documented breeding (Lockwood and Freeman 2014, Eddleman et al. 1994). Inland migrants in the state have been detected in the fall from early August through early October, with winter residents arriving by the end of this period, and spring migrants found inland from early April through early May (Lockwood and Freeman 2014). The species migrates at night, though little is known of its migratory behavior or stopover habitat because it is rarely detected (Lockwood and Freeman 2014, Eddleman et al. 1994).

The USFWS (2021a, 2021b) does not list the eastern black rail as potentially occurring in Fayette County; however, TPWD (2021a) includes the species on its county list. Occurrence of the subspecies within or in proximity to the project area has not been recorded (TXNDD 2021, eBird 2021, iNaturalist 2021). No habitat for the eastern black rail occurs in the project area and the proposed project activities are not anticipated to adversely impact the species.

Piping Plover (Threatened)

A small but stocky migratory shorebird of approximately seven inches in length with a wingspan of nearly 15 inches, the piping plover (*Charadrius melodus*) is one of several plovers marked with a single black neck band (Campbell 2003, USFWS 2021e). Distinguishing features include its combination of short and stout bill, pale upperparts, and orange legs in all seasons. The piping plover is a federally threatened migratory bird species that breeds in the northern Great Plains of the U.S. and Canada, along beaches of the Great Lakes, and along the Atlantic coastline from North Carolina to Newfoundland (Haig and Oring 1987, USFWS 2021e). It was listed as threatened in this portion of its range on December 11, 1985 (50 FR 50726).

