ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1614B

MAJOR PERMIT AMENDMENT APPLICATION

VOLUME 2 OF 7

Prepared for

Pine Hill Farms Landfill TX, LP

May 2024

STATE OF TEXAS
JASON E. EDWARDS
99336
LICENSED
PROFESSIONAL ENGINEER
05/20/2024

Prepared by

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109
817-735-9770

Project No. 0120-076-11-106

This document is intended for permitting purposes only.

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1614B

MAJOR PERMIT AMENDMENT APPLICATION
VOLUME 2 OF 7

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05/20/2024

COORDINATION WITH
U.S. ARMY CORPS OF ENGINEERS

- _______________, USACE Determination Letter.
- March 7, 2024, Hydrex request for review letter.

_________________, USACE DETERMINATION LETTER

[INSERT USACE DETERMINATION LETTER]

MARCH 7, 2024, HYDREX REQUEST FOR REVIEW LETTER

U.S. Army Corps of Engineers (USACE) **NATIONWIDE PERMIT PRE-CONSTRUCTION NOTIFICATION (PCN)** 33 CFR 330. The proponent agency is CECW-CO-R.	***Form Approved -*** ***OMB No. 0710-0003*** ***Expires: 02-28-2022***

DATA REQUIRED BY THE PRIVACY ACT OF 1974

Authority Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332.

Principal Purpose Information provided on this form will be used in evaluating the nationwide permit pre-construction notification.

Routine Uses This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of the agency coordination process.

Disclosure Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued.

The public reporting burden for this collection of information, 0710-0003, is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or burden reduction suggestions to the Department of Defense, Washington Headquarters Services, at [redacted] Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

PLEASE DO NOT RETURN THIS FORM TO THE ABOVE EMAIL.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (*see sample drawings and/or instructions*) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME

First - Austin Middle - Last - Sparks

Company - Republic Services, Inc

Company Title - Environmental Manager - East Texas Area

E-mail Address - [redacted]

8. AUTHORIZED AGENT'S NAME AND TITLE (*agent is not required*)

First - Clayton Middle - A Last - Collier

Company - Hydrex Environmental, LLC

E-mail Address - [redacted]

6. APPLICANT'S ADDRESS:

Address- 12920 FM 2767

City - Tyler State - Texas Zip - 75708 Country - USA

9. AGENT'S ADDRESS:

Address- 312 Old Tyler Road

City - Nacogdoches State - Texas Zip - 75961 Country -

7. APPLICANT'S PHONE NOs. with AREA CODE

a. Residence	b. Business	c. Fax	d. Mobile
	903-539-7986		

10. AGENT'S PHONE NOs. with AREA CODE

a. Residence	b. Business	c. Fax	d. Mobile
	936-568-9451		

STATEMENT OF AUTHORIZATION

11. I hereby authorize, Clayton A. Collier to act in my behalf as my agent in the processing of this this nationwide permit pre-construction notification and to furnish, upon request, supplemental information in support of this nationwide permit pre-construction notification.

Sparks, Austin Digitally signed by: Sparks, Austin DN: CN = Sparks, Austin OU = *Regions, West, Users Date: 2024.03.08 08:18:33 -06'00'
SIGNATURE OF APPLICANT

2024-03-08
DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME or TITLE (*see instructions*)

Royal Oaks Landfill
Proposed Expansion Area +/- 48 Acres
Cherokee County, Texas
USACE Project No. SWF-2021-00405

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

13. NAME OF WATERBODY, IF KNOWN (*if applicable*) Barber Branch	14. PROPOSED ACTIVITY STREET ADDRESS (*if applicable*) 440 Heath Lane
15. LOCATION OF PROPOSED ACTIVITY (*see instructions*) Latitude °N: 32.002444 N Longitude °W: 95.268041 W	City: Jacksonville State: TX Zip: 75766

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (*see instructions*)

State Tax Parcel ID
942200400

Municipality
City of Jacksonville

Section	Township	Range
N/A	N/A	N/A

17. DIRECTIONS TO THE SITE.

The site is located approximately 2 miles north of Jacksonville, Texas. From the intersection of US-79 and US-69, head northwest on US-69 for approximately 2.8 miles. Turn right onto Heath Lane, then continue for 0.5 miles until reaching the Royal Oaks Landfill entrance.

18. IDENTIFY THE SPECIFIC NATIONWIDE PERMIT(S) YOU PROPOSE TO USE:

Nationwide Permit 39 (Commercial and Institutional Developments)

19. DESCRIPTION OF PROPOSED NATIONWIDE PERMIT ACTIVITY (*see instructions*)

The proposed Royal Oaks Landfill Expansion is planned to expand east from the existing permitted landfill footprint in order to add additional capacity to the landfill. The proposed plans involve a horizontal expansion of the landfill, which includes a proposed 28.6-acre landfill footprint for waste disposal area and associated infrastructure and stormwater controls, totalling approximately 48 acres (“Project Area”). Unavoidable impacts to WOTUS from this project will include approximately 394 linear feet (0.04 acres) of relatively permanent waters (RPW) (intermittent stream) impacts, and 0.37 acres of scrub-shrub wetland impacts.

20. DESCRIPTION OF PROPOSED MITIGATION MEASURES (*see instructions*)

The proposed expansion area is the only area available for additional waste disposal cells to be built off of the existing landfill. Due to the proposed impacts (>0.1 acres), compensatory mitigation is required and will be purchased from the Butler Creek Mitigation Bank (BCMB).

21. PURPOSE OF NATIONWIDE PERMIT ACTIVITY (*Describe the reason or purpose of the project, see instructions*)

The Royal Oaks Landfill Expansion is proposed in order to meet the increase in demand of waste disposal for Jacksonville, Texas and surrounding areas. Due to the location of the existing landfill and its components, the only available area for expansion of the Royal Oaks Landfill is east of the current permit boundary. A significant portion of the area proposed for expansion is already utilized for soil borrow pits and landfill access.

22. Quantity of Wetlands, Streams, or Other Types of Waters Directly Affected by Proposed Nationwide Permit Activity (*see instructions*)

Acres	Linear Feet	Cubic Yards Dredged or Discharged
0.41 ac of wetlands & RPW (Int. Stream)	394 LF of RPW (Intermittent Stream)	1,227.7 cu yds

Each PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site.

23. List any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project on any related activity (*see instructions*)

N/A

24. If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and requires pre-construction notification, explain how the compensatory mitigation requirement in paragraph (c) of general condition 23 will be satisfied, or explain why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required for the proposed activity.

To satisfy GC 23, Republic proposes to purchase 366 intermittent stream credits, and 0.23 wetland credits from Butler Creek Mitigation Bank (BCMB) to satisfy compensatory mitigation requirements.

25. Is Any Portion of the Nationwide Permit Activity Already Complete? ☐ Yes ☒ No If Yes, describe the completed work:

N/A

26. List the name(s) of any species listed as endangered or threatened under the Endangered Species Act that might be affected by the proposed NWP activity or utilize the designated critical habitat that might be affected by the proposed NWP activity. (*see instructions*)

Based on the project area and the Official Species List provided by the USFWS dated 03/07/2024, this project should have "No Effect" on any federally threatened or endangered species.

27. List any historic properties that have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic property or properties. (*see instructions*)

A Cultural Resources Study was conducted by Stone Point Services. According to Stone Point Services, the project will not impact National Register of Historic Places (NRHP), or State Archeological Landmark (SAL) listed, eligible, or potentially eligible structures or sites within the project site. Results of the survey were subsequently submitted to the Texas Historic Commission (THC) for review. The THC,'s review concluded that no historic properties are present or affected by the proposed project, no historic properties will be affected by the proposed project, and THC/State Historic Preservation Office (SHPO) concurs with the information provided in the survey.

28. For a proposed NWP activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, identify the Wild and Scenic River or the "study river":

N/A

29. If the proposed NWP activity also requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, have you submitted a written request for section 408 permission from the Corps district having jurisdiction over that project? ☐ Yes ☒ No

If "yes", please provide the date your request was submitted to the Corps District:

30. If the terms of the NWP(s) you want to use require additional information to be included in the PCN, please include that information in this space or provide it on an additional sheet of paper marked Block 30. (*see instructions*)

31. Pre-construction notification is hereby made for one or more nationwide permit(s) to authorize the work described in this notification. I certify that this information in this pre-construction notification is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

Sparks, Austin — Digitally signed by: Sparks, Austin DN: CN = Sparks, Austin OU = "Regions, West, Users Date: 2024.03.08 08:18:53 -06'00'		[signature]	3/7/24
SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE

The Pre-Construction Notification must be signed by the person who desires to undertake the proposed activity (applicant) and, if the statement in block 11 has been filled out and signed, the authorized agent.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

THREATENED AND ENDANGERED SPECIES HABITAT EVALUATION

ROYAL OAKS LANDFILL
PROPOSED EXPANSION AREA +/- 48 ACRES

CHEROKEE COUNTY, TEXAS

USACE Project No. SWF-2021-00405
Hydrex Project No. A-12-1509

Report Date:
March 7, 2024

Prepared For:
Mr. Andy Gray
Project Manager
U.S. Army Corps of Engineers
Fort Worth District
Regulatory Division – Cooper Lake
828 CR 4795
Sulphur Springs, TX 75482

Prepared By:
Hydrex Environmental
312 Old Tyler Road
Nacogdoches, Texas 75961
(936) 568-9451

HYDREX ENVIRONMENTAL

March 7, 2024

Mr. Andy Gray
Project Manager
U.S. Army Corps of Engineers
Fort Worth District
Regulatory Division – Cooper Lake
828 CR 4795
Sulphur Springs, TX 75482

RE: PRE-CONSTRUCTION NOTIFICATION FOR NATIONWIDE PERMIT 39
Royal Oaks Landfill
Proposed Expansion Area +/- 48 Acres
Cherokee County, Texas
USACE Project No. SWF-2021-00405

Dear Mr. Gray,

The enclosed application package is a request for authorization under Nationwide Permit 39 (Commercial and Institutional Developments) for unavoidable impacts to waters of the U.S. (WOTUS) associated with the expansion of the Royal Oaks Landfill. The 144-acre Royal Oaks Landfill property consists of an existing 54.5-acre permitted landfill footprint. The proposed plans involve a horizontal expansion of the landfill, which includes a proposed 28.6-acre landfill expansion footprint for waste disposal and associated infrastructure and stormwater controls, totalling approximately 48 acres ("Project Area"). This request is being submitted by Hydrex Environmental (Hydrex) on behalf of Republic Services, Inc. (Republic).

The 48-acre Project Area consists of forested and disturbed areas east of the existing 54.5-acre permitted landfill footprint. The project is situated within the extra-territorial jurisdiction (ETJ) of Jacksonville along Heath Lane (CR 4102), as depicted on Figure 1 in Appendix A. The approximate NAD83 geographic coordinates for the site entrance and area delineated are as follows: N 32.002444, W 95.268041.

The Royal Oaks Landfill Expansion is proposed, in order to meet the long-term disposal needs for Cherokee County, Texas and surrounding areas. Due to the location of the existing landfill and its components, the only available area for expansion of the Royal Oaks Landfill is east of the existing permitted landfill footprint. A significant portion of the area proposed for expansion is already utilized for soil borrow pits and landfill access. Development surrounding the exiting landfill are both residential and commercial to the west and north, and numerous potential WOTUS and a closed landfill are located to the south. Therefore, the location of the expansion is limited to the property east of the existing permitted landfill footprint where impacts to aquatic resources could not be avoided. The location of project components is depicted on Figures 2 and 3 in Appendix A.

312 OLD TYLER ROAD
NACOGDOCHES, TX 75961
printed on recycled paper
936-568-9451
FAX: 936-568-9527

The initial delineation of WOTUS report was completed on August 13, 2021, and a Request for Approved Jurisdictional Determination (AJD) was submitted on August 17, 2021, where the project was assigned to regulatory project manager Mr. Fred Land. An AJD Site Visit was conducted by members of Hydrex and the USACE Fort Worth District on August 9, 2022. During this site visit, the delineated features were reviewed by the USACE.

On May 25, 2023, the U.S. Supreme Court issued a judicial ruling on the scope of the Clean Water Act's applicability in *Sackett v. Environmental Protection Agency*. On September 8, 2023, the EPA and USACE published a final conforming rule to amend the definition of 'Waters of the United States'" in response to *Sackett v. Environmental Protection Agency*. The conforming rule was made immediately effective upon publication in the Federal Register. However, as a result of ongoing litigation in 27 states, including Texas, and for certain parties, the agencies are interpreting "waters of the United States" consistent with the pre-2015 regulatory regime and the Supreme Court's decision in Sackett until further notice (https://www.epa.gov/wotus). Based on *Sackett v. Environmental Protection Agency*, the following jurisdiction waters will be impacted:

- **UT-1B (Intermittent / RPW):** 394 LF, 0.04 ac
- **Wetland A (Scrub-Shrub):** 0.37 ac

The Texas Commission on Environmental Quality (TCEQ) guidance *Conditions of Section 401 Certification for Nationwide Permits, Regional Conditions, and General Conditions* (2020) states that Section 401 Water Quality Certification (WQC) under use of NWP 39 is granted if stream bed losses are limited to 1,500 linear feet. According to the USACE Fort Worth District, stream bed losses are weighted based on stream classification and quality. Based on the lengths, classification, and quality of streams determined by the results of the delineation and functional assessment, this project will be in compliance with the TCEQ requirements. The calculations for stream bed losses are outlined in the Water Quality Certification section of this document.

Based on these impacts and the compliance with TCEQ WQC regulations, this project can proceed under NWP 39 with compensatory mitigation required. Compensatory mitigation credits for stream and wetland impacts are proposed to be purchased from the Butler Creek Mitigation Bank. Therefore, on behalf of Republic, we respectfully request authorization under NWP 39 for unavoidable impacts associated with the Royal Oaks Landfill Expansion.

DELINEATION OF WATERS OF THE U.S.

The initial delineation of WOTUS report was completed on August 13, 2021, which included the locations and descriptions of the delineated features as follows: one (1) named tributary (Barber Branch), eight (8) unnamed tributaries (UT-2 through UT-9), four (4) upland man-made stormwater ditches (Ditch 1 through Ditch 4), three (3) stormwater outlets (Stormwater Outlets 1 through 3), two (2) erosional gullies (Erosional Gully 1 and 2), three (3) stormwater control features (Stormwater Control Features 1 through 3), and two (2) excavations (Excavations 1 and 2). The results of this delineation were submitted to the USACE Fort Worth District as part of a Request for AJD on August 17, 2021. The August 2021 Request for AJD was prepared and submitted under the Navigable Waters Protection Rule (NWPR), which was the effective regulatory guidance at the time. After the NWPR was vacated August 30, 2021, the project was reevaluated under the Rapanos (Pre-2015) Guidance. The original Delineation of WOTUS Report, which includes datasheets and photographic documentation, can be found in Appendix G. The Addendum to Delineation of WOTUS Report can be found in Appendix B.

An AJD Site Visit was conducted by members of Hydrex and the USACE Fort Worth District on August 9, 2022. During this site visit, the delineated features were reviewed by the USACE. As agreed upon by the USACE, the jurisdictional features to be impacted by this project can be found in Table 1 below.

Table 1. Jurisdictional features to be impacted, as determined by the USACE Fort Worth District.

Aquatic Resource	Type	Length (LF)	Area (ac)
UT-1B	Intermittent / RPW	394	0.04
Wetland A	Scrub-Shrub	--	0.37
	Total	**394 linear feet**	**0.41 acres**

RPW: Relatively Permanent Water

Additionally, two (2) streams (UT-1D and UT-6) were determined to be relatively permanent waters (RPWs), and therefore jurisdictional, but will not be impacted by the proposed landfill expansion. Three (3) ephemeral streams, UT-1A, UT-1C, and UT-3, were determined to be non-RPWs, and therefore non-jurisdictional.

PROJECT DETAILS

The Project Area consists of forested and disturbed areas located to the east of the existing permitted landfill footprint. The proposed Royal Oaks Landfill Expansion components include a proposed 28.6-acre landfill expansion footprint for waste disposal and associated infrastructure and stormwater controls, totalling approximately 48 acres.

In order to minimize impacts to the environment, appropriate soil erosion and sediment controls (sediment fence, hay bales, rock riprap, vegetation mats, etc.) will be used and maintained in effective operating conditions during the construction and during operation of all project elements. All development within this project will be designed to drain towards the stormwater management ditches and ponds. Stormwater will be routed through perimeter ditches towards the on-site detention ponds and five (5) discharge points into UT-1D, UT-3, UT-6. Construction is expected to be initiated following the approval of the expansion permit by TCEQ. The proposed volume of fill from each proposed project element can be found in Table 2 below. Designs for the project area, provided by Weaver Consultants Group, are included in Appendix C.

Table 2. Volume of Proposed Fill to be Placed in WOTUS.

Project Element	Aquatic Resource	Material (cubic yards) Native Fill	Total Fill in WOTUS (cubic yards)
Waste Disposal Cells	UT-1B	28.7	**1,227.7**
	Wetland A	1,194	

WATER QUALITY CERTIFICATION

In accordance with the Texas Commission on Environmental Quality (TCEQ) guidance *Conditions of Section 401 Certification for Nationwide Permits, Regional Conditions, and General Conditions*, published in 2020, Section 401 Water Quality Certification (WQC) for use of NWP 39 is only permitted if stream bed losses are limited to 1,500 linear feet. Based on discussions with the USACE Fort Worth District, stream bed losses are weighted based on stream classification and quality.

In order to determine if this project falls within TCEQ guidelines for WQC, the total linear footage of intermittent stream was calculated and compared to the total allowable impacts. For this project, a total of 394 LF of low-quality intermittent stream impacts are proposed. There are 394 LF of proposed low-quality intermittent stream impacts, which amounts to 49.3% of the total allowable impacts based on the 800 LF threshold for intermittent. Based on the length and quality of proposed intermittent stream impacts indicated by the results of the delineation and functional assessment, this project will be in compliance with the TCEQ requirements. The TCEQ guidelines for WQC can be found in Appendix H.

GENERAL CONDITIONS

In accordance with the guidelines of NWP 39, all limitations, criteria, and general and regional conditions will be followed by Republic for this project. Specifically, General Conditions 10, 12, 18, 20, 21, and 23 are addressed below.

<u>General Condition 10: Fills Within 100-Year Floodplains</u>
In accordance with USACE General Condition 10, a review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for the area has been reviewed. The FEMA FIRM indicates the entirety of the Project Area is located within areas mapped as Zone X. Zone X is described as areas outside the 100-year floodplain and, by definition, carry less than a 0.2 percent chance of flooding annually. Therefore, this project does not require a floodplain development permit.

<u>General Condition 12: Erosion and Sediment Controls</u>
In accordance with USACE General Condition 12, appropriate soil erosion and sediment controls (sediment fence, hay bales, rock riprap, vegetation mats, etc.) will be used and maintained in effective operating conditions during the construction of all project elements. Accumulations of sediment will be removed from sediment control fencing, hay bales, and any other devices as necessary to ensure adequate sedimentation controls are maintained. At a minimum, sediment accumulations will be removed when fifty percent (50%) of the design capacity of the sediment control fencing has been exceeded. Upon completion of construction activities, final stabilization in all previously disturbed areas of the construction site will be achieved. All temporary Best Management Practices (BMPs) will be removed. Exposed soils and other fills will be permanently stabilized at the earliest practicable date. A stormwater pollution prevention plan (SWP3) will be followed for the duration of the construction period and until the site is stabilized.

General Condition 18: Threatened and Endangered Species

In accordance with USACE General Condition 18, a threatened and endangered species habitat evaluation was performed by Hydrex as part of this investigation. This evaluation was based upon the U.S. Fish and Wildlife Service Information for Planning and Consultation (IPaC) Official Species List for threatened and endangered species and habitat descriptions provided by Texas Department of Wildlife (TPWD), Louisiana Department of Wildlife and Fisheries (LDWF), NatureServe, and USFWS.

The list indicates the following eight (8) species occur within Cherokee County:

- Tricolored bat (*Perimyotis subflavus*): PROPOSED ENDANGERED
- Piping plover (*Charadrius melodus*): THREATENED
- Red-cockaded woodpecker (*Picoides borealis*): ENDANGERED
- Rufa red knot (*Calidris canutus rufa*): THREATENED
- Alligator snapping turtle (*Macrochelys temminckii*): PROPOSED THREATENED
- Louisiana pigtoe (*Pleurobema riddellii*): PROPOSED THREATENED
- Monarch butterfly (*Danaus plexippus*): CANDIDATE
- Neches river rose-mallow(*Hibiscus dasycalyx)* ENDANGERED

An effect determination was made for each federal-listed species, as follows: 'no effect'; 'may affect, but not likely to adversely affect'; and 'may affect'. Furthermore, a determination was made for all proposed and candidate species, as follows: 'jeopardy' or 'no jeopardy'.

Based on the professional opinion of Hydrex, construction activities associated with the proposed project will have 'no effect' on federally listed threatened or endangered species, and 'no jeopardy' determinations for proposed and candidate species. Furthermore, we believe the effects of this project will not result in the destruction or adverse modification of the critical habitat of threatened or endangered species, or cause or contribute to the take of any threatened or endangered species. The Threatened and Endangered Species Habitat Evaluation is included in Appendix D.

General Condition 20: Historic Properties

In accordance with USACE General Condition 20, a Cultural Resources Survey was conducted by Stone Point Services (Stone Point). Royal Oaks Landfill is located on land owned by the City of Jacksonville. Therefore, the Antiquities Code of Texas (ACT) applies and consultation with the Texas Historical Commission (THC) is required. Stone Point acquired an Antiquities Permit (Archeology Permit # 31167) for an intensive archaeological survey (i.e. pedestrian survey) that meets or exceeds the Texas Historic Commission (THC) and Council of Texas Archeologists survey standards. Stone Point conducted the onsite archaeological survey in May of 2023, which did not identify any cultural resources at the project site. According to Stone Point, the project will not impact National Register of Historic Places (NRHP), or State Archeological Landmark (SAL) listed, eligible, or potentially eligible structures or sites within the project site.

The Cultural Resource Survey was submitted to the THC for review on August 10, 2023. The THC's review concluded the following:

- No historic properties are present or affected by the proposed project,
- No histroric properties will be affected by the proposed project, and
- THC/State Historic Preservation Office (SHPO) concurs with the information provided in the survey.

The THC's concurrence with findings and the Cultural Resources Survey report can be found in Appendix E.

General Condition 21: Discovery of Previously Unknown Remains and Artifacts
In accordance with USACE General Condition 21, if any previously unknown historic, cultural, or archaeological remains are found during construction activities, all project activity near the location must cease immediately until proper notification of consulting parties has occurred and mitigative measures have been determined and implemented.

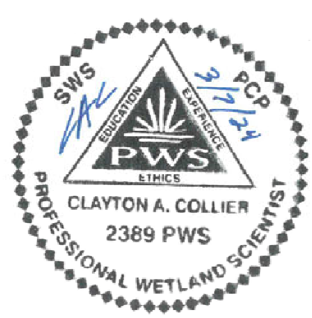
General Condition 23: Mitigation
In accordance with USACE General Condition 23, compensatory mitigation is proposed for impacts where the total loss of wetlands exceeds 0.1 acres, or the total loss of streams exceeds 0.03 acres. The proposed Royal Oaks Landfill Expansion will permanently impact approximately 394 linear feet (0.04 acres) of intermittent stream and 0.37 acres of scrub-shrub wetland. This amounts to 0.41 acres of permanent impacts to WOTUS. Based on these impacts, compensatory mitigation will be required as part of this project. Republic proposes to purchase mitigation credits from Butler Creek Mitigation Bank (BCMB). The Royal Oaks Landfill is located within the secondary service area of the BCMB; therefore a 1.5 multiplier will be applied to all credit purchases.

The BCMB utilizes the Texas Rapid Assessment Method (TXRAM) Version 2.0 for the calculation of compensatory mitigation credits. Therefore, a TXRAM 2.0 functional assessment was performed for impacts to UT-1B and Wetland A. Based on this functional assessment, the proposed Royal Oaks Landfill Expansion will require the purchase of 366 intermittent stream credits, and 0.23 wetland credits to satisfy compensatory mitigation requirements. A summary of the TXRAM functional assessment scores for each jurisdictional feature can be found in the Royal Oaks Landfill Expansion Mitigation Plan (Appendix F).

On behalf of Republic, we respectfully request authorization under NWP 39 for the impacts described herein. Should you have any questions or need any additional information, please do not hesitate to contact me at [redacted] or (936) 568-9451.

Sincerely,
Hydrex Environmental

Clayton A. Collier, REM, PWS
GM / Senior Environmental Scientist



APPENDICES

DISTRIBUTION

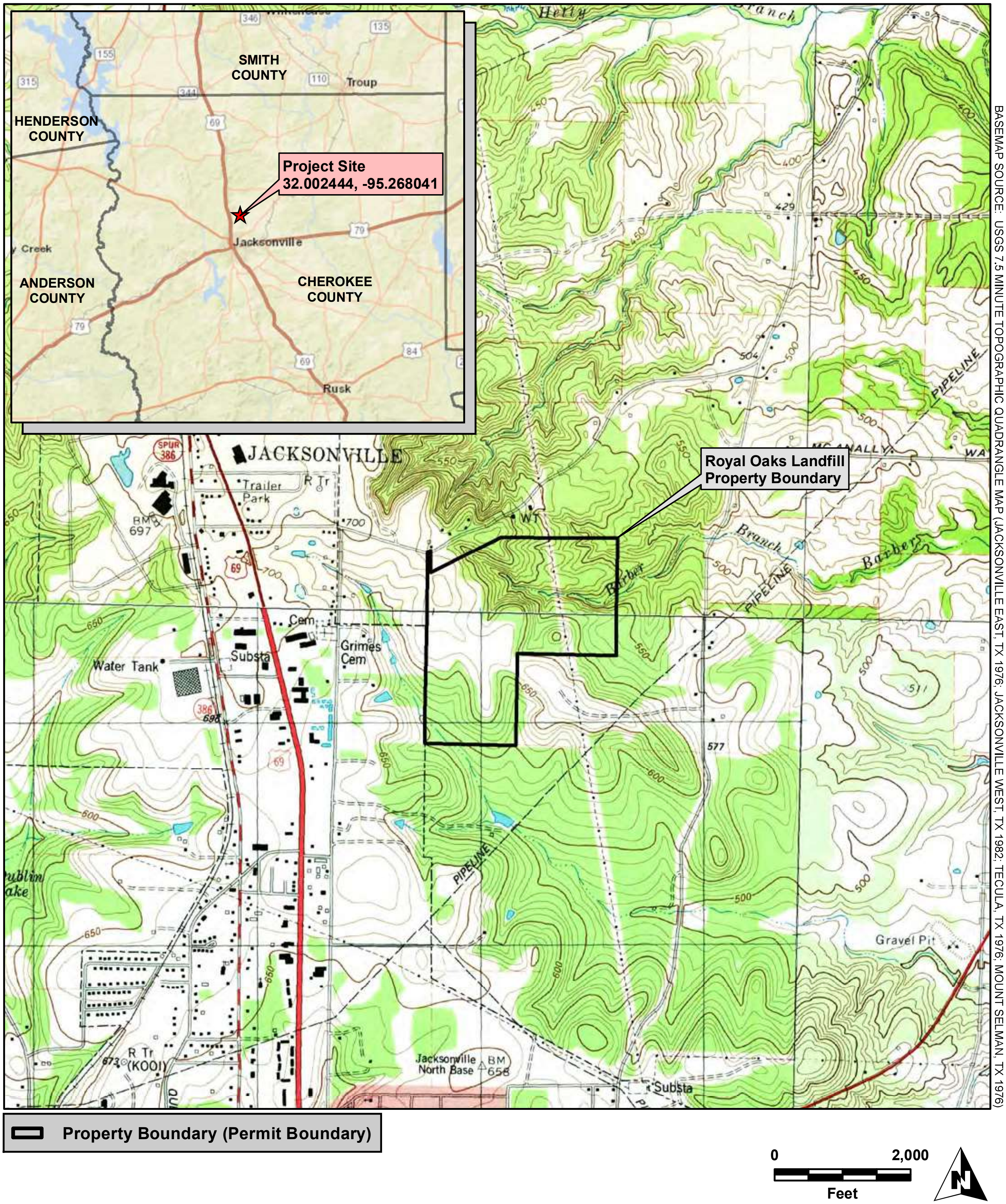
Mr. Andy Gray
Project Manager
U.S. Army Corps of Engineers
Fort Worth District
Regulatory Division – Cooper Lake
828 CR 4795
Sulphur Springs, TX 75482

Mr. Austin Sparks, P.E.
Environmental Manager - East Texas Area
Republic Services, Inc.
12920 FM 2767
Tyler, Texas 75708

Mr. Clayton A. Collier
GM / Senior Environmental Scientist
Hydrex Environmental
312 Old Tyler Road
Nacogdoches, Texas 75961

APPENDIX A

MAPS



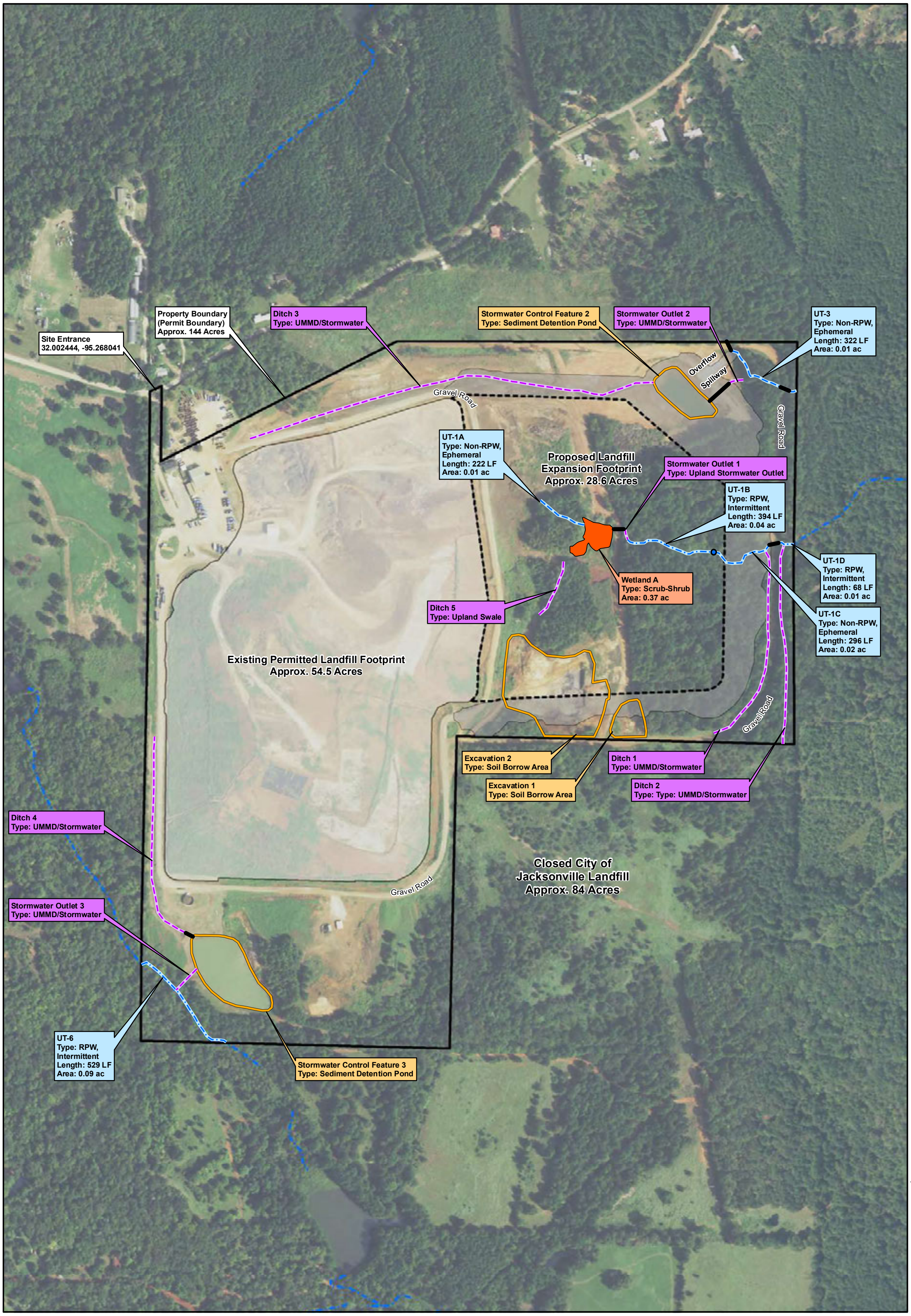
Hydrex ENVIRONMENTAL

Figure 1

USGS Topographic Map

Royal Oaks Landfill
Republic Services, Inc.
Cherokee County, Texas
PRE-CONSTRUCTION NOTIFICATION FOR NWP 39

Map Revised: 03/06/2024	Project Number: A-12-1509	GIS Analyst: CRK



BASEMAP SOURCE: 2020 AERIAL PHOTOGRAPH PROVIDED BY NAIP; HYDROLOGY PROVIDED BY USGS

Culvert
Property Boundary (Permit Boundary)
Existing Permitted Landfill Footprint
Proposed Landfill Expansion Footprint
Proposed Footprint of Infrastructure & Stormwater Controls
Delineated Scrub-Shrub Wetland
Landfill Excavation
Flow Regime Change
Delineated Stream (Non-RPW)
Delineated Stream (RPW)
Upland Man-Made Ditch (UMMD) / Stormwater
USGS NHD Intermittent Stream (Off-Site)

Hydrex ENVIRONMENTAL

FIGURE 2

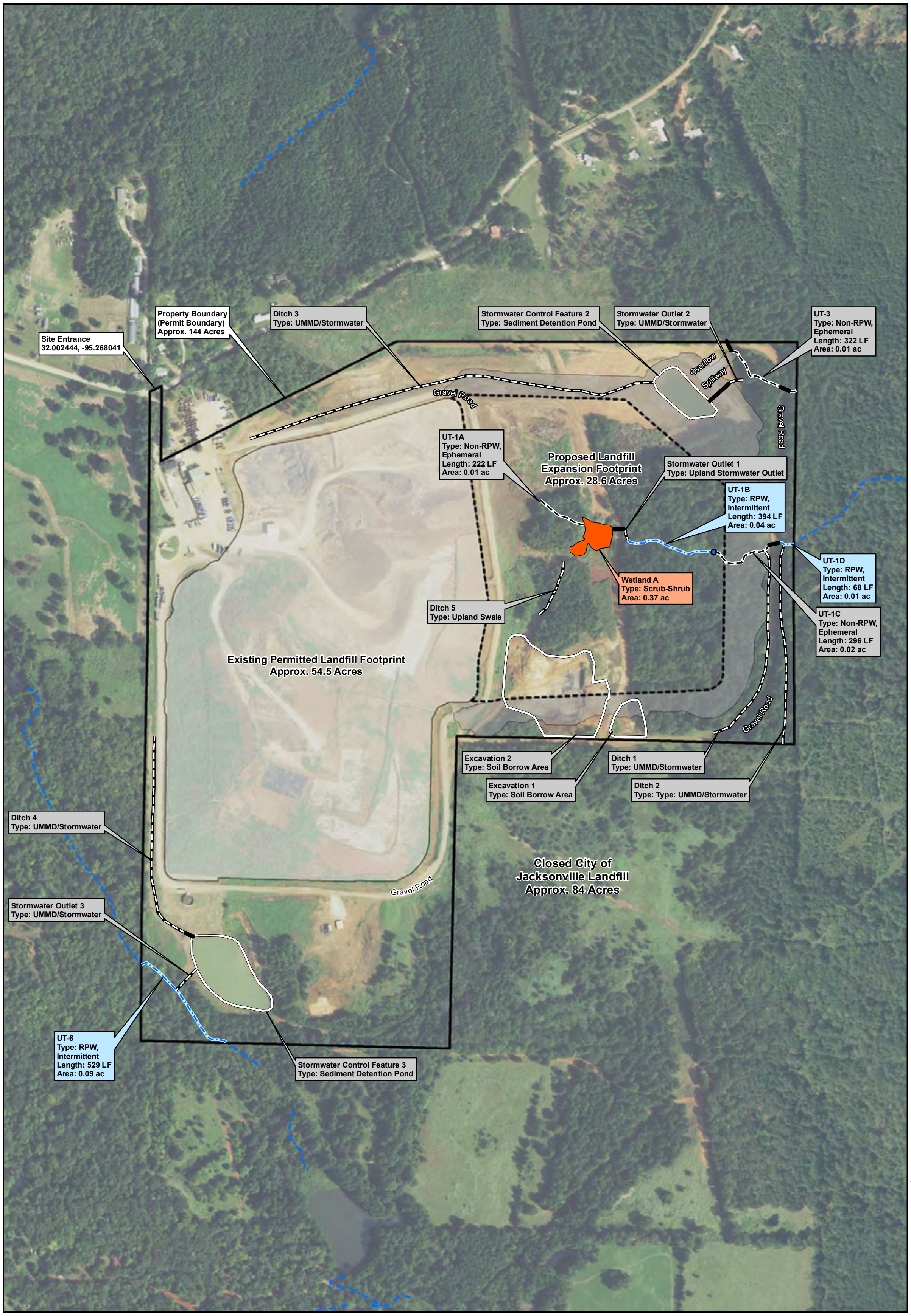
DELINEATED AQUATIC FEATURES MAP

0 400
Feet

N

Royal Oaks Landfill
Republic Services, Inc.
Cherokee County, Texas
PRE-CONSTRUCTION NOTIFICATION FOR NWP 39

Map Revised: 03/06/2024	Project Number: A-12-1509	GIS Analyst: CRK



BASEMAP SOURCE: 2020 AERIAL PHOTOGRAPH PROVIDED BY NAIP; HYDROLOGY PROVIDED BY USGS

Culvert
Property Boundary (Permit Boundary)
Existing Permitted Landfill Footprint
Proposed Landfill Expansion Footprint
Proposed Footprint of Infrastructure & Stormwater Controls
Delineated Scrub-Shrub Wetland (Jurisdictional)
Landfill Excavation (Non-Jurisdictional)
Flow Regime Change
Delineated Stream (RPW, Jurisdictional)
Delineated Stream (Non-RPW, Non-Jurisdictional)
Upland Man-Made Ditch (UMMD) / Stormwater (Non-Jurisdictional)
USGS NHD Intermittent Stream (Off-Site)

Hydrex ENVIRONMENTAL

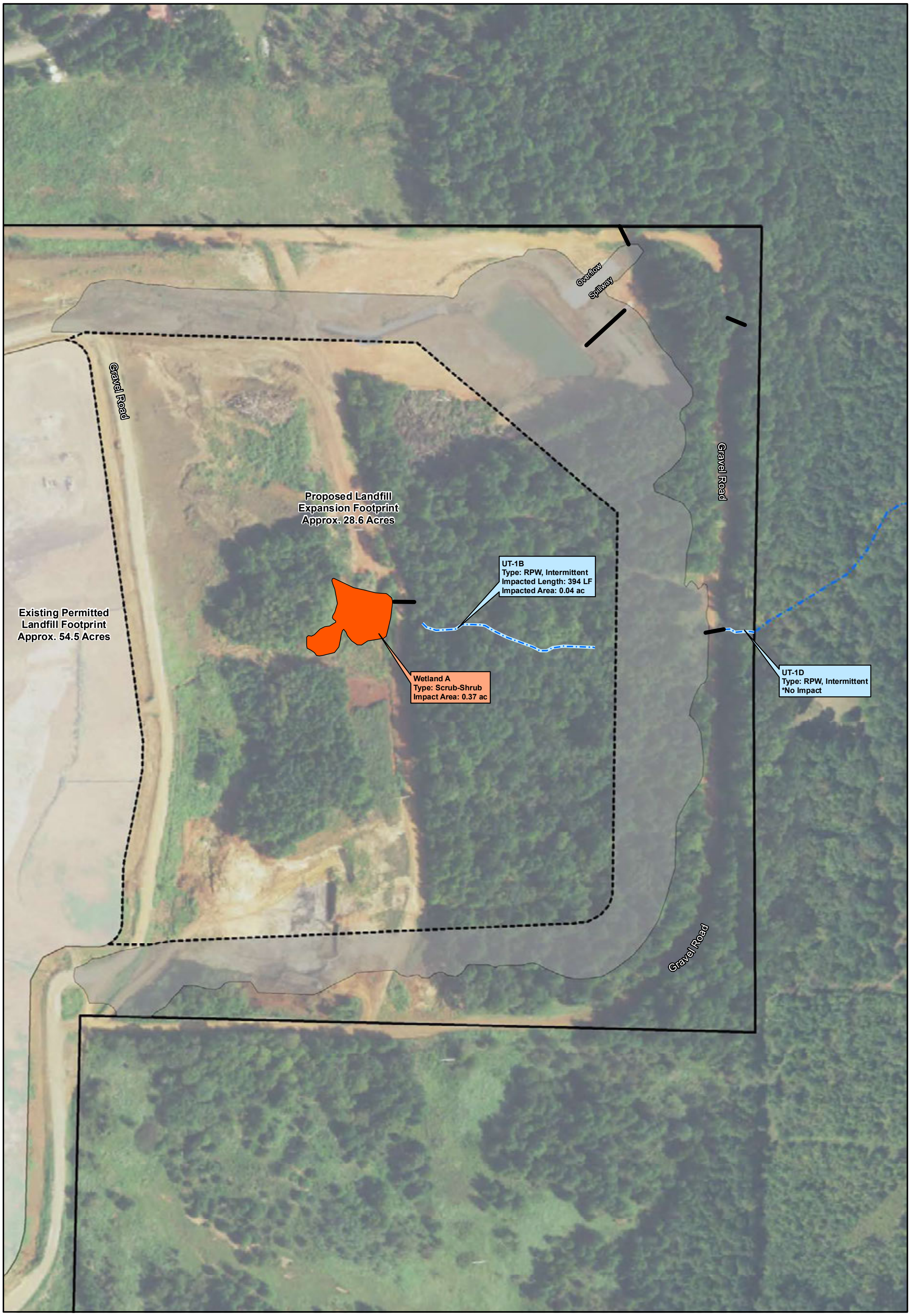
FIGURE 3

JURISDICTIONAL DETERMINATION MAP

0 400
Feet

Royal Oaks Landfill
Republic Services, Inc.
Cherokee County, Texas
PRE-CONSTRUCTION NOTIFICATION FOR NWP 39

Map Revised: 03/06/2024	Project Number: A-12-1509	GIS Analyst: CRK



Culvert
Property Boundary (Permit Boundary)
Existing Permitted Landfill Footprint
Proposed Landfill Expansion Footprint
Proposed Footprint of Infrastructure & Stormwater Controls
Delineated Scrub-Shrub Wetland (Jurisdictional)
Delineated Stream (RPW, Jurisdictional)
USGS NHD Intermittent Stream (Off-Site)

Hydrex ENVIRONMENTAL

FIGURE 4

PROPOSED IMPACTS TO WOTUS MAP

0 200
Feet

N

Royal Oaks Landfill
Republic Services, Inc.
Cherokee County, Texas
PRE-CONSTRUCTION NOTIFICATION FOR NWP 39

Map Revised: 03/06/2024 | Project Number: A-12-1509 | GIS Analyst: CRK

APPENDIX B

ADDENDUM TO DELINEATION OF WOTUS REPORT
(June 5, 2023)

Hydrex ENVIRONMENTAL

July 5, 2023

Mr. Frederick Land
U.S. Army Corps of Engineers
Fort Worth District
Regulatory Division
Taylor Street, Room 3A37
Fort Worth, Texas 76102

RE: ADDENDUM TO DELINEATION OF WATERS OF THE U.S. REPORT
Royal Oaks Landfill
Proposed Expansion +/- 48 Acres
Cherokee County, Texas
USACE Project No. SWF-2021-00405

Dear Mr. Land:

Hydrex Environmental (Hydrex) was contracted by Republic Services, Inc. (Republic) to perform a delineation of waters of the U.S. (WOTUS) and receive authorization under Section 404 from the U.S. Army Corps of Engineers (USACE) Fort Worth District for the proposed landfill expansion. This letter serves as an addendum to the previous Delineation of WOTUS Report dated August 13, 2021 and prepared by Hydrex. This report should be referenced for further details regarding the delineation.

The Project Area consists of approximately 48 acres of forested and disturbed areas located to the east of the existing landfill. The project is situated within the city limits of Jacksonville along Heath Lane (CR 4102). The approximate NAD83 geographic coordinates for the site entrance and area delineated are as follows: N 32.002444, W 95.268041.

The initial delineation of WOTUS report was completed on August 13, 2021, which included the locations and descriptions of the delineated features as follows: one (1) named tributary (Barber Branch), eight (8) unnamed tributaries (UT-2 through UT-9), four (4) upland man-made / stormwater ditches (Ditch 1 through Ditch 4), three (3) stormwater outlets (Stormwater Outlets 1 through 3), two (2) erosional gullies (Erosional Gully 1 and 2), three (3) stormwater control features (Stormwater Control Features 1 through 3), and two (2) excavations (Excavations 1 and 2). The results of this delineation were submitted to the USACE Fort Worth District as part of a Request for Approved Jurisdictional Determination (AJD) on August 17, 2021, where the project was assigned to regulatory project manager Mr. Fred Land. The August 2021 Request for AJD was prepared and submitted under the Navigable Waters Protection Rule (NWPR), which was the regulatory guidance at the time. As the NWPR was vacated August 30, 2021, the project was reevaluated under the Rapanos (Pre-2015) Guidance.

312 OLD TYLER ROAD
NACOGDOCHES, TX 75961
printed on recycled paper
936-568-9451
FAX: 936-568-9527

An AJD Site Visit was conducted by members of Hydrex and the USACE Fort Worth District on August 9, 2022. During this site visit, the previously delineated features were reviewed and verified by the USACE. A summary of the results of this site visit and the jurisdictional features can be found in Table 1. Updated site maps displaying the jurisdictional features can be found in Attachment A.

Table 1. Jurisdictional Features as determined by the USACE Fort Worth District.

Aquatic Resource	Type	Length (LF)	Area (ac)
UT-1A	Ephemeral	222	0.01
UT-1B	Intermittent	394	0.04
UT-1C	Ephemeral	296	0.02
UT-1D	Intermittent	68	0.01
UT-3	Ephemeral	322	0.01
UT-6	Intermittent	529	0.09
Wetland A	Scrub-Shrub	--	0.37

In addition to the AJD site visit, Hydrex completed additional documentation of the project site in order to determine the necessary permitting and mitigation steps. This included the establishment of an additional observation point in Wetland A (Observation Point 9), and the functional assessment of the jurisdictional features as described above. Wetland Determination Datasheets and Functional Assessment Datasheets can be found in Attachments B and C.

Furthermore, a review of historic aerial photographs was completed for Ditches 3 and 5 to determine if these features were once natural tributaries, or stormwater management ditches as they appear today. Based on a review of aerial photography and maps dating back to 1947, we do not believe there is clear evidence supporting the presence of a natural tributary in the location of either Ditch 3 or Ditch 5. According to knowledgeable site personnel, both features were created to management stormwater runoff from the existing landfill. The historic aerial photographs are provided in Appendix C of the original delineation report.

I appreciate the opportunity to present this information. If you have any questions regarding these findings or our recommendations, or if further clarification is necessary, please feel free to contact me at [redacted] or (936) 568-9451. I look forward to working with you in the future.

Sincerely,
Hydrex Environmental

SWS PCP
EDUCATION EXPERIENCE
PWS
ETHICS
CLAYTON A. COLLIER
2389 PWS
PROFESSIONAL WETLAND SCIENTIST
CAC 7/5/2023

Clayton A. Collier, REM, PWS
GM / Senior Environmental Scientist

ATTACHMENTS

Attachment A	MAPS
Figure 1	Delineated Features Map
Figure 2	Jurisdictional Features Map
Attachment B	PHOTOGRAPHIC DOCUMENTATION
Attachment C	WETLAND DETERMINATION DATASHEET
Attachment D	FUNCTIONAL ASSESSMENT DATASHEETS

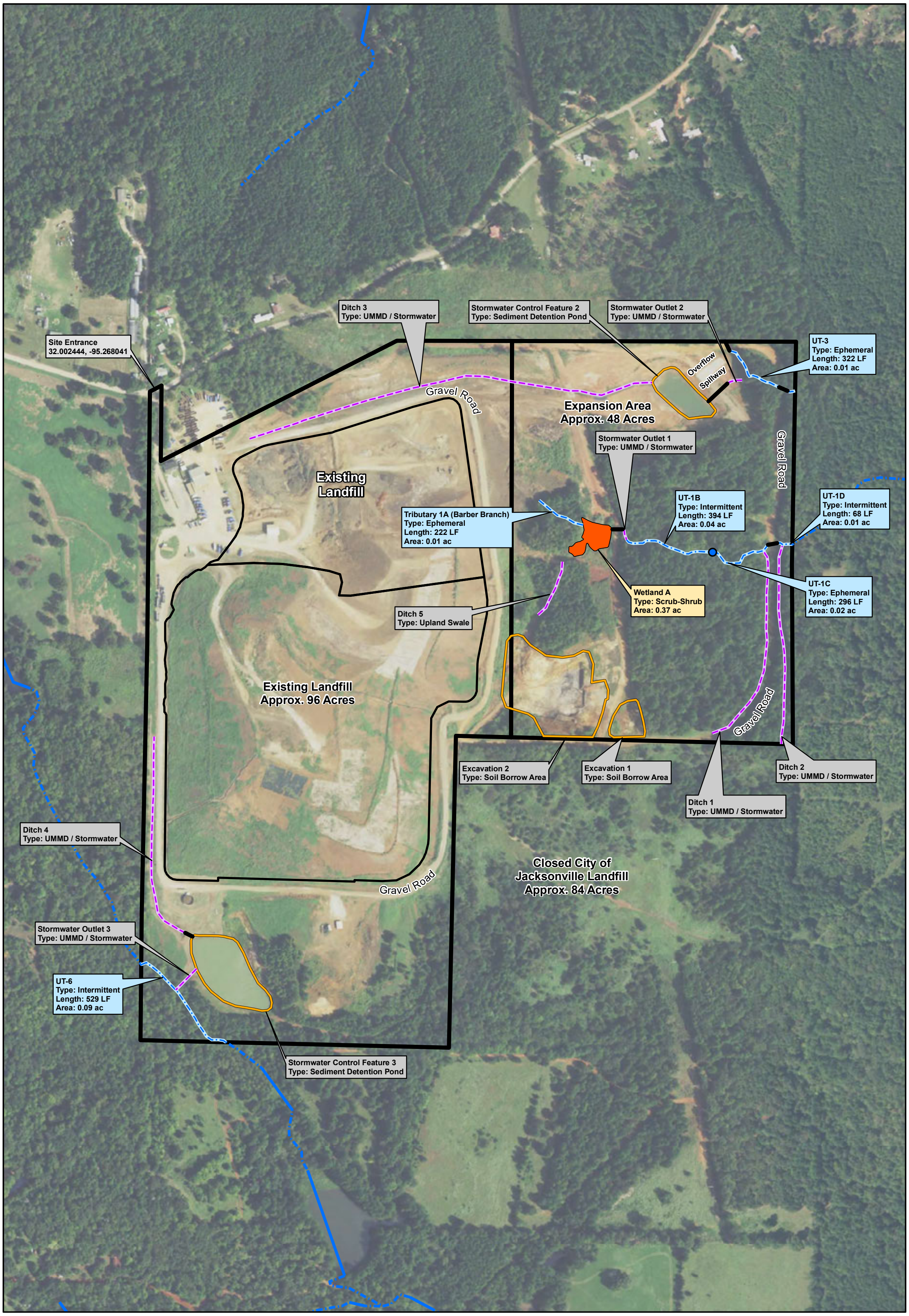
DISTRIBUTION

Mr. Frederick Land
U.S. Army Corps of Engineers
Fort Worth District
Regulatory Division
Taylor Street, Room 3A37
Fort Worth, Texas 76102

Mr. Austin Sparks, P.E.
Environmental Manager - East Texas Area
Republic Services, Inc.
12920 FM 2767
Tyler, Texas 75708

ATTACHMENT A

MAPS



BASEMAP SOURCE: 2020 AERIAL PHOTOGRAPH PROVIDED BY NAIP.

Current Limits Of Waste
Property Boundary
Delineated Scrub-Shrub Wetland
Landfill Excavations
Delineated Ephemeral Stream
Delineated Intermittent Stream
Upland Man-Made Ditch (UMMD) / Stormwater
Culvert
USGS NHD Perennial Stream
USGS NHD Intermittent Stream

Hydrex ENVIRONMENTAL
1120 NW Stallings Drive
Nacogdoches, Texas 75964
(936) 568-9451

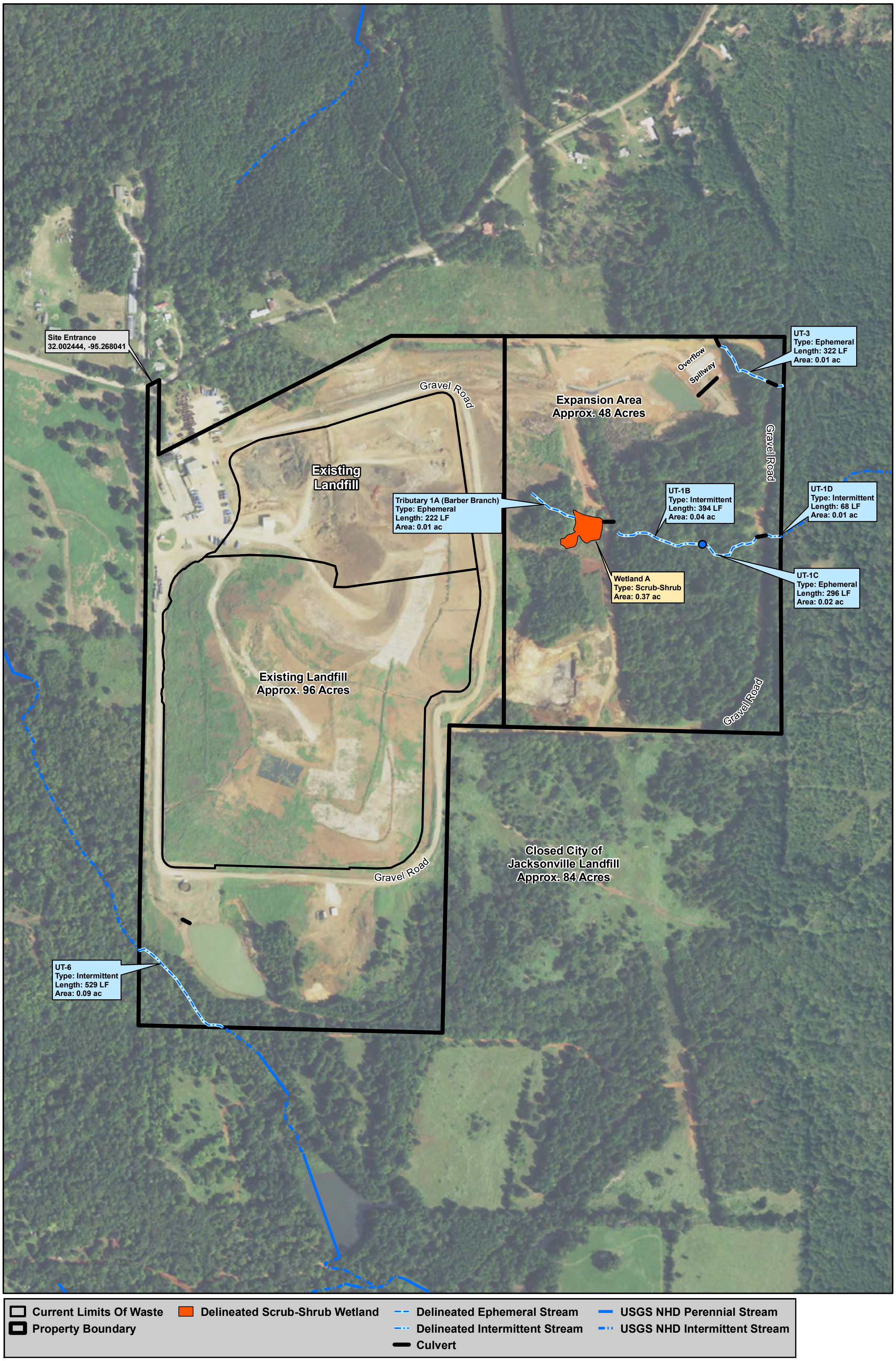
FIGURE 1

DELINEATED FEATURES MAP

0 400
Feet
N

Royal Oaks Landfill
Republic Services, Inc.
Cherokee County, Texas
Request for Approved Jurisdictional Determination

Map Revised: 03/02/2023 | Project Number: A-12-1509 | GIS Analyst: DTM



Hydrex ENVIRONMENTAL
1120 NW Stallings Drive
Nacogdoches, Texas 75964
(936) 568-9451

FIGURE 2

JURISDICTIONAL FEATURES MAP

0 400
Feet

Royal Oaks Landfill
Republic Services, Inc.
Cherokee County, Texas
Request for Approved Jurisdictional Determination

Map Revised: 03/02/2023 | Project Number: A-12-1509 | GIS Analyst: DTM

ATTACHMENT B

PHOTOGRAPHIC DOCUMENTATION

Site Photographs


Observation Point 9: Soil Profile


Observation Point 9: Typical Vegetation


Wetland A (Scrub-Shrub): North


Wetland A (Scrub-Shrub): East Boundary

ATTACHMENT C

WETLAND DETERMINATION DATASHEET

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending Requirement Control Symbol EXEMPT: (Authority: AR 335-15, paragraph 5-2a)

Project/Site: Royal Oaks Landfill Expansion (A-12-1509) City/County: Cherokee County Sampling Date: 02-28-23
Applicant/Owner: Republic Services, Inc. State: TX Sampling Point: 9
Investigator(s): D. Morgan, J. Paul Section, Township, Range: N/A
Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 1
Subregion (LRR or MLRA): LRR P Lat: 32.000812 Long: -95.261923 Datum: NAD83
Soil Map Unit Name: Pits NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil X, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No X
Hydric Soil Present? Yes X No ___
Wetland Hydrology Present? Yes ___ No X
Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:
Primary Indicators (minimum of one is required; check all that apply)
___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15) **(LRR U)**
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)
___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
X FAC-Neutral Test (D5)
___ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:
Surface Water Present? Yes ___ No ___ Depth (inches): ___
Water Table Present? Yes ___ No ___ Depth (inches): ___
Saturation Present? Yes ___ No ___ Depth (inches): ___
(includes capillary fringe)
Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

ENG FORM 6116-2-SG, JUL 2018 Atlantic and Gulf Coastal Plain – Version 2.0

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: 9

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30')			
1. *Salix nigra*	30	Yes	OBL
2. *Baccharis halimifolia*	3	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	33 =Total Cover		
50% of total cover: 17	20% of total cover: 7		
Herb Stratum (Plot size: 30')			
1. *Typha domingensis*	30	Yes	OBL
2. *Solidago gigantea*	40	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70 =Total Cover		
50% of total cover: 35	20% of total cover: 14		
Woody Vine Stratum (Plot size: 30')			
1. *Rubus argutus*	4	No	FAC
2.			
3.			
4.			
5.			
	4 =Total Cover		
50% of total cover: 2	20% of total cover: 1		

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ___	x 1 = ___
FACW species ___	x 2 = ___
FAC species ___	x 3 = ___
FACU species ___	x 4 = ___
UPL species ___	x 5 = ___
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (If observed, list morphological adaptations below.)

ENG FORM 6116-2-SG, JUL 2018 Atlantic and Gulf Coastal Plain – Version 2.0

SOIL Sampling Point: 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 4/6	100					Loamy/Clayey	
3-10	7.5YR 4/4	100					Loamy/Clayey	
10-16	5YR 3/4	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)
___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Organic Bodies (A6) **(LRR P, T, U)**
___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
___ Muck Presence (A8) **(LRR U)**
___ 1 cm Muck (A9) **(LRR P, T)**
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Coast Prairie Redox (A16) **(MLRA 150A)**
___ Sandy Mucky Mineral (S1) **(LRR O, S)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) **(LRR P, S, T, U)**
___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
___ Thin Dark Surface (S9) **(LRR S, T, U)**
___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
___ Loamy Mucky Mineral (F1) **(LRR O)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) **(LRR U)**
___ Depleted Ochric (F11) **(MLRA 151)**
___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
___ Umbric Surface (F13) **(LRR P, T, U)**
___ Delta Ochric (F17) **(MLRA 151)**
___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:
___ 1 cm Muck (A9) **(LRR O)**
___ 2 cm Muck (A10) **(LRR S)**
___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: ___
Depth (inches): ___
Hydric Soil Present? Yes X No ___

Remarks:
Soils are heavily disturbed from soil borrow pit activities, but the area appears to be functioning as a wetland.

ENG FORM 6116-2-SG, JUL 2018 Atlantic and Gulf Coastal Plain – Version 2.0

ATTACHMENT D

FUNCTIONAL ASSESSMENT DATASHEETS

Version 2.0 - Final

TXRAM STREAM FINAL SCORING SHEET

Project/Site Name/No.: Royal Oaks Landfill Project Type: ☑ Fill/Impact (☑ Linear ☐ Non-linear) ☐ Mitigation/Conservation

Stream ID/Name: UT-1A SAR No.: 1 Size (LF): 222 Date: 2-2-2023 Evaluator(s): DM, JP

Stream Type: Ephemeral Ecoregion: South Central Plains (Piney Woods) Delineation Performed: ☐ Previously ☑ Currently

8-Digit HUC: 1202004 Upper Angelina Watershed Condition (developed, pasture, etc.): Developed Watershed Size: Approx. 50 ac

Aerial Photo Date and Source: 2020 (NAIP) Site Photos: Attached Representative: ☑ Yes ☐ No

Stressor(s): Landfill Are normal climatic/hydrologic conditions present? ☑ Yes ☐ No (If no, explain in Notes)

Notes:

Stream Characteristics

Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank: 4.5	Avg. Banks: 0.2
Avg. Waters Edge: 0.1	Avg. Water: Dry
Avg. OHWM: 2.0	Avg. OHWM: 0.2

Scoring Table

Core Element	***Metric***	***Metric Score***	***Core Element Score Calculation***	***Core Element Score***
Channel condition	Floodplain connectivity	2	Sum of metric scores / 15 x 30	8.0
	Bank condition	1		
	Sediment deposition	1		
Buffer condition	Composite buffer (left bank)	1.63	Sum of bank scores / 10 x 20	9.0
	Composite buffer (right bank)	2.88		
In-stream condition	Substrate composition	1	Sum of metric scores / 10 x 25	2.5
	In-stream habitat	0		
Hydrologic condition	Flow regime	0	Sum of metric scores / 8 x 25	0.0
	Channel flow status	0		
Sum of core element scores = overall TXRAM stream score				19.5
Additional points for limited habitats = overall TXRAM stream score x 0.025 for each bank (right/left) if: L R ☐ ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				-
Sum of overall TXRAM stream score and additional points = **total overall TXRAM stream score**				19.5

Representative Site Photograph:

View looking upstream along UT-1A.

View looking downstream along UT-1A.

TXRAM STREAM DATA SHEET

Project/Site Name/No.: Royal Oaks Landfill Project Type: ☒ Fill/Impact (☒ Linear ☐ Non-linear) ☐ Mitigation/Conservation

Stream ID/Name: UT-1A SAR No.: 1 Size (LF): 288 Date: 02-28-2023 Evaluator(s): DM, JP

Stream Type: Ephemeral Ecoregion: South Central Plains (Piney Woods) Delineation Performed: ☒ Previously ☐ Currently

8-Digit HUC: 1202004 Upper Angelina Watershed Condition (developed, pasture, etc.): Landfill Watershed Size: Approx. 50 ac

Aerial Photo Date and Source: 2020 (NAIP) Site Photos: Attached Representative: ☒ Yes ☐ No

Stressor(s): Landfill Are normal climatic/hydrologic conditions present? ☒ Yes ☐ No (If no, explain in Notes)

Stream Characteristics

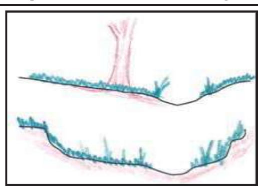
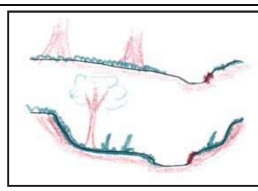
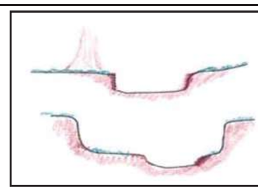
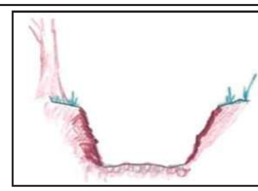
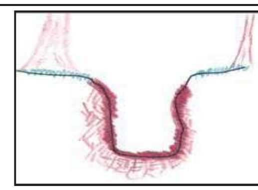
Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank 4.5 ft	Avg. Banks: 0.2
Avg. Waters Edge: 0.1 ft	Avg. Water: Dry
Avg. OHWM: 2.0 ft	Avg. OHWM: 0.2 ft

Notes:

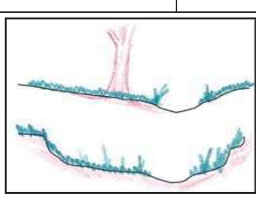
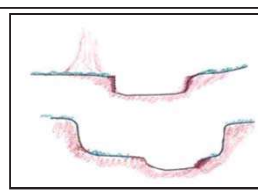
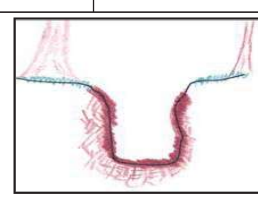
CHANNEL CONDITION

Floodplain Connectivity

Perennial / Intermittent

				
6 / 5	4	3	2	1
Very little incision and access to the original floodplain or fully developed wide bankfull benches scores a "5" for this metric. ☐ Very little incision and access to the original floodplain with significant floodplain connection indications (i.e., riverine wetlands) score a "6" for this metric. ☐	Slight incision and likely having regular (i.e., at least once a year) access to bankfull benches or newly developed floodplains along majority of the reach. ☐	Moderate incision and presence of near vertical/ undercut banks; irregular (i.e., greater than 2 year return interval) access to floodplain or possible access to floodplain or bankfull benches at isolated areas. ☐	Overwidened or incised channel and likely to widen further; majority of both banks near vertical/undercut; unlikely/rarely having access to floodplain or bankfull benches. ☐	Deeply incised channel or channelized flow; severe incision with flow contained within the banks; majority of banks vertical/undercut. ☐

Ephemeral

		
3	2	1
Slight incision and unlikely/rarely having access to floodplain or bankfull benches. ☐	Moderate incision and no access to floodplain. ☑	Deeply incised channel or channelized flow; majority of banks vertical/undercut. ☐

Score: 2

Bank Condition

Left Bank Active Erosion: 45 % Right Bank Active Erosion: 40 % Average: 42.5

Bank Protection/Stabilization: ☐ Natural ☐ Artificial: ____

Score: 1

Sediment Deposition

☐ Less than 10% of the bottom covered by excessive sediment deposition; bars with established vegetation (5)

☐ 10–20% of the bottom covered by excessive sediment deposition; few established bars with indicators of recently deposited sediments (4)

☐ 20–30% of the bottom covered by excessive sediment deposition; some deposition on old bars and creating new bars; some sediment deposits at in-stream structures; OR obstructed view of the channel bottom and a lack of other depositional features (3)

☐ 30–50% of the bottom covered by excessive sediment deposition; some newly created bars; moderate sediment deposits at in-stream structures (2)

☐ Greater than 50% of the bottom covered by excessive sediment deposition resulting in aggrading channel (1)

Score: 1

RIPARIAN BUFFER CONDITION

Riparian Buffer - See Table 26 to determine appropriate buffer distance. Confirm in office review.

Identify each buffer type and score using the primary or secondary buffer method of evaluation (see sections 3.3.2.1.2 and 3.3.2.1.4).

Left Bank

Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Forest	60	Native	Low	4	50.5	2.02
2. Landfill	0	None	Complete	0	49.5	0.00
3.						
4.						
5.						

Left Bank Primary Buffer Subtotal: 2.02 **X 0.7 = Left Bank Primary Buffer Total** 1.41

Secondary Buffer Type	*Canopy Cover*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Landfill	0	Complete	0	71.0	0.00
2. Forest	80	Low	5	12.4	0.62
3. Road	0	Complete	0	13.8	0.00
4. Forest	60	Low	4	2.8	0.11
5.					

Left Bank Secondary Buffer Subtotal: 0.73 **X 0.3 = Left Bank Secondary Buffet Total** 0.22

Left Bank Primary Buffer Total + Left Bank Secondary Buffer Total = Composite Buffer Left Bank Metric Score 1.63

Right Bank

Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Forest	60	Native	Low	4	84.1	3.36
2. Landfill	0	None	Complete	0	15.9	0
3.						
4.						
5.						

Right Bank Primary Buffer Subtotal: 3.36 **X 0.7 = Right Bank Primary Buffer Total** 2.36

Secondary Buffer Type	*Canopy Cover*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Forest	60	Low	4	42.2	1.69
2. Landfill	0	Complete	0	54.0	0
3. Road	0	Complete	0	2.8	0
4. Forest	80	Low	5	1.1	0.06
5.					

Right Bank Secondary Buffer Subtotal: 1.74 **X 0.3 = Right Bank Secondary Buffer Total** 0.52

Right Bank Primary Buffer Total + Right Bank Secondary Buffer Total = Composite Buffer Right Bank Metric Score 2.88

Stream ID/Name: UT-1A SAR No.: 1

IN-STREAM CONDITION

Substrate Composition (estimate percentages)

Boulder:	Gravel:	Fines (silt, clay, muck):	Artificial:	Large Woody Debris/Leaf Packs:
Cobble:	Sand:	Bedrock (smooth):	Bedrock (fractured):	

Default score due to excessive suspended sediment ☐ **Default score due to depth** ☐ **Score:** 1

In-stream Habitat (check all habitat types that are present and check box for appropriate percent cover at each transect)

Habitat Types by Presence and Cover	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Undercut Banks													
Overhanging Vegetation													
Rootmats													
Rootwads													
Woody Debris/Leaf Packs													
Boulders/Cobbles													
Aquatic Macrophytes													
Bedrock with Interstitial Space													
Artificial Habitat Enhancement													
Other:													
Number Present													
Percent Cover in Streams OHWM Width ≤ 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-29% cover (2)													
Transect has 30-50% cover (3)													
Transect has > 50% cover (4)													
Percent Cover Score													
Percent Cover in Streams OHWM Width > than 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-14% cover (2)													
Transect has 15-30% cover (3)													
Transect has > 30% cover (4)													
Percent Cover Score													
Habitat Types by Presence	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Riffle/Pool Sequence													
Canopy Cover 70% or Greater													
Natural Step-pools													
Number Present													
Total Score													

Average: 0 **Score:** 0

HYDROLOGIC CONDITION

Flow Regime

☐ Noticeable surface flow present (4)
☐ Continual pool of water but lacking noticeable flow (3)
☐ Isolated pools and interstitial (subsurface) flow (2)
☐ Isolated pools and no evidence of surface or interstitial flow (1)
☐ Dry channel and no observable pools or interstitial flow (0)
Artificial / altered water source ☐ No ☐ Yes: ______________

Score: 0

Channel Flow Status

☐ Water covering greater than 75% of the channel bottom width; less than 25% of channel substrate is exposed (4)
☐ Water covering 50–75% of the channel bottom width; 25–50% of channel substrate is exposed (3)
☐ Water covering 25–50% of the channel bottom width; 50–75% of channel substrate is exposed (2)
☐ Water present but covering less than 25% of the channel bottom width; greater than 75% of channel substrate is exposed (1)
☐ No water present in the channel; 100% of channel substrate exposed (0)

Score: 0

Version 2.0 - Final

TXRAM STREAM FINAL SCORING SHEET

Project/Site Name/No.: Royal Oaks Landfill Project Type: ☑ Fill/Impact (☑ Linear ☐ Non-linear) ☐ Mitigation/Conservation

Stream ID/Name: UT-1B SAR No.: 1 Size (LF): 394 Date: 2-28-2023 Evaluator(s): DM, JP

Stream Type: Intermittent Ecoregion: South Central Plains (Piney Woods) Delineation Performed: ☐ Previously ☑ Currently

8-Digit HUC: 1202004 Upper Angelina Watershed Condition (developed, pasture, etc.): Developed Watershed Size: Approx. 60 ac

Aerial Photo Date and Source: 2020 (NAIP) Site Photos: Attached Representative: ☑ Yes ☐ No

Stressor(s): Landfill Are normal climatic/hydrologic conditions present? ☑ Yes ☐ No (If no, explain in Notes)

Notes:

Stream Characteristics

Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank: 15	Avg. Banks: 8.5
Avg. Waters Edge: 3.5	Avg. Water: 3.5
Avg. OHWM: 3.5	Avg. OHWM: 3.5

Scoring Table

Core Element	*Metric*	*Metric Score*	*Core Element Score Calculation*	*Core Element Score*
Channel condition	Floodplain connectivity	2	Sum of metric scores / 15 x 30	10.0
	Bank condition	1		
	Sediment deposition	2		
Buffer condition	Composite buffer (left bank)	4.77	Sum of bank scores / 10 x 20	17.9
	Composite buffer (right bank)	4.16		
In-stream condition	Substrate composition	2	Sum of metric scores / 10 x 25	15.0
	In-stream habitat	4		
Hydrologic condition	Flow regime	4	Sum of metric scores / 8 x 25	18.8
	Channel flow status	2		
Sum of core element scores = overall TXRAM stream score				61.6
Additional points for limited habitats = overall TXRAM stream score x 0.025 for each bank (right/left) if: L R ☐ ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				-
Sum of overall TXRAM stream score and additional points = **total overall TXRAM stream score**				61.1

Representative Site Photograph:

View looking upstream along UT-1B.

View looking downstream along UT-1B.

TXRAM STREAM DATA SHEET

Project/Site Name/No.: Royal Oaks Landfill Project Type: ☒ Fill/Impact (☒ Linear ☐ Non-linear) ☐ Mitigation/Conservation

Stream ID/Name: UT-1B SAR No.: 1 Size (LF): 394 Date: 02-28-2023 Evaluator(s): DM, JP

Stream Type: Intermittent Ecoregion: South Central Plains (Piney Woods) Delineation Performed: ☒ Previously ☐ Currently

8-Digit HUC: 1202004 Upper Angelina Watershed Condition (developed, pasture, etc.): Landfill Watershed Size: Approx. 60 ac

Aerial Photo Date and Source: 2020 (NAIP) Site Photos: Attached Representative: ☒ Yes ☐ No

Stressor(s): Landfill Are normal climatic/hydrologic conditions present? ☒ Yes ☐ No (If no, explain in Notes)

Stream Characteristics

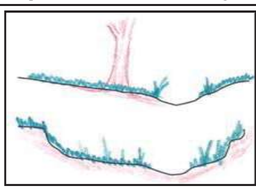
Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank 15 ft	Avg. Banks: 8.5 ft
Avg. Waters Edge: 3.5 ft	Avg. Water: 3.5 ft
Avg. OHWM: 3.5 ft	Avg. OHWM: 3.5 ft

Notes:

CHANNEL CONDITION

Floodplain Connectivity

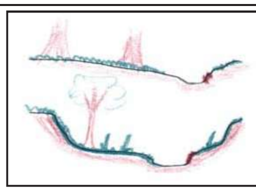
Perennial / Intermittent



6 / 5

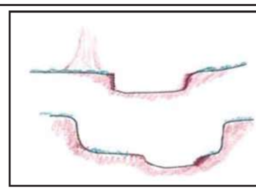
Very little incision and access to the original floodplain or fully developed wide bankfull benches scores a "5" for this metric. ☐

Very little incision and access to the original floodplain with significant floodplain connection indications (i.e., riverine wetlands) score a "6" for this metric. ☐



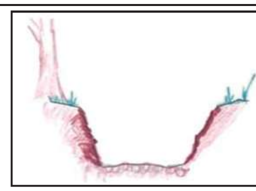
4

Slight incision and likely having regular (i.e., at least once a year) access to bankfull benches or newly developed floodplains along majority of the reach. ☐



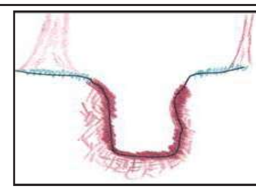
3

Moderate incision and presence of near vertical/ undercut banks; irregular (i.e., greater than 2 year return interval) access to floodplain or possible access to floodplain or bankfull benches at isolated areas. ☐



2

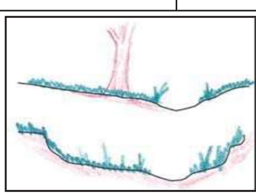
Overwidened or incised channel and likely to widen further; majority of both banks near vertical/undercut; unlikely/rarely having access to floodplain or bankfull benches. ☐



1

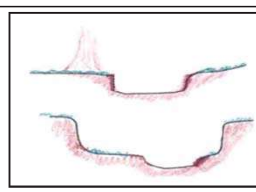
Deeply incised channel or channelized flow; severe incision with flow contained within the banks; majority of banks vertical/undercut. ✓

Ephemeral



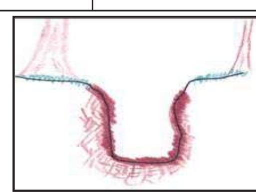
3

Slight incision and unlikely/rarely having access to floodplain or bankfull benches. ☐



2

Moderate incision and no access to floodplain. ☐



1

Deeply incised channel or channelized flow; majority of banks vertical/undercut. ☐

Score: 1

Bank Condition

Left Bank Active Erosion: 40 % Right Bank Active Erosion: 90 % Average: 65

Bank Protection/Stabilization: ☒ Natural ☐ Artificial:

Score: 1

Sediment Deposition

☐ Less than 10% of the bottom covered by excessive sediment deposition; bars with established vegetation (5)

☐ 10–20% of the bottom covered by excessive sediment deposition; few established bars with indicators of recently deposited sediments (4)

☐ 20–30% of the bottom covered by excessive sediment deposition; some deposition on old bars and creating new bars; some sediment deposits at in-stream structures; OR obstructed view of the channel bottom and a lack of other depositional features (3)

☒ 30–50% of the bottom covered by excessive sediment deposition; some newly created bars; moderate sediment deposits at in-stream structures (2)

☐ Greater than 50% of the bottom covered by excessive sediment deposition resulting in aggrading channel (1)

Score: 2

RIPARIAN BUFFER CONDITION

Riparian Buffer - See Table 26 to determine appropriate buffer distance. Confirm in office review.

Identify each buffer type and score using the primary or secondary buffer method of evaluation (see sections 3.3.2.1.2 and 3.3.2.1.4).

Left Bank

Primary Buffer Type	Canopy Cover	Vegetation Community	Land Use	Score	Percentage of Area	Subtotal
1. Forest	80	Native	Low	5	99.8	4.99
2. Road	0	None	Complete	0	0.2	0
3.						
4.						
5.						

Left Bank Primary Buffer Subtotal: 4.99 **X 0.7 = Left Bank Primary Buffer Total** 3.49

Secondary Buffer Type	Canopy Cover	Land Use	Score	Percentage of Area	Subtotal
1. Forest	80	Low	5	85.3	4.27
2. Landfill	0	Complete	0	10.7	0
3. Road	0	Complete	0	3.9	0
4.					
5.					

