Solid Waste Disposal Area Landfill

**(Landfill Cell 3, Landfill Cell 2A,
Landfill Cell 1C, Landfill Cell 2B)**

Location Restrictions Demonstration

**W.A. Parish Electric Generating Station
Thompsons, Texas**

October 2018

Prepared For:

NRG Texas Power LLC

Tony Dworaczyk, P.G.
Senior Project Manager

Jason Leik, P.E.
Program Manager

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Certification

I, the undersigned Texas Professional Engineer, hereby certify that I am familiar with the technical requirements of Title 40 Code of Federal Regulations Part 257 Subpart D (§257). I also certify that it is my professional opinion that, to the best of my knowledge, information, and belief, that the information in this demonstration is in accordance with current good and accepted engineering practice(s) and standard(s), and meets the requirements of §257.64.

For the purpose of this document, "certify" and "certification" shall be interpreted and construed to be a "statement of professional opinion". The certification is understood and intended to be an expression of my professional opinion as a Texas Licensed Professional Engineer, based upon knowledge, information, and belief. The statement(s) of professional opinion are not and shall not be interpreted or construed to be a guarantee or a warranty of the analysis herein.

Jason Leik — Jason Leik, P.E.

91043 — Texas License Number

Signature of Professional Engineer

10/12/18 — Date

STATE OF TEXAS
JASON A. LEIK
91043
LICENSED
PROFESSIONAL ENGINEER

FIRM #3775

Section 1
Background

The purpose of this document is to demonstrate the compliance of the Solid Waste Disposal Area (SWDA) Landfill (Landfill Cell 3, Landfill Cell 2A, Landfill Cell 1C, and Landfill Cell 2B) at the W.A. Parish Electric Generating Station (Station) with the location restrictions outlined in the Environmental Protection Agency's (EPA's) final coal combustion residuals (CCR) rule (Title 40 Code of Federal Regulations Parts 257 and 261) Subpart D - "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments" (§257.60 through §257.64, federal rule). The SWDA is considered a CCR landfill and is only subject to the location restriction for unstable areas (§257.64). This document includes information from a desktop study and Site work to demonstrate that the SWDA is not located in unstable areas (§257.64).

1.1 Site Setting

The NRG Texas Power LLC (NRG) Station is located in Thompsons, Fort Bend County, Texas, adjacent to Smithers Lake (Figure 1). The electricity generating portion of the Site, or the main Plant Operations Area (Plant Area) is located along the southeastern shore of the lake.

According to the Geologic Atlas of Texas, Houston Sheet (BEG 1982), the Site is underlain by alluvium and the Beaumont Formation (also commonly referred to as Beaumont Clay). The alluvium is present at the SWDA CCR units and along the Brazos River, which is located approximately 0.9 miles from the northern boundary of the SWDA CCR units. The alluvium is not present at the Plant Area (or the SWDA CCR Units), which is consistent with this area being located outside of the Brazos River floodplain zone (FBC 2018). Both the alluvium and the Beaumont Formation are comprised of clay, silt, and sand, and may include stream channel, point bar, natural levee, backswamp, coastal marsh and mud flat deposits. The thickness of the Beaumont Formation is approximately 100 feet.

The alluvium and Beaumont Formation are located within the upper unit of the Chicot aquifer system. At most locations throughout Fort Bend County, the Chicot aquifer system is under confined conditions (TWDB 1990). The Chicot aquifer system is primarily recharged by precipitation at locations where it outcrops in Austin, Harris, and Waller Counties; groundwater then flows laterally within Fort Bend County (TWDB 1990).

1.2 SWDA

The following describes the CCR landfill cells that make up the SWDA.

1.2.1 Landfill Cell 1C

Landfill Cell 1C receives nonmarketable CCR materials, which are trucked from the Plant. The landfill is constructed over a significant deposit of in situ clay soils. Storm water is directed to an incised storm water collection pond in the western portion of Cell 1C. The storm water from this pond is discharged through a permitted Texas Pollutant Discharge Elimination System (TPDES) wastewater outfall (004) on an as-needed basis. Generally, the cell is constructed of berms with vegetated exterior slopes; the inside slopes and crests are surfaced with stabilized CCR material to control vegetation and act as an erosion protection layer.

Landfill Cell 1C is designed as a Class 2 non-hazardous landfill under Texas Commission on Environmental Quality (TCEQ) criteria.

1.2.2 Landfill Cell 2A

The landfill cell is constructed over a significant deposit of in-situ clay soils. Storm water is directed to the southwestern portion of Cell 2A, where it is transferred for final discharge through TPDES Outfall 004 on an as-needed basis. Generally, the cell is constructed of berms with vegetated exterior slopes; the inside slopes and crests are surfaced with stabilized CCR material to control vegetation and act as an erosion protection layer.