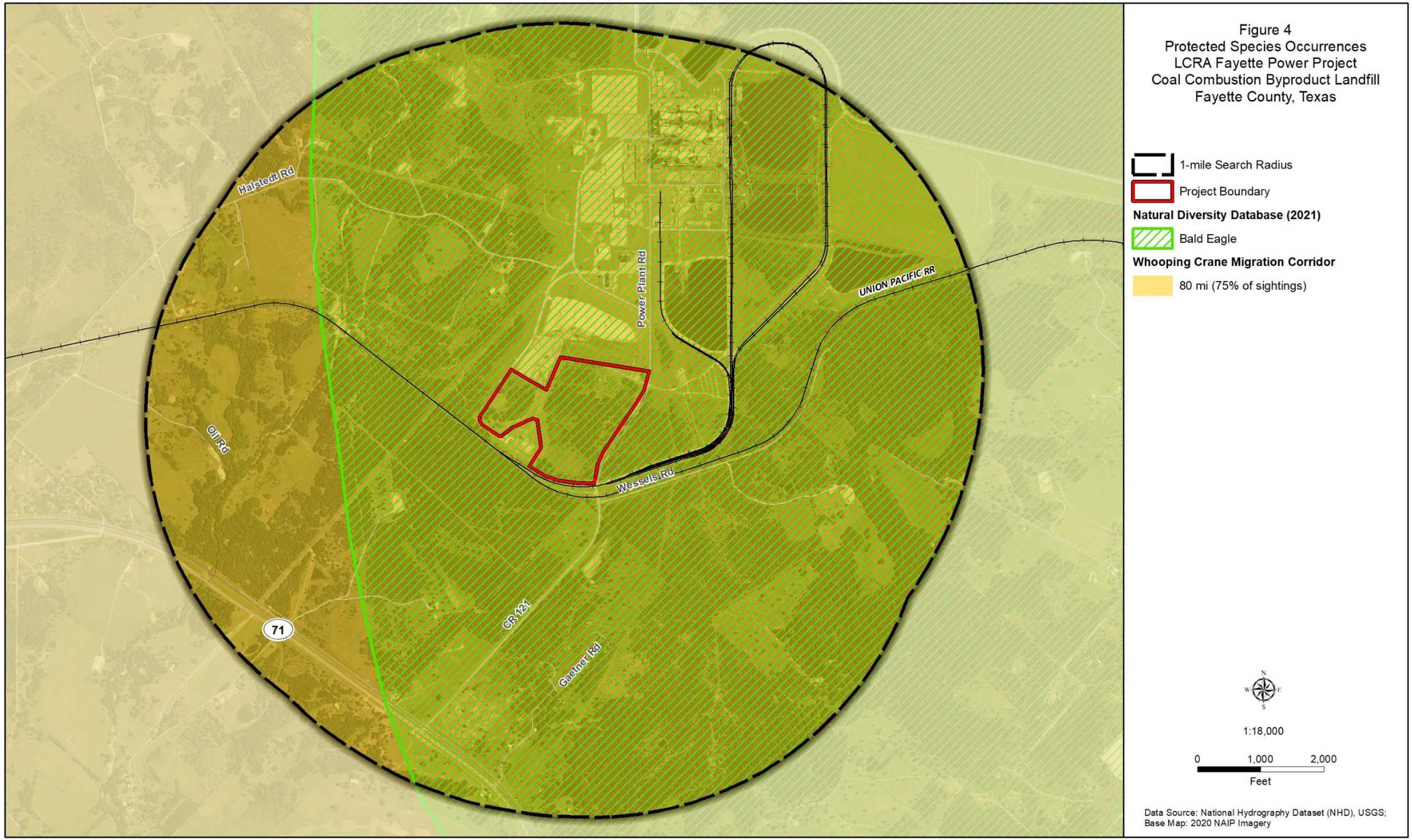


Figure 4
Protected Species Occurrences
LCRA Fayette Power Project
Coal Combustion Byproduct Landfill
Fayette County, Texas

1-mile Search Radius

Project Boundary

Natural Diversity Database (2021)

Bald Eagle

Whooping Crane Migration Corridor

80 mi (75% of sightings)

1:18,000

0 1,000 2,000

Feet

Data Source: National Hydrography Dataset (NHD), USGS;
Base Map: 2020 NAIP Imagery

Piping plovers spend three to four months of the year on their breeding grounds in the northern U.S. and Canada and the remainder of the year on their wintering grounds. One of their primary wintering areas is the Texas coast, where it is estimated that more than 35 percent of the known piping plover population overwinters (Campbell 2003). These plovers arrive in Texas between late July and late October and depart for their breeding grounds between early March and mid-May (Oberholser 1974). Little is known of the migration routes of the piping plover since the species is not often observed at inland locations during migration, but in Texas most individuals appear to pass east of the Balcones Escarpment (Lockwood and Freeman 2014). Primary habitats used during migration include beaches and alkali flats, which are preferred, although reservoir shorelines, natural lakes, rivers, marshes, industrial ponds, and fish farms have all been documented to be used, with substrate type predominantly mudflat (Elliott-Smith and Haig 2004).

No occurrences of piping plover are recorded within or immediately adjacent to the project area (TXNDD 2021, eBird 2021, iNaturalist 2021). The nearest records of occurrence are approximately 13 miles to the northeast at Lake Somerville State Park (eBird 2021). No habitat for the piping plover occurs in the project area and the project is not expected to impact the species.

Rufa Red Knot (Threatened)

The rufa red knot (*Caladris canutus rufa*) is a federally threatened sandpiper species known for its long migrations, breeding in the central Canadian Arctic and wintering along the Atlantic coasts of Argentina and Chile, the north coast of Brazil, the northwest Gulf of Mexico (particularly at Laguna Madre), and the southeast United States (USFWS 2013, 2014). The species was listed as threatened on January 12, 2015 (79 FR 73705). Red knots are principally marine shorebirds in the non-breeding season, feeding on polychaete worms, small crabs, and marine mollusks (Baker et al. 2013). In appearance, the species is a bulky, medium-sized shorebird about 9 to 11 inches in length with a wingspan of approximately 20 inches, noted by its rusty-red in color with reddish head and breast and darker upper parts exhibiting feathers with dark brown-black centers and rufous and grey edges in breeding plumage (USFWS 2011, 2013). In Texas, the species is very rarely detected inland and is a rare migrant through the eastern half of the state, with inland migrants more commonly detected in the fall (Lockwood and Freeman 2014). Inland habitats used in migration include beach habitats, such as saline lakeshores, as well as sandflats and mudflats with high densities of benthic bivalves (Baker et al. 2013).