Left Bank Secondary Buffer Subtotal: 4.27 **X 0.3 = Left Bank Secondary Buffet Total** 1.28

Left Bank Primary Buffer Total + Left Bank Secondary Buffer Total = Composite Buffer Left Bank Metric Score 4.77

Right Bank

Primary Buffer Type	Canopy Cover	Vegetation Community	Land Use	Score	Percentage of Area	Subtotal
1. Forest	80	Native	Low	5	87.9	4.39
2. Road	0	None	Complete	0	8.4	0
3. Landfill	0	None	Complete	0	3.7	0
4.						
5.						

Right Bank Primary Buffer Subtotal: 4.39 **X 0.7 = Right Bank Primary Buffer Total** 3.08

Secondary Buffer Type	Canopy Cover	Land Use	Score	Percentage of Area	Subtotal
1. Forest	80	Low	5	71.7	3.59
2. Landfill	0	Complete	0	21.9	0
3. Road	0	Complete	0	6.3	0
4.					
5.					

Right Bank Secondary Buffer Subtotal: 3.59 **X 0.3 = Right Bank Secondary Buffer Total** 1.08

Right Bank Primary Buffer Total + Right Bank Secondary Buffer Total = Composite Buffer Right Bank Metric Score 4.16

 Stream ID/Name: UT-1B SAR No.: 1

IN-STREAM CONDITION

Substrate Composition (estimate percentages)

Boulder:	Gravel: 30	Fines (silt, clay, muck): 95	Artificial:	Large Woody Debris/Leaf Packs:
Cobble: 5	Sand:	Bedrock (smooth):	Bedrock (fractured):	

Default score due to excessive suspended sediment ☐ **Default score due to depth** ☐ **Score:** 1

In-stream Habitat (check all habitat types that are present and check box for appropriate percent cover at each transect)

Habitat Types by Presence and Cover	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Undercut Banks	✓												
Overhanging Vegetation	✓												
Rootmats													
Rootwads													
Woody Debris/Leaf Packs	✓												
Boulders/Cobbles	✓												
Aquatic Macrophytes													
Bedrock with Interstitial Space													
Artificial Habitat Enhancement													
Other:													
Number Present	4												
Percent Cover in Streams OHWM Width ≤ 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-29% cover (2)	✓												
Transect has 30-50% cover (3)													
Transect has > 50% cover (4)													
Percent Cover Score	2												
Percent Cover in Streams OHWM Width > than 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-14% cover (2)													
Transect has 15-30% cover (3)													
Transect has > 30% cover (4)													
Percent Cover Score													
Habitat Types by Presence	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Riffle/Pool Sequence													
Canopy Cover 70% or Greater													
Natural Step-pools													
Number Present	0												
Total Score	6												

Average: 6 **Score:** 4

HYDROLOGIC CONDITION

Flow Regime

☒ Noticeable surface flow present (4)
☐ Continual pool of water but lacking noticeable flow (3)
☐ Isolated pools and interstitial (subsurface) flow (2)
☐ Isolated pools and no evidence of surface or interstitial flow (1)
☐ Dry channel and no observable pools or interstitial flow (0)
Artificial / altered water source ☐ No ☐ Yes: ______

Score: 4

Channel Flow Status

☐ Water covering greater than 75% of the channel bottom width; less than 25% of channel substrate is exposed (4)
☐ Water covering 50–75% of the channel bottom width; 25–50% of channel substrate is exposed (3)
☒ Water covering 25–50% of the channel bottom width; 50–75% of channel substrate is exposed (2)
☐ Water present but covering less than 25% of the channel bottom width; greater than 75% of channel substrate is exposed (1)
☐ No water present in the channel; 100% of channel substrate exposed (0)

Score: 2

TXRAM STREAM FINAL SCORING SHEET

Project/Site Name/No.: Royal Oaks Landfill Project Type: ☑ Fill/Impact (☑ Linear ☐ Non-linear) ☐ Mitigation/Conservation

Stream ID/Name: UT-1C SAR No.: 1 Size (LF): 296 Date: 2-28-2023 Evaluator(s): DM, JP

Stream Type: Ephemeral Ecoregion: South Central Plains (Piney Woods) Delineation Performed: ☐ Previously ☑ Currently

8-Digit HUC: 1202004 Upper Angelina Watershed Condition (developed, pasture, etc.): Developed Watershed Size: Approx. 75 ac

Aerial Photo Date and Source: 2020 (NAIP) Site Photos: Attached Representative: ☑ Yes ☐ No

Stressor(s): Landfill Are normal climatic/hydrologic conditions present? ☑ Yes ☐ No (If no, explain in Notes)

Notes:

Stream Characteristics

Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank: 4.8	Avg. Banks: 1.2
Avg. Waters Edge: 2.0	Avg. Water: 0.2
Avg. OHWM: 3.0	Avg. OHWM: 0.2

Scoring Table

Core Element	*Metric*	*Metric Score*	*Core Element Score Calculation*	*Core Element Score*
Channel condition	Floodplain connectivity	2	Sum of metric scores / 15 x 30	8.0
	Bank condition	1		
	Sediment deposition	1		
Buffer condition	Composite buffer (left bank)	4.63	Sum of bank scores / 10 x 20	18.2
	Composite buffer (right bank)	4.46		
In-stream condition	Substrate composition	1	Sum of metric scores / 10 x 25	10.0
	In-stream habitat	3		
Hydrologic condition	Flow regime	4	Sum of metric scores / 8 x 25	21.9
	Channel flow status	3		
Sum of core element scores = overall TXRAM stream score				58.1
Additional points for limited habitats = overall TXRAM stream score x 0.025 for each bank (right/left) if: L R ☐ ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				-
Sum of overall TXRAM stream score and additional points = **total overall TXRAM stream score**				58.1

Representative Site Photograph:

View looking upstream along UT-1C.

View looking downstream along UT-1C.

TXRAM STREAM DATA SHEET

Project/Site Name/No.: Royal Oaks Landfill Project Type: ☒ Fill/Impact (☒ Linear ☐ Non-linear) ☐ Mitigation/Conservation

Stream ID/Name: UT-1C SAR No.: 1 Size (LF): 296 Date: 02-28-2023 Evaluator(s): DM, JP

Stream Type: Ephemeral Ecoregion: South Central Plains (Piney Woods) Delineation Performed: ☒ Previously ☐ Currently

8-Digit HUC: 1202004 Upper Angelina Watershed Condition (developed, pasture, etc.): Landfill Watershed Size: Approx. 75 ac

Aerial Photo Date and Source: 2020 (NAIP) Site Photos: Attached Representative: ☒ Yes ☐ No

Stressor(s): Landfill Are normal climatic/hydrologic conditions present? ☒ Yes ☐ No (If no, explain in Notes)

Stream Characteristics

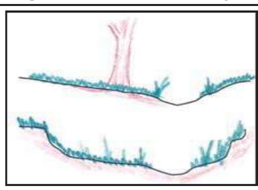
Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank 4.8 ft	Avg. Banks: 1.2 ft
Avg. Waters Edge: 2.0 ft	Avg. Water: 0.2 ft
Avg. OHWM: 3.0 ft	Avg. OHWM: 0.2 ft

Notes:

CHANNEL CONDITION

Floodplain Connectivity

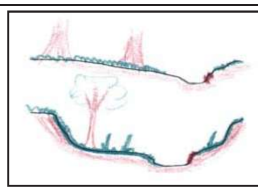
Perennial / Intermittent



6 / 5

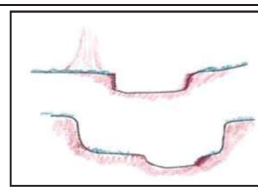
Very little incision and access to the original floodplain or fully developed wide bankfull benches scores a "5" for this metric. ☐

Very little incision and access to the original floodplain with significant floodplain connection indications (i.e., riverine wetlands) score a "6" for this metric. ☐



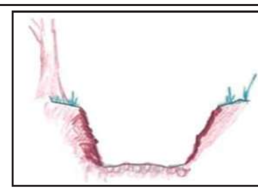
4

Slight incision and likely having regular (i.e., at least once a year) access to bankfull benches or newly developed floodplains along majority of the reach. ☐



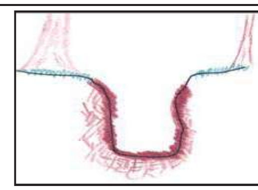
3

Moderate incision and presence of near vertical/ undercut banks; irregular (i.e., greater than 2 year return interval) access to floodplain or possible access to floodplain or bankfull benches at isolated areas. ☐



2

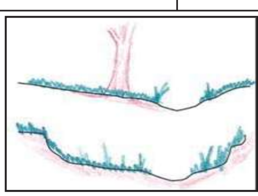
Overwidened or incised channel and likely to widen further; majority of both banks near vertical/undercut; unlikely/rarely having access to floodplain or bankfull benches. ☐



1

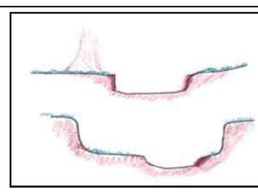
Deeply incised channel or channelized flow; severe incision with flow contained within the banks; majority of banks vertical/undercut. ☐

Ephemeral



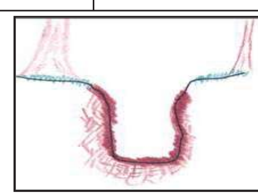
3

Slight incision and unlikely/rarely having access to floodplain or bankfull benches. ☐



2

Moderate incision and no access to floodplain. ✓



1

Deeply incised channel or channelized flow; majority of banks vertical/undercut. ☐

Score: 2

Bank Condition

Left Bank Active Erosion: 40 % Right Bank Active Erosion: 50 % Average: 45

Bank Protection/Stabilization: ☒ Natural ☐ Artificial:

Score: 1

Sediment Deposition

☐ Less than 10% of the bottom covered by excessive sediment deposition; bars with established vegetation (5)

☐ 10–20% of the bottom covered by excessive sediment deposition; few established bars with indicators of recently deposited sediments (4)

☐ 20–30% of the bottom covered by excessive sediment deposition; some deposition on old bars and creating new bars; some sediment deposits at in-stream structures; OR obstructed view of the channel bottom and a lack of other depositional features (3)

☐ 30–50% of the bottom covered by excessive sediment deposition; some newly created bars; moderate sediment deposits at in-stream structures (2)

☒ Greater than 50% of the bottom covered by excessive sediment deposition resulting in aggrading channel (1)

Score: 1

RIPARIAN BUFFER CONDITION

Riparian Buffer - See Table 26 to determine appropriate buffer distance. Confirm in office review.

Identify each buffer type and score using the primary or secondary buffer method of evaluation (see sections 3.3.2.1.2 and 3.3.2.1.4).

Left Bank

Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Forest	80	Native	Low	5	92.7	4.63
2. Road	0	None	Complete	0	6.3	0.00
3.						
4.						
5.						

Left Bank Primary Buffer Subtotal: 4.63 **X 0.7 = Left Bank Primary Buffer Total** 3.24

Secondary Buffer Type	*Canopy Cover*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Forest	80	Low	5	92.6	4.63
2. Road	0	Complete	0	7.4	0
3.					
4.					
5.					

Left Bank Secondary Buffer Subtotal: 4.63 **X 0.3 = Left Bank Secondary Buffet Total** 1.39

Left Bank Primary Buffer Total + Left Bank Secondary Buffer Total = Composite Buffer Left Bank Metric Score 4.63

Right Bank

Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Forest	80	Native	Low	5	87.5	4.38
2. Road	0	None	Complete	0	12.5	0
3.						
4.						
5.						

Right Bank Primary Buffer Subtotal: 4.38 **X 0.7 = Right Bank Primary Buffer Total** 3.06

Secondary Buffer Type	*Canopy Cover*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Forest	80	Low	5	93.6	4.68
2. Road	0	Complete	0	6.4	0
3.					
4.					
5.					

Right Bank Secondary Buffer Subtotal: 4.68 **X 0.3 = Right Bank Secondary Buffer Total** 1.40

Right Bank Primary Buffer Total + Right Bank Secondary Buffer Total = Composite Buffer Right Bank Metric Score 4.46

Stream ID/Name: UT-1C SAR No.: 1

IN-STREAM CONDITION

Substrate Composition (estimate percentages)

Boulder: 5	Gravel:	Fines (silt, clay, muck): 95	Artificial:	Large Woody Debris/Leaf Packs:
Cobble:	Sand:	Bedrock (smooth):	Bedrock (fractured):	

Default score due to excessive suspended sediment ☐ **Default score due to depth** ☐ **Score:** 1

In-stream Habitat (check all habitat types that are present and check box for appropriate percent cover at each transect)

Habitat Types by Presence and Cover	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Undercut Banks													
Overhanging Vegetation	✓	✓											
Rootmats			✓										
Rootwads		✓											
Woody Debris/Leaf Packs	✓												
Boulders/Cobbles													
Aquatic Macrophytes													
Bedrock with Interstitial Space													
Artificial Habitat Enhancement													
Other:													
Number Present	2	2	1										
Percent Cover in Streams OHWM Width ≤ 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-29% cover (2)	✓	✓	✓										
Transect has 30-50% cover (3)													
Transect has > 50% cover (4)													
Percent Cover Score	2	2	2										
Percent Cover in Streams OHWM Width > than 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-14% cover (2)													
Transect has 15-30% cover (3)													
Transect has > 30% cover (4)													
Percent Cover Score													
Habitat Types by Presence	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Riffle/Pool Sequence													
Canopy Cover 70% or Greater		✓	✓										
Natural Step-pools													
Number Present	0	1	1										
Total Score	4	5	4										

Average: 4.33 **Score:** 3

HYDROLOGIC CONDITION

Flow Regime

- ☒ Noticeable surface flow present (4)
- ☐ Continual pool of water but lacking noticeable flow (3)
- ☐ Isolated pools and interstitial (subsurface) flow (2)
- ☐ Isolated pools and no evidence of surface or interstitial flow (1)
- ☐ Dry channel and no observable pools or interstitial flow (0)
- Artificial / altered water source ☐ No ☐ Yes: ________

Score: 4

Channel Flow Status

- ☐ Water covering greater than 75% of the channel bottom width; less than 25% of channel substrate is exposed (4)
- ☒ Water covering 50–75% of the channel bottom width; 25–50% of channel substrate is exposed (3)
- ☐ Water covering 25–50% of the channel bottom width; 50–75% of channel substrate is exposed (2)
- ☐ Water present but covering less than 25% of the channel bottom width; greater than 75% of channel substrate is exposed (1)
- ☐ No water present in the channel; 100% of channel substrate exposed (0)

Score: 3

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TXRAM STREAM FINAL SCORING SHEET

Project/Site Name/No.: Royal Oaks Landfill Project Type: ☑ Fill/Impact (☑ Linear ☐ Non-linear) ☐ Mitigation/Conservation

Stream ID/Name: UT-1D SAR No.: 1 Size (LF): 68 Date: 2-28-2023 Evaluator(s): DM, JP

Stream Type: Intermittent Ecoregion: South Central Plains (Piney Woods) Delineation Performed: ☐ Previously ☑ Currently

8-Digit HUC: 1202004 Upper Angelina Watershed Condition (developed, pasture, etc.): Developed Watershed Size: Approx. 80 ac

Aerial Photo Date and Source: 2020 (NAIP) Site Photos: Attached Representative: ☑ Yes ☐ No

Stressor(s): Landfill Are normal climatic/hydrologic conditions present? ☑ Yes ☐ No (If no, explain in Notes)

Notes:

Stream Characteristics

Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank: 10.3	Avg. Banks: 5.5
Avg. Waters Edge: 2.9	Avg. Water: 0.3
Avg. OHWM: 4.1	Avg. OHWM: 0.5

Scoring Table

Core Element	*Metric*	*Metric Score*	*Core Element Score Calculation*	*Core Element Score*
Channel condition	Floodplain connectivity	1	Sum of metric scores / 15 x 30	8.0
	Bank condition	1		
	Sediment deposition	2		
Buffer condition	Composite buffer (left bank)	4.11	Sum of bank scores / 10 x 20	16.5
	Composite buffer (right bank)	4.12		
In-stream condition	Substrate composition	4	Sum of metric scores / 10 x 25	17.5
	In-stream habitat	3		
Hydrologic condition	Flow regime	4	Sum of metric scores / 8 x 25	21.9
	Channel flow status	3		
Sum of core element scores = overall TXRAM stream score				63.8
Additional points for limited habitats = overall TXRAM stream score x 0.025 for each bank (right/left) if: L R ☐ ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				-
Sum of overall TXRAM stream score and additional points = **total overall TXRAM stream score**				63.8

Representative Site Photograph:

View looking downstream along UT-1D.

View looking downstream along UT-1D.

Version 2.0 - Final

TXRAM STREAM DATA SHEET

Project/Site Name/No.: Royal Oaks Landfill Project Type: ☒ Fill/Impact (☒ Linear ☐ Non-linear) ☐ Mitigation/Conservation

Stream ID/Name: UT-1D SAR No.: 1 Size (LF): 394 Date: 02-28-2023 Evaluator(s): DM, JP

Stream Type: Intermittent Ecoregion: South Central Plains (Piney Woods) Delineation Performed: ☒ Previously ☐ Currently

8-Digit HUC: 1202004 Upper Angelina Watershed Condition (developed, pasture, etc.): Landfill Watershed Size: Approx. 80 ac

Aerial Photo Date and Source: 2020 (NAIP) Site Photos: Attached Representative: ☒ Yes ☐ No

Stressor(s): Landfill Are normal climatic/hydrologic conditions present? ☒ Yes ☐ No (If no, explain in Notes)

Stream Characteristics

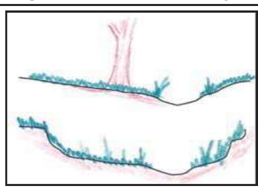
Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank 10.3 ft	Avg. Banks: 5.5 ft
Avg. Waters Edge: 2.9 ft	Avg. Water: 0.3 ft
Avg. OHWM: 4.1 ft	Avg. OHWM: 0.5 ft

Notes:

CHANNEL CONDITION

Floodplain Connectivity

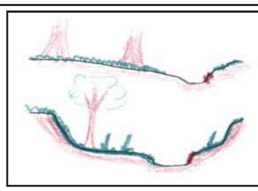
Perennial / Intermittent



6 / 5

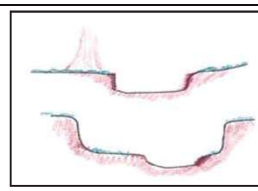
Very little incision and access to the original floodplain or fully developed wide bankfull benches scores a “5” for this metric. ☐

Very little incision and access to the original floodplain with significant floodplain connection indications (i.e., riverine wetlands) score a “6” for this metric. ☐



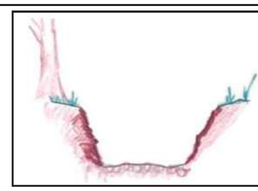
4

Slight incision and likely having regular (i.e., at least once a year) access to bankfull benches or newly developed floodplains along majority of the reach. ☐



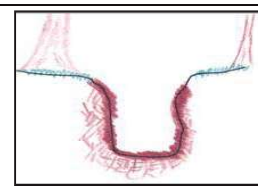
3

Moderate incision and presence of near vertical/ undercut banks; irregular (i.e., greater than 2 year return interval) access to floodplain or possible access to floodplain or bankfull benches at isolated areas. ☐



2

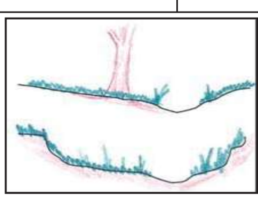
Overwidened or incised channel and likely to widen further; majority of both banks near vertical/undercut; unlikely/rarely having access to floodplain or bankfull benches. ☐



1

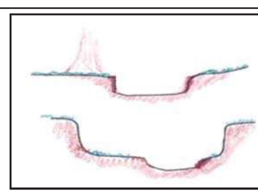
Deeply incised channel or channelized flow; severe incision with flow contained within the banks; majority of banks vertical/undercut. ✓

Ephemeral



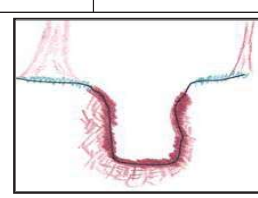
3

Slight incision and unlikely/rarely having access to floodplain or bankfull benches. ☐



2

Moderate incision and no access to floodplain. ☐



1

Deeply incised channel or channelized flow; majority of banks vertical/undercut. ☐

Score: 1

Bank Condition

Left Bank Active Erosion: 40 % Right Bank Active Erosion: 90 % Average: 65

Bank Protection/Stabilization: ☒ Natural ☐ Artificial:

Score: 1

Sediment Deposition

☐ Less than 10% of the bottom covered by excessive sediment deposition; bars with established vegetation (5)

☐ 10–20% of the bottom covered by excessive sediment deposition; few established bars with indicators of recently deposited sediments (4)

☐ 20–30% of the bottom covered by excessive sediment deposition; some deposition on old bars and creating new bars; some sediment deposits at in-stream structures; OR obstructed view of the channel bottom and a lack of other depositional features (3)

☒ 30–50% of the bottom covered by excessive sediment deposition; some newly created bars; moderate sediment deposits at in-stream structures (2)

☐ Greater than 50% of the bottom covered by excessive sediment deposition resulting in aggrading channel (1)

Score: 2

RIPARIAN BUFFER CONDITION

Riparian Buffer - See Table 26 to determine appropriate buffer distance. Confirm in office review.

Identify each buffer type and score using the primary or secondary buffer method of evaluation (see sections 3.3.2.1.2 and 3.3.2.1.4).

Left Bank

Primary Buffer Type	Canopy Cover	Vegetation Community	Land Use	Score	Percentage of Area	Subtotal
1. Forest	80	Native	Moderate	4	79	3.95
2. Road	0	None	Complete	0	21	0.00
3.						
4.						
5.						

Left Bank Primary Buffer Subtotal: 3.95 **X 0.7 = Left Bank Primary Buffer Total** 2.76

Secondary Buffer Type	Canopy Cover	Land Use	Score	Percentage of Area	Subtotal
1. Forest	80	Low	5	89.9	4.50
2. Road	0	Complete	0	10.1	0
3.					
4.					
5.					

Left Bank Secondary Buffer Subtotal: 4.50 **X 0.3 = Left Bank Secondary Buffet Total** 1.35

Left Bank Primary Buffer Total + Left Bank Secondary Buffer Total = Composite Buffer Left Bank Metric Score 4.77

Right Bank

Primary Buffer Type	Canopy Cover	Vegetation Community	Land Use	Score	Percentage of Area	Subtotal
1. Forest	80	Native	Low	5	79.1	3.95
2. Road	0	None	Complete	0	20.9	0
3.						
4.						
5.						

Right Bank Primary Buffer Subtotal: 3.95 **X 0.7 = Right Bank Primary Buffer Total** 2.77

Secondary Buffer Type	Canopy Cover	Land Use	Score	Percentage of Area	Subtotal
1. Forest	80	Low	5	90.1	4.50
2. Road	0	Complete	0	9.9	0
3.					
4.					
5.					

Right Bank Secondary Buffer Subtotal: 4.50 **X 0.3 = Right Bank Secondary Buffer Total** 1.35

Right Bank Primary Buffer Total + Right Bank Secondary Buffer Total = Composite Buffer Right Bank Metric Score 4.16

Stream ID/Name: UT-1D SAR No.: 1

IN-STREAM CONDITION

Substrate Composition (estimate percentages)

Boulder:	Gravel: 30	Fines (silt, clay, muck): 95	Artificial:	Large Woody Debris/Leaf Packs:
Cobble: 5	Sand:	Bedrock (smooth):	Bedrock (fractured):	

Default score due to excessive suspended sediment ☐ **Default score due to depth** ☐ **Score:** 1

In-stream Habitat (check all habitat types that are present and check box for appropriate percent cover at each transect)

Habitat Types by Presence and Cover	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Undercut Banks	✓												
Overhanging Vegetation	✓												
Rootmats													
Rootwads													
Woody Debris/Leaf Packs	✓												
Boulders/Cobbles	✓												
Aquatic Macrophytes													
Bedrock with Interstitial Space													
Artificial Habitat Enhancement													
Other:													
Number Present	4												
Percent Cover in Streams OHWM Width ≤ 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-29% cover (2)	✓												
Transect has 30-50% cover (3)													
Transect has > 50% cover (4)													
Percent Cover Score	2												
Percent Cover in Streams OHWM Width > than 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-14% cover (2)													
Transect has 15-30% cover (3)													
Transect has > 30% cover (4)													
Percent Cover Score													
Habitat Types by Presence	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Riffle/Pool Sequence													
Canopy Cover 70% or Greater													
Natural Step-pools													
Number Present	0												
Total Score	6												

Average: 6 **Score:** 4

HYDROLOGIC CONDITION

Flow Regime

☒ Noticeable surface flow present (4)
☐ Continual pool of water but lacking noticeable flow (3)
☐ Isolated pools and interstitial (subsurface) flow (2)
☐ Isolated pools and no evidence of surface or interstitial flow (1)
☐ Dry channel and no observable pools or interstitial flow (0)
Artificial / altered water source ☐ No ☐ Yes: ______________

Score: 4

Channel Flow Status

☐ Water covering greater than 75% of the channel bottom width; less than 25% of channel substrate is exposed (4)
☐ Water covering 50–75% of the channel bottom width; 25–50% of channel substrate is exposed (3)
☒ Water covering 25–50% of the channel bottom width; 50–75% of channel substrate is exposed (2)
☐ Water present but covering less than 25% of the channel bottom width; greater than 75% of channel substrate is exposed (1)
☐ No water present in the channel; 100% of channel substrate exposed (0)

Score: 2

TXRAM WETLAND FINAL SCORING SHEET

Project/Site Name/No.: Northeast Landfill Project Type: ■ Fill/Impact (☐ Linear ■ Non-linear) ☐ Mitigation/Conservation

Wetland ID/Name: A WAA No.: 1 Size: 0.4 Acres Date: 4-15-2020 Evaluator(s): CRK, DTM

Wetland Type: Riverine, PSS Ecoregion: N/A Delineation Performed: ☐ Previously ■ Currently

Aerial Photo Date and Source: 2018 (BING), 2017 (NAIP) Site Photos: March 17, 2020 Representative: ■ Yes ☐ No

Notes: Permanent Scrub-Shrub Wetland Impact

Core Element	***Metric***	***Metric Score***	***Core Element Score Calculation***	***Core Element Score***
Landscape	Aquatic Context	2	Sum of metric scores / 8 x 15	7.5
	Buffer	2		
Hydrology	Water source	1	Sum of metric scores / 12 x 30	10
	Hydroperiod	1		
	Hydrologic flow	2		
Soils	Organic matter	1	Sum of metric scores / 12 x 15	2.5
	Sedimentation	1		
	Soil modification	0		
Physical Structure	Topographic complexity	2	Sum of metric scores / 12 x 20	8.3
	Edge complexity	2		
	Physical habitat richness	1		
Biotic Structure	Plant strata	2	Sum of metric scores / 28 x 20	11.4
	Species richness	1		
	Non-native/invasive infestation	4		
	Interspersion	2		
	Strata overlap	2		
	Herbaceous cover	3		
	Vegetation alterations	2		
Sum of core element scores = overall TXRAM wetland score				39.7
Additional points for unique resources = overall TXRAM wetland score x 0.10 if: ☐ Area of Caddo Lake designated a “Wetland of International Importance” under the Ramsar Convention ☐ Bald cypress – water tupelo swamp ☐ Pitcher plant bog ☐ Spring				Not Applicable
Additional points for limited habitats = overall TXRAM wetland score x 0.05 if: ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				Not Applicable
Sum of overall TXRAM wetland score and additional points = **total overall TXRAM wetland score**				**39.7**

Representative Site Photograph:

Scrub-shrub Wetland A looking north.

Scrub-shrub Wetland A looking southwest.

TXRAM WETLAND DATA SHEET

Project/Site Name/No.: Royal Oaks Landfill Project Type: ■ Fill/Impact (☐ Linear ■ Non-linear) ☐ Mitigation/Conservation

Wetland ID/Name: A WAA No.: 1 Size: 0.37 Acres Date: 2-28-2023 Evaluator(s): DM, JP

Wetland Type: Depressional, PSS Ecoregion: South Central Plains (Piney Woods) Delineation Performed: ■ Previously ☐ Currently

Aerial Photo Date and Source: 2020 (NAIP) Site Photos: Attached Representative: ■ Yes ☐ No

Notes:

LANDSCAPE

Aquatic Context – Confirm in office review. See figures in section 2.3.1.1 for examples.

Notes on any barriers or alterations that prevent connection: Two roads with culverts, heavy disturbance from landfill activities.

Aquatic resources within 1,000 feet of WAA to which wetland connects (including number for other considerations): 2 **Score:** 2

Buffer – Evaluate to 500 feet from WAA boundary. Confirm in office review. See figures in section 2.3.1.2 for examples.

Buffer Type/Description	*Score (See Narratives)*	*Percentage*	*Subtotal*
1. Forested	4	50%	2.0
2. Landfill	0	40%	0.0
3. Soil Excavation	0	10%	0.0
4.			
5.			

Score: 2.0

HYDROLOGY

Water Source – Degree of natural or unnatural/artificial influence. Confirm in office review for watershed.

Natural: ☐ Precipitation ☐ Groundwater ■ Overbank flow/stream discharge ■ Overland flow ☐ Beaver activity ☐ Other:

Unnatural/Manipulated: ■ Impoundment ☐ Outfall ☐ Irrigation/pumping ☐ Other artificial influence or control:

Watershed: ■ Development ☐ Irrigated agriculture ☐ Wastewater treatment plant ☐ Impoundment ■ Other: Landfill

Degree of artificial influence/control: ■ Complete ☐ High ☐ Low ☐ None

Wetland created/restored/enhanced: ☐ Sustainable/replicates natural ☐ Controlled **Score:** 1

Hydroperiod – Variability and recent alteration of the duration, frequency, and magnitude of inundation/saturation.

Evaluate the hydroperiod including natural variation: Low variability

Direct evidence of alteration: Natural: ☐ Log-jam ☐ Channel migration ■ Other: Excavated

Human: ☐ Diversions ☐ Ditches ☐ Levees ■ Impoundments ☐ Other:

Riverine only: ☐ Recent channel in-stability/dis-equilibrium (☐ Degradation or ☐ Aggradation)

Indirect evidence of alteration: ☐ Wetland plant stress: ☐ Plant morphology:

☐ Upland species encroachment: ☐ Plant Community: ■ Soil: Disturbed soils

Change/Alteration of hydroperiod: ☐ None ☐ Due to natural events ■ Human influences (☐ Slight or ■ High)

Degree hydroperiod of wetland created/restored/enhanced replicates natural patterns:

Lacustrine fringe on human impoundment: ☐ High variability ☐ Low variability ☐ Recent changes to hydroperiod **Score:** 1

Hydrologic Flow – Movement of water to or from surrounding area and openness to water moving through the WAA.

Flow: ■ Inlets: 1 ☐ Outlets: 1 ■ Signs of water movement to or from WAA: Flow through site (UT-1A to UT-1B)

Restrictions: ☐ Levee ☐ Berm/dam ☐ Diversion ■ Other: Road with culvert

High flowthrough: ☐ Floodplain ■ Drift deposits ■ Drainage patterns ■ Sediment deposits ☐ Other:

Low flowthrough: ■ High landscape position ☐ Stagnant water ■ Closed contours ☐ Other: **Score:** 2

SOILS

Organic Matter – Use data and indicators from wetland determination data form(s) based on applicable regional supplement.

☐ High (organic soil or indicator A1, A2, A3)

☐ Moderate (indicator A9, S1, F1 in AW or A9, S1, S2, F1 in GP or A6, A7, A9, S7, F13 in AGCP)

☐ Low (indicated by thin organic or organic-mineral layer) ■ None observable in surface layer as described herein **Score:** 1

Sedimentation – Deposition of excess sediment due to human actions. Confirm in office review for landscape.

Landscape with stress that could lead to excess sedimentation? ☒ Yes ☐ No — Landscape position: ☐ High ☒ Low

Magnitude of recent runoff/flooding events: ☒ High ☐ Low — Percent of WAA with excess sediment deposition: 70

☐ Sand deposits: ____% of area, ____ average thickness — ☒ Silt/Clay deposits: 100 % of area, 4 in. average thickness

Lacustrine fringe only: ☐ Upper end of impoundment ☐ Degrades wetland ☐ Contributes to wetland processes — **Score:** 1

Soil Modification – Physical changes by human activities. Confirm in office review for past.

Type (Check those applicable and circle R for recent or P for past): ☐ Farming R/P ☐ Logging R/P ☒ Mining R/P ☒ Filling R/P

☐ Grading R/P ☐ Dredging R/P ☐ Off-road vehicles R/P ☒ Other R/P: Impoundment/Borrow Area

Percent of WAA with recent soil modification: 100 % — Degree of modification: ☒ High ☐ Low

Indicators of past modification: ☐ High bulk density ☐ Low organic matter ☒ Lack of soil structure ☒ Lack of horizons ☐ Hardpan

☐ Dramatic change in texture/color ☐ Heterogeneous mixture ☐ Other: ____

Indicators of recovery: ☐ Organic matter ☐ Structure ☐ Horizons ☐ Mottling ☐ Hydric soil ☐ Other: None

Percent of WAA with past modification: 100 % — Recovery: ☐ Complete ☐ High ☐ Moderate ☒ Low ☐ None — **Score:** 0

PHYSICAL STRUCTURE

Topographic Complexity – See figures in section 2.3.4.1. Record % micro-topography and % WAA for each elevation gradient.

Elevation gradients (EG): 2 — Evidence: ☒ Plant assemblages ☒ Level of saturation/inundation ☒ Path of water flow ☐ Slope

Micro-topography: 10 % of WAA (By EG: EG1: 5%; EG2: 5%)

Types: ☒ Depressions ☐ Pools ☐ Burrows ☐ Swales ☐ Wind-thrown tree holes ☐ Mounds ☐ Gilgai ☐ Islands

☐ Variable shorelines ☒ Partially buried debris ☐ Debris jams ☐ Plant hummocks/roots ☐ Other: ____ — **Score:** 2

Edge Complexity – Confirm in office review. See figure in section 2.3.4.2 to evaluate wetland boundary.

WAA: ☒ In seasonal floodplain ☐ Contiguous to other wetland — ☒ Edge vertical structure variation: Low

Horizontal variability: ☐ High ☐ Moderate ☒ Low ☐ None — **Score:** 2

Physical Habitat Richness – See definitions and table in section 2.3.4.3 for habitat types applicable to each wetland type.

Label of habitat types qualifying as present in WAA: Seasonally inundated swales — Total: 1 — **Score:** 1

BIOTIC STRUCTURE

Plant Strata – Use applicable wetland delineation regional supplement and data from determination data form(s).

Number of plant strata: ☐ ≥ 4 ☐ 3 ☒ 2 ☐ 1 ☐ 0 — **Score:** 2

Species Richness – Use data from determination data form(s) to count species with 5% or more relative cover in a stratum.

Number of species across all strata and determination data forms (not counting a species more than once): 3 — **Score:** 1

Non-Native/Invasive Infestation – Use data from determination data form(s). See tables in section 2.3.5.3 for examples.

Average total relative cover of non-native/invasive species across all strata and determination data forms: 0 % — **Score:** 4

Interspersion – Confirm in office review. Use figure in section 2.3.5.4 to determine the degree of interspersion of plant zones.

Degree of horizontal/plan view interspersion: ☐ High ☐ Moderate ☒ Low ☐ None ☐ Bottomland hardwood forest — **Score:** 3

Strata Overlap – Use strata defined in plant strata metric using applicable regional supplement. See figures in section 2.3.5.5.

High overlap (≥ 3 strata overlapping): 0 % of WAA — Moderate overlap (2 strata overlapping): 50 % of WAA

Herbaceous species/dense litter overlap (only in portion where there are no other strata overlapping): 40 % of WAA

Total percentage of WAA with some form of overlap (if more than one present): 90 % of WAA — **Score:** 2

Herbaceous Cover – Estimate for entire WAA. In South Central Plains or East Central Texas Plains: ☐ Bottomland hardwood forest

Total cover of emergent and submergent plants: ☐ > 75% ☒ 51–75% ☐ 26–50% ☐ ≤ 25% — **Score:** 3

Vegetation Alterations – Unnatural (human-caused) stressors. Confirm in office review for past.

Type (Check those applicable and circle R for recent or P for past): ☐ Disking R/P ☐ Mowing/shredding R/P ☐ Logging R/P

☐ Cutting R/P ☐ Trampling R/P ☐ Herbicide treatment R/P ☐ Herbivory R/P ☐ Disease R/P ☐ Chemical spill R/P

☐ Pollution R/P ☐ Feral hog rooting R/P ☐ Woody debris removal R/P ☒ Other R/P: Excavation

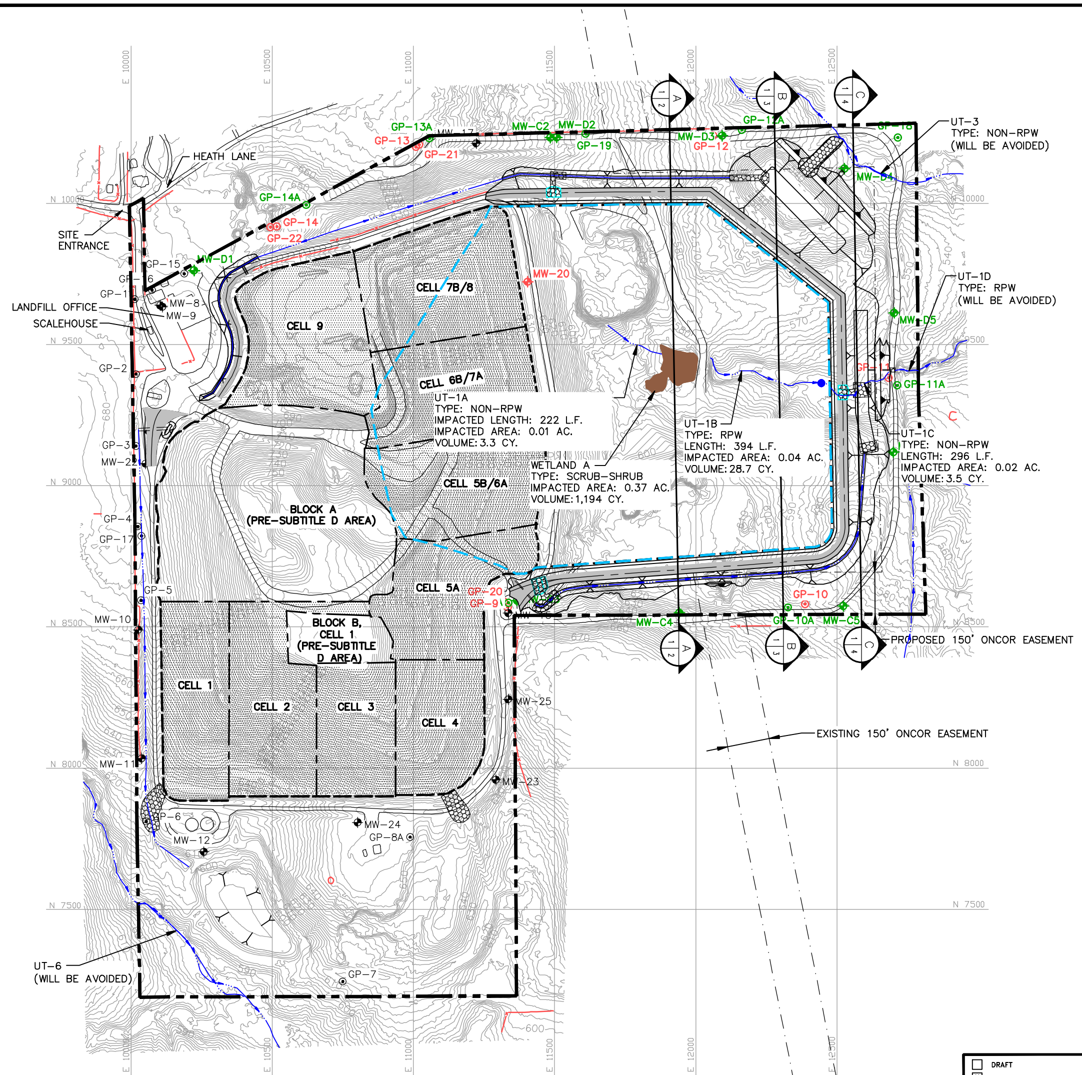
Percent of WAA with recent vegetation alteration: 10 % — Severity of alteration: ☐ High ☒ Low

Percent of WAA with past vegetation alteration: 100 % — Degree of recovery: ☐ Complete ☐ High ☒ Moderate ☐ Low

☐ Alteration to improve wetland (degree of natural community recovery): ____ — **Score:** 2

APPENDIX C

PROJECT DESIGN DETAILS



LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMIT OF WASTE
- NEWLY PERMITTED AIRSPACE LIMIT OF WASTE
- CELL BOUNDARY
- SITE GRID
- EXISTING CONTOUR (SEE NOTE 1)
- EXISTING EASEMENT
- PROPOSED EASEMENT (SEE NOTE 6)
- EXISTING FENCE
- EXISTING SUBTITLE D COMPOSITE LINED AREA
- MW-10 EXISTING GROUNDWATER MONITORING WELL
- MW-21 EXISTING GROUNDWATER MONITORING WELL (TO BE DECOMMISSIONED)
- MW-D1 PROPOSED GROUNDWATER MONITORING WELL
- GP-1 EXISTING GAS PROBE
- GP-10 EXISTING GAS PROBE (TO BE DECOMMISSIONED)
- GP-10A PROPOSED GAS PROBE

NOTES:

1. EXISTING CONTOURS DEVELOPED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN NOVEMBER 10, 2022.
2. PERMIT BOUNDARY WAS REPRODUCED FROM LEGAL DESCRIPTION PROVIDED BY STANGER SURVEYING COMPANY, DATED APRIL 1995.

FEATURE	TYPE	AREA (AC.)	VOLUME OF FILL (CY.)
WETLAND A	SCRUB-SHRUB	0.37	1,194
UT-1A	NON-RPW	0.01	3.3
UT-1B	RPW	0.04	28.7
UT-1C	NON-RPW	0.02	3.5

☐ DRAFT
☒ FOR INFORMATION PURPOSES ONLY
☐ ISSUED FOR CONSTRUCTION

DATE: 01/2023
FILE: 0120-76-11
CAD: 4-SITE PLAN.DWG

DRAWN BY: JDW
DESIGN BY: SAB
REVIEWED BY: KDG

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

REVISIONS

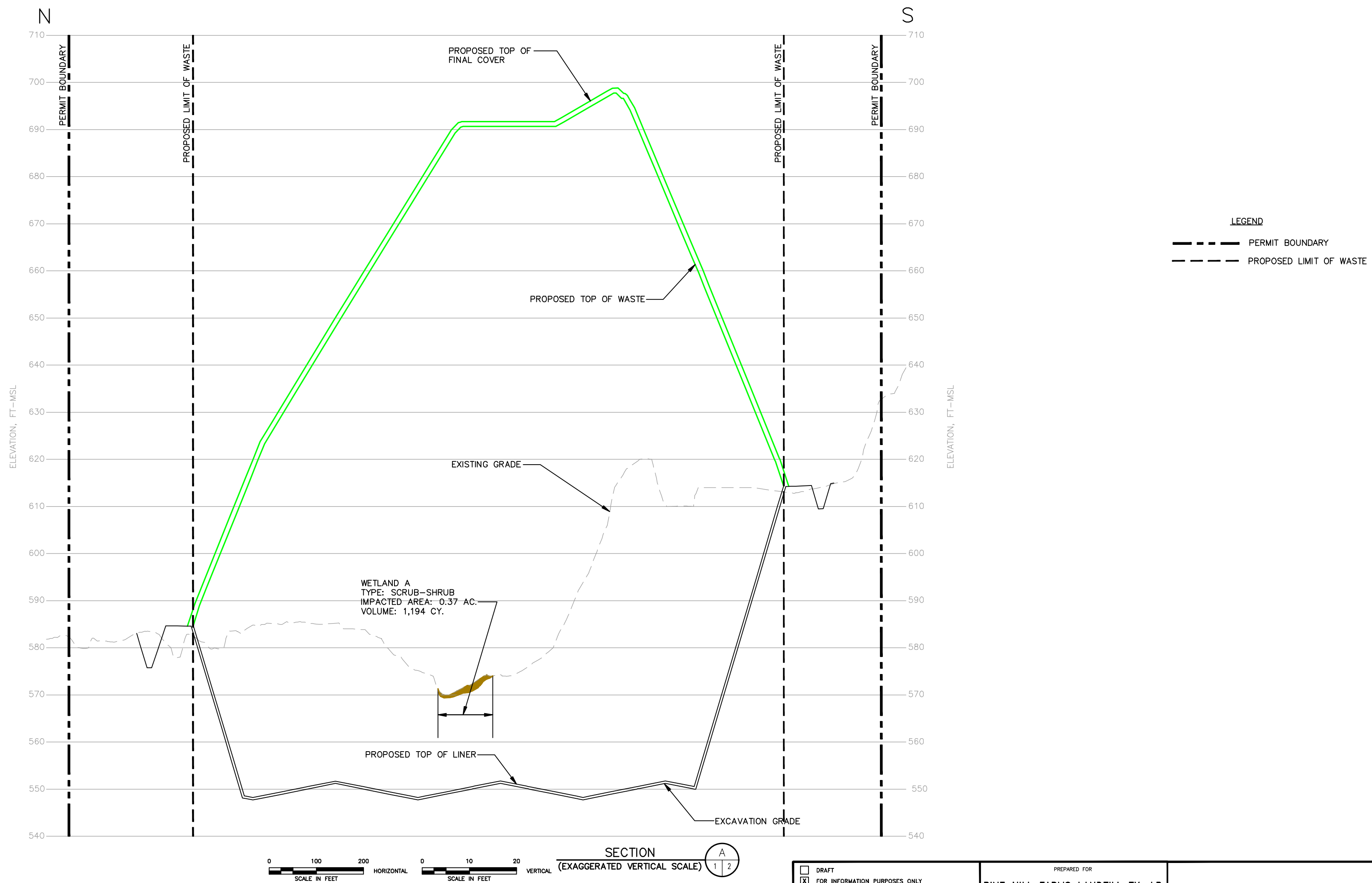
NO.	DATE	DESCRIPTION

SITE PLAN

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

WWW.WCGRP.COM

FIGURE 1



☐ DRAFT
☒ FOR INFORMATION PURPOSES ONLY
☐ ISSUED FOR CONSTRUCTION

DATE: 01/2023
FILE: 0120–76–11
CAD: 4–SITE PLAN.DWG

DRAWN BY: JDW
DESIGN BY: SAB
REVIEWED BY: KDG

Weaver Consultants Group
TBPE REGISTRATION NO. F–3727

PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

REVISIONS

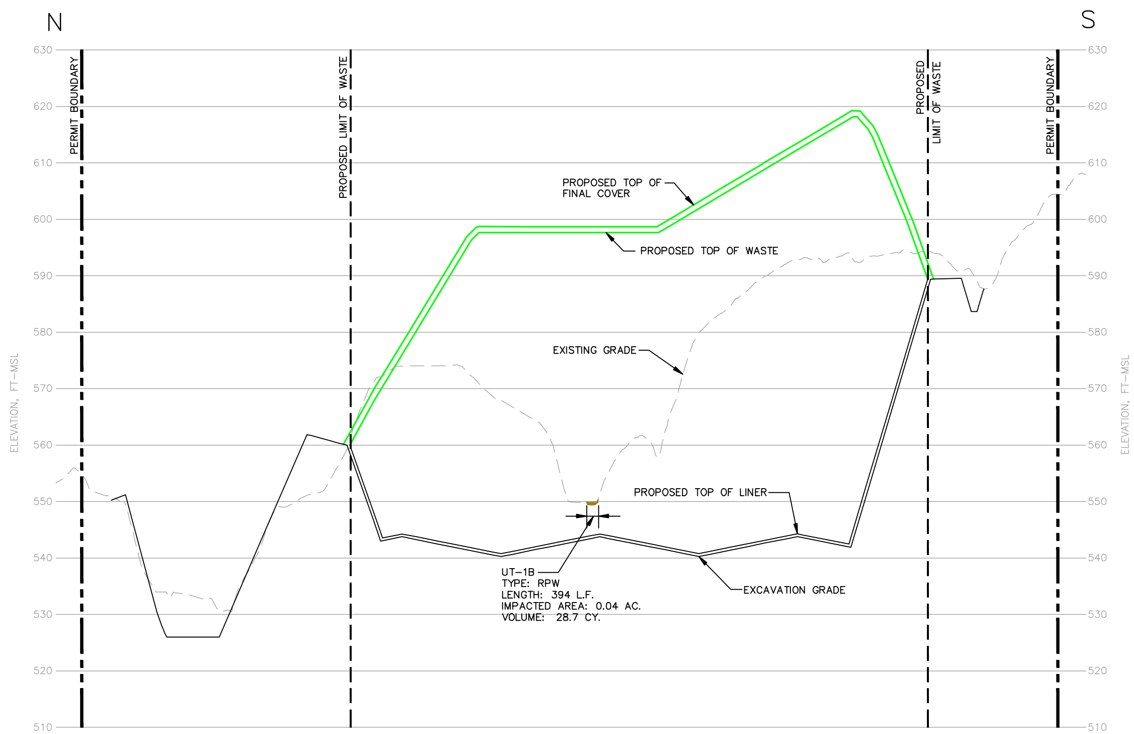
NO.	DATE	DESCRIPTION

CROSS SECTION A

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

WWW.WCGRP.COM

FIGURE 2



LEGEND

PERMIT BOUNDARY

PROPOSED LIMIT OF WASTE

0 100 200 SCALE IN FEET HORIZONTAL

0 10 20 SCALE IN FEET VERTICAL

SECTION B 1 3
(EXAGGERATED VERTICAL SCALE)

☐ DRAFT
☒ FOR INFORMATION PURPOSES ONLY
☐ ISSUED FOR CONSTRUCTION

DATE: 01/2023
FILE: 0120-76-11
CAD: 4-SITE PLAN.DWG

DRAWN BY: JDW
DESIGN BY: SAB
REVIEWED BY: KDG

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION

CROSS SECTION B

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

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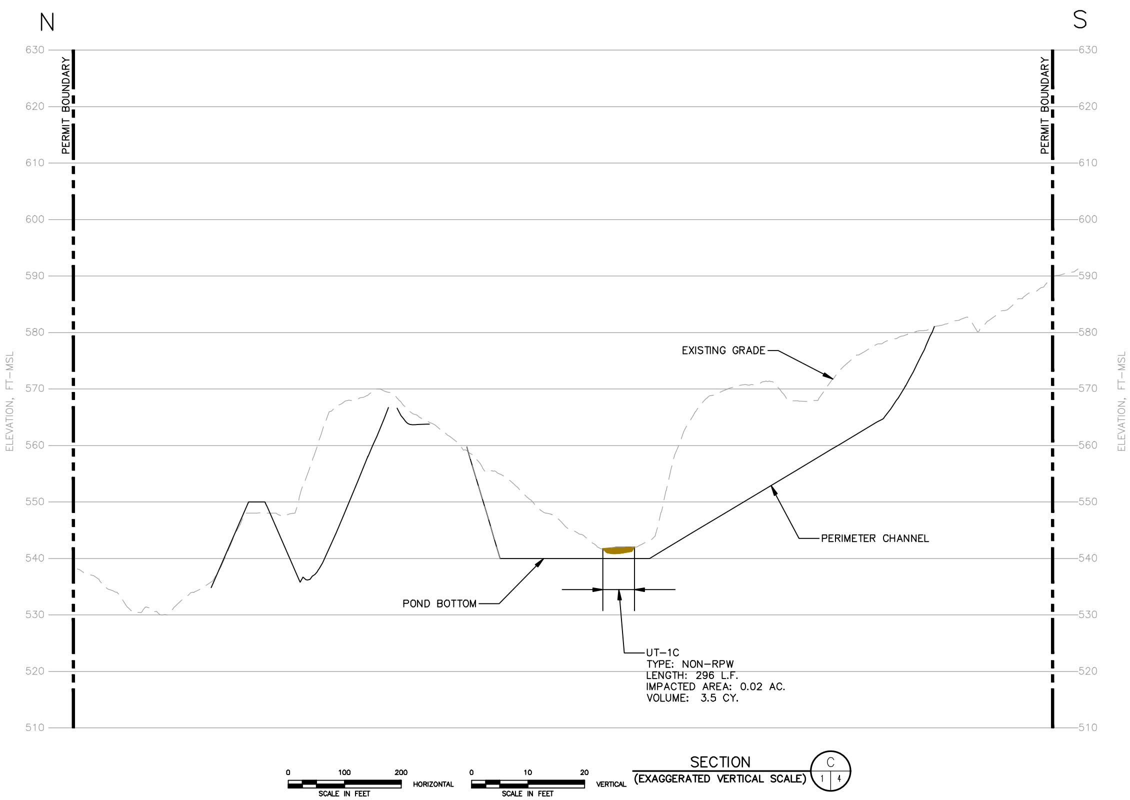
FIGURE 3



☐ DRAFT
☒ FOR INFORMATION PURPOSES ONLY
☐ ISSUED FOR CONSTRUCTION

DATE: 01/2023
FILE: 0120-76-11
CAD: 4-SITE PLAN.DWG

DRAWN BY: JDW
DESIGN BY: SAB
REVIEWED BY: KDG

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION

CROSS SECTION C

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

WWW.WCGRP.COM

FIGURE 4

APPENDIX D

THREATENED AND ENDANGERED SPECIES HABITAT EVALUATION

THREATENED AND ENDANGERED SPECIES HABITAT EVALUATION

ROYAL OAKS LANDFILL
PROPOSED EXPANSION AREA +/- 48 ACRES

CHEROKEE COUNTY, TEXAS

USACE Project No. SWF-2021-00405
Hydrex Project No. A-12-1509

Report Date:
March 7, 2024

Prepared For:
Mr. Andy Gray
Project Manager
U.S. Army Corps of Engineers
Fort Worth District
Regulatory Division – Cooper Lake
828 CR 4795
Sulphur Springs, TX 75482

Prepared By:
Hydrex Environmental
312 Old Tyler Road
Nacogdoches, Texas 75961
(936) 568-9451

March 7, 2024

Mr. Andy Gray
Project Manager
U.S. Army Corps of Engineers
Fort Worth District
Regulatory Division – Cooper Lake
828 CR 4795
Sulphur Springs, TX 75482

RE: THREATENED AND ENDANGERED SPECIES HABITAT EVALUATION
Royal Oaks Landfill
Proposed Expansion Area +/- 48 Acres
Cherokee County, Texas
USACE Project No. SWF-2021-00405
Hydrex Project No. A-12-1509

Dear Mr. Gray:

Hydrex Environmental (Hydrex) has been contracted by Republic Services, Inc. (Republic) to complete a threatened and endangered species habitat evaluation for the above-referenced project site in Cherokee County, Texas. Federal-listed species were provided by the *Official Species List* generated through the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) online system.

The list indicates the following eight (8) species occur within Cherokee County, Texas:

- Tricolored bat (*Perimyotis subflavus*): PROPOSED ENDANGERED
- Piping plover (*Charadrius melodus*): THREATENED
- Red-cockaded woodpecker (*Picoides borealis*): ENDANGERED
- Rufa red knot (*Calidris canutus rufa*): THREATENED
- Alligator snapping turtle (*Macrochelys temminckii*): PROPOSED THREATENED
- Louisiana pigtoe (*Pleurobema riddellii*): PROPOSED THREATENED
- Monarch butterfly (*Danaus plexippus*): CANDIDATE
- Neches river rose-mallow(*Hibiscus dasycalyx)* ENDANGERED

Hydrex performed a preliminary habitat evaluation for all federal-listed species for Cherokee County, Texas. As part of the preliminary habitat evaluation, Hydrex performed a desktop review of readily available maps and aerial photographs in order to determine the potential for each listed species based on habitat descriptions provided by Texas Department of Wildlife (TPWD), Louisiana Department of Wildlife and Fisheries (LDWF), NatureServe, and USFWS.

The Royal Oaks Landfill Expansion is proposed, in order to meet the long-term disposal needs for Cherokee County, Texas and surrounding areas. Due to the location of the existing landfill and its components, the only available area for expansion of the Royal Oaks Landfill is east of the existing permitted landfill footprint.

The project site is situated within a rural setting surrounded by the existing landfill to the west, and rural residential properties, agricultural land, and managed forestland to the north, east, and south. At the time of this evaluation the project site was undeveloped and partially utilized for soil borrow pits and landfill access. Areas of the project site that were not utilized for the existing landfill were heavily forested. The aquatic habitats (natural and man-made) across the project site consist of sediment detention ponds, stormwater drainage ditches, scrub-shrub wetland, and ephemeral and intermittent streams.

An onsite reconnaissance was performed on June 10, 2021 and July 15, 2021, to visually inspect the project site for listed individuals and their associated habitat. Habitat and characteristic descriptions for the threatened and endangered species in Cherokee County, Texas are listed below.

Based on the professional opinion of Hydrex, an effect determination was made for each federal-listed species, as follows: 'no effect'; 'may affect, but not likely to adversely affect'; and 'may affect'. Furthermore, a determination was made for all proposed and candidate species, as follows: 'jeopardy' or 'no jeopardy' The USFWS IPaC Official Species List for the project can be found as an attachment to this letter.

HABITATS

Tricolored Bat (*Perimyotis subflavus*): PROPOSED ENDANGERED

The tricolored bat is a small yellowish-brown insectivorous bat. Characteristics of the tricolored bat include a forearm length of 31–35 millimeters, short round ears with a blunt, straight tragus, and tricolored fur. The tricolored fur is black at the base, has a band of lighter brown, and a black wing membrane surrounding a reddish-orange forearm. Tricolored bats will hibernate six to nine months per year in caves or mines, with temperatures ranging from 8-13 °C, and minimal airflow. Typically, the bat is loyal to their hibernation site and will return each year. During the summer months, maternal colonies will reside in buildings, tree cavities, and rock crevices. Foraging takes place along forest edges and over ponds and waterways hunting for small insects. According to the *Species Status Assessment (SSA) Report for the Tricolored Bat (Perimyotis subflavus), Version 1.1* (USFWS, 2021), the bats emerge early evening to forage in treetops and closer to the ground later in the evening. The SSA also states that to support all life stages, the tricolored bat populations require a matrix of interconnected habitats that support spring migration, summer maternity colony formation, fall swarming, and winter hibernation.

Determination: No Jeopardy

The following reasons for this effect determination are listed below.

- The project site does not consist of caves or mines for hibernation.
- The project does not consist of suitable roosting habitat.
- The project site consists of some foraging habitat, but the presence of foraging habitat alone is not a part of interconnected habitats to support all life stages required for tricolored bat populations.

- Activities associated with this project will likely not be conducted during evening hours when the bats emerge for foraging.
- If activities associated with this project are conducted during foraging hours, the areas surrounding the project site provide suitable forgaging habitat for the bat to retreat to.

Critical Habitat: No critical habitat is designated for this species.

Piping Plover (*Charadrius melodus*): THREATENED

The piping plover is a small bird approximately 17.8 centimeters long with a wingspan of 38 centimeters. Piping plovers are sandy, gray, and brown in color, and have a white underside and orange legs. The white rump, which is visible in flight, distinguishes this species from other small plovers. The piping plover is primarily a coastal species; however, it will use a variety of habitats and migrate in response to local weather and tidal conditions. Coastal habitats include sand spits, small islands, tidal flats, shoals, and sandbars with inlets. In early April, the plover will begin arrival on breeding grounds which typically include sandy beaches along the Atlantic Coast from Canada to North Carolina, along the sand and gravel shores of Lakes Michigan, Huron, and Superior, river sandbars and islands, barren shorelines of inland lakes, and alkali wetlands in the northern Great Plains of Canada and the United States. The piping plover will winter primarily along Gulf Coast beaches from Florida to Mexico, along the Atlantic Coast from North Carolina to Florida, and on Caribbean islands. Winter habitat includes beaches, sand flats, mudflats, algal mats, emergent sea grass beds, wash-over passes, and very small dunes where seaweed (*Sargassum spp.)* or other debris has accumulated sand. Optimal site characteristics are large, bare or very sparsely vegetated tidal mudflats, sand flats, and algal flats.

Determination: No Effect

The following reasons for this effect determination are listed below.

- According to the USFWS Consistency Letter (attached), it was determined the proposed action will have "no effect" on the piping plover.
- This is not a wind related project.
- The project site does not consist of coastal habitat and is located approximately 170 miles from the Texas Gulf Coast.
- The location of the project site is not in the piping plover's northern breeding region.

Critical Habitat: Project site is not located within critical habitat designated for this species.

<u>Red-cockaded woodpecker (*Picoides borealis*): ENDANGERED</u>

Red-cockaded woodpeckers are relatively small, however gradual changes occur based on geography, larger birds are generally located to the north. Red-cockaded woodpeckers range from 20-23 centimeters in length, with a wingspan of 35-38 centimeters. The red-cockaded woodpecker has a black crown, narrow white lines above black eyes, heavy black stripe seperating the cheek from throat, and white to grayish nasal tufts. Their bills are black, while their legs can range from black to gray. The male can be identified by the cockade (a tiny red streak) behind the eye on the upper border of the cheek. The red-cockaded woodpecker requires vast areas of open pine habitat. The red-cockaded woodpecker is the only species of woodpecker that excavates its nesting cavities exclusively in living pines. Living pines include mature (60+) or older pines that typically suffer from red-heart disease (aka red heart fungus). Longleaf pines (*Pinus palustris*) are the most preferred species, but other species of southern pine are also utilized. In Texas, cavities have been found in longleaf, loblolly, shortleaf, and slash pines.

Determination: No Effect

The following reasons for this effect determination are listed below.

- According to the USFWS Consistency Letter (attached), it was determined the proposed action will have "no effect" on the red-cockaded woodpecker.
- The project site does not consist of nesting or foraging habitat (i.e., mature, vast, open pine).
- No pine trees infected with heartwood fungus or nesting cavities within pine trees were observed during the onsite reconnaissance.

Critical Habitat: No critical habitat is designated for this species.

<u>Rufa Red Knot (*Calidris canutus rufa*): THREATENED</u>

The red knot is a stocky, medium-sized shorebird with a relatively short bill and legs. The red knot measures 22-28 centimeters with a wingspan of up to 51 centimeters. The red knot varies in plumage throughout the seasons. Distinguishable characteristics include proportionately small head, small eyes, short neck, tapered black bill with a relatively fine tip (approximately the length of the birds head), and white rump. During migration the red knot takes advantage of suitable stopover habitat by using inland saline lakes and freshwater habitats including wetlands, riverine sandbars, and man-made impoundments. In these nonbreeding habitats, red knots require sparse vegetation and open landscapes to avoid predation. Within breeding grounds, red knots generally nest in dry, slightly elevated tundra locations, often on windswept slopes with little vegetation.

Determination: No effect

The following reasons for this effect determination are listed below.

- According to the USFWS Consistency Letter (attached), it was determined the proposed action will have "no effect" on the rufa red knot.
- This is not a wind related project.
- The project site consists of soil borrow areas and forested and scrub-shrub habitat, and does not consist of tundra or open habitat required in the breeding and non-breeding seasons.

Critical Habitat: Project site is not located within the proposed critical habitat designated for this species.

Alligator Snapping Turtle (*Macrochelys temminckii*): PROPOSED THREATENED

The alligator snapping turtle is among the largest freshwater turtles. Characteristics include a triangularly shaped head, pointed nose, a pronounced hook in their beak, and a long tail. The carapace will be brown or tan in color and have 3 rows of extremely prominent ridges on the top. Alligator snapping turtles are highly aquatic and restricted to river systems and associated bodies of water. Requires perennial water bodies; rivers, canals, lakes, and oxbows; also, marshes, wooded swamps, bayous, and ponds near running water, and sometimes will enter brackish coastal waters. Females emerge to lay eggs close to the water's edge.

Determination: No Jeopardy

The following reasons for this effect determination are listed below.

- The project site does not consist of any perennial water bodies such as rivers, canals, lakes, and oxbows; or marshes, wooded swamps, bayous, ponds near running water, and brackish coastal waters.

Critical Habitat: No critical habitat is designated for this species.

Louisiana Pigtoe (*Pleurobema riddellii*): PROPOSED THREATENED

The Louisiana pigtoe will grow in length up to 12.7 centimeters and has a thick, inflated triangular to sub-quadrate shell. The shell is solid without sculpturing, reddish-brown to black in color on the exterior and will sometimes have greenish rays. The interior shell is typically white in color with an iridescent posterior. Typical habitat for the Louisiana pigtoe is flowing streams and moderately sized rivers in Texas, Louisiana, west Mississippi, southeast Oklahoma, and southwest Arkansas with cobble, rock or sand, gravel, and woody debris substrates.

Determination: No effect

The following reasons for this effect determination are listed below.

- The project site does not consist of perennial flowing streams or moderately sized rivers.

Critical Habitat: Project site is not located within the proposed critical habitat designated for this species.

Monarch Butterfly (*Danaus plexippus*): CANDIDATE

The monarch butterfly is a large and conspicuous butterfly with a wingspan of 7-10 centimeters. The wings are bright orange in color surrounded by black borders and black veins. The black border has a double row of white spots on the upper side of the wings. The monarch can be found in fields, roadside areas, open areas, wet areas, or urban gardens. Wherever found, the monarch must have flowering plants for foraging and milkweed species for reproduction. Wintering habitats consist of Oyamel Fir Forests at an elevation of 2,400 to 3,600 meters, temperatures ranging from 0-15 °C, and high humidity to keep the butterfly from drying out.

Determination: No Jeopardy

The following reasons for this effect determination are listed below.

- The project site does not provide adequate numbers of flowering plants for foraging habitat as it consists of disturbed areas and forested areas.
- The project site does not consist of wintering habitat.

Critical Habitat: No critical habitat is designated for this species.

Neches River Rose-mallow (*Hibiscus dasycalyx): THREATNED*

The Neches River rose-mallow is a non-woody perennial. The stems are hairless, greenish to reddish-green, and apprroximatley 2.5 meters tall. The leaves have three thin lobes that taper to a point, the middle lobe of the is longer and perpendicular to the side lobes. Under the petals there are hairy bracts and sepals. The petals of the flower are creamy white with a deep red base. At maturity the 1-3 centimeter fruit is enclosed in the sepals. The Neches river rose-mallow occurs at the edge of woodlands in open marshy habitats found in sloughs, oxbows, river terraces and sand bars. The Neches River rose-mallow has not been found along the Neches River, but prefers soils near standing water, which are inundated during the wet months of the winter and spring but dry up at the surface during the summer.

Determination: No effect

The following reasons for this effect determination are listed below.

- The project site does not consist of open marshy habitats found in sloughs, oxbows, river terraces or sand bars.

Critical Habitat: Project site is not located within the critical habitat designated for this species.

CONCLUSIONS

A **'No Effect'** determination was made for the following four (4) species:

- Piping plover (*Charadrius melodus*): THREATENED
- Red-cockaded woodpecker (*Picoides borealis*): ENDANGERED
- Rufa red knot (*Calidris canutus rufa*): THREATENED
- Neches river rose-mallow(*Hibiscus dasycalyx)* ENDANGERED

A **'No Jeopardy'** determination was made for the following four (4) species:

- Tricolored bat (*Perimyotis subflavus*): PROPOSED ENDANGERED
- Alligator snapping turtle (*Macrochelys temminckii*): PROPOSED THREATENED
- Louisiana pigtoe (*Pleurobema riddellii*): PROPOSED THREATENED
- Monarch butterfly (*Danaus plexippus*): CANDIDATE

Based on the findings of this evaluation and in the best professional opinion of Hydrex, we believe the effects of this project will not result in the destruction or adverse modification of the critical habitat of threatened or endangered species, or cause or contribute to the take of any threatened or endangered species.

I appreciate the opportunity to present this information. If you have any questions regarding these findings, or if further clarification is necessary, please feel free to contact me at [redacted] or (936) 568-9451.

Sincerely,
Hydrex Environmental

Christina Keim

Christina R. Keim, REM, PWS
Senior Biologist, Manager of Ecological Services

SWS PCP PWS CHRISTINA R. KEIM PWS 2981 PROFESSIONAL WETLAND SCIENTIST
CRK 3-7-24

ATTACHMENTS:

USFWS Consistency Letter for Royal Oaks Landfill
USFWS Information for Planning and Consulting (IPaC) Official Species List

DISTRIBUTION

Mr. Andy Gray
Project Manager
U.S. Army Corps of Engineers
Fort Worth District
Regulatory Division – Cooper Lake
828 CR 4795
Sulphur Springs, TX 75482

Ms. Christina R. Keim, REM, PWS
Senior Biologist, Manager of Ecological Services
Hydrex Environmental
312 Old Tyler Road
Nacogdoches, Texas 75961

USFWS CONSISTENCY LETTER FOR ROYAL OAKS LANDFILL

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arlington Ecological Services Field Office
501 West Felix Street
Suite 1105
Fort Worth, TX 76115-3410
Phone: (817) 277-1100 Fax: (817) [redacted]
[redacted]

In Reply Refer To: March 07, 2024
Project code: 2024-0035493
Project Name: Royal Oaks Landfill - Proposed Expansion

Subject: Consistency letter for 'Royal Oaks Landfill - Proposed Expansion' for specified federally threatened and endangered species and designated critical habitat that may occur in your proposed project area consistent with the Arlington Ecological Services Field Office (ESFO) Determination Key (DKey) for project review and guidance for federally listed species.

Dear Christina Keim:

The U.S. Fish and Wildlife Service (Service) received on **March 07, 2024** your effects determination for the 'Royal Oaks Landfill - Proposed Expansion' (the Action) using the Arlington ESFO DKey for project review and guidance for federally-listed species within the Information for Planning and Consultation (IPaC) system. The Service developed this system in accordance with the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

Based on your answers and the assistance of the Service's Arlington ESFO DKey, you determined the proposed Action will have "No Effect" on the following species:

Species	Listing Status	Determination
Neches River Rose-mallow (*Hibiscus dasycalyx*)	Threatened	No effect
Piping Plover (*Charadrius melodus*)	Threatened	No effect
Red-cockaded Woodpecker (*Picoides borealis*)	Endangered	No effect
Rufa Red Knot (*Calidris canutus rufa*)	Threatened	No effect

Consultation Status

Thank you for informing the Service of your "No Effect" determinations for this project. No further consultation/coordination for this project is required for these species.

This letter only covers the listed species in the above table. The following species may also occur in the Action area:

- Alligator Snapping Turtle *Macrochelys temminckii* Proposed Threatened
- Louisiana Pigtoe *Pleurobema riddellii* Proposed Threatened
- Monarch Butterfly *Danaus plexippus* Candidate
- Tricolored Bat *Perimyotis subflavus* Proposed Endangered

If you determine your project may affect additional listed or proposed listed species not covered by the Arlington ESFO DKey, please contact our office at (817) 277-1100 or your Service point of contact in the Arlington ESFO to discuss methods to avoid or minimize potential adverse effects to those species. Candidate species are not afforded protection under the ESA; however, we recommend they be considered in project planning and that conservation measures be implemented to avoid or minimize impacts to individuals or their habitat as much as possible.

The Service recommends that your agency contact the Arlington ESFO or re-evaluate the Action in IPaC if: 1) the scope, timing, duration, or location of the Action changes, 2) new information reveals the Action may affect listed species or designated critical habitat, or 3) a new species is listed or critical habitat designated. If any of the above conditions occurs, additional consultation with the Arlington ESFO should take place before project changes are final or resources committed.

At Risk Species: The Service's responsibilities under the ESA include evaluating species that have been petitioned to be listed or are candidates for listing under the ESA. These "at risk" species are not afforded protection under the ESA; however, we continue to collect information on their status and potential threats in order to assess their biological status and address requirements under the ESA. For these reasons, we request any information on the status of these species (e.g., surveys) be provided to the Arlington ESFO for consideration. This may also include any conservation measures implemented to avoid or reduce impacts to these species as a result of proposed actions. The proposed project falls within the range of the following at risk species:

Western chicken turtle (https://ecos.fws.gov/ecp/species/9903)

Bald and Golden Eagle Protection Act(BGEPA): The following resources are provided to project proponents and consulting agencies as additional information. Bald and golden eagles are not included in this section 7(a)(2) consultation and this information does not constitute a determination of effects by the Service.

The Service developed the National Bald Eagle Management Guidelines to advise landowners, land managers, and others who share public and private lands with bald eagles when and under what circumstances the protective provisions of the BGEPA may apply to their activities. The guidelines should be consulted prior to conducting new or intermittent activity near an eagle nest. This document may be downloaded from the following site: https://www.fws.gov/media/national-bald-eagle-management-guidelines-0

If the recommendations detailed in the National Bald Eagle Management Guidelines cannot be followed, you may apply for a permit to authorize removal or relocation of an eagle nest in certain instances. The application form is located at https://fwsepermits.servicenowservices.com/fws/.

Please note this guidance does not authorize bird mortality for species that are protected under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. sec. 703-712). If you believe migratory birds will be affected by this activity, we recommend you contact our Migratory Bird Permit Office at P.O. Box 709, Albuquerque, NM 87103, (505) 248-7882.

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

Royal Oaks Landfill - Proposed Expansion

2. Description

The following description was provided for the project 'Royal Oaks Landfill - Proposed Expansion':

> Proposed expansion of the existing landfill, encompassing approximately 48 acres. Expansion will include construction of additional landfill cells, new stormwater controls, and other features as needed.

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@32.00089425,-95.26107624027327,14z

QUALIFICATION INTERVIEW

1. Does the proposed project involve research or other actions that include the collection, capture, handling, or harassment of any individual federally listed threatened, endangered or proposed species?

   No
2. Does the proposed project involve the use of manned or unmanned aircraft (e.g., airplanes, helicopters, drones, balloons)?

   No
3. Is the action authorized, funded, or being carried out by a Federal agency?

   Yes
4. Are you the Federal agency or designated non-federal representative?

   No
5. Is the project a communications tower licensed or regulated by the Federal Communications Commission?

   No
6. Is the lead federal agency for the project Housing and Urban Development?

   No
7. Is this a wind energy project ?

   No
8. Is this a solar energy project ?

   No
9. [Semantic] Does the project intersect the piping plover AOI?

   Automatically answered
   Yes
10. [Semantic] Does the project intersect the red knot AOI?

    Automatically answered
    Yes
11. [Semantic] Does the project intersect the peppered chub critical habitat?

    Automatically answered
    No
12. [Semantic] Does the project intersect the red-cockaded woodpecker AOI?

    Automatically answered
    Yes
13. Will the project involve removal of suitable red-cockaded woodpecker **foraging** habitat (pine or pine/hardwood stands in which 50 percent or more of the dominant trees are pines and the dominant pine trees are 30 years of age or older) as described in 2003 Red-Cockaded Woodpecker Recovery Plan Appendix 4. Survey Protocol?

    No

14. Will the project occur within suitable red-cockaded woodpecker **nesting** habitat (pine or pine/hardwood stands that contain pines 60 years of age or older)?

    No

15. [Semantic] Does the project intersect the sharpnose shiner critical habitat?

    Automatically answered
    No

16. [Semantic] Does the project intersect the smalleye shiner critical habitat?

    Automatically answered
    No

17. [Semantic] Does the project intersect the Neches River rose-mallow AOI?

    Automatically answered
    Yes

18. Will the project cause hydrologic alterations to designated critical habitat? Alterations to the hydrology of Neches River rose-mallow habitat can occur as a result of projects that do not directly overlap suitable habitat, but occur within the watershed or upstream of suitable habitat.

    No

19. Will the project occur in suitable Neches River rose-mallow habitat as described in the 2018 Neches River Rose-Mallow Recovery Outline?

    No

20. Will the project cause hydrologic alterations to suitable Neches River rose-mallow habitat as described in the 2018 Neches River Rose-Mallow Recovery Outline? Alterations to the hydrology of Neches River rose-mallow habitat can occur as a result of projects that do not directly overlap suitable habitat, but occur within the watershed or upstream of suitable habitat.

    No

21. [Semantic] Does the project intersect the black-capped vireo range?

    Automatically answered
    No

22. [Semantic] Does the project intersect the Texas screwstem range?

    Automatically answered
    No

23. [Semantic] Does the project intersect the western chicken turtle range?

    Automatically answered
    Yes

24. [Semantic] Does the project intersect the Kisatchie painted crayfish range?

    Automatically answered
    No

25. Do you have additional supporting documents you would like to upload to support your project review (e.g., Biological Evaluation, Habitat Assessment, Environmental Report, photos, maps, etc.)?

    No

IPAC USER CONTACT INFORMATION

Agency: Hydrex Environmental, LLC
Name: Christina Keim
Address: 312 Old Tyler Road
City: Nacogdoches
State: TX
Zip: 75961
Email [redacted]
Phone: 9365689451

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Army Corps of Engineers

USFWS INFORMATION FOR PLANNING AND CONSULTING (IPAC) OFFICIAL SPECIES LIST

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arlington Ecological Services Field Office
501 West Felix Street
Suite 1105
Fort Worth, TX 76115-3410
Phone: (817) 277-1100 Fax: (817) 277-1129
Email Address: [redacted]

In Reply Refer To: March 07, 2024
Project Code: 2024-0035493
Project Name: Royal Oaks Landfill - Proposed Expansion

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, which may occur within the boundary of your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under section 7(a)(1) of the Act, Federal agencies are directed to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Under and 7(a)(2) and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether their actions may affect threatened and endangered species and/or designated critical habitat. A Federal action is an activity or program authorized, funded, or carried out, in whole or in part, by a Federal agency (50 CFR 402.02).

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For Federal actions other than major construction activities, the Service suggests that a biological evaluation (similar to a Biological Assessment) be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

After evaluating the potential effects of a proposed action on federally listed species, one of the following determinations should be made by the Federal agency:

1. *No effect* **-** the appropriate determination when a project, as proposed, is anticipated to have no effects to listed species or critical habitat. A "no effect" determination does not require section 7 consultation and no coordination or contact with the Service is necessary. However, the action agency should maintain a complete record of their evaluation, including the steps leading to the determination of affect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related information.
2. *May affect, but is not likely to adversely affect* - the appropriate determination when a proposed action's anticipated effects to listed species or critical habitat are insignificant, discountable, or completely beneficial. Insignificant effects relate to the size of the impact and should never reach the scale where "take" of a listed species occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not be able to meaningfully measure, detect, or evaluate insignificant effects, or expect discountable effects to occur. This determination requires written concurrence from the Service. A biological evaluation or other supporting information justifying this determination should be submitted with a request for written concurrence.
3. *May affect, is likely to adversely affect* - the appropriate determination if any adverse effect to listed species or critical habitat may occur as a consequence of the proposed action, and the effect is not discountable or insignificant. This determination requires formal section 7 consultation.

The Service has performed up-front analysis for certain project types and species in your project area. These analyses have been compiled into *determination keys*, which allows an action agency, or its designated non-federal representative, to initiate a streamlined process for determining a proposed project's potential effects on federally listed species. The determination keys can be accessed through IPaC.