Landfill Cell 2A is designed as a Class 2 non-hazardous landfill under TCEQ criteria.

1.2.3 Landfill Cell 2B

Landfill Cell 2B receives marketable CCR materials, which are trucked from the Plant. The landfill is constructed over a significant deposit of in-situ clay soils. Storm water is directed to an incised storm water collection pond in the southern portion of Cell 2B. The storm water is then transferred for final discharge through TPDES Outfall 004 on an as-needed basis. Generally, the cell is constructed of berms with vegetated exterior slopes; the inside slopes and crests are surfaced with stabilized CCR material to control vegetation and act as an erosion protection layer.

Landfill Cell 2B is designed as a Class 2 non-hazardous landfill under TCEQ criteria.

1.2.4 Landfill Cell 3

Landfill Cell 3 receives bottom ash, which is trucked from the Plant. The landfill is constructed over a significant deposit of in-situ clay soils. Storm water is directed to an incised storm water collection pond in the western portion of Cell 3. The storm water collected in Cell 3 is discharged through TPDES Outfall 004 on an as-needed basis. Generally, the cell is constructed of berms with vegetated exterior slopes; the inside slopes and crests are surfaced with stabilized CCR material to control vegetation and act as an erosion protection layer.

Landfill Cell 3 is designed as a Class 2 non-hazardous landfill under TCEQ criteria.

Section 2
Location Restrictions

The location restriction designated in the federal CCR rule is presented below with a corresponding demonstration to show compliance. The location restriction includes conformance with the unstable area criteria.

2.1 §257.64 - Unstable Areas

The federal CCR rule requires that CCR units not be located in an unstable area unless the owner or operator demonstrates that recognized and generally accepted good engineering practices have been incorporated into the design of the CCR unit to ensure that the integrity of the structural components of the CCR unit will not be disrupted. Factors associated with soil conditions resulting in significant differential settlement, geologic or geomorphologic features, and human-made features or events must be evaluated to determine compliance.

This demonstration was performed by evaluating the results of a Site visit by a Texas registered professional engineer, reviewing local geology and topography, and evaluating human-made features or events at the SWDA area.

None of the geological or geomorphological information reviewed suggest the presence of unstable areas at the existing SWDA. On-Site or local soil conditions have not resulted in differential settling. Unstable areas are not present at the Site as a result of human-made features or events.

Evidence of unstable areas was not observed during the Site inspection of the SWDA. The following presents a summary of the SWDA inspection conducted on September 11, 2018 by Mr. Jason Leik, P.E. Photographs taken during the inspection are included in Appendix A. The summary includes a discussion of each cell that makes up the SWDA.

Landfill Cell 3 Summary:

Cell 3 is located north of the Plant in the landfill area. Cell 3 is part of a larger disposal area with an established perimeter berm. The land to the west and south of Cell 3 is undeveloped, and Cortez Road runs along the east berm. Immediately to the north of Cell 3 is a filled and capped cell.

The berm around Cell 3 is flat and even, with even side slopes and no visual evidence of erosion, bulging, or settlement. The exterior of the berm is heavily vegetated and the toe of the

berm was not accessible during the inspection. The interior of the berm on the west side of the cell lacked vegetation and appeared to be have been recently re-graded due to the presence of equipment tracks in the soil.

Landfill Cell 2A Summary:

Cell 2A is located north of Cell 3 and north of the Plant. The cell is surrounded by undeveloped land to the west, closed cells to the north and south, and Cortez Road to the east.

The cell is surrounded on three sides by a well-defined berm. The berms on the south, west, and north sides are flat, smooth and even. Both sides of the berm are moderately vegetated. No areas of bulging, erosion or settlement, and no seeps were observed during the inspection. A higher density of vegetation was present around the interior toe of the berm, preventing visual inspection.

The east side of the cell had a much lower perimeter (about five feet). An access road connects the cell to Cortez Road north of the midpoint of the east side of the cell. Based on visual inspection, it did not appear that there was a high point or peak where this access road crosses the perimeter of the cell, rather a consistent slope from the interior of the cell to Cortez Road. There was no active drainage occurring, even though it had rained less than eight hours before the inspection.

Landfill Cell 1C Summary:

Cell 1C is L-shaped and located north of Cell 2A and the Plant, and is surrounded by a closed cell to the south, undeveloped areas and closed cells to the west and north, and closed cells and Cortez Road to the east. .