No sightings of the red knot have been reported from the project area or immediate vicinity (TXNDD 2021, eBird 2021, iNaturalist 2021). The nearest recorded occurrences are to the northwest near Austin, Texas, at Hornsby Bend Bird Observatory approximately 60 miles away (eBird 2021). No habitat for the red knot occurs in the project area and the proposed project is not expected to impact the species.

Whooping Crane (Endangered)

The endangered whooping crane (*Grus americana*) is North America's tallest bird, with a standing height of five feet or more (Urbanek and Lewis 2020). The species was listed on March 11, 1967 (32 FR 4001) with critical habitat later designated (43 FR 20938). Although four geographically distinct populations of whooping cranes exist in the wild, the Aransas-Wood Buffalo Population (AWBP) is the largest and the only natural, self-sustaining population. The AWBP breeds in isolated marshy areas of Wood Buffalo National Park in Canada's Northwest Territories and overwinters on the Texas coast. Each fall, the entire population of whooping cranes migrates approximately 2,600 miles from this national park in northern

Canada to the Aransas National Wildlife Refuge (ANWR) and adjacent areas of the Texas mid coast in Aransas, Calhoun, and Refugio counties, where the species overwinters in oak savannahs, salt marshes, and bays (Campbell 2003, Canadian Wildlife Service [CWS] and USFWS 2007, USFWS 2009a).

During migration, the AWBP of whooping cranes generally follow the same flight path, with the normal migration corridor in Texas stretching from the eastern edge of the panhandle eastward to the east-central portion of the state, with most migrants crossing over Central Texas. Travel during migration is typically during daylight hours in groups of one to five birds, using thermals and wind currents at high altitudes (1,000 to 6,000 feet) to travel extended distances (200 to 400 miles per day) with minimal effort at speeds up to 30 miles per hour. Inclement conditions, such as shifting wind direction and the loss of thermal currents later in the day, demand excessive energy expenditure and cause whooping cranes to seek stopover habitat for roosting and foraging. The majority of the whooping crane migration stopover sites are located in the central part of the U.S., along significant wetland complexes and riverine habitats, with sporadic stopover sites in Central Texas (CWS and USFWS 2007). In migration, whooping cranes are known to utilize a variety of habitat types, including freshwater marshes, wet prairies, inland lakes, small farm ponds, upland grain fields, and riverine systems. Shallow flooded freshwater wetlands are used for roosting, while croplands and emergent wetlands are used for feeding. Riverine habitats, such as submerged sandbars, are also often used for roosting. Most roost sites are within 0.6 mile of a suitable feeding area and are typically distanced from human development. Low elevation flight is common during travel between roosting and foraging habitats, during inclement conditions, and when taking off and landing at stopover sites. Each whooping crane makes approximately 7 to 9 stopovers in the U.S. during each migration (Armbruster 1990, CWS and USFWS 2007, Howe 1987, Howe 1989, Lingle et al. 1991).

In relation to the typical AWBP migration corridor (Tacha et al. 2010), the project area is located near the center of the corridor (**Figure 4**), suggesting that potential exists for whooping cranes to migrate through the project area. There are no records of whooping cranes from the project area or immediate vicinity (TXNDD 2021, eBird 2021, iNaturalist 2021). The nearest sighting is approximately 20 miles to the southwest in Muldoon, Texas (eBird 2021).

B&A performed a whooping crane habitat assessment to identify potential whooping crane migration stopover habitat within one mile of the project area. Potential migration stopover habitat was calculated using the methodology outlined in the Watershed Institute (2013). Based on the results of B&A's habitat assessment, there are no water features within one mile of the project area that are considered potential migration stopover habitat. Due to the lack of migration stopover sites in the project area and vicinity, the project is not expected to adversely impact whooping cranes.

4.2.2 Mollusks

False Spike (Proposed Endangered)

The false spike (*Fusconaia mitchelli*) is a medium-sized freshwater mussel that was proposed for federal listing as endangered with critical habitat on August 26, 2021 (86 FR 47916). Its shell is tawny-brown to dark brown or black, oval to round in shape, and up to 5.2 inches in length (Howells 2014, NatureServe 2021). Its historical range included the Brazos, Colorado, and Guadalupe river systems in Central Texas, and the Rio Grande system in New Mexico, Texas, and Mexico (Howells 2014, 74 FR

66260). Currently the false spike occurs in four populations: the Little Brazos River and some tributaries (Brazos River Basin), the lower San Saba and Llano Rivers (Colorado Basin), and in the lower Guadalupe River (Guadalupe River Basin) (86 FR 47916). Suitable habitat includes larger creeks and rivers, often in sand, gravel, or cobble substrates, in slow to moderate flows at shallow depths and not within impoundments (Howells 2014). The life history of most mussels in Texas is poorly understood, and the glochidial host fish for the false spike is unknown (74 FR 66260).