The Service recommends that candidate species, proposed species, and proposed critical habitat be addressed should consultation be necessary. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found at: https://www.fws.gov/service/section-7-consultations

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan (https://www.fws.gov/library/collections/bald-and-golden-eagle-management). Additionally, wind energy projects should follow the wind energy guidelines (https://www.fws.gov/media/land-based-wind-energy-guidelines) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: https://www.fws.gov/media/recommended-best-practices-communication-tower-design-siting-construction-operation. The Federal Aviation Administration (FAA) released specifications for and made mandatory flashing L-810 lights on new towers 150-350 feet AGL, and the elimination of L-810 steady-burning side lights on towers above 350 feet AGL. While the FAA made these changes to reduce the number of migratory bird collisions (by as much as 70%), extinguishing steady-burning side lights also reduces maintenance costs to tower owners. For additional information concerning migratory birds and eagle conservation plans, please contact the Service's Migratory Bird Office at 505-248-7882.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Arlington Ecological Services Field Office
501 West Felix Street
Suite 1105
Fort Worth, TX 76115-3410
(817) 277-1100

PROJECT SUMMARY

Project Code: 2024-0035493
Project Name: Royal Oaks Landfill - Proposed Expansion
Project Type: Landfill - Solid Waste
Project Description: Proposed expansion of the existing landfill, encompassing approximately 48 acres. Expansion will include construction of additional landfill cells, new stormwater controls, and other features as needed.
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@32.00089425,-95.26107624027327,14z

Counties: Cherokee County, Texas

ENDANGERED SPECIES ACT SPECIES

There is a total of 8 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 2 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

BIRDS

NAME	STATUS
Piping Plover *Charadrius melodus* Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. Your location does not overlap the critical habitat. This species only needs to be considered under the following conditions: ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red-cockaded Woodpecker *Picoides borealis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7614	Endangered
Rufa Red Knot *Calidris canutus rufa* There is **proposed** critical habitat for this species. This species only needs to be considered under the following conditions: ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened

REPTILES

NAME	STATUS
Alligator Snapping Turtle *Macrochelys temminckii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4658	Proposed Threatened

CLAMS

NAME	STATUS
Louisiana Pigtoe *Pleurobema riddellii* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/10233	Proposed Threatened

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

FLOWERING PLANTS

NAME	STATUS
Neches River Rose-mallow *Hibiscus dasycalyx* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1441	Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

BALD & GOLDEN EAGLES

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

---

1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are likely bald eagles present in your project area. For additional information on bald eagles, refer to Bald Eagle Nesting and Sensitivity to Human Activity

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence ( )

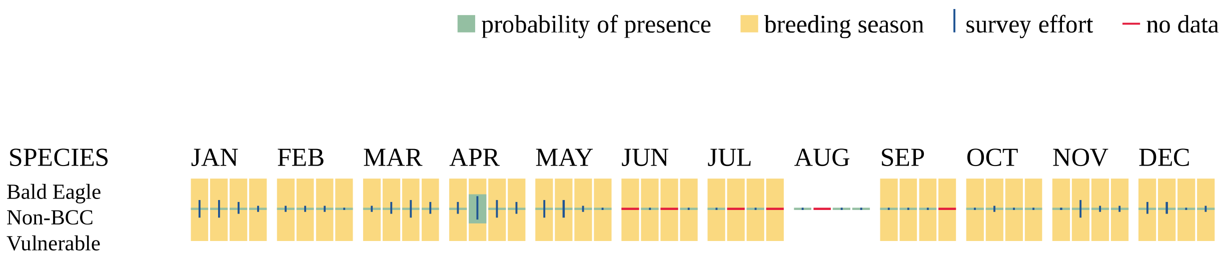
Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season ( )

Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

---

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE

SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31
Brown-headed Nuthatch *Sitta pusilla* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9427	Breeds Mar 1 to Jul 15
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25
Prothonotary Warbler *Protonotaria citrea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9439	Breeds Apr 1 to Jul 31
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	Breeds May 10 to Sep 10
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9431	Breeds May 10 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

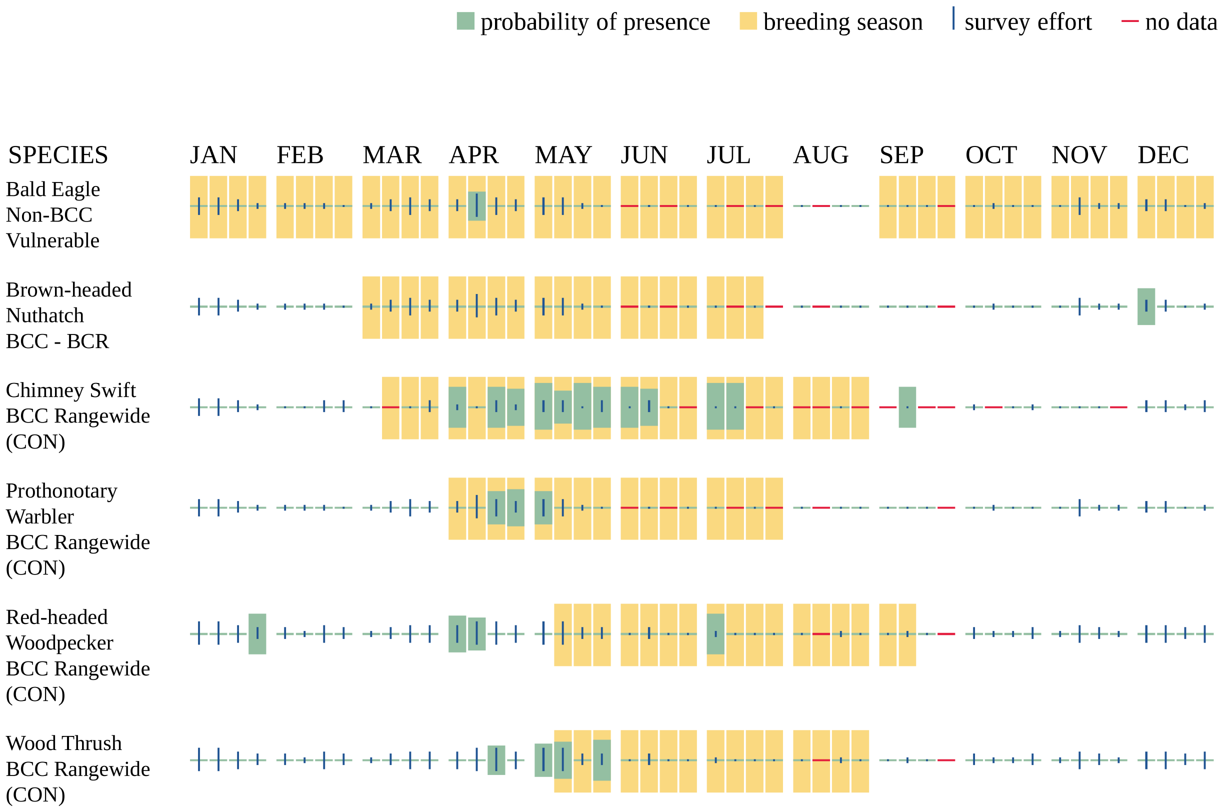
Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)

Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

RIVERINE

- R4SBC

IPAC USER CONTACT INFORMATION

Agency: Hydrex Environmental, LLC
Name: Christina Keim
Address: 312 Old Tyler Road
City: Nacogdoches
State: TX
Zip: 75961
Email [redacted]
Phone: 9365689451

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Army Corps of Engineers

APPENDIX E

TEXAS HISTORIC COMMISSION'S CONCURRENCE WITH FINDINGS & CULTURAL RESOURCE SURVEY

From: [redacted]
To: [redacted]
Subject: Royal Oaks Landfill Expansion
Date: Thursday, August 10, 2023 9:35:48 AM

Re: Project Review under Section 106 of the National Historic Preservation Act and/or the Antiquities Code of Texas
THC Tracking #202310283
Date: 08/10/2023
Royal Oaks Landfill Expansion (Permit 31167)
440 Heath Lane
Jacksonville,TX 75766

Description: Archeological draft report for a negative findings survey. USACE SWF-2021-00405

Dear Todd McMakin:
Thank you for your submittal regarding the above-referenced project. This response represents the comments of the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission (THC), pursuant to review under Section 106 of the National Historic Preservation Act and the Antiquities Code of Texas.

The review staff, led by Caitlin Brashear and Emily Dylla, has completed its review and has made the following determinations based on the information submitted for review:

Above-Ground Resources

- No historic properties are present or affected by the project as proposed. However, if historic properties are discovered or unanticipated effects on historic properties are found, work should cease in the immediate area; work can continue where no historic properties are present. Please contact the THC's History Programs Division at 512-463-5853 to consult on further actions that may be necessary to protect historic properties.

Archeology Comments

- No historic properties affected. However, if cultural materials are encountered during construction or disturbance activities, work should cease in the immediate area; work can continue where no cultural materials are present. Please contact the THC's Archeology Division at 512-463-6096 to consult on further actions that may be necessary to protect the cultural remains.
- THC/SHPO concurs with information provided.
- This draft report is acceptable. To facilitate review and make project information and final reports available through the Texas Archeological Sites Atlas, we appreciate submission of tagged pdf copies of the final report including one restricted version with all site location information (if applicable), and one public version with all site location

information redacted; an online abstract form submitted via the abstract tab on eTRAC; and survey area shapefiles submitted via the shapefile tab on eTRAC. For questions on how to submit these please visit our video training series at: https://www.youtube.com/playlist?list=PLONbbv2pt4cog5t6mCqZVaEAx3d0MkgQC Please note that these steps are required for projects conducted under a Texas Antiquities Permit.

We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your cooperation in this review process, and for your efforts to preserve the irreplaceable heritage of Texas. If the project changes, or if new historic properties are found, please contact the review staff. If you have any questions concerning our review or if we can be of further assistance, please email the following reviewers: [redacted]

This response has been sent through the electronic THC review and compliance system (eTRAC). Submitting your project via eTRAC eliminates mailing delays and allows you to check the status of the review, receive an electronic response, and generate reports on your submissions. For more information, visit http://thc.texas.gov/etrac-system.

Sincerely,

for Mark Wolfe, State Historic Preservation Officer
Executive Director, Texas Historical Commission

Please do not respond to this email.

cc: [redacted]

Cultural Resources Survey of the Royal Oaks Landfill Expansion Project, Cherokee County, Texas

Final Report - Restricted

Authored by:
Todd McMakin
Brad Husemann
and
Emma Richburg

Stone Point Services, LLC
11827 County Road 41
Tyler, TX 75706

Submitted to:
Hydrex Environmental
312 Old Tyler Road
Nacogdoches, TX 75961

USACE Permit Number: SWF-2021-00405
THC Antiquities Permit No. 31167

Stone Point Services, SPS22C0215

Todd McMakin
Principal Investigator

August 10, 2023

Cultural Resources Survey of the Royal Oaks Landfill Expansion Project, Cherokee County, Texas

Final Report - Restricted

Submitted by
Todd McMakin, Owner/Senior Archeologist
Stone Point Services, LLC
11827 County Road 41
Tyler, TX 75706
903-881-3103

Submitted to:
Hydrex Environmental
312 Old Tyler Road
Nacogdoches, TX 75961

Royal Oaks Landfill Expansion
Survey Dates: May 30-31, 2023
Total Area Surveyed: 48.2-acres (19.5-hectares)
Maps: USGS Jacksonville West Quadrangle (7.5')
USGS Mount Selmon Quadrangle (7.5')

USACE Permit Number: SWF-2021-00405
THC Antiquities Permit No. 31167

Stone Point Services, SPS22C0215

August 10, 2023

Abstract

On May 30 to 31, 2023, Stone Point Services, LLC conducted a cultural resource survey of the proposed Royals Oaks Landfill Expansion project, located in the city of Jacksonville in Cherokee County, Texas for Hydrex Environmental. The proposed project is approximately 370 by 526-meters (1214 by 1725-feet) rectangular parcel of property in a bottomland and upland setting adjacent to the existing Republic Services Royal Oaks Landfill and is comprised of 19.5-hectares (48.2-acres). The anticipated depth of impact (vertical APE) is 15.2-meters (50-feet) below the present ground surface. It is understood that this work will operate under Nationwide Permit (NWP) 39 through the US Army Corps of Engineers (USACE) Fort Worth District and that the USACE will have review authority for this project (USACE# SWF-2021-00405). As such, this project will be reviewed under Section 106 of the National Historic Preservation Act (NHPA). Furthermore, as the proposed undertaking is located on city property it is understood that this work will include permitting and regulatory oversight by the Texas Historical Commission (THC) in order to comply with the requirements of the Antiquities Code of Texas (ACT). This survey was conducted as part of USACE permit application # SWF-2021-00405 and under Texas Antiquities Permit 31167. The survey area consists of a wooded area proposed for a landfill expansion. The subject property is surrounded by an existing landfill, agricultural fields, floodplain, and woodlands.

Background research revealed no previously recorded archeological sites within the survey area and field investigations identified no new cultural resources (archeological sites or historic resources) within the survey area. We therefore find that this project will not impact National Register of Historic Places (NRHP) listed, eligible, or potentially eligible structures or sites within the survey area, nor will it impact State Antiquities Landmark (SAL) resources. This project is recommended to proceed with no additional consideration of archeological or historic resources. All records produced as a result of this project will be submitted to Stephen F. Austin State University (SFASU) for curation. Survey methods conducted within the survey area meet or exceed methods recommended by the THC and the Council of Texas Archeologists (CTA) (2020).

Late Discovery Protocol

In the event of an inadvertent discovery of human remains and/or archeological cultural deposits, all project activity near the location will cease immediately until proper notification of consulting parties has occurred and mitigative measures have been determined and implemented.

Executive Summary

On May 30 to 31, 2023, Stone Point Services, LLC conducted a cultural resource survey of the proposed Royals Oaks Landfill Expansion project, located in the city of Jacksonville in Cherokee County, Texas for Hydrex Environmental. The proposed project is approximately 370 by 526-meters (1214 by 1725-feet) rectangular parcel of property in a bottomland and upland setting adjacent to the existing Republic Services Royal Oaks Landfill and is comprised of 19.5-hectares (48.2-acres). The anticipated depth of impact (vertical APE) is 15.2-meters (50-feet) below the present ground surface. It is understood that this work will operate under Nationwide Permit (NWP) 39 through the US Army Corps of Engineers (USACE) Fort Worth District and that the USACE will have review authority for this project (USACE# SWF-2021-00405). As such, this project will be reviewed under Section 106 of the National Historic Preservation Act (NHPA). Furthermore, as the proposed undertaking is located on city property it is understood that this work will include permitting and regulatory oversight by the Texas Historical Commission (THC) in order to comply with the requirements of the Antiquities Code of Texas (ACT). This survey was conducted as part of USACE permit application # SWF-2021-00405. The survey area consists of a city owned landfill and wooded area. The subject property is surrounded by agricultural fields, floodplain, and woodlands.

Field investigations were conducted from May 30 to 31, 2023, by Principal Investigator Todd McMakin along with archeologist Brad Husemann. Survey methods included pedestrian survey spaced at 15-meter (50-foot) intervals within the survey area. Shovel tests were placed at 30-meter (100-foot) intervals along transects spaced at 30-meters (100-feet) apart in high potential areas, with supplemental shovel tests also placed in areas deemed higher in potential. Lower potential areas were surveyed at reduced intervals and placed in areas more likely to contain intact sites. The minimum number of shovel tests required for the 19.5-hectares (48.2-acres) tract is 55 shovel tests (THC 2020). In total, 57 shovel tests were excavated within the project area, representing approximately 1.2 shovel tests per acre. All shovel tests were negative for cultural materials. Approximately 10.36-hectares (25.6-acres) of the project area have been severely impacted by previous mechanical disturbance and erosion. Shovel testing was conducted within those areas with intact soils, representing approximately 9.15-hectares (22.6-acres). Within the intact portions of the survey area, approximately 2.5 shovel tests were excavated per acre.

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Pendleton Property Project Summary		
Project Management: Hydrex Environmental		
Project Location: 440 Heath Lane Jacksonville, TX 75766 County: Cherokee		
Proposed development (APE): 19.5-hectares (48.2-acres)	**Area Surveyed:** 19.5-hectares (48.2-acres)	**Date(s) of Background Research**: March 21, 2023
Field methods: 57 shovel tests 15-meter (50-foot) pedestrian transects 30-meter (100-foot) interval shovel testing (high potential) Subject shovel testing (low potential)	**Field Crew**: Todd McMakin Brad Husemann	**Date(s) of Field Visit**: May 30 and 31, 2023
Direct Effects Determination: No resources for direct effects	**Recommendations**: This project is recommended to proceed with no additional consideration of cultural resources.	**Project Reference** SPS #: SPS22C0215 Antiquities Permit No. 31167 USACE Permit: SWF-2021-00405

Acknowledgements

Stone Point Services would like to thank Hydrex Environmental for providing us with the necessary data to complete this survey. Todd McMakin served as Principal Investigator and provided input on the Draft Technical Report. Todd McMakin and Brad Husemann completed all fieldwork. Appreciation is also extended to Katherine McMakin, Danny Lewis and Jill Jodie, GIS Specialists for Stone Point Services.

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Chapter 1: Introduction

Stone Point Services, LLC conducted a cultural resource survey of the proposed Royals Oaks Landfill Expansion project, located in the city of Jacksonville in Cherokee County, Texas for Hydrex Environmental. The proposed project is approximately 370 by 526-meters (1214 by 1725-feet) rectangular parcel of property in a bottomland and upland setting adjacent to the existing Republic Services Royal Oaks Landfill and is comprised of 19.5-hectares (48.2-acres) (Figure 1-4). The anticipated depth of impact (vertical APE) is 15.2-meters (50-feet) below the present ground surface. It is understood that this work will operate under Nationwide Permit (NWP) 39 through the US Army Corps of Engineers (USACE) Fort Worth District and that the USACE will have review authority for this project (USACE# SWF-2021-00405). As such, this project will be reviewed under Section 106 of the National Historic Preservation Act (NHPA). Furthermore, as the proposed undertaking is located on city property it is understood that this work will include permitting and regulatory oversight by the Texas Historical Commission (THC) in order to comply with the requirements of the Antiquities Code of Texas (ACT). This survey was conducted as part of USACE permit application # SWF-2021-00405 and THC Antiquities Permit No. 31167. The survey area consists of a city owned landfill and wooded area. The subject property is surrounded by agricultural fields, floodplain, and woodlands.

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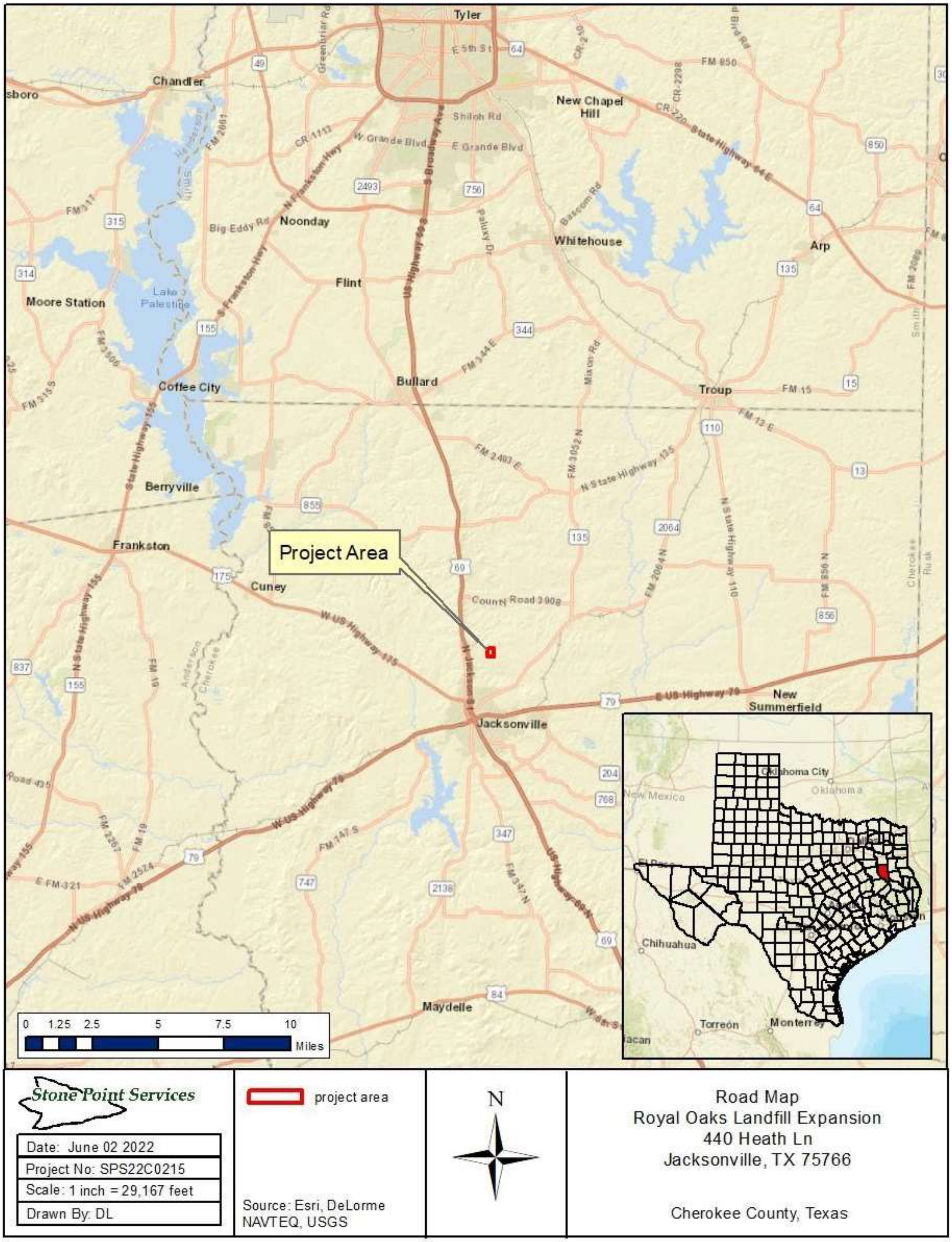

Figure 1: General overview map.

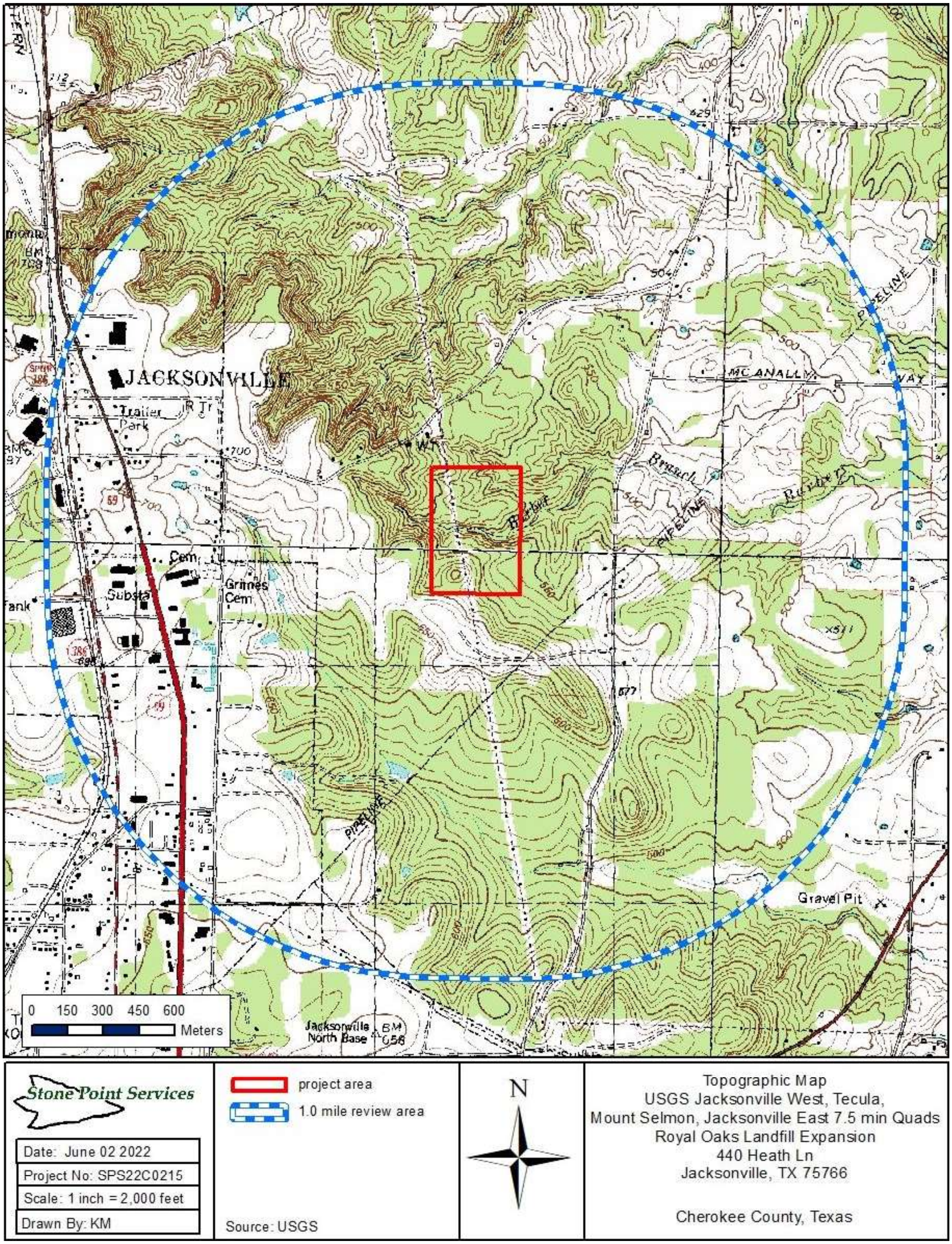

Figure 2: USGS Jacksonville West, Tecula, Mount Selmon, and Jacksonville East 7.5-min Quadrangle maps showing the project area.

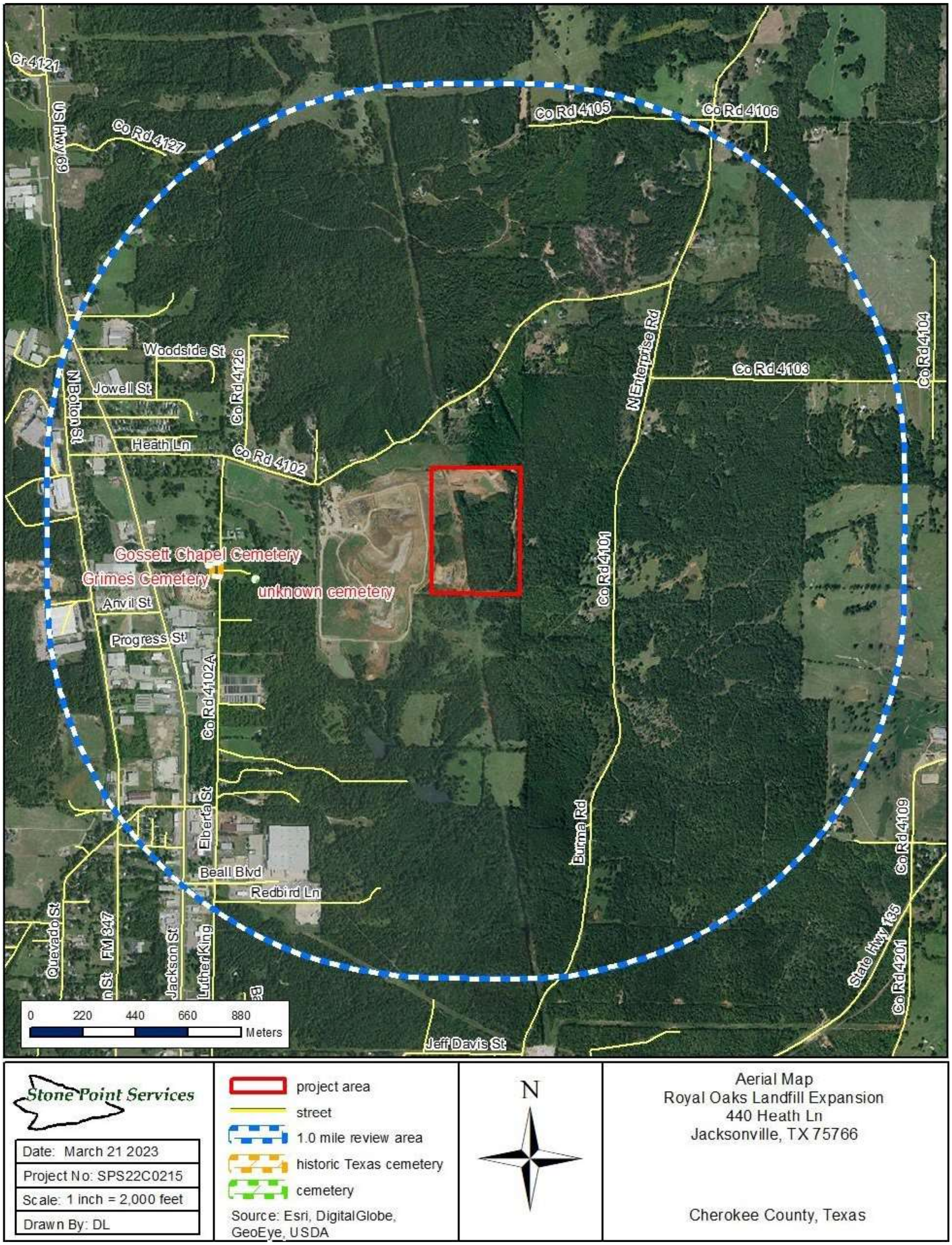

Figure 3: Aerial map showing the project area.

Figure 4: Construction area for the proposed Royals Oaks Landfill Expansion project.

Chapter 2: Natural and Cultural Setting

Environmental Setting

The survey area is located in Cherokee County, in the city of Jacksonville, TX. This portion of Cherokee County lies within the Pineywoods ecological region (Texas Parks and Wildlife Department [TPWD] 2023a). This area consists of rolling hills of pine and oak with rich hardwood bottomlands that are frequently renewed by long-term flooding (TPWD 2023b). The subject property is located in a rural setting, north of Jacksonville, surrounded by agricultural fields, floodplain, and woodlands.

Flora and Fauna

Cherokee County is located within the Austroriparian biotic province (Blair 1950; Dice 1943). This region supports a broad range of indigenous species.

Animals that historically may have been used for food, shelter, and clothing (or perhaps for tools) in Cherokee County include white-tailed deer (*Odocoileus virginianus*), fox squirrel (*Sciurus niger*), raccoon (*Procyon lotor*), virginia opossum *(Didelphis virginiana*), bison (*Bison bison*), beaver (*Castor canadensis*), black bear (*Ursus americanus*), turkey (*Meleagris gallopavo*), quail (*Colinus virginianus*), and other smaller birds and rodent species (Davis and Schmidly 1994).

Most of the upland habitats primarily include cropland, forests, and woodland. Typical species noted within this area include Drummond red maple (*Acer rubrum L.* var. *drummondii*), river birch (*Betula nigra*), flowering dogwood (*Cornus florida*), loblolly pine (*Pinus taeda*), big bluestem (*Andropogon gerardii*), Virginia creeper (*Parthenocissus quinquefolia*), and other woodland species that benefit from the heavy rainfall in the region (TPWD 2023b).

Figure 5: View from survey area northeast corner, facing southwest.

Figure 6: View from survey area northwest corner, facing southeast.

Figure 7: View from survey area southwest corner, facing northeast.

Figure 8: View from survey area southeast corner, facing northwest.

Figure 9: Overview of disturbance area in northern part of project area, facing north-northeast from tree line.

Figure 10: Earthen easement (disturbed), facing northwest from tree line.

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Figure 12: Overview of disturbance area in southern part of project area, facing south-southwest from tree line.

Figure 13: Overview of undisturbed upland area south of creek, facing southeast.

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Figure 15: Creek bed, facing west-southwest.

Figure 16: Overview of undisturbed floodplain in northeastern part of survey area, facing south.

Geology and Soils

The survey area is located in Cherokee County, in the city of Jacksonville. The survey area is located in the Gulf Coastal Plains physiographic region (United States Geological Survey [USGS] Bureau of Economic Geology [BEG] 2023). This area generally consists of rolling hills of pine and oak with rich hardwood bottomlands that are frequently renewed by long-term flooding (TPWD 2023b). The underlying geologic unit for the area is the Queen City Sand Formation (Map Unit Eqc) (Figure 17), and the Weches Formation (Map Unit Ew). The Queen City Sand Formations consists of fine grained to medium grained sand and clay and extends 30 to 123-meters (100 to 400-feet) below the surface. The Weches Formation consists of marl, quartz sand, and clay and extends approximately 15 to 27-meters (50 to 90-feet) below the surface region (United States Geological Survey [USGS] Bureau of Economic Geology [BEG] 2023).

The US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) *Soil Survey of Cherokee County, Texas* (2023) was used in determining soils within the project area (Figure 18; Table 1). Soils within the project area include Angelina (Map Unit: Md), Trawick-Bub complex, 8 to 40 percent slopes (Map Unit: Bt), and Nacogdoches fine sandy loam, sloping, eroding (Map Unit: Ng). The Angelina series consists of very deep, very poorly drained, slowly permeable soils formed in acid, stratified loamy sediments. Angelina soils occur on flood plains and are ponded for long periods of time. Trawick soils are moderately deep, well drained, and moderately slowly permeable. The Trawick series formed in glauconite materials and can be found on gently sloping to steep uplands. The Bub series consists of well drained, very slowly permeable, shallow to glauconite geologic materials. These soils are on moderately steep to steep hilly Redlands. Nacogdoches soils are deep, well drained, moderately slowly permeable and formed in thick marine sediments high in glauconite. Undisturbed soils in the survey area are likely to exhibit the following horizonation:

Table 1: Soils within the project area

Soil type	***Horizon***	***Depth***	***Color***	***Texture***
Angelina	01	0-1 inch	-	Leaves, stems, and other litter in various stages of decomposition
	02	1-3 inches	-	Decomposing organic material
	A1g	3-7 inches	Light gray (10YR 6/1)	Sandy clay
	C1g	7-14 inches	Light gray (10YR 7/1)	Sandy clay loam
	C2g	14-26 inches	Light gray (10YR 6/1)	Sandy clay loam
	C3g	26-35 inches	Light gray (10YR 6/1)	Sandy clay loam
	C4g	35-63 inches	Variegated light gray (10YR 6/1)	Clay loam
Trawick	Ap	0-6 inches	Dark reddish brown (5YR 3/3)	Fine sandy loam
	Bt1	6-13 inches	Dark red (10R 3/6)	Clay
	Bt2	13-24 inches	Dark reddish brown (2.5YR 3/4)	Clay

Soil type	Horizon	Depth	Color	Texture
	BCt	24-30 inches	Dark reddish brown (2.5YR 3/4)	Clay loam
	C	30-39 inches	Light olive brown (2.5Y 5/6)	Weathered glauconitic materials
	Cr	39-57 inches	Light olive brown (2.5Y 5/6)	Weathered glauconitic materials
Bub	A	0-4 inches	Dark reddish brown (5YR 3/4)	Gravelly clay loam
	Bt	4-17 inches	Yellowish red (5YR 4/6)	Clay
	Cr1	17-35 inches	Yellowish red (5YR 4/6)	alternate layers of about 60 fractured discontinuous glauconitic ironstone and weathered glauconitic materials and about 40 percent glauconitic shale
	Cr2	35-80 inches	Alternate layers of yellowish red (5YR 4/6), light olive brown (2.5YR 5/6), and dark brown (7.5YR 3/2)	Alternate layers of glauconitic ironstone, glauconitic materials, and glauconitic marl
Nacogdoches	Ap	0-6 inches	Dark reddish brown (5YR 3/4)	Fine sandy loam
	B21t	6-30 inches	Dark red 910R 3/6)	Clay
	B22t	30-70 inches	Dark red (2.5YR 3/6)	Clay
	B3	70-100 inches	Stratified red (2.5YR 4/6)	Clay

A field description of a soil type may vary from the soils designated by the NRCS for a specific area. The degree of sunlight, soil moisture, and personal observations can lead to variation during soil profile descriptions. Additionally, topography, erosion, deposition, and/or artificial impacts may lead to differences in soil horizon thickness between NRCS data collected in advance of an archeological survey and actual project area soil thicknesses observed during fieldwork. For an expanded description of soil forming factors, processes, and interpretive strategies, see Schoeneberger and colleagues (2012) and Brady and Weil (2010). Soils in the project area are partially disturbed from past landfill activities, agricultural land use, and deforestation for agricultural land and landfill use.

For information regarding site formation, post-depositional processes, and the interplay of geomorphology and archeology, see Goldberg and Macphail (2006), Stein and Farrand (2001) and Waters (1992).

LiDAR imagery of the project area (Figures 19-20) shows a region of relatively flat uplands with significant areas of earth movement, or push piles, across the area from vegetation clearing and mass movement of soils by heavy machinery. The intermittent tributary that constitutes the USACE jurisdictional feature is oriented generally east to west across the central portion of the APE. Imagery illustrates relatively steep relief in this area and where mechanical impacts are located across most of the area.

Additional indications of soil disturbance by heavy machinery are present as linear features along existing roads (bordering the area) and borrow area to the north and south (see Chapter 3). The relatively flat area between the machinery disturbances may be the result of previous land clearing and soil movement by heavy machinery. Overall, LiDAR imagery attests to widespread soil impacts within the entirety of the APE. These images verify historic aerial images and field observations which show significant disturbance across most of the area.

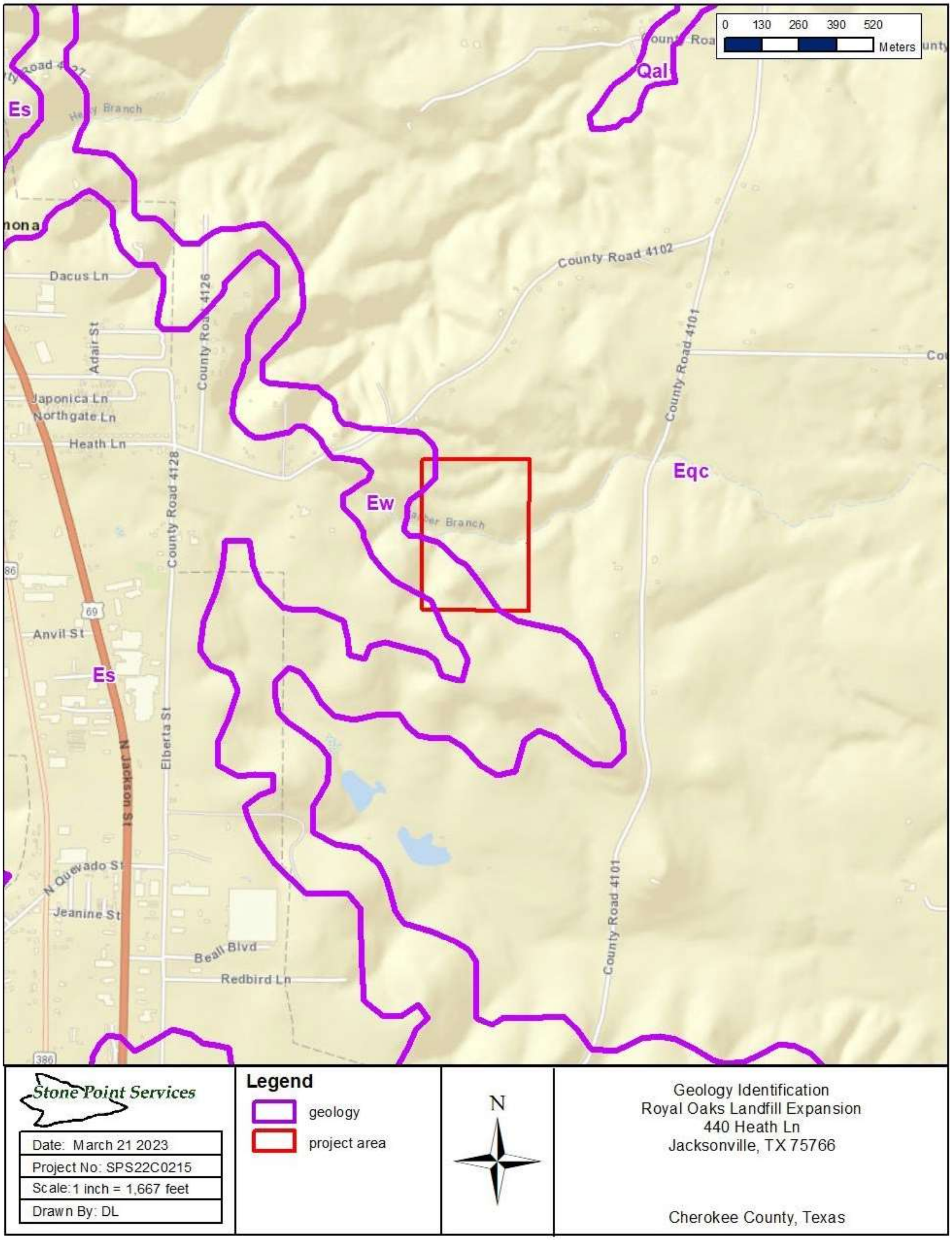

Figure 17: Map indicating underlying geology in the survey area.

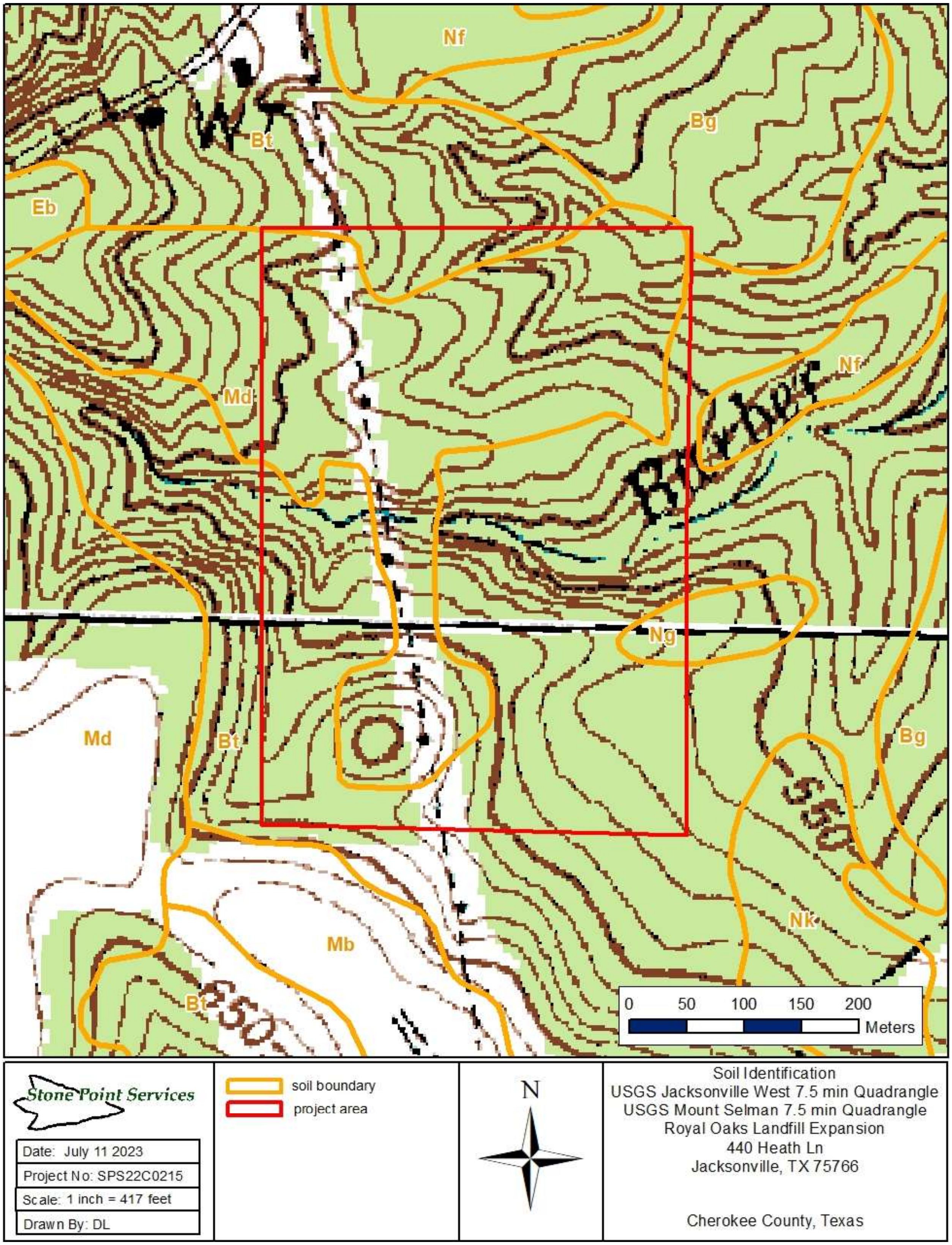

Figure 18: Soil types within the survey area.

Figure 19: LiDAR hillshade map of the project area

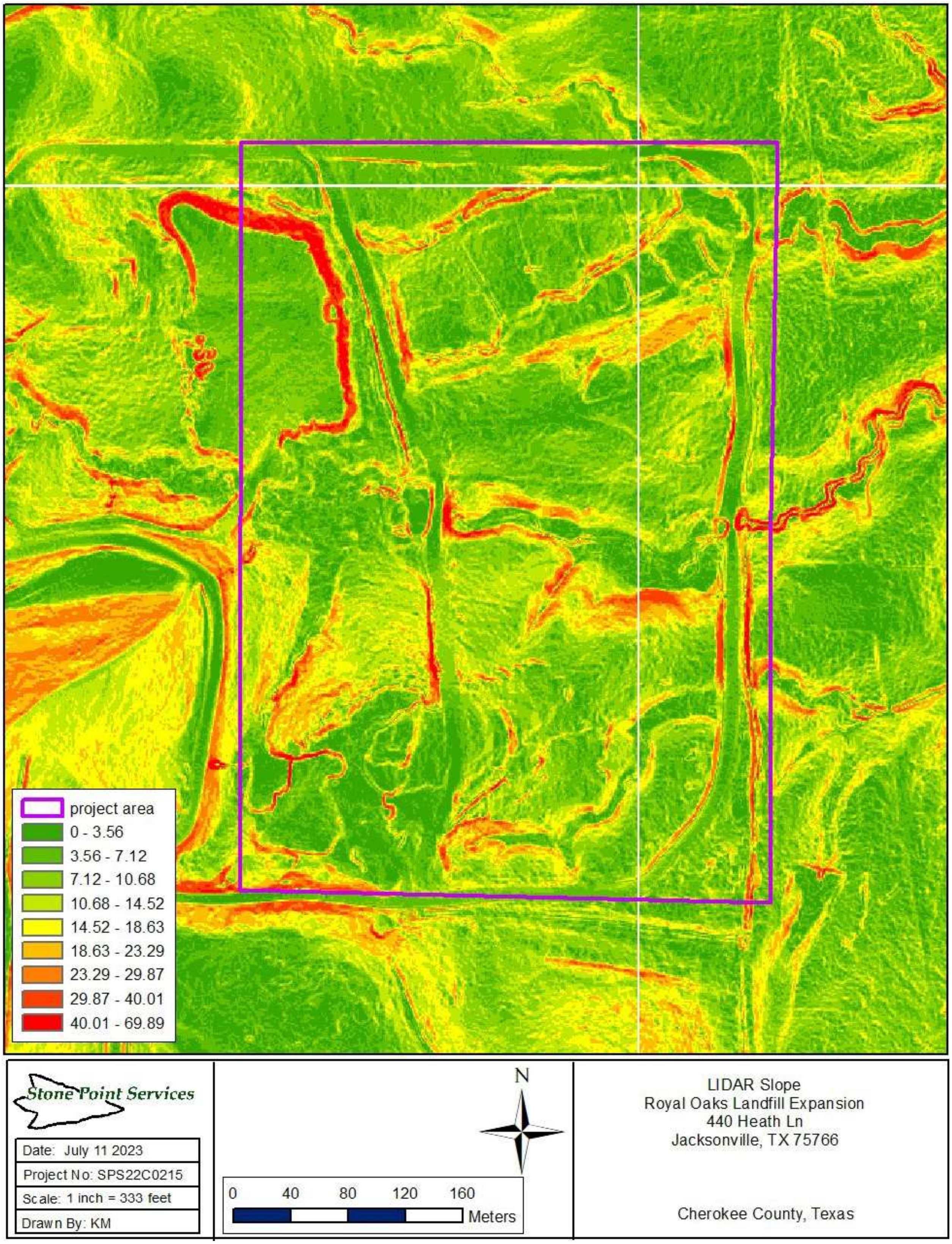

Figure 20: LiDAR slope intensity map of the project area

Cultural Setting

The earliest humans in North America arrived during the Paleoindian Period, which begins at approximately 9500 BC and ends at 7000 BC in Texas. Table 2 identifies the major periods in East Texas. For more detail, please see Perttula (2004).

Table 2: East Texas Cultural Sequence

Dates	Period
9500 - 7000 BC	Paleoindian
7000 - 200 BC	Archaic
200 BC - AD 800	Woodland
AD 800 - 1680	Caddo
AD 800 - 1000	• Formative Caddo
AD 1000 - 1200	• Early Caddo
AD 1200 - 1400	• Middle Caddo
AD 1400 - 1680	• Late Caddo
AD 1500 - 1950	Historic
AD 1542 - 1800	Spanish and French Influence
AD 1800- 1821	American Immigration
AD 1821 - 1836	Mexican State
AD 1836 - 1846	Republic of Texas
AD 1846	Texas becomes a US state
AD 1861 - 1865	Civil War
AD 1865 - 1900	Reconstruction
AD 1900 - present	Modern era

Prehistoric Overview

Cherokee County lies within the northeast Texas Archeological Region (Kenmotsu and Perttula 1993). Prehistoric temporal divisions are usually determined by changes in prehistoric diet and by the types of materials (artifacts) used. In many instances, periods are somewhat subjective. In most cases, tribal affiliation is not assigned to any particular group until well into the late prehistoric periods. For the majority of prehistory, groups are associated with periods rather than distinct cultural divisions. In other words, archeologists will often refer to a "Middle Archaic" population, rather than noting a specific culture. In some areas, such distinctions are possible, but it is somewhat rare.

Paleoindian Period (9500 - 7000 BC)

The Paleoindian Period is the least understood period in east Texas prehistory due to the low numbers of sites investigated that date to this period. In addition, minimal radiocarbon dates and the general lack of stratigraphically intact sites results in a poor understanding of this period. The subsistence strategy relied heavily on big game hunting with a high selectivity for specific tool types. It appears that the social organization of the Paleoindian Period was loosely structured. These societies appear to have included social groups loosely organized around a central nuclear family. Most Paleoindian sites are very small and located near smaller streams and tributaries. Tools were made of high quality materials and sometimes non-local lithic material was used. In addition, Paleoindians commonly refurbished and recycled tools (Story 1990). The diagnostic artifacts associated from the Paleoindian Period in east Texas include Clovis, Dalton, San Patrice, and Scottsbluff projectile points and Albany scrapers, Red River Knives, and Dalton Adzes (Cliff and Peter 1992).

Archaic Period (7000 - 200 BC)

The Archaic Period is defined by its change in subsistence strategy and a modification in tool manufacturing techniques. Tools were more often made of local materials, were less well made, and they were rarely recycled. Due to its large expanse of time, the Archaic Period is subdivided into three stages with tentative dates: Early (7000 - 4000 BC), Middle (4000 - 2000 BC), and Late (2000 - 200 BC).

Subsistence in the Early Archaic focused on hunting with a greater reliance on gathering. Story (1990) notes small and widely distributed sites reflecting high mobility within a still undefined territory. Dart points associated with the Early Archaic include Cossatot, Dawson, Kirk, Keithville, Palmer, and Wells (Story 1990). Foraging was a primary type of subsistence during the Middle Archaic. The increase in the use of plant food brought about a greater diversity in tool types, including: polished stone tools, mortars and pestles, and a variety of chipped stone tools. Dart points associated with the Archaic include the Big Sandy, Calf Creek, Johnson, Carrollton, Morrill, Evans, Lone Oak, Trinity, and Wesley (Story 1990). During the Late Archaic, an increase in the number of archeological sites and their size indicates an exploitation of all available food resources within the geographic boundaries of any specific group. The following types of projectile points are typical of the period: Ellis, Ensor, Palmillas, Yarbrough, Gary, and Kent (Kenmotsu and Perttula 1993).

Woodland Period (200 BC - AD 800)

The Woodland Period is characterized by the introduction of pottery and the bow and arrow in northeast Texas. Although some occupations were small and of a short duration, many others indicated an increase in population density and a longer occupation. The presence of burial mounds in some parts of northeast Texas represents status differentiation within these cultures. The Woodland Period is characterized by an abundance of Gary points, expanded stem points, and early ceramic styles such as Sandy Paste Wares, Williams Plain, Cooper Boneware, Marksville, and Troyville (Cliff and Peter 1992). There is some difficulty in dating Woodland Period sites because many contain aspects of both the Late Archaic and the Formative Caddo.

Caddo Period (AD 800 - 1680)

The Caddo Period is divided into stages relating to the development of the Caddo, the culture that dominated the area: Formative Caddo (AD 800- 1000), Early Caddo (AD 1000 - 1200), Middle Caddo (AD 1200 - 1400), and Late Caddo (AD 1400 - 1680). Each stage is defined by its associated distinctive tools and pottery. Alba, Bonham, Scallorn, and Catahoula arrow points, and Copena knives are typical tools. Holly Fine Engraved, Hickory Fine Engraved, Spiro Engraved, Kiam Incised, Coles Creek Incised, and Weches Fingernail Impressed ceramics are examples of the Formative Caddo stage (Clark, Jr. and Ivey 1974; Perttula 1995; Thurmond 1990). The Early Caddo stage is typically associated with Sanders Engraved, Hickory Fine Engraved, Sanders Plain, and Canton Incised ceramics (Perttula 1995). Arrow points from this stage are similar to those of the Formative Caddo.

Formative and Early Caddo Period sites are generally fairly small and are generally found on terraces adjacent to water sources, with mounds located near major rivers. Early Caddo sites are more numerous than formative Caddo Sites and they tend to indicate a general hunting and gathering adaptation, supplemented with horticulture (Perttula et al. 1986:54-55). Maize has been identified on Early Caddo sites. The Middle Caddo appear to be much more common than Early Caddo sites, with most occupations being located on elevated landforms along major and minor tributaries and rivers. The Middle Caddo culture appears to be more heavily reliant on agricultural production. The Late Caddo show significant regional variation. The Late Caddo Period lasted into historic times and is marked by Caddo-European contact. During the 1790s other Indians such as the Choctaw, Delaware, and Cherokee migrated from east of the Mississippi River into Caddo territory. Due to the competition for land and resources there developed an animosity between the Caddo and the newcomers. Today, descendants of the prehistoric Caddo live in northeast Texas and in Oklahoma (Newcomb 1961).

Historic Overview

The Historic Period began at approximately AD 1600 when Columbus and other early explorers reach North America from Europe. Although there was some interaction (primarily Spanish and French) in the 16th century, it was not until the late 17th century and into the early 18th century that Texas would become heavily influenced by the Spanish and French. In order to convert the natives to Catholicism, the Spanish constructed a series of missions in the area that would become Texas. As noted above, the Caddo populations in east Texas during this time included primarily two groups, the Hasinai and the Kadohadacho.

Spain would retain the greatest influence of any nation in east Texas throughout the eighteenth century. The French were located primarily in Louisiana at this time, but some interaction with French traders took place in east Texas. Americans would not make a significant impact on east Texas until after 1800. The Louisiana Purchase in 1803 saw an influx on American settlers into Louisiana and east Texas. Many settlers would come into Texas from the north, following Trammel's Trace, a road that led from the Texas/Arkansas border at the Red River into east Texas and down to Nacogdoches.

The fight for Texas independence had little direct impact on northeast Texas. Most of the battles were fought in the southern and central sections of the state. In 1836, Texas won its independence from Mexico. The Republic of Texas was short-lived. In December 1845, Texas became the twenty-eighth US state.

History of Cherokee County

The first European to reach the area of present-day Cherokee County was likely the French explorer René-Robert Cavelier, Sieur de La Salle who, after establishing the doomed settlement at Fort St. Louis in 1686, explored Hasinai Caddo territory in East Texas. Henri Joutel was part of that expedition and wrote about their peaceful encounter with a Hasinai Caddo settlement that they named Neches Village. Located near present day Lake Jacksonville, Joutel described it as the largest and most populous he had ever seen (Roach 1952: 4). La Salle was murdered by his own men near the town of Alto and the fort was abandoned in 1687. Just thirty years later the Spanish had established two missions and a fort in the heart of Hasinai territory (modern day Cherokee County). These settlements, San Francisco de las Tejas, San Francisco de las Neches, and Presidio des las Neches served the dual purpose of discouraging French encroachment and converting the local Hasinai people to Christianity. The missions were ultimately unsuccessful, and the Spanish retreated from East Texas by the 1760s (Cherokee County Historical Commission [CCHC] 1986: 3-4).

By the 1820s the Caddo tribes in East Texas were weakened by diseases introduced by the Europeans and the Europeans themselves had largely retreated from eastern Texas. This paved the way for new groups of people to occupy the region. Driven westward into Texas by the expanding United States, a band of the Cherokee tribe led by Chief Bowles crossed the Red River and entered Texas in 1822 with what the Mexican governor reported as one hundred warriors and two hundred women and children (Roach 1952: 5). Within a few years the Cherokee and their associated bands had grown significantly and settled in several villages between the Angelina and Neches Rivers. These people cleared land, raised livestock, planted crops, and built log structures. Many individuals received formal education and the group attempted several times to gain legal title to the land from Mexico, and later the Republic of Texas (CCHC 1986: 5).

Despite being a prosperous and peaceful people, the Cherokee inevitably came into conflict with the Anglo-American settlers who claimed the Cherokee land and settled in increasing numbers during the 1830s. The Killough's were one such family and emigrated from Alabama to settled near present-day Jacksonville in 1837. The Cordova Rebellion occurred that year, and when a band of rebels composed of Native Americans, Mexicans, and a few whites was discovered near Nacogdoches, they fled north to Cherokee Village where they asked Chief Bowels to join them. Bowles refused and the group fled west from the pursuing Texas militia towards the Neches Saline. During this episode they attacked the Killough family and captured or killed eighteen men woman and children (CCHC 1986: 7). This event, known as the Killough Massacre, was blamed on the Cherokee, and as the result the Republic of Texas declared war on the tribe and their associated bands. This declaration resulted in their complete exodus from the state by 1839.

Anglo-Americans began to settle in present-day Cherokee County during the 1830s but only a few settlements existed before the area became a county in 1846. In 1832 a six-league grant was made to William Barr and Samuel Davenport, and the colorful Indian trader Peter Ellis Bean purchased 405-hectares (1,000-acres) along the San Antonio Road just west of the Angelina River. Competing with Bean, Martin Lacey established Lacey's Fort near Alto which saw action during the Cordova Rebellion. Lockranzie, founded by the Durst and Bean families, was located south of the Durst Bridge on the west side of the Angelina River and was renamed Linwood in the 1850s. Stryker Town was located on the west bank of Stryker Creek at the crossing of the Caddo Trace from Trammels Trace to the Neches Saline. Cooks Fort was established when Joseph Cook hired a company of soldiers in Nacogdoches to build a wooden stockade and several buildings on his land three miles southeast of present-day Rusk. In 1846 it was a thriving village of two hundred and fifty people and was considered as a site for the new county seat (Roach 1952: 32-33).

Like a handful of other counties, Cherokee County was carved from Nacogdoches County by act of the Texas Legislature in 1846. Immigration to Texas had increased exponentially during the 1840s as threats from hostile Indians and invasion by Mexico largely subsided. In addition, the annexation of Texas meant that immigrants who purchased land there could settle with confidence knowing that land and law would be protected and upheld by the United States. The increasing population put pressure on the Texas Legislature to subdivide the handful of existing large counties so that residents could travel to their county seat in a day's ride and participate in the local or state political apparatus. It is for these reasons that many Texas counties were established in the 1840s, including Cherokee. After the establishment of the county, which was named after the tribe that previously occupied the land, a commission was chosen to find the new county seat. Sporting familiar names such as Killough, Box, and Lacey, the commission chose 40.5-hectares (100-acres) on the west half the Hundley headright and named it in honor of the distinguished soldier and statesman Thomas Jefferson Rusk who, ironically, was the man who defeated the Cherokee in battle and drove them from Texas (Roach 1952: 37-38).

The 1850s was a decade of prosperity. During this time Cherokee County had become more like the Old South where most of the settlers immigrated from. The population of Cherokee County included approximately 12,000 people. One quarter of the 12,000 residents was comprised of slaves as cotton production expanded within the county. The crop was so valuable that it was used to fund business and industrial ventures. Cotton was hauled overland to Jefferson, Texas and floated down the Red River where it eventually reached the Mississippi and the port of New Orleans. Locals also took advantage of the plentiful pine and hardwood forests. A steam-powered mill was built at Bean's Creek in 1850 by I.N. Fisher and another steam powered sawmill was established southwest of Pine Town (CCHC 1986:13,17). Connecting these products to markets were roads and bridges. The largest road went to Nacogdoches and there were several privately owned toll bridges that operated over the Angelina and Neches Rivers. The first telegraph line was strung in 1854 and, fastened to pine trees, it connected Rusk to Henderson. Wealth from these industries powered growth and by 1860 Cherokee County was one of only three counties large enough to have its own senator in the Texas Legislature (Roach 1952: 43).

When Texas seceded from the Union and joined the Confederacy in 1861, residents of Cherokee County contributed soldiers, resources, and labor—at a great cost. A state company known as the "Lone Star Defenders" was organized in 1861 and fought with the 3rd Texas Cavalry in action across the south. There was a prisoner of war camp two miles south of Rusk that was crowded with Union prisoners after the Battle of Mansfield. The county also supplied the Confederacy with salt which was in abundance on the salines of the Neches River. As with so many other counties in Texas and across the south, the Civil War had a negative impact on the lives and economy of people living in Cherokee County. The population decreased by over 10 percent, and a shortage of labor meant that non-cultivated land increased while the county's wealth dropped (Roach 1952: 83-85).

Cherokee County rebounded quickly from the devastation of the war, primarily due to its natural resources and the railroad. The arrival of the railroads drastically altered the settlement patterns and all the antebellum towns except Jacksonville, Rusk, and Alto disappeared because they did not have access to the railroad. While only a small portion of the overall economy in the 1850s, the county's timber industry increased in the 1880s as railroad construction opened distant markets and encouraged the construction of large sawmills. By the turn of the century there were several large lumber companies that operate in the county such as the Chronister, Arkansas, and Southern Pine Lumber Companies. Many towns grew up around these company mills, such as Wildhurst and Kilraven, but these were largely abandoned by the 1920s when much of the forests were denuded (CCHC 1986: 17).

There were also sporadic, yet notable, attempts to develop an iron industry. Charcoal, limestone, and iron ore had to be smelted in a furnace to create usable pig iron. Cherokee County had large iron ore deposits and plentiful timber to make charcoal. During the Civil War, the Chapel Hill Manufacturing Company had an operation near present-day Ironton. Powered primarily by slave labor, the operation ended when the slaves were freed, and thieves stole the equipment. There were several large foundries that operated in Rusk. The East Texas Penitentiary was located in Cherokee County until 1917 and provided convict labor. The town of New Birmingham, established to be the Texas iron equivalent of Birmingham, Alabama, was built just two miles southwest of Rusk in 1889. The ultra-modern town featured thirty-two mercantile stores, an ice plant, and what may have been Texas's first electric power plant. Within two years it had a population of 2,000 people, 400 homes, and a three-story hotel that was visited by Jay Gould and Grover Cleveland, however; due to the financial panic of 1896 and a fire at the Tassie Bell furnace, the town of New Birmingham was abandoned along with the Cherokee County iron industry by 1900 (CCHC 1986: 20-22).

With the iron industry no longer profitable, oil would become a driving economic force that would last throughout the twentieth century. Despite multiple failed attempts by others, notably Jack

Colliton who lost over a million dollars, drilling for oil was ultimately successful in Cherokee County. The Humble Oil and Refining Company (now Exxon) operated many wells in the Cary Lake and Boggy Creek fields that were initially producing 10,000 barrels a day (CCHC 1986: 18-19). The oil boom fattened pockets across East Texas with many residents of Cherokee County profiting from oil leases and royalties. Drilling continued throughout the 1940s and 50s and many of the wells are still producing to this day (Roach 1952: 115).

After the Civil War, peaches and tomatoes joined cotton as Cherokee County's chief agricultural exports, all three of which became a mainstay of its economy in the twentieth century. An 8,500-acre commercial peach orchard, located on land previously stripped for iron production, was planted by the Morrill Orchard Company in 1900 and another, the 11,000 tree Dining Car orchard, was established near Ironton. At the suggestion of the American Refrigerated Transit Co. who was shipping the peaches to markets across the U.S., Cherokee County residents diversified their crop and started to grow tomatoes. In 1897 just six freight cars of tomatoes were shipped, but by the next year ninety cars of tomatoes made their way north. Tomatoes proved lucrative as the return on one acre of the fruit was $250 compared to just $30 for an acre of cotton (CCHC 1986:15-16). By 1917, Cherokee County accounted for ninety percent of all Texas tomatoes and the City of Jacksonville has been holding an annual Tomato Festival since 1934.

While the Great Depression led to a decline in cotton production in the 1930s, the economy of Cherokee County remained strong due to the East Texas oil field and the population reached 40,000 by 1940. This trend continued thanks to the growth of manufacturing in Jacksonville after WWII and the expansion of the state hospital in Rusk. By the early 1980s some twenty-six percent of the county's labor force worked in professional and related services, twenty-two percent in manufacturing, and eighteen percent in wholesale and retail trade. The population was about 51,000 in 2010 (Ross 2021).

History of Jacksonville, Texas

Jacksonville began as the village of Gum Creek. The area was identified by Jackson Smith when he served as a scout under General Rusk to hunt down the perpetrators of the Killough Massacre in 1838. Smith returned to that land nine years later to build a blacksmith shop and a log home and became the first postmaster of Gum Springs in 1848. The village began to grow when Dr. Jackson built an office and Tom Dean opened a store near Smith's shop. In 1850 Smith paid to have a townsite of twenty-four blocks surveyed near his home and when it was finished, they decided to name it Jacksonville for obvious reasons (CCHC 1986: 55). By the 1850s there were dozens of businesses operating around the square including a log hotel and a bowling alley. There were Methodist and a Baptist church, a small school, and a Masonic lodge.

The Civil War brought suffering and deprivation to the once prosperous town of Jacksonville. Several hundred men from the area left to fight and the town raised its own Company K of the 18th Texas Infantry. Over the course of the war trade diminished and many of the buildings fell into disrepair. Lawlessness took over and the town developed a bad reputation, known for fights, feuds, and homicides (Jacksonville Centennial Book Committee [JCBC] 1972: 7).

The town was saved with the coming of the International & Great Northern Railroad (IGN) in 1872—but for a price. The railroad bypassed the town by two miles, so the residents had to abandon the old Jacksonville and establish a new townsite beside the tracks. The City of Jacksonville was thus incorporated in 1873 with the IGN train depot being the town center. Buildings were either dismantled and reconstructed or moved by oxen to the new site. The railroad era brought a flurry of new construction. Several saloons and churches sprang up and the town's first school, Jacksonville Collegiate Institute was founded in 1873 (Roach 1952: 173).

Jacksonville expanded in the twentieth century as it became the county center for the trade and export of cotton, peaches, and tomatoes. As a result, the Southern Pacific Railroad expanded their facilities and built yards, warehouses, and shops. (JCBC 1972: 47). The Texas and New Orleans Railroad also constructed various rail facilities to benefit from the growing commercial activity. Other institutions cropped up to serve the burgeoning city. After the first bank failed due to the crash of 1893, the Fleagers operated as the town's only bank until 1903 when one of the owner's absconded with all the deposits. The First National Bank opened in 1904 and has since helped finance local agriculture and business. A hospital known as the Cherokee Sanitarium was built in 1919 and would become the Nann Travis Memorial Hospital. Originally founded in 1854 as the New Danville Masonic Female Academy near Kilgore, Lon Morris Community College moved to Jacksonville in 1908. It was the oldest existing junior college in Texas before it was shuttered due to bankruptcy in 2012 (JCBC 1972: 22-23).

Despite the Great Depression, Jacksonville continued to grow into Cherokee County's largest city. In addition to being a local banking and transportation hub, the city became a wholesale and manufacturing center with a variety of different factories that produced baskets, candy, toys, and plastics. Due to large scale tomato production up until the 1950s, the town was dubbed the "tomato capitol of the world," and continues to have an annual Tomato Fest. The population has increased steadily over the years, from a little over 1,500 in 1904 to almost 15,000 today (City of Jacksonville 2021).

Previous Investigations

Stone Point Services, LLC completed a Texas archeological site file review on March 21, 2023, for a 1.6-kilometer (1-mile) review area around the survey area, utilizing the site files at the Texas Archeological Sites Atlas online database (Figure 21). Two previously recorded archeological sites were recorded within a 1.6-kilometer (1-mile) radius of the project area (Table 3). No archeological projects were identified within a 1.6-kilometer (1-mile) radius of the project area.

Table 3: Previously recorded archeological sites within 1.6-kilometers (1-mile) of project area.

Site #	Date	Description	NRHP Status	Distance from Project Area
41CE11	N/A	Pots found by A. M. Wilson	Unknown	0.73-mi NW
41CE300	1984	Prehistoric artifact scatter	Not Eligible	0.28-mi SW

A Texas State Historic Preservation Office (SHPO) file review was also completed on March 21, 2023. Sources used for this review included the NRHP database, the Texas Archeological Sites Atlas for Cherokee County and the Texas Department of Transportation Historic Property List identified no NRHP listed or eligible historic resources, historic markers, or Recorded Texas Historic Landmarks were identified within 1.6-kilometers (1-mile) of the subject property. Grimes Cemetery is a Historic Texas Cemetery (CE-C004) located 0.885-kilometers (0.55-miles) west of the project area. There is also an unknown cemetery (not recorded as historic) located 0.756-kilometers (0.47-miles) west of the project area.

Figure 21: Archeological sites and surveys within 1.6-kilometers (1-mile) of the project area.

Chapter 3: Project Methodology

The methods for this project meet or exceed the minimum requirements for surveys in Texas established by the THC and the CTA (2020). This project included three phases: 1) background research, 2) field investigations, and 3) laboratory analysis. Each phase of the investigations is described in detail below.

Background Research

The background literature and records search for the project area was conducted through the Texas Archeological Sites Atlas, as well as, through online map services, such as the historic aerial photography housed online at the USDA and the Texas Natural Resources Information System (TNRIS). The records examined at the Texas Archeological Sites Atlas included a review of their online system containing information about previously recorded archeological and historic resources in the vicinity of the present project. The literature review was used to determine if previously recorded cultural resources are in or near the project area, and also served to provide a historical context for the study area. If the location of a site was questionable, or if the Texas Archeological Sites Atlas information appeared inaccurate, a trip was made to the Texas Archeological Research Laboratory (TARL) for additional research.

The background research also included information about standing historic structures and known cemeteries located near the survey area. As noted above, the purpose of the background research is to inform the Stone Point Services crew of potentially important cultural resources that have been previously identified near the survey area. Using data from the background research, our researchers can identify those areas that are more likely to contain archeological sites.

In addition to previous investigations, historic aerial photography and road maps were searched for the presence of potentially important historic structures and properties that may be present in the survey area. A combination of all data was used as a general background for the investigations and the resulting report.

General Land Office (GLO) maps were reviewed from 1851 (Figure 22), 1871 and 1877 (Arlitt 1877; Klappenbach and Lungkwitz 1871; Martin 1851). No structures appeared on these maps. All the property associated with the proposed Royal Oaks Landfill Expansion was part of the land originally patented to Thomas Queved as early as 1851. The GLO maps through 1877 indicated that the land was owned by Thomas Queved since 1851. No structures appear on any GLO map of the survey area.

A combination of all data was used as a general background for the investigations and the resulting report. A review of historical aerial imagery from 1943 (Figure 23), 1954, 1971, 1976, 1982, 1983, 1983, 1995, 2004, 2009, 2010, 2012, 2014, 2016, 2018, and how no structures within the project area (Nationwide Environmental Title Research, LLC [NETR] 2023). Google Earth imagery

(2023) from 1995 (Figure 24) shows the disturbance of half of the northern half of the project area, as well as, roads throughout the project area. The surrounding property was used for agricultural purposes from approximately 1947 to 1983, after which the landfill construction included the addition of roads and portions of the land were razed and cleared. Furthermore, no structures are present within the project area on the historic 1951 (edited 1952) USGS Jacksonville topographic quadrangle map and 1946 (edited 1960) USGS Bullard topographic quadrangle map (Figure 25).

The Potential Archeological Liability Map (PALM) provides a model to indicate general areas of highest and lowest probability for archeological sites (Figure 26). The modelled probabilities for this survey area indicate low or low-to-moderate probabilities for both shallow and deep prehistoric archeological sites throughout the survey area. The bottomland portion of the project area is conducive to forming buried soils. Archeological sites across the bottomland, if present, may be positioned below thick alluvium from successive flooding events. The potential for farming and ranching-related historic resources is low within the floodplain and upland areas due to a lack of historic structures located directly in the project area. The archeological survey will focus increased shovel testing on the highest-probability areas within 100-meters (328-feet) of the tributary and in the upland areas where prehistoric and historic sites may be identified.

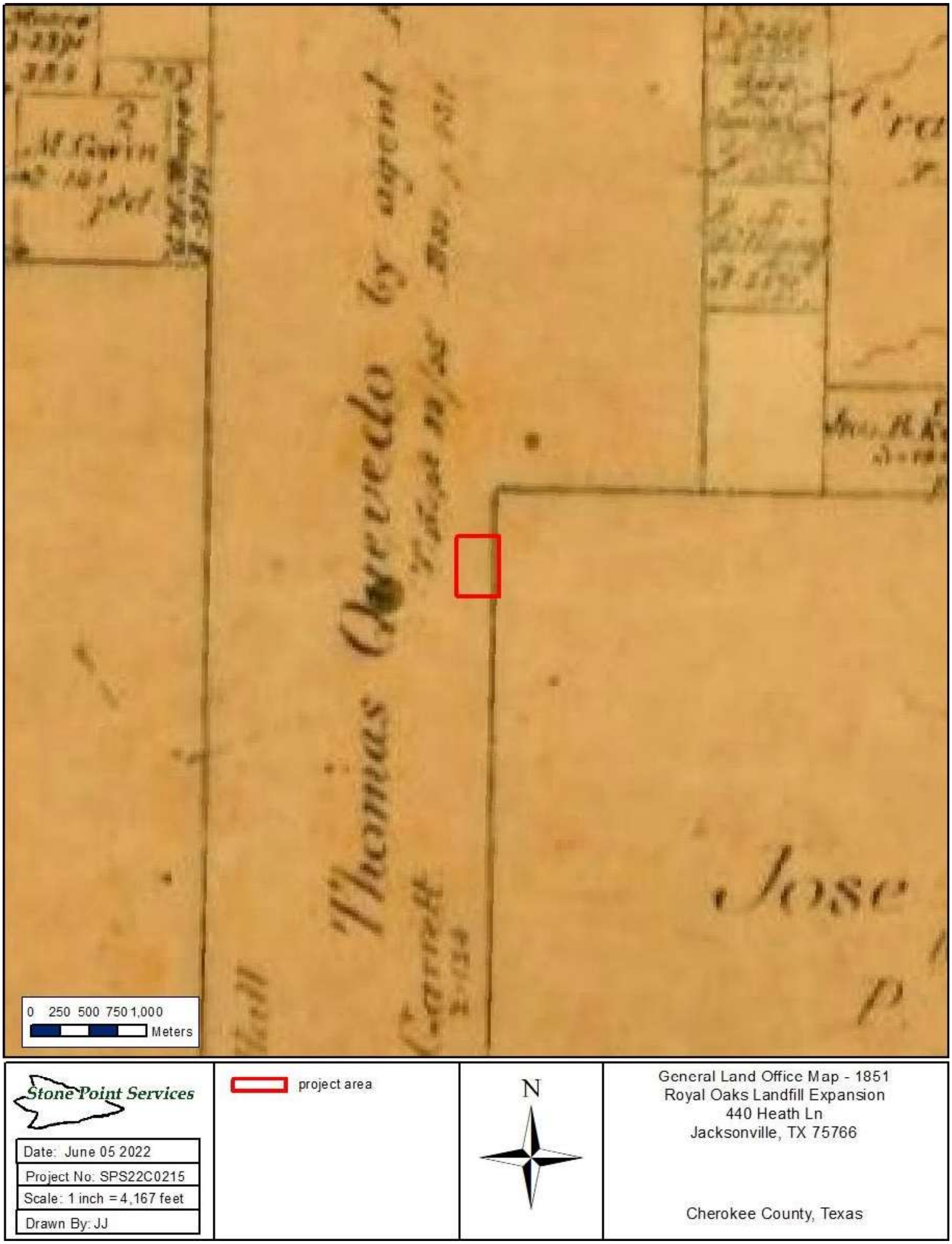

Figure 22: 1851 GLO map of the survey area.

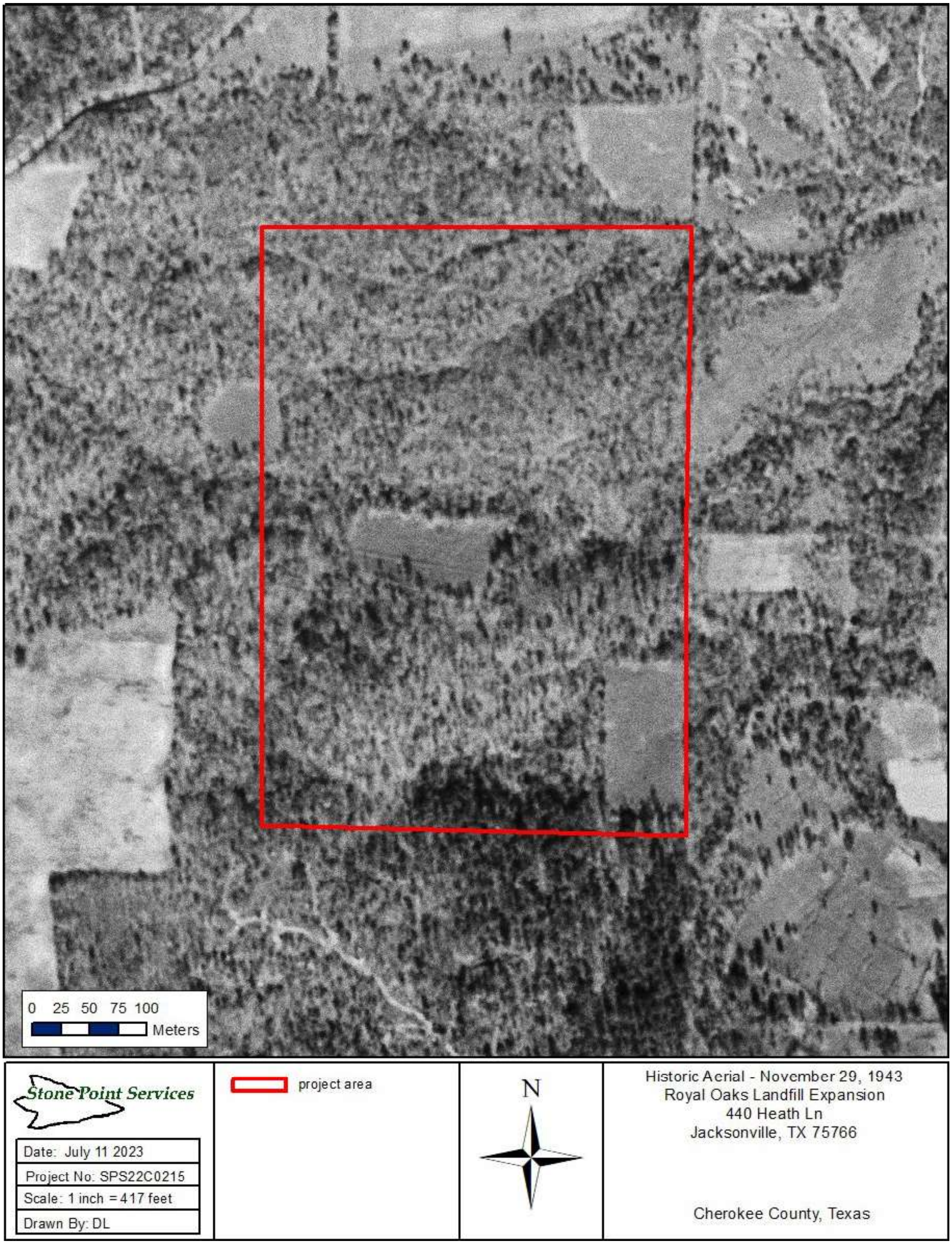

Figure 23: 1943 aerial imagery map of project area.