The berms are flat and even, with no bulging, settlement, or erosion. The west berm is not yet vegetated, but the berms along the south and east are heavily vegetated.

Landfill Cell 2B Summary:

Cell 2B is located east of Cortez Road and east of Cell 1C. Cell 2B was constructed in 2012 and appears to have been recently re-graded along the south and east berms due to lack of vegetation and presence of equipment tracks.

The berms on all four sides of Cell 2B are flat, smooth and even with no areas of bulging, erosion, or settlement. The berms on the west, south and north are regular in shape. It appears that excavated material from the impoundment was placed in a pile that runs along the north berm. The exterior of the berms on all sides is heavily vegetated and not readily accessible for visual inspection.

Evidence of unstable areas due to soil conditions resulting in significant differential settling, geologic or geomorphologic features, or human-made features or events is not supported by this determination; therefore, the existing SWDA is not located in unstable areas. The existing SWDA is in compliance with the requirements of §257.64.

Section 3
Conclusions

Based on the evaluation provided in this demonstration, the existing SWDA (Landfill Cell 3, Landfill Cell 2A, Landfill Cell 1C, and Landfill Cell 2B) at the W.A. Parish Electric Generating Station is in compliance with the location restrictions provided in §257.64 of the CCR rule. No additional action, justification, or demonstration is required to document compliance with the location restrictions provided in the CCR rule after this demonstration has been placed into the operating record, posted to the publicly accessible website, and provided for government notification.

Section 4
References

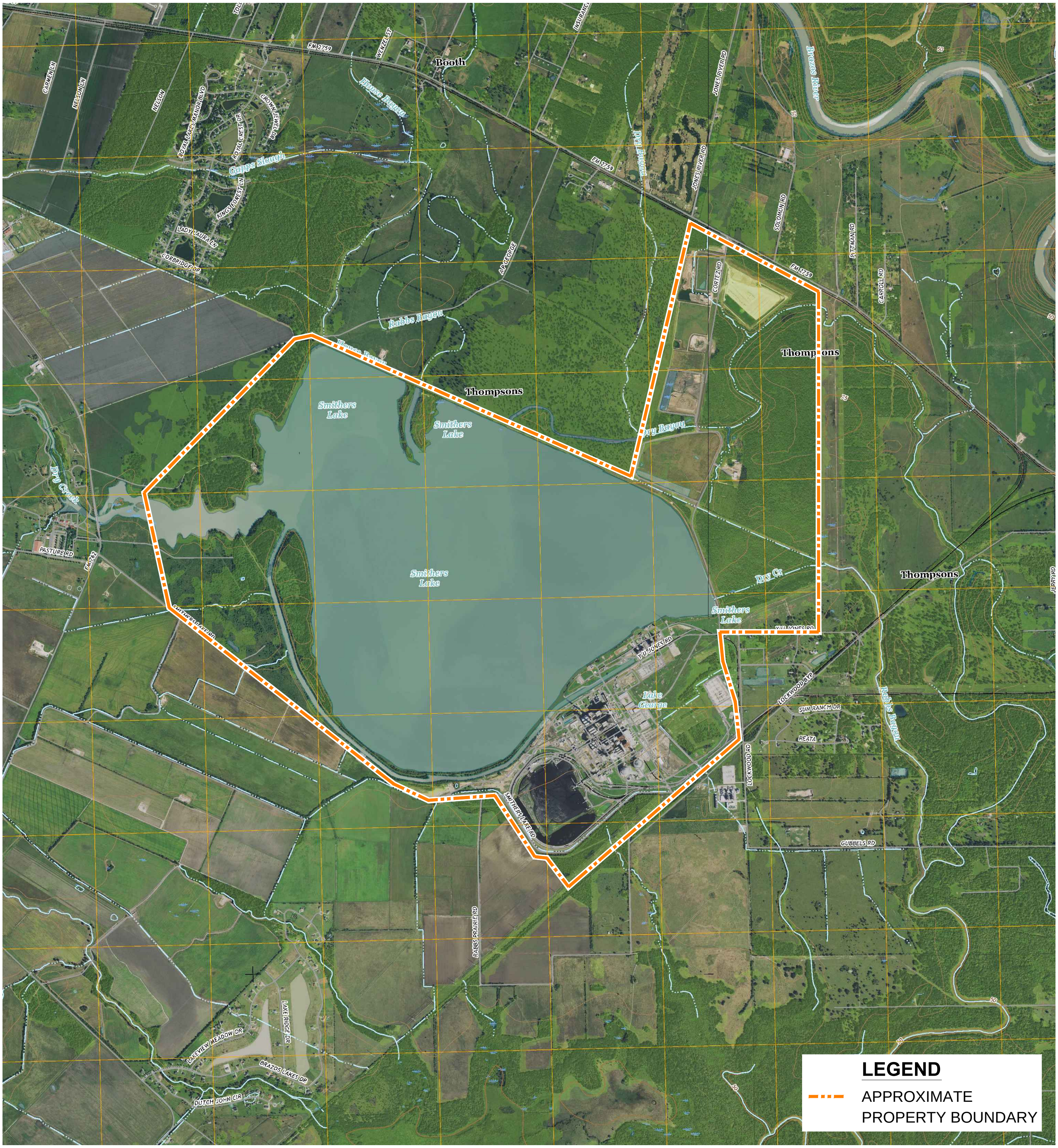
BEG 1982. Geologic Atlas of Texas, Houston Sheet. The University of Texas at Austin, Bureau of Economic Geology. Revised 1982.