The project area is outside of the recognized range for the false spike, and recorded occurrence does not exist for the project area or immediate vicinity (USFWS 2021b, TXNDD 2021, iNaturalist 2021). Erosion/sedimentation control measures will be implemented prior to construction to minimize adverse impacts to receiving waters from erosion and sedimentation. Based on the known range information for the species and lack of suitable habitat in the project area, the false spike does not occur in the project area and the project is not expected to adversely affect the species.

Guadalupe Orb (Proposed Endangered)

Recently recognized in 2018 as a separate species from the Texas pimpleback (*Cyclonaias [Quadrula] petrina*), the Guadalupe orb was first identified from the San Marcos River in the San Antonio/Guadalupe River Basin, to which the species is believed endemic (Burlakova et al. 2018, NatureServe 2021). This freshwater mussel species was proposed for federal listing as endangered with critical habitat on August 26, 2021 (86 FR 47916). The Guadalupe orb exhibits a yellow to tan, brown to black, and sometimes with green rays or concentric blotches, subquadrate to suboval shell that is moderately inflated and relatively thin, reaching a length of approximately 2.5 inches (Burlakova et al. 2018). In the San Marcos River, the species has been observed in flowing water with a sand and gravel substrate, mostly in water less than 6.6 feet deep (Burlakova et al. 2018, NatureServe 2021).

The project area is outside of the recognized range for the Guadalupe orb and records for the species do not exist for the project area or immediate vicinity (USFWS 2021b, TXNDD 2021, iNaturalist 2021). Erosion/sedimentation control measures will be implemented prior to construction to minimize adverse impacts to receiving waters from erosion and sedimentation. Based on the known range information for the species and lack of suitable habitat in the project area, the Guadalupe orb does not occur in the project area. Construction of the proposed project is not expected to adversely affect the Guadalupe orb.

Texas Fawnsfoot (Proposed Threatened)

The Texas fawnsfoot (*Truncilla macrodon*) is a small, relatively thin-shelled mussel that can reach 2.4 inches in length but is usually much smaller. It is proposed for federal listing as threatened with critical habitat (86 FR 47916). Its shell is oval to elliptical with coloration that varies from tan to brown to green (Howells 2014, USFWS 2015). The Texas fawnsfoot is a very rare, freshwater mussel species endemic to Central Texas that historically inhabited the Colorado and Brazos drainages, with little known about its habitat (Howells 2014, USFWS 2015). Currently it is known from seven populations: East Fork Trinity River, Middle Trinity River, Clear Fork Brazos River, Upper Brazos River, Middle/Lower Brazos River, San Saba/Colorado Rivers, and Lower Colorado River (86 FR 47916). Preferred habitat includes moderate-sized creeks and rivers in flowing water with substrates of mud, sand, and gravel (Howells 2014).

Recorded occurrence of the species does not exist for the project area or immediate vicinity (TXNDD 2021, iNaturalist 2021). The nearest recorded occurrence is from the Colorado River south of La Grange, Texas, approximately seven miles west of the project area, where live individuals were not observed but shells ranging from recently dead to subfossil were found (TXNDD 2021). Field reconnaissance of the project area revealed no suitable habitat for Texas fawnsfoot. The Colorado River, two to three miles south/southwest of the project area, is the only large perennial stream in the vicinity that could provide suitable habitat for the species. Erosion/sedimentation control measures will be implemented prior to construction to minimize adverse impacts to receiving waters from erosion and sedimentation. Construction of the proposed project should have no impact on the Texas fawnsfoot.