Figure 24: 1995 historic aerial imagery map of project area.

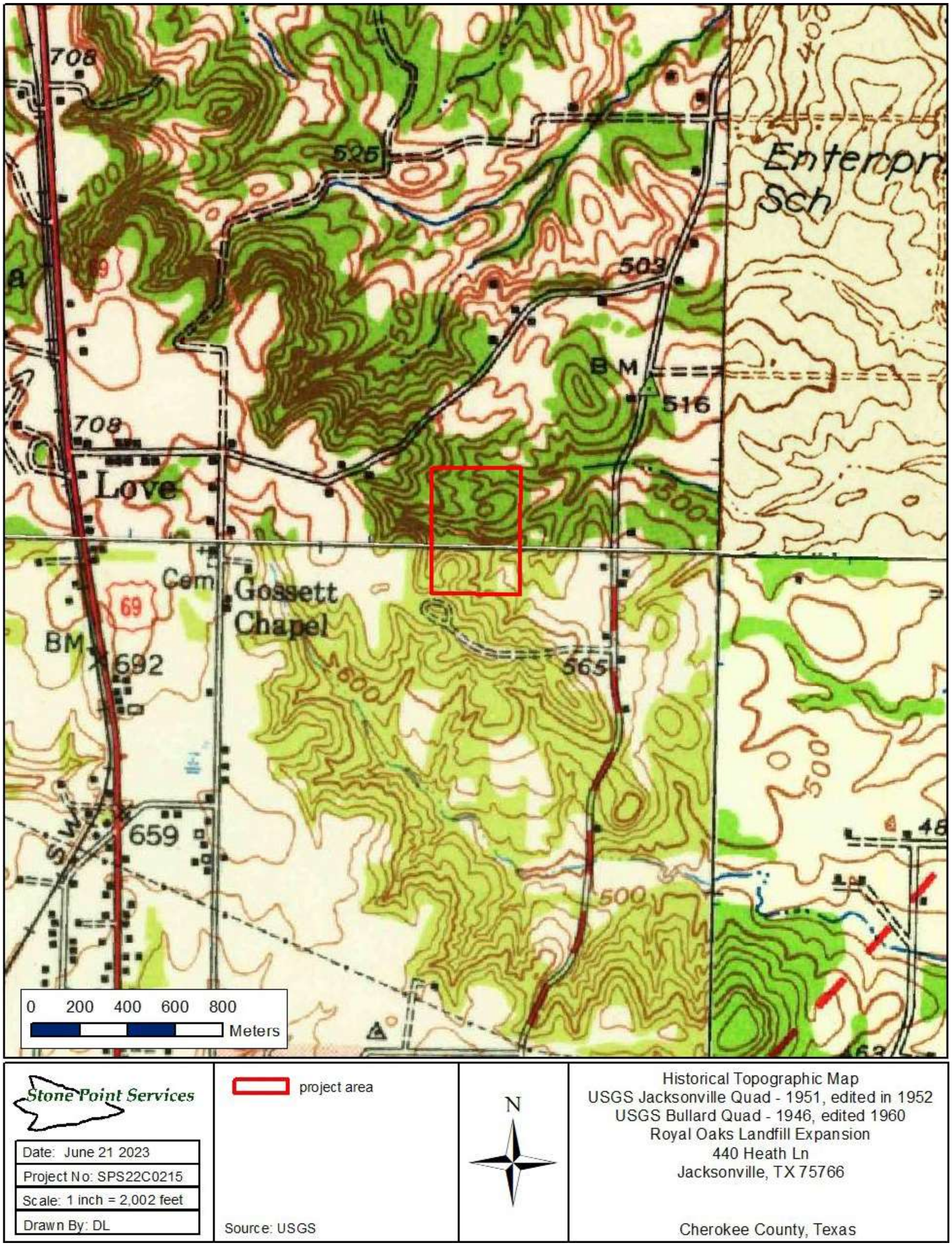

Figure 25: 1951 Jacksonville, 1946 Bullard USGS topographic map of the survey area.

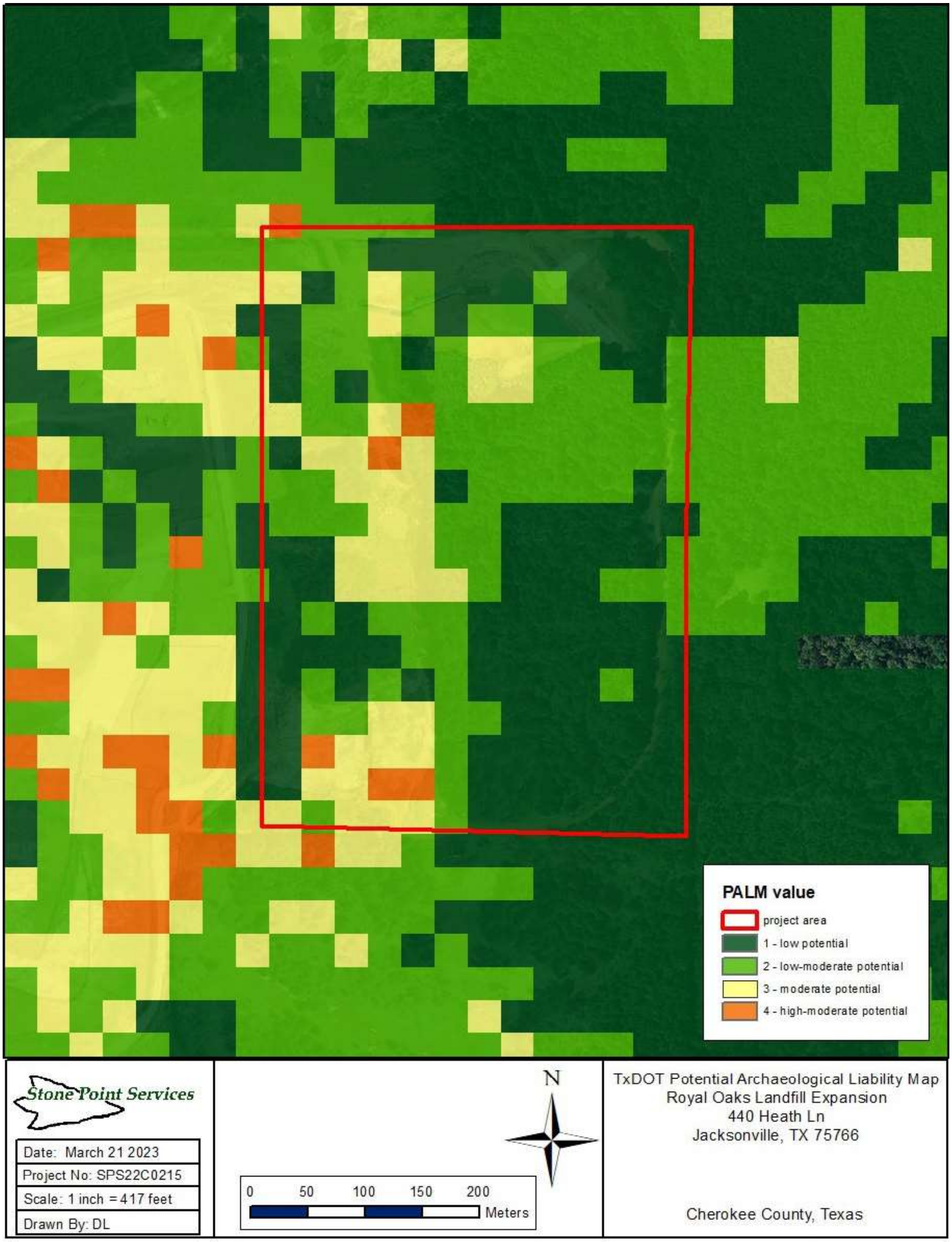

Figure 26: TxDOT Potential Archeological Liability Map.

Field Methods

The archeological investigation of the project area included an intensive archeological survey using both pedestrian survey and shovel testing techniques. Pedestrian survey was used to locate quarries, cemeteries, chimneys, earthworks, and other above ground features, as well as, artifacts lying on the ground surface. Transects used for the pedestrian survey were roughly spaced at 30-meter (100-foot) intervals within the survey area. In addition to the pedestrian survey, shovel tests were spaced at 30-meter (100-feet) intervals along transects spaced 30-meters (100-feet) apart within the project area. Supplemental shovel tests were also placed in areas deemed higher in potential.

Shovel tests measured at least 30-centimeters (12-inches) in diameter and were excavated to sterile subsoil or at least 80-centimeters (31-inches) below ground surface, whichever was encountered first. Each shovel test was excavated in no greater than 20-centimeter (8-inch) levels, as per state guidelines. The location of shovel tests was recorded with a GPS unit (3 to 5-meter (10 to 16-foot) accuracy with differential correction) and plotted on project maps. Soil from shovel testing was screened through 0.64-centimeter (0.25-inch) wire mesh hardware cloth using hand screens. If artifacts are encountered below the ground surface, additional shovel tests will be excavated at 10-meter (33-foot) or closer intervals within the survey boundary to delineate site boundaries. For site delineation efforts, shovel tests will be placed along perpendicular axes from the positive shovel test until two consecutive negative shovel tests are encountered along each axis. A minimum of nine shovel tests will be excavated at any previously recorded or newly identified archeological resource (e.g., initial positive test followed by two negatives in each cardinal direction). Sites were recorded using a GPS unit and plotted on USGS 7.5-minute topographic maps. Site delineation activity will be restricted to property owned by the City of Jacksonville and delineation of any potential site will not extend beyond these property boundaries onto private property. All shovel tests were mapped using ArcGIS 10 with standard shape file formats.

Artifacts, if recovered, were to be field analyzed, photographed, then returned to their original provenience. Each site was to be photographed with high resolution digital color images (ten megapixels or higher) and documented using a Texas archeological site form that was submitted to the TARL upon conclusion of the fieldwork. The Project Archeologist maintained detailed notes on survey methods, sites identified during the survey, and relevant environmental factors associated with each site.

Laboratory Methods

The following post-field activities meet SHPO guidelines. Survey records for survey on public property will be submitted to the archeology laboratory at SFASU for curation. Laboratory methods for preparing notes and additional media will follow the guidelines set forth by the THC and the CTA (2020). Since no artifacts were collected during this survey, no artifacts will be curated as part of this project.

NRHP Eligibility Assessments (Federal)

Archeological resources identified during this survey were evaluated to determine their NRHP eligibility. As per 36 CFR 60.4, four broad criteria should be used when making a NRHP eligibility determination. In order to be considered eligible for the NRHP, a resource must possess integrity (location, design, setting, materials, workmanship, feeling, association), and it must meet at least ONE of the following criteria:

A. it is associated with events that have made a significant contribution to the broad pattern of history;
B. it is associated with the lives of persons significant in the past;
C. it embodies distinctive characteristics of a type, period, or method of construction, or represents the work of a master, possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction;
D. it has yielded, or is likely to yield, information important to history or prehistory.

Criteria A, B, and C are usually applied to historic structures, features, and non-archeological resources (i.e., battlegrounds, etc.). Criterion D is most often used to determine the NRHP eligibility of archeological resources. In most instances, an archeological site or historical resources must be at least 50 years old when it is assessed. In some instances, especially regarding particularly important resources (e.g., the World Trade Center Site), a structure or location may be nominated for the NRHP even if it does not meet the 50-year rule. As a general rule, any property or site greater than 50 years of age may be considered for the NRHP.

Criterion D is the most commonly applied criterion in archeological surveying. The surveyor must try to determine if the site in question has adequate context for it to answer important questions about history or prehistory. The ultimate decision of eligibility is generally determined by the SHPO and/or the federal agency requesting the survey. The surveyor can make recommendations, but ultimately the SHPO or the federal agency will make the final determination of eligibility, either through concurring with a recommendation or not.

Archeological survey, and associated site delineation, is rarely sufficient to make a final ruling of a site's NRHP eligibility. In most cases, the archeologist will recommend a site as either "potentially eligible" for the NRHP or "not eligible" for the NRHP. If a recommendation of "potentially eligible" is given, and the SHPO or federal agency concurs, the site should be treated as if it is "eligible" for nomination to the NRHP. Additional testing of the site will generally be sufficient to make the final determination of NRHP eligibility. If a recommendation of "not eligible" is made for the site, and if the SHPO and/or federal agency concur, the site is then considered to be unlikely to provide information important to our understanding of history or prehistory.

Archeologists generally look for a certain set of criteria to determine if a site possesses integrity. The most common keys in making this determination are location, setting, materials, and association. When archeologists speak of a site being "intact" or if they mention "context" they usually are referring to whether a site has sufficient deposits that appear to be undisturbed to answer the important questions about the prehistoric and historic past that will make it potentially eligible under Criterion D. The materials (artifacts) present can aid in dating the site and assigning cultural association. If a site is associated with a specific group or period, and that association can be determined through archeological research, then the site may retain sufficient integrity to be recommended potentially eligible for the NRHP. If a site is intact, this means that the site has retained its original location and setting and has not been disturbed. As an example, if an archeological site has buried deposits and ample time-diagnostic artifacts for dating the site, but there is evidence of disturbance, this would call into the question the reliability of any data recovered from the site. As such, a site may be recommended not eligible for the NRHP if it is highly disturbed. Another example would be a small prehistoric site with potentially intact deposits but no time-diagnostic artifacts or organic remains to help identify the age and association of the site. In this latter case, an eligibility determination of not eligible may be rendered. Small lithic (stone) scatters are often determined not eligible due to the lack of research potential.

Historic archeological sites pose a separate but similar set of issues. Although a prehistoric site may sometimes have evidence of a structure, they are far more common on historic sites. A historical structure on a site may be recommended not eligible for the NRHP due to it not meeting Criteria A, B, or C, and yet the archeological site that surrounds the structure may in fact be eligible for the NRHP under Criterion D (information potential). Although the structure is in poor condition and possibly not eligible for the NRHP, the archeological site might contain information about the period in which the structure was used. In this case, the structure may be a contributing element to the site's NRHP eligibility under Criterion D.

State Process - State Antiquities Landmark (SAL) Eligibility Assessments

The ACT requires state agencies and political subdivisions of the state (including cities, counties, river authorities, municipal utility districts, and school districts) to notify the THC of ground-disturbing activity on public land and work affecting state-owned historic buildings. The law also established the designation of State Antiquities Landmark, which may be applied to historic buildings and archeological sites. The Antiquities Code (Texas Natural Resource Code, Title 9, Chapter 191, Subchapter D, Section 191.092) details the eligibility requirements for designation of structures or buildings as a SAL. The criteria for evaluation of archeological sites as a SAL are also contained in Chapter 26 of the Texas Administrative code, (Subchapter C, Rule 26.10). Pertaining to archeological resources, sites, objects, buildings, artifacts, implements, and locations of historical, archeological, scientific, or educational interest, including those pertaining to prehistoric and historical American Indians or aboriginal campsites, dwellings, and habitation sites, their artifacts and implements of culture, as well as, archeological sites of every character that are located in, on, or under the surface of any land belonging to the State of Texas or to any county, city, or political subdivision of the state are considered SALs and are eligible for designation (Texas Natural Resource Code, Title 9, Chapter 191, Subchapter D, Section 191.092).

There are four categories of resources with regard to SAL designation: archeological sites, shipwrecks, caches and collections and historic buildings and structures. The THC considers the following criteria when evaluating archeological sites and historic buildings and structures for designation as a SAL:

Archeological Sites
There are five criteria for assessing an archeological site for SAL designation under Rule 26.10 *Criteria for Evaluating Archeological Sites*. One or more of the criteria may be used for assessment of the site.

1) The site must have the potential to contribute to a better understanding of the history or prehistory of Texas by the addition of new and important information;

2) the site's archeological deposits and artifacts are preserved intact within the site which would support research potential or preservation interests of the site;

3) the site possesses a unique or rare attributes concerning Texas history or prehistory;

4) the study of the site provides an opportunity to test theories and methods of preservation which would contribute new scientific knowledge; and

5) there is a high likelihood that vandalism and relic collecting has occurred or could occur leading to a need for landmark designation to ensure maximum legal protection or further investigations to mitigate the effects of vandalism or relic collecting if the site cannot be protected.

Historic Structures
In order to be considered for SAL designation, a historic structure must first be listed with the NRHP. Buildings, structures, cultural landscapes and non-archeological sites, objects and districts may be designated under Rule 26.19 *Criteria for Evaluating Historic Structures* if they meet specific qualifying criteria.

1) The property must meet at least one of the following:

a) the property is associated with events making a significant contribution to broad patterns of our history, including importance to a particular cultural or ethnic group;

b) the property is associated with the lives of significant persons from the past;

c) the property embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction;

d) the property has yielded, or may be likely to yield, information important to Texas culture or history;

2) the property retains integrity at the time of the nomination, as determined by the executive director of the commission; and

3) the property must be listed in the National Register of Historic Places, either individually, or as a contributing property within a historic district.

The ACT requires state agencies and political subdivisions of the state (including cities, counties, river authorities, municipal utility districts, and school districts) to notify the THC of ground-disturbing activity on public land and work affecting state-owned historic buildings. The law also established the designation of SAL, which may be applied to historic buildings and archeological sites. For instance, if Texas public property is involved, or if State funding is involved, then the contracting archeologist will form recommendations for SAL eligibility. Recommendations for SAL designations are made on the basis of information gathered during fieldwork, background research, and laboratory analyses.

In Texas, all unassessed sites that have not been determined ineligible for the NRHP by a federal agency and received concurrence from THC, are treated as eligible by THC until determined otherwise based on further fieldwork or other considerations. Archeological resources, sites, objects, buildings, artifacts, implements, and locations of historical, archeological, scientific, or educational interest, including those pertaining to prehistoric and historical American Indians or aboriginal campsites, dwellings, and habitation sites, their artifacts and implements of culture, as well as, archeological sites of every character that are located in, on, or under the surface of any land belonging to the State of Texas or to any county, city, or political subdivision of the state are considered SALs and are considered eligible for designation until determined otherwise (Texas Natural Resource Code, Title 9, Chapter 191, Subchapter D, Section 191.092).

Contracting archeologists recommend sites as either eligible, ineligible, or unassessed or for designation as a SAL. The term “potentially eligible” is not a recognized category for recommendation when assessing SAL potential. There is no federal involvement with SAL eligibility. Further, not all sites that are eligible for the NRHP are similarly eligible for SAL designation. Likewise, not all sites that are eligible for SAL designation are similarly eligible for NRHP inclusion. Laboratory Methods

The following post-field activities meet SHPO guidelines. Upon completion of all field investigations, if recovered in the field, recovered artifacts were to be returned to the Stone Point Services Lab and washed, catalogued, and analyzed. If not recovered in field, artifacts were photographed and measured for documentation. Records for survey on private property will be submitted to SFASU for curation. Laboratory methods for preparing artifacts, notes, and additional media will follow the guidelines set forth by the THC and the CTA (2020) and by TARL (2023). Since no artifacts were collected during this, no artifacts will be curated as part of this project.

Chapter 4: Results and Recommendations

Stone Point Services, LLC conducted a cultural resource survey of the proposed Royals Oaks Landfill Expansion project, located in the city of Jacksonville in Cherokee County, Texas for Hydrex Environmental. The proposed project is approximately 370 by 526-meters (1214 by 1725-feet) rectangular parcel of property in a bottomland and upland setting adjacent to the existing Republic Services Royal Oaks Landfill and is comprised of 19.5-hectares (48.2-acres). The anticipated depth of impact (vertical APE) is 15.2-meters (50-feet) below the present ground surface. It is understood that this work will operate under NWP 39 through the USACE Fort Worth District and that the USACE will have review authority for this project (USACE# SWF-2021-00405). As such, this project will be reviewed under Section 106 of the NHPA. Furthermore, as the proposed undertaking is located on city property it is understood that this work will include permitting and regulatory oversight by the THC in order to comply with the requirements of the ACT. This survey was conducted as part of USACE permit application # SWF-2021-00405. The survey area consists of a city owned landfill and wooded area. The subject property is surrounded by agricultural fields, floodplain, and woodlands.

Prior to initiation of field investigations, background research was conducted to identify any previously recorded surveys or NRHP listed, eligible, or potentially eligible historic resources within a 1.6-kilometer (1-mile) review area of the project. Grimes Cemetery is a Historic Texas Cemetery (CE-C004) located 0.885-kilometers (0.55-miles) west of the project area. There is also an unknown cemetery (not recorded as historic) located 0.756-kilometers (0.47-miles) west of the project area. A review of the Texas Archeological Sites Atlas and the NRHP Inventory for Cherokee County was conducted on March 21, 2023. The proposed Royal Oaks Landfill project area has not been previously surveyed for archeological or historic resources. No NRHP properties were documented in the survey area. No archeological sites were previously documented within the project area. Two archeological sites have been previously recorded within 1.6-kilometers (1-mile) of the current project area. No archeological surveys were documented within 1.6-kilometers (1-mile) of the current project area.

Field investigations were conducted May 30 to 31, 2023, by Principal Investigator Todd McMakin and Junior Archeologist Brad Husemann. Survey methods included pedestrian survey spaced at 15-meter (50-foot) intervals within the survey area. Shovel tests were placed at 30-meter (100-foot) intervals along transects spaced at 30-meters (100-feet) apart. Supplemental shovel tests were also placed in areas deemed higher in potential. The minimum number of shovel tests required for the 19.5-hectares (48.2-acres) tract is 55 shovel tests (THC 2020). In total, 57 shovel tests were excavated within the project area, representing approximately 1.18 shovel tests per acre. All shovel tests were negative for cultural materials.

The survey included an assessment of direct effects and visual effects. Field investigations revealed that ground disturbance had occurred in the past throughout the project area as the result of various developments of the landfill. No archeological sites or isolated finds were recorded during this survey.

Project Soil Discussion

As noted above, soils across the survey area primarily consist of Trawick-Bub complex, 8 to 40 percent slopes (Map Unit: Bt), Angelina (Map Unit: Md), and Nacogdoches fine sandy loam, sloping, eroding (Map Unit: Ng). The Trawick series are moderately deep, well drained, moderately slowly permeable soils that formed mainly in the Weches geologic formation, which is rich in glauconite. These soils are on gently sloping to steep uplands. Slopes range from 2 to 45 percent. The Bub series consists of well drained, very slowly permeable soils on uplands. These soils are shallow to glauconitic geologic materials. They are on moderately steep to steep hilly redlands of East Texas. The Nacogdoches series consists of deep, well drained, moderately slowly permeable soils that formed in thick marine sediments high in glauconite. These soils are on gently to strongly sloping uplands. The Angelina series consists of very deep, very poorly drained, slowly permeable soils that formed in acid, stratified loamy sediments. These soils are on flood plains and are ponded for long periods of time. Slopes are less than 1 percent. The Angelina series is the only series in the survey area consisting of Holocene alluvium.

Fifty-seven shovel tests were completed across the survey area based off a combination of a 30-meter (98-foot) grid, as well as, supplemental shovel tests based on topography and obvious disturbances (Figures 27-30). Average shovel test depth overall was 33-centimeters (13-inches) with the shallowest terminated due to bedrock at 18-centimeters (7-inches).

Shovel tests in the Trawick-Bub (Bt) complex (Figures 31 and 32) that were left intact enough to read showed varying values of brown to reddish brown sandy loams or loamy sands (A-horizon) overlaying strong brown to yellowish red clays to sandy loams (B-horizon). In some places, an E-horizon consisting of a reddish yellow sandy loam was visible. This soil complex covered the majority of the project area, except in the northern portion.

Shovel tests in the Angelina series (Figure 32) that were left intact enough to read showed varying horizons, due to local variations in deposition. In general, these shovel tests revealed a strong brown sandy clay loam punctuated by thick lenses of coarse sand and gravel, which may represent intense flooding episodes.

Only one shovel test was placed in the Nacogdoches series (Figure 31) and it was too disturbed to show intact horizons.

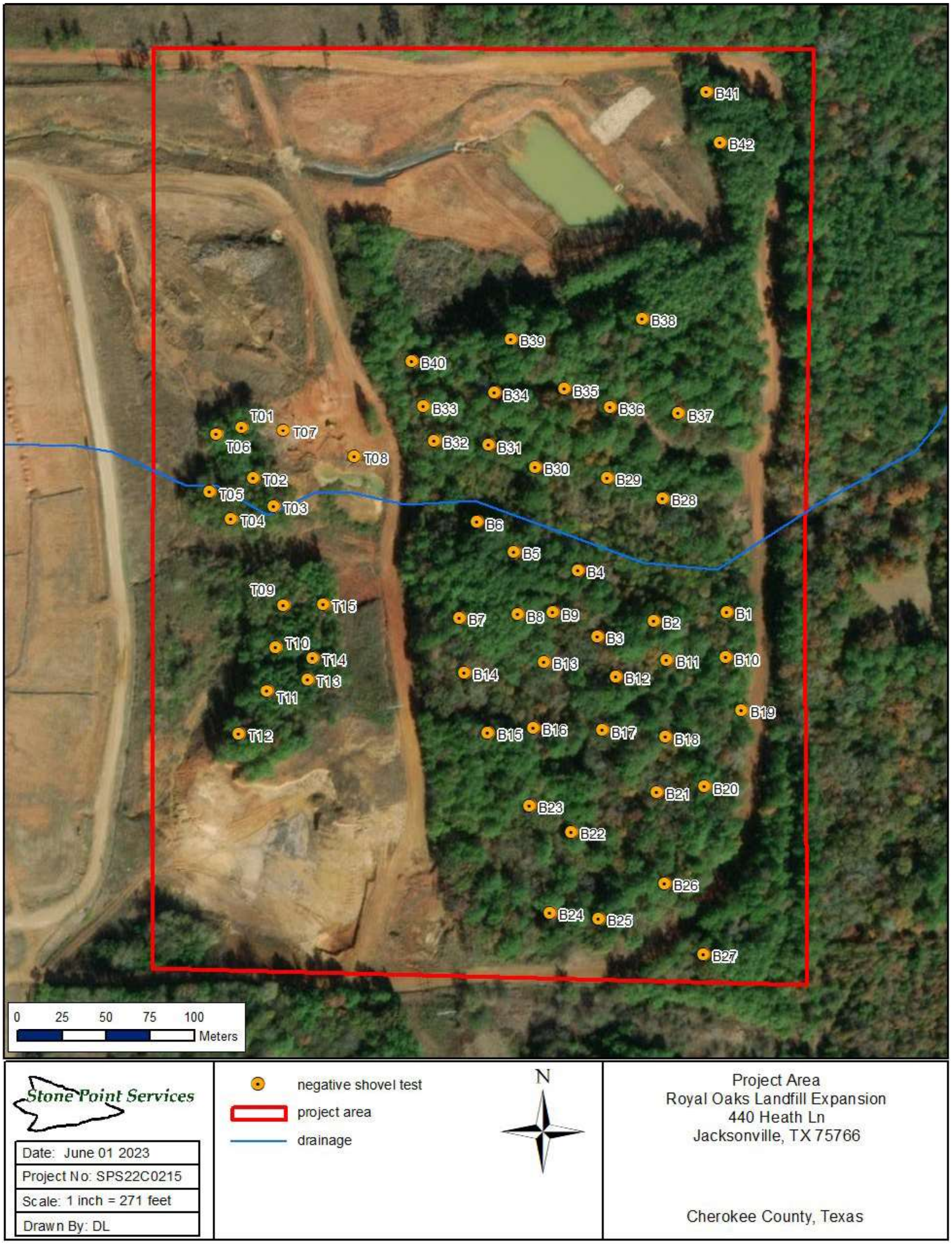

Figure 27: Project area map with project shovel test locations

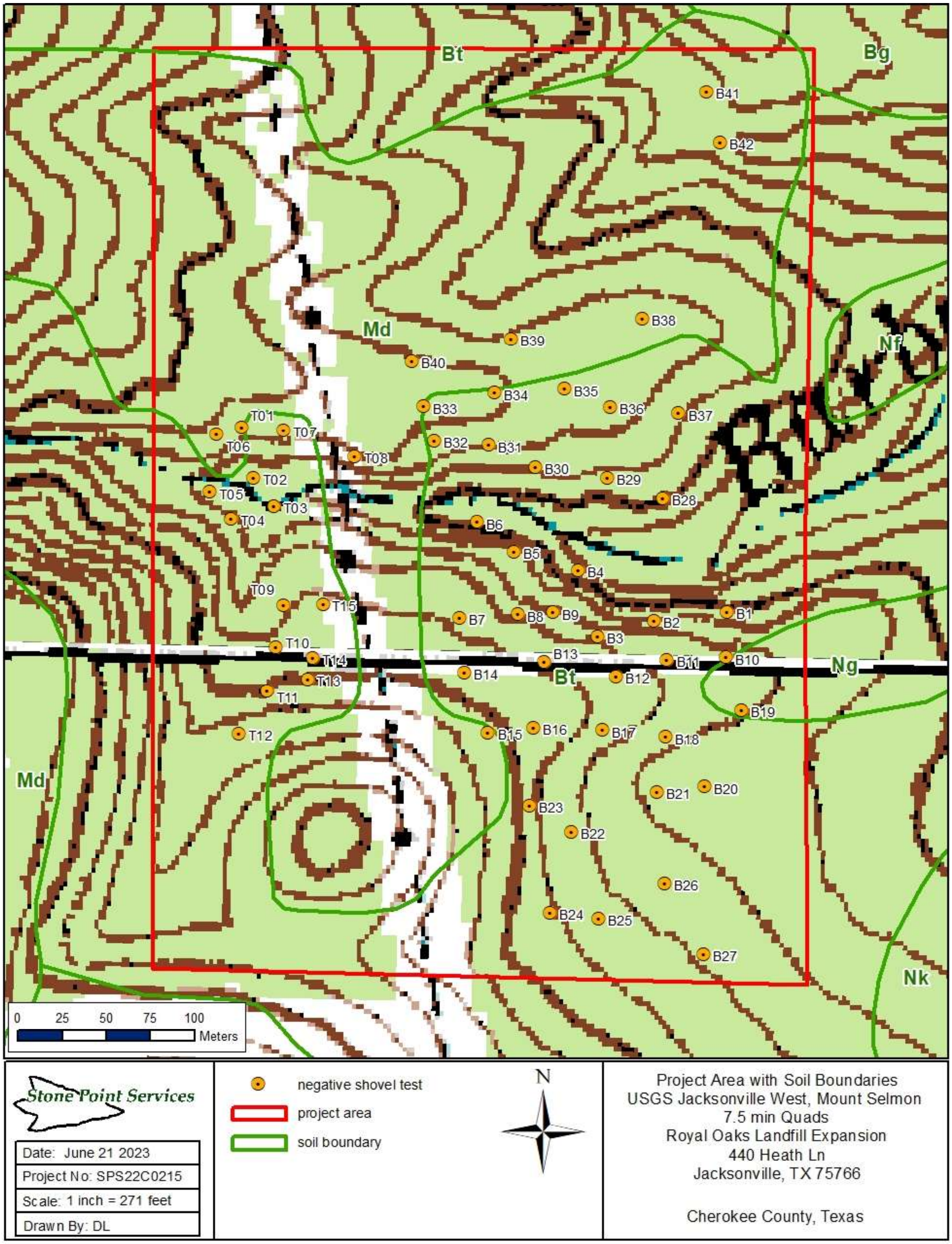

Figure 28: USGS Jacksonville West and Mount Selmon 7.5-min Quad maps showing shovel test locations

Figure 29: Disturbance map with shovel tests

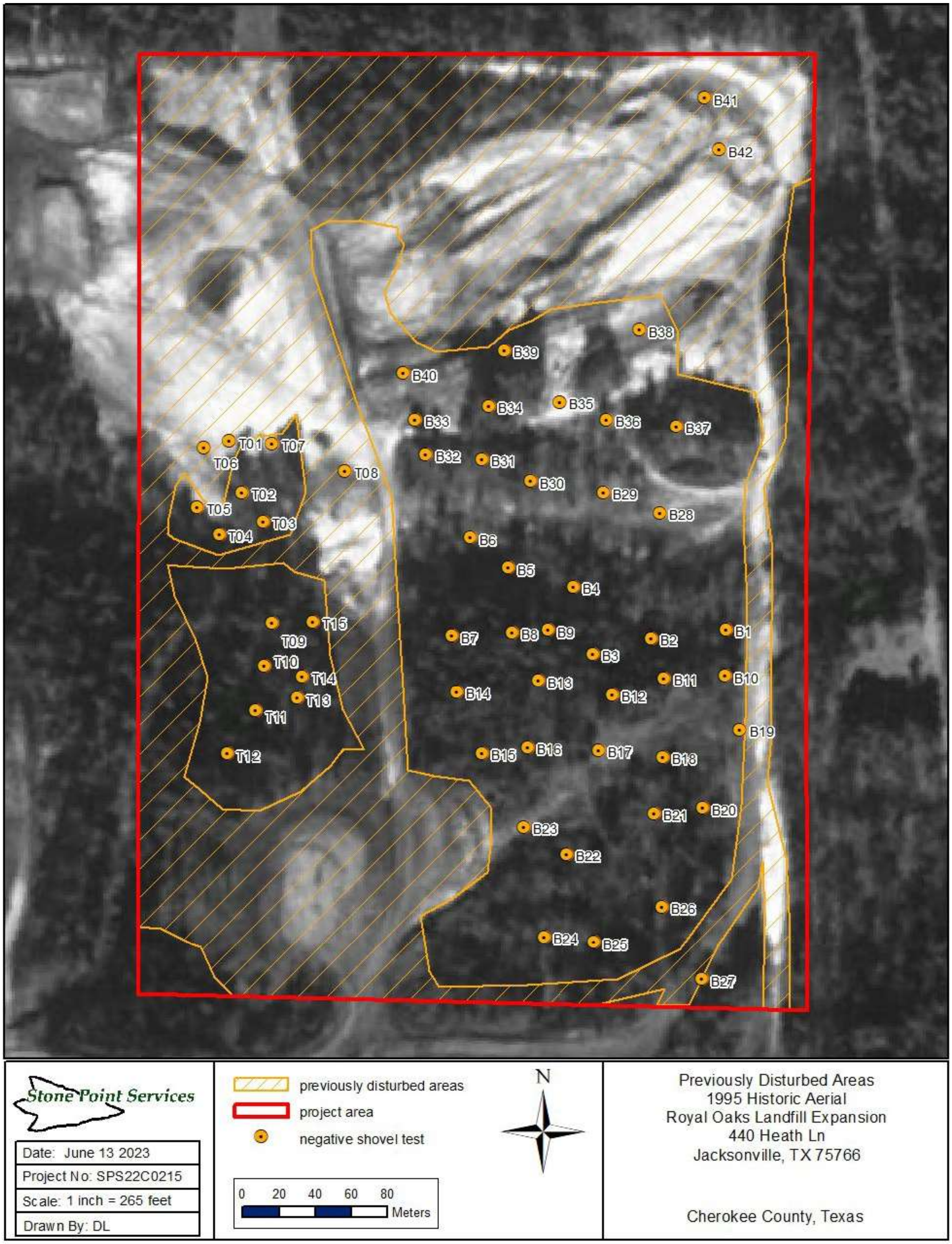

Figure 30: Disturbance map with shovel tersts, overlain on 1995 aerial image.

Figure 31: Intact genetic horizons of the Trawick-Bub soil complex with yellowish soil (B9)

Figure 32: Intact genetic horizons of the Trawick-Bub soil complex with reddish soil (B11)

Figure 33: Nacogdoches soil (Disturbed) (B19)

Figure 34: Intact horizons of the Angelina soil series (B42)

Landscape Transformations

Indicators of modern landscape transformations were evident in the northern and southwestern portions of the survey area. Large swaths of the survey area have already been mechanically scraped and deposited in push piles (Figures 9 and 12). A large detention pond (Figure 11) has been excavated in the northern part of the survey area and an earthen easement (Figure 10) has been constructed directly to the east. Shovel testing was mainly focused in areas with intact soils.

Assessment of Deep Testing Potential

The CTA guidelines require that a cultural resources survey must conduct mechanical prospection (deep testing) in areas of Holocene-aged deposition where the project-related impacts will extend below the reach of shovel testing capabilities. The Angelina series (map unit: Md) is mapped across portions of the Royal Oaks project area and consists of very deep, very poorly drained, slowly permeable soils formed in stratified loamy sediments of Holocene age. The Angelina series soils occur on marshy flood plains and are ponded for long periods of time. Due to the age of the parent material in which the Angelina soils formed, it could potentially contain archeological materials that became buried below appreciably-thick alluvium. In the case of this particular Subject Property, however, soil constituents comprising the Angelina series have been removed across the entirety of the soil map unit such that the Angelina soil unit no longer exists within the APE. The Angelina series soils have been removed to expose the basal Weches and Queen City sand Formations of Eocene age (Figures 35 and 36). As noted above in Figures 29 and 30, historic imagery attests to the removal of soil across the survey area that has altered the landscape where clayey floodplain soils of the Angelina series have been completely removed by heavy machinery. LiDAR imagery provided above also shows the areas of mechanical cutting where the Angelina soils were mined for use elsewhere. The removal of the Angelina series soil unit by heavy machinery occurred over the past decades and is not a recent occurrence.

The underlying geologic unit for the area is the Queen City Sand Formation (Map Unit Eqc) and the Weches Formation (Map Unit Ew). The Queen City Sand Formations consists of fine grained to medium grained sand and clay with localized beds of glauconite-quartz sandstone/greensand that contains exposures of ferruginous ledges and rubble. The Weches Formation contains stratigraphic members consisting of marl, quartz sand, glauconitic-rich sandstone, and clay and extends approximately 15 to 27-meters (50 to 90-feet) below the surface region (BEG 2023). Both the Queen City Sand Formation and the Weches Formation are represented across the survey area and are exposed surrounding the basin where the Holocene-aged clayey Angelina soil units was mined. At this time the Holocene-aged Angelina soil unit has been removed from the area by heavy machinery and the current surface exposure consists of a mechanically cut (truncated) surface of the Weches Formation in the southern portion of the survey area, and the Queen City Sand unit in the northern portion of the survey area. Green-colored glauconite sandstone, which forms across deep ocean floors, is observable at the ground surface in the northern portion of the survey area (Figure 37). In the southern portion of the survey area, the Angelina series has been scraped away to expose alternating beds of sandstone and clay associated with the Weches Formation. Due to the fact that Holocene-aged deposits across the survey area have been removed by machinery and transported away from the survey area for use elsewhere, as demonstrated by exposed Eocene-aged rock at the ground surface, deep testing for archeological materials was not conducted as part of this cultural resources survey.

Figure 35: Truncated Weches Formation at ground surface with no remaining Holocene unit

Figure 36: View of truncated Weches Formation below mechanical push pile

Figure 37: Exposed glauconitic sandstone (greensand) visible at ground surface

Management Recommendations

The survey included both an assessment of direct effects. No NRHP listed, eligible, or potentially eligible structures, archeological sites or other historic properties were present in the APE-DE. Therefore, it is our recommendation that this project be allowed to proceed as planned.

Post Review Discovery

If any new Historic Properties or cultural material (including archeological material such as flint or stone tools, pottery, fire hearths, human remains, historic glass, ceramics, metal, or building foundations) are exposed during construction or disturbance activities, work should cease in the immediate area; work can continue where no historic properties or cultural materials are present. If historic properties are found, please contact the THC's History Programs Division at 512-463-5853 to consult on further actions that may be necessary to protect historic properties. If cultural materials are encountered, please contact the THC's Archeology Division at 512-463-6096 to consult on further actions that may be necessary to protect the cultural remains.

All records produced as a result of this project will follow the guidelines set forth by the THC and the CTA (2020) and will be submitted to SFASU in Nacogdoches, Texas for curation.

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Appendix A: Shovel Test Log

STP	Cultural Material	Location	Latitude	Longitude	Depth and Soil Descriptions
B1	None	Upland Area South of Creek	32.000405	-95.259581	0-11 cm: 7.5YR 4/3 brown sandy loam 11-24 cm: 7.5YR 5/6 strong brown clay 24 cm: Terminated in subsoil
B2	None	Upland Area South of Creek	32.000353	-95.260019	0-12 cm: 7.5YR 4/3 brown loamy sand 12-26 cm: 7.5YR 5/6 strong brown loamy sand 26 cm: Terminated at rock impasse
B3	None	Upland Area South of Creek	32.000268	-95.260355	0-30 cm: 7.5YR 4/3 brown loamy sand 30-44 cm: 7.5YR 5/6 strong brown loamy sand 44 cm: Terminated at rock impasse
B4	None	Upland Area South of Creek	32.000602	-95.260479	0-28 cm: 7.5YR 4/3 brown loamy sand 28-40 cm: 7.5YR 5/6 strong brown clay 40 cm: Terminated at rock impasse
B5	None	Upland Area South of Creek	32.00069	-95.260866	0-29 cm: 5YR 5/4 reddish brown loamy sand 29 cm: Terminated at rock impasse
B6	None	Upland Area South of Creek	32.000837	-95.261092	0-30 cm: 7.5YR 4/3 brown loamy sand 30-32 cm: 5YR 5/4 reddish brown loamy sand 32 cm: Terminated at rock impasse
B7	None	Upland Area South of Creek	32.000344	-95.261186	0-31 cm: 5YR 4/3 reddish brown loamy sand 31-33 cm: 5YR 4/6 yellowish red sandy clay 33 cm: Terminated at rock impasse
B8	None	Upland Area South of Creek	32.000369	-95.260835	0-20 cm: 7.5YR 4/3 brown loamy sand 20-35 cm: 7.5YR 5/6 strong brown loamy sand 35 cm: Terminated at rock impasse
B9	None	Upland Area South of Creek	32.000383	-95.260624	0-22 cm: 10YR 5/2 grayish brown loamy sand 22-45 cm: 10YR 6/6 brownish yellow loamy sand 45 cm: Terminated at rock impasse
B10	None	Upland Area South of Creek	32.000173	-95.25958	0-31 cm: 5YR 4/3 reddish brown loamy sand 31-35 cm: 5YR 4/6 yellowish red loamy sand 35 cm: Terminated at rock impasse
B11	None	Upland Area South of Creek	32.000153	-95.259936	0-23 cm: 7.5YR 4/3 brown loamy sand 23-36 cm: 5YR 5/6 yellowish red loamy sand 36 cm: Terminated at rock impasse

STP	Cultural Material	Location	Latitude	Longitude	Depth and Soil Descriptions
B12	None	Upland Area South of Creek	32.000065	-95.260237	0-21 cm: 7.5YR 4/3 brown loamy sand 21-31 cm: 10YR 6/6 brownish yellow loamy sand 31 cm: Terminated at rock impasse
B13	None	Upland Area South of Creek	32.00013	-95.260672	0-16 cm: 7.5YR 4/3 brown loamy sand 16-36 cm: 7.5YR 4/6 strong brown loamy sand 36 cm: Terminated at rock impasse
B14	None	Upland Area South of Creek	32.000067	-95.261149	0-30 cm: 5YR 4/3 reddish brown loamy sand 30-34 cm: 5YR 5/6 yellowish red clay 34 cm: Terminated at rock impasse
B15	None	Upland Area South of Creek	31.999762	-95.260998	0-19 cm: 5YR 4/3 reddish brown loamy sand 19-25 cm: 5YR 5/6 yellowish red clay 25 cm: Terminated at rock impasse
B16	None	Upland Area South of Creek	31.999794	-95.260729	0-31 cm: 5YR 4/3 reddish brown loamy sand 31-42 cm: 5YR 5/6 yellowish red loamy sand 42 cm: Terminated at rock impasse
B17	None	Upland Area South of Creek	31.999787	-95.260311	0-42 cm: 5YR 5/3 reddish brown loamy sand 42 cm: Terminated at rock impasse
B18	None	Upland Area South of Creek	31.99976	-95.259934	0-28 cm: 5YR 4/3 reddish brown loamy sand 28-33 cm: 5YR 5/6 yellowish red loamy sand 33 cm: Terminated at rock impasse
B19	None	Upland Area South of Creek	31.999904	-95.259484	0-27 cm: 5YR 5/4 reddish brown clay and 5YR 5/4 reddish brown sandy loam and 10YR 6/6 brownish yellow gravel (Disturbed) 27 cm: Terminated at rock impasse
B20	None	Upland Area South of Creek	31.99951	-95.259693	0-31 cm: 5YR 5/4 reddish brown sandy loam 31-33 cm: 5YR 5/6 yellowish red clay 33 cm: Terminated at rock impasse
B21	None	Upland Area South of Creek	31.999478	-95.259978	0-31 cm: 5YR 5/4 reddish brown sandy loam 31-34 cm: 5YR 5/6 yellowish red clay 34 cm: Terminated at rock impasse
B22	None	Upland Area South of Creek	31.999265	-95.260486	0-39 cm: 5YR 5/4 reddish brown sandy loam 39 cm: Terminated at rock impasse
B23	None	Upland Area	31.999395	-95.260741	0-34 cm: 5YR 5/4 reddish brown sandy loam 34-39 cm: 5YR 5/6 yellowish red sandy clay

STP	Cultural Material	Location	Latitude	Longitude	Depth and Soil Descriptions
		South of Creek			39 cm: Terminated at rock impasse
B24	None	Upland Area South of Creek	31.998851	-95.260606	0-41 cm: 7.5YR 5/4 brown sandy loam 41 cm: Terminated at rock impasse
B25	None	Upland Area South of Creek	31.998828	-95.260314	0-37 cm: 5YR 4/3 reddish brown sandy loam 37-42 cm: 5YR 5/6 yellowish red sandy clay 42 cm: Terminated at rock impasse
B26	None	Upland Area South of Creek	31.999014	-95.259923	0-36 cm: 5YR 4/3 reddish brown sandy loam 36 cm: Terminated at rock impasse
B27	None	Upland Area South of Creek	31.998654	-95.259679	0-43 cm: 5YR 4/3 reddish brown sandy loam and 10YR 6/6 brownish yellow sand (Disturbed) 43 cm: Terminated due to disturbance
B28	None	Upland Area North of Creek	32.00098	-95.259981	0-19 cm: 7.5YR 5/3 brown loamy sand 19 cm: Terminated at rock impasse
B29	None	Upland Area North of Creek	32.001075	-95.260317	0-17 cm: 5YR 4/3 reddish brown loamy sand 17-26 cm: 5YR 5/6 yellowish red loamy sand 26 cm: Terminated at rock impasse
B30	None	Upland Area North of Creek	32.001125	-95.260746	0-18 cm: 5YR 5/3 reddish brown loamy sand 18 cm: Terminated at rock impasse
B31	None	Upland Area North of Creek	32.00123	-95.26103	0-24 cm: 5YR 5/3 reddish brown loamy sand 24 cm: Terminated at rock impasse
B32	None	Upland Area North of Creek	32.001246	-95.26136	0-8 cm: 5YR 4/3 reddish brown sandy loam 8-21 cm: 5YR 5/6 yellowish red clay 21 cm: Terminated in subsoil
B33	None	Upland Area North of Creek	32.001422	-95.261427	0-23 cm: 7.5YR 5/3 brown sandy loam 23-42 cm: 7.5YR 6/6 reddish yellow sandy loam 42-52 cm: 5YR 5/6 yellowish red sandy clay loam 52 cm: Terminated in subsoil
B34	None	Upland Area North of Creek	32.001499	-95.261	0-23 cm: 7.5YR 5/3 brown sandy loam 23-45 cm: 5YR 5/4 reddish brown sandy loam 45 cm: Terminated at rock impasse

STP	Cultural Material	Location	Latitude	Longitude	Depth and Soil Descriptions
B35	None	Upland Area North of Creek	32.001526	-95.260582	0-27 cm: 7.5YR 5/4 reddish brown sandy loam 27 cm: Terminated at rock impasse
B36	None	Upland Area North of Creek	32.00144	-95.260306	0-16 cm: 7.5YR 5/3 brown sandy loam 16-25 cm: 5YR 5/3 reddish brown sandy loam 25 cm: Terminated at rock impasse
B37	None	Upland Area North of Creek	32.001414	-95.259896	0-29 cm: 7.5YR 5/4 brown sandy loam 29 cm: Terminated at rock impasse
B38	None	Upland Area North of Creek	32.001895	-95.260124	0-18 cm: 5YR 5/6 yellowish red clay loam 18 cm: Terminated in subsoil
B39	None	Upland Area North of Creek	32.001777	-95.260911	0-30 cm: 7.5YR 5/3 brown sandy loam 30-36 cm: 5YR 5/4 reddish brown sandy loam 36 cm: Terminated at rock impasse
B40	None	Upland Area North of Creek	32.001651	-95.261504	0-28 cm: 7.5YR 5/4 brown sandy loam 28 cm: Terminated at rock impasse
B41	None	Floodplain North of Creek	32.003058	-95.25977	0-18 cm: 7.5YR 5/8 strong brown sandy clay loam 18-22 cm: 7.5YR 5/8 strong brown coarse sand and gravel 22-28 cm: 7.5YR 5/8 strong brown sandy clay loam 28-33 cm: 7.5YR 5/8 strong brown coarse sand and gravel 33-80 cm: 7.5YR 5/8 strong brown sandy clay loam 80 cm: Terminated at maximum depth
B42	None	Floodplain North of Creek	32.002802	-95.25968	0-11 cm: 7.5YR 5/8 strong brown coarse sand and gravel 11-35 cm: 7.5YR 5/8 strong brown mottled with 10YR 7/4 very pale brown medium sand 35-80 cm: 7.5YR 5/8 strong brown sandy clay loam 80 cm: Terminated at maximum depth
T01	None	West central	32.001293	-95.262515	Disturbed 0-63cm: Dark gray sandy clay mixed with modern plastic and asphalt
T02	None	West central	32.00104	-95.262435	Disturbed: Likely fill 0-57cm: Dark gray sandy clay mixed with modern plastic and asphalt
T03	None	West central	32.000896	-95.262309	0-46cm: Yellowish brown sandy loam 46-55cm: Red clay
T04	None	West central	32.000827	-95.262564	0-41cm: Yellowish brown sandy loam 41-55cm: Red clay Evidence of disturbance on surface

STP	Cultural Material	Location	Latitude	Longitude	Depth and Soil Descriptions
T05	None	West central	32.000962	-95.262695	Very wet 0-22cm: Wet yellowish brown sandy loam 22-34cm: Yellowish-red clay (wet)
T06	None	West central	32.00126	-95.262662	0-24cm: Yellowish brown sandy loam 24-37cm: Reddish brown clay
T07	None	West central	32.001285	-95.262263	0-31cm: Yellowish brown sandy loam 31-42cm: Red clay
T08	None	West central	32.001158	-95.261834	0-21cm: Red clay
T09	None	West central	32.000391	-95.262242	0-7cm: Grayish brown sandy loam 7-23cm: Red clay
T10	None	West central	32.000176	-95.262281	Steep slope (~15 degree) 0-26cm: Grayish brown sandy loam with dense roots 26-41cm: Yellowish red clay with dense roots and gravel
T11	None	West central	31.99995	-95.262329	Steep slope (~15 degree) 0-28cm: Grayish brown sandy loam with dense roots 28-45cm: Yellowish red clay with dense roots and gravel
T12	None	West central	31.999733	-95.262491	Very Steep slope (~20 degree) 0-17cm: Grayish brown sandy loam with dense roots 17-26cm: Yellowish red clay with dense roots and gravel
T13	None	West central	32.000017	-95.262088	Steep slope (~10 degree) 0-31cm: Grayish brown sandy loam with dense roots 31-45cm: Yellowish red clay with dense roots and gravel
T14	None	West central	32.000128	-95.262058	Steep slope (10 degree) 0-11cm: Grayish brown sandy loam with dense roots 11-25cm: Yellowish red clay with dense roots and gravel
T15	None	West central	32.000399	-95.262004	0-16cm: Grayish brown sandy loam with dense roots 16-27cm: Yellowish red clay with dense roots and gravel

APPENDIX F

MITIGATION PLAN

March 7, 2024

Mr. Andy Gray
Project Manager
U.S. Army Corps of Engineers
Fort Worth District
Regulatory Division – Cooper Lake
828 CR 4795
Sulphur Springs, TX 75482

RE: COMPENSATORY MITIGATION PLAN
Royal Oaks Landfill
Proposed Expansion Area +/- 48 Acres
Cherokee County, Texas
USACE Project No. SWF-2021-00405

Hydrex Environmental (Hydrex) has been contracted by Republic Services, Inc. (Republic) to coordinate with the U.S. Army Corps of Engineers concerning the expansion of the Royal Oaks Landfill utilizing Nationwide Permit 39 (NWP 39). The 144-acre Royal Oaks Landfill property consists of an existing 54.5-acre permitted landfill footprint. The proposed plans involve a horizontal expansion of the landfill, which includes a proposed 28.6-acre landfill expansion footprint for waste disposal and associated infrastructure and stormwater controls, totalling approximately 48 acres ("Project Area"). This mitigation plan addresses compensatory mitigation requirements at the above-referenced project site to satisfy the requirements of the NWP 39.

Based on the conclusions of the *Addendum to Delineation of Waters of the U.S. Report* dated July 5, 2023 and included as part of the NWP 39 Pre-Construction Notification (PCN) package, the following jurisdiction waters will be impacted:

- **UT-1B (Intermittent):** 394 LF, 0.04 ac
- **Wetland A (Scrub-Shrub):** 0.37 ac

In accordance with USACE General Condition 23, compensatory mitigation is proposed for impacts where the total loss of wetlands exceeds 0.1 acres, or the total loss of streams exceeds 0.3 acres. The proposed Royal Oaks Landfill Expansion will permanently impact approximately 394 linear feet (0.04 acres) of intermittent stream and 0.37 acres of scrub-shrub wetland. This amounts to 0.41 acres of permanent impacts to WOTUS. Based on these impacts, compensatory mitigation will be required as part of this project. Republic proposes to purchase stream and wetland mitigation credits from Butler Creek Mitigation Bank (BCMB) in order to offset unavoidable, permanent impacts from the proposed landfill expansion. The Royal Oaks Landfill is located within the secondary service area of the BCMB; therefore a 1.5 multiplier will be applied to all credit purchases.

312 OLD TYLER ROAD
NACOGDOCHES, TX 75961
936-568-9451
FAX: 936-568-9527

The BCMB utilizes the Texas Rapid Assessment Method (TXRAM) Version 2.0 for the calculation of compensatory mitigation credits. Therefore, a TXRAM 2.0 functional assessment was performed for impacts to UT-1B and Wetland A. Utilizing TXRAM, Hydrex determined potential mitigation requirements for permanent impacts to the 394 linear feet (0.04 acres) and 0.37 acres of scrub-shrub wetland impacts within the project site.

TXRAM wetland and stream functional assessments were performed by Hydrex for UT-1D and Wetland A. A summary of this functional assessment and the individual scores for each jurisdictional feature can be found in Table 1 below.

Table 1. Summary of TXRAM Functional Assessment Scores.

Aquatic Resource	Type	Length (LF)	Area (ac)	Total TXRAM Score	TXRAM Units	Total Credits Required (Secondary Service Area Modifier)
UT-1B	Intermittent	394	0.01	62	244	**366 Stream Credits**
Wetland A	Scrub-Shrub	--	0.37	40	0.15	**0.23 Wetland Credits**

Based on this functional assessment, the proposed Royal Oaks Landfill Expansion will require the purchase of 366 intermittent stream credits and 0.23 wetland credits to satisfy compensatory mitigation requirements. TXRAM Functional Assessment Data Sheets can be found attached.

If you have any questions regarding this plan, or if further clarification is necessary, please feel free to contact me at [redacted]

Sincerely,
Hydrex Environmental

Clayton A. Collier, REM, PWS
GM / Senior Environmental Scientist

SWS PCP
CLAYTON A. COLLIER
2389 PWS
PROFESSIONAL WETLAND SCIENTIST
3/7/24

Attachments: TXRAM 2.0 Functional Assessment Datasheets

TXRAM STREAM FINAL SCORING SHEET

Project/Site Name/No.: Royal Oaks Landfill Project Type: ☑ Fill/Impact (☑ Linear ☐ Non-linear) ☐ Mitigation/Conservation

Stream ID/Name: UT-1B SAR No.: 1 Size (LF): 394 Date: 2-28-2023 Evaluator(s): DM, JP

Stream Type: Intermittent Ecoregion: South Central Plains (Piney Woods) Delineation Performed: ☐ Previously ☑ Currently

8-Digit HUC: 1202004 Upper Angelina Watershed Condition (developed, pasture, etc.): Developed Watershed Size: Approx. 60 ac

Aerial Photo Date and Source: 2020 (NAIP) Site Photos: Attached Representative: ☑ Yes ☐ No

Stressor(s): Landfill Are normal climatic/hydrologic conditions present? ☑ Yes ☐ No (If no, explain in Notes)

Notes:

Stream Characteristics

Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank: 15	Avg. Banks: 8.5
Avg. Waters Edge: 3.5	Avg. Water: 3.5
Avg. OHWM: 3.5	Avg. OHWM: 3.5

Scoring Table

Core Element	*Metric*	*Metric Score*	*Core Element Score Calculation*	*Core Element Score*
Channel condition	Floodplain connectivity	2	Sum of metric scores / 15 x 30	10.0
	Bank condition	1		
	Sediment deposition	2		
Buffer condition	Composite buffer (left bank)	4.77	Sum of bank scores / 10 x 20	17.9
	Composite buffer (right bank)	4.16		
In-stream condition	Substrate composition	2	Sum of metric scores / 10 x 25	15.0
	In-stream habitat	4		
Hydrologic condition	Flow regime	4	Sum of metric scores / 8 x 25	18.8
	Channel flow status	2		
Sum of core element scores = overall TXRAM stream score				61.6
Additional points for limited habitats = overall TXRAM stream score x 0.025 for each bank (right/left) if: L R ☐ ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				-
Sum of overall TXRAM stream score and additional points = **total overall TXRAM stream score**				61.1

Representative Site Photograph:

View looking upstream along UT-1B.

View looking downstream along UT-1B.

TXRAM STREAM DATA SHEET

Project/Site Name/No.: Royal Oaks Landfill Project Type: ☒ Fill/Impact (☒ Linear ☐ Non-linear) ☐ Mitigation/Conservation

Stream ID/Name: UT-1B SAR No.: 1 Size (LF): 394 Date: 02-28-2023 Evaluator(s): DM, JP

Stream Type: Intermittent Ecoregion: South Central Plains (Piney Woods) Delineation Performed: ☒ Previously ☐ Currently

8-Digit HUC: 1202004 Upper Angelina Watershed Condition (developed, pasture, etc.): Landfill Watershed Size: Approx. 60 ac

Aerial Photo Date and Source: 2020 (NAIP) Site Photos: Attached Representative: ☒ Yes ☐ No

Stressor(s): Landfill Are normal climatic/hydrologic conditions present? ☒ Yes ☐ No (If no, explain in Notes)

Stream Characteristics

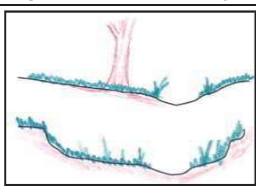
Stream Width (Feet) (Bank to Bank Distance Used for Buffer Calculation)	*Stream Height/Depth (Feet)*
Avg. Bank to Bank 15 ft	Avg. Banks: 8.5 ft
Avg. Waters Edge: 3.5 ft	Avg. Water: 3.5 ft
Avg. OHWM: 3.5 ft	Avg. OHWM: 3.5 ft

Notes:

CHANNEL CONDITION

Floodplain Connectivity

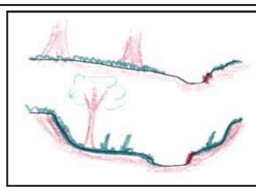
Perennial / Intermittent



6 / 5

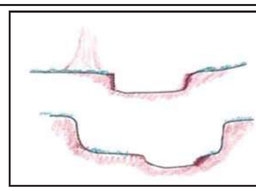
Very little incision and access to the original floodplain or fully developed wide bankfull benches scores a "5" for this metric. ☐

Very little incision and access to the original floodplain with significant floodplain connection indications (i.e., riverine wetlands) score a "6" for this metric. ☐



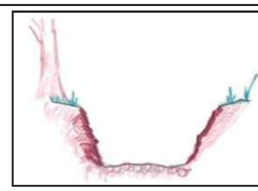
4

Slight incision and likely having regular (i.e., at least once a year) access to bankfull benches or newly developed floodplains along majority of the reach. ☐



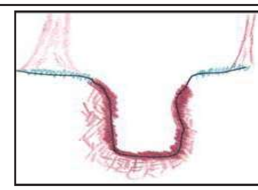
3

Moderate incision and presence of near vertical/ undercut banks; irregular (i.e., greater than 2 year return interval) access to floodplain or possible access to floodplain or bankfull benches at isolated areas. ☐



2

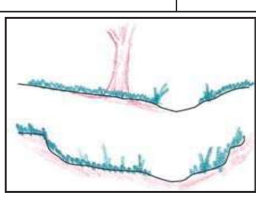
Overwidened or incised channel and likely to widen further; majority of both banks near vertical/undercut; unlikely/rarely having access to floodplain or bankfull benches. ☐



1

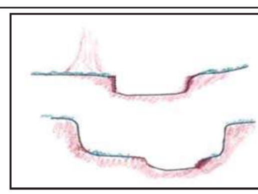
Deeply incised channel or channelized flow; severe incision with flow contained within the banks; majority of banks vertical/undercut. ✓

Ephemeral



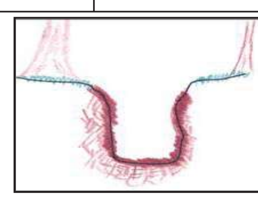
3

Slight incision and unlikely/rarely having access to floodplain or bankfull benches. ☐



2

Moderate incision and no access to floodplain. ☐



1

Deeply incised channel or channelized flow; majority of banks vertical/undercut. ☐

Score: 1

Bank Condition

Left Bank Active Erosion: 40 % Right Bank Active Erosion: 90 % Average: 65

Bank Protection/Stabilization: ☒ Natural ☐ Artificial:

Score: 1

Sediment Deposition

☐ Less than 10% of the bottom covered by excessive sediment deposition; bars with established vegetation (5)

☐ 10–20% of the bottom covered by excessive sediment deposition; few established bars with indicators of recently deposited sediments (4)

☐ 20–30% of the bottom covered by excessive sediment deposition; some deposition on old bars and creating new bars; some sediment deposits at in-stream structures; OR obstructed view of the channel bottom and a lack of other depositional features (3)

☒ 30–50% of the bottom covered by excessive sediment deposition; some newly created bars; moderate sediment deposits at in-stream structures (2)

☐ Greater than 50% of the bottom covered by excessive sediment deposition resulting in aggrading channel (1)

Score: 2

RIPARIAN BUFFER CONDITION

Riparian Buffer - See Table 26 to determine appropriate buffer distance. Confirm in office review.

Identify each buffer type and score using the primary or secondary buffer method of evaluation (see sections 3.3.2.1.2 and 3.3.2.1.4).

Left Bank

Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Forest	80	Native	Low	5	99.8	4.99
2. Road	0	None	Complete	0	0.2	0
3.						
4.						
5.						

Left Bank Primary Buffer Subtotal: 4.99 **X 0.7 = Left Bank Primary Buffer Total** 3.49

Secondary Buffer Type	*Canopy Cover*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Forest	80	Low	5	85.3	4.27
2. Landfill	0	Complete	0	10.7	0
3. Road	0	Complete	0	3.9	0
4.					
5.					

Left Bank Secondary Buffer Subtotal: 4.27 **X 0.3 = Left Bank Secondary Buffet Total** 1.28

Left Bank Primary Buffer Total + Left Bank Secondary Buffer Total = Composite Buffer Left Bank Metric Score 4.77

Right Bank

Primary Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Forest	80	Native	Low	5	87.9	4.39
2. Road	0	None	Complete	0	8.4	0
3. Landfill	0	None	Complete	0	3.7	0
4.						
5.						

Right Bank Primary Buffer Subtotal: 4.39 **X 0.7 = Right Bank Primary Buffer Total** 3.08

Secondary Buffer Type	*Canopy Cover*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Forest	80	Low	5	71.7	3.59
2. Landfill	0	Complete	0	21.9	0
3. Road	0	Complete	0	6.3	0
4.					
5.					

Right Bank Secondary Buffer Subtotal: 3.59 **X 0.3 = Right Bank Secondary Buffer Total** 1.08

Right Bank Primary Buffer Total + Right Bank Secondary Buffer Total = Composite Buffer Right Bank Metric Score 4.16

Stream ID/Name: UT-1B SAR No.: 1

IN-STREAM CONDITION

Substrate Composition (estimate percentages)

Boulder:	Gravel: 30	Fines (silt, clay, muck): 95	Artificial:	Large Woody Debris/Leaf Packs:
Cobble: 5	Sand:	Bedrock (smooth):	Bedrock (fractured):	

Default score due to excessive suspended sediment ☐ **Default score due to depth** ☐ **Score:** 1

In-stream Habitat (check all habitat types that are present and check box for appropriate percent cover at each transect)

Habitat Types by Presence and Cover	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Undercut Banks	✓												
Overhanging Vegetation	✓												
Rootmats													
Rootwads													
Woody Debris/Leaf Packs	✓												
Boulders/Cobbles	✓												
Aquatic Macrophytes													
Bedrock with Interstitial Space													
Artificial Habitat Enhancement													
Other:													
Number Present	4												
Percent Cover in Streams OHWM Width ≤ 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-29% cover (2)	✓												
Transect has 30-50% cover (3)													
Transect has > 50% cover (4)													
Percent Cover Score	2												
Percent Cover in Streams OHWM Width > than 15'	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Transect has 0% cover (0)													
Transect has 1-5% cover (1)													
Transect has 6-14% cover (2)													
Transect has 15-30% cover (3)													
Transect has > 30% cover (4)													
Percent Cover Score													
Habitat Types by Presence	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Riffle/Pool Sequence													
Canopy Cover 70% or Greater													
Natural Step-pools													
Number Present	0												
Total Score	6												

Average: 6 **Score:** 4

HYDROLOGIC CONDITION

Flow Regime

☒ Noticeable surface flow present (4)
☐ Continual pool of water but lacking noticeable flow (3)
☐ Isolated pools and interstitial (subsurface) flow (2)
☐ Isolated pools and no evidence of surface or interstitial flow (1)
☐ Dry channel and no observable pools or interstitial flow (0)
Artificial / altered water source ☐ No ☐ Yes: ______

Score: 4

Channel Flow Status

☐ Water covering greater than 75% of the channel bottom width; less than 25% of channel substrate is exposed (4)
☐ Water covering 50–75% of the channel bottom width; 25–50% of channel substrate is exposed (3)
☒ Water covering 25–50% of the channel bottom width; 50–75% of channel substrate is exposed (2)
☐ Water present but covering less than 25% of the channel bottom width; greater than 75% of channel substrate is exposed (1)
☐ No water present in the channel; 100% of channel substrate exposed (0)

Score: 2

TXRAM WETLAND FINAL SCORING SHEET

Project/Site Name/No.: Northeast Landfill Project Type: ■ Fill/Impact (☐ Linear ■ Non-linear) ☐ Mitigation/Conservation

Wetland ID/Name: A WAA No.: 1 Size: 0.4 Acres Date: 4-15-2020 Evaluator(s): CRK, DTM

Wetland Type: Riverine, PSS Ecoregion: N/A Delineation Performed: ☐ Previously ■ Currently

Aerial Photo Date and Source: 2018 (BING), 2017 (NAIP) Site Photos: March 17, 2020 Representative: ■ Yes ☐ No

Notes: Permanent Scrub-Shrub Wetland Impact

Core Element	*Metric*	*Metric Score*	*Core Element Score Calculation*	*Core Element Score*
Landscape	Aquatic Context	2	Sum of metric scores / 8 x 15	7.5
	Buffer	2		
Hydrology	Water source	1	Sum of metric scores / 12 x 30	10
	Hydroperiod	1		
	Hydrologic flow	2		
Soils	Organic matter	1	Sum of metric scores / 12 x 15	2.5
	Sedimentation	1		
	Soil modification	0		
Physical Structure	Topographic complexity	2	Sum of metric scores / 12 x 20	8.3
	Edge complexity	2		
	Physical habitat richness	1		
Biotic Structure	Plant strata	2	Sum of metric scores / 28 x 20	11.4
	Species richness	1		
	Non-native/invasive infestation	4		
	Interspersion	2		
	Strata overlap	2		
	Herbaceous cover	3		
	Vegetation alterations	2		
Sum of core element scores = overall TXRAM wetland score				39.7
Additional points for unique resources = overall TXRAM wetland score x 0.10 if: ☐ Area of Caddo Lake designated a "Wetland of International Importance" under the Ramsar Convention ☐ Bald cypress – water tupelo swamp ☐ Pitcher plant bog ☐ Spring				Not Applicable
Additional points for limited habitats = overall TXRAM wetland score x 0.05 if: ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				Not Applicable
Sum of overall TXRAM wetland score and additional points = **total overall TXRAM wetland score**				**39.7**

Representative Site Photograph:

Scrub-shrub Wetland A looking north.

Scrub-shrub Wetland A looking southwest.

TXRAM WETLAND DATA SHEET

Project/Site Name/No.: Royal Oaks Landfill Project Type: ■ Fill/Impact (☐ Linear ■ Non-linear) ☐ Mitigation/Conservation

Wetland ID/Name: A WAA No.: 1 Size: 0.37 Acres Date: 2-28-2023 Evaluator(s): DM, JP

Wetland Type: Depressional, PSS Ecoregion: South Central Plains (Piney Woods) Delineation Performed: ■ Previously ☐ Currently

Aerial Photo Date and Source: 2020 (NAIP) Site Photos: Attached Representative: ■ Yes ☐ No

Notes:

LANDSCAPE

Aquatic Context – Confirm in office review. See figures in section 2.3.1.1 for examples.

Notes on any barriers or alterations that prevent connection: Two roads with culverts, heavy disturbance from landfill activities.

Aquatic resources within 1,000 feet of WAA to which wetland connects (including number for other considerations): 2 **Score:** 2

Buffer – Evaluate to 500 feet from WAA boundary. Confirm in office review. See figures in section 2.3.1.2 for examples.

Buffer Type/Description	*Score (See Narratives)*	*Percentage*	*Subtotal*
1. Forested	4	50%	2.0
2. Landfill	0	40%	0.0
3. Soil Excavation	0	10%	0.0
4.			
5.			

Score: 2.0

HYDROLOGY

Water Source – Degree of natural or unnatural/artificial influence. Confirm in office review for watershed.

Natural: ☐ Precipitation ☐ Groundwater ■ Overbank flow/stream discharge ■ Overland flow ☐ Beaver activity ☐ Other: ______

Unnatural/Manipulated: ■ Impoundment ☐ Outfall ☐ Irrigation/pumping ☐ Other artificial influence or control: ______

Watershed: ■ Development ☐ Irrigated agriculture ☐ Wastewater treatment plant ☐ Impoundment ■ Other: Landfill

Degree of artificial influence/control: ■ Complete ☐ High ☐ Low ☐ None

Wetland created/restored/enhanced: ☐ Sustainable/replicates natural ☐ Controlled **Score:** 1

Hydroperiod – Variability and recent alteration of the duration, frequency, and magnitude of inundation/saturation.

Evaluate the hydroperiod including natural variation: Low variability

Direct evidence of alteration: Natural: ☐ Log-jam ☐ Channel migration ■ Other: Excavated

Human: ☐ Diversions ☐ Ditches ☐ Levees ■ Impoundments ☐ Other: ______

Riverine only: ☐ Recent channel in-stability/dis-equilibrium (☐ Degradation or ☐ Aggradation)

Indirect evidence of alteration: ☐ Wetland plant stress: ______ ☐ Plant morphology: ______

☐ Upland species encroachment: ______ ☐ Plant Community: ______ ■ Soil: Disturbed soils

Change/Alteration of hydroperiod: ☐ None ☐ Due to natural events ■ Human influences (☐ Slight or ■ High)

Degree hydroperiod of wetland created/restored/enhanced replicates natural patterns: ______

Lacustrine fringe on human impoundment: ☐ High variability ☐ Low variability ☐ Recent changes to hydroperiod **Score:** 1

Hydrologic Flow – Movement of water to or from surrounding area and openness to water moving through the WAA.

Flow: ■ Inlets: 1 ☐ Outlets: 1 ■ Signs of water movement to or from WAA: Flow through site (UT-1A to UT-1B)

Restrictions: ☐ Levee ☐ Berm/dam ☐ Diversion ■ Other: Road with culvert

High flowthrough: ☐ Floodplain ■ Drift deposits ■ Drainage patterns ■ Sediment deposits ☐ Other: ______

Low flowthrough: ■ High landscape position ☐ Stagnant water ■ Closed contours ☐ Other: ______ **Score:** 2

SOILS

Organic Matter – Use data and indicators from wetland determination data form(s) based on applicable regional supplement.

☐ High (organic soil or indicator A1, A2, A3)

☐ Moderate (indicator A9, S1, F1 in AW or A9, S1, S2, F1 in GP or A6, A7, A9, S7, F13 in AGCP)

☐ Low (indicated by thin organic or organic-mineral layer) ■ None observable in surface layer as described herein **Score:** 1

Sedimentation – Deposition of excess sediment due to human actions. Confirm in office review for landscape.
Landscape with stress that could lead to excess sedimentation? ■ Yes ☐ No Landscape position: ☐ High ■ Low
Magnitude of recent runoff/flooding events: ■ High ☐ Low Percent of WAA with excess sediment deposition: 70
☐ Sand deposits: ____% of area, ____ average thickness ■ Silt/Clay deposits: 100 % of area, 4 in. average thickness
Lacustrine fringe only: ☐ Upper end of impoundment ☐ Degrades wetland ☐ Contributes to wetland processes **Score:** 1

Soil Modification – Physical changes by human activities. Confirm in office review for past.
Type (Check those applicable and circle R for recent or P for past): ☐ Farming R/P ☐ Logging R/P ■ Mining R/P ■ Filling R/P
☐ Grading R/P ☐ Dredging R/P ☐ Off-road vehicles R/P ■ Other R/P: Impoundment/Borrow Area
Percent of WAA with recent soil modification: 100 % Degree of modification: ■ High ☐ Low
Indicators of past modification: ☐ High bulk density ☐ Low organic matter ■ Lack of soil structure ■ Lack of horizons ☐ Hardpan
☐ Dramatic change in texture/color ☐ Heterogeneous mixture ☐ Other: ____
Indicators of recovery: ☐ Organic matter ☐ Structure ☐ Horizons ☐ Mottling ☐ Hydric soil ☐ Other: None
Percent of WAA with past modification: 100 % Recovery: ☐ Complete ☐ High ☐ Moderate ■ Low ☐ None **Score:** 0

PHYSICAL STRUCTURE

Topographic Complexity – See figures in section 2.3.4.1. Record % micro-topography and % WAA for each elevation gradient.
Elevation gradients (EG): 2 Evidence: ■ Plant assemblages ■ Level of saturation/inundation ■ Path of water flow ☐ Slope
Micro-topography: 10 % of WAA (By EG: EG1: 5%; EG2: 5%)
Types: ■ Depressions ☐ Pools ☐ Burrows ☐ Swales ☐ Wind-thrown tree holes ☐ Mounds ☐ Gilgai ☐ Islands
☐ Variable shorelines ■ Partially buried debris ☐ Debris jams ☐ Plant hummocks/roots ☐ Other:____ **Score:** 2

Edge Complexity – Confirm in office review. See figure in section 2.3.4.2 to evaluate wetland boundary.
WAA: ■ In seasonal floodplain ☐ Contiguous to other wetland ■ Edge vertical structure variation: Low
Horizontal variability: ☐ High ☐ Moderate ■ Low ☐ None **Score:** 2

Physical Habitat Richness – See definitions and table in section 2.3.4.3 for habitat types applicable to each wetland type.
Label of habitat types qualifying as present in WAA: Seasonally inundated swales Total: 1 **Score:** 1

BIOTIC STRUCTURE

Plant Strata – Use applicable wetland delineation regional supplement and data from determination data form(s).
Number of plant strata: ☐ ≥ 4 ☐ 3 ■ 2 ☐ 1 ☐ 0 **Score:** 2

Species Richness – Use data from determination data form(s) to count species with 5% or more relative cover in a stratum.
Number of species across all strata and determination data forms (not counting a species more than once): 3 **Score:** 1

Non-Native/Invasive Infestation – Use data from determination data form(s). See tables in section 2.3.5.3 for examples.
Average total relative cover of non-native/invasive species across all strata and determination data forms: 0 % **Score:** 4

Interspersion – Confirm in office review. Use figure in section 2.3.5.4 to determine the degree of interspersion of plant zones.
Degree of horizontal/plan view interspersion: ☐ High ☐ Moderate ■ Low ☐ None ☐ Bottomland hardwood forest **Score:** 3

Strata Overlap – Use strata defined in plant strata metric using applicable regional supplement. See figures in section 2.3.5.5.
High overlap (≥ 3 strata overlapping): 0 % of WAA Moderate overlap (2 strata overlapping): 50 % of WAA
Herbaceous species/dense litter overlap (only in portion where there are no other strata overlapping): 40 % of WAA
Total percentage of WAA with some form of overlap (if more than one present): 90 % of WAA **Score:** 2

Herbaceous Cover – Estimate for entire WAA. In South Central Plains or East Central Texas Plains: ☐ Bottomland hardwood forest
Total cover of emergent and submergent plants: ☐ > 75% ■ 51–75% ☐ 26–50% ☐ ≤ 25% **Score:** 3

Vegetation Alterations – Unnatural (human-caused) stressors. Confirm in office review for past.
Type (Check those applicable and circle R for recent or P for past): ☐ Disking R/P ☐ Mowing/shredding R/P ☐ Logging R/P
☐ Cutting R/P ☐ Trampling R/P ☐ Herbicide treatment R/P ☐ Herbivory R/P ☐ Disease R/P ☐ Chemical spill R/P
☐ Pollution R/P ☐ Feral hog rooting R/P ☐ Woody debris removal R/P ■ Other R/P: Excavation
Percent of WAA with recent vegetation alteration: 10 % Severity of alteration: ☐ High ■ Low
Percent of WAA with past vegetation alteration: 100 % Degree of recovery: ☐ Complete ☐ High ■ Moderate ☐ Low
☐ Alteration to improve wetland (degree of natural community recovery):____ **Score:** 2

APPENDIX G

DELINEATION OF WOTUS REPORT
(August 13, 2021)

DELINEATION OF WATERS OF THE U.S. AND JURISDICTIONAL DETERMINATION

ROYAL OAKS LANDFILL

AN APPROXIMATE 144-ACRE PROPERTY
CHEROKEE COUNTY, TEXAS

Hydrex Project No. A-12-1509

Report Date: August 13, 2021

Prepared for:
Mr. Austin Sparks, P.E.
Environmental Manager – East Texas Area
Republic Services, Inc.
12920 FM 2767
Tyler, Texas 75708

Prepared by:
Hydrex Environmental
1120 NW Stallings Drive
Nacogdoches, Texas 75964-3428
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Hydrex
ENVIRONMENTAL

August 13, 2021

Mr. Austin Sparks, P.E.
Environmental Manager – East Texas Area
Republic Services, Inc.
12920 FM 2767
Tyler, Texas 75708

RE: DELINEATION OF WATERS OF THE U.S. AND JURISDICTIONAL DETERMINATION
Royal Oaks Landfill
An Approximate 144-Acre Property
Cherokee County, Texas
Hydrex Project No. A-12-1509

Dear Mr. Sparks:

Hydrex Environmental (Hydrex) has been contracted by Republic Services, Inc. (Republic) to complete a delineation of waters of the U.S. (WOTUS), including wetlands, and jurisdictional determination at the above-referenced project site. This report presents a summary of our findings.