Sargent & Lundy LLC, Annual Inspections of CCR Landfills Cells, January 12, 2018.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/. Accessed [09/20/2018].

United States Geological Survey (USGS). 2018. USGS - Texas Geology Web Map Viewer: Available online at https://txpub.usgs.gov/dss/texasgeology/. Accessed [9/14/2018].

Figures



REFERENCE: U.S.G.S. 7.5 MINUTE TOPOGRAPHIC QUADRANGLES
MISSOURI CITY, TEXAS (2016) / SMITHERS LAKE, TEXAS (2016) / SUGAR LAND, TEXAS (2016) / THOMPSONS, TEXAS (2016)

TEXAS
QUADRANGLE LOCATION

N

0 2,000' 4,000' 8,000'

SCALE IN FEET
1" = 4,000'-0"

PROJECT:
NRG TEXAS POWER, LLC
W.A. Parish Station
Thompsons, Texas

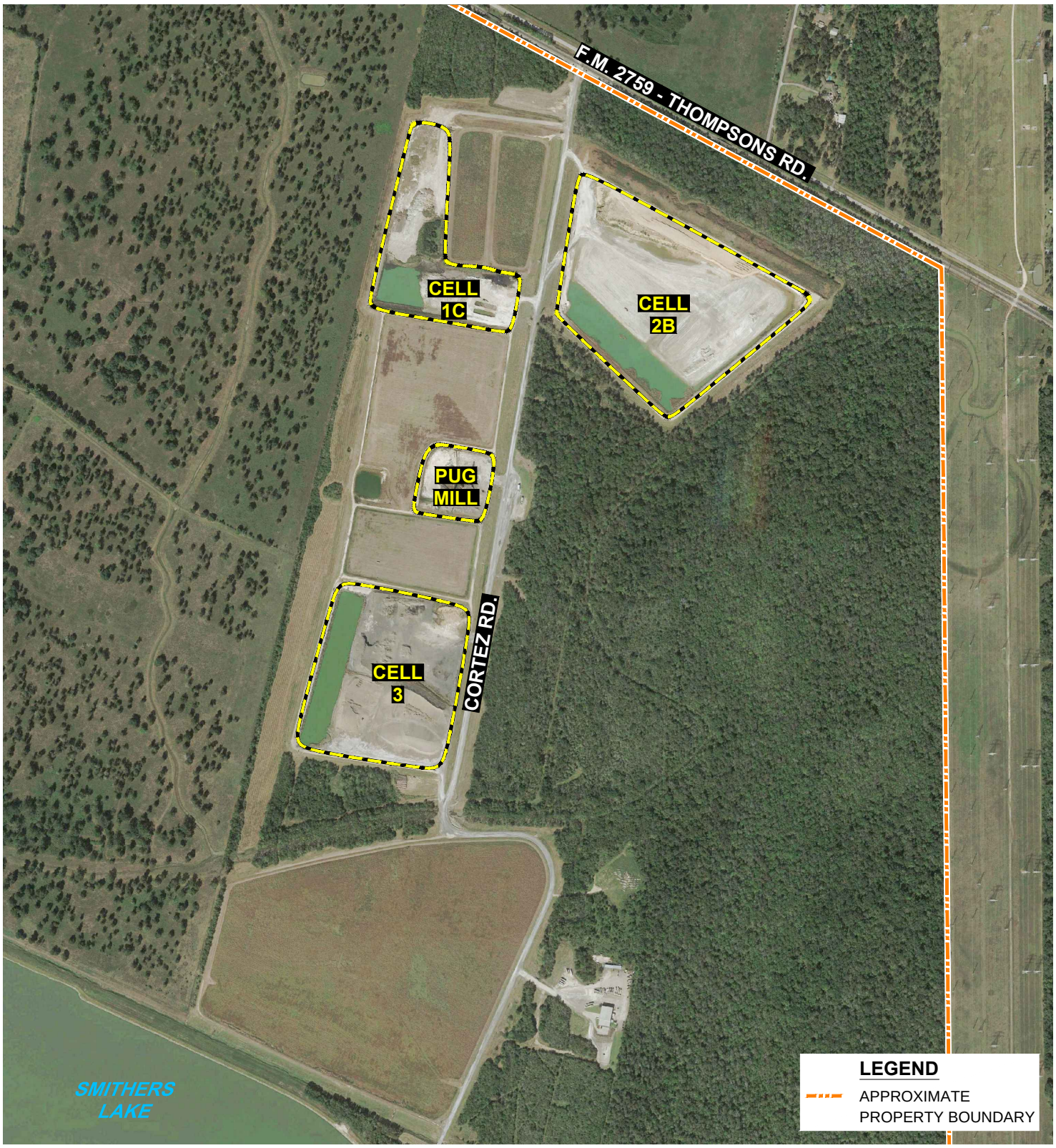
TITLE:
SITE LOCATION MAP

DRAWN BY:	O. Fonseka	PROJECT No.:	294645.0000.0000
CHECKED BY:	T. Dworaczyk	**FIGURE 1**	
APPROVED BY:	T. Dworaczyk		
DATE:	September 2018		

TRC
10550 Richmond Ave.
Suite 210
Houston, TX 77042
Phone: 713.244.1000

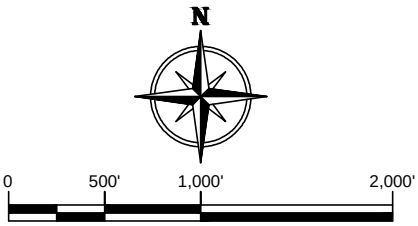
FILE: Fig X - NRG-WAParishStation - Site Location Map.dwg

HOU M:\ACAD-TRC\DRAFTING\NRG\W.A. Parish Station - Thompsons-TX\ Fig X - NRG-WAParishStation - Site Location Map.dwg 09/25/18



IMAGERY SOURCE: Google Earth (10/28/2017)

TEXAS
SUBJECT SITE LOCATION



SCALE IN FEET
1" = 1,000'-0"

PROJECT:
NRG TEXAS POWER, LLC
W.A. Parish Station
Thompsons, Texas

TITLE:
SOLID WASTE DISPOSAL AREA

DRAWN BY:	O. Fonseka	PROJECT No.:	294645.0000.0000
CHECKED BY:	T. Dworaczyk		
APPROVED BY:	T. Dworaczyk		**FIGURE 2**
DATE:	September 2018		

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FILE: Fig 2 - NRG-WAParishStation - SWD Area.dwg

HOU M:\ACAD-TRC\DRAFTING\NRG\W.A. Parish Station - Thompons-TX\ Fig 2 - NRG-WAParishStation - SWD Area.dwg 09/26/18

Appendix A
Photographs

Location: SW Corner Side Cell 3 Landfill facing N

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: SW Corner Side Cell 3 Landfill facing N

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: SW Corner Side Cell 3 Landfill facing N

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: SW Corner Side Cell 3 Landfill facing E