Texas Pimpleback (Proposed Endangered)

The Texas pimpleback (*Quadrula petrina*) is proposed for federal listing as endangered with critical habitat (86 FR 47916). An endemic species to the state, the Texas pimpleback historically occurred across the Colorado River basin. It currently is known to occur in five isolated populations: Concho River, Upper San Saba River, Lower San Saba river/Colorado River, Llano River, and the Lower Colorado River (86 FR 47916). Only the Lower San Saba and Llano River populations are known to be successfully reproducing (86 FR 47916). The shell of the species is approximately four inches long and is yellow to tan, brown to black, and sometimes with green rays or concentric blotches (Howells 2014). The species inhabits moderate to larger creeks and rivers in flowing waters and mud, sand, or gravel bottoms, or sometimes in gravel-filled cracks in bedrock, often at depths less than 6.6 feet, but is not known to occur in impoundments (Howells 2014). The life history of most mussels in Texas is poorly understood, and the glochidial host fish for the Texas pimpleback is unknown but is probably catfish (Howells 2014, 74 FR 66260).

Recorded occurrence of the species does not exist for the project area or immediate vicinity (TXNDD 2021, iNaturalist 2021). The nearest recorded occurrence is from the Colorado River south of La Grange, Texas, approximately seven miles west of the project area, where live individuals were not observed but shells ranging from recently dead to subfossil were found (TXNDD 2021). Field reconnaissance of the project area revealed no suitable habitat for the Texas pimpleback. The Colorado River, two to three miles south/southwest of the project area, is the only large perennial stream in the vicinity that could provide suitable habitat for the species. Erosion/sedimentation control measures will be implemented prior to construction to minimize adverse impacts to receiving waters from erosion and sedimentation. Construction of the proposed project should have no impact on the Texas pimpleback.

4.2.3 Insects

Monarch Butterfly (Candidate)

The monarch butterfly (*Danaus plexippus*), a member of the family Nymphalidae, is a charismatic North American species known for its bright orange wings with a black border and black veins (USFWS 2021b). Adult monarchs lay eggs on their obligate milkweed host plant (primarily *Asclepias* spp.), which their larvae rely on as a food source during development (USFWS 2021b, iNaturalist 2021). The monarch life cycle varies by geographic location, but in many regions where monarchs are present, monarchs breed year-round (USFWS 2020). Monarchs migrate through Texas in the fall and spring and are generally observed in a wide variety of habitats (iNaturalist 2021). Adult monarch butterflies require a diversity of blooming nectar

resources, which they feed on throughout migration and during the breeding season. They also need milkweed (for both oviposition and larval feeding) embedded within this diverse nectaring habitat (USFWS 2020).

The project area provides potentially suitable habitat for the monarch butterfly. A search of the iNaturalist website identified one monarch observation approximately 1.7 miles southeast of the project area (iNaturalist 2021). Currently the monarch is a candidate for federal listing and is not provided protection under ESA; however, the USFWS encourages cooperative conservation measures since candidate species may warrant future protection under the ESA.

4.2.4 Plants

Navasota ladies'-tresses (Endangered)

Approximately 15 species of ladies'-tresses (genus *Spiranthes*), members of the orchid family Orchidaceae, occur in Texas and flower during the spring or fall. Each of these species is perennial, but relatively inconspicuous on the landscape, occurring as a basal rosette prior to flowering and then reducing to a single flowering scape, reaching a height of 8 to 15 inches. NLT, an endemic federally endangered species, has a historic range that includes a 13-county area of east-central Texas within the Post Oak Savannah Vegetational Area, as described by Gould et al. (1960). NLT typically flowers from mid-October to mid-November, and vegetative growth (the rosette stage) appears in springtime but may appear anytime between September and May (USFWS 1984, Wonkka et al. 2012). Individual plants do not flower every year, and the flowering population fluctuates from year to year (Ariza 2013). Flowering response is likely correlated with available moisture during the vegetative phase (described above) and the period just prior to flowering (August–September) (Parker 2001, Wilson 2002, Hammons 2008, Ariza 2013).