EXECUTIVE SUMMARY

The project site consists of an approximate 144-acre property that includes the existing permitted landfill of 96 acres and the proposed landfill expansion area of 48 acres. The project is situated within the city limits of Jacksonville along Heath Lane (CR 4102). The approximate NAD83 geographic coordinates for the site entrance and area delineated are as follows: N 32.002444, W 95.268041.

Based on the results of this investigation, one (1) named tributary (Barber Branch), eight (8) unnamed tributaries (UT-2 through UT-9), four (4) upland man-made / stormwater ditches (Ditch 1 through Ditch 4), three (3) stormwater outlets (Stormwater Outlets 1 through 3), two (2) erosional gullies (Erosional Gully 1 and 2), three (3) stormwater control features (Stormwater Control Features 1 through 3), and two (2) excavations (Excavations 1 and 2) were delineated by Hydrex. The delineated aquatic resources are summarized in Table 1 below, and depicted on Plates B-1, B-2, and B-3 in Appendix B.

Table 1. Delineated Aquatic Resources and Jurisdictional Opinion by Hydrex

Aquatic Resource	Type	Length (LF)	Area (ac)	Jurisdictional Opinion
Tributary 1A (Headwaters of Barber Branch)	Ephemeral	288	0.013	Potentially Non-Jurisdictional
Tributary 1B (Barber Branch)	Intermittent	758	0.072	Potentially Jurisdictional
UT-2	Ephemeral	669	0.037	Potentially Non-Jurisdictional
UT-3	Ephemeral	210	0.007	Potentially Non-Jurisdictional
UT-4	Ephemeral	147	0.004	Potentially Non-Jurisdictional
UT-5	Ephemeral	260	0.013	Potentially Non-Jurisdictional
UT-6	Intermittent	529	0.092	Potentially Jurisdictional
UT-7	Ephemeral	243	0.009	Potentially Non-Jurisdictional

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Aquatic Resource	Type	Length (LF)	Area (ac)	Jurisdictional Opinion
UT-8	Intermittent	91	0.006	Potentially Jurisdictional
UT-9	Intermittent	66	0.005	Potentially Jurisdictional
Ditch 1	UMMD* / Stormwater	892	--	Potentially Non-Jurisdictional
Ditch 2	UMMD* / Stormwater	866	--	Potentially Non-Jurisdictional
Ditch 3	UMMD* / Stormwater	1,795	--	Potentially Non-Jurisdictional
Ditch 4	UMMD* / Stormwater	949	--	Potentially Non-Jurisdictional
Stormwater Outlet 1	UMMD* / Stormwater	51	--	Potentially Non-Jurisdictional
Stormwater Outlet 2	UMMD* / Stormwater	67	--	Potentially Non-Jurisdictional
Stormwater Outlet 3	UMMD* / Stormwater	128	--	Potentially Non-Jurisdictional
Erosional Gully 1	Erosional Gully	100	--	Potentially Non-Jurisdictional
Erosional Gully 2	Erosional Gully	208		Potentially Non-Jurisdictional
Stormwater Control Feature 1	Sediment Detention Pond	--	0.32	Potentially Non-Jurisdictional
Stormwater Control Feature 2	Sediment Detention Pond	--	0.73	Potentially Non-Jurisdictional
Stormwater Control Feature 3	Sediment Detention Pond	--	1.58	Potentially Non-Jurisdictional
Excavation 1	Soil Borrow Area	--	0.44	Potentially Non-Jurisdictional
Excavation 2	Soil Borrow Area	--	3.18	Potentially Non-Jurisdictional

**UMMD – Upland, Man-Made Ditch*

It should be noted, the jurisdictional status presented herein is based solely on the professional opinion of Hydrex and our interpretation of the Navigable Waters Protection Rule. The USACE and U.S. Environmental Protection Agency (EPA) have the final authority regarding jurisdiction over waters of the United States.

INTRODUCTION

The project site consists of an approximate 144-acre property that includes the existing permitted landfill of 96 acres and the proposed landfill expansion area of 48 acres. The project is situated within the city limits of Jacksonville along Heath Lane (CR 4102). The approximate NAD83 geographic coordinates for the site entrance and area delineated are as follows: N 32.002444, W 95.268041.

The majority of the existing landfill has been previously disturbed due to development of the site as an active municipal solid waste (MSW) landfill. Development most notably consists of current and completed waste disposal cells, roads, a scale house, main office, maintenance shop, and stormwater control features. Current development within the expansion area consists of soil borrow areas, stormwater control features, roads and a powerline right-of-way.

Republic proposes to horizontally expand the landfill and construct new waste cells in the area located east of the current limits of waste.

SETTING

The project site is located near the city of Jacksonville, Texas (Plate A-1, Appendix A). Rural homesteads are located to the west, northwest, and north of the site. The remaining dominant surrounding land use consists of managed forested tracts. Land use on the project site is dominated by the development of the existing Royal Oaks MSW landfill, but also includes portions of forested areas. The easternmost and southernmost portions of the project site contain the most notable percentage of forest land.

According to the Geologic Atlas of Texas (Palestine Sheet, 1993), three outcrop formations are mapped within the project site (Plate A-2, Appendix A). The ridge extending from the northwest corner of the site in a southeasterly direction is mapped as Sparta Sand (Es). The sideslopes immediately downgradient and radiating from the ridge are mapped as Weches (Ew), while the sideslopes further downgradient of the Weches are mapped as Queen City Sand (Eqc).

The United States Geological Survey (USGS) 7.5-minute topographic quadrangle map (Mount Selman, TX Sheet, 1973 and Jacksonville West, TX Sheet, 1982) indicates a ridge extends from the northwest corner of the site in a southeasterly direction. This ridge appears to drain east and south. Drainage extending east from the ridge contributes flow towards Barber Branch, an intermittent tributary depicted in the eastern portion of the property. Drainage extending south from the ridge contributes flow towards an unnamed intermittent tributary depicted in the southwest corner of the property (Plate A-3, Appendix A).

The entirety of the project site is located within FEMA Zone X (Plate A-4, Appendix A). Zone X is described as areas outside of the 100-year floodplain, and by definition carry less than 0.2 percent chance of flooding annually.

The National Wetlands Inventory (NWI) Map depicts intermittent stream habitat (R4SBC) in the eastern portion of the property along Barbers Branch, and in the southwest corner of the property (Plate A-5, Appendix A).

The Natural Resource Conservation Service (NRCS) web soil survey for Cherokee County indicates four (4) soil mapping units occur within the project site boundary (Plate A-6, Appendix A). It should be noted, NRCS correspondence with the Bryan, Texas Soil Survey office has confirmed a mapping error from the web soil survey for the subject property. Soil mapping unit polygons labeled “Md – Angelina Series” should be labeled “Pits” and correlate with landfill development. According to the NRCS, an error was made when transposing the paper soil survey to digital format. The map correction has been made to Plate A-6 in Appendix A, and the web soil survey is to be updated within the next year or so based on correspondence with NRCS. According to the NRCS *Hydric Soil List*, none of the soil mapping units located on the property are listed as a hydric soil.

METHODS AND PROCEDURES

Methods used in this study were consistent with those set forth in the *1987 Corps of Engineers Wetlands Delineation Manual* and the 2010 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plains Region (Version 2.0)* and the *2005 USACE Regulatory Guidance Letter No. 05-05: Ordinary High Water Mark Identification.* Flagging was used to mark the boundaries between any wetlands and non-wetlands as well as the ordinary high water marks (OHWM) of any streams and open waters. Based on the ordinary high water mark, the average widths and depths of any identified streams were measured using a hand-held measuring tape.

In addition, a review of readily available maps and aerial photographs was performed as part of this investigation (Appendices A, B and C). The following sources were utilized:

1. USGS 7.5 Minute Topographic Quadrangle Map: Mount Selman and Jacksonville West, TX sheets (1976, 1982, and 2016.).
2. USFWS National Wetlands Inventory Map: USFWS East Texas Database, 2018.
3. Soil Survey Data for Cherokee County, Texas: USDA-NRCS Web Soil Survey, accessed 7/2021.
4. FEMA Flood Insurance Rate Map: Panel Nos. 48073C175D and 48073C0285D, effective 1/6/2011
5. Aerial Photographs: 1947 USGS; 1957 USGS; 1971 USGS; 1980 USGS; 1996 USGS/TOP; 2004 NAIP/TOP; 2009 NAIP/TOP; 2015 TOP; 2011 BING; 2018 NAIP; 2020 NAIP.
6. Light Detection and Ranging (LiDAR) Data: USGS, 2016.

FINDINGS

<u>On-Site Reconnaissance</u>

A reconnaissance of the project site was performed by Hydrex on June 10, 2021 and July 15, 2021 to evaluate site conditions and identify potential WOTUS (potentially jurisdictional wetlands, streams, and open waters). During the on-site investigations, eight (8) observation points were established. The findings at each observation point representing conditions found throughout the project site are summarized in Table 2 below. The locations of all observation points are depicted on Plates B-1, B-2, and B-3 in Appendix B. Site photographs are included in Appendix E. Field data sheets detailing the findings at each observation point are included in Appendix D.

Table 2. Wetland Determination Data Form Summary Table

Observation Point	Dominance of Hydrophytic Vegetation	Wetland Hydrology Indicators Present	Hydric Soil Indicator Present	Wetland Determination*	Location / Representation
1	44.4%	None	None	Non-Wetland	Observation Point 1 was established within mixed pine-hardwood forest and represents upland site conditions observed within the southeast portion of the expansion area.
2	75%	A3, B1, B2, B3, D2	None	Non-Wetland	Observation Point 2 was established within the valley of Barber Branch and represents non-wetland site conditions observed in close proximity to Barber Branch.

Observation Point	Dominance of Hydrophytic Vegetation	Wetland Hydrology Indicators Present	Hydric Soil Indicator Present	Wetland Determination*	Location / Representation
3	33.3%	None	None	Non-Wetland	Observation Point 3 was established within a pine stand and represents upland site conditions observed within the northeast portion of the expansion area.
4	0%	None	None	Non-Wetland	Observation Point 4 was established within a soil stockpile area associated with the active landfill and represents upland site conditions observed within the western portion of the expansion area.
5	100%	A3, B2, B3	None	Non-Wetland	Observation Point 5 was established within a valley that has been heavily disturbed by adjacent landfill activity. The disturbance mainly consists of high levels of sediment accumulation.
6	30%	None	None	Non-Wetland	Observation Point 6 was established within mixed pine-hardwood forest and represents upland site conditions observed within the southern portion of the existing landfill area.
7	0%	None	None	Non-Wetland	Observation Point 7 was established within a completed, capped, vegetated waste cell and represents the portions of the delineation area that have been developed into a MSW landfill.
8	71.4%	D2	None	Non-Wetland	Observation Point 8 was established within a relict patch of forest habitat surrounded by landfill development and represents upland site conditions observed within the northern portions of the existing landfill area.

**A positive wetland determination at an observation point, as defined by the U.S. Corps of Engineers Wetlands Delineation Manual, must demonstrate 1) a dominance of hydrophytic vegetation (>50% dominance of hydrophytic vegetation), 2) a minimum of one primary or two secondary wetland hydrology indicators, and 3) the presence of a hydric soil indicator*.

Although a limited number of official observation points were established, the field survey covered the entire project site.

Based on the results of this investigation, one (1) named tributary (Barber Branch), eight (8) unnamed tributaries (UT-2 through UT-9), four (4) upland man-made / stormwater ditches (Ditch 1 through Ditch 4), three (3) stormwater outlets (Stormwater Outlets 1 through 3), two (2) erosional gullies (Erosional Gully 1 and 2), three (3) stormwater control features (Stormwater Control Features 1 through 3), and two (2) excavations (Excavations 1 and 2) were delineated by Hydrex. The delineated aquatic resources are summarized in Table 1 below, and depicted on Plates B-1, B-2, and B-3 in Appendix B.

Table 3. Delineated Aquatic Resources

Aquatic Resource	Type	Average Measurements Based on the OHWM		Length (LF)	Area (ac)	Jurisdictional Opinion	Geographic Coordinates (NAD83)
		Width (ft)	Depth (ft)				
Tributary 1A (Headwaters of Barber Branch)	Ephemeral Stream	2.0	0.2	288	0.013	Potentially Non-Jurisdictional	32.001133, -95.262274
Tributary 1B (Barber Branch)	Intermittent Stream	3.93	0.5	758	0.072	Potentially Jurisdictional	32.000761, -95.260504
UT-2	Ephemeral	2.4	0.3	669	0.037	Potentially Non-Jurisdictional	31.999089, -95.260233
UT-3	Ephemeral	1.4	0.2	210	0.007	Potentially Non-Jurisdictional	32.002856, -95.259658
UT-4	Ephemeral	1.1	0.1	147	0.004	Potentially Non-Jurisdictional	32.003042, -95.259880
UT-5	Ephemeral	2.2	0.2	260	0.013	Potentially Non-Jurisdictional	32.000267, -95.262424
UT-6	Intermittent	7.6	0.4	529	0.092	Potentially Jurisdictional	31.995291, -95.267452
UT-7	Ephemeral	1.6	0.2	243	0.009	Potentially Non-Jurisdictional	32.000637, -95.259852
UT-8	Intermittent	2.8	0.8	91	0.006	Potentially Jurisdictional	32.000665, -95.259659
UT-9	Intermittent	3.1	0.4	66	0.005	Potentially Jurisdictional	32.000673, -95.259932
Ditch 1	UMMD* / Stormwater	--	--	892	--	Potentially Non-Jurisdictional	31.999552, -95.259459
Ditch 2	UMMD* / Stormwater	--	--	866	--	Potentially Non-Jurisdictional	31.999694, -95.259215
Ditch 3	UMMD* / Stormwater	--	--	1,795	--	Potentially Non-Jurisdictional	32.002745, -95.263946
Ditch 4	UMMD* / Stormwater	--	--	949	--	Potentially Non-Jurisdictional	31.997157, -95.267960
Stormwater Outlet 1	UMMD* / Stormwater	--	--	51	--	Potentially Non-Jurisdictional	32.000955, -95.261457
Stormwater Outlet 2	UMMD* / Stormwater	--	--	67	--	Potentially Non-Jurisdictional	32.002808, -95.259972
Stormwater Outlet 3	UMMD* / Stormwater	--	--	128	--	Potentially Non-Jurisdictional	31.995563, -95.267440
Erosional Gully 1	Erosional Gully	--	--	100	--	Potentially Non-Jurisdictional	32.000549, -95.260614

Aquatic Resource	Type	Average Measurements Based on the OHWM		Length (LF)	Area (ac)	Jurisdictional Opinion	Geographic Coordinates (NAD83)
		Width (ft)	Depth (ft)				
Erosional Gully 2	Erosional Gully	--	--	208	--	Potentially Non-Jurisdictional	32.000652, -95.262928
Stormwater Control Feature 1	Sediment Detention Pond	--	--	--	0.32	Potentially Non-Jurisdictional	32.000907, -95.261845
Stormwater Control Feature 2	Sediment Detention Pond	--	--	--	0.73	Potentially Non-Jurisdictional	32.002628, -95.260697
Stormwater Control Feature 3	Sediment Detention Pond	--	--	--	1.58	Potentially Non-Jurisdictional	31.995656, -95.266855
Excavation 1	Soil Borrow Area	--	--	--	0.44	Potentially Non-Jurisdictional	31.998738, -95.261359
Excavation 2	Soil Borrow Area	--	--	--	3.18	Potentially Non-Jurisdictional	31.999091, -95.259852

**UMMD – Upland, Man-Made Ditch*

According to the USACE Antecedent Precipitation Tool, site hydrologic conditions at the time of each delineation site visit was "wetter than normal" when compared to a 30-year range. This was taken into consideration, and best professional judgement was used when delineating in these conditions in order to properly assess the hydrologic characteristics of the site. The results of the Antecedent Precipitation Tool are included in Appendix F.

JURISDICTIONAL OPINION

The Navigable Waters Protection Rule (NWPR), which became effective June 22, 2020, outlines the definitions for perennial, intermittent, and ephemeral streams. Perennial streams are defined as streams where surface water flows continuously year round. Intermittent streams are defined as streams where surface water flows continuously during certain times of the year and more than in direct response to precipitation. Ephemeral streams are defined as streams where surface water flows or pools only in direct response to precipitation. According to the NWPR as described in 33 CFR Part 328, ephemeral streams are no longer considered jurisdictional, regardless of connectivity to traditional navigable waters.

Included in Table 4 below is the professional opinion of Hydrex as to the jurisdictional status of each aquatic resource. It should be noted, the jurisdictional status presented herein is based solely on the professional opinion of Hydrex and our interpretation of the Navigable Waters Protection Rule.

Table 4. Jurisdictional Rationale of Delineated Aquatic Resources

Aquatic Resource	Type	Jurisdictional Opinion	Jurisdictional Rationale
Tributary 1A (Headwaters of Barber Branch)	Ephemeral	Potentially Non-Jurisdictional	Tributary 1A (Headwaters of Barber Branch) carries ephemeral flow. **Therefore, Tributary 1A (Barber Branch) should be considered potentially non-jurisdictional (NWPR Exclusion (b)(3) ephemeral feature).**
Tributary 1B (Barber Branch)	Intermittent	Potentially Jurisdictional	Tributary 1B (Barber Branch) carries intermittent flow, and is connected to a TNW in a typical year. **Therefore, Tributary 1B (Barber Branch) should be considered potentially jurisdictional ((a)(2) water).**
UT-2	Ephemeral	Potentially Non-Jurisdictional	UT-2 carries ephemeral flow. **Therefore, UT-2 should be considered potentially non-jurisdictional (NWPR Exclusion (b)(3) ephemeral feature).**
UT-3	Ephemeral	Potentially Non-Jurisdictional	UT-3 carries ephemeral flow. **Therefore, UT-3 should be considered potentially non-jurisdictional (NWPR Exclusion (b)(3) ephemeral feature).**
UT-4	Ephemeral	Potentially Non-Jurisdictional	UT-4 carries ephemeral flow. **Therefore, UT-4 should be considered potentially non-jurisdictional (NWPR Exclusion (b)(3) ephemeral feature).**
UT-5	Ephemeral	Potentially Non-Jurisdictional	UT-5 carries ephemeral flow. **Therefore, UT-5 should be considered potentially non-jurisdictional (NWPR Exclusion (b)(3) ephemeral feature).**
UT-6	Intermittent	Potentially Jurisdictional	UT-6 carries intermittent flow, and is connected to a TNW in a typical year. **Therefore, UT-6 should be considered potentially jurisdictional ((a)(2) water).**
UT-7	Ephemeral	Potentially Non-Jurisdictional	UT-7 carries ephemeral flow. **Therefore, UT-7 should be considered potentially non-jurisdictional (NWPR Exclusion (b)(3) ephemeral feature).**
UT-8	Intermittent	Potentially Jurisdictional	UT-8 carries intermittent flow, and is connected to a TNW in a typical year. **Therefore, UT-8 should be considered potentially jurisdictional ((a)(2) water).**
UT-9	Intermittent	Potentially Jurisdictional	UT-9 carries intermittent flow, and is connected to a TNW in a typical year. **Therefore, UT-9 should be considered potentially jurisdictional ((a)(2) water).**
Ditch 1	UMMD* / Stormwater	Potentially Non-Jurisdictional	Ditch 1 appears to be an upland man-made drainage ditch (UMMD) lacking evidence of an OHWM. Ditch 1 is not a reroute of a tributary and was created in dry land for the purpose of stormwater management. **Therefore, consistent with the NWPR, Ditch 1 should be considered potentially non-jurisdictional (NWPR Exclusion (b)(5) ditch that is not an (a)(1) or (a)(2) water).**
Ditch 2	UMMD* / Stormwater	Potentially Non-Jurisdictional	Ditch 2 appears to be an upland man-made drainage ditch (UMMD) lacking evidence of an OHWM. Ditch 2 is not a reroute of a tributary and was created in dry land for the purpose of stormwater management. **Therefore, consistent with the NWPR, Ditch 2 should be considered potentially non-jurisdictional (NWPR Exclusion (b)(5) ditch that is not an (a)(1) or (a)(2) water).**
Ditch 3	UMMD* / Stormwater	Potentially Non-Jurisdictional	Ditch 3 appears to be an upland man-made drainage ditch (UMMD) lacking evidence of an OHWM. Ditch 3 is not a reroute of a tributary and was created in dry land for the purpose of stormwater management. **Therefore, consistent with the NWPR, Ditch 3 should be considered potentially non-jurisdictional (NWPR Exclusion (b)(5) ditch that is not an (a)(1) or (a)(2) water).**
Ditch 4	UMMD* / Stormwater	Potentially Non-Jurisdictional	Ditch 4 appears to be an upland man-made drainage ditch (UMMD) lacking evidence of an OHWM. Ditch 4 is not a reroute of a tributary and was created in dry land for the purpose of stormwater management. **Therefore, consistent with the NWPR, Ditch 4 should be considered potentially non-jurisdictional (NWPR Exclusion (b)(5) ditch that is not an (a)(1) or (a)(2) water).**

Aquatic Resource	Type	Jurisdictional Opinion	Jurisdictional Rationale
Stormwater Outlet 1	UMMD* / Stormwater	Potentially Non-Jurisdictional	Stormwater Outlet 1 is a structure constructed in uplands to convey stormwater runoff from a sediment detention pond. Stormwater Outlet 1 appears to have been constructed in dry land and is not a reroute of a tributary. **Therefore, consistent with the NWPR, Stormwater Outlet 1 should be considered potentially non-jurisdictional (NWPR Exclusion (b)(10) stormwater control feature).**
Stormwater Outlet 2	UMMD* / Stormwater	Potentially Non-Jurisdictional	Stormwater Outlet 2 is a structure constructed in uplands to convey stormwater runoff from a sediment detention pond. Stormwater Outlet 2 appears to have been constructed in dry land and is not a reroute of a tributary. **Therefore, consistent with the NWPR, Stormwater Outlet 2 should be considered potentially non-jurisdictional (NWPR Exclusion (b)(10) stormwater control feature).**
Stormwater Outlet 3	UMMD* / Stormwater	Potentially Non-Jurisdictional	Stormwater Outlet 3 is a structure constructed in uplands to convey stormwater runoff from a sediment detention pond. Stormwater Outlet 3 appears to have been constructed in dry land and is not a reroute of a tributary. **Therefore, consistent with the NWPR, Stormwater Outlet 3 should be considered potentially non-jurisdictional (NWPR Exclusion (b)(10) stormwater control feature).**
Erosional Gully 1	Erosional Gully	Potentially Non-Jurisdictional	Erosional Gully 1 consists of a steeply sloping upland area that has eroded into a sharp cut in the landscape. Erosional Gully 1 does not exhibit an OHWM, and is not the reroute of a tributary. **Therefore, Erosional Gully 1 is an upland area and should be considered potentially non-jurisdictional (NWPR Exclusion (b)(3) ephemeral feature).**
Erosional Gully 2	Erosional Gully	Potentially Non-Jurisdictional	Erosional Gully 2 consists of a steeply sloping upland area that has eroded into a sharp cut in the landscape. Erosional Gully 2 does not exhibit an OHWM, and is not the reroute of a tributary. **Therefore, Erosional Gully 2 is an upland area and should be considered potentially non-jurisdictional (NWPR Exclusion (b)(3) ephemeral feature).**
Stormwater Control Feature 1	Sediment Detention Pond	Potentially Non-Jurisdictional	Stormwater Control Feature 1 is a sediment detention pond constructed in uplands to detain stormwater runoff and intercept sediment loads generated by the active landfill. Stormwater Control Feature 1 appears to have been constructed in dry land and is not an impoundment of WOTUS. **Therefore, consistent with the NWPR, Stormwater Control Feature 1 should be considered potentially non-jurisdictional (NWPR Exclusion (b)(10) stormwater control feature).**
Stormwater Control Feature 2	Sediment Detention Pond	Potentially Non-Jurisdictional	Stormwater Control Feature 2 is a sediment detention pond constructed in uplands to detain stormwater runoff and intercept sediment loads generated by the active landfill. Stormwater Control Feature 2 appears to have been constructed in dry land and is not an impoundment of WOTUS. **Therefore, consistent with the NWPR, Stormwater Control Feature 2 should be considered potentially non-jurisdictional (NWPR Exclusion (b)(10) stormwater control feature).**
Stormwater Control Feature 3	Sediment Detention Pond	Potentially Non-Jurisdictional	Stormwater Control Feature 3 is a sediment detention pond constructed in uplands to detain stormwater runoff and intercept sediment loads generated by the active landfill. Stormwater Control Feature 3 appears to have been constructed in dry land and is not an impoundment of WOTUS. **Therefore, consistent with the NWPR, Stormwater Control Feature 3 should be considered potentially non-jurisdictional (NWPR Exclusion (b)(10) stormwater control feature).**
Excavation 1	Soil Borrow Area	Potentially Non-Jurisdictional	Excavation 1 is a pit excavated in uplands to obtain fill/sand/gravel. Excavation 1 serves as a soil borrow pit to provide daily waste cover and construction material for the adjacent active landfill. No water was observed within Excavation 1 during the delineation nor is any inundation visible on aerial photography. Excavation 1 is located outside the 10-year floodplain and therefore is not connected to WOTUS in a typical year. **Therefore, consistent with the NWPR, Excavation 1 should be considered potentially non-jurisdictional (NWPR Exclusion (b)(9) pit excavated in upland to obtain fill/sand/gravel).**

Aquatic Resource	Type	Jurisdictional Opinion	Jurisdictional Rationale
Excavation 2	Soil Borrow Area	Potentially Non-Jurisdictional	Excavation 2 is a pit excavated in uplands to obtain fill/sand/gravel. Excavation 2 serves as a soil borrow pit to provide daily waste cover and construction material for the adjacent active landfill. No water was observed within Excavation 2 during the delineation nor is any inundation visible on aerial photography. Excavation 2 is located outside the 10-year floodplain and therefore is not connected to WOTUS in a typical year. **Therefore, consistent with the NWPR, Excavation 2 should be considered potentially non-jurisdictional (NWPR Exclusion (b)(9) pit excavated in upland to obtain fill/sand/gravel).**

**UMMD – Upland, Man-Made Ditch*

FEMA 100-Year Floodplain

A review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FEMA Panel Nos. 48073C0175D and 48073C0285D, effective 1/6/2011) for the area indicates the entire property is mapped as Zone X. Zone X is described as areas outside of the 100-year floodplain, and by definition carry less than 0.2 percent chance of flooding annually. Additional FEMA data was reviewed through the FEMA Estimated Based Flood Elevation (estBFE) Viewer online mapping tool (webapps.usgs.gov/infrm/estBFE). The FEMA base level engineering data provides estimated 10-year and 100-year flood extents for Cherokee County. Based on a review of the data, the 10-year and 100-year flood extents begin approximately 0.7 miles downstream of the project site along Barber Branch. Therefore, the project site is located outside both the 10-year and 100-year floodplains.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of this investigation, one (1) named tributary (Barber Branch), eight (8) unnamed tributaries (UT-2 through UT-9), four (4) upland man-made / stormwater ditches (Ditch 1 through Ditch 4), three (3) stormwater outlets (Stormwater Outlets 1 through 3), two (2) erosional gullies (Erosional Gully 1 and 2), three (3) stormwater control features (Stormwater Control Features 1 through 3), and two (2) excavations (Excavations 1 and 2) were delineated by Hydrex. The delineated aquatic resources are summarized in Table 1 below, and depicted on Plates B-1, B-2, and B-3 in Appendix B.

Table 1. Delineated Aquatic Resources and Jurisdictional Opinion by Hydrex

Aquatic Resource	Type	Length (LF)	Area (ac)	Jurisdictional Opinion
Tributary 1A (Headwaters of Barber Branch)	Ephemeral	288	0.013	Potentially Non-Jurisdictional
Tributary 1B (Barber Branch)	Intermittent	758	0.072	Potentially Jurisdictional
UT-2	Ephemeral	669	0.037	Potentially Non-Jurisdictional
UT-3	Ephemeral	210	0.007	Potentially Non-Jurisdictional
UT-4	Ephemeral	147	0.004	Potentially Non-Jurisdictional
UT-5	Ephemeral	260	0.013	Potentially Non-Jurisdictional
UT-6	Intermittent	529	0.092	Potentially Jurisdictional

Aquatic Resource	Type	Length (LF)	Area (ac)	Jurisdictional Opinion
UT-7	Ephemeral	243	0.009	Potentially Non-Jurisdictional
UT-8	Intermittent	91	0.006	Potentially Jurisdictional
UT-9	Intermittent	66	0.005	Potentially Jurisdictional
Ditch 1	UMMD* / Stormwater	892	--	Potentially Non-Jurisdictional
Ditch 2	UMMD* / Stormwater	866	--	Potentially Non-Jurisdictional
Ditch 3	UMMD* / Stormwater	1,795	--	Potentially Non-Jurisdictional
Ditch 4	UMMD* / Stormwater	949	--	Potentially Non-Jurisdictional
Stormwater Outlet 1	UMMD* / Stormwater	51	--	Potentially Non-Jurisdictional
Stormwater Outlet 2	UMMD* / Stormwater	67	--	Potentially Non-Jurisdictional
Stormwater Outlet 3	UMMD* / Stormwater	128	--	Potentially Non-Jurisdictional
Erosional Gully 1	Erosional Gully	100	--	Potentially Non-Jurisdictional
Erosional Gully 2	Erosional Gully	208		Potentially Non-Jurisdictional
Stormwater Control Feature 1	Sediment Detention Pond	--	0.32	Potentially Non-Jurisdictional
Stormwater Control Feature 2	Sediment Detention Pond	--	0.73	Potentially Non-Jurisdictional
Stormwater Control Feature 3	Sediment Detention Pond	--	1.58	Potentially Non-Jurisdictional
Excavation 1	Soil Borrow Area	--	0.44	Potentially Non-Jurisdictional
Excavation 2	Soil Borrow Area	--	3.18	Potentially Non-Jurisdictional

** UMMD – Upland, Man-Made Ditch*

It should be noted, the jurisdictional status presented herein is based solely on the professional opinion of Hydrex and our interpretation of the Navigable Waters Protection Rule. Therefore, we recommend requesting an Approved Jurisdictional Determination (AJD) from the USACE Fort Worth District in order to determine the jurisdictional status of the delineated aquatic resources. An AJD is an official determination issued by the USACE confirming jurisdictional “waters of the United States, “navigable waters of the United States”, or both, are either present or absent within an area of interest. An AJD made by the USACE is valid for 5 years.

I appreciate the opportunity to present this information. If you have any questions regarding these findings, or if further clarification is necessary, please feel free to contact me at [redacted].com or (936) 568-9451. I look forward to working with you in the future.

Sincerely,
Hydrex Environmental

Kyle M. Compton, PWS
Environmental Scientist

SWS PCP PWS EDUCATION EXPERIENCE ETHICS
KYLE COMPTON
3158 PWS
PROFESSIONAL WETLAND SCIENTIST
KMC 8-13-2021

Clayton A. Collier, REM, PWS
Senior Environmental Scientist

SWS PCP PWS EDUCATION EXPERIENCE ETHICS
CLAYTON A. COLLIER
2389 PWS
PROFESSIONAL WETLAND SCIENTIST
CAC 8-13-21

APPENDICES

APPENDIX A **SITE OVERVIEW MAPS**

Plate A-1	Vicinity Map
Plate A-2	Regional Geologic Map
Plate A-3	USGS Topographic Map
Plate A-4	FEMA Flood Insurance Rate Map
Plate A-5	National Wetlands Inventory Map
Plate A-6	NRCS Soil Survey Map

APPENDIX B **DELINEATION MAPS**

Plate B-1	Delineation Map
Plate B-2	Delineation Map (2020 Aerial Photograph)
Plate B-3	Delineation Map (2016 LiDAR Digital Terrain Model)

APPENDIX C **HISTORIC AERIAL PHOTOGRAPHS AND USGS TOPOGRAPHIC MAPS**

Plate C-1	1947 Aerial Photograph
Plate C-2	1957 Aerial Photograph
Plate C-3	1971 Aerial Photograph
Plate C-4	1976/1982 USGS Topographic Map
Plate C-5	1980 Aerial Photograph
Plate C-6	1996 Aerial Photograph
Plate C-7	2004 Aerial Photograph
Plate C-8	2009 Aerial Photograph
Plate C-9	2015 Aerial Photograph
Plate C-10	2016 USGS Topographic Map
Plate C-11	2018 Aerial Photograph
Plate C-12	2020 Aerial Photograph

APPENDIX D **WETLAND DETERMINATION DATA FORMS**

APPENDIX E **SITE PHOTOGRAPHS**

Landfill Development Photographs
Delineated Features Photographs
Observation Point Photographs

APPENDIX F **ANTECEDENT PRECIPITATION TOOL RESULTS**

APPENDIX G **CONSULTANT QUALIFICATIONS**

APPENDIX H **LIMITATIONS**

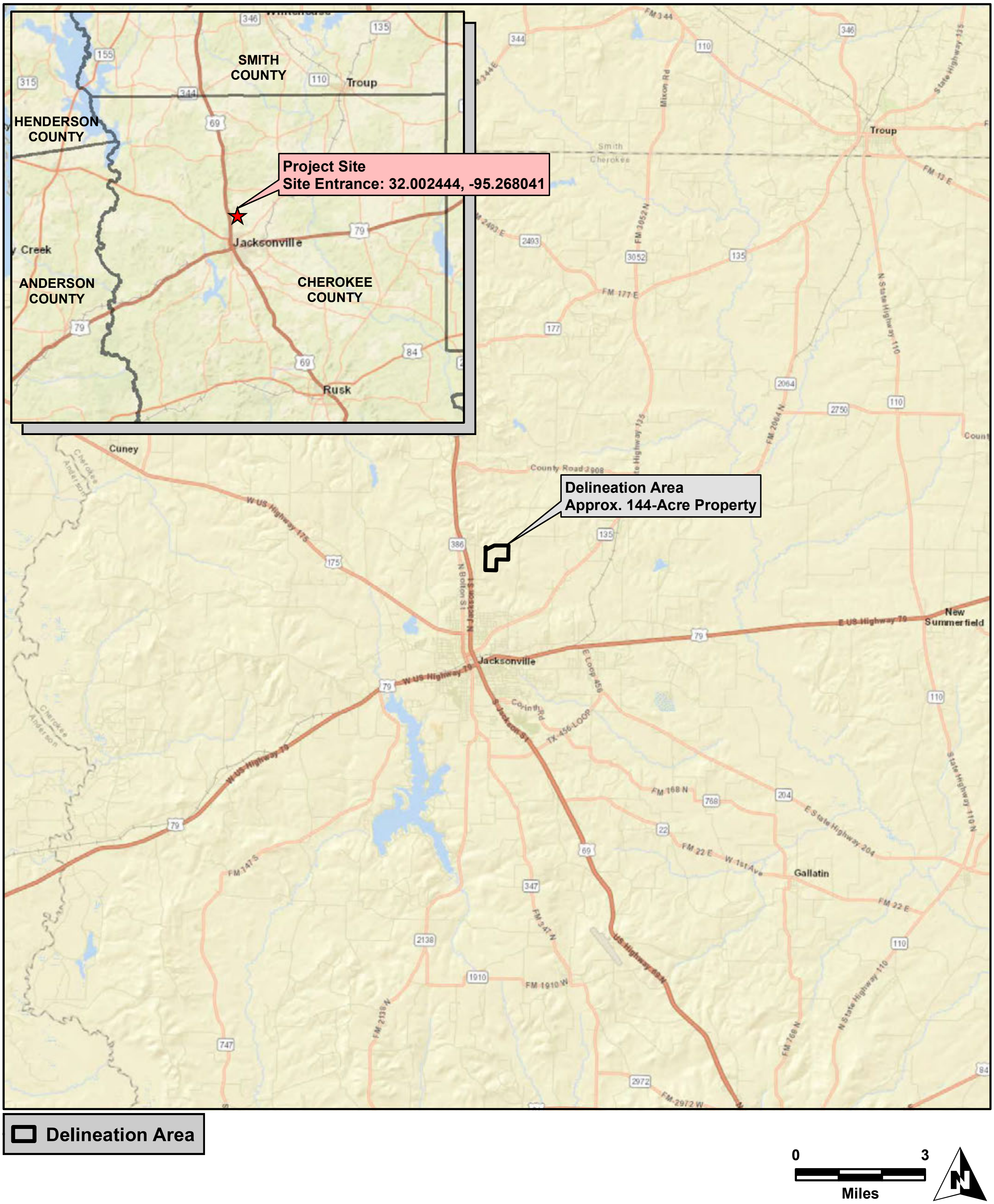
DISTRIBUTION

Mr. Austin Sparks, P.E.
Environmental Manager – East Texas Area
Republic Services, Inc.
12920 FM 2767
Tyler, Texas 75708

Mr. Clayton A. Collier, REM, PWS
Senior Environmental Scientist
Hydrex Environmental
1120 NW Stallings Drive
Nacogdoches, Texas 75964

APPENDIX A

SITE OVERVIEW MAPS



BASEMAP SOURCE: ESRI ARCGIS ONLINE WORLD STREET MAP

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PLATE A - 1

VICINITY MAP

Royal Oaks Landfill
An Approximate 144-Acre Tract
Cherokee County, Texas
Delineation of WOTUS and Jurisdictional Determination

Map Revised: 07/12/2021	Project Number: A-12-1509	GIS Analyst: SMD

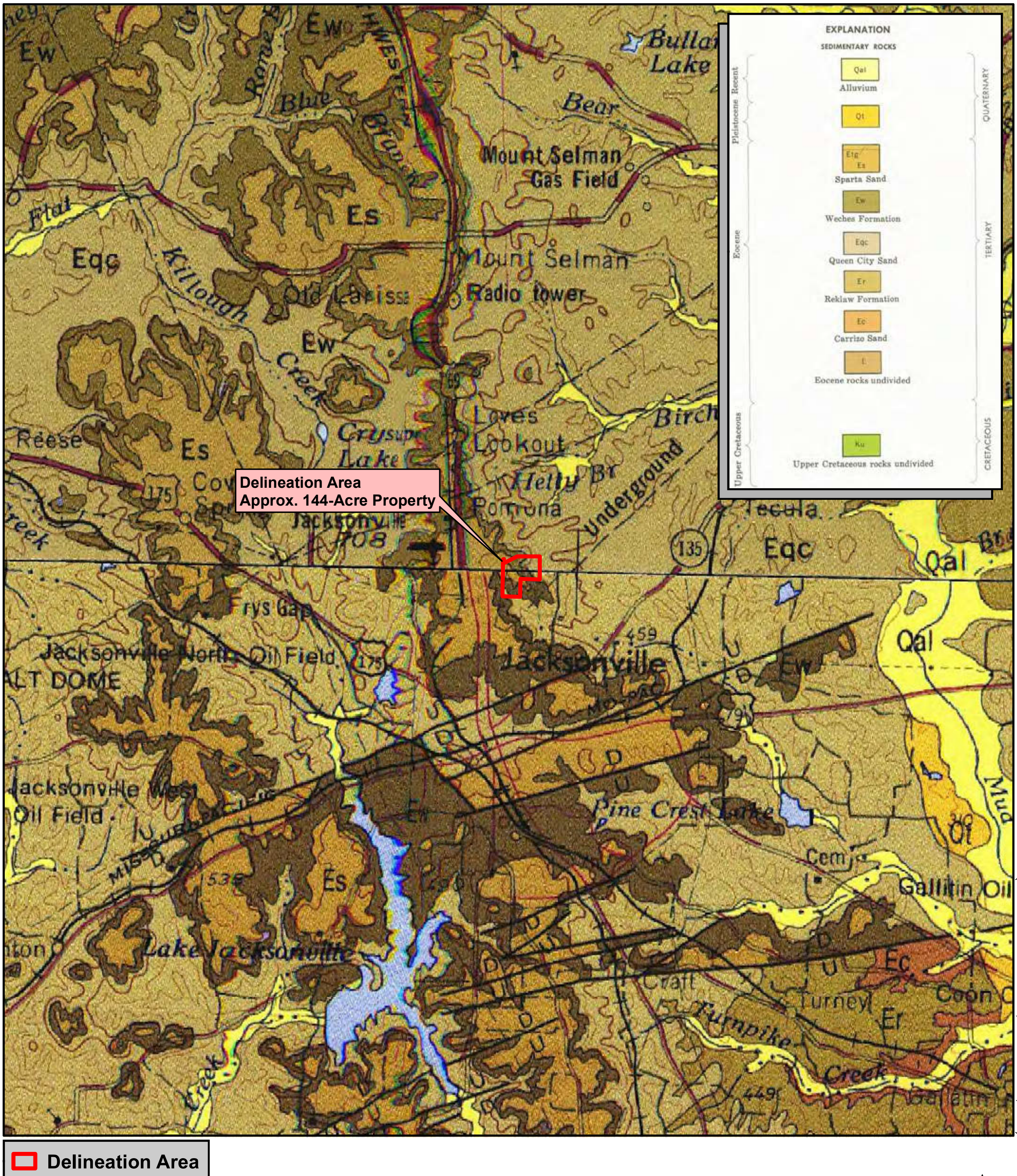

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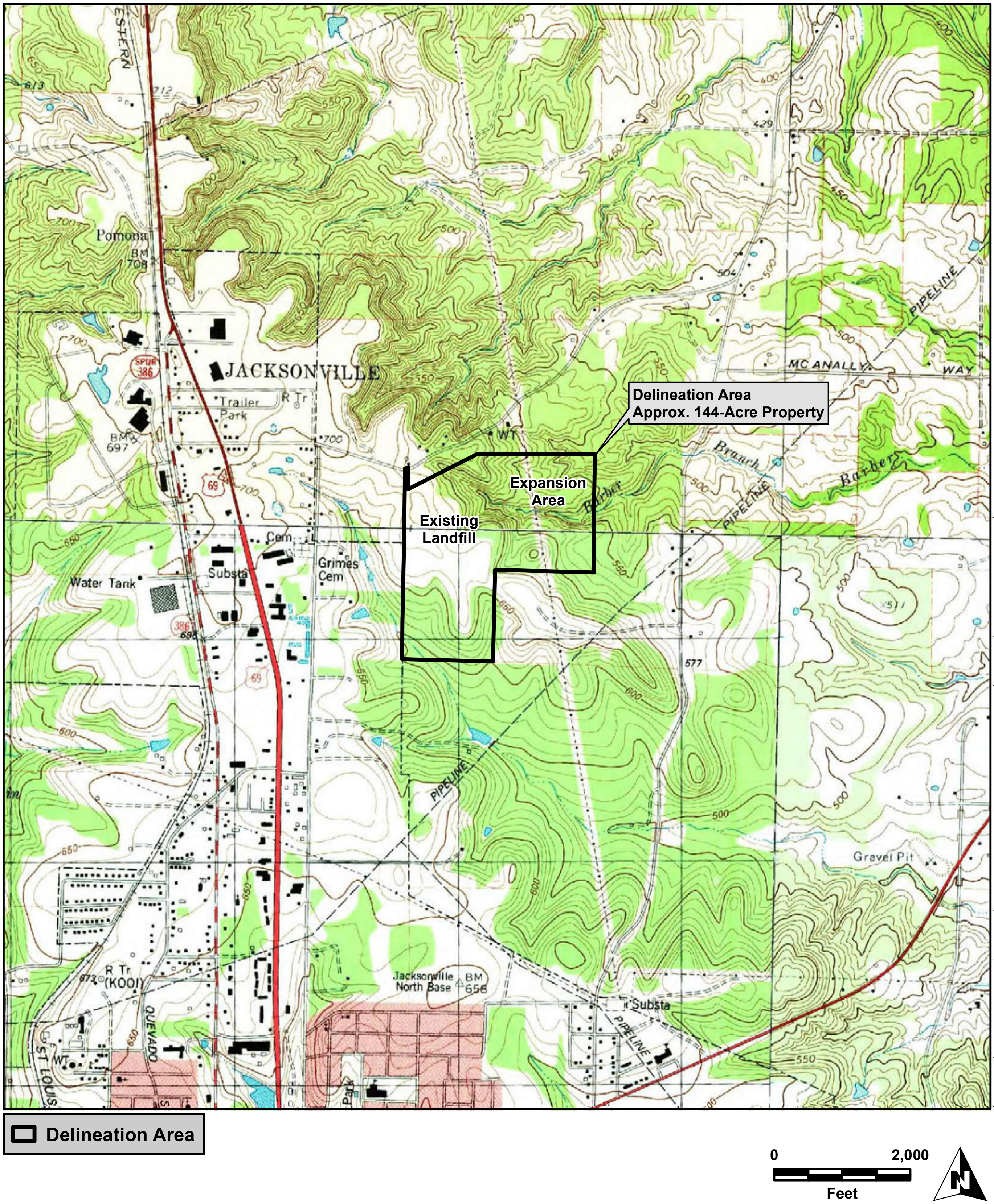
PLATE A - 2

REGIONAL GEOLOGIC MAP

Royal Oaks Landfill
An Approximate 144-Acre Tract
Cherokee County, Texas
Delineation of WOTUS and Jurisdictional Determination

Map Revised: 07/12/2021	Project Number: A-12-1509	GIS Analyst: SMD



BASEMAP SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE MAP (JACKSONVILLE EAST, TX 1976; JACKSONVILLE WEST, TX 1982; TECULA, TX 1976; MOUNT SELMAN, TX 1976)

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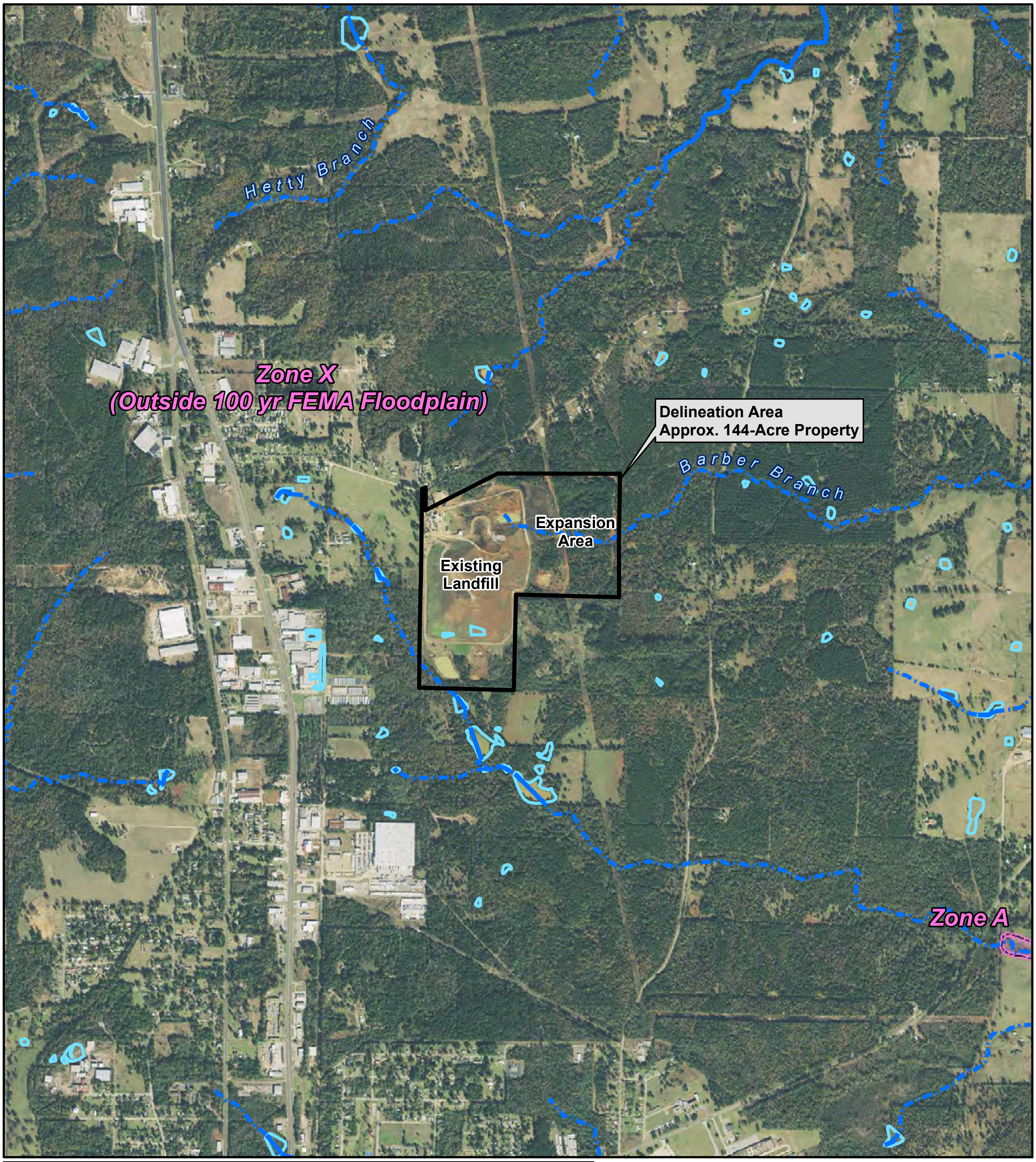
PLATE A - 3

USGS TOPOGRAPHIC MAP

Royal Oaks Landfill
An Approximate 144-Acre Tract
Cherokee County, Texas
Delineation of WOTUS and Jurisdictional Determination

Map Revised: 07/12/2021	Project Number: A-12-1509	GIS Analyst: SMD



BASEMAP SOURCE: 2018 AERIAL PHOTOGRAPH PROVIDED BY NAIP, HYDROLOGY BY USGS, FLOOD DATA PROVIDED BY FEMA (PANEL NO 48073C0175D 1/6/2011, 48073C0200D 1/6/2011, 48073C0285D 1/6/2011, 48073C0305D 1/6/2011)

Delineation Area	USGS Waterbody
FEMA Flood Zone	USGS River / Perennial Stream
	USGS Ephemeral / Intermittent Stream

0 2,000
Feet

N

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PLATE A - 4

FEMA FLOOD INSURANCE RATE MAP

Royal Oaks Landfill
An Approximate 144-Acre Tract
Cherokee County, Texas
Delineation of WOTUS and Jurisdictional Determination

Map Revised: 07/12/2021 | Project Number: A-12-1509 | GIS Analyst: SMD

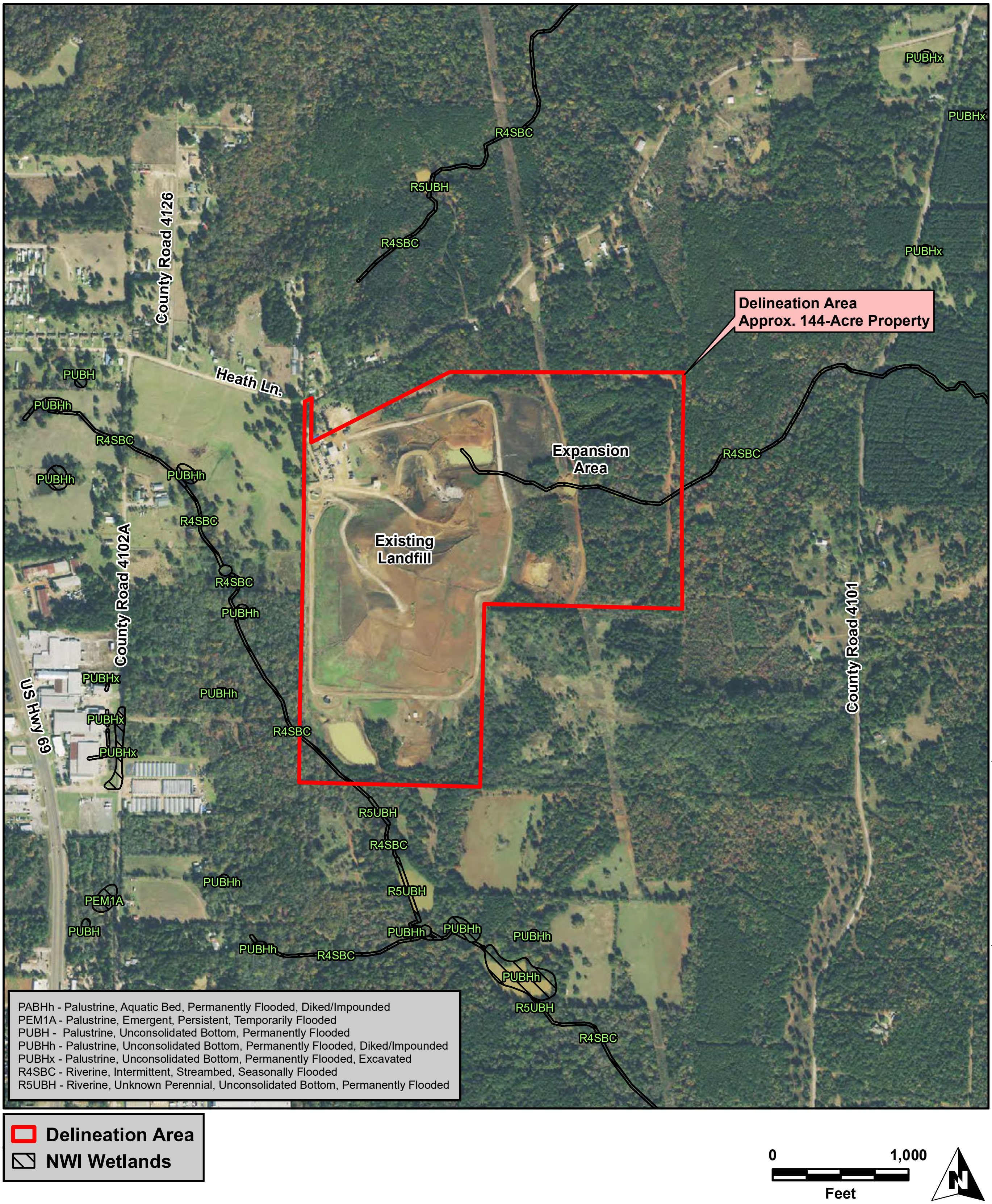

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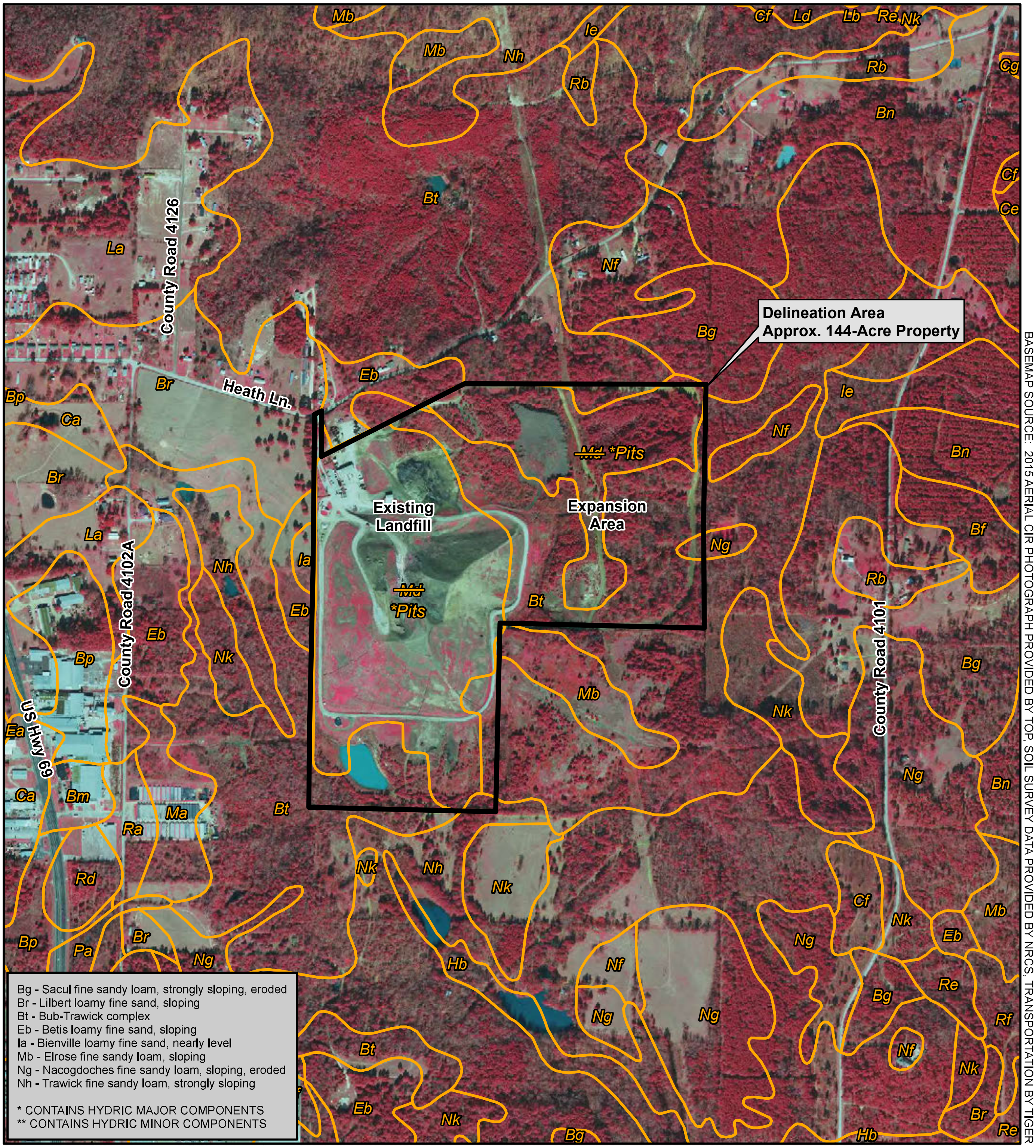
PLATE A - 5

NATIONAL WETLANDS INVENTORY MAP

Royal Oaks Landfill
An Approximate 144-Acre Tract
Cherokee County, Texas
Delineation of WOTUS and Jurisdictional Determination

Map Revised: 07/12/2021	Project Number: A-12-1509	GIS Analyst: SMD



Delineation Area
NRCS Soil Map Unit

*NRCS correspondence with the Bryan, Texas Soil Survey office has confirmed a mapping error from the web soil survey for the subject property. Soil mapping unit polygons labeled "Md – Angelina Series" should be labeled "Pits" and correlate with landfill development. According to the NRCS, an error was made when transposing the paper soil survey to digital format. The map correction has been made to Plate A-6, and the web soil survey is to be updated within the next year or so based on correspondence with NRCS.

0 1,000
Feet

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PLATE A - 6

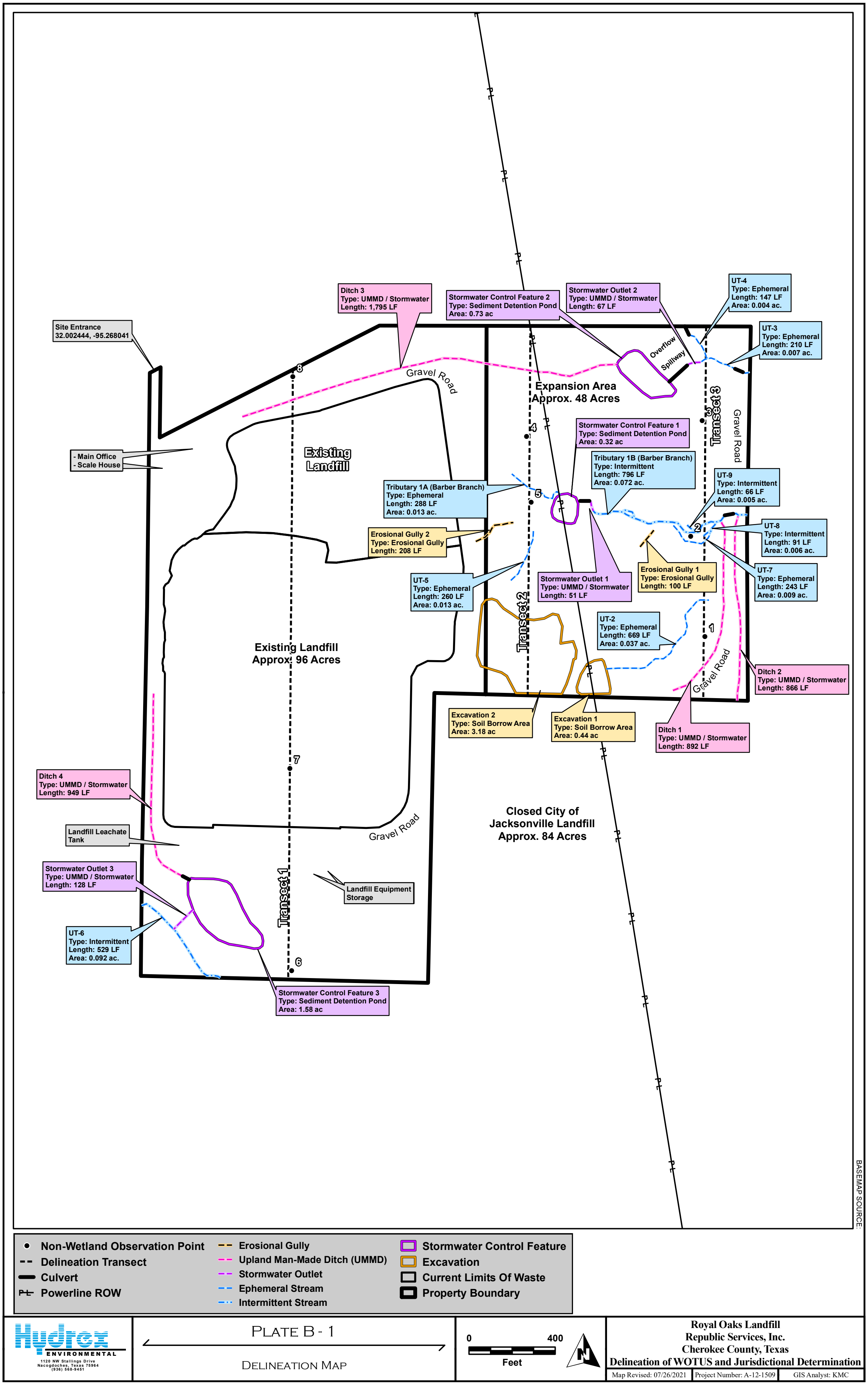
NRCS SOIL SURVEY MAP

Royal Oaks Landfill
An Approximate 144-Acre Tract
Cherokee County, Texas
Delineation of WOTUS and Jurisdictional Determination

Map Revised: 07/12/2021 | Project Number: A-12-1509 | GIS Analyst: SMD

APPENDIX B

DELINEATION MAPS


Ditch 3
Type: UMMD / Stormwater
Length: 1,795 LF
Stormwater Control Feature 2
Type: Sediment Detention Pond
Area: 0.73 ac
Stormwater Outlet 2
Type: UMMD / Stormwater
Length: 67 LF
UT-4
Type: Ephemeral
Length: 147 LF
Area: 0.004 ac.
UT-3
Type: Ephemeral
Length: 210 LF
Area: 0.007 ac.
Site Entrance
32.002444, -95.268041
Overflow
Spillway
Gravel Road
Expansion Area
Approx. 48 Acres
Transect 3
Gravel Road
Stormwater Control Feature 1
Type: Sediment Detention Pond
Area: 0.32 ac
Tributary 1B (Barber Branch)
Type: Intermittent
Length: 796 LF
Area: 0.072 ac.
- Main Office
- Scale House
Existing Landfill
Tributary 1A (Barber Branch)
Type: Ephemeral
Length: 288 LF
Area: 0.013 ac.
UT-9
Type: Intermittent
Length: 66 LF
Area: 0.005 ac.
UT-8
Type: Intermittent
Length: 91 LF
Area: 0.006 ac.
Erosional Gully 2
Type: Erosional Gully
Length: 208 LF
Erosional Gully 1
Type: Erosional Gully
Length: 100 LF
UT-7
Type: Ephemeral
Length: 243 LF
Area: 0.009 ac.
UT-5
Type: Ephemeral
Length: 260 LF
Area: 0.013 ac.
Stormwater Outlet 1
Type: UMMD / Stormwater
Length: 51 LF
Transect 2
UT-2
Type: Ephemeral
Length: 669 LF
Area: 0.037 ac.
Existing Landfill
Approx. 96 Acres
Gravel Road
Ditch 2
Type: UMMD / Stormwater
Length: 866 LF
Excavation 2
Type: Soil Borrow Area
Area: 3.18 ac
Excavation 1
Type: Soil Borrow Area
Area: 0.44 ac
Ditch 1
Type: UMMD / Stormwater
Length: 892 LF
Ditch 4
Type: UMMD / Stormwater
Length: 949 LF
Closed City of
Jacksonville Landfill
Approx. 84 Acres
Landfill Leachate
Tank
Gravel Road
Stormwater Outlet 3
Type: UMMD / Stormwater
Length: 128 LF
Transect 1
Landfill Equipment
Storage
UT-6
Type: Intermittent
Length: 529 LF
Area: 0.092 ac.
Stormwater Control Feature 3
Type: Sediment Detention Pond
Area: 1.58 ac
1
2
3
4
5
6
7
8
PL
BASEMAP SOURCE:
Non-Wetland Observation Point
Delineation Transect
Culvert
Powerline ROW
Erosional Gully
Upland Man-Made Ditch (UMMD)
Stormwater Outlet
Ephemeral Stream
Intermittent Stream
Stormwater Control Feature
Excavation
Current Limits Of Waste
Property Boundary
Hydrex
ENVIRONMENTAL
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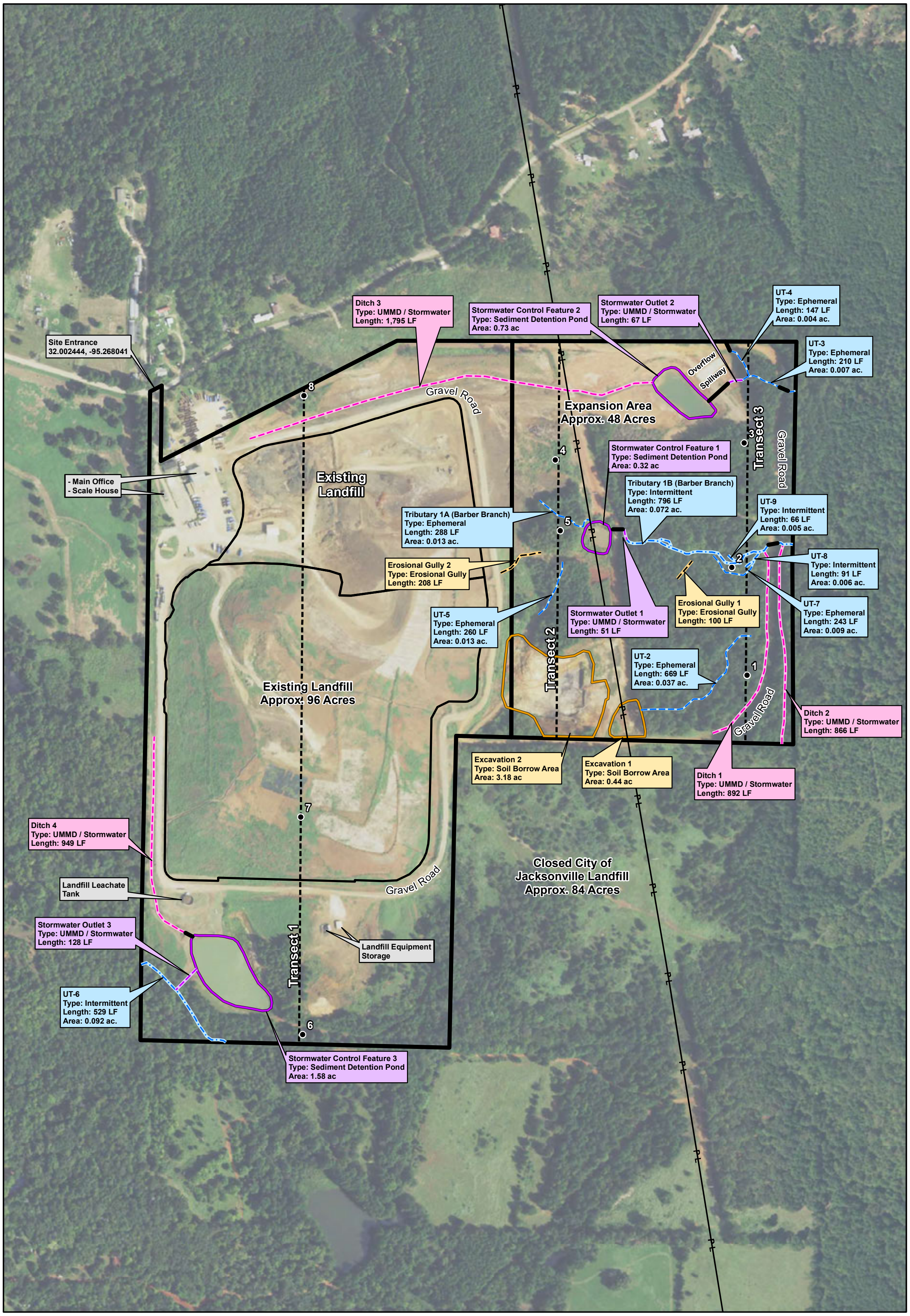
Nacogdoches, Texas 75964
(936) 568-9451
PLATE B - 1
DELINEATION MAP
0
400
Feet
N
Royal Oaks Landfill
Republic Services, Inc.
Cherokee County, Texas
Delineation of WOTUS and Jurisdictional Determination
Map Revised: 07/26/2021
Project Number: A-12-1509
GIS Analyst: KMC



BASEMAP SOURCE: 2020 AERIAL PHOTOGRAPH PROVIDED BY NAIP.