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: SW Corner Side Cell 3 Landfill facing N

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: SW Corner Cell 2a Pug Mill Area facing N

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: SW Corner Cell 2a Pug Mill Area facing E

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: NW Corner Cell 2a Pug Mill Area facing E

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: NW Corner Cell 2a Pug Mill Area facing S

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: SE Corner Cell 2a Pug Mill Area facing N

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: SE Corner Cell 2a Pug Mill Area facing W

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: SW Corner Side Cell 1c Landfill facing N

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: SW Corner Side Cell 1c Landfill facing W

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: SW Corner Side Cell 1c Landfill facing E

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: NW Corner Side Cell 1c Landfill facing S

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: SE Corner Side Cell 1c Landfill facing N

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: Middle of Cell 1c Landfill facing S

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: SW Corner of Cell 2b Landfill Facing E

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: SW Corner of Cell 2b Landfill Facing W

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: SW Corner of Cell 2b Landfill Facing N

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: SE Corner of Cell 2b Landfill Facing W

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: SE Corner of Cell 2b Landfill Facing N

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: SE Corner of Cell 2b Landfill Facing N

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: NE Corner of Cell 2b Landfill Facing S

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18

Location: NE Corner of Cell 2b Landfill Facing W

Site: WA Parish Owner: NRG Photograph Taken by: Jason Leik Date of Inspection: 9/11/18