NLT is a niche specialist that occupies openings in post oak woodland and savannah with grassland patches in sand to sandy loams, often along the streambanks of upland drainages or intermittent streams and in areas with suitable hydrologic factors, such as a perched water table associated with an underlying claypan (Wonkka et al. 2012, TPWD 2021a). According to USFWS (2009b), NLT is often found along the naturally eroded slopes of the upper reaches of drainages and ephemeral streams, or occasionally near the margins of seeps and swales. Ariza (2013) describes habitat for the species as a distinctive niche along the upper reaches of drainages between the floodplain and open grasslands within the post oak savannah, with the species occurring in naturally disturbed areas of small openings within 80 meters (262 feet) of drainages. Hammons et al. (2009) describes habitat as usually within 600 feet of ephemeral and intermittent drainages. Based on documented population locations, proximity to streams appears important but may exceed these thresholds seemingly when edaphic requirements are met (i.e., high moisture availability).

As an edaphic endemic, suitable soils for NLT are characterized as well-drained, sand to sandy loam surface soils that often have a shallow underlying claypan that is thought to create sufficient subsurface hydrology to support NLT (USFWS 1984, 2009b, Hammons 2008, Ariza 2013, TPWD 2021a). Vegetative associates include little bluestem (*Schizachyrium scoparium*), splitbeard bluestem, broomsedge bluestem, pinkscale blazing star (*Liatris elegans*), nodding ladies'-tresses, and sundews (*Drosera* spp.) in the herbaceous

stratum. Commonly associated trees and shrubs include post oak, blackjack oak, yaupon, farkleberry, and American beautyberry (*Callicarpa americana*) (USFWS 2009b).

Appropriate microsite conditions for the species are associated with soil moisture requirements and typically include a perched water table, commonly caused by the subsurface claypan typical of post oak savannah soils, as previously discussed (TPWD 2021a, TPWD 2021b, Wonkka et al. 2012). Adequate light availability, such as that provided by canopy gaps in otherwise closed-canopy, forested habitat is also required, and NLT has been found to typically occur where canopy cover is greater than 40 percent (Wonkka et al. 2012, Ariza 2013). Optimal microhabitat is characterized by small natural clearings within woodlands or at their margins along the dripline, followed by the margins of wildlife trails and upper watershed stream banks, where the aforementioned edaphic criteria are met (Wonkka et al. 2012). USFWS (1984) typifies the species' habitat as a late-successional niche within established woodlands; however, occurrence along fencerows and rights-of-way within post oak woodlands and savannahs has also been reported, suggesting the importance of either periodic disturbance or high light availability (Wilson 2002, Wonkka et al. 2012). NLT is also known to occur in areas where edaphic factors such as high aluminum content or hydrologic factors associated with a perched water table limit competing vegetation in the herbaceous layer (Texas Organization for Endangered Species 1993).

Numerous factors limit the suitability of areas as habitat. NLT occurrence has been found to be associated low leaf litter cover (e.g., one to three leaves thick) that is uniformly distributed, and the species is unlikely where thick leaf litter is present (Hammons 2008, Ariza 2013). Further, occurrence of NLT is unlikely where dense pasture grasses (e.g., Bermudagrass and bahiagrass [*Paspalum notatum*]) or tall herbaceous vegetation are found (USFWS 2009b). Active grazing is also a deterrent to occurrence. Development of a dense woody understory replacing the herbaceous component through "thicketization" has been accredited with limiting suitability (USFWS 2009b, Ariza 2013, Wonkka et al. 2012). NLT is rarely found in floodplain forests or openings dominated by tall grasses (USFWS 1993).

Advancement in modeling potential NLT habitat within its range is presented by Wang et al. (2019). Through use of a maximum entropy (Maxent) modeling tool, they assessed the relative influence of biologically relevant topographic characteristics, land cover features, geological formations, and edaphic (i.e., soil) factors on the occurrence of NLT. In doing so, they found local-scale edaphic variables to be the most informative, with soil taxonomic units explaining the highest amount of variance. Wang et al. (2019) imply that specific soil characteristics are correlated with the occurrence of symbiotic mycorrhizal fungi which NLTs are dependent. Soil taxonomic units exhibiting high predictability for presence of NLT were fine smectitic, thermic, Ultic Paleudalfs, and fine mixed, active, thermic, Udic Paleudalfs, which generally correspond to the Burlewash, Singleton, and Shiro soil series. The authors note that many areas with NLT occurrence are not mapped upon these generally associated soil series or on similar soil mapping units matching these characteristics, which they attribute to the occurrence of soil inclusions of the previously noted suitable soils in otherwise unsuitable soil mapping units.