- Non-Wetland Observation Point
- Delineation Transect
- Culvert
- Powerline ROW
- Erosional Gully
- Upland Man-Made Ditch (UMMD)
- Stormwater Outlet
- Ephemeral Stream
- Intermittent Stream
- Stormwater Control Feature
- Excavation
- Current Limits Of Waste
- Property Boundary

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PLATE B - 2

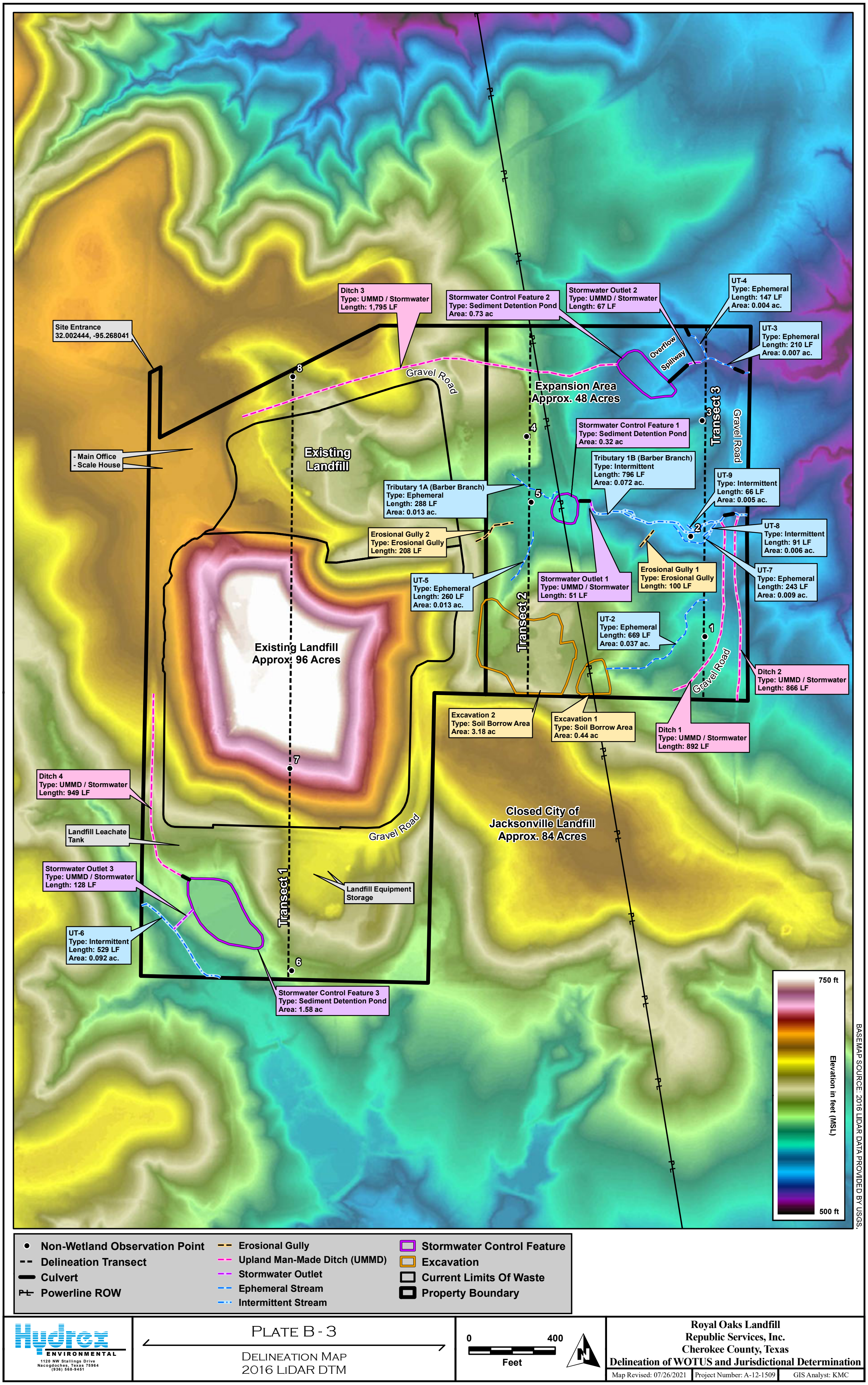
DELINEATION MAP
2020 AERIAL PHOTOGRAPH

0 400
Feet

N

Royal Oaks Landfill
Republic Services, Inc.
Cherokee County, Texas
Delineation of WOTUS and Jurisdictional Determination

Map Revised: 07/26/2021 | Project Number: A-12-1509 | GIS Analyst: KMC


Ditch 3
Type: UMMD / Stormwater
Length: 1,795 LF
Stormwater Control Feature 2
Type: Sediment Detention Pond
Area: 0.73 ac
Stormwater Outlet 2
Type: UMMD / Stormwater
Length: 67 LF
UT-4
Type: Ephemeral
Length: 147 LF
Area: 0.004 ac.
UT-3
Type: Ephemeral
Length: 210 LF
Area: 0.007 ac.
Site Entrance
32.002444, -95.268041
Overflow
Spillway
Gravel Road
Expansion Area
Approx. 48 Acres
Transect 3
Gravel Road
Stormwater Control Feature 1
Type: Sediment Detention Pond
Area: 0.32 ac
- Main Office
- Scale House
Existing Landfill
Tributary 1B (Barber Branch)
Type: Intermittent
Length: 796 LF
Area: 0.072 ac.
UT-9
Type: Intermittent
Length: 66 LF
Area: 0.005 ac.
Tributary 1A (Barber Branch)
Type: Ephemeral
Length: 288 LF
Area: 0.013 ac.
UT-8
Type: Intermittent
Length: 91 LF
Area: 0.006 ac.
Erosional Gully 2
Type: Erosional Gully
Length: 208 LF
UT-7
Type: Ephemeral
Length: 243 LF
Area: 0.009 ac.
UT-5
Type: Ephemeral
Length: 260 LF
Area: 0.013 ac.
Stormwater Outlet 1
Type: UMMD / Stormwater
Length: 51 LF
Erosional Gully 1
Type: Erosional Gully
Length: 100 LF
Transect 2
UT-2
Type: Ephemeral
Length: 669 LF
Area: 0.037 ac.
Existing Landfill
Approx. 96 Acres
Gravel Road
Ditch 2
Type: UMMD / Stormwater
Length: 866 LF
Excavation 2
Type: Soil Borrow Area
Area: 3.18 ac
Excavation 1
Type: Soil Borrow Area
Area: 0.44 ac
Ditch 1
Type: UMMD / Stormwater
Length: 892 LF
Ditch 4
Type: UMMD / Stormwater
Length: 949 LF
Closed City of
Jacksonville Landfill
Approx. 84 Acres
Landfill Leachate
Tank
Gravel Road
Stormwater Outlet 3
Type: UMMD / Stormwater
Length: 128 LF
Landfill Equipment
Storage
Transect 1
UT-6
Type: Intermittent
Length: 529 LF
Area: 0.092 ac.
Stormwater Control Feature 3
Type: Sediment Detention Pond
Area: 1.58 ac
750 ft
Elevation in feet (MSL)
500 ft
BASEMAP SOURCE: 2016 LIDAR DATA PROVIDED BY USGS.
Non-Wetland Observation Point
Delineation Transect
Culvert
Powerline ROW
Erosional Gully
Upland Man-Made Ditch (UMMD)
Stormwater Outlet
Ephemeral Stream
Intermittent Stream
Stormwater Control Feature
Excavation
Current Limits Of Waste
Property Boundary
Hydrex
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Nacogdoches, Texas 75964
(936) 568-9451
Plate B - 3
Delineation Map
2016 LiDAR DTM
0
400
Feet
N
Royal Oaks Landfill
Republic Services, Inc.
Cherokee County, Texas
Delineation of WOTUS and Jurisdictional Determination
Map Revised: 07/26/2021
Project Number: A-12-1509
GIS Analyst: KMC

APPENDIX C

HISTORIC AERIAL PHOTOGRAPHS AND USGS TOPOGRAPHIC MAPS

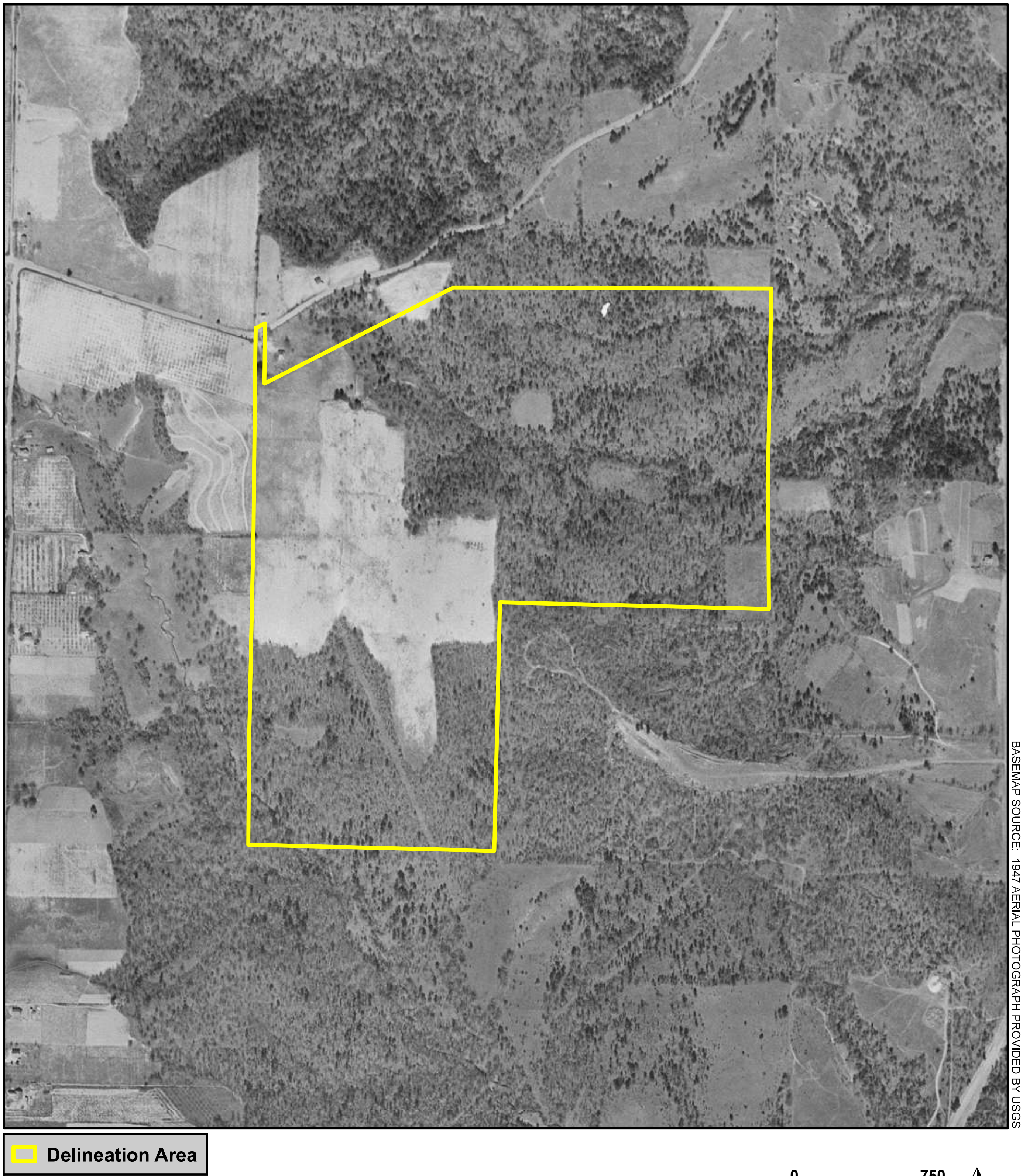

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PLATE C - 1

1947 AERIAL PHOTOGRAPH

Royal Oaks Landfill
An Approximate 144-Acre Tract
Cherokee County, Texas
Delineation of WOTUS and Jurisdictional Determination

Map Revised: 07/12/2021 | Project Number: A-12-1509 | GIS Analyst: SMD

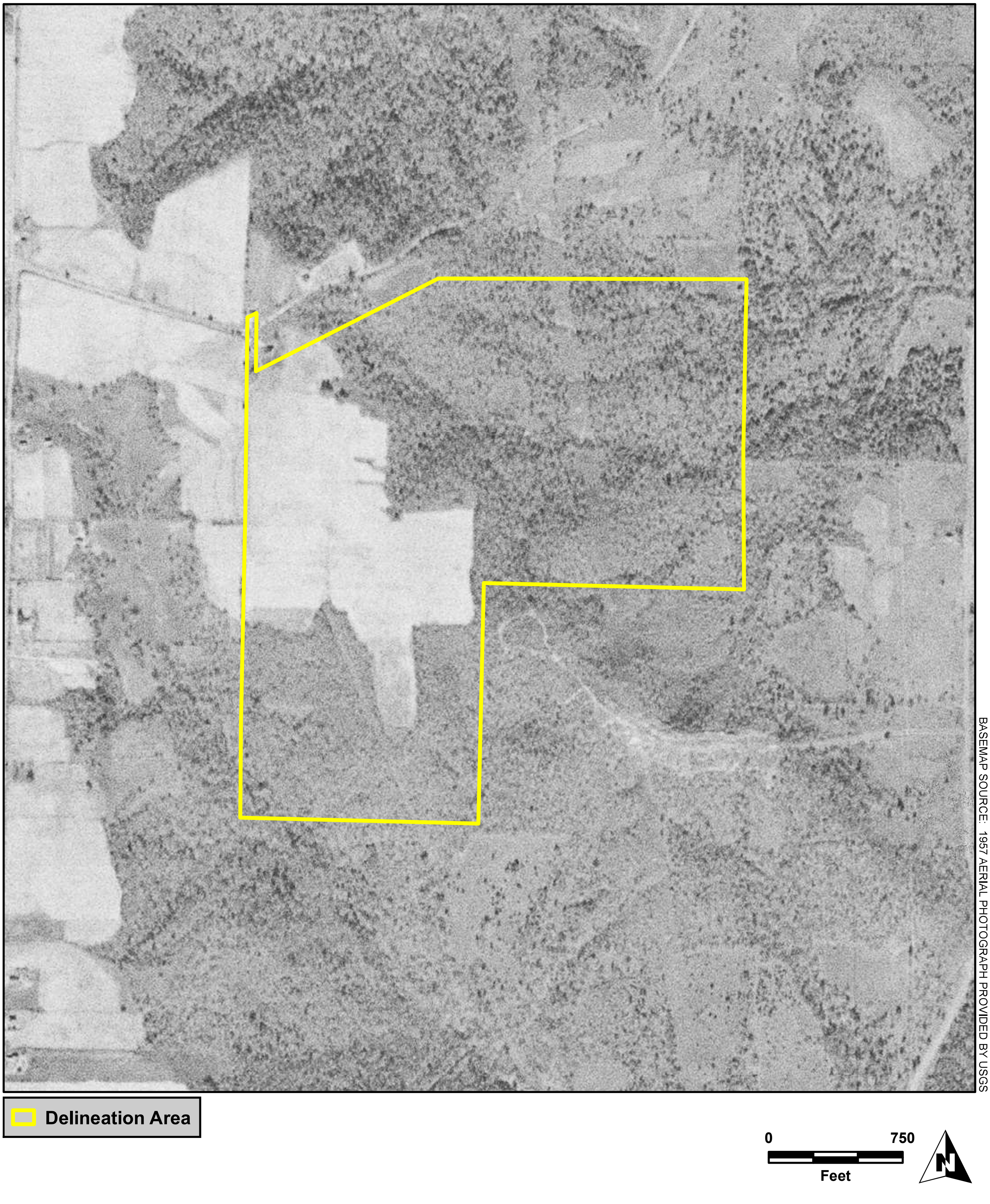

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PLATE C - 2

1957 AERIAL PHOTOGRAPH

Royal Oaks Landfill
An Approximate 144-Acre Tract
Cherokee County, Texas
Delineation of WOTUS and Jurisdictional Determination

Map Revised: 07/12/2021	Project Number: A-12-1509	GIS Analyst: SMD

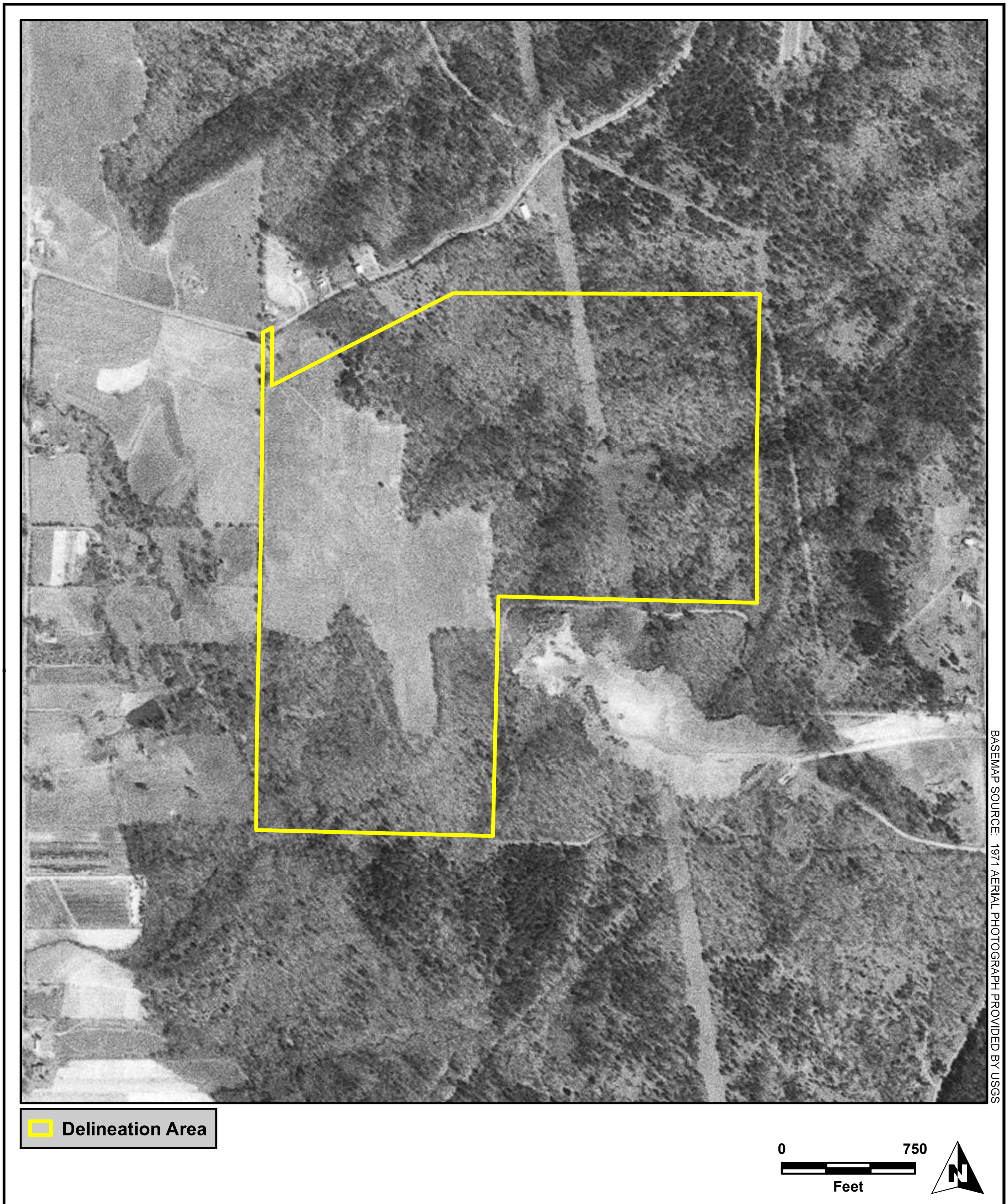

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PLATE C - 3

1971 AERIAL PHOTOGRAPH

Royal Oaks Landfill
An Approximate 144-Acre Tract
Cherokee County, Texas
Delineation of WOTUS and Jurisdictional Determination

Map Revised: 07/12/2021 | Project Number: A-12-1509 | GIS Analyst: SMD

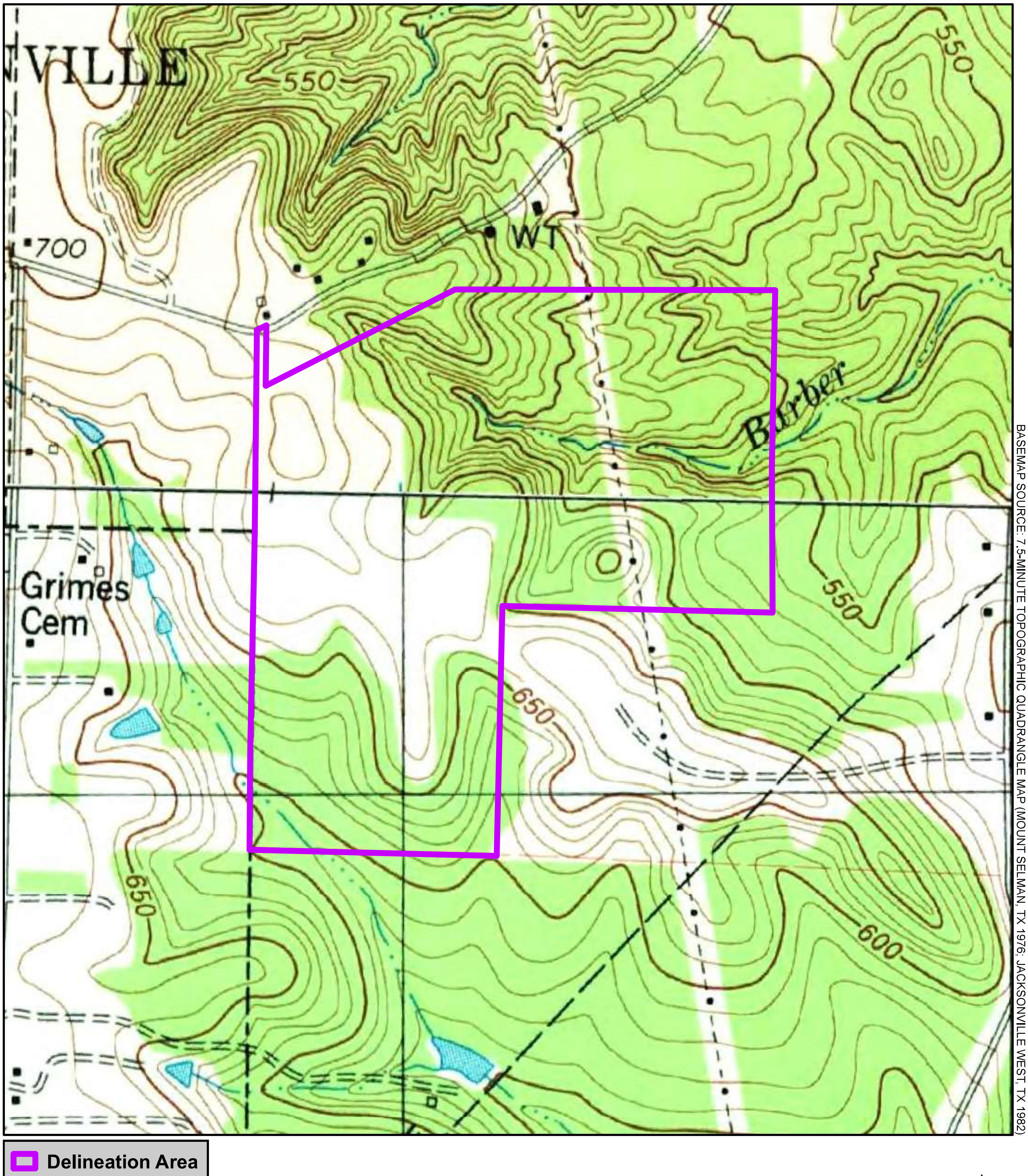

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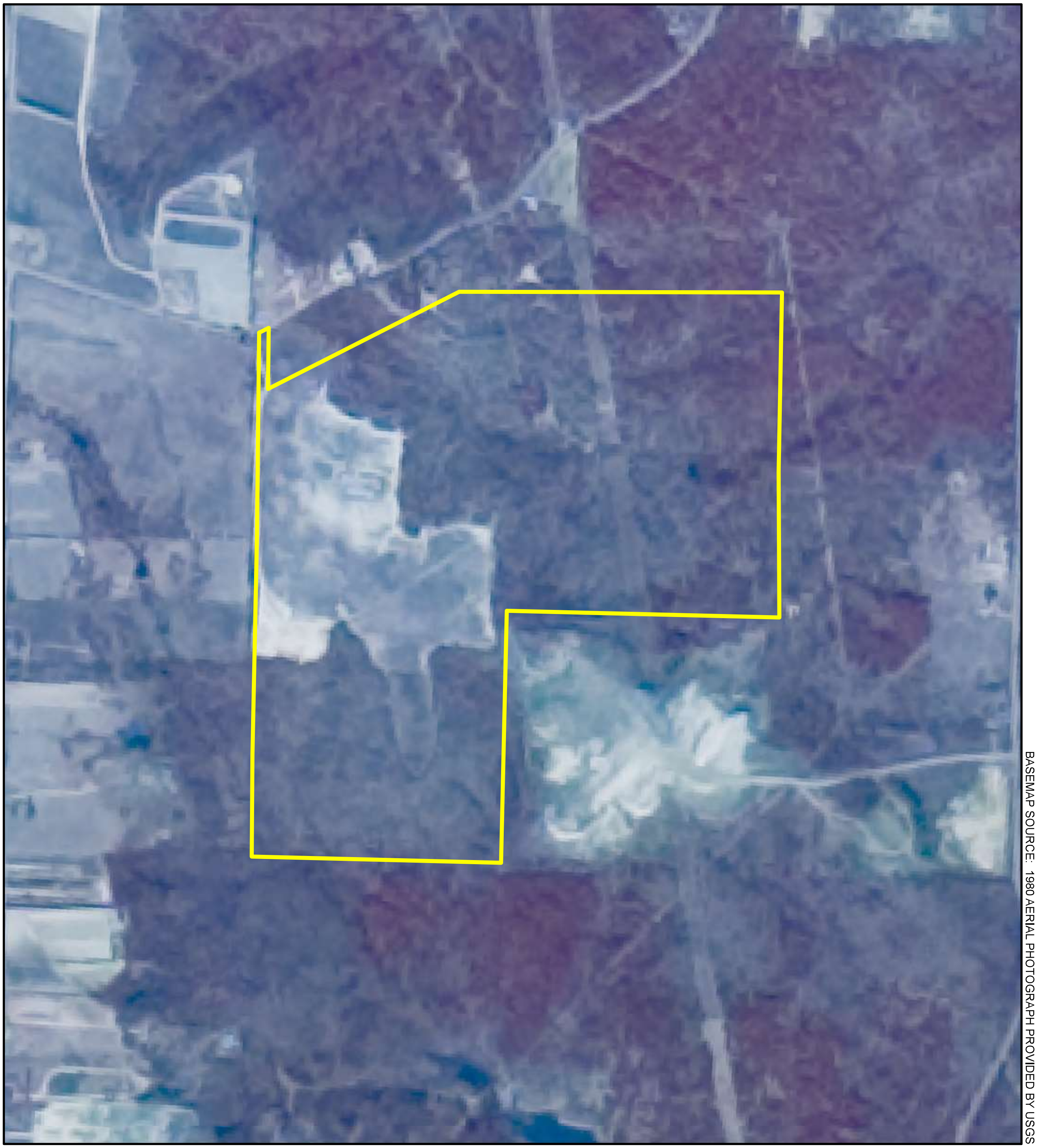
PLATE C -4

1976/ 1982 USGS TOPOGRAPHIC MAP

Royal Oaks Landfill
An Approximate 144-Acre Tract
Cherokee County, Texas
Delineation of WOTUS and Jurisdictional Determination

Map Revised: 07/12/2021	Project Number: A-12-1509	GIS Analyst: SMD



Delineation Area

0 750
Feet

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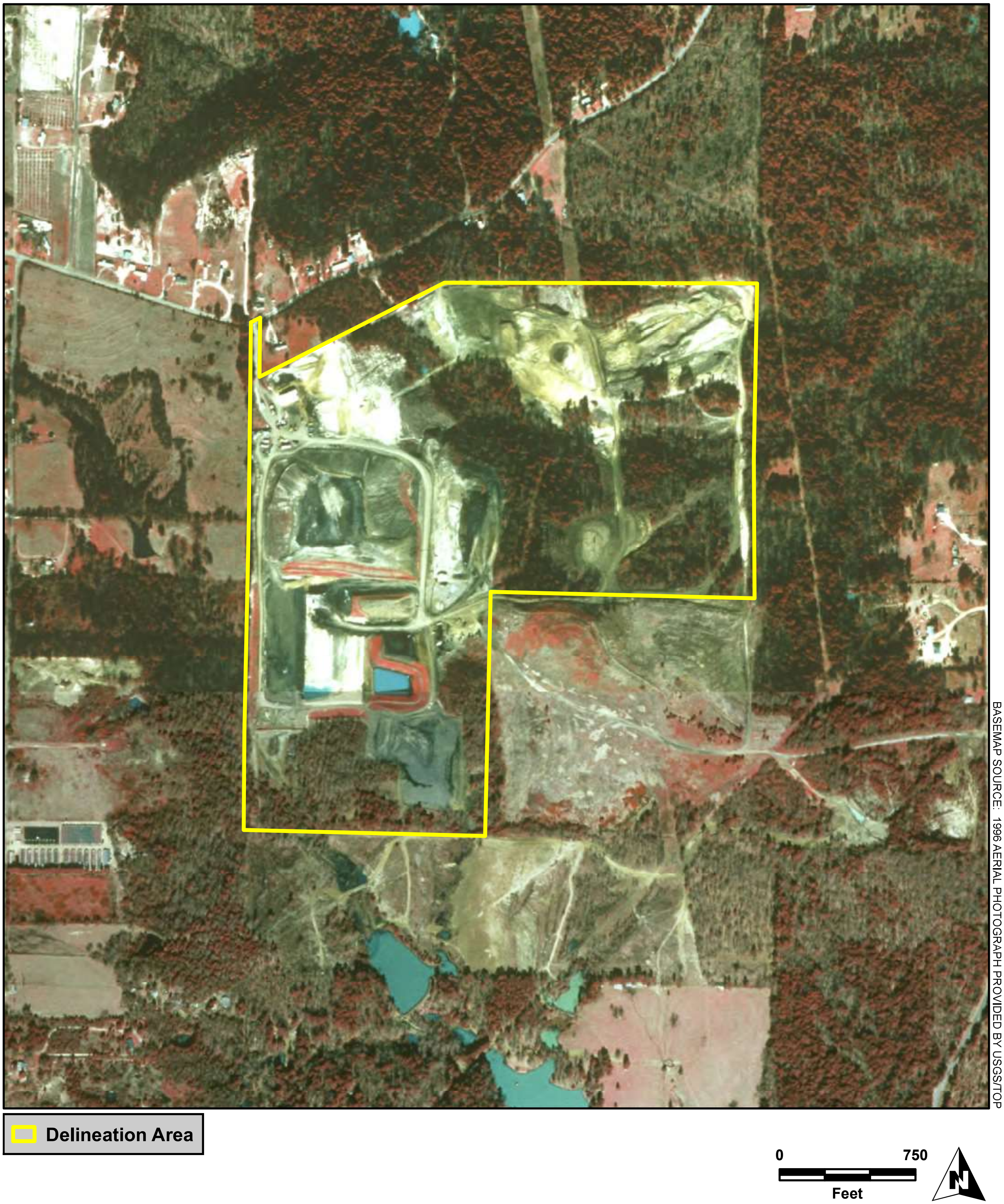
PLATE C - 5

1980 AERIAL PHOTOGRAPH

Royal Oaks Landfill
An Approximate 144-Acre Tract
Cherokee County, Texas
Delineation of WOTUS and Jurisdictional Determination

Map Revised: 07/12/2021 | Project Number: A-12-1509 | GIS Analyst: SMD



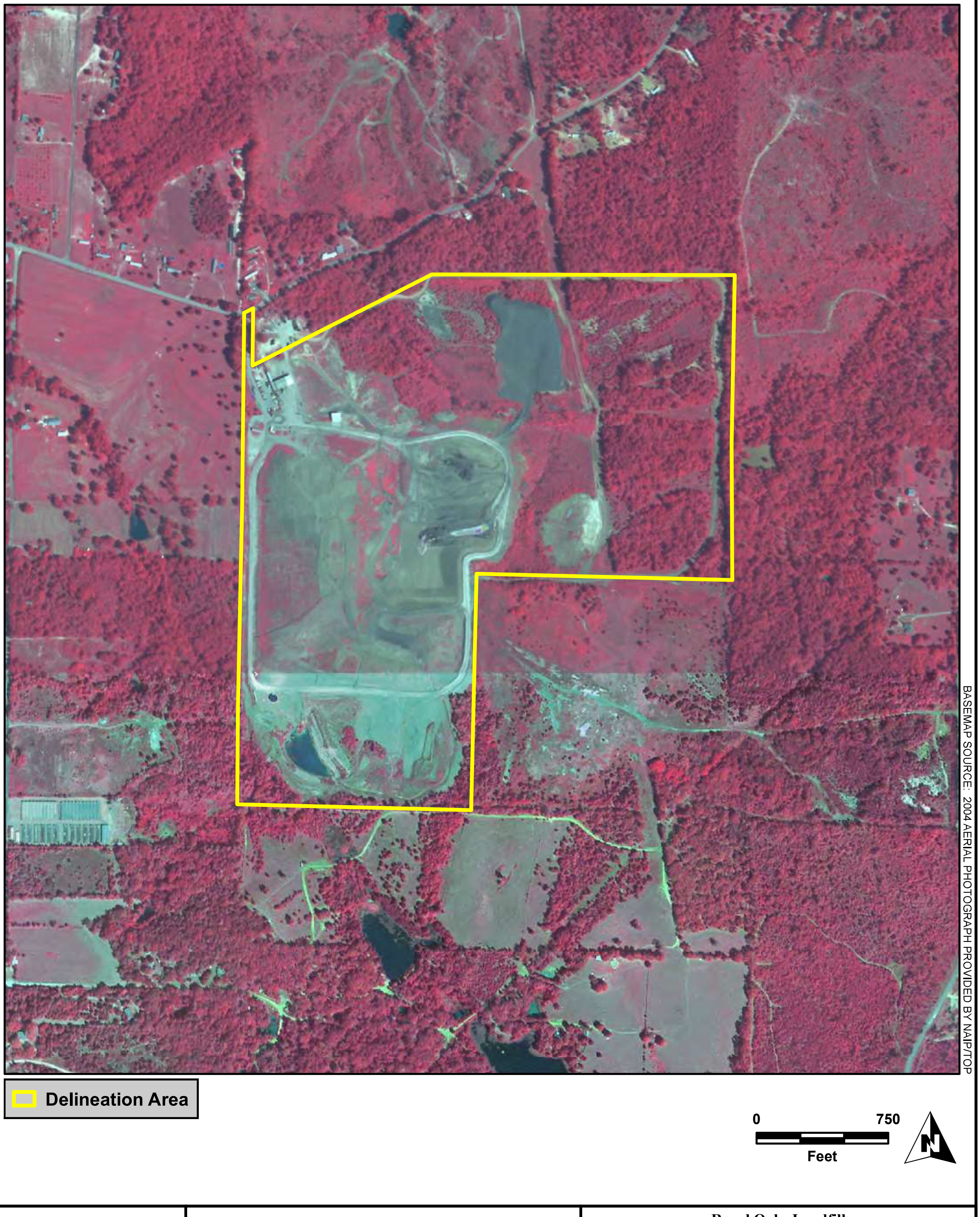
Hydrex ENVIRONMENTAL
1120 NW Stallings Drive
Nacogdoches, Texas 75964
(936) 568-9451

PLATE C - 6

1996 AERIAL PHOTOGRAPH

Royal Oaks Landfill
An Approximate 144-Acre Tract
Cherokee County, Texas
Delineation of WOTUS and Jurisdictional Determination

Map Revised: 07/12/2021 | Project Number: A-12-1509 | GIS Analyst: SMD



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Nacogdoches, Texas 75964
(936) 568-9451

PLATE C - 7

2004 AERIAL PHOTOGRAPH

Royal Oaks Landfill
An Approximate 144-Acre Tract
Cherokee County, Texas
Delineation of WOTUS and Jurisdictional Determination

Map Revised: 07/12/2021	Project Number: A-12-1509	GIS Analyst: SMD

Delineation Area

0 750
Feet

N

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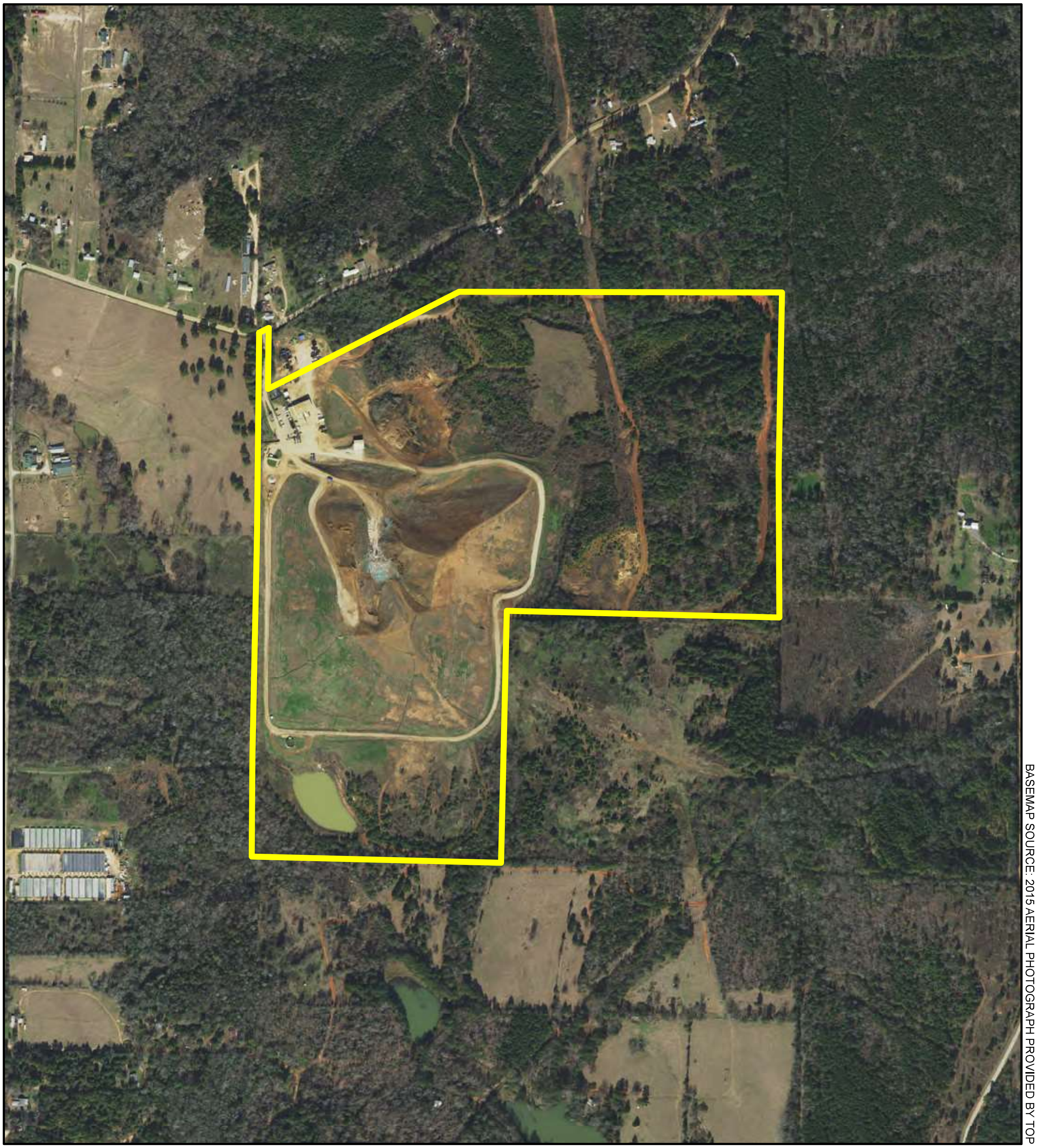
PLATE C - 8

2009 AERIAL PHOTOGRAPH

Royal Oaks Landfill
An Approximate 144-Acre Tract
Cherokee County, Texas
Delineation of WOTUS and Jurisdictional Determination

Map Revised: 07/12/2021	Project Number: A-12-1509	GIS Analyst: SMD



Delineation Area

0 750
Feet

N

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PLATE C - 9

2015 AERIAL PHOTOGRAPH

Royal Oaks Landfill
An Approximate 144-Acre Tract
Cherokee County, Texas
Delineation of WOTUS and Jurisdictional Determination

Map Revised: 07/12/2021	Project Number: A-12-1509	GIS Analyst: SMD

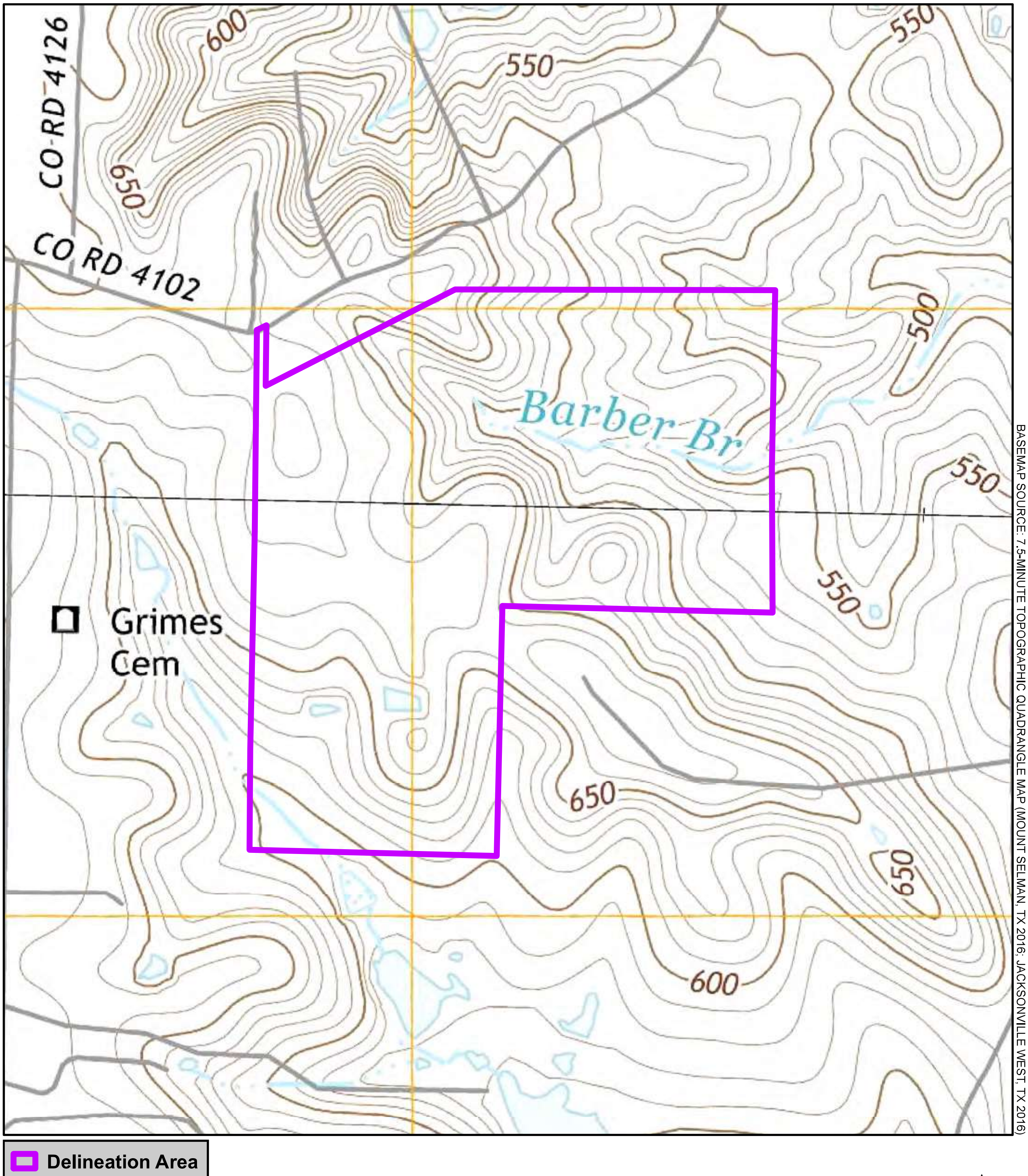

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PLATE C -10

2016 USGS TOPOGRAPHIC MAP

Royal Oaks Landfill
An Approximate 144-Acre Tract
Cherokee County, Texas
Delineation of WOTUS and Jurisdictional Determination

Map Revised: 07/12/2021 | Project Number: A-12-1509 | GIS Analyst: SMD

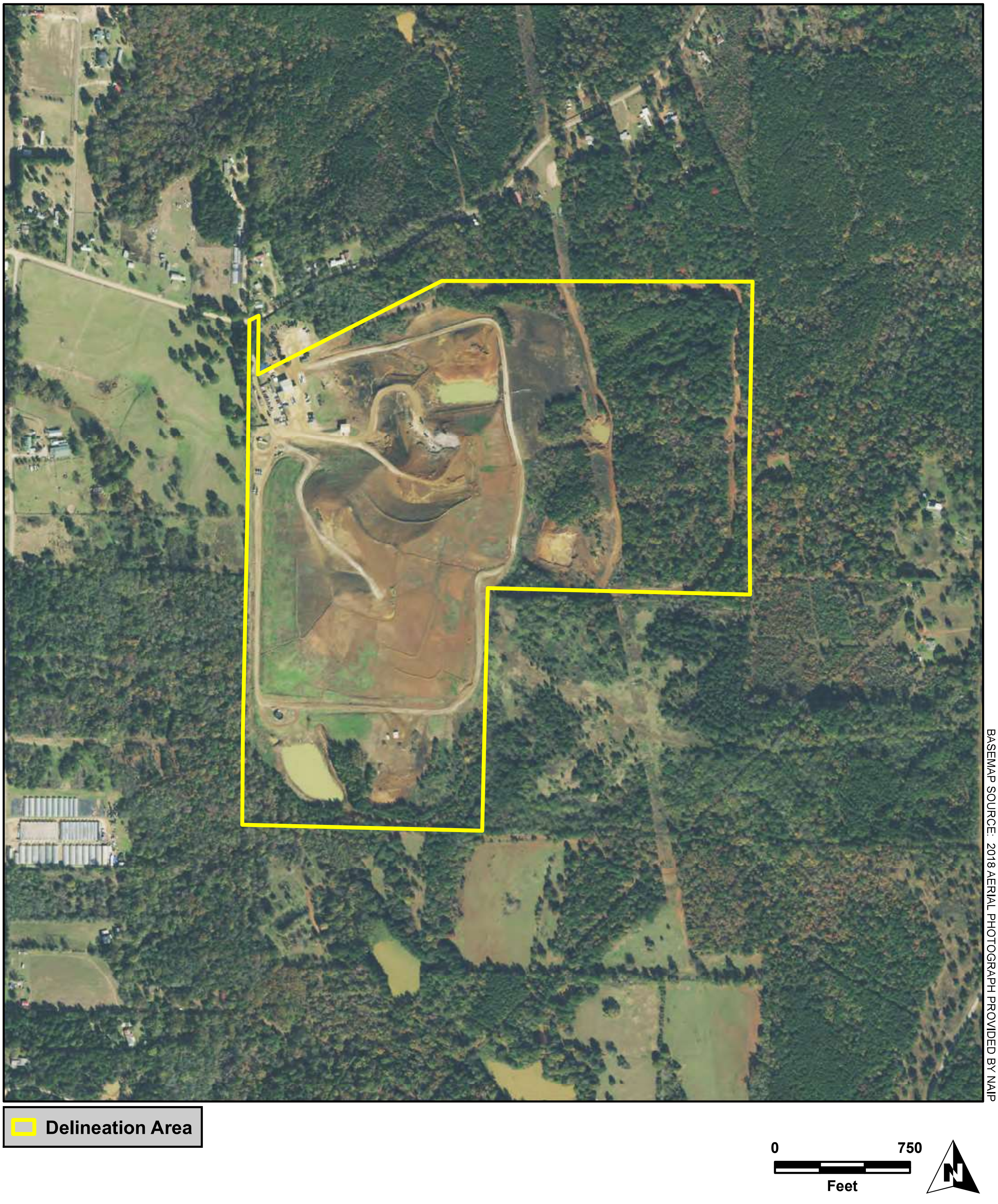

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PLATE C -11

2018 AERIAL PHOTOGRAPH

Royal Oaks Landfill
An Approximate 144-Acre Tract
Cherokee County, Texas
Delineation of WOTUS and Jurisdictional Determination

Map Revised: 07/12/2021	Project Number: A-12-1509	GIS Analyst: SMD

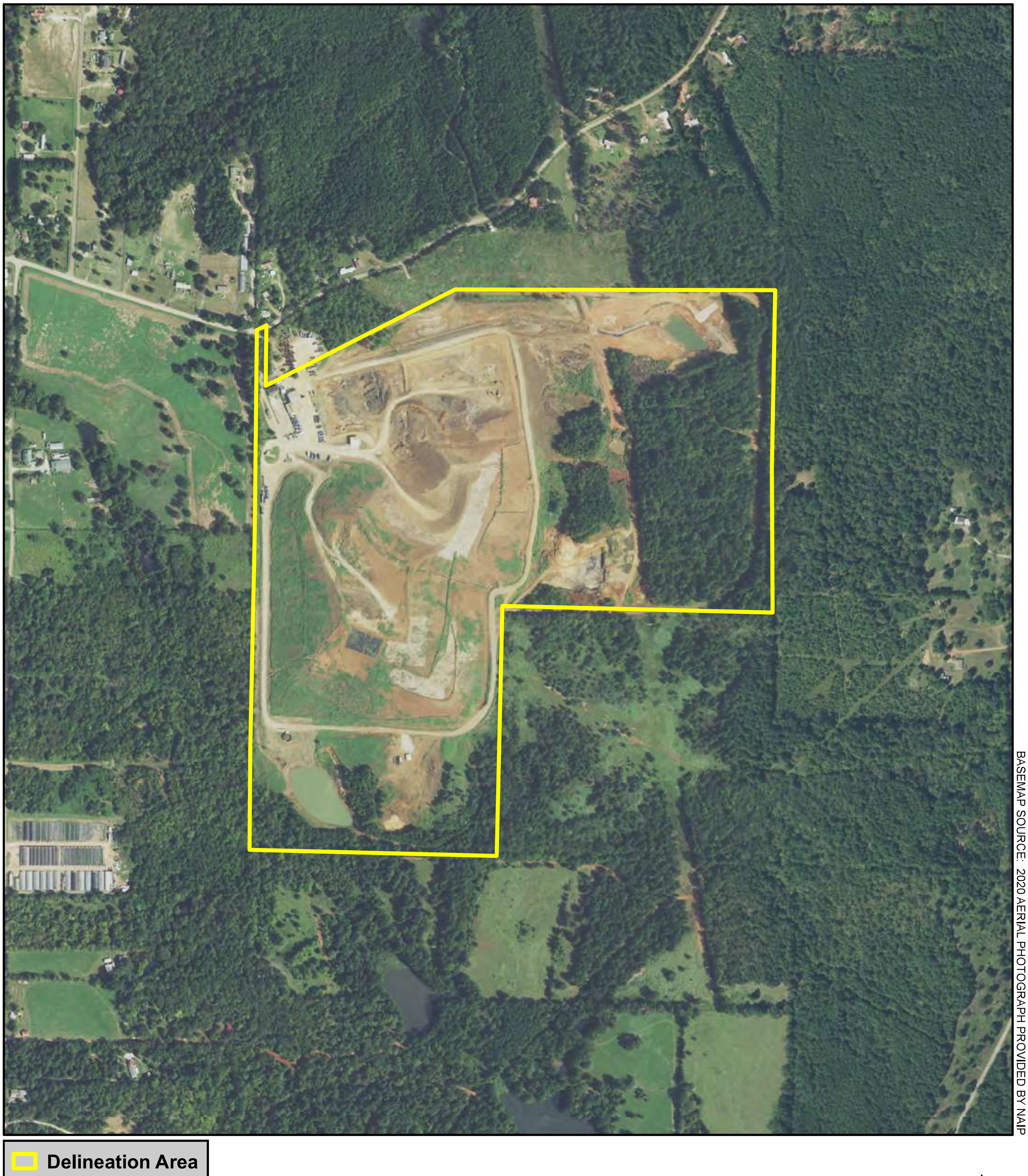

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PLATE C-12

2020 AERIAL PHOTOGRAPH

Royal Oaks Landfill
An Approximate 144-Acre Tract
Cherokee County, Texas
Delineation of WOTUS and Jurisdictional Determination

Map Revised: 07/12/2021	Project Number: A-12-1509	GIS Analyst: SMD

APPENDIX D

WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Royal Oaks Landfill Expansion (A-12-1509) City/County: Cherokee County Sampling Date: 6-10-21
Applicant/Owner: Republic Services, Inc. State: TX Sampling Point: 1
Investigator(s): K. Compton, T. Bryant Section, Township, Range: N/A
Landform (hillslope, terrace, etc.): Ridge Local relief (concave, convex, none): Convex Slope (%): 3-4
Subregion (LRR or MLRA): LRR P Lat: 31.99931 Long: -95.259717 Datum: NAD 83
Soil Map Unit Name: Bt - Bub-Trawick complex NWI classification: Upland
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No ✓
Hydric Soil Present? Yes ___ No ✓
Wetland Hydrology Present? Yes ___ No ✓
Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)
- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)
- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:
Surface Water Present? Yes ___ No ✓ Depth (inches): ___
Water Table Present? Yes ___ No ✓ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___
Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
FAC-Neutral Test: 0 FACW/OBL Species, 5 FACU/UPL Species

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 1

Tree Stratum (Plot size: 30' Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus echinata (Not Listed)	30	Yes	UPL
2. Quercus stellata	15	Yes	UPL
3. Ulmus alata	10		FACU
4. Juniperus virginiana	5		FACU
5.			
6.			
7.			
8.			
= Total Cover	60		
50% of total cover: 30	20% of total cover: 12		

Sapling/Shrub Stratum (Plot size: 30' Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Juniperus virginiana	15	Yes	FACU
2. Viburnum rufidulum	12	Yes	UPL
3. Ilex vomitoria	10	Yes	FAC
4. Ulmus alata	5		FACU
5. Cornus florida	4		FACU
6.			
7.			
8.			
= Total Cover	46		
50% of total cover: 23	20% of total cover: 9.2		

Herb Stratum (Plot size: 30' Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Carya tomentosa (Not Listed)	10	Yes	UPL
2. Chasmanthium sessiliflorum	8	Yes	FAC
3. Quercus falcata	2		FACU
4. Quercus stellata	2		UPL
5.–12.			
= Total Cover	22		
50% of total cover: 11	20% of total cover: 4.4		

Woody Vine Stratum (Plot size: 30' Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Toxicodendron radicans	10	Yes	FAC
2. Smilax bona-nox	5	Yes	FAC
3. Parthenocissus quinquefolia	3		FACU
4. Vitis rotundifolia	2		FAC
5.			
= Total Cover	20		
50% of total cover: 10	20% of total cover: 4		

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across All Strata: 9 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 44.4% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ___	x 1 = ___
FACW species ___	x 2 = ___
FAC species ___	x 3 = ___
FACU species ___	x 4 = ___
UPL species ___	x 5 = ___
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:
- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	2.5YR 4/6	100					SL	
3-13	2.5YR 3/6	100					L	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)
- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:
- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: ___
Depth (inches): ___
Hydric Soil Present? Yes ___ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Royal Oaks Landfill Expansion (A-12-1509) City/County: Cherokee County Sampling Date: 6-10-21

Applicant/Owner: Republic Services, Inc. State: TX Sampling Point: 2

Investigator(s): K. Compton, T. Bryant Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR or MLRA): LRR P Lat: 32.000587 Long: -95.259959 Datum: NAD 83

Soil Map Unit Name: Bt - Bub-Trawick complex NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____
Hydric Soil Present?	Yes ____	No ✓
Wetland Hydrology Present?	Yes ✓	No ____

Is the Sampled Area within a Wetland? Yes ✓ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☑ Water Marks (B1)
- ☑ Sediment Deposits (B2)
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): Throughout

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

FAC-Neutral Test: 1 FACW/OBL Species, 2 FACU/UPL Species

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 2

Tree Stratum (Plot size: 30' Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Betula nigra	40	Yes	FACW
2. Platanus occidentalis	10		FACW
3. Salix nigra	10		OBL
4. Acer rubrum	5		FAC
5.			
6.			
7.			
8.			
	65 = Total Cover		
50% of total cover: 32.5	20% of total cover: 13		

Sapling/Shrub Stratum (Plot size: 30' Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Juniperus virginiana	5	Yes	FACU
2. Liquidambar styraciflua	5	Yes	FAC
3. Ulmus alata	3	Yes	FACU
4.			
5.			
6.			
7.			
8.			
	13 = Total Cover		
50% of total cover: 6.5	20% of total cover: 2.6		

Herb Stratum (Plot size: 30' Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Ligustrum sinense	10	Yes	FAC
2. Morella cerifera	8	Yes	FAC
3. Chasmanthium latifolium	5		FAC
4. Lactuca canadensis	2		FACU
5. Onoclea sensibilis	2		FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	27 = Total Cover		
50% of total cover: 13.5	20% of total cover: 5.4		

Woody Vine Stratum (Plot size: 30' Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Vitis rotundifolia	10	Yes	FAC
2. Berchemia scandens	3	Yes	FAC
3.			
4.			
5.			
	13 = Total Cover		
50% of total cover: 6.5	20% of total cover: 2.6		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-15	5YR 5/6	100					SiL	
15-19	5YR 5/6							iron concretions / gravel
19-24	7.5YR 4/4	90	10YR 5/3	10	D	M	SiL	iron concretions / gravel

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____

Depth (inches): ____

Hydric Soil Present? Yes ____ No ✓

Remarks:

This area has received a heavy load of sediment from up-gradient landfill activities.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Royal Oaks Landfill Expansion (A-12-1509) City/County: Cherokee County Sampling Date: 6-10-21
Applicant/Owner: Republic Services, Inc. State: TX Sampling Point: 3
Investigator(s): K. Compton, T. Bryant Section, Township, Range: N/A
Landform (hillslope, terrace, etc.): Sideslope Local relief (concave, convex, none): None Slope (%): 6
Subregion (LRR or MLRA): LRR P Lat: 32.002068 Long: -95.259823 Datum: NAD 83
Soil Map Unit Name: Pits NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No ✓	Is the Sampled Area within a Wetland?	Yes ____ No ✓
Hydric Soil Present? Yes ____ No ✓		
Wetland Hydrology Present? Yes ____ No ✓		

Remarks:

Observation Point 3 has been determined to be very similar to, and was sufficiently described by Observation Point 1. Hydrology, vegetation, and/or hydric soil indicators were adjusted slightly to describe the current observation point as necessary.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____
Water Table Present? Yes ____ No ✓ Depth (inches): ____
Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____
Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

FAC-Neutral Test: 0 FACW/OBL Species, 4 FACU/UPL Species

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: 3

Tree Stratum (Plot size: 30' Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus echinata (Not Listed)	70	Yes	UPL
2. Liquidambar styraciflua	10		FAC
3.–8.			
	80 = Total Cover		
50% of total cover: 40	20% of total cover: 16		
Sapling/Shrub Stratum (Plot size: 30' Radius)			
1. Juniperus virginiana	10	Yes	FACU
2. Rhus copallinum	8	Yes	UPL
3. Liquidambar styraciflua	4		FAC
4. Ulmus alata	3		FACU
5.–8.			
	25 = Total Cover		
50% of total cover: 12.5	20% of total cover: 5		
Herb Stratum (Plot size: 30' Radius)			
1. Quercus falcata	5	Yes	FACU
2.–12.			
	5 = Total Cover		
50% of total cover: ____	20% of total cover: ____		
Woody Vine Stratum (Plot size: 30' Radius)			
1. Rubus argutus	15	Yes	FAC
2. Smilax bona-nox	4	Yes	FAC
3.–5.			
	19 = Total Cover		
50% of total cover: 9.5	20% of total cover: 3.8		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 6 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: (If observed, list morphological adaptations below).

SOIL Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	2.5YR 4/6	100					SL	
3-13	2.5YR 3/6	100					L	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____
Depth (inches): ____

Hydric Soil Present? Yes ____ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Royal Oaks Landfill Expansion (A-12-1509) City/County: Cherokee County Sampling Date: 6-10-21

Applicant/Owner: Republic Services, Inc. State: TX Sampling Point: 4

Investigator(s): K. Compton, T. Bryant Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Sideslope Local relief (concave, convex, none): None Slope (%): 3-4

Subregion (LRR or MLRA): LRR P Lat: 32.001821 Long: -95.26245 Datum: NAD 83

Soil Map Unit Name: Pits NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No ✓
Hydric Soil Present? Yes ___ No ✓
Wetland Hydrology Present? Yes ___ No ✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___
Water Table Present? Yes ___ No ✓ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

FAC-Neutral Test: 0 FACW/OBL Species, 2 FACU/UPL Species

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 4

Tree Stratum (Plot size: 30' Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.–8.			
	0 = Total Cover		
50% of total cover: ___	20% of total cover: ___		

Sapling/Shrub Stratum (Plot size: 30' Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.–8.			
	0 = Total Cover		
50% of total cover: ___	20% of total cover: ___		

Herb Stratum (Plot size: 30' Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Cynodon dactylon	40	Yes	FACU
2. Sorghum halepense	40	Yes	FACU
3. Helianthus annuus	15		FAC
4. Rudbeckia hirta	10		FACU
5. Elymus virginicus	8		FAC
6. Daucus carota	5		UPL
7.–12.			
	118 = Total Cover		
50% of total cover: 59	20% of total cover: 23.6		

Woody Vine Stratum (Plot size: 30' Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.–5.			
	0 = Total Cover		
50% of total cover: ___	20% of total cover: ___		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ___	x 1 = ___
FACW species ___	x 2 = ___
FAC species ___	x 3 = ___
FACU species ___	x 4 = ___
UPL species ___	x 5 = ___
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5YR 4/4	100					SiL	
5-14	7.5YR 4/6	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Royal Oaks Landfill Expansion (A-12-1509) City/County: Cherokee County Sampling Date: 6-10-21

Applicant/Owner: Republic Services, Inc. State: TX Sampling Point: 5

Investigator(s): K. Compton, T. Bryant Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): None Slope (%): 1-2

Subregion (LRR or MLRA): LRR P Lat: 32.000981 Long: -95.26236 Datum: NAD 83

Soil Map Unit Name: Bt - Bub-Trawick complex NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ____	Is the Sampled Area within a Wetland?	Yes ____ No ✓
Hydric Soil Present?	Yes ____ No ✓		
Wetland Hydrology Present?	Yes ✓ No ____		

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1)
- [x] Sediment Deposits (B2)
- [x] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [x] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): Throughout

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

FAC-Neutral Test: 0 FACW/OBL Species, 1 FACU/UPL Species

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 5

Tree Stratum (Plot size: 30' Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Liquidambar styraciflua	50	Yes	FAC
2. Salix nigra	15		OBL
3. Ulmus americana	10		FAC
4.			
5.			
6.			
7.			
8.			
	75 = Total Cover		
50% of total cover: 37.5	20% of total cover: 15		
Sapling/Shrub Stratum (Plot size: 30' Radius)			
1. Ligustrum sinense	15	Yes	FAC
2. Acer rubrum	3		FAC
3.–8.			
	18 = Total Cover		
50% of total cover: 9	20% of total cover: 3.6		
Herb Stratum (Plot size: 30' Radius)			
1. Ligustrum sinense	10	Yes	FAC
2.–12.			
	10 = Total Cover		
50% of total cover: 5	20% of total cover: 2		
Woody Vine Stratum (Plot size: 30' Radius)			
1. Toxicodendron radicans	10	Yes	FAC
2.–5.			
	10 = Total Cover		
50% of total cover: 5	20% of total cover: 2		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- [ ] 1 - Rapid Test for Hydrophytic Vegetation
- [x] 2 - Dominance Test is >50%
- [ ] 3 - Prevalence Index is ≤3.0[1]
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 4/4	100					SiL	
6-8	7.5YR 5/2	100					SiL	
8-15	7.5YR 4/4	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Organic Bodies (A6) **(LRR P, T, U)**
- [ ] 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- [ ] Muck Presence (A8) **(LRR U)**
- [ ] 1 cm Muck (A9) **(LRR P, T)**
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Coast Prairie Redox (A16) **(MLRA 150A)**
- [ ] Sandy Mucky Mineral (S1) **(LRR O, S)**
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) **(LRR P, S, T, U)**
- [ ] Polyvalue Below Surface (S8) **(LRR S, T, U)**
- [ ] Thin Dark Surface (S9) **(LRR S, T, U)**
- [ ] Loamy Mucky Mineral (F1) **(LRR O)**
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Marl (F10) **(LRR U)**
- [ ] Depleted Ochric (F11) **(MLRA 151)**
- [ ] Iron-Manganese Masses (F12) **(LRR O, P, T)**
- [ ] Umbric Surface (F13) **(LRR P, T, U)**
- [ ] Delta Ochric (F17) **(MLRA 151)**
- [ ] Reduced Vertic (F18) **(MLRA 150A, 150B)**
- [ ] Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- [ ] Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- [ ] 1 cm Muck (A9) **(LRR O)**
- [ ] 2 cm Muck (A10) **(LRR S)**
- [ ] Reduced Vertic (F18) **(outside MLRA 150A,B)**
- [ ] Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- [ ] Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____

Depth (inches): ____

Hydric Soil Present? Yes ____ No ✓

Remarks:

This area has received a heavy load of sediment from up-gradient landfill activities.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Royal Oaks Landfill Expansion (A-12-1509) City/County: Cherokee County Sampling Date: 6-10-21
Applicant/Owner: Republic Services, Inc. State: TX Sampling Point: 6
Investigator(s): K. Compton, T. Bryant Section, Township, Range: N/A
Landform (hillslope, terrace, etc.): Sideslope Local relief (concave, convex, none): None Slope (%): 4-5
Subregion (LRR or MLRA): LRR P Lat: 31.994936 Long: -95.265803 Datum: NAD 83
Soil Map Unit Name: Bt - Bub-Trawick complex NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No ✓	Is the Sampled Area within a Wetland?	Yes ___ No ✓
Hydric Soil Present?	Yes ___ No ✓		
Wetland Hydrology Present?	Yes ___ No ✓		

Remarks:

Observation Point 6 has been determined to be very similar to, and was sufficiently described by Observation Point 1. Hydrology, vegetation, and/or hydric soil indicators were adjusted slightly to describe the current observation point as necessary.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___
Water Table Present? Yes ___ No ✓ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___
Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

FAC-Neutral Test: 0 FACW/OBL Species, 6 FACU/UPL Species

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 6

Tree Stratum (Plot size: 30' Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus echinata (Not Listed)	30	Yes	UPL
2. Quercus falcata	15	Yes	FACU
3. Ulmus alata	10		FACU
4. Juniperus virginiana	5		FACU
5.			
6.			
7.			
8.			
	60 = Total Cover		
50% of total cover: 30	20% of total cover: 12		

Sapling/Shrub Stratum (Plot size: 30' Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Juniperus virginiana	15	Yes	FACU
2. Viburnum rufidulum	12	Yes	UPL
3. Ilex vomitoria	10	Yes	FAC
4. Ulmus alata	5		FACU
5. Cornus florida	4		FACU
6.			
7.			
8.			
	46 = Total Cover		
50% of total cover: 23	20% of total cover: 9.2		

Herb Stratum (Plot size: 30' Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Callicarpa americana	10	Yes	FACU
2. Carya tomentosa (Not Listed)	10	Yes	UPL
3. Chasmanthium sessiliflorum	8	Yes	FAC
4. Rudbeckia hirta	5		FACU
5. Quercus falcata	2		FACU
6. Quercus stellata	2		UPL
7.			
8.			
9.			
10.			
11.			
12.			
	37 = Total Cover		
50% of total cover: 18.5	20% of total cover: 7.5		

Woody Vine Stratum (Plot size: 30' Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Toxicodendron radicans	10	Yes	FAC
2. Smilax bona-nox	5	Yes	FAC
3. Parthenocissus quinquefolia	3		FACU
4. Vitis rotundifolia	2		FAC
5.			
	20 = Total Cover		
50% of total cover: 10	20% of total cover: 4		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 10 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 30% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ___	x 1 = ___
FACW species ___	x 2 = ___
FAC species ___	x 3 = ___
FACU species ___	x 4 = ___
UPL species ___	x 5 = ___
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3	2.5YR 4/6	100					SL	
3-13	2.5YR 3/6	100					L	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___
Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Royal Oaks Landfill Expansion (A-12-1509) City/County: Cherokee County Sampling Date: 6-10-21
Applicant/Owner: Republic Services, Inc. State: TX Sampling Point: 7
Investigator(s): K. Compton, T. Bryant Section, Township, Range: N/A
Landform (hillslope, terrace, etc.): Landfill Local relief (concave, convex, none): Convex Slope (%): 6
Subregion (LRR or MLRA): LRR P Lat: 31.997519 Long: -95.265892 Datum: NAD 83
Soil Map Unit Name: Pits NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No ✓
Hydric Soil Present? Yes ___ No ✓
Wetland Hydrology Present? Yes ___ No ✓
Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___
Water Table Present? Yes ___ No ✓ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___
Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

FAC-Neutral Test: 0 FACW/OBL Species, 1 FACU/UPL Species

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 7

Tree Stratum (Plot size: 30' Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
50% of total cover: ___ 20% of total cover: ___			
Sapling/Shrub Stratum (Plot size: 30' Radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
50% of total cover: ___ 20% of total cover: ___			
Herb Stratum (Plot size: 30' Radius)			
1. Cynodon dactylon	60	Yes	FACU
2. Hordeum pusillum	5		FACU
3. Melilotus indicus	3		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	68 = Total Cover		
50% of total cover: 34 20% of total cover: 13.6			
Woody Vine Stratum (Plot size: 30' Radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: ___ 20% of total cover: ___			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___
Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

Capped portion of the completed landfill. No excavating allowed.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Royal Oaks Landfill Expansion (A-12-1509) City/County: Cherokee County Sampling Date: 6-10-21

Applicant/Owner: Republic Services, Inc. State: TX Sampling Point: 8

Investigator(s): K. Compton, T. Bryant Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): Concave Slope (%): 2-3

Subregion (LRR or MLRA): LRR P Lat: 32.002518 Long: -95.26597 Datum: NAD 83

Soil Map Unit Name: Bt - Bub-Trawick Complex NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____	Is the Sampled Area within a Wetland?	Yes ____ No ✓
Hydric Soil Present? Yes ____ No ✓		
Wetland Hydrology Present? Yes ____ No ✓		

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

FAC-Neutral Test: 1 FACW/OBL Species, 1 FACU/UPL Species

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: 8

Tree Stratum (Plot size: 30' Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Celtis laevigata	15	Yes	FACW
2. Pinus echinata (Not Listed)	8	Yes	UPL
3. Salix nigra	4		OBL
4.			
5.			
6.			
7.			
8.			
	27 = Total Cover		
50% of total cover: 13.5 20% of total cover: 5.4			
Sapling/Shrub Stratum (Plot size: 30' Radius)			
1. Ligustrum sinense	30	Yes	FAC
2. Juniperus virginiana	5		FACU
3. Ligustrum japonicum	5		FAC
4. Cercis canadensis	3		UPL
5.			
6.			
7.			
8.			
	43 = Total Cover		
50% of total cover: 21.5 20% of total cover: 8.6			
Herb Stratum (Plot size: 30' Radius)			
1. Ligustrum sinense	15	Yes	FAC
2. Ligustrum japonicum	12	Yes	FAC
3. Elymus virginicus	8	Yes	FAC
4.–12.			
	35 = Total Cover		
50% of total cover: 17.5 20% of total cover: 7			
Woody Vine Stratum (Plot size: 30' Radius)			
1. Rubus trivialis	10	Yes	FACU
2.–5.			
	10 = Total Cover		
50% of total cover: 5 20% of total cover: 2			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 71.4% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (If observed, list morphological adaptations below).

SOIL Sampling Point: 8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	2.5YR 4/6	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____

Depth (inches): ____

Hydric Soil Present? Yes ____ No ✓

Remarks:

APPENDIX E

SITE PHOTOGRAPHS

View of the northern portion of the existing landfill.

Another view looking across the northern portion of the existing landfill. Garbage truck traffic is visible in the background.

View of equipment working on the northern portion of the existing landfill.

View looking across the top of the central portion of the existing landfill.

View looking across the southern portion of the existing landfill.

View of the southern portion of the existing landfill.

Site Photographs - Landfill Development

View of landfill equipment storage.

View of landfill leachate tank.


View looking upstream along Tributary 1A - Headwaters of Barber Branch (Ephemeral).


View looking downstream along Tributary 1A - Headwaters of Barber Branch (Ephemeral).

View looking upstream along Tributary 1B - Barber Branch (Intermittent).

View looking downstream along Tributary 1B - Barber Branch (Intermittent).


Another view looking upstream along Tributary 1B - Barber Branch (Intermittent).


Another view looking downstream along Tributary 1B - Barber Branch (Intermittent).

View looking upstream along UT-2 (Ephemeral).

View looking downstream along UT-2 (Ephemeral).


View looking upstream along UT-3 (Ephemeral).


View looking downstream along UT-3 (Ephemeral).


View looking upstream along UT-4 (Ephemeral).


View looking downstream along UT-4 (Ephemeral).


View looking upstream along UT-5 (Ephemeral).


View looking downstream along UT-5 (Ephemeral).

View looking upstream along UT-6 (Intermittent).

View looking downstream along UT-6 (Intermittent).


View looking upstream along UT-7 (Ephemeral).


View looking downstream along UT-7 (Ephemeral).


View looking upstream along UT-8 (Intermittent).


View looking downstream along UT-8 (Intermittent).


View looking upstream along UT-9 (Intermittent).


View looking downstream along UT-9 (Intermittent).

View looking upgradient along Ditch 1.

View looking downgradient along Ditch 1.

View looking upgradient along Ditch 2.

View looking downgradient along Ditch 2.


View looking upgradient along Ditch 3.


View looking downgradient along Ditch 3.

View looking upgradient along Ditch 4.

View looking downgradient along Ditch 4.

View looking upgradient along Stormwater Outlet 1.

View looking downgradient along Stormwater Outlet 1.

View looking upgradient along Stormwater Outlet 2.


View looking downgradient along Stormwater Outlet 2.

View looking upgradient along Stormwater Outlet 3.

View looking downgradient along Stormwater Outlet 3.


View looking upgradient along Erosional Gully 1.


View looking downgradient along Erosional Gully 1.

View looking upgradient along Erosional Gully 2.

View looking downgradient along Erosional Gully 2.

View looking across Stormwater Control Feature 1 (Sediment Detention Pond).

Another view looking across Stormwater Control Feature 1 (Sediment Detention Pond).


View looking across Stormwater Control Feature 2 (Sediment Detention Pond).


Another view looking across Stormwater Control Feature 2 (Sediment Detention Pond). The overflow spillway is visible on the right side of the photograph.

View looking across Stormwater Control Feature 3 (Sediment Detention Pond).

Another view looking across Stormwater Control Feature 3 (Sediment Detention Pond).

View looking across Excavation 1 (Soil Borrow Area).

Another view looking across Excavation 1 (Soil Borrow Area).


View looking across Excavation 2 (Soil Borrow Area).


Another view looking across Excavation 2 (Soil Borrow Area).

Site Photographs - Observation Points

View of soil profile at Observation Point 1.


Typical vegetation near Observation Point 1.

View of soil profile at Observation Point 2.


Typical vegetation near Observation Point 2.


Typical vegetation near Observation Point 3.


Another view of typical vegetation near Observation Point 3.

Site Photographs - Observation Points

View of soil profile at Observation Point 4.

Typical vegetation near Observation Point 4.

View of soil profile at Observation Point 5.

Typical vegetation near Observation Point 5.

Typical vegetation near Observation Point 6.

Another view of typical vegetation near Observation Point 6.

Site Photographs - Observation Points


Typical vegetation near Observation Point 7.


Another view of typical vegetation near Observation Point 7.

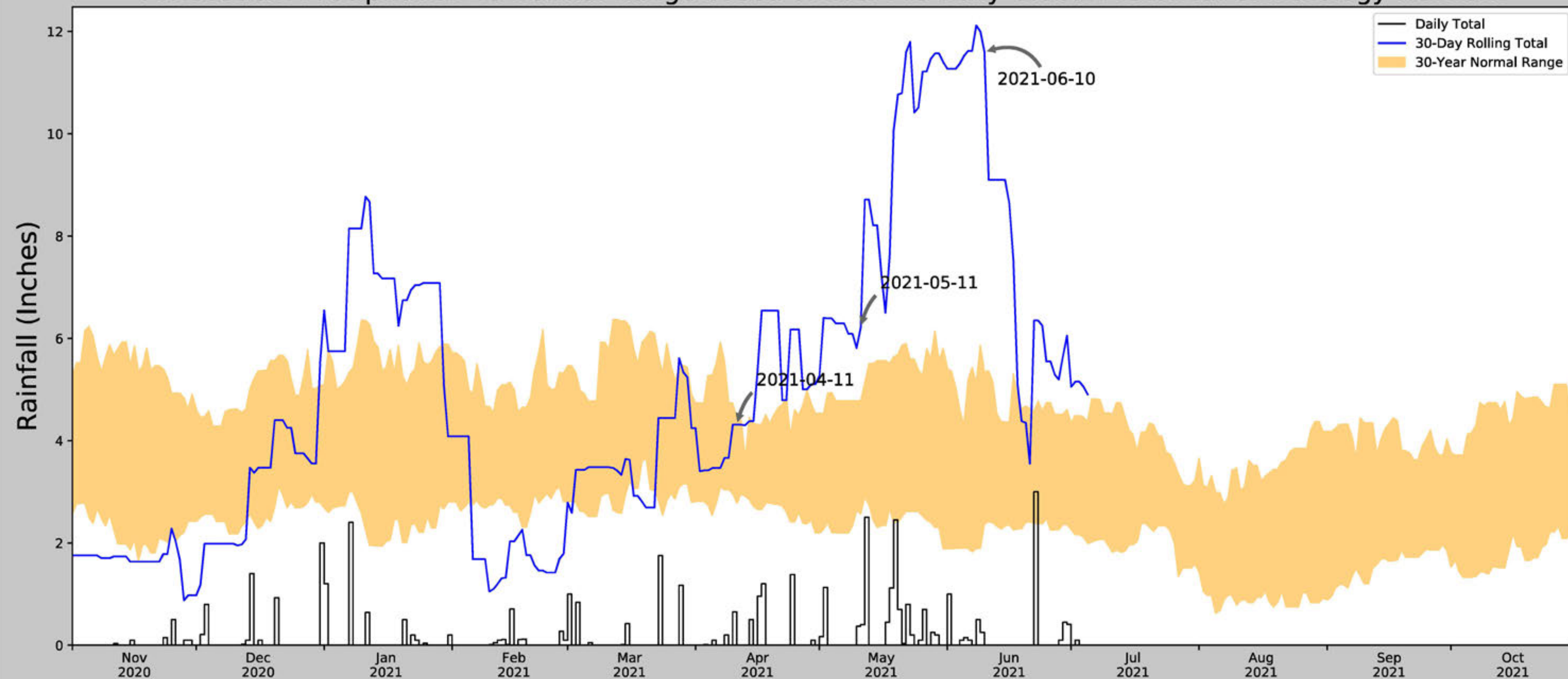

View of soil profile at Observation Point 8.


Typical vegetation near Observation Point 8.

APPENDIX F

ANTECEDENT PRECIPITATION TOOL RESULTS

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	32.000751, -95.262744
Observation Date	2021-06-10
Elevation (ft)	586.72
Drought Index (PDSI)	Moderate wetness (2021-05)
WebWIMP H_2O Balance	Dry Season

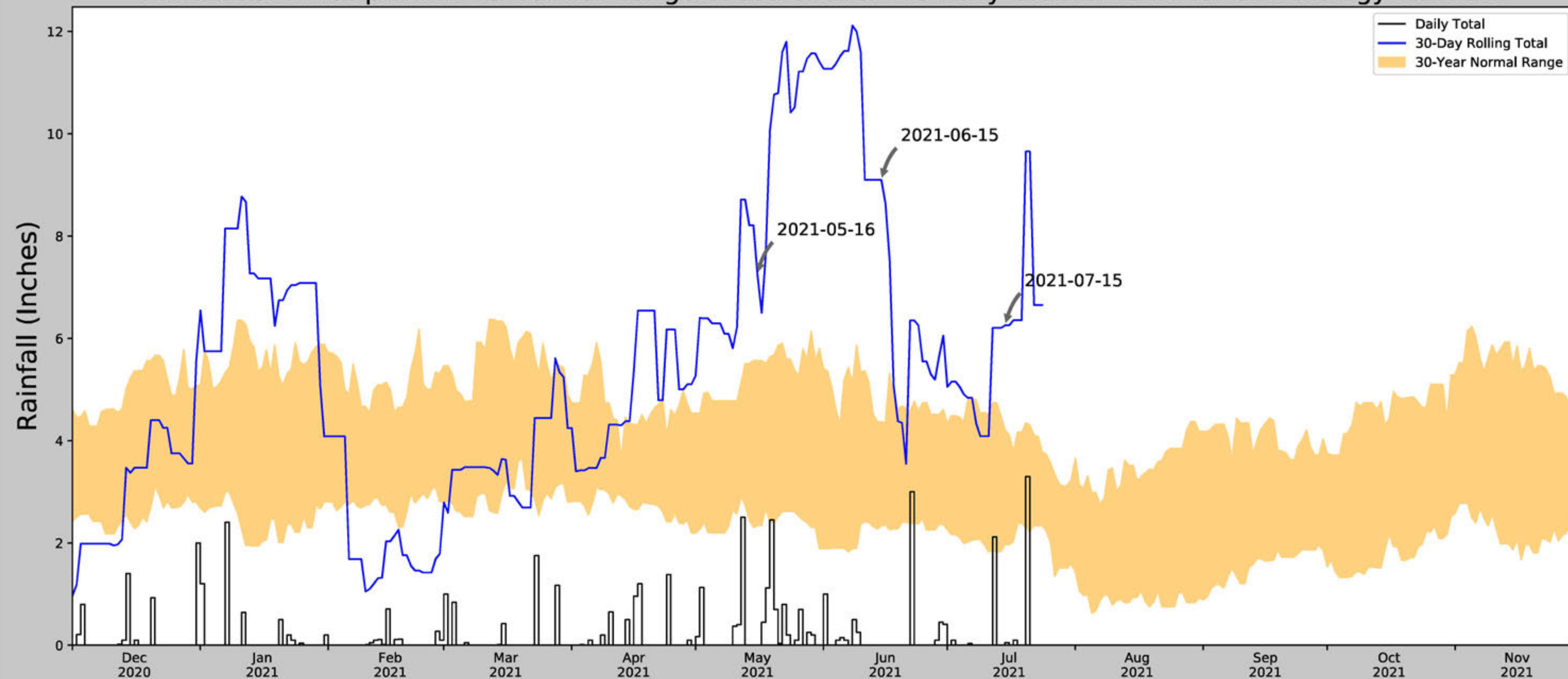
30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2021-06-10	2.372441	5.343701	11.598426	Wet	3	3	9
2021-05-11	2.572441	4.778347	6.212599	Wet	3	2	6
2021-04-11	2.781102	4.443701	4.314961	Normal	2	1	2
Result							Wetter than Normal - 17

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days (Normal)	Days (Antecedent)
JACKSONVILLE	31.9622, -95.2736	560.039	2.739	26.681	1.305	10011	83
JACKSONVILLE 3.5 ENE	31.977, -95.2015	437.008	3.946	149.712	2.367	32	0
DIALVILLE 2 W	31.8614, -95.2619	616.142	9.628	29.422	4.616	1107	0
NEW SUMMERFIELD 2W	31.9747, -95.1381	372.047	7.523	214.673	5.0	174	6
BULLARD 3.7 E	32.1361, -95.2564	408.136	9.359	178.584	5.883	26	1
WHITEHOUSE 3 S	32.2039, -95.2342	479.003	14.135	107.717	7.884	2	0
RUSK	31.8092, -95.1428	694.882	14.989	108.162	8.366	1	0

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	32.000751, -95.262744
Observation Date	2021-07-15
Elevation (ft)	586.72
Drought Index (PDSI)	Moderate wetness (2021-06)
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2021-07-15	1.967717	4.214961	6.255906	Wet	3	3	9
2021-06-15	2.333465	4.362992	9.098425	Wet	3	2	6
2021-05-16	2.340945	5.564961	7.251969	Wet	3	1	3
Result							Wetter than Normal - 18

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days (Normal)	Days (Antecedent)
JACKSONVILLE	31.9622, -95.2736	560.039	2.739	26.681	1.305	10011	79
JACKSONVILLE 3.5 ENE	31.977, -95.2015	437.008	3.946	149.712	2.367	32	0
DIALVILLE 2 W	31.8614, -95.2619	616.142	9.628	29.422	4.616	1107	0
NEW SUMMERFIELD 2W	31.9747, -95.1381	372.047	7.523	214.673	5.0	174	7
BULLARD 3.7 E	32.1361, -95.2564	408.136	9.359	178.584	5.883	26	4
WHITEHOUSE 3 S	32.2039, -95.2342	479.003	14.135	107.717	7.884	2	0
RUSK	31.8092, -95.1428	694.882	14.989	108.162	8.366	1	0

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

APPENDIX G

CONSULTANT QUALIFICATIONS

Kyle M. Compton, PWS
Environmental Scientist

DISCIPLINE: Environmental Science

EDUCATION: Stephen F. Austin State University
Nacogdoches, Texas
B.S. Environmental Science, Agriculture minor

CERTIFICATIONS AND CONTINUING EDUCATION:

- Professional Wetland Scientist (PWS) No. 3158
- Federal Aviation Administration (FAA), Certified Small Unmanned Aircraft System (sUAS) Remote Pilot
- Advanced Plant Identification Course with Dr. Charles Allen
- Wetlands Delineation Training
  (USACE 1987 Manual and Regional Supplements)
- Safeland USA Certification
- Transportation Workers Identification Credential (TWIC)
- Texas Freshwater Mussel Identification Workshop with TPWD
- Hydrex Mussel Survey Methodology and Identification Training

PROFESSIONAL EXPERIENCE:

- Delineation of WOTUS, including wetlands
- Wetland and stream functional assessments
- Monitor well installation and maintenance
- Groundwater sampling
- Landfill gas monitoring
- Landfill gas remediation flares and other systems
- Direct-push soil and geologic core sampling procedures
- Proficient in ArcGIS software
- The use of "Mt. Sopris Instruments" geophysical water well logging equipment
- Installation and use of water well transducers for the purpose of groundwater drawdown studies
- FEMA floodplain determination and development permitting

PROFESSIONAL SOCIETIES:

- Society of Wetland Scientists

EXPERIENCE ACQUISITION:

Hydrex Environmental
Nacogdoches, Texas
Environmental Scientist

Clayton A. Collier, REM, PWS
General Manager, Sr. Environmental Scientist

DISCIPLINE: Environmental Science

EDUCATION:

Stephen F. Austin State University
Nacogdoches, Texas
B.S. Environmental Science, Geology minor

Stephen F. Austin State University
Nacogdoches, Texas
Graduate Studies
Aquatic Vascular Plants
Water Resource Management
Geographic Information Systems

CERTIFICATIONS AND CONTINUING EDUCATION:

- Registered Environmental Professional (REM) No. 918302383
- Professional Wetland Scientist (PWS) No. 2389
- NEPA and Environmental Review Training (HUD)
- Wetlands Delineation Course (1987 USACE Manual)
- Wetlands Delineation Course (Regional Supplement)
- Wetlands Permitting Course (USACE)
- Wetland Plant Identification
- Rosgen's Level I Applied Fluvial Geomorphology
- Rosgen's Level II River Morphology and Application
- Rosgen's Level III River Assessment and Monitoring
- Applied Groundwater Statistics Course
- Texas Risk Reduction Program Training
- SafeLand USA Certification
- 2012-2013 Leadership Nacogdoches Program
- Certified Small Unmanned Aircraft System (sUAS) Remote Pilot
- Member of the ATCOFA Advisory Council
- Hydrex Mussel Survey Methodology and Identification Training

PROFESSIONAL EXPERIENCE:

Over fifteen years have been dedicated to a range of environmental projects for government, commercial, industrial, and private entities. During these years, experience has been gained in a wide variety of projects pertaining to environmental sampling and analysis techniques for soil, gas, and water. Attention has been paid to the development of skills in the areas of wetlands delineation, permitting and mitigation, installation of monitoring systems, environmental site assessments, and geographic information system (GIS) mapping.

SPECIFIC EXPERIENCE:

WATERS OF THE UNITED STATES

Experienced in investigations and delineations concerning waters of the U.S. in accordance with the 1987 W*etlands Delineation Manual* and 2010 *Regional Supplements*. Expertise in streamlining United States

Corps of Engineers (USACE) permitting and performing jurisdictional determinations. Proficient in mitigation ratios as well as to aid in feasibility studies for potential mitigation banks. Management performing functional analyses of waters of the U.S. for purposes of determining compensatory of projects related to the delineation, permitting and/or mitigation of Section 404 and Section 10 waters of the U.S. includes numerous large tracts proposed for development, multiple proposed mitigation banks, over 300 miles of linear projects (utility lines, roads, etc.) and over 200 multi-acre oil/gas facilities (well pads, comp, stations, frac pits, etc.).

ECOLOGICAL

Skilled in performing habitat surveys for rare, threatened, and endangered species and identifying the potential to affect their critical habitat. Qualified in advancing the project through consultation with the United States Fish and Wildlife Service (USFWS) in accordance with Section 7 of the Endangered Species Act.

ENVIRONMENTAL

Qualified in conducting Phase I Environmental Site Assessments (ESA), which are an integral part to many private, commercial, and industrial real estate transactions. Experienced in a variety of environmental sampling and analysis techniques along with the application and utilization of numerous sampling and monitoring devices. Accomplished in the sampling of groundwater monitor wells at solid waste facilities using both manual and low-flow purge techniques. Skilled in soil gas monitoring and sampling by way of the Summa canister method.

GIS MAPPING/DRAFTING

Qualified in GIS mapping and computer drafting with demonstrated proficiency in AutoCAD, AutoSketch, and various ESRI ArcGIS applications including ArcView and ArcPad. Accomplished in global positioning system (GPS) data collection and in the integration of collected data with ESRI Spatial Analyst and 3D Analyst mapping software.

GROUNDWATER

Accomplished in the installation, sampling, monitoring, statistical analysis, and reporting of groundwater monitoring systems.

PROFESSIONAL SOCIETIES:

- Society of Wetland Scientists
- National Registry of Environmental Professionals (NREP)
- Texas Association of Environmental Professionals
- 2012-2015 Nacogdoches County Chamber of Commerce Board of Directors
- 2016-2017 City of Nacogdoches Parks Master Plan Steering Committee

EXPERIENCE ACQUISITION:

Hydrex Environmental
Nacogdoches, Texas
Senior Environmental Scientist

APPENDIX H

LIMITATIONS

LIMITATIONS

The work conducted by **Hydrex Environmental** and described in this report was performed in accordance with generally accepted scientific principles and practices, observing the same degree of care and skill generally exercised by the profession under similar circumstances and conditions. The opinions expressed in the report, together with the observations and findings are based on our professional judgment of the data developed and gathered during the course of this investigation and upon conditions that existed at the time of the specified field activities. Some of the information provided in this report may have been derived from a variety of published sources. It is not the intent or purpose of **Hydrex Environmental** to validate the precision of data generated by other parties.

The investigation is considered sufficient in detail and scope to form a reasonable basis for the conclusions presented in this report. Due to the nature of such investigations, interpretations and conclusions must be based on limited site data.

Hydrex Environmental is not responsible for the conclusions, opinions, or recommendations made by others based on the contents of this report. No other warranty, expressed or implied, is made in regard to the work performed by **Hydrex Environmental** during the course of this investigation.

APPENDIX H

USACE PERMIT GUIDELINES

Nationwide Permit 39
Commercial and Institutional Developments

Effective Date: March 15, 2021 / Expiration Date: March 14, 2026
Authorities: Sections 10 and 404

Discharges of dredged or fill material into non-tidal waters of the United States for the construction or expansion of commercial and institutional building foundations and building pads and attendant features that are necessary for the use and maintenance of the structures. Attendant features may include, but are not limited to, roads, parking lots, garages, yards, utility lines, storm water management facilities, wastewater treatment facilities, and recreation facilities such as playgrounds and playing fields. Examples of commercial developments include retail stores, industrial facilities, restaurants, business parks, and shopping centers. Examples of institutional developments include schools, fire stations, government office buildings, judicial buildings, public works buildings, libraries, hospitals, and places of worship. The construction of new golf courses and new ski areas is not authorized by this NWP.

The discharge must not cause the loss of greater than 1/2-acre of non-tidal waters of the United States. This NWP does not authorize discharges of dredged or fill material into non-tidal wetlands adjacent to tidal waters.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity. (See general condition 32.) (Authorities: Sections 10 and 404)

Note: For any activity that involves the construction of a wind energy generating structure, solar tower, or overhead transmission line, a copy of the PCN and NWP verification will be provided by the Corps to the Department of Defense Siting Clearinghouse, which will evaluate potential effects on military activities.

Nationwide Permit General Conditions

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation.

(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his or her authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. Removal of Temporary Structures and Fills. Temporary structures must be removed, to the maximum extent practicable, after their use has been discontinued.

Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. (a) No NWP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status.

(b) If a proposed NWP activity will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the permittee must submit a pre-construction notification (see general condition 32). The district engineer will coordinate the PCN with the Federal agency with direct management responsibility for that river. Permittees shall not begin the NWP activity until notified by the district engineer that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status.

(c) Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: http://www.rivers.gov/.

17. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify designated critical habitat or critical habitat proposed for such designation. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless ESA section 7 consultation addressing the consequences of the proposed activity on listed species or critical habitat has been completed. See 50 CFR

402.02 for the definition of "effects of the action" for the purposes of ESA section 7 consultation, as well as 50 CFR 402.17, which provides further explanation under ESA section 7 regarding "activities that are reasonably certain to occur" and "consequences caused by the proposed action."

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA (see 33 CFR 330.4(f)(1)). If pre-construction notification is required for the proposed activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under section 7 of the ESA.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed such designation) might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat or critical habitat proposed for such designation, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation), the pre-construction notification must include the name(s) of the endangered or threatened species (or species proposed for listing) that might be affected by the proposed activity or that utilize the designated critical habitat (or critical habitat proposed for such designation) that might be affected by the proposed activity. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. For activities where the non-Federal applicant has identified listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation) that might be affected or is in the vicinity of the activity, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification that the proposed activity will have "no effect" on listed species (or species proposed for listing or designated critical habitat (or critical habitat proposed for such designation), or until ESA section 7 consultation or conference has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation or conference with the FWS or NMFS the district engineer may add species-specific permit conditions to the NWPs.

(e) Authorization of an activity by an NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) If the non-federal permittee has a valid ESA section 10(a)(1)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed NWP activity, the non-federal applicant should provide a copy of that ESA section 10(a)(1)(B) permit with the PCN required by paragraph (c) of this general condition. The district engineer will coordinate with the agency that issued the ESA section 10(a)(1)(B) permit to determine whether the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation conducted for the ESA section 10(a)(1)(B) permit. If that coordination results in concurrence from the agency that the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation for the ESA section 10(a)(1)(B) permit, the district engineer does not need to conduct a separate ESA section 7 consultation for the proposed NWP activity. The district engineer will notify the non-federal applicant within 45 days of receipt of a complete pre-construction notification whether the ESA section 10(a)(1)(B) permit covers the proposed NWP activity or whether additional ESA section 7 consultation is required.

(g) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the FWS and NMFS or their world wide web pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.nmfs.noaa.gov/pr/species/esa/ respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for ensuring that an action authorized by an NWP complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting the appropriate local office of the U.S. Fish and Wildlife Service to determine what measures, if any, are necessary or appropriate to reduce adverse effects to migratory birds or eagles, including whether "incidental take" permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

20. Historic Properties. (a) No activity is authorized under any NWP which may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of section 106 of the National Historic Preservation Act (see 33 CFR

330.4(g)(1)). If pre-construction notification is required for the proposed NWP activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under section 106 may be necessary. The respective federal agency is responsible for fulfilling its obligation to comply with section 106.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the NWP activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties might have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or designated tribal representative, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts commensurate with potential impacts, which may include background research, consultation, oral history interviews, sample field investigation, and/or field survey. Based on the information submitted in the PCN and these identification efforts, the district engineer shall determine whether the proposed NWP activity has the potential to cause effects on the historic properties. Section 106 consultation is not required when the district engineer determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). Section 106 consultation is required when the district engineer determines that the activity has the potential to cause effects on historic properties. The district engineer will conduct consultation with consulting parties identified under 36 CFR 800.2(c) when he or she makes any of the following effect determinations for the purposes of section 106 of the NHPA: no historic properties affected, no adverse effect, or adverse effect.

(d) Where the non-Federal applicant has identified historic properties on which the proposed NWP activity might have the potential to cause effects and has so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects to historic properties or that NHPA section 106 consultation has been completed. For non-federal permittees, the district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA section 106 consultation is required. If NHPA section 106 consultation is required, the district engineer will notify the non-Federal applicant that he or she cannot begin the activity until section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. Permittees that discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by an NWP, they must immediately notify the district engineer of what they have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, 52, 57 and 58 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38, and 54, notification is required in accordance with general condition 32, for any activity proposed by permittees in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only

after she or he determines that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects.

(d) Compensatory mitigation at a minimum one-for-one ratio will be required for all losses of stream bed that exceed 3/100-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. This compensatory mitigation requirement may be satisfied through the restoration or enhancement of riparian areas next to streams in accordance with paragraph (e) of this general condition. For losses of stream bed of 3/100-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects. Compensatory mitigation for losses of streams should be provided, if practicable, through stream rehabilitation, enhancement, or preservation, since streams are difficult-to-replace resources (see 33 CFR 332.3(e)(3)).

(e) Compensatory mitigation plans for NWP activities in or near streams or other open waters will normally include a requirement for the restoration or enhancement, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, the restoration or maintenance/protection of riparian areas may be the only compensatory mitigation required. If restoring riparian areas involves planting vegetation, only native species should be planted. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to restore or maintain/protect a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or maintaining/protecting a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of minimization or compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(f) Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in no more than minimal adverse environmental effects. For the NWPs, the preferred mechanism for providing compensatory mitigation is mitigation bank credits or in-lieu fee program credits (see 33 CFR 332.3(b)(2) and (3)). However, if an appropriate number and type of mitigation bank or in-lieu credits are not available at the time the PCN is submitted to the district engineer, the district engineer may approve the use of permittee-responsible mitigation.

(2) The amount of compensatory mitigation required by the district engineer must be sufficient to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). (See also 33 CFR 332.3(f).)

(3) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, aquatic resource restoration should be the first compensatory mitigation option considered for permittee-responsible mitigation.

(4) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) through (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)). If permittee-responsible mitigation is the proposed option, and the proposed compensatory mitigation site is located on land in which another federal agency holds an easement, the district engineer will coordinate with that federal agency

to determine if proposed compensatory mitigation project is compatible with the terms of the easement.

(5) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan needs to address only the baseline conditions at the impact site and the number of credits to be provided (see 33 CFR 332.4(c)(1)(ii)).

(6) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan (see 33 CFR 332.4(c)(1)(ii)).

(g) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any NWP activity resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that an NWP activity already meeting the established acreage limits also satisfies the no more than minimal impact requirement for the NWPs.

(h) Permittees may propose the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the permittee must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). For activities resulting in the loss of marine or estuarine resources, permittee-responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(i) Where certain functions and services of waters of the United States are permanently adversely affected by a regulated activity, such as discharges of dredged or fill material into waters of the United States that will convert a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse environmental effects of the activity to the no more than minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state or federal, dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. (a) Where the certifying authority (state, authorized tribe, or EPA, as appropriate) has not previously certified compliance of an NWP with CWA section 401, a CWA section 401 water quality certification for the proposed discharge must be obtained or waived (see 33 CFR 330.4(c)). If the permittee cannot comply with all of the conditions of a water quality certification previously issued by certifying authority for the issuance of the NWP, then the permittee must obtain a water quality certification or waiver for the proposed discharge in order for the activity to be authorized by an NWP.

(b) If the NWP activity requires pre-construction notification and the certifying authority has not previously certified compliance of an NWP with CWA section 401, the proposed discharge is not authorized by an NWP until water quality certification is obtained or waived. If the certifying authority issues a water quality certification for the proposed discharge, the permittee must submit a copy of the certification to the district engineer. The discharge is not authorized by an NWP until the district engineer has notified the permittee that the water quality certification requirement has been satisfied by the issuance of a water quality certification or a waiver.

(c) The district engineer or certifying authority may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). If the permittee cannot comply with all of the conditions of a coastal zone management consistency concurrence previously issued by the state, then the permittee must obtain an individual coastal zone management consistency concurrence or presumption of concurrence in order for the activity to be authorized by an NWP. The district engineer or a state may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its CWA section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is authorized, subject to the following restrictions:

(a) If only one of the NWPs used to authorize the single and complete project has a specified acreage limit, the acreage loss of waters of the United States cannot exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank

stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1⁄3-acre.

(b) If one or more of the NWPs used to authorize the single and complete project has specified acreage limits, the acreage loss of waters of the United States authorized by those NWPs cannot exceed their respective specified acreage limits. For example, if a commercial development is constructed under NWP 39, and the single and complete project includes the filling of an upland ditch authorized by NWP 46, the maximum acreage loss of waters of the United States for the commercial development under NWP 39 cannot exceed 1/2-acre, and the total acreage loss of waters of United States due to the NWP 39 and 46 activities cannot exceed 1 acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

"When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

____
(Transferee)

____
(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the activity and mitigation.

The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

31. Activities Affecting Structures or Works Built by the United States. If an NWP activity also requires review by, or permission from, the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a "USACE project"), the prospective permittee must submit a pre-construction notification. See paragraph (b)(10) of general condition 32. An activity that requires section 408 permission and/or review is not authorized by an NWP until the appropriate Corps office issues the section 408 permission or completes its review to alter, occupy, or use the USACE project, and the district engineer issues a written NWP verification.

32. Pre-Construction Notification. (a) *Timing.* Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or are in the vicinity of the activity, or to notify the Corps pursuant to general condition 20 that the activity might have the potential to cause effects to historic properties, the permittee

cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) *Contents of Pre-Construction Notification*: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed activity;

(3) Identify the specific NWP or NWP(s) the prospective permittee wants to use to authorize the proposed activity;

(4) (i) A description of the proposed activity; the activity's purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; a description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity; and any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings for linear projects that require Department of the Army authorization but do not require pre-construction notification. The description of the proposed activity and any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or other mitigation measures.

(ii) For linear projects where one or more single and complete crossings require pre-construction notification, the PCN must include the quantity of anticipated losses of wetlands, other special aquatic sites, and other waters for each single and complete crossing of those wetlands, other special aquatic sites, and other waters (including those single and complete crossings authorized by an NWP but do not require PCNs). This information will be used by the district engineer to evaluate the cumulative adverse environmental effects of the proposed linear project, and does not change those non-PCN NWP activities into NWP PCNs.

(iii) Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the activity and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(5) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial and intermittent streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. Furthermore, the 45-day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(6) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands or 3/100-acre of stream bed and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(7) For non-federal permittees, if any listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation) might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat (or critical habitat proposed for such designation), the PCN must include the name(s) of those endangered or threatened species (or species proposed for listing) that might be affected by the proposed activity or utilize the designated critical habitat (or critical habitat proposed for such designation) that might be affected by the proposed activity. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with the Endangered Species Act;

(8) For non-federal permittees, if the NWP activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, the PCN must state which historic property might have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with section 106 of the National Historic Preservation Act;

(9) For an activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible

inclusion in the system while the river is in an official study status, the PCN must identify the Wild and Scenic River or the “study river” (see general condition 16); and

(10) For an NWP activity that requires permission from, or review by, the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, the pre-construction notification must include a statement confirming that the project proponent has submitted a written request for section 408 permission from, or review by, the Corps office having jurisdiction over that USACE project.

(c) *Form of Pre-Construction Notification*: The nationwide permit pre-construction notification form (Form ENG 6082) should be used for NWP PCNs. A letter containing the required information may also be used. Applicants may provide electronic files of PCNs and supporting materials if the district engineer has established tools and procedures for electronic submittals.

(d) *Agency Coordination*: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity’s compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the activity’s adverse environmental effects so that they are no more than minimal.

(2) Agency coordination is required for: (i) all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States; (ii) NWP 13 activities in excess of 500 linear feet, fills greater than one cubic yard per running foot, or involve discharges of dredged or fill material into special aquatic sites; and (iii) NWP 54 activities in excess of 500 linear feet, or that extend into the waterbody more than 30 feet from the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes.

(3) When agency coordination is required, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (FWS, state natural resource or water quality agency, EPA, and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to notify the district engineer via telephone, facsimile transmission, or e-mail that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse environmental effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity’s compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure that the net adverse environmental effects of the proposed activity are no more than minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies’ concerns were

considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(4) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(5) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

District Engineer's Decision

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If a project proponent requests authorization by a specific NWP, the district engineer should issue the NWP verification for that activity if it meets the terms and conditions of that NWP, unless he or she determines, after considering mitigation, that the proposed activity will result in more than minimal individual and cumulative adverse effects on the aquatic environment and other aspects of the public interest and exercises discretionary authority to require an individual permit for the proposed activity. For a linear project, this determination will include an evaluation of the single and complete crossings of waters of the United States that require PCNs to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings of waters of the United States authorized by an NWP. If an applicant requests a waiver of an applicable limit, as provided for in NWPs 13, 36, or 54, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in only minimal individual and cumulative adverse environmental effects.

2. When making minimal adverse environmental effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. He or she will also consider the cumulative adverse environmental effects caused by activities authorized by an NWP and whether those cumulative adverse environmental effects are no more than minimal. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource

functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional or condition assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse environmental effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.

3. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands or 3/100-acre of stream bed, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for NWP activities with smaller impacts, or for impacts to other types of waters. The district engineer will consider any proposed compensatory mitigation or other mitigation measures the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed activity are no more than minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are no more than minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure that the NWP activity results in no more than minimal adverse environmental effects. If the net adverse environmental effects of the NWP activity (after consideration of the mitigation proposal) are determined by the district engineer to be no more than minimal, the district engineer will provide a timely written response to the applicant. The response will state that the NWP activity can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

4. If the district engineer determines that the adverse environmental effects of the proposed activity are more than minimal, then the district engineer will notify the applicant either: (a) that the activity does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the activity is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal; or (c) that the activity is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse environmental effects, the activity will be authorized within the 45-day PCN period (unless additional time is

required to comply with general conditions 18, 20, and/or 31), with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation plan or a requirement that the applicant submit a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal. When compensatory mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

Further Information

1. District engineers have authority to determine if an activity complies with the terms and conditions of an NWP.

2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.

3. NWPs do not grant any property rights or exclusive privileges.

4. NWPs do not authorize any injury to the property or rights of others.

5. NWPs do not authorize interference with any existing or proposed Federal project (see general condition 31).

Attachment 1
Conditions of Section 401 Certification for Nationwide Permits, Regional Conditions, and General Conditions

General Condition 12 (Soil Erosion and Sediment Controls)
Erosion control and sediment control best management practices (BMPs) are required with the use of this general condition. Attachment 2 describes the BMPs and the Nationwide Permits (NWPs) to which they apply. If the applicant does not choose one of the BMPs listed in Attachment 2, an individual 401 certification is required.

General Condition 25 (Water Quality)
Post-construction total suspended solids (TSS) BMPs are required with the use of this general condition. Attachment 2 describes the BMPs and the NWPs to which they apply. If the applicant does not choose one of the BMP's listed in Attachment 2, an individual 401 certification is required. Bridge deck runoff is exempt from this requirement.

Regional Condition 17 condition
The Permit Evaluation Requirement Process, effective November 1, 2009, is required for all proposed and existing permits within San Jacinto River Waste Pits Superfund Site Area of Concern.

All NWPs except for NWP 3
These NWPs are not authorized for use in coastal dune swales, mangrove marshes, and Columbia bottomlands in the Galveston District, Texas.

NWP 3 (Maintenance)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 6 (Survey Activities)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 7 (Outfall Structures and Associated Intake Structures)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 12 (Oil or Natural Gas Pipeline Activities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 13 (Bank Stabilization)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 14 (Linear Transportation Projects)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 15 (U.S. Coast Guard Approved Bridges)
Soil Erosion and Sediment Controls under General Condition 12 are required.

Attachment 1
Conditions of Section 401 Certification for Nationwide Permits, Regional Conditions, and General Conditions

NWP 16 (Return Water From Upland Contained Disposal Areas)
Activities that would be regulated under Standard Industrial Classification (SIC) codes 1442 and 1446 (industrial and construction sand and gravel mining) are not eligible for this NWP. Effluent from an upland contained disposal area shall not exceed a TSS concentration of 300 mg/L unless a site-specific TSS limit, or a site-specific correlation curve for turbidity (nephelometric turbidity units (NTU)) versus TSS has been approved by TCEQ.

NWP 17 (Hydropower Projects)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 18 (Minor Discharges)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 19 (Minor Dredging)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 21 (Surface Coal Mining Activities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required. Stream bed losses are limited to 1,500 linear feet.

NWP 22 (Removal of Vessels)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 25 (Structural Discharges)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 27 (Aquatic Habitat Restoration, Establishment, and Enhancement Activities)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 29 (Residential Developments)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required. Stream bed losses are limited to 1,500 linear feet.

NWP 30 (Moist Soil Management for Wildlife)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 31 (Maintenance of Existing Flood Control Facilities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

Attachment 1

Conditions of Section 401 Certification for Nationwide Permits, Regional Conditions, and General Conditions

NWP 32 (Completed Enforcement Actions)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 33 (Temporary Construction, Access and Dewatering)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 36 (Boat Ramps)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 37 (Emergency Watershed Protection and Rehabilitation)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 38 (Cleanup of Hazardous and Toxic Waste)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 39 (Commercial and Institutional Developments)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required. Stream bed losses are limited to 1,500 linear feet.

NWP 40 (Agricultural Activities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required. Stream bed losses are limited to 1,500 linear feet.

NWP 41 (Reshaping Existing Drainage Ditches and Irrigation Ditches)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 42 (Recreational Facilities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required. Stream bed losses are limited to 1,500 linear feet.

NWP 43 (Stormwater Management Facilities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Stream bed losses are limited to 1,500 linear feet.

NWP 44 (Mining Activities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required. Stream bed losses are limited to 1,500 linear feet.

Attachment 1
Conditions of Section 401 Certification for Nationwide Permits, Regional Conditions, and General Conditions

NWP 45 (Repair of Uplands Damaged by Discrete Events)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 46 (Discharges in Ditches)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 49 (Coal Remining Activities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP 50 (Underground Coal Mining Activities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required. Stream bed losses are limited to 1,500 linear feet.

NWP 51 (Land-Based Renewal Energy Generation Facilities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required. Stream bed losses are limited to 1,500 linear feet.

NWP 52 (Water-Based Renewal Energy Generation Pilot Projects)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required. Stream bed losses are limited to 1,500 linear feet.

NWP 53 (Removal of Low-Head Dams)
Soil Erosion and Sediment Controls under General Condition 12 are required.

NWP 54 (Living Shorelines)
Sediment Controls under General Condition 12 are required.

NWP C (Electric Utility Line and Telecommunications Activities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP D (Utility Line Activities for Water and Other Substances)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

NWP E (Water Reclamation and Reuse Facilities)
Soil Erosion and Sediment Controls under General Condition 12 are required. Post-construction TSS controls under General Condition 25 are required.

COORDINATION WITH
U.S. DEPARTMENT OF THE INTERIOR,
FISH AND WILDLIFE SERVICE

- March 7, 2024, Hydrex Letter of Coordination.

MARCH 7, 2024, HYDREX LETTER OF COORDINATION

THREATENED AND ENDANGERED SPECIES HABITAT EVALUATION

ROYAL OAKS LANDFILL PROPOSED EXPANSION AREA +/- 48 ACRES

CHEROKEE COUNTY, TEXAS

USACE Project No. SWF-2021-00405
Hydrex Project No. A-12-1509

Report Date:
March 7, 2024

Prepared For:
Omar Bocanegra
U.S. Fish and Wildlife Service
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March 7, 2024

Omar Bocanegra
U.S. Fish and Wildlife Service
Arlington Texas Ecological Services Field Office
501 West Felix Street, Suite 1105
Fort Worth, Texas, 76115

RE: THREATENED AND ENDANGERED SPECIES HABITAT EVALUATION
Royal Oaks Landfill
Proposed Expansion Area +/- 48 Acres
Cherokee County, Texas
USACE Project No. SWF-2021-00405
Hydrex Project No. A-12-1509

Dear Mr. Bocanegra:

Hydrex Environmental (Hydrex) has been contracted by Republic Services, Inc. (Republic) to complete a threatened and endangered species habitat evaluation for the above-referenced project site in Cherokee County, Texas. Federal-listed species were provided by the *Official Species List* generated through the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) online system.

The list indicates the following eight (8) species occur within Cherokee County, Texas:

- Tricolored bat (*Perimyotis subflavus*): PROPOSED ENDANGERED
- Piping plover (*Charadrius melodus*): THREATENED
- Red-cockaded woodpecker (*Picoides borealis*): ENDANGERED
- Rufa red knot (*Calidris canutus rufa*): THREATENED
- Alligator snapping turtle (*Macrochelys temminckii*): PROPOSED THREATENED
- Louisiana pigtoe (*Pleurobema riddellii*): PROPOSED THREATENED
- Monarch butterfly (*Danaus plexippus*): CANDIDATE
- Neches river rose-mallow(*Hibiscus dasycalyx)* ENDANGERED

Hydrex performed a preliminary habitat evaluation for all federal-listed species for Cherokee County, Texas. As part of the preliminary habitat evaluation, Hydrex performed a desktop review of readily available maps and aerial photographs in order to determine the potential for each listed species based on habitat descriptions provided by Texas Department of Wildlife (TPWD), Louisiana Department of Wildlife and Fisheries (LDWF), NatureServe, and USFWS.

The Royal Oaks Landfill Expansion is proposed, in order to meet the long-term disposal needs for Cherokee County, Texas and surrounding areas. Due to the location of the existing landfill and its components, the only available area for expansion of the Royal Oaks Landfill is east of the existing permitted landfill footprint.

The project site is situated within a rural setting surrounded by the existing landfill to the west, and rural residential properties, agricultural land, and managed forestland to the north, east, and south. At the time of this evaluation the project site was undeveloped and partially utilized for soil borrow pits and landfill access. Areas of the project site that were not utilized for the existing landfill were heavily forested. The aquatic habitats (natural and man-made) across the project site consist of sediment detention ponds, stormwater drainage ditches, scrub-shrub wetland, and ephemeral and intermittent streams.

An onsite reconnaissance was performed on June 10, 2021 and July 15, 2021, to visually inspect the project site for listed individuals and their associated habitat. Habitat and characteristic descriptions for the threatened and endangered species in Cherokee County, Texas are listed below.

Based on the professional opinion of Hydrex, an effect determination was made for each federal-listed species, as follows: 'no effect'; 'may affect, but not likely to adversely affect'; and 'may affect'. Furthermore, a determination was made for all proposed and candidate species, as follows: 'jeopardy' or 'no jeopardy' The USFWS IPaC Official Species List for the project can be found as an attachment to this letter.

HABITATS

Tricolored Bat (*Perimyotis subflavus*): PROPOSED ENDANGERED

The tricolored bat is a small yellowish-brown insectivorous bat. Characteristics of the tricolored bat include a forearm length of 31–35 millimeters, short round ears with a blunt, straight tragus, and tricolored fur. The tricolored fur is black at the base, has a band of lighter brown, and a black wing membrane surrounding a reddish-orange forearm. Tricolored bats will hibernate six to nine months per year in caves or mines, with temperatures ranging from 8-13 °C, and minimal airflow. Typically, the bat is loyal to their hibernation site and will return each year. During the summer months, maternal colonies will reside in buildings, tree cavities, and rock crevices. Foraging takes place along forest edges and over ponds and waterways hunting for small insects. According to the *Species Status Assessment (SSA) Report for the Tricolored Bat (Perimyotis subflavus), Version 1.1* (USFWS, 2021), the bats emerge early evening to forage in treetops and closer to the ground later in the evening. The SSA also states that to support all life stages, the tricolored bat populations require a matrix of interconnected habitats that support spring migration, summer maternity colony formation, fall swarming, and winter hibernation.

Determination: No Jeopardy

The following reasons for this effect determination are listed below.

- The project site does not consist of caves or mines for hibernation.
- The project does not consist of suitable roosting habitat.
- The project site consists of some foraging habitat, but the presence of foraging habitat alone is not a part of interconnected habitats to support all life stages required for tricolored bat populations.

- Activities associated with this project will likely not be conducted during evening hours when the bats emerge for foraging.
- If activities associated with this project are conducted during foraging hours, the areas surrounding the project site provide suitable forgaging habitat for the bat to retreat to.

Critical Habitat: No critical habitat is designated for this species.

Piping Plover (*Charadrius melodus*): THREATENED

The piping plover is a small bird approximately 17.8 centimeters long with a wingspan of 38 centimeters. Piping plovers are sandy, gray, and brown in color, and have a white underside and orange legs. The white rump, which is visible in flight, distinguishes this species from other small plovers. The piping plover is primarily a coastal species; however, it will use a variety of habitats and migrate in response to local weather and tidal conditions. Coastal habitats include sand spits, small islands, tidal flats, shoals, and sandbars with inlets. In early April, the plover will begin arrival on breeding grounds which typically include sandy beaches along the Atlantic Coast from Canada to North Carolina, along the sand and gravel shores of Lakes Michigan, Huron, and Superior, river sandbars and islands, barren shorelines of inland lakes, and alkali wetlands in the northern Great Plains of Canada and the United States. The piping plover will winter primarily along Gulf Coast beaches from Florida to Mexico, along the Atlantic Coast from North Carolina to Florida, and on Caribbean islands. Winter habitat includes beaches, sand flats, mudflats, algal mats, emergent sea grass beds, wash-over passes, and very small dunes where seaweed (*Sargassum spp.)* or other debris has accumulated sand. Optimal site characteristics are large, bare or very sparsely vegetated tidal mudflats, sand flats, and algal flats.

Determination: No Effect

The following reasons for this effect determination are listed below.

- According to the USFWS Consistency Letter (attached), it was determined the proposed action will have "no effect" on the piping plover.
- This is not a wind related project.
- The project site does not consist of coastal habitat and is located approximately 170 miles from the Texas Gulf Coast.
- The location of the project site is not in the piping plover’s northern breeding region.

Critical Habitat: Project site is not located within critical habitat designated for this species.

<u>Red-cockaded woodpecker (*Picoides borealis*): ENDANGERED</u>
Red-cockaded woodpeckers are relatively small, however gradual changes occur based on geography, larger birds are generally located to the north. Red-cockaded woodpeckers range from 20-23 centimeters in length, with a wingspan of 35-38 centimeters. The red-cockaded woodpecker has a black crown, narrow white lines above black eyes, heavy black stripe seperating the cheek from throat, and white to grayish nasal tufts. Their bills are black, while their legs can range from black to gray. The male can be identified by the cockade (a tiny red streak) behind the eye on the upper border of the cheek. The red-cockaded woodpecker requires vast areas of open pine habitat. The red-cockaded woodpecker is the only species of woodpecker that excavates its nesting cavities exclusively in living pines. Living pines include mature (60+) or older pines that typically suffer from red-heart disease (aka red heart fungus). Longleaf pines (*Pinus palustris*) are the most preferred species, but other species of southern pine are also utilized. In Texas, cavities have been found in longleaf, loblolly, shortleaf, and slash pines.

Determination: No Effect
The following reasons for this effect determination are listed below.

- According to the USFWS Consistency Letter (attached), it was determined the proposed action will have "no effect" on the red-cockaded woodpecker.
- The project site does not consist of nesting or foraging habitat (i.e., mature, vast, open pine).
- No pine trees infected with heartwood fungus or nesting cavities within pine trees were observed during the onsite reconnaissance.

Critical Habitat: No critical habitat is designated for this species.

<u>Rufa Red Knot (*Calidris canutus rufa*): THREATENED</u>
The red knot is a stocky, medium-sized shorebird with a relatively short bill and legs. The red knot measures 22-28 centimeters with a wingspan of up to 51 centimeters. The red knot varies in plumage throughout the seasons. Distinguishable characteristics include proportionately small head, small eyes, short neck, tapered black bill with a relatively fine tip (approximately the length of the birds head), and white rump. During migration the red knot takes advantage of suitable stopover habitat by using inland saline lakes and freshwater habitats including wetlands, riverine sandbars, and man-made impoundments. In these nonbreeding habitats, red knots require sparse vegetation and open landscapes to avoid predation. Within breeding grounds, red knots generally nest in dry, slightly elevated tundra locations, often on windswept slopes with little vegetation.

Determination: No effect
The following reasons for this effect determination are listed below.

- According to the USFWS Consistency Letter (attached), it was determined the proposed action will have "no effect" on the rufa red knot.
- This is not a wind related project.
- The project site consists of soil borrow areas and forested and scrub-shrub habitat, and does not consist of tundra or open habitat required in the breeding and non-breeding seasons.

Critical Habitat: Project site is not located within the proposed critical habitat designated for this species.

Alligator Snapping Turtle (*Macrochelys temminckii*): PROPOSED THREATENED

The alligator snapping turtle is among the largest freshwater turtles. Characteristics include a triangularly shaped head, pointed nose, a pronounced hook in their beak, and a long tail. The carapace will be brown or tan in color and have 3 rows of extremely prominent ridges on the top. Alligator snapping turtles are highly aquatic and restricted to river systems and associated bodies of water. Requires perennial water bodies; rivers, canals, lakes, and oxbows; also, marshes, wooded swamps, bayous, and ponds near running water, and sometimes will enter brackish coastal waters. Females emerge to lay eggs close to the water's edge.

Determination: No Jeopardy

The following reasons for this effect determination are listed below.

- The project site does not consist of any perennial water bodies such as rivers, canals, lakes, and oxbows; or marshes, wooded swamps, bayous, ponds near running water, and brackish coastal waters.

Critical Habitat: No critical habitat is designated for this species.

Louisiana Pigtoe (*Pleurobema riddellii*): PROPOSED THREATENED

The Louisiana pigtoe will grow in length up to 12.7 centimeters and has a thick, inflated triangular to sub-quadrate shell. The shell is solid without sculpturing, reddish-brown to black in color on the exterior and will sometimes have greenish rays. The interior shell is typically white in color with an iridescent posterior. Typical habitat for the Louisiana pigtoe is flowing streams and moderately sized rivers in Texas, Louisiana, west Mississippi, southeast Oklahoma, and southwest Arkansas with cobble, rock or sand, gravel, and woody debris substrates.

Determination: No effect

The following reasons for this effect determination are listed below.

- The project site does not consist of perennial flowing streams or moderately sized rivers.

Critical Habitat: Project site is not located within the proposed critical habitat designated for this species.

Monarch Butterfly (*Danaus plexippus*): CANDIDATE

The monarch butterfly is a large and conspicuous butterfly with a wingspan of 7-10 centimeters. The wings are bright orange in color surrounded by black borders and black veins. The black border has a double row of white spots on the upper side of the wings. The monarch can be found in fields, roadside areas, open areas, wet areas, or urban gardens. Wherever found, the monarch must have flowering plants for foraging and milkweed species for reproduction. Wintering habitats consist of Oyamel Fir Forests at an elevation of 2,400 to 3,600 meters, temperatures ranging from 0-15 °C, and high humidity to keep the butterfly from drying out.

Determination: No Jeopardy

The following reasons for this effect determination are listed below.

- The project site does not provide adequate numbers of flowering plants for foraging habitat as it consists of disturbed areas and forested areas.
- The project site does not consist of wintering habitat.

Critical Habitat: No critical habitat is designated for this species.

Neches River Rose-mallow (*Hibiscus dasycalyx): THREATNED*

The Neches River rose-mallow is a non-woody perennial. The stems are hairless, greenish to reddish-green, and apprroximatley 2.5 meters tall. The leaves have three thin lobes that taper to a point, the middle lobe of the is longer and perpendicular to the side lobes. Under the petals there are hairy bracts and sepals. The petals of the flower are creamy white with a deep red base. At maturity the 1-3 centimeter fruit is enclosed in the sepals. The Neches river rose-mallow occurs at the edge of woodlands in open marshy habitats found in sloughs, oxbows, river terraces and sand bars. The Neches River rose-mallow has not been found along the Neches River, but prefers soils near standing water, which are inundated during the wet months of the winter and spring but dry up at the surface during the summer.

Determination: No effect

The following reasons for this effect determination are listed below.

- The project site does not consist of open marshy habitats found in sloughs, oxbows, river terraces or sand bars.

Critical Habitat: Project site is not located within the critical habitat designated for this species.

CONCLUSIONS

A **'No Effect'** determination was made for the following four (4) species:

- Piping plover (*Charadrius melodus*): THREATENED
- Red-cockaded woodpecker (*Picoides borealis*): ENDANGERED
- Rufa red knot (*Calidris canutus rufa*): THREATENED
- Neches river rose-mallow(*Hibiscus dasycalyx)* ENDANGERED

A **'No Jeopardy'** determination was made for the following four (4) species:

- Tricolored bat (*Perimyotis subflavus*): PROPOSED ENDANGERED
- Alligator snapping turtle (*Macrochelys temminckii*): PROPOSED THREATENED
- Louisiana pigtoe (*Pleurobema riddellii*): PROPOSED THREATENED
- Monarch butterfly (*Danaus plexippus*): CANDIDATE

Based on the findings of this evaluation and in the best professional opinion of Hydrex, we believe the effects of this project will not result in the destruction or adverse modification of the critical habitat of threatened or endangered species, or cause or contribute to the take of any threatened or endangered species.

I appreciate the opportunity to present this information. If you have any questions regarding these findings, or if further clarification is necessary, please feel free to contact me at ckeim@hydrex-inc.com or (936) 568-9451.

Sincerely,
Hydrex Environmental

Christina Keim

Christina R. Keim, REM, PWS
Senior Biologist, Manager of Ecological Services

SWS PCP EDUCATION EXPERIENCE PWS ETHICS
CRK 3-7-24
CHRISTINA R. KEIM
PWS 2981
PROFESSIONAL WETLAND SCIENTIST

ATTACHMENTS:

USFWS Consistency Letter for Royal Oaks Landfill
USFWS Information for Planning and Consulting (IPaC) Official Species List

DISTRIBUTION

Omar Bocanegra
U.S. Fish and Wildlife Service
Arlington Texas Ecological Services Field Office
501 West Felix Street, Suite 1105
Fort Worth, Texas, 76115

Ms. Christina R. Keim, REM, PWS
Senior Biologist, Manager of Ecological Services
Hydrex Environmental
312 Old Tyler Road
Nacogdoches, Texas 75961

USFWS CONSISTENCY LETTER FOR ROYAL OAKS LANDFILL

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arlington Ecological Services Field Office
501 West Felix Street
Suite 1105
Fort Worth, TX 76115-3410
Phone: (817) 277-1100 Fax: (817) 277-1129
Email [redacted]

In Reply Refer To: March 07, 2024
Project code: 2024-0035493
Project Name: Royal Oaks Landfill - Proposed Expansion

Subject: Consistency letter for 'Royal Oaks Landfill - Proposed Expansion' for specified federally threatened and endangered species and designated critical habitat that may occur in your proposed project area consistent with the Arlington Ecological Services Field Office (ESFO) Determination Key (DKey) for project review and guidance for federally listed species.

Dear Christina Keim:

The U.S. Fish and Wildlife Service (Service) received on **March 07, 2024** your effects determination for the 'Royal Oaks Landfill - Proposed Expansion' (the Action) using the Arlington ESFO DKey for project review and guidance for federally-listed species within the Information for Planning and Consultation (IPaC) system. The Service developed this system in accordance with the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

Based on your answers and the assistance of the Service's Arlington ESFO DKey, you determined the proposed Action will have "No Effect" on the following species:

Species	**Listing Status**	**Determination**
Neches River Rose-mallow (*Hibiscus dasycalyx*)	Threatened	No effect
Piping Plover (*Charadrius melodus*)	Threatened	No effect
Red-cockaded Woodpecker (*Picoides borealis*)	Endangered	No effect
Rufa Red Knot (*Calidris canutus rufa*)	Threatened	No effect

Consultation Status

Thank you for informing the Service of your "No Effect" determinations for this project. No further consultation/coordination for this project is required for these species.

This letter only covers the listed species in the above table. The following species may also occur in the Action area:

- Alligator Snapping Turtle *Macrochelys temminckii* Proposed Threatened
- Louisiana Pigtoe *Pleurobema riddellii* Proposed Threatened
- Monarch Butterfly *Danaus plexippus* Candidate
- Tricolored Bat *Perimyotis subflavus* Proposed Endangered

If you determine your project may affect additional listed or proposed listed species not covered by the Arlington ESFO DKey, please contact our office at (817) 277-1100 or your Service point of contact in the Arlington ESFO to discuss methods to avoid or minimize potential adverse effects to those species. Candidate species are not afforded protection under the ESA; however, we recommend they be considered in project planning and that conservation measures be implemented to avoid or minimize impacts to individuals or their habitat as much as possible.

The Service recommends that your agency contact the Arlington ESFO or re-evaluate the Action in IPaC if: 1) the scope, timing, duration, or location of the Action changes, 2) new information reveals the Action may affect listed species or designated critical habitat, or 3) a new species is listed or critical habitat designated. If any of the above conditions occurs, additional consultation with the Arlington ESFO should take place before project changes are final or resources committed.

At Risk Species: The Service's responsibilities under the ESA include evaluating species that have been petitioned to be listed or are candidates for listing under the ESA. These "at risk" species are not afforded protection under the ESA; however, we continue to collect information on their status and potential threats in order to assess their biological status and address requirements under the ESA. For these reasons, we request any information on the status of these species (e.g., surveys) be provided to the Arlington ESFO for consideration. This may also include any conservation measures implemented to avoid or reduce impacts to these species as a result of proposed actions. The proposed project falls within the range of the following at risk species:

Western chicken turtle (https://ecos.fws.gov/ecp/species/9903)

Bald and Golden Eagle Protection Act(BGEPA): The following resources are provided to project proponents and consulting agencies as additional information. Bald and golden eagles are not included in this section 7(a)(2) consultation and this information does not constitute a determination of effects by the Service.

The Service developed the National Bald Eagle Management Guidelines to advise landowners, land managers, and others who share public and private lands with bald eagles when and under what circumstances the protective provisions of the BGEPA may apply to their activities. The guidelines should be consulted prior to conducting new or intermittent activity near an eagle nest. This document may be downloaded from the following site: https://www.fws.gov/media/national-bald-eagle-management-guidelines-0

If the recommendations detailed in the National Bald Eagle Management Guidelines cannot be followed, you may apply for a permit to authorize removal or relocation of an eagle nest in certain instances. The application form is located at https://fwsepermits.servicenowservices.com/fws/.

Please note this guidance does not authorize bird mortality for species that are protected under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. sec. 703-712). If you believe migratory birds will be affected by this activity, we recommend you contact our Migratory Bird Permit Office at P.O. Box 709, Albuquerque, NM 87103, (505) 248-7882.

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

Royal Oaks Landfill - Proposed Expansion

2. Description

The following description was provided for the project 'Royal Oaks Landfill - Proposed Expansion':

> Proposed expansion of the existing landfill, encompassing approximately 48 acres. Expansion will include construction of additional landfill cells, new stormwater controls, and other features as needed.

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@32.00089425,-95.26107624027327,14z

QUALIFICATION INTERVIEW

1. Does the proposed project involve research or other actions that include the collection, capture, handling, or harassment of any individual federally listed threatened, endangered or proposed species?

   No

2. Does the proposed project involve the use of manned or unmanned aircraft (e.g., airplanes, helicopters, drones, balloons)?

   No

3. Is the action authorized, funded, or being carried out by a Federal agency?

   Yes

4. Are you the Federal agency or designated non-federal representative?

   No

5. Is the project a communications tower licensed or regulated by the Federal Communications Commission?

   No

6. Is the lead federal agency for the project Housing and Urban Development?

   No

7. Is this a wind energy project ?

   No

8. Is this a solar energy project ?

   No

9. [Semantic] Does the project intersect the piping plover AOI?

   Automatically answered
   Yes

10. [Semantic] Does the project intersect the red knot AOI?

    Automatically answered
    Yes

11. [Semantic] Does the project intersect the peppered chub critical habitat?

    Automatically answered
    No

12. [Semantic] Does the project intersect the red-cockaded woodpecker AOI?

    Automatically answered
    Yes

13. Will the project involve removal of suitable red-cockaded woodpecker **foraging** habitat (pine or pine/hardwood stands in which 50 percent or more of the dominant trees are pines and the dominant pine trees are 30 years of age or older) as described in 2003 Red-Cockaded Woodpecker Recovery Plan Appendix 4. Survey Protocol?

    No

14. Will the project occur within suitable red-cockaded woodpecker **nesting** habitat (pine or pine/hardwood stands that contain pines 60 years of age or older)?

    No

15. [Semantic] Does the project intersect the sharpnose shiner critical habitat?

    Automatically answered
    No

16. [Semantic] Does the project intersect the smalleye shiner critical habitat?

    Automatically answered
    No

17. [Semantic] Does the project intersect the Neches River rose-mallow AOI?

    Automatically answered
    Yes

18. Will the project cause hydrologic alterations to designated critical habitat? Alterations to the hydrology of Neches River rose-mallow habitat can occur as a result of projects that do not directly overlap suitable habitat, but occur within the watershed or upstream of suitable habitat.

    No

19. Will the project occur in suitable Neches River rose-mallow habitat as described in the 2018 Neches River Rose-Mallow Recovery Outline?

    No

20. Will the project cause hydrologic alterations to suitable Neches River rose-mallow habitat as described in the 2018 Neches River Rose-Mallow Recovery Outline? Alterations to the hydrology of Neches River rose-mallow habitat can occur as a result of projects that do not directly overlap suitable habitat, but occur within the watershed or upstream of suitable habitat.

    No

21. [Semantic] Does the project intersect the black-capped vireo range?

    Automatically answered
    No

22. [Semantic] Does the project intersect the Texas screwstem range?

    Automatically answered
    No

23. [Semantic] Does the project intersect the western chicken turtle range?

    Automatically answered
    Yes

24. [Semantic] Does the project intersect the Kisatchie painted crayfish range?

    Automatically answered
    No

25. Do you have additional supporting documents you would like to upload to support your project review (e.g., Biological Evaluation, Habitat Assessment, Environmental Report, photos, maps, etc.)?

    No

IPAC USER CONTACT INFORMATION

Agency: Hydrex Environmental, LLC
Name: Christina Keim
Address: 312 Old Tyler Road
City: Nacogdoches
State: TX
Zip: 75961
Email [redacted]
Phone: 9365689451

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Army Corps of Engineers

USFWS INFORMATION FOR PLANNING AND CONSULTING (IPAC)
OFFICIAL SPECIES LIST

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arlington Ecological Services Field Office
501 West Felix Street
Suite 1105
Fort Worth, TX 76115-3410
Phone: (817) 277-1100 Fax: (817) 277-1129
Email [redacted]

In Reply Refer To: March 07, 2024
Project Code: 2024-0035493
Project Name: Royal Oaks Landfill - Proposed Expansion

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, which may occur within the boundary of your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under section 7(a)(1) of the Act, Federal agencies are directed to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Under and 7(a)(2) and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether their actions may affect threatened and endangered species and/or designated critical habitat. A Federal action is an activity or program authorized, funded, or carried out, in whole or in part, by a Federal agency (50 CFR 402.02).

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For Federal actions other than major construction activities, the Service suggests that a biological evaluation (similar to a Biological Assessment) be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

After evaluating the potential effects of a proposed action on federally listed species, one of the following determinations should be made by the Federal agency:

1. *No effect* **-** the appropriate determination when a project, as proposed, is anticipated to have no effects to listed species or critical habitat. A "no effect" determination does not require section 7 consultation and no coordination or contact with the Service is necessary. However, the action agency should maintain a complete record of their evaluation, including the steps leading to the determination of affect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related information.
2. *May affect, but is not likely to adversely affect* - the appropriate determination when a proposed action's anticipated effects to listed species or critical habitat are insignificant, discountable, or completely beneficial. Insignificant effects relate to the size of the impact and should never reach the scale where "take" of a listed species occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not be able to meaningfully measure, detect, or evaluate insignificant effects, or expect discountable effects to occur. This determination requires written concurrence from the Service. A biological evaluation or other supporting information justifying this determination should be submitted with a request for written concurrence.
3. *May affect, is likely to adversely affect* - the appropriate determination if any adverse effect to listed species or critical habitat may occur as a consequence of the proposed action, and the effect is not discountable or insignificant. This determination requires formal section 7 consultation.

The Service has performed up-front analysis for certain project types and species in your project area. These analyses have been compiled into *determination keys*, which allows an action agency, or its designated non-federal representative, to initiate a streamlined process for determining a proposed project's potential effects on federally listed species. The determination keys can be accessed through IPaC.

The Service recommends that candidate species, proposed species, and proposed critical habitat be addressed should consultation be necessary. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found at: https://www.fws.gov/service/section-7-consultations

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan (https://www.fws.gov/library/collections/bald-and-golden-eagle-management). Additionally, wind energy projects should follow the wind energy guidelines (https://www.fws.gov/media/land-based-wind-energy-guidelines) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: https://www.fws.gov/media/recommended-best-practices-communication-tower-design-siting-construction-operation. The Federal Aviation Administration (FAA) released specifications for and made mandatory flashing L-810 lights on new towers 150-350 feet AGL, and the elimination of L-810 steady-burning side lights on towers above 350 feet AGL. While the FAA made these changes to reduce the number of migratory bird collisions (by as much as 70%), extinguishing steady-burning side lights also reduces maintenance costs to tower owners. For additional information concerning migratory birds and eagle conservation plans, please contact the Service's Migratory Bird Office at 505-248-7882.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Arlington Ecological Services Field Office
501 West Felix Street
Suite 1105
Fort Worth, TX 76115-3410
(817) 277-1100

PROJECT SUMMARY

Project Code: 2024-0035493
Project Name: Royal Oaks Landfill - Proposed Expansion
Project Type: Landfill - Solid Waste
Project Description: Proposed expansion of the existing landfill, encompassing approximately 48 acres. Expansion will include construction of additional landfill cells, new stormwater controls, and other features as needed.
Project Location:
The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@32.00089425,-95.26107624027327,14z

Counties: Cherokee County, Texas

ENDANGERED SPECIES ACT SPECIES

There is a total of 8 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 2 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

BIRDS

NAME	STATUS
Piping Plover *Charadrius melodus* Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. Your location does not overlap the critical habitat. This species only needs to be considered under the following conditions: ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red-cockaded Woodpecker *Picoides borealis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7614	Endangered
Rufa Red Knot *Calidris canutus rufa* There is **proposed** critical habitat for this species. This species only needs to be considered under the following conditions: ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened

REPTILES

NAME	STATUS
Alligator Snapping Turtle *Macrochelys temminckii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4658	Proposed Threatened

CLAMS

NAME	STATUS
Louisiana Pigtoe *Pleurobema riddellii* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/10233	Proposed Threatened

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

FLOWERING PLANTS

NAME	STATUS
Neches River Rose-mallow *Hibiscus dasycalyx* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1441	Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

BALD & GOLDEN EAGLES

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

---

1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are likely bald eagles present in your project area. For additional information on bald eagles, refer to Bald Eagle Nesting and Sensitivity to Human Activity

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence ( )

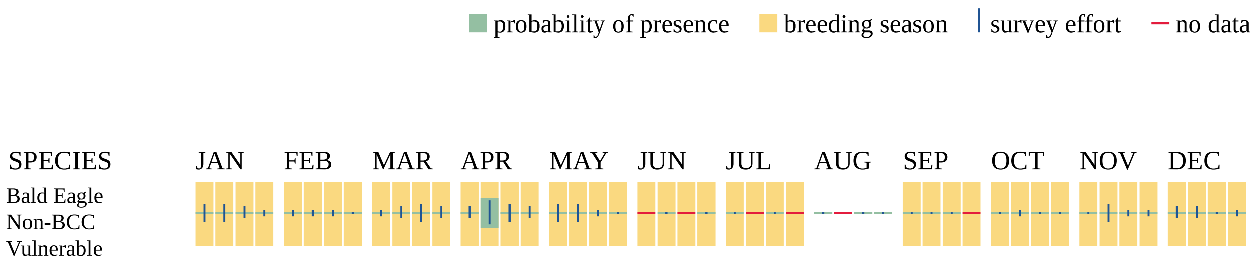
Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season ( )

Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE

SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31
Brown-headed Nuthatch *Sitta pusilla* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9427	Breeds Mar 1 to Jul 15
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25
Prothonotary Warbler *Protonotaria citrea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9439	Breeds Apr 1 to Jul 31
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	Breeds May 10 to Sep 10
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9431	Breeds May 10 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

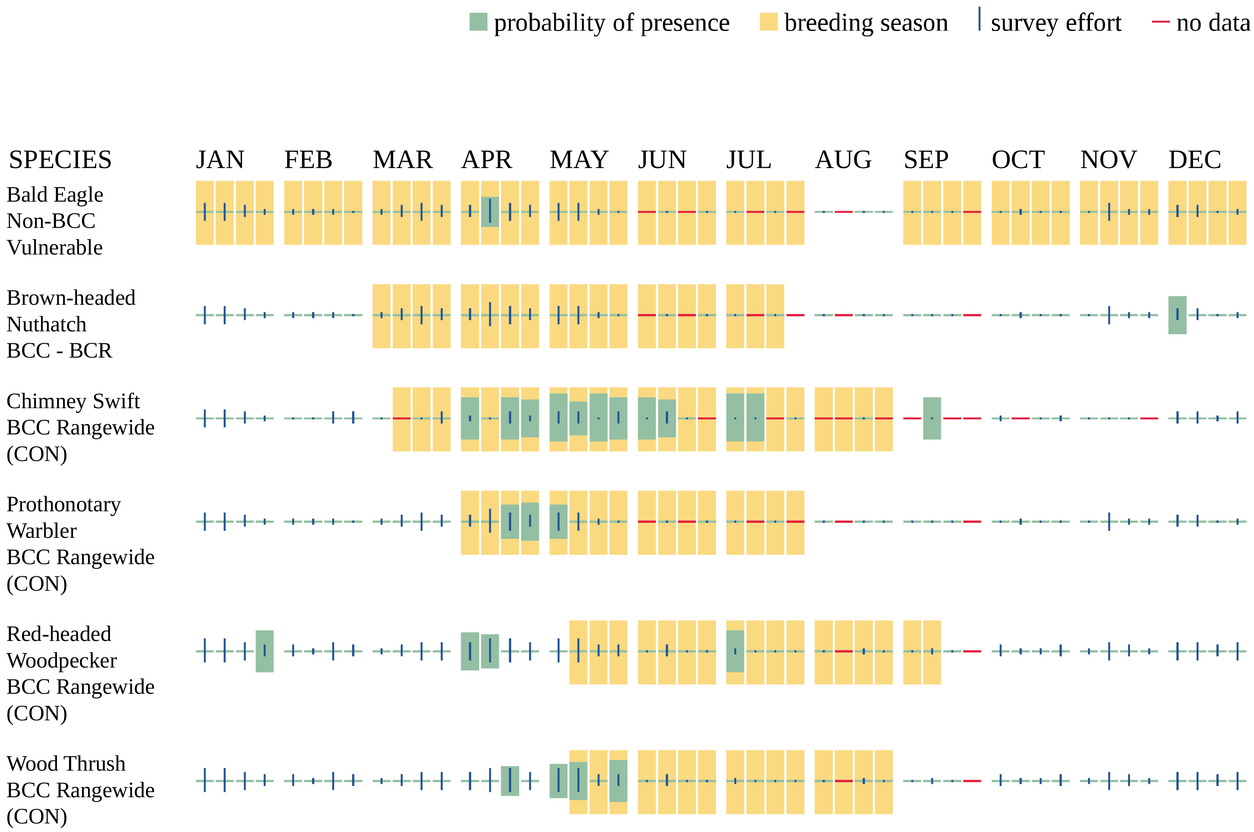
Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)

Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

RIVERINE

- R4SBC

IPAC USER CONTACT INFORMATION

Agency: Hydrex Environmental, LLC
Name: Christina Keim
Address: 312 Old Tyler Road
City: Nacogdoches
State: TX
Zip: 75961
Email [redacted]
Phone: 9365689451

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Army Corps of Engineers

COORDINATION WITH
EAST TEXAS COUNCIL OF GOVERNMENTS

- May 20, 2024, ETCOG Review Letter

May 20, 2024
Project No. 0120-076-11-106

Ms. Lisa Smith
Community and Economic Development Specialist
East Texas Council of Governments
3800 Stone Road
Kilgore, TX 75862

Re: ETCOG Conformance Review Request
Major Permit Amendment Application
Royal Oaks Landfill

Dear Ms. Smith:

Consistent with the requirements of Title 30 Texas Administrative Code (TAC) §330.61(p), please find attached a copy of Parts I/II of the referenced major permit amendment application which has been prepared for Pine Hill Farms Landfill TX, LP. The purpose of the major permit amendment is to increase the disposal capacity of the Royal Oaks Landfill (Royal Oaks) by expanding the landfill. The currently permitted peak elevation of 776.5 feet mean sea level (ft-msl) remains in the proposed expanded landfill. The existing 54.5-acre waste disposal area will be expanded to 28.6 acres, which will increase the permitted disposal capacity by approximately 5.3 million cubic yards. The continued operation of the Royal Oaks Landfill will provide for the long-term disposal needs of Cherokee County and surrounding communities.

The major permit amendment application was submitted to TCEQ on April 17, 2024. The submittal of Parts I/II of the application to the East Texas Council of Governments (ETCOG) is made pursuant to Title 30 TAC §330.61(p), which reads:

> *"Council of governments and local government review request. The owner or operator shall submit documentation that Parts I and II of the application were submitted for review to the applicable council of governments for compliance with regional solid waste plans. The owner or operator shall also submit documentation that a review letter was requested from any local governments as appropriate for compliance with local solid waste plans. A review letter is not a prerequisite to a final determination on a permit or registration application."*

We believe that the continued development of the Royal Oaks Landfill is consistent with the ETCOG Regional Solid Waste Plan for the following reasons:

- One of the goals of the ETCOG's Regional Solid Waste Plan is to develop regional cost-effective, efficient and environmentally-suitable solid waste management systems. The Royal Oaks Landfill is identified as a key part of the PRPC Regional

Solid Waste Plan. The continued development of the facility will provide an economical option for continued disposal.

- The Royal Oaks Landfill is specifically listed in the ETCOG Regional Plan and is consistent with ETCOG's goal of providing integrated waste management practices to provide ample, convenient collection and disposal options.
- The additional capacity gained by the approval of this expansion project will contribute to meeting ETCOG's goal to regionally, ensure continued, adequate disposal capability.

Your assistance with this matter is appreciated. We also are prepared to make a presentation to the ETCOG, if requested. Please call if you have any questions or need additional information.

Sincerely,
Weaver Consultants Group, LLC

Jason A. Edwards, P.E.
Senior Engineer

cc: Austin Sparks, Pine Hill Farms Landfill TX, LP

Enclosures: Parts I/II, Royal Oaks Landfill Major Permit Amendment Application

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1614B

MAJOR PERMIT AMENDMENT APPLICATION

PARTS I/IIC
LOCATION RESTRICTION DEMONSTRATIONS

Prepared for:

Pine Hill Farms Landfill TX, LP

May 2024

STATE OF TEXAS
JASON E. EDWARDS
99336
LICENSED
PROFESSIONAL ENGINEER
05/20/2024

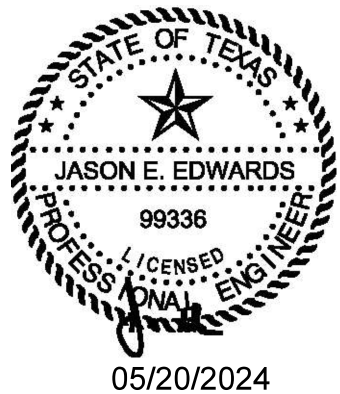
Prepared by:

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No. 0120-076-11-106

This document intended for permitting purposes only.

CONTENTS



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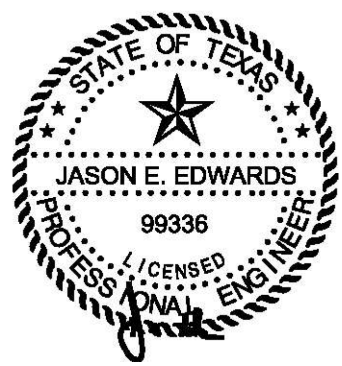
05/20/2024

TABLES AND FIGURES

Tables

Figures



05/20/2024

1 INTRODUCTION

The purpose of this appendix is to provide demonstrations of the location restrictions for the Royal Oaks Landfill. Title 30 Texas Administrative Code (TAC) §330, Subchapter M identifies eleven location restrictions for the protection of human health and the environment. The eleven location restrictions include easements and buffer zones, airports, floodplains, groundwater, endangered or threatened species, wetlands, fault areas, seismic impact zones, unstable areas, coastal areas, and Type I and Type IV landfill permit issuance prohibited areas.

The Subtitle D regulations also require that the owner of a site must demonstrate either that the location restrictions do not apply or that the landfill, while located in a restricted area, is designed and operated in such a way that it protects human health and the environment.

2 EASEMENTS AND BUFFER ZONES

The easements and buffer zones location restrictions within Title 30 TAC §330.543 require that no solid waste disposal shall occur within 25 feet of the center line of any utility line or pipeline easement but no closer than the easement, unless otherwise authorized by the Executive Director. Also, all pipeline and utility easements shall be clearly marked with posts that extend at least six feet above ground level, spaced at intervals no greater than 300 feet. In addition, for vertical or lateral expansions, the owner or operator shall establish and maintain a 125-foot buffer zone for any newly permitted airspace.

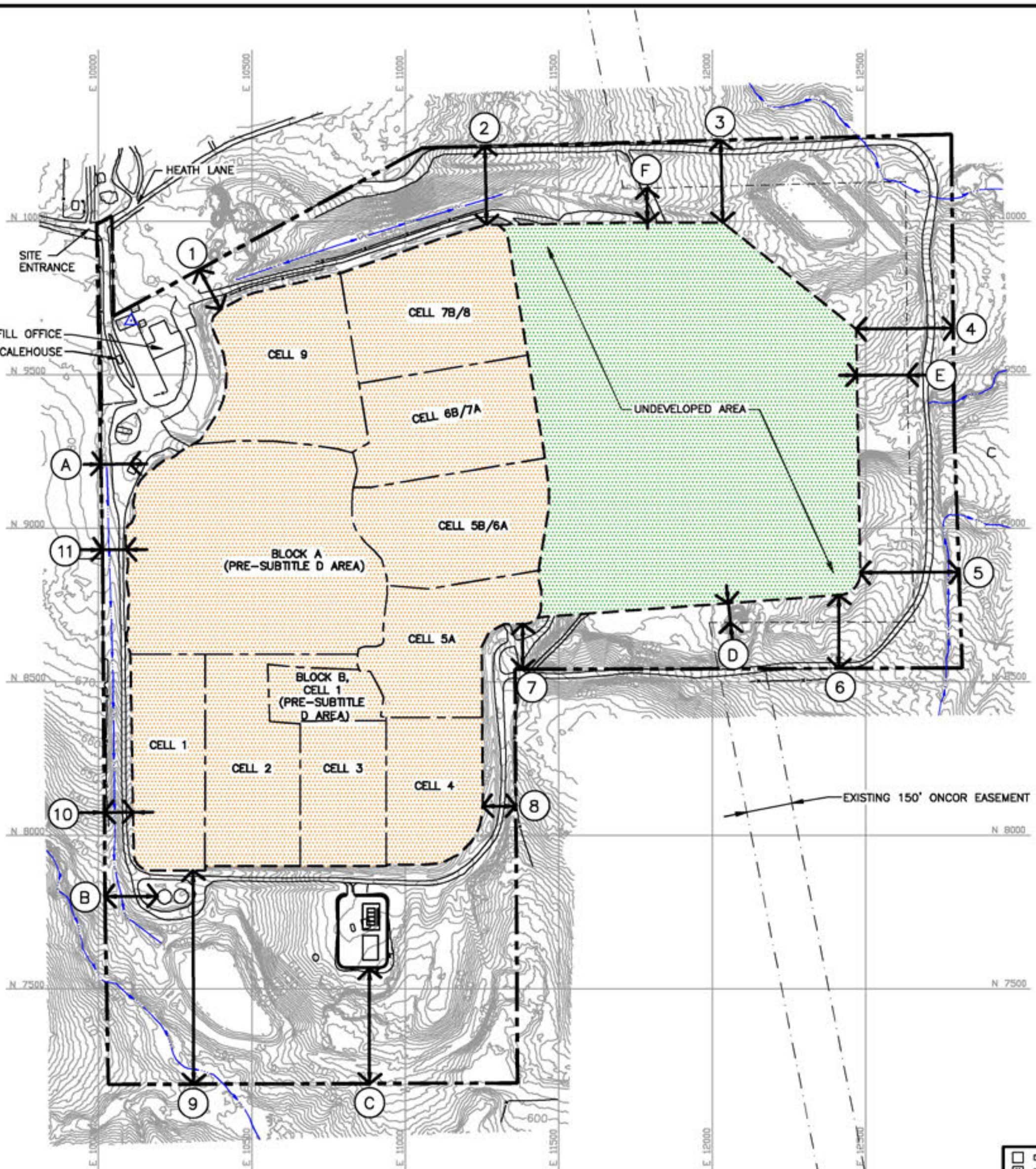
The proposed buffer zones for the site are shown on Drawing I/IIC-1 and are discussed below.

- **Existing Permitted Limits of Waste.** As shown on Drawing I/IIC-1, a buffer zone of at least 50 feet is maintained between the permit boundary and the permitted limits of waste defined in TCEQ Permit No. MSW-1614A.
- **Newly Permitted Limits of Waste.** As shown on Drawing I/IIC-1, a buffer zone of at least 125 feet is maintained between the permit boundary and the proposed new waste disposal airspace (labeled as "newly permitted airspace limit of waste"), consistent with Title 30 TAC §330.543(b)(2)(B).
- **Leachate Storage Tank Area.** A buffer zone of over 50 feet is maintained between the permit boundary and the leachate storage tank area.
- **Citizens Convenience Center.** A buffer zone of over 50 feet is maintained between the permit boundary and the existing Citizens Convenience Center.

An ONCOR electrical delivery company easement is currently located with the proposed waste footprint. An agreement has been reached with ONCOR to relocate this easement as shown on Figure I/IIC-1. Refer to Appendix I/IIF for the ONCOR agreement.

No solid waste disposal will occur within 25 feet of the centerline of any utility line or pipeline easement. In addition, all utility line and pipeline easements will be clearly marked in accordance with the Site Operating Plan.

Given the above, the site is in compliance with the easements and buffer zone location restrictions.



0 200 400
SCALE IN FEET

05/20/2024

LEGEND

- PERMIT BOUNDARY
- LIMIT OF WASTE
- CELL BOUNDARY
- EXISTING EASEMENT
- PROPOSED EASEMENT
- CHANNEL CENTERLINE
- E 10500 SITE GRID
- 610 EXISTING CONTOUR (SEE NOTE 1)
- PREVIOUSLY AUTHORIZED DISPOSAL AREA
- NEWLY PERMITTED DISPOSAL AREA

NOTES:

1. EXISTING CONTOURS DEVELOPED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN NOVEMBER 10, 2022. THE GRID SYSTEM IS BASED ON A SITE GRID SYSTEM. ELEVATIONS ARE BASED ON NAVD 88.
2. PERMIT BOUNDARY WAS REPRODUCED FROM LEGAL DESCRIPTION PROVIDED BY STANGER SURVEYING COMPANY, DATED APRIL 1995.

LANDFILL BUFFER ZONE INFORMATION		
LOCATION	BUFFER ZONE BETWEEN PERMIT BOUNDARY AND PREVIOUSLY AUTHORIZED DISPOSAL AREA	BUFFER ZONE BETWEEN PERMIT BOUNDARY AND NEWLY PERMITTED DISPOSAL AREA
1	142 FEET	142 FEET
2	250 FEET	250 FEET
3	NA	262 FEET
4	NA	311 FEET
5	NA	316 FEET
6	NA	239 FEET
7	148 FEET	148 FEET
8	108 FEET	NA
9	695 FEET	NA
10	107 FEET	NA
11	76 FEET	NA
PROCESSING/DISPOSAL UNIT BUFFER ZONE INFORMATION		
A	EXISTING CITIZENS CONVENIENCE CENTER	95 FEET
B	EXISITNG LEACHATE STORAGE TANKS	171 FEET
C	BULKING FACILITY	374 FEET
EASEMENT BUFFER ZONE INFORMATION		
D	ONCOR EASEMENT	63 FEET
E	ONCOR EASEMENT	165 FEET
F	ONCOR EASEMENT	113 FEET

- [ ] DRAFT
- [x] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION

DATE: 05/2024
FILE: 0120-76-11
CAD: C-1 BUFFER PLAN.DWG
DRAWN BY: JDW
DESIGN BY: BPY
REVIEWED BY: JAC

Weaver Consultants Group
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PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

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NO.	DATE	DESCRIPTION

MAJOR PERMIT AMENDMENT BUFFER ZONE PLAN

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

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FIGURE I/IIC-1

SHEET I/IIC-3

G:\0120\76\EXPANSION 2023\PARTS I-II\I-IIC\C-1 BUFFER PLAN.dwg, byoung, 1:2

3 AIRPORT SAFETY

The Airport Safety Location Restrictions within Title 30 TAC §330.545 require that airports within the vicinity of the landfill site be identified. The regulation states that land disposal sites located within 10,000 feet of an airport runway end used by turbojet aircraft or within 5,000 feet of an airport runway end used by piston-type aircraft shall demonstrate that the unit is designed and operated so that the landfill does not pose a bird hazard to aircrafts.

The FAA reviewed the proposed changes to determine the potential for the site to be a hazard to air navigation. As documented in a letter dated December 21, 2023, the FAA has determined that the proposed changes do not pose a hazard to air navigation (refer to Appendix I/IIB for more information).

In addition, Title 30 TAC §330.545(b) requires that small general service airports located within a 6-mile radius of a lateral expansion be notified of the proposed expansion. Title 30 TAC §330.545(b) also requires that large general public commercial airports located within a 5-mile radius of a lateral expansion be notified of the proposed expansion. Only one private-use airport (Hunter Field Airport) is shown being located within the 10,000-foot radius of the landfill. Hunter Field Airport is a private use, turf runway airport. No small general service airport runways or large general public commercial airports are located within the 6-mile radius of the landfill (as shown on Figure I/II-8.1 in Parts I/II).

Given the above, the site is in compliance with the Airport Location Restriction.

4 FLOODPLAINS

Title 30 TAC §330.547 prohibits waste disposal operations located in the 100-year floodway as defined by FEMA, requires that new expansion areas not restrict the flow of the 100-year flood, reduce the temporary water stage capacity of the floodplain, or result in washout of solid waste; and requires storage and processing facilities to be located outside of the 100-year floodplain. The floodplain is shown on Figure I/II-11.1 in Parts I/II.

Supporting floodplain information is included in Parts I/II, Section 11.1 and Appendix IIIF. Compliance with each floodplain location/coordination regulation is listed in Table 4-1.

Table 4-1
Floodplain Location Restriction Requirements

Regulatory Citation	Regulation Summary	How Regulation is Addressed
330.547(a)	No disposal operations located in a 100-year floodway.	As shown on Figure I/II-11.1, no disposal operations are located in a 100-year floodway.
330.547(b)	Proposed developments shall not restrict the flow of the 100-year flood, reduce floodplain storage capacity, or result in solid waste washout.	No proposed developments are located within the 100-year floodplain (refer to the effective FIRM on Figure I/II-11.1).
330.547(c)	Storage and processing facilities located outside of 100-year floodplain unless facilities prevent washing during 100-year event.	There are no proposed facilities within the limits of the 100-year floodplain.

5 GROUNDWATER

The groundwater location restriction within Title 30 TAC §330.549 prohibits a Type I or Type IAE landfill on the recharge zone of the Edwards Aquifer. Given that the Royal Oaks Landfill is not located on the recharge zone of the Edwards Aquifer, the site is in compliance with the groundwater location restriction.

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6 ENDANGERED OR THREATENED SPECIES

The endangered or threatened species location restrictions within Title 30 TAC §330.551 require that the facility and the operation of the facility not result in the destruction or adverse modification of the critical habitat of endangered or threatened species, or contribute to the taking of any endangered or threatened species.

The U.S. Fish and Wildlife Services (FWS) and Texas Parks and Wildlife Department (TPWD) were contacted to request information regarding endangered or threatened species or their critical habitat with respect to the site. In addition, a site specific threatened and endangered species habitat assessment was completed by Hydrex Environmental (refer to the TPWD and FWS tabs in Appendix I/IIB). This study concluded that the area within the landfill permit boundary does not provide habitat for nor has critical habitat been designated in the project area for any threatened or endangered species.

Therefore, it is concluded that the lateral expansion of the Royal Oaks Landfill will not result in the destruction or adverse modification of the critical habitat of any threatened or endangered species, or cause or contribute to the taking of any threatened or endangered species.

Given the above, the site is in compliance with the endangered or threatened species location restriction.

7 WETLANDS

The area within the existing permit boundary of the Royal Oaks Landfill was evaluated for compliance with wetlands provisions, including the determination and identification requirements in Title 30 TAC §330.61(m)(2) and (3) and the wetlands location restriction in §330.553(b).

A waters of the U.S. and wetlands determination/delineation was preformed by Hydrex Environmental, Inc. Excerpts from their March 2024 report is included in Appendix I/IIB which describes and identifies wetlands located within the facility boundary.

The proposed post-development condition of the landfill will require excavation of additional waters of the U.S. previously delineated as intermittent/RPW and scrub-scrub wetland. Coordination with the USACE for the proposed Project (SWF-2021-00405) in included in Appendix I/IIB.

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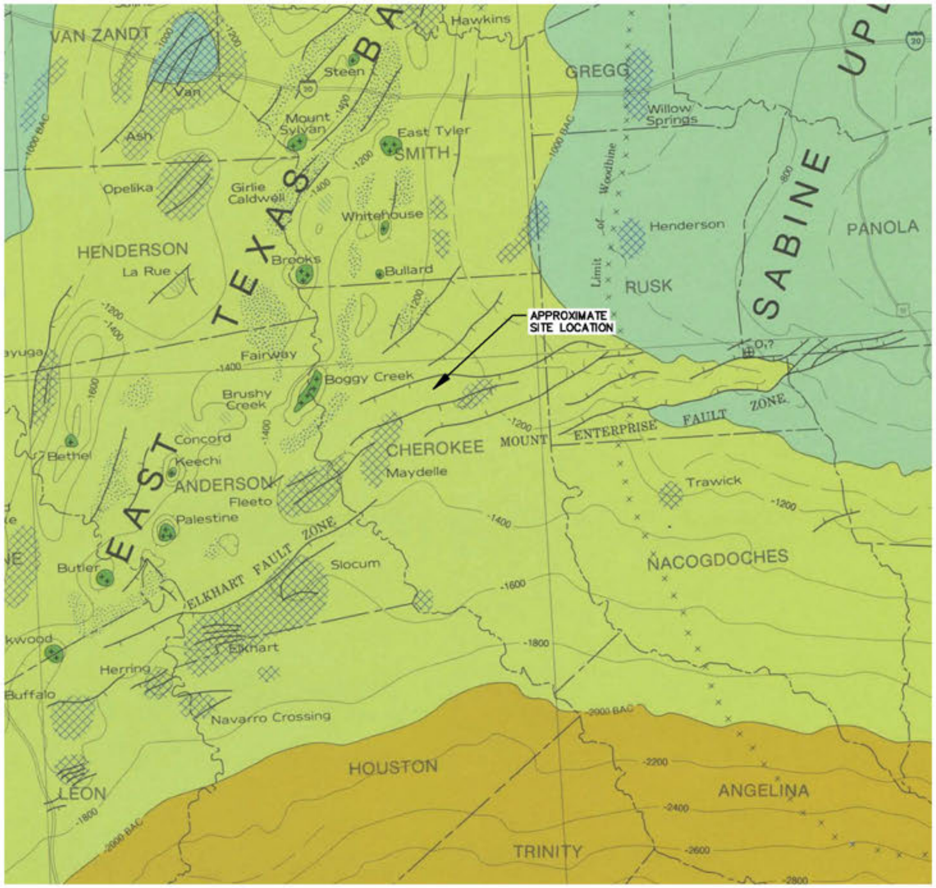
8 FAULT AREAS

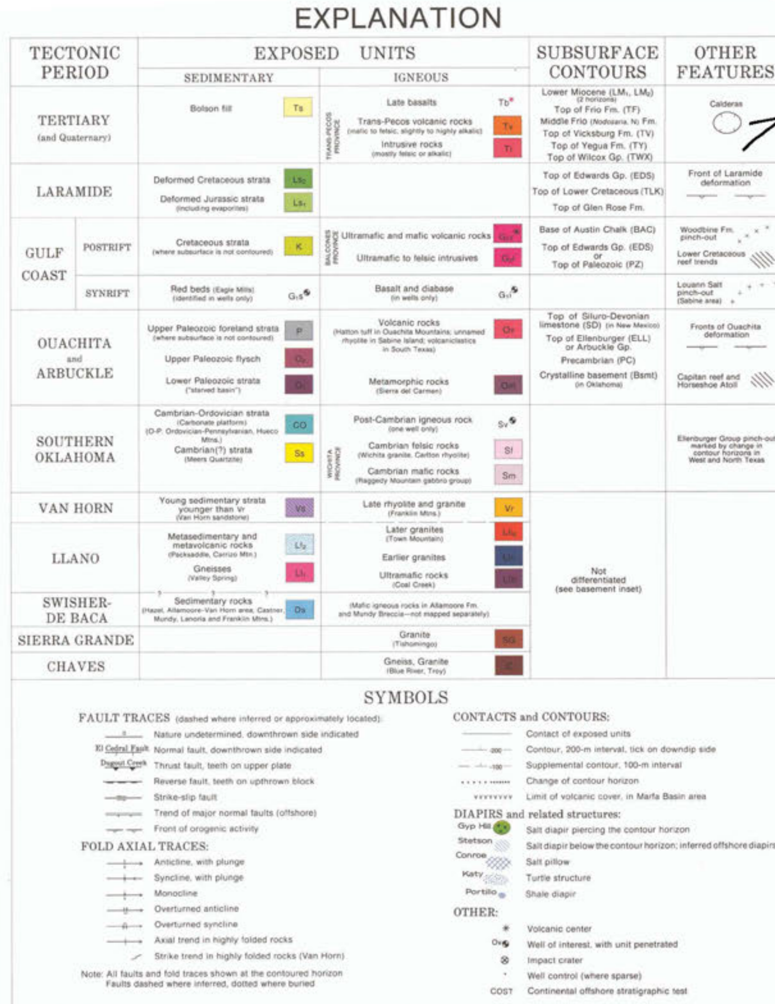
The Royal Oaks Landfill and the surrounding area were examined by Aaron K. Evans, P.G., a Texas licensed WCG professional geoscientist, for indications of the presence of Holocene (last 11,000 years) faulting according to Title 30 TAC §330.555 criteria. The study included a physical inspection of the site and surrounding area, and reviews of a previous fault investigation, available literature and maps, and a current aerial photography. The following is a summary of the findings from the study.