A review of the TXNDD element of occurrence records revealed one NLT occurrence approximately five miles northeast of the project area (TXNDD 2021). Sandy loam and loamy fine sand soils occurring in the project area include the Rek and Straber soil series (**Table 2, Figure 3**). Based on review of aerial imagery,

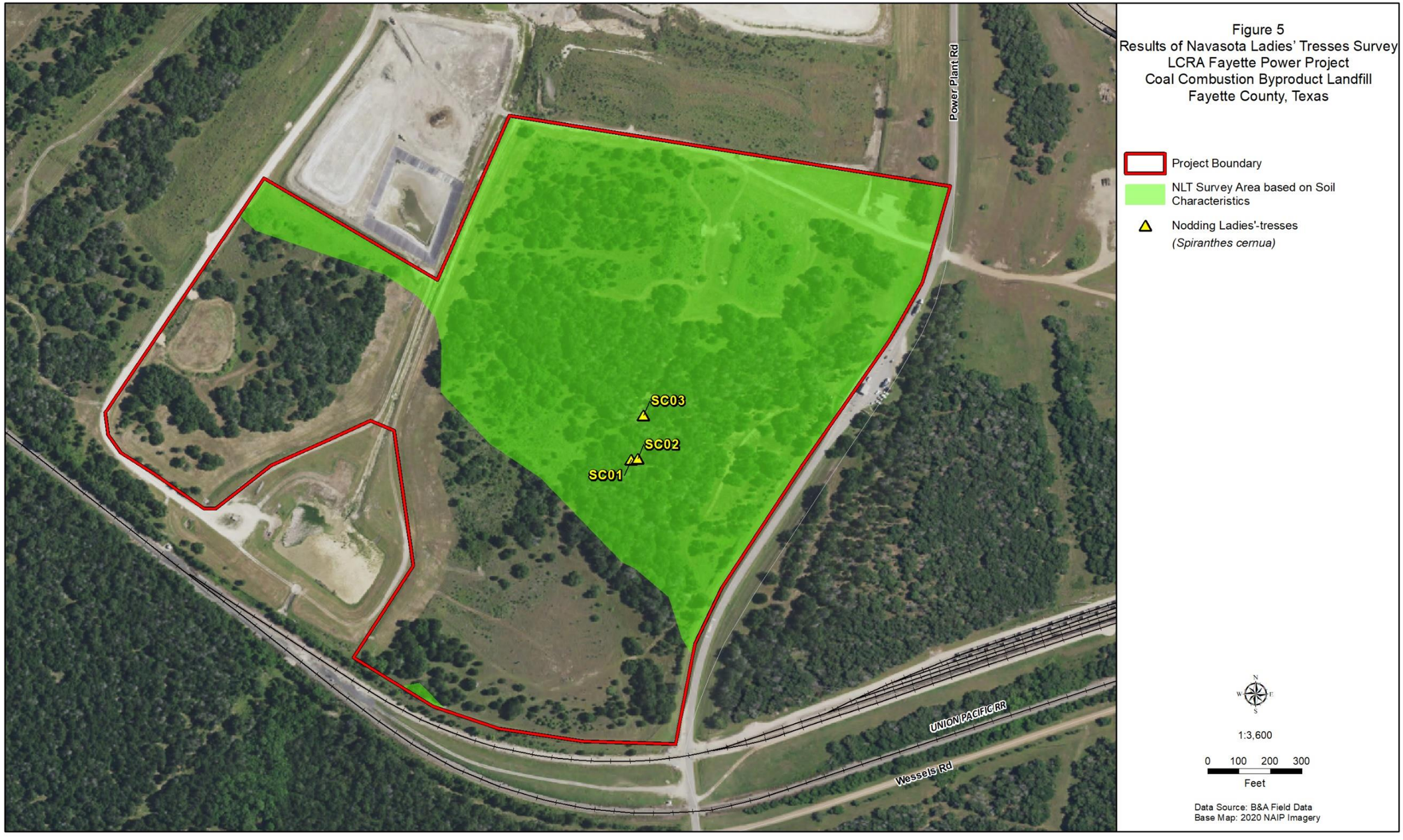
potentially suitable NLT habitat requiring field review was identified where woodland or savannah overlay suitable soils in the project area, with the most likely areas of potential occurrence of NLT along the dripline within the project area in proximity to the existing runoff channel.

Despite preliminary identification of potentially suitable NLT habitat by remote assessment, field survey did not identify suitable habitat within the project area. Factors limiting the suitability of habitat within the project area were dense cover of tall herbaceous vegetation that extended to the dripline; dense leaf litter in adjacent woodlands/savannahs; high browsing pressure; overly dense midstory cover by yaupon in woodlands; and/or absence of typical vegetative associates. Further, despite the mapped presence of potentially suitable soils, no areas exhibiting high soil moisture availability were identified (evidenced by soil saturation, seeps, inundation, or plant assemblage present) that characterize edaphic conditions required for suitable NLT habitat.

No NLTs were found as a result of presence/absence survey. Three nodding ladies'-tresses, a vegetative associate that closely resembles NLT, were observed in the project area (**Figure 5**); however, nodding ladies'-tresses occupies a much broader habitat than NLT and is not solely indicative of potential NLT habitat. As discussed above, habitat in the project area was determined unsuitable for NLT. As such, the project is not expected to adversely affect the species.

5.0 SUMMARY AND RECOMMENDATIONS

B&A conducted a habitat assessment for federally protected species that could potentially occur within the project area and a presence/absence survey for NLT in November 2021. No habitat for federally listed endangered or threatened species was identified by B&A through desktop review or field reconnaissance. Several federally listed avian species may migrate through the project area, although proposed project activities are not anticipated to affect these species. The existing runoff channel identified in the project area does not provide habitat for freshwater mussels. Erosion/sedimentation control best management practices (BMPs) will be installed at all stream crossings in accordance with the project's stormwater pollution prevention plan (SWPPP) to minimize sediment and other potential pollutants from leaving the project site. The project is not expected to result in water quality degradation of project area streams and should not result in adverse impacts to freshwater mussels. Bald eagles could nest in the vicinity of the project area; however, no bald eagles, eagle nests, or potentially suitable nesting habitat were observed within the project area. If eagles are observed in the project area prior to construction, it may be prudent to conduct a winter nest survey to determine if eagles are nesting within the project area or a 600-foot buffer. Results of the NLT presence/absence surveys did not identify NLTs or potentially suitable habitat for the species within the project area.


Power Plant Rd
SC03
SC02
SC01
UNION PACIFIC RR
Wessels Rd
Figure 5
Results of Navasota Ladies' Tresses Survey
LCRA Fayette Power Project
Coal Combustion Byproduct Landfill
Fayette County, Texas
Project Boundary
NLT Survey Area based on Soil Characteristics
Nodding Ladies'-tresses
(Spiranthes cernua)
N
W
E
S
1:3,600
0 100 200 300
Feet
Data Source: B&A Field Data
Base Map: 2020 NAIP Imagery

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Appendix A

Representative Photographs

Photo 1. Upland savannah within project area exhibiting dense herbaceous cover

Photo 2. Dense understory dominated by eastern redcedar and yaupon within project area woodlands

Photo 3. Woodland edge characterized by low herbaceous cover and gravelly soil outcrops

Photo 4. Existing runoff channel in project area

Photo 5. Water feature mapped as a pond within uplands in the project area

Photo 6. Representative photograph of the habitat, open woodlands, where nodding ladies'-tresses SC01 and SC02 in **Figure 5** were observed in the project area during NLT presence/absence survey

Photo 7. Nodding ladies'-tresses (SC01 in **Figure 5**) individual documented in the project area

Photo 8. Nodding ladies'-tresses (SC02 in **Figure 5**) individual documented in the project area

Photo 9. Representative photograph of the habitat, road cut through woodlands, where nodding ladies'-tresses SC03 in **Figure 5** was observed in the project area during NLT presence/absence survey

Photo 10. Nodding ladies'-tresses (SC03 in **Figure 5**) individual documented in the project area