Consistent with Title 30 TAC §330.555, the fault study included a literary review of the Tectonic Map of Texas (BEG, 1991), Lineaments of Texas Map (BEG, 1981), the USGS Quaternary Fault and Fold Database (accessed September 2023), area USGS 7.5 Minute Topographic Quadrangle Maps (Jacksonville West, Jacksonville East, Mount Selman, and Tecula, TX; 2022), Google Earth aerial imagery of Cherokee County (accessed September 2023), and field reconnaissance of the Royal Oaks Landfill and the surrounding areas (conducted September 2023). The study was conducted to identify pre-Holocene faults that may indicate areas of concern or areas that may warrant additional investigation in the immediate landfill vicinity.

The site location is plotted on Drawing I/IIC-2 – Regional Tectonic Map and Drawing I/IIC-3 – Regional Lineament Map. As indicated on these figures, the Royal Oaks Landfill is about one mile southeast of the nearest mapped potential fault and is greater that one mile from the nearest mapped lineament. Review of the USGS Quaternary Fault and Fold Database of the United States indicated no recently active faults are located within 50 miles of the facility.

Based on review of the aforementioned references and field reconnaissance from area roadways, no areas of concern were noted in the landfill vicinity. No unusual scarps, topographic breaks, vegetation changes, or lineations were interpreted within 200 feet of the site. No structural damage to facilities, natural surface depressions, or surface indications of crude oil and natural gas accumulations were observed. No structural influence of stream courses was observed. In addition, no unusual relief or topographic features, such as sag ponds, truncated alluvial spurs, or offset tributary alignments, were observed. In summary, there is no evidence of Holocene faulting within 200 feet of the site. Therefore, the facility complies with the fault area location restriction listed in Title 30 TAC §330.555.





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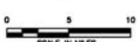

NOTE:

1. MAP ADAPTED FROM TECTONIC MAP OF TEXAS, T.E. EWING et al, 1991, BUREAU OF ECONOMIC GEOLOGY, THE UNIVERSITY OF TEXAS AT AUSTIN.

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FILE: 0120-806-11	DESIGN BY: DS
CAD: I/IIC-2_REGIONAL TECTONIC MAP.DWG	REVIEWED BY: AKE

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MAJOR PERMIT AMENDMENT
REGIONAL TECTONIC MAP

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

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DRAWING I/IIC-2

SHEET I/IIC-10

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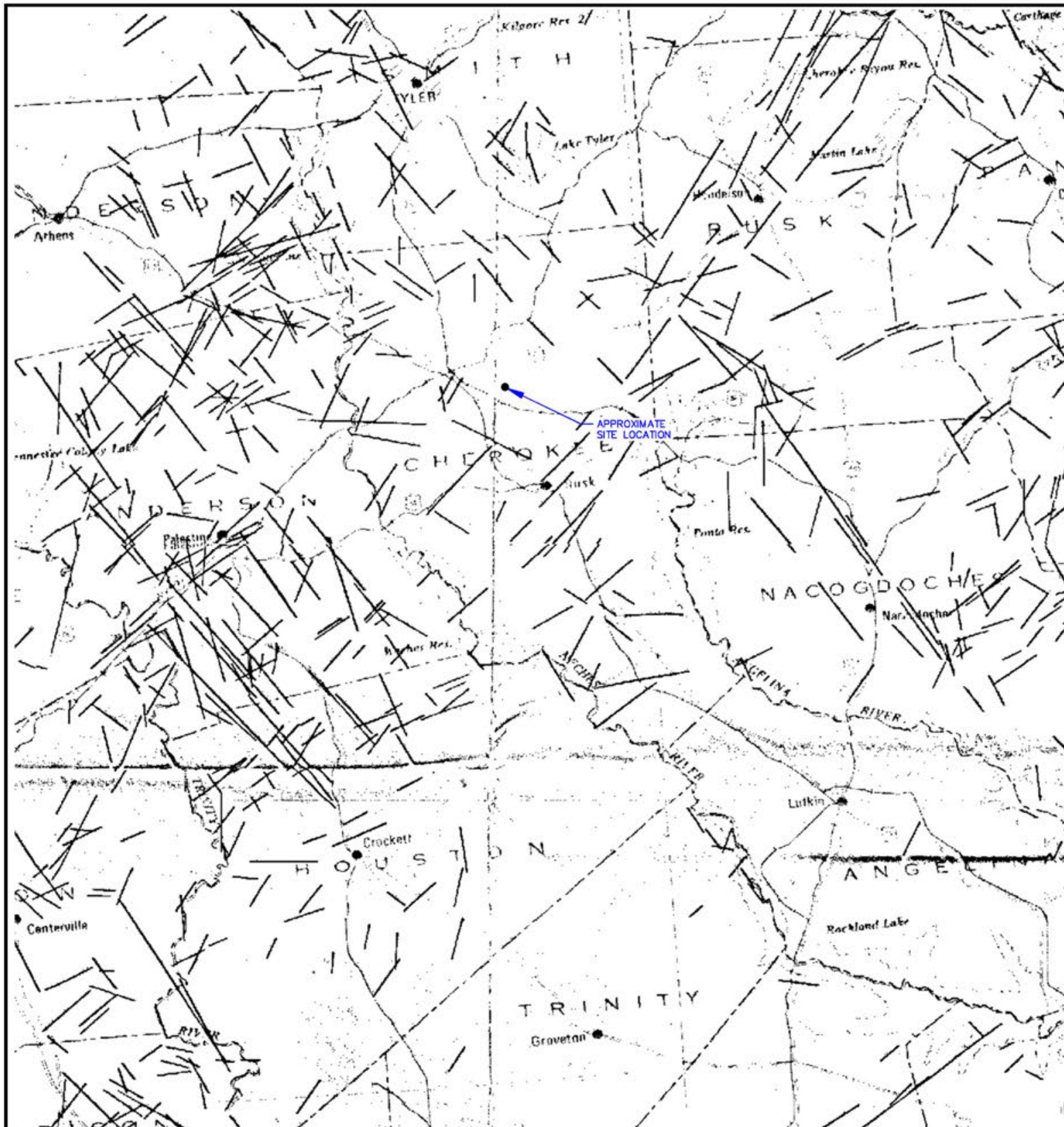

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SCALE IN MILES

LINEAMENTS OF TEXAS

1981

THE UNIVERSITY OF TEXAS AT AUSTIN
BUREAU OF ECONOMIC GEOLOGY

BY C. M. WOODRUFF, JR., S. CHRISTOPHER CARAN, AND ERIC J. THOMPSON

Prepared for the U.S. Department of Energy, Division of Geothermal Energy
Under Contract No. DE-AS07-79-ID12057, Geothermal Resource Assessment
for the State of Texas

NOTE:

1. LINEAMENT MAP ADAPTED FROM LINEAMENTS OF TEXAS, C.M. WOODRUFF et al, 1981, BUREAU OF ECONOMIC GEOLOGY, THE UNIVERSITY OF TEXAS AT AUSTIN.

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MAJOR PERMIT AMENDMENT
REGIONAL LINEAMENT MAP

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

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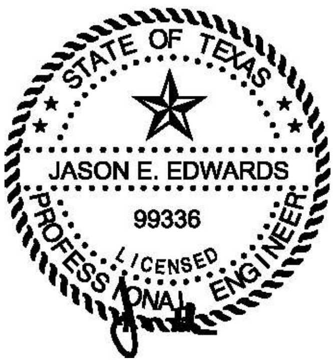
9 SEISMIC IMPACT ZONES

The seismic impact zone location restriction defined by Title 30 TAC §330.557 is an area with a 10 percent or greater probability that the maximum horizontal acceleration in rock, expressed as a percentage of the earth's standard gravitational pull, will exceed 0.10 g in 250 years. Drawing I/IIC-4 is a Seismic Impact Zone Map adapted from USGS seismic hazard maps for peak ground acceleration with a 2 percent in 50 years return period (USGS, 2018). According to the USGS, a 10 percent probability in 250 years is equivalent to a 2 percent probability in 50 years. According to this figure, the site has lower than a 10 percent in 250-year probability of seismic impact and the seismic impact zone location restriction does not apply.



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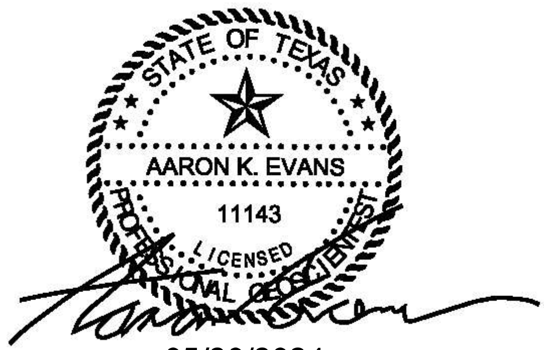

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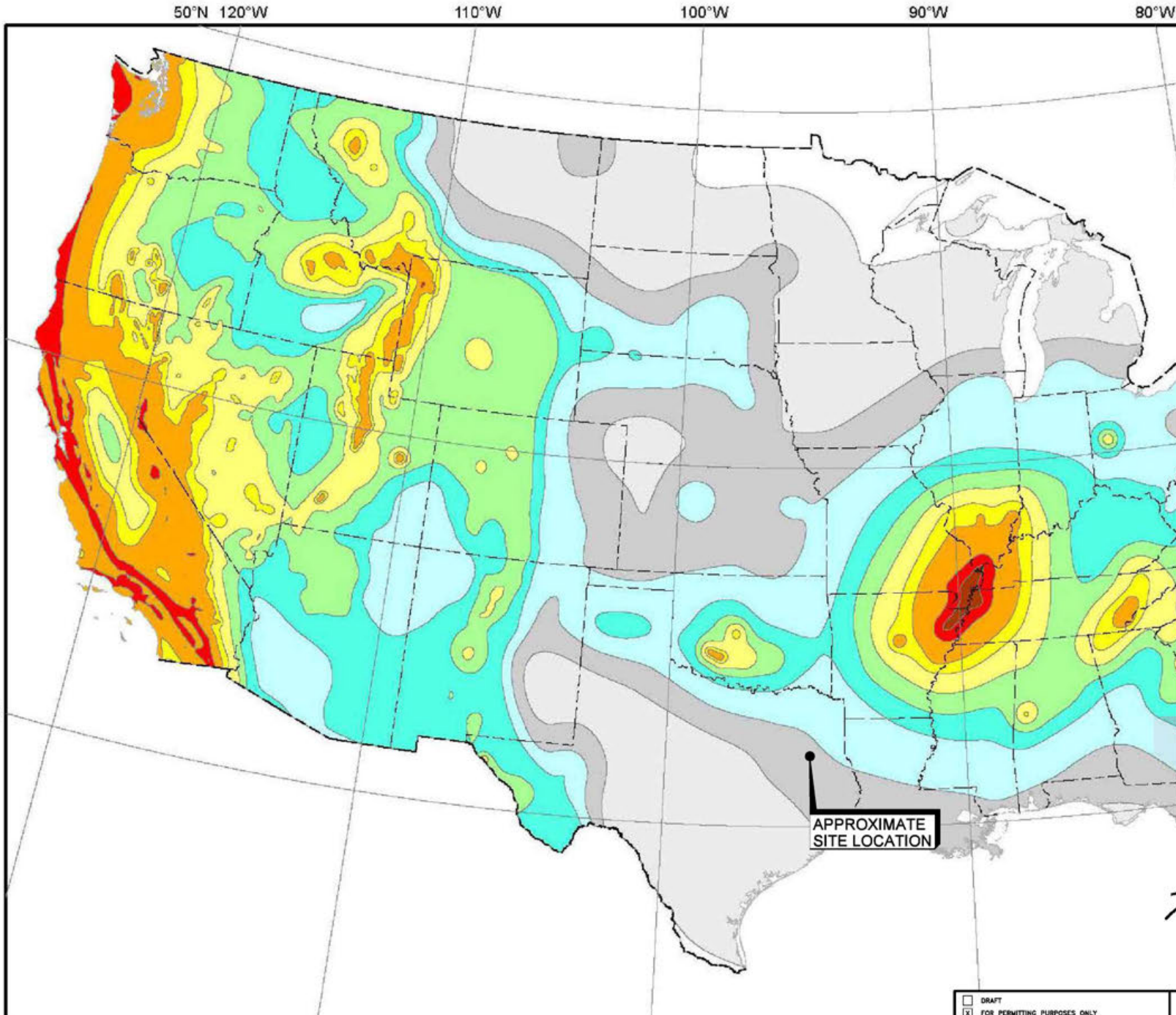

Peak horizontal acceleration (g)

	> 1.6
	0.8 - 1.6
	0.4 - 0.8
	0.3 - 0.4
	0.2 - 0.3
	0.14 - 0.2
	0.1 - 0.14
	0.06 - 0.1
	0.04 - 0.06
	0.02 - 0.04
	< 0.02

NOTES:

1. SEISMIC IMPACT ZONE MAP MODIFIED FROM 2018 USGS NATIONAL SEISMIC HAZARD MAP FOR 2% EXCEEDANCE PROBABILITY IN A 50 YEAR TIME FRAME.
2. ACCORDING TO THE USGS EARTHQUAKE HAZARD WEBSITE (http://earthquake.usgs.gov),THE PROBABILITY THAT THE PEAK GROUND ACCELERATION WILL EXCEED 0.1g IN A 250-YEAR TIME PERIOD AT THE ROYAL OAKS LANDFILL IS 5.5 PERCENT.

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FILE: 0120-076-11
CAD: I/IIC-4_SEISMIC ZONE MAP.DWG

DRAWN BY: JDW
DESIGN BY: DS
REVIEWED BY: AKE

Weaver Consultants Group
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REVISIONS

NO.	DATE	DESCRIPTION

MAJOR PERMIT AMENDMENT
SEISMIC IMPACT ZONE MAP

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

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(Engineer's seal pertai non-italicized text in Section 10 of Appendix I/IIC.)

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(Geoscientist's seal pertains to italicized text in Section 10 of Appendix I/IIC.)

10 UNSTABLE AREAS

10.1 Introduction

The location restriction criteria in Title 30 TAC §330.559 require engineering measures to be incorporated into the design of a disposal unit located in an unstable area to ensure that the integrity of the structural components of the disposal unit will not be disrupted. Unstable areas, by definition, are areas susceptible to natural or human-induced events or forces that are capable of impairing the integrity of some or all structural components (i.e., liner and overliner systems, leachate collection systems, and final cover systems) of a disposal unit. Unstable areas can include poor foundation conditions, areas susceptible to mass movement, or karst terrain.

These three potential unstable area conditions are discussed in the following three subsections.

10.2 Foundation Conditions

10.2.1 Bottom Liner Foundation Condition

A foundation settlement analysis is included in Appendix IIIE (Appendix IIIE-B) to verify that the amount of consolidation of the natural soils below the site will not adversely affect the integrity of the existing and future liner systems. As noted in Appendix IIIE, the strain on both liner systems caused by differential settlement is within acceptable limits for the liner system materials. In addition, the bottom liner leachate collection system design, included in Appendix IIIC, has been developed to account for settlement. As demonstrated in Appendix IIIC, the leachate collection system will function as designed after the final settlement of the foundation soils has occurred.

Onsite and local geologic and geomorphologic features were evaluated as part of Appendix IIIG for naturally induced events or forces that would have the potential to affect the integrity of the landfill or the landfill's components. No potential for subsidence due to local groundwater withdrawal was identified in this evaluation. The area obtains its water resources largely from surface water reservoirs. For these *reasons, there is no significant potential for landfill subsidence due to groundwater withdrawal.*

Given the above, it is concluded that no naturally induced event or forces will adversely affect the landfill or the landfill components.

10.2.2 Final Cover Foundation Condition

The geotechnical design in Appendix IIIE includes demonstrations that the proposed final cover system will function as designed after the final settlement of waste placed below the final cover area is complete. The demonstrations also include a strain analysis showing that the differential settlement of waste will not be detrimental to the final cover system and the maximum estimated strain will be below allowable strain values for each final cover system component.

10.3 Mass Movement

The geotechnical design in Appendix IIIE includes an analysis that the mass movement of natural soils and the landfill will not occur at the site. A detailed summary of the slope stability analyses is provided in Section 5 of Appendix IIIE. The analyses show that the excavated and constructed slopes will be stable. The analyses incorporate various interim fill conditions and the final configuration condition of the landfill. The results of the stability analyses indicate that the proposed excavation, constructed liner, interim waste fill slopes, overliner, and final configuration slopes are stable under the conditions analyzed. The results of the stability analyses demonstrate that the calculated factor of safety values are higher than the recommended minimum factors of safety. The recommended minimum factors of safety for the conditions analyzed were determined using recommendations from the USACE "Design and Construction of Levees" manual (EM 1110-2-1913) and the EPA's "Technical Guidance Manual for Design of Solid Waste Disposal Facilities." An infinite slope stability analysis was also developed for the liner, overliner, and final cover systems and are discussed in more detail in Section 5.5.2 of Appendix IIIE. The results of both the generalized slope stability and interface slope stability analyses indicate that the landfill and its components will be geotechnically stable as designed.

Furthermore, to ensure interface stability of the landfill components, the minimum interface strength requirements have been incorporated into the Appendix IIID – Liner Quality Control Plan for future bottom and overliner construction and Appendix IIIJ-A – Final Cover System Quality Control Plan for the future final cover system.

10.4 Karst Terrain

As discussed in Appendix IIIG of Part III, the site is located in the Interior Coastal Plains regional physiographic province. The province is underlain predominately by Cretaceous-age and deeper older sediments. Aaron K. Evans, P.G. (a WCG Texas licensed professional geoscientist) reviewed the Texas Speleological Survey Cave and Karst Database (2008), area USGS 7.5 Minute Topographic Quadrangle Maps (Jacksonville East, Jacksonville West, Mount Selman, and Tecula, TX; 2022), Google Earth aerial imagery of Cherokee County (accessed September 2023), site boring logs data, and performed onsite field investigations of the Royal Oaks Landfill and the surrounding areas (conducted September 2023).

Based on review of the aforementioned references and field investigation from area roadways, no characteristic karstic map features are present, no surface indications of karst development were observed, and no karst topography or sinkholes exist in the site vicinity. Based on borehole data and regional stratigraphy, the conditions necessary for karst development (e.g., shallow unit of fractured or elevated porosity limestone) is not present in the area immediately beneath the landfill permit boundary.

10.5 Summary

In summary, the bottom liner system is generally founded in the dense sediments of the Queen City Formation. In addition, the final cover and pre-Subtitle D area overliner systems are designed to ensure that the integrity of these systems will be maintained. The stability analysis shows that each landfill component will be stable and no mass movements will occur. *Finally, there is no potential for karst development to occur.*

Given the above, it is concluded that no naturally induced event or forces will adversely affect the landfill or the landfill components. This conclusion is based on a review of the site in its current state, *the expected groundwater usage* and development around the site, and the facility operations itself; *there are no onsite local soil conditions, geologic conditions, geomorphologic features, or potential for karst development to occur* as well as no human induced features or events (both surface and subsurface) that would result in significant differential settlement or other unstable conditions. Therefore, the site meets the requirements of Title 30 TAC §330.559. The site is and will continue to be in compliance with this location restriction.

11 COASTAL AREAS

The coastal areas location restriction within Title 30 TAC §330.561 requires that a new landfill cell or expansion of an existing cell of a landfill managing Class 1 Industrial Solid Waste not be located on a barrier island or peninsula or within 1,000 feet of an active coastal shoreline erosion.

Given that the Royal Oaks Landfill does not accept Class 1 Industrial Solid Waste and is located more than 1,000 feet from the nearest coastal shoreline, the site is in compliance with the coastal areas location restriction.

12 TYPE I AND TYPE IV LANDFILL PERMIT ISSUANCE PROHIBITED

The Type I and Type IV Landfill Permit Issuance Prohibited location restriction within Title 30 TAC §330.563 prohibits the issuance of a permit for a Type IV landfill that is located within 100 feet of a canal that is used as a public drinking water source or for irrigation of crops used for human or animal consumption or that is located in a county with a population of more than 225,000 that is located adjacent to the Gulf of Mexico. The location restriction also prohibits the issuance of a permit for a new Type I or Type IV landfill or a permit amendment authorizing the conversion of a Type IV landfill to a Type I landfill only if the landfill is located adjacent to a county with a population of more than 3.3 million and inside the boundaries of a national forest, as designated by the United States Forest Service, on public or private land.

Given that the Royal Oaks Landfill is a Type I landfill and is not located inside the boundaries of a national forest, the site is in compliance with the Type I and Type IV Landfill Permit Issuance Prohibited location restriction.

APPENDIX I/IID

TRANSPORTATION INFORMATION

- Engineering Study
- Transportation Data and Coordination Report Form for Municipal Solid Waste Type I Landfills (Form 20719)

STATE OF TEXAS
JASON E. EDWARDS
99336
LICENSED
PROFESSIONAL ENGINEER

05/20/2024

ENGINEERING STUDY

Sustainability in Action

November 30, 2023

Mr. Vernon M. Webb, P.E.
District Engineer
Texas Department of Transportation, Tyler District
2709 W. Front Street
Tyler, Texas 75702

Re: Engineering Study
Royal Oaks Landfill
Cherokee County, Texas

Dear Mr. Webb:

The purpose of this letter, submitted on behalf of Pine Hill Farms Landfill TX, LP, is to demonstrate coordination with the Texas Department of Transportation (TxDOT), consistent with Title 30 TAC §330.61(i)(4). This regulation requires that an applicant for a municipal solid waste (MSW) facility coordinate with TxDOT regarding any potential traffic or location restrictions.

Weaver Consultants Group, LLC is preparing a Major Permit Amendment for an existing Type I municipal solid waste (MSW) facility, under contract with Pine Hill Farms Landfill TX, LP to obtain the necessary authorization to expand the existing Royal Oaks Landfill. The proposed expansion will extend the ability of Pine Hill Farms Landfill TX, LP to collect, process, and dispose of solid waste for Cherokee County and surrounding areas. The existing site entrance is located immediately south of Heath Lane, east of northbound US Highway 69, in Cherokee County, Texas.

To assist you in your review, a project summary and site location maps have been provided as an overview of the Major Permit Amendment.

The attached engineering study demonstrates that the site access roads – US Highway 69 and Heath Lane (east and west of the landfill entrance) – will provide adequate access to the site now and in the foreseeable future. The landfill has been in operation for many years and the traffic patterns of the solid waste collection vehicles that use area access roads are well established. As a result of the proposed expansion, landfill vehicles will continue to use a small percentage of access road capacity, and the existing entrance will not be modified. It is expected that the traffic patterns will remain consistent with the current traffic patterns. Additionally, please note a permit is not being requested from TxDOT for this project.

To verify compliance with Title 30 TAC §330.61(i)(4), we are requesting a letter from TxDOT regarding the adequacy of the site access roads and any traffic or location restrictions at or near the site.

Please call if you have any questions or need additional information.

Sincerely,
Pine Hill Farms Landfill TX, LP

Austin Sparks, P.E.
Environmental Manager

Attachments: Attachment A - Royal Oaks Landfill Engineering Study

cc: Jason A. Edwards, Weaver Consultants Group, LLC

ATTACHMENT A
ROYAL OAKS LANDFILL ENGINEERING STUDY

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1614B

ENGINEERING STUDY

Prepared for

Pine Hill Farms Landfill TX, LP

November 2023

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER
12/15/2023

Prepared by

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Blvd., Suite 206
Fort Worth, Texas 76109
817-735-9770

Project No. 0120-076-11-106

This document is intended for permitting purposes only.

CONTENTS

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER
12/15/2023

1 INTRODUCTION

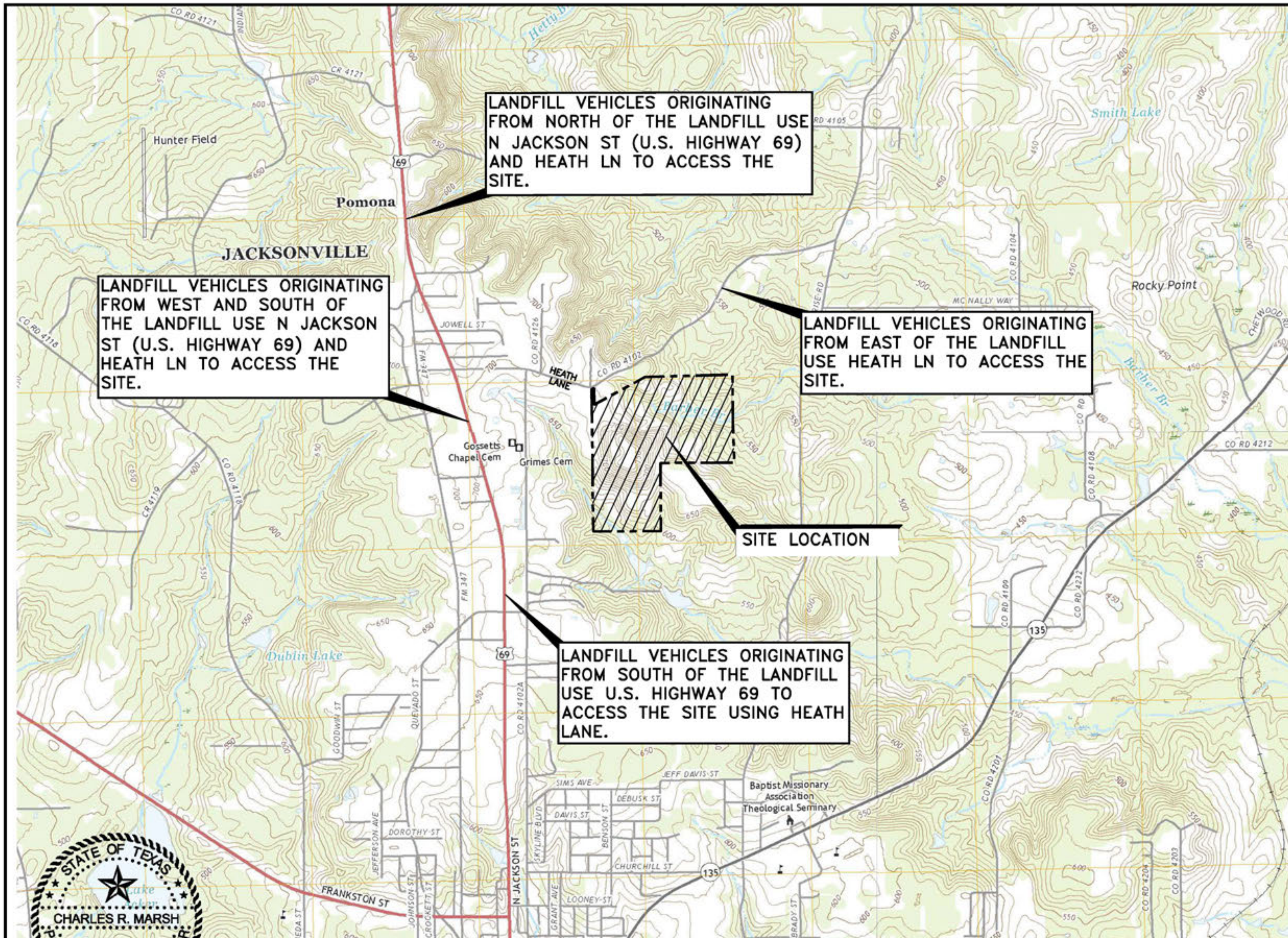
1.1 Purpose

Weaver Consultants Group, LLC is in the process of developing a Major Permit Amendment Application, on behalf of Pine Hill Farms Landfill TX, LP, to authorize the future expansion of the Royal Oaks Landfill. The purpose of this study is to demonstrate that the access roads to the Royal Oaks Landfill (U.S. Highway 69 and Heath Lane) will provide adequate access to the site. The Engineering Study is completed consistent with the requirements listed in 30 TAC §330.61(i), which requires the following information.

- Provide data on the availability and adequacy of roads that the owner or operator will use to access the site;
- Provide data on the volume of vehicular traffic on access roads within one mile of the proposed facility, both existing and expected, during the expected life of the proposed facility;
- Project the volume of traffic expected to be generated by the facility on the access roads within one mile of the proposed facility; and
- Submit documentation of coordination of all designs of proposed public roadway improvements such as turning lanes, storage lanes, etc., associated with site entrances with the agency exercising maintenance responsibility of the public roadway involved. In addition, the owner or operator shall submit documentation of coordination with the Texas Department of Transportation for traffic and location restrictions.

1.2 Summary of Proposed Landfill Expansion

Royal Oaks Landfill is an existing municipal solid waste landfill located in Cherokee County, Texas at 440 Heath Lane, Jacksonville, TX 75766. The current landfill waste disposal unit is approximately 54.5 acres. The proposed permit amendment includes a horizontal expansion of the existing permitted waste disposal footprint area. The proposed horizontal expansion has a total area of approximately 28.6 acres. The proposed expansion areas are located entirely within the existing 144.3-acre permit boundary.



N

0 1000 2000
SCALE IN FEET

LEGEND

LANDFILL PERMIT BOUNDARY

ROAD CLASSIFICATION

Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

MOUNT SELMAN, TX 2022

TECULA, TX 2022

JACKSONVILLE WEST, TX 2022

JACKSONVILLE EAST, TX 2022

Produced by the United States Geological Survey

North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and 1 000-meter grid: Universal Transverse Mercator, Zone 15R
This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery.....NAIP, September 2016 - November 2016
Roads.....U.S. Census Bureau, 2015 - 2018
Names.....GNIS, 1979 - 2022
Hydrography.....National Hydrography Dataset, 2003 - 2022
Contours.....National Elevation Dataset, 2018
Boundaries.....Multiple sources; see metadata file 2019 - 2021
Wetlands.....FWS National Wetlands Inventory Not Available

NOTES:

1. REPRODUCED FROM 2022 USGS 7.5 QUADRANGLES: JACKSONVILLE EAST, JACKSONVILLE WEST, MOUNT SELMAN, AND TECULA.

STATE OF TEXAS
CHARLES R. MARSH
105073
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12/15/2023

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PREPARED FOR
PINE HILL FARMS LANDFILL, LP

DATE: 03/2023	DRAWN BY: RAA
FILE: 0120-76-11	DESIGN BY: MB
CAD: FIGURE 1-1.DWG	REVIEWED BY: CRM

REVISIONS

NO.	DATE	DESCRIPTION

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

MAJOR PERMIT AMENDMENT
SITE LOCATION MAP AND TRAFFIC PATTERNS

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

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FIGURE 1-1

2 TRAFFIC INFORMATION

2.1 Availability and Adequacy of Roads

As shown on Figure 1-1, the access roads within one mile of the site are U.S. Highway 69 (four-lane, asphalt-paved, 55 mph), Heath Lane west of the landfill entrance (two-lane, asphalt-paved, 30 mph), and Heath Lane east of the landfill entrance (two-lane, asphalt-paved, 35 mph). Heath Lane is the main access road that waste collection vehicles will use to access the site. Other nearby roads may be periodically used by landfill vehicles to serve residences and businesses located along or near those roadways, and are not considered access roads in this context.

The Royal Oaks Landfill site entrance is provided at the south side of Heath Lane by an existing driveway along Heath Lane. Figures 2-1 and 2-2 provide an overview of the site entrance. As shown on Figure 2-2, the existing site entrance includes an approximately 20-foot-wide concrete road from Heath Lane to the scalehouse. The length of the entrance road is approximately 340 feet, which provides a more than ample queuing area for waste vehicles to avoid disrupting traffic on Heath Lane.

2.2 Volume of Vehicular Traffic

The volume of vehicle traffic on the site access roads (U.S. Highway 69 and Heath Lane), is summarized on Table 2.1. As noted on Table 2.1, TxDOT traffic counts from 2022 (U.S. Highway 69) and 2013 (Heath Lane) were available for all site access roads. The TxDOT traffic counts were adjusted to 2023 traffic conditions to account for the additional traffic created by area growth between the time volume data was collected and 2023. Additionally, traffic conditions were also projected to the year 2041, which is the estimated year when the landfill will reach its capacity. In summary, all access roads operate at a Level of Service (LOS) of A throughout the projected life of the site and will provide adequate access to the landfill.

ROYAL OAKS LANDFILL
0120-076-11-106
TRAFFIC STUDY

Table 2.1
2-Way Traffic Volumes

Location	2023 Traffic Conditions[1,2]						Projected 2041 Traffic Conditions[2]					
	Daily			Peak Hour[3]			Daily			Peak Hour[3]		
	Landfill Trips[4]	Non-Landfill Trips	Total	Landfill Trips	Non-Landfill Trips	Total	Landfill Trips[4]	Non-Landfill Trips	Total	Landfill Trips	Non-Landfill Trips	Total
U. S. Highway 69 (North)[5]	228	13,824	14,052	23	1,382	1,405	266	16,118	16,384	27	1,612	1,638
U. S. Highway 69 (South)	228	15,326	15,554	23	1,533	1,555	266	17,869	18,135	27	1,787	1,813
Heath Lane (West)	228	707	935	23	71	93	266	824	1,090	27	82	109
Heath Lane (East)	228	707	935	23	71	93	266	824	1,090	27	82	109

Notes:

[1] 2023 Traffic conditions are based on volumes provided on the TxDOT 2013 and 2022 Traffic Counts. These volumes are projected using population growth rates in the Texas Water Development Board 2011 and 2021 state water plan projections data.

[2] The annual population growth rate is 0.94% for 2011-2020, 0.92% for 2021-2030, 0.82% for 2031-2040, and 0.83% for 2041-2050.

[3] Peak hour volumes are assumed to be ten percent of the total daily traffic volume.

[4] 2041 Landfill trips are projected from 2023 landfill trips. 2023 landfill trips were estimated from landfill waste inflow capacity at year 2022 .

[5] It is conservatively assumed that 100 percent of all landfill traffic will travel U. S. Highway 69 (north of landfill), U. S. Highway 69 (south of landfill), and Heath Lane.

Table 2.2
Traffic Impact Assessment[1]

Location	Roadway Capacity (veh/hr)	2023 Traffic Conditions						Projected 2041 Traffic Conditions					
		Total Volume (vpd)	Landfill Vehicles (vpd)	Peak Hour Volume[2] (veh)	% of Roadway Capacity used	LOS [1]	% of Roadway Capacity Used by Landfill Vehicles	Total Volume (vpd)	Landfill Vehicles (vpd)	Peak Hour Volume[2] (veh)	% of Roadway Capacity used	LOS [1]	% of Roadway Capacity Used by Landfill Vehicles
U. S. Highway 69 (North)	6,400	14,052	228	1,405	22.0%	A	0.4%	16,384	266	1,638	25.6%	A	0.4%
U. S. Highway 69 (South)	6,400	15,554	228	1,555	24.3%	A	0.4%	18,135	266	1,813	28.3%	A	0.4%
Heath Lane (West)	3,200	935	228	93	2.9%	A	0.7%	1,090	266	109	3.4%	A	0.8%
Heath Lane (East)	3,200	935	228	93	2.9%	A	0.7%	1,090	266	109	3.4%	A	0.8%

Notes:

[1] Level of Service for U. S. Highway 69 (north of landfill), U. S. Highway 69 (south of landfill), and Heath Lane are determined based on average travel speed from "Transportation Research Board. 2016. Highway Capacity Manual 6th Edition: A Guide for Multimodal Mobility Analysis. Washington, DC: The National Academies Press", Chapter 15.

[2] Peak hour volumes are assumed to be ten percent of the total daily traffic volume.

2.3 Queuing

As shown on Figure 2-2, approximately 340 feet of queuing space within the facility gate provides for space for at least six waste hauling vehicles. Therefore, the available queuing area is sufficient to avoid disturbance on the site entrance road, thereby not disturbing vehicular traffic along Heath Lane.

N

0 300 600
SCALE IN FEET

LEGEND

LANDFILL PERMIT BOUNDARY

NOTES:

1. AERIAL IMAGERY PROVIDED BY GOOGLE EARTH, DATED SEPTEMBER 9, 2022.

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER
12/15/2023

☐ DRAFT ☒ FOR INFORMATIONAL PURPOSES ONLY ☐ ISSUED FOR CONSTRUCTION	PREPARED FOR PINE HILL FARMS LANDFILL, LP
DATE: 03/2023 FILE: 0120-76-11 CAD: FIGURE 2-1.DWG DRAWN BY: RAA DESIGN BY: MB REVIEWED BY: CRM	REVISIONS
Weaver Consultants Group TBPE REGISTRATION NO. F-3727	

NO.	DATE	DESCRIPTION

MAJOR PERMIT AMENDMENT
ENTRANCE ROAD

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

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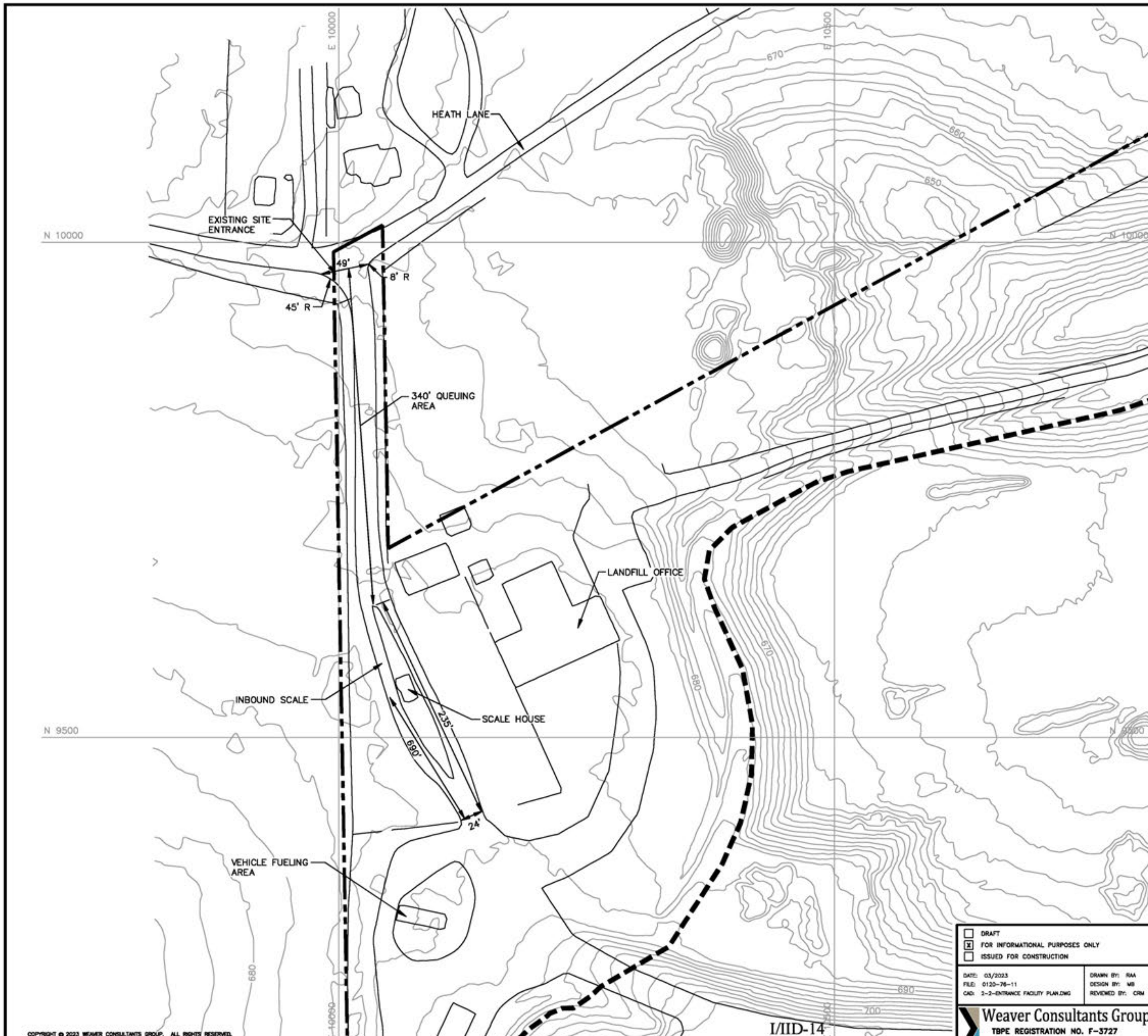
FIGURE 2-1

O:\0120\76\EXPANSION 2023\TRAFFIC STUDY\2-1 ENTRANCE ROAD.dwg, byoung, 1:2



LEGEND

- LANDFILL PERMIT BOUNDARY
- 660 EXISTING CONTOUR
- PAVED AREA (SEE NOTE 2)
- x—x EXISTING FENCE

NOTES:

1. EXISTING CONTOURS DEVELOPED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN NOVEMBER 10, 2022.
2. PAVED AREAS INSIDE THE PERMIT BOUNDARY HIGHLIGHTED. ALL WEATHER PAVING MAY BE PROVIDED USING ASPHALT, CONCRETE, OR GRAVEL OR A COMBINATION OF VARIOUS ALL WEATHER SURFACING.

STATE OF TEXAS
CHARLES R. MARSH
105073
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12/15/2023

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DRAWN BY: RAA
DESIGN BY: MB
REVIEWED BY: CRM

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PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION

MAJOR PERMIT AMENDMENT
ENTRANCE FACILITY PLAN

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

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FIGURE 2-2

3 SUMMARY

In summary, the current 2023 area roadway system provides adequate access to the Royal Oaks Landfill and would be minimally affected by the proposed landfill expansion. Additionally, the projected 2041 traffic conditions would also be minimally affected by the proposed expansion and landfill vehicles will utilize less than 1% of the access road capacity. Therefore, the area traffic conditions for the existing access roads within one mile of the site (U.S. Highway 69 and Heath Lane) will not be significantly impacted due to the proposed landfill expansion.

APPENDIX A

PROJECT SUMMARY AND SITE LOCATION MAPS

Project Summary
Royal Oaks Landfill
Cherokee County, Texas

Introduction

The Royal Oaks Landfill is in the process of developing a major permit amendment application to provide long-term disposal capacity for authorized solid waste that is generated in this area. The landfill currently serves residences and businesses in the communities of Cherokee County and nearby counties. The permit amendment application will be submitted to the Texas Commission on Environmental Quality (TCEQ) and will undergo a detailed review before the operative Permit for this facility is issued.

The objective of this summary is to provide an overview of the proposed project. The following subsections detail information regarding the owner and operator of the site, general site information, and a summary of the proposed site design.

Owner/Operator Information

The Royal Oaks Landfill is owned by the City of Jacksonville and operated by Pine Hill Farm TX, LP. Pine Hill Farms TX, LP is a subsidiary of Republic Services (Republic). Republic is one of the leading providers of solid waste services in the nation and provides services to residential, municipal and commercial customers across the country.

Site Information

The following drawings are attached to this summary.

- Figure 1 – Site Location Map. This figure shows the site location on a standard TxDOT county highway map.
- Figure 2 – General Topographic Map. This figure shows the site location on a USGS topographic map.
- Figure 3 – Aerial Photograph. This figure details both the currently permitted landfill and proposed reconfigured landfill on an aerial photograph.
- Figure 4 – Site Plan. This plan details both the currently permitted landfill and proposed landfill configuration on a detailed topographic map.
- Figure 5 – Existing and Proposed Landfill Completion Plan. This figure provides a comparison between the currently permitted landfill and the proposed reconfigured landfill completion plan.

Site History

The Royal Oaks Landfill is an existing 144.3-acre municipal solid waste facility (TCEQ Permit No. MSW-1614A) located approximately 0.5 miles east of the intersection of Heath Lane and U.S. Highway 69 in Cherokee County.

The site was originally permitted as a Type I Municipal Solid Waste Landfill in 1984. The landfill was operated by the City of Jacksonville until 1988, when the permit was transferred to Laidlaw Waste Systems, Inc. The permit was amended in 1996 to horizontally and vertically expand the landfill. In 2002, the permit was transferred to Pine Hill Farms Landfill TX, LP, a limited partnership with Republic.

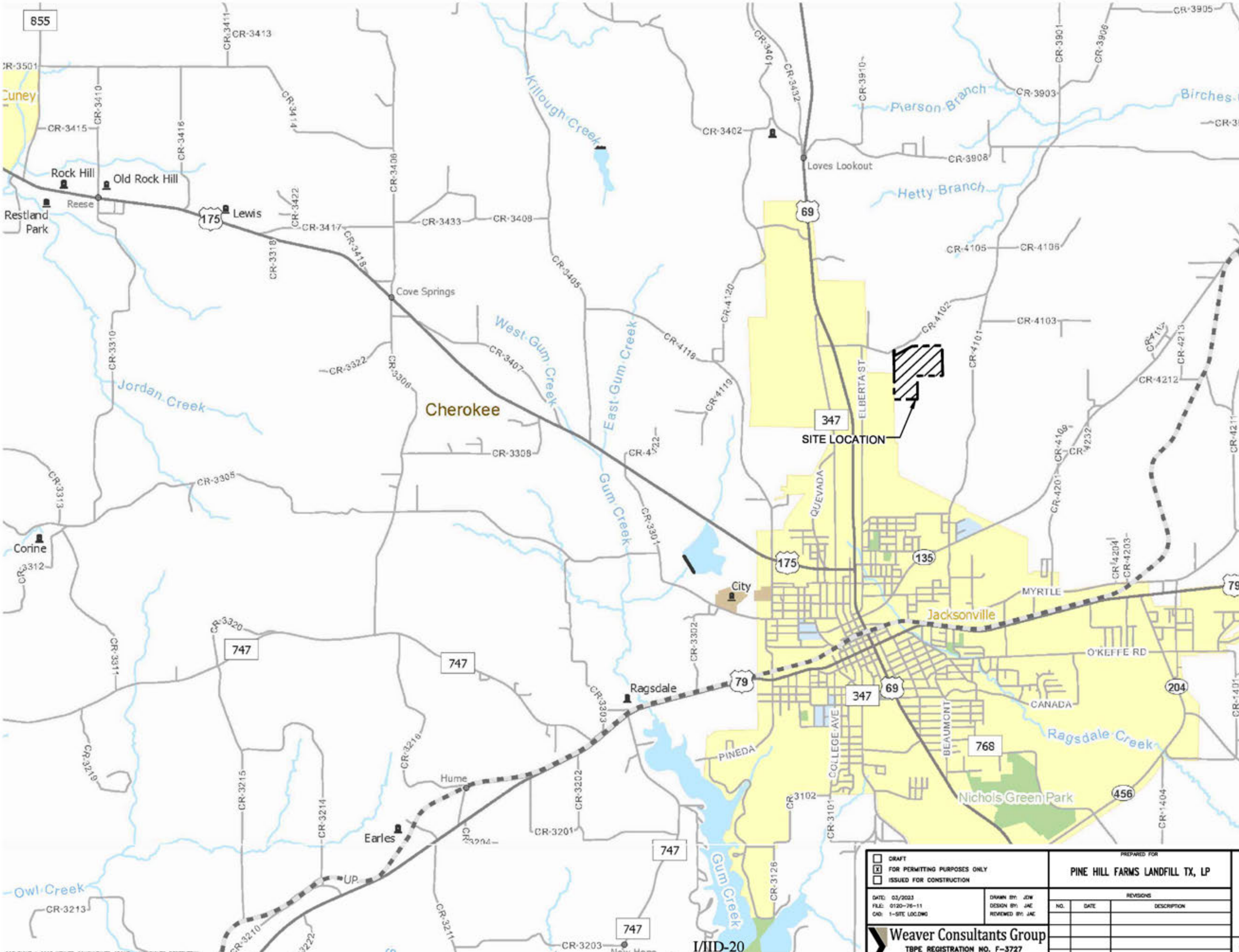
Design Summary

The following information presents a summary of the design and operations of the proposed Royal Oaks Landfill project.

- The Royal Oaks Landfill is an existing Type I municipal solid waste landfill facility (MSW Permit No. MSW-1614A). The existing landfill currently serves residences and businesses in the communities of Cherokee County and nearby counties.
- With this amendment application, the existing 144.3-acre permit boundary will not be changed. The permitted limit of waste will increase by 28.6 acres from approximately 54.5 acres to approximately 83.1 acres.
- Accepted wastes will remain consistent with the current municipal solid waste landfill permit. The classifications of solid waste to be accepted at the Royal Oaks Landfill include household waste, yard waste, commercial waste, industrial waste (nonhazardous), construction-demolition waste, and some special wastes.
- A liner and final cover system that meets all regulatory requirements will be used for the solid waste containment system. The design objective of the containment system (final cover, liner, and leachate management systems) is to isolate the solid waste and remove leachate (defined as liquid that has contacted solid waste) that may collect on the liner system. Collected leachate will be stored on-site then either processed onsite or transferred to an authorized treatment facility for disposal. The construction procedures of the liner and cover systems follow strict TCEQ-approved quality control procedures, which are verified by an independent testing firm. Each of the containment system components must be thoroughly reviewed and approved by the TCEQ before solid waste is placed in the landfill.
- To control landfill gas emissions and minimize the potential for subsurface migration, a landfill gas (LFG) collection and control system (GCCS) may be installed at the site. The collection system will consist of vertical extraction wells and collection piping throughout the waste mass. The collected LFG will be combusted in a flare or processed for beneficial reuse as renewable energy. If installed, routine

monitoring of the GCCS will be performed to verify the efficiency of the GCCS to collect and control generated LFG.

- To verify that the highest level of environmental protection is provided, the following landfill monitoring systems are provided:
  - Groundwater Monitoring System. The purpose of the groundwater monitoring system is to verify the integrity of the containment system and verify that area groundwater is not adversely impacted by the landfill. This is accomplished by obtaining water samples from the monitor wells located on the perimeter of the landfill, which are screened in the upper most groundwater zones. The water samples are tested at an off-site laboratory.
  - Gas Monitoring System. The purpose of the landfill gas monitoring system is to verify that landfill gas does not migrate off-site. This is accomplished by sampling monitoring probes located on the perimeter of the landfill.
- These systems are routinely sampled and tested.
- Site Operations. The site will be operated by personnel who have been trained and certified by the TCEQ. A detailed site operating plan will be included in the permit amendment application. The plan will detail the required equipment, personnel, and safety procedures required to operate the site in accordance with TCEQ regulations. The active landfill area will be covered each evening to prevent potential nuisance conditions such as odors and vectors. The Royal Oaks Landfill will continue to be inspected by the TCEQ on a regular basis to ensure the site is in compliance with state regulations.



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0 1/2 1
SCALE IN MILES

LEGEND

- Unincorporated Community
- County Seat
- Border Crossing
- Cemetery
- Cemetery (Inside City)
- Deep Draft Port
- Shallow Draft Port
- Railroad
- Dam
- River or Stream
- TXDOT District
- Lakes
- Education
- Military
- Airport Runway
- Airport
- Prison
- Parks and Other Public Land

LANDFILL PROPERTY

NOTES:

1. REPRODUCED FROM 2018 TEXAS DEPARTMENT OF TRANSPORTATION COUNTY MAPS, CHEROKEE COUNTY.

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED PROFESSIONAL ENGINEER
12/15/2023

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PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

DATE: 03/2023
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CAD: 1-SITE LOC.DWG

DRAWN BY: JDW
DESIGN BY: JAE
REVIEWED BY: JAE

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SITE LOCATION MAP

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

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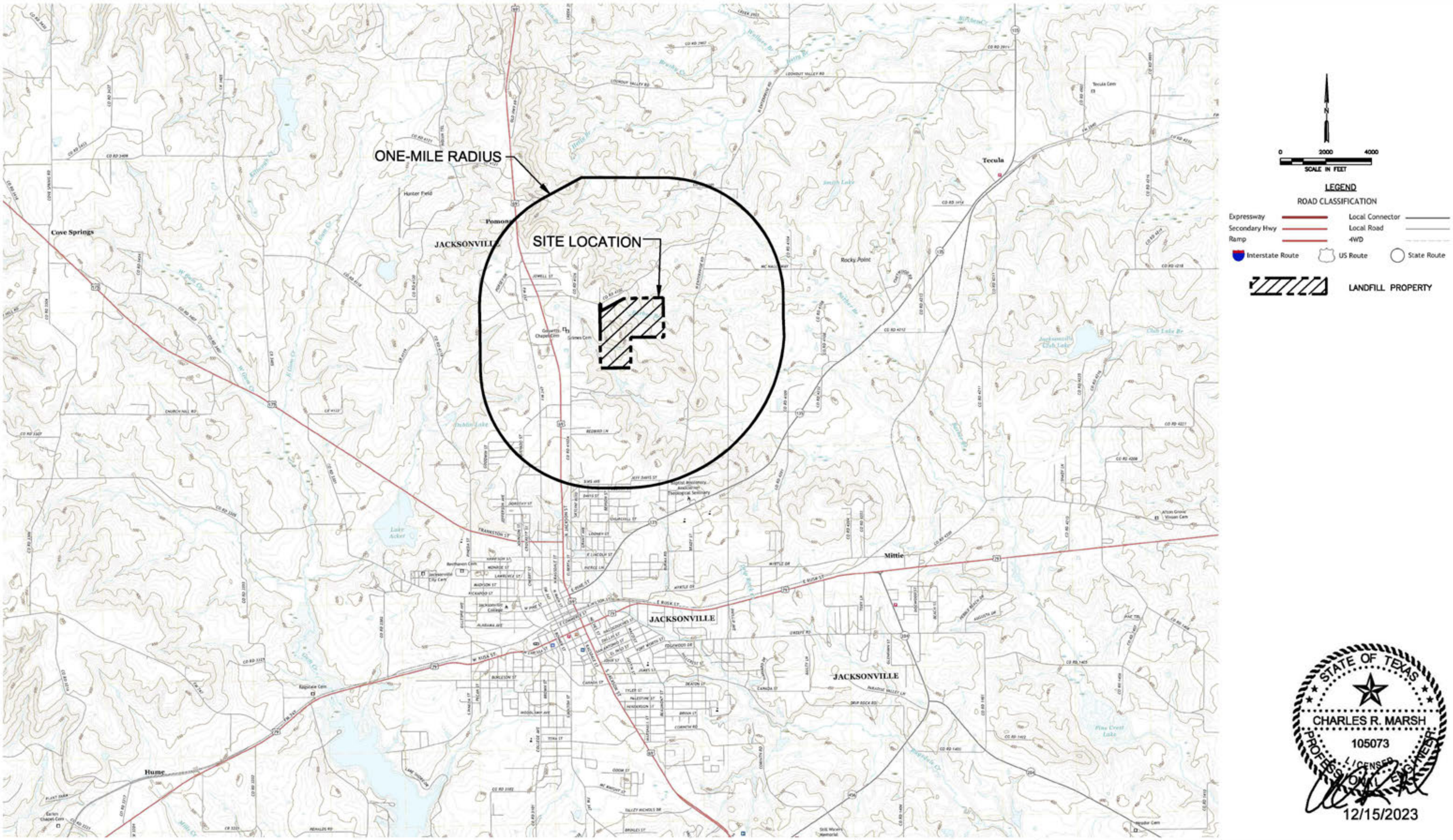
FIGURE 1

O:\0120\76\EXPANSION 2023\PARTS I-II\COORDINATION LETTERS\1 - SITE LOCATION.dwg, byoung, 1:2



JACKSONVILLE WEST, TX 2022 | JACKSONVILLE EAST, TX 2022 | MOUNT SELMAN, TX 2022 | TECULA, TX 2022

NOTES:

1. REPRODUCED FROM 7.5 MINUTE, JACKSONVILLE WEST, JACKSONVILLE EAST, MOUNT SELMAN, AND TECULA TEXAS QUADRANGLE USGS MAP DATED 2022.

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CAD: 2-GENERAL TOPO.DWG	REVIEWED BY: JAE

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GENERAL TOPOGRAPHIC MAP

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

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FIGURE 2

0 200 400
SCALE IN FEET

LEGEND

PERMIT BOUNDARY
PERMITTED LIMIT OF WASTE
PROPOSED LIMIT OF WASTE

NOTE:

1. AERIAL PHOTOGRAPH PROVIDED BY FIRMATEK, LLC DATED 11-10-2022.

STATE OF TEXAS
CHARLES R. MARSH
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12/15/2023

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DATE: 03/2023 FILE: 0120-76-11 CAD: 3-AERIAL PHOTOGRAPH.DWG	DRAWN BY: JDW DESIGN BY: JAE REVIEWED BY: JAE	ROYAL OAKS LANDFILL CHEROKEE COUNTY, TEXAS
Weaver Consultants Group TBPE REGISTRATION NO. F-3727		WWW.WCGRP.COM / FIGURE 3

REVISIONS		
NO.	DATE	DESCRIPTION

LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMIT OF WASTE
- PROPOSED LIMITS OF WASTE
- CELL BOUNDARY
- E 10500 SITE GRID
- 610 EXISTING CONTOUR (SEE NOTE 1)

NOTES:

1. EXISTING CONTOURS DEVELOPED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN NOVEMBER 10, 2022.
2. PERMIT BOUNDARY WAS REPRODUCED FROM LEGAL DESCRIPTION PROVIDED BY STANGER SURVEYING COMPANY, DATED APRIL 1995.

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CAD: 4-SITE PLAN.DWG

DRAWN BY: JDW
DESIGN BY: JAE
REVIEWED BY: JAE

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PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION

SITE PLAN

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

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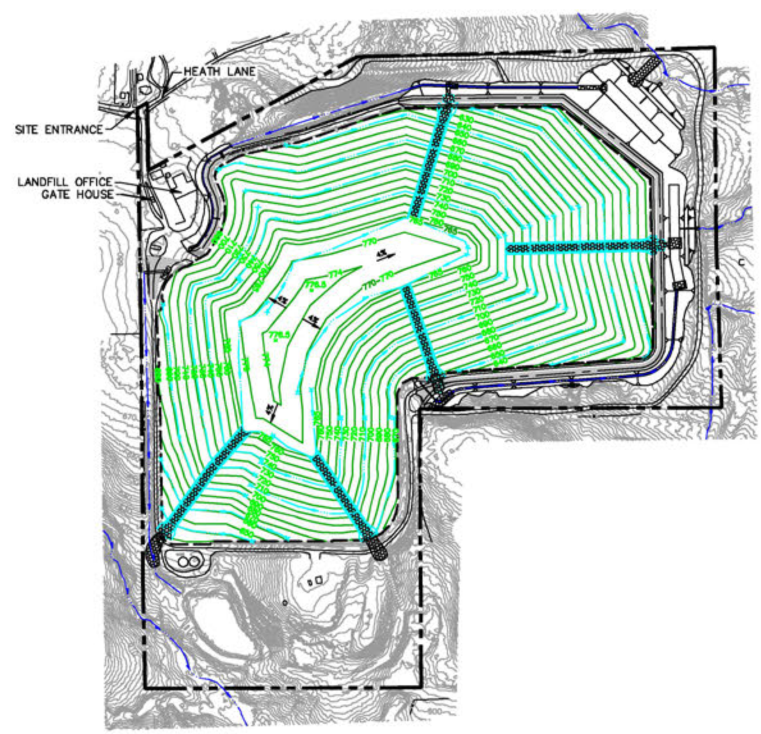
FIGURE 4

O:\0120\76\EXPANSION 2023\PARTS I-II\COORDINATION LETTERS\4-SITE PLAN.dwg, byoung, 1:2

PERMITTED LANDFILL COMPLETION PLAN



PROPOSED LANDFILL COMPLETION PLAN

0 300 600
SCALE IN FEET

LEGEND

- PERMIT BOUNDARY
- LIMIT OF WASTE
- 590 EXISTING CONTOUR (SEE NOTE 1)
- 750 FINAL COVER CONTOUR
- DRAINAGE FLUME
- DRAINAGE SWALE
- GABIONS

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER
12/15/2023

NOTES:

1. EXISTING CONTOURS DEVELOPED BY FIRMATEK, LLC FROM AERIAL PHOTOGRAPHY FLOWN NOVEMBER 10, 2022.
2. PERMIT BOUNDARY WAS REPRODUCED FROM LEGAL DESCRIPTION PROVIDED BY STANGER SURVEYING COMPANY, DATED APRIL 1995.

I/IID-24

☐ DRAFT
☒ FOR PERMITTING PURPOSES ONLY
☐ ISSUED FOR CONSTRUCTION

DATE: 12/2023	DRAWN BY: JDW
FILE: 0120-76-11	DESIGN BY: JAE
CAD: 5-FINAL COVER COMPARISSON.DWG	REVIEWED BY: JAE

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION

EXISTING AND PROPOSED LANDFILL COMPLETION PLAN

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

WWW.WCGRP.COM

FIGURE 5

O:\0120\76\EXPANSION 2023\PARTS I-II\COORDINATION LETTERS\5-FINAL COVER COMPARISSON.dwg, byoung, 1:2

TRANSPORTATION DATA AND COORDINATION REPORT FORM FOR MUNICIPAL SOLID WASTE TYPE I LANDFILLS (FORM 20719)

Texas Commission on Environmental Quality

Transportation Data and Coordination Report Form for Municipal Solid Waste Type I Landfills

This form is for use by applicants or site operators of Municipal Solid Waste (MSW) Type I landfills to provide data and information to address the availability and adequacy of access roads to a landfill site, the volume of vehicular traffic on and generated by the facility on area roadways, and to provide coordination information as required under 30 TAC §330.61(i). Roadways that provide primary access to a landfill facility must be adequate and possess appropriate design capacity to safely accommodate the additional volumes and weights of traffic generated or expected to be generated by this landfill facility during its active life. Data provided in this form should correspond with data contained in the coordination documents submitted to the Texas Department of Transportation or other agency that has jurisdiction over affected area roads.

If you need assistance in completing this form, please contact the Municipal Solid Waste Permits Section of the Waste Permits Division at (512) 239-2335.

I. General Information

Facility Name: Royal Oaks Landfill

MSW Permit No.: 1614B

Site Operator/Permittee Name and Mailing Address: Pine Hill Farms Landfill, TX, LP 440 Heath Lane, Jacksonville, TX, 75766

II. Documentation of Coordination with the Texas Department of Transportation (TXDOT) for Traffic and Location Restrictions

1. A traffic study document and cover letter was submitted to TXDOT as Coordination for traffic and location restrictions for the subject facility and a copy of the documents submitted to TXDOT is attached herein: ☒ Yes ☐ No

   If you checked “No” , provide explanation:

2. Date of submission of the coordination documents to TXDOT: 11/30/2023

3. TXDOT’s response received? ☐ Yes ☒ No

4. If “No” is checked in response to Item I.3 above, complete Items I.4 and I.5 below only after TxDOT’s response is received.

5. Did TxDOT’s response include recommendation of improvements to any of the roadways or intersections that lead to the site? ☐ Yes ☐ No

6. If you checked “Yes” in Item I.5 above, proceed to Section III., TxDOT’s Recommended Roadway or Intersection Improvements (as applicable).

7. If you checked “No” in Item I.5 above, provide TxDOT’s response to the traffic and location restrictions compliance coordination for the subject site: *(Enter TxDOT’s response to coordination correspondence)*

III. TxDOT Recommended Roadway or Intersection Improvements (as applicable)

Enter TxDOT’s recommendations for improvement of roadways or intersections that lead to the site:

1.

2.

3.

IV. Documentation of Coordination of Improvement Designs of Public Roadways (turning lanes, storage lanes, acceleration/deceleration lanes, etc.) at and Near the Site Entrances with Agencies that Exercise Maintenance Responsibility

1. Complete Table 1 with information regarding documentation of coordination of improvement designs for existing and proposed roads.

Table 1: Public Roadway Improvements Coordination

Existing and Proposed Roads Associated with the Site Entrance(s)	Agency Exercising Maintenance Responsibility	Date of Coordination Correspondence from the Applicant or Site Operator to the Agency Responsible	Date of the Coordination Response Letter from the Agency Responsible	Did the Agency Responsible Require Improvements to the Roadway(s) Associated with the Site Entrance(s) (check Yes or No as applicable)
U.S. Highway 69	TxDOT	11/30/2023		☐Yes ☐No
Heath Lane	TxDOT	11/30/2023		☐Yes ☐No
				☐Yes ☐No
				☐Yes ☐No

2. If you checked "Yes" in the last column of Table 1, indicating that improvements are required, address the following:

   (a) Briefly describe the improvements proposed for the public roadway(s) associated with the site entrance(s):

   (b) A copy of the proposed improvement design submitted to the agency exercising maintenance responsibility over the roadway is attached herein: ☐Yes ☐No. If you checked "No" please explain:

   (c) A copy of the response letter from the agency exercising maintenance responsibility over the roadway(s) associated with the site entrance(s) approving the improvement design is attached herein: ☐Yes ☐No. If you checked "No" please explain:

V. Facility Location and Operation Information Used in Estimating Transportation Data

1. Facility Location Information

   Entrance located approximately 0.5 miles east of the intersection of Heath Lane and U.S. Highway 69 in Cherokee County.

2. Waste Acceptance Rates

   (a) Initial Waste Acceptance Rate: 625 tons/day (Part III, Appendix M)

   (b) Estimated Maximum Waste Acceptance Rate at any Time During Facility Life: 737 tons/day (Part III, Appendix M)

3. Hours of Operation and Site Life

   (a) a. Operating Hours: 24 hours per day, 7 days per week, although actual hours may vary

   (b) b. Waste Acceptance Hours: 24 hours per day, 7 days per week, although actual hours may vary

   (c) c. Estimated Site Life: 19.5 years (Part III, Appendix M)

4. Other Information Used or Assumed in Estimating Transportation Data: (1) Growth Rate Projections obtained from Texas Water Development Board, 2022 Regional Water Plan; (2) Traffic County Data from TxDOT.

VI. Facility Daily Traffic Volume Data

1. Complete Table 2 with estimated existing daily volume of traffic generated by the facility.

Table 2: Estimated Existing Daily Volume of Traffic Generated

Vehicle Type	Traffic Volume to Facility (vehicles per day, vpd)	Traffic Volume from Facility (vpd)
Trucks	86	86
Employee Vehicles	15	15
Visitors Vehicles	13	13
Other Vehicles		
Summation of Daily Volume of Traffic to and from the Facility		
Total Daily Volume of Traffic	114	114

(a) Describe the source(s) of or method(s) used to obtain the existing daily volume of traffic generated by the facility: Estimated from landfill waste inflow capacity at year 2022.

(b) Location(s) of traffic counts (if applicable): Scalehouse

2. Complete Table 3 with estimated future daily volume of traffic generated by the facility.

Table 3: Estimated Future Daily Volume of Traffic Generated

Vehicle Type	Traffic Volume to Facility (vpd)	Traffic Volume from Facility (vpd)
Trucks	102	102
Employee Vehicles	17	17
Visitors Vehicles	14	14
Other Vehicles		
Summation of Daily Volume of Traffic to and from the Facility		
Total Daily Volume of Traffic	133	133

3. Describe the method(s) used to obtain the estimated future daily volume of traffic generated by the facility, including dates, traffic growth rates, and sources of the growth rates: Based on the projected future waste acceptance rate.

4. Maps showing the facility boundary and roads within 1 mile of the facility that provide access to the site are attached herein. Yes ☒ No☐. If you checked "No" please explain:

VII. Availability and Adequacy of Roads

1. Complete Table 4 with information regarding the primary access roadways.

Table 4: Roadway Characteristics of the Primary Access Roadways

List the roads that the owner or operator will use as primary access to the site	Existing Annual Average Daily Traffic on Roadway (vpd)	Expected Annual Average Daily Traffic on Roadway (vpd)	Existing Roadway Capacity	Expected Roadway Capacity	Max Gross Weight Allowed (lbs)	Max/Min Posted Speed Limit (mph)	Min Vertical Clearance (ft)	Surface Type and No. of Lanes	Level of Service	Existing Traffic Generated by the Facility on Each Roadway	Expected Traffic Generated by the Facility on Each Roadway
Heath Lane (west)	935	1,090	3,200	3,200		30		Asphalt 2 lanes	A	228	266
Heath Lane (east)	935	1,090	3,200	3,200		30		Asphalt 2 lanes	A	228	266

2. Complete Table 5 with information regarding other access roadways within one mile.

Table 5: Roadway Characteristics of Other Access Roadways within One Mile of the Facility Boundary

List other access roadways within 1 mile of the facility	Existing Annual Average Daily Traffic on Roadway	Expected Annual Average Daily Traffic on Roadway	Existing Roadway Capacity	Expected Roadway Capacity	Max Gross Weight Allowed (lbs)	Max/Min Posted Speed Limit (mph)	Min Vertical Clearance (ft)	Surface Type and No. of Lanes	Level of Service	Existing Traffic Generated by the Facility on Each Roadway	Expected Traffic Generated by the Facility on Each Roadway
U.S. Highway 69 (north)	14,052	16,384	6,400	6,400		75		Asphalt 4 lanes	A	228	266
U.S. Highway 69 (South)	15,554	18,135	6,400	6,400		75		Asphalt 4 lanes	A	228	266

3. Complete Table 6 with information regarding access roadway intersections within one mile.

Table 6: Roadway Intersection Characteristics

Please list major (signalized) roadway intersections for access roads within 1 mile of facility	Existing Capacity	Existing Level of Service
N/A		

Please list major (signalized) roadway intersections for access roads within 1 mile of facility	Existing Capacity	Existing Level of Service

4. (For applicants that conducted traffic counts) Peak period traffic counts were conducted at critical intersections and roadways in the area: ☐ Yes ☒ No

   If "No" is checked, please explain: Landfill traffic count is available from the operator as each vehicle using the facility must report to the scalehouse.

VIII. Conclusions on the availability and adequacy of roads to be used for accessing the facility

Enter conclusions regarding the availability and adequacy of roads to be used for accessing the facility using information obtained from access roadway data; data on the volume of existing and expected vehicular traffic on the access roads within one mile of the facility; and the projection of the volume of traffic expected to be generated by the facility on the access roads:

The Engineering Study is included in Appendix I/IID, as reviewed and approved by TxDOT, concludes that the public roads adequate access to the landfill.

IX. Highway Beautification

Enter facility distance from interstate or primary highways and screening information as required by 30 TAC 330.23(a).

1. Distance of Facility from Interstate or Primary Highway: 2,700 feet from U.S. Highway 69.

2. Type of Facility Screening Provided, if applicable: N/A

X. Analysis of the Impact of the Facility upon Airports

Enter the Part, Appendix, Attachment, Section, and Page Number of the application where analysis of the impact of the facility upon airports is provided: Parts I/II, Section 8.2 Page I/II-8-1; and Appendix I/IIB – Demonstration of Coordination

XI. Documentation of Coordination with the Federal Aviation Administration for Compliance with Airport Location Restrictions

1. Applicant has submitted written information to FAA describing the facility location, maximum height of waste units, type of waste accepted at the facility, and other facility-relevant data and information as required: ☒ Yes ☐ No

   (a) Enter Date of Coordination Letter to FAA: 11/30/2023

   (b) Enter Date of FAA Response: 12/21/2023

2. Indicate FAA Response and Final Action:

   ☐ FAA Acknowledged No Adverse Impact.

   ☒ FAA Recommended Safety Improvements. (*Complete Section XII if you check this item.*)

3. A copy of the Documentation of Coordination with FAA for compliance with airport location restrictions is attached herein. ☒Yes ☐No. If you checked "No" please explain:

XII. FAA Recommended Changes or Improvements for Airport Safety, (as applicable)

Enter FAA's recommended changes or improvements to the facility for airport safety or for compliance with airport location restrictions.

The structure is to be marked/lighted in accordance with FAA Advisory Circular 70/7460-1-M, Obstruction Marking and Lighting, Red Lights – Chapters 4, 5 (Red), & 15.

XIII. Attachments

- Maps showing the facility boundary and roads within 1 mile of the facility.
- Documentation of coordination of all designs of proposed public roadway improvements associated with site entrances with the agency exercising maintenance responsibility of the public roadway involved; and the response letter received from the agency, as applicable.
- Documentation of coordination with the Texas Department of Transportation (TxDOT) for traffic and location restrictions, including any traffic study report; and the response letter received from TxDOT.

- Documentation of coordination with the Federal Aviation Administration for compliance with airport location restrictions; and the response letter received from FAA.
- Other documents attached: N/A

APPENDIX I/IIE

TPDES PERMIT

STATE OF TEXAS
JASON E. EDWARDS
99336
LICENSED
PROFESSIONAL ENGINEER

05/20/2024

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
Texas Pollutant Discharge Elimination System
Stormwater Multi-Sector General Permit

The Notice of Intent (NOI) for the facility listed below was received on November 10, 2021. The intent to discharge stormwater associated with industrial activity under the terms and conditions imposed by the Texas Pollutant Discharge Elimination System (TPDES) stormwater Multi-Sector General Permit (MSGP) TXR050000 is acknowledged. Your facility's unique TPDES MSGP stormwater authorization number is:

TXR05K666
Coverage Effective: November 19, 2001
Sector: L,P   Primary SIC code: 4953

TCEQ's stormwater MSGP requires certain stormwater pollution prevention and control measures, possible monitoring and reporting, and periodic inspections. Among the conditions and requirements of this permit, you must have prepared and implemented a stormwater pollution prevention plan (SWP3) that is tailored to your industrial site. As a facility authorized to discharge under the stormwater MSGP, all terms and conditions must be complied with to maintain coverage and avoid possible penalties.

Facility/Site Information:
RN101927010
Royal Oaks Landfill
608 Cr 4102
Jacksonville, TX 75766
Cherokee County

Operator:
CN600129530
Pine Hill Farms Landfill Tx, LP
12920 FM 2767
Tyler, TX 75708

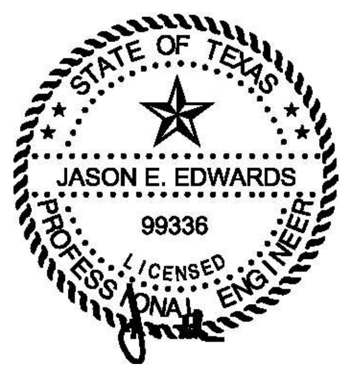
The MSGP <u>and</u> all authorizations expire on August 14, 2026, <u>unless otherwise amended</u>. If you have any questions related to your application, you may contact the Stormwater Processing Center by email at [redacted] or by telephone at (512) 239-3700. For technical issues, you may contact the stormwater technical staff by email at [redacted] or by telephone at (512) 239-4671. Also, you may obtain information on the TCEQ web site at https://www.tceq.texas.gov/goto/wq-dpa. A copy of this document should be kept with your SWP3.

Issued Date: November 10, 2021

FOR THE COMMISSION

APPENDIX I/IIF

ONCOR AGREEMENT



05/20/2024

[INSERT ONCOR AGREEMENT]

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1614B

MAJOR PERMIT AMENDMENT APPLICATION

PART III – SITE DEVELOPMENT PLAN
SITE DEVELOPMENT PLAN NARRATIVE

Prepared for

Pine Hill Farms Landfill TX, LP

May 2024

STATE OF TEXAS
JASON E. EDWARDS
99336
LICENSED
PROFESSIONAL ENGINEER
05/20/2024

Prepared by:

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Blvd., Suite 206
Fort Worth, TX 76109
817-735-9770

WCG Project No. 0120-076-11-106

This document is intended for permitting purposes only.

STATE OF TEXAS
JASON E. EDWARDS
99336
LICENSED
PROFESSIONAL ENGINEER

CONTENTS

05/20/2024

CONTENTS (CONTINUED)

STATE OF TEXAS
JASON E. EDWARDS
99336
LICENSED
PROFESSIONAL ENGINEER
05/20/2024

LIST OF ACRONYMS

ASTM – American Society for Testing and Materials

BER – Ballast Evaluation Report

BMPs – best management practices

CFR – Code of Federal Regulations

CLOMR – Conditional Letter of Map Revision

CMP – corrugated metal pipe

CN – curve number

COC – chain-of-custody

CQA – construction quality assurance

CU – consolidated-undrained

EDE – elevation of the deepest excavation

EPA – Environmental Protection Agency

ETJ – extra territorial jurisdiction

FAA – Federal Aviation Administration

FEMA – Federal Emergency Management Agency

FIRM – Flood Insurance Rate Map

FML – flexible membrane liner

FMLER – flexible membrane liner evaluation report

ft-msl – feet above mean sea level

FTB – film tear bond

FWS – U.S. Fish and Wildlife Service

LIST OF ACRONYMS (Continued)

GLER – geomembrane liner evaluation report

GWSAP – groundwater sampling and analysis plan

HDPE – high density polyethylene

LCS – leachate collection system

LEL – lower explosive limit

LFG – landfill gas

LLDPE – linear low density polyethylene

LQCP – Liner Quality Control Plan

MCLs – maximum contaminant levels

msl – mean sea level

MSW – municipal solid waste

NAAQS – National Ambient Air Quality Standards

NCTCOG – North Central Texas Council of Governments

NFIP – National Flood Insurance Program

NOI – Notice of Intent

NSF – National Sanitation Foundation

NSPS – New Source Performance Standards

NWP – Nationwide Permit

NWS – National Weather Service

O&M – operations and maintenance

PCBs – polychlorinated biphenyls

PI – point of intersection

LIST OF ACRONYMS (Continued)

PVI – Point of Vertical Intersection

POR – Professional of Record

POTW – publicly owned treatment works

QA/QC – quality assurance/quality control

RCRA – Resource Conservation Recovery Act

SBP – soil boring plan

SCS – Soil Conservation Service

SDP – site development plan

SLER – soils and liner evaluation report

SOP – site operating plan

SSC – statistically significant change

TAC – Texas Administrative Code

TCEQ – Texas Commission on Environmental Quality

TDH – Texas Department of Health

THC – Texas Historical Commission

TPDES – Texas Pollutant Discharge Elimination System

TPWD – Texas Parks and Wildlife Department

TWC - Texas Water Commission

TWDB – Texas Water Development Board

TxDOT – Texas Department of Transportation

UEL – upper explosive limit

USACE – United States Army Corps of Engineers

USCS – Unified Soil Classification System

LIST OF ACRONYMS (Continued)

USGS – United States Geological Survey

USLE – universal soil loss equation

UTM – Universal Transverse Mercator System

WCG – Weaver Consultants Group

1 INTRODUCTION (§330.63(A))

This Site Development Plan (SDP) for the Royal Oaks Landfill has been prepared consistent with the MSW regulations within Title 30 TAC Chapter 330, including §330.63. This SDP provides the design details needed to provide for the safeguarding of the health, welfare, and physical property of the people and the environment through consideration of geology, soil conditions, drainage, land use, zoning, and adequacy of access roads and highways.

This section addresses §330.63. Additional specific regulatory cites addressed by each section of Part III are listed in the heading.

2 GENERAL FACILITY DESIGN (§330.63(B))

2.1 Facility Access (§330.63(b)(1))

2.1.1 Site Access

The site entrance is located approximately 0.5 miles east of the intersection of Heath Lane and U.S. Highway 69 in Cherokee County. The primary access roadways to the site are U.S. Highway 69, and Heath Lane. Access is controlled by a gate. The gate is locked when the site is not in operation.

2.1.2 Access Control

Vehicle access to the landfill will be controlled at the site entrance by signs that direct all landfill traffic to the scalehouse during site operating hours. Personnel on duty at the entrance regulate access to the landfill. When the facility is unattended, the gate to the site will be locked to prevent unauthorized vehicle access. As shown on Parts I/II, Drawing I/IIA.12 – Access Control Plan, an existing three-strand barbed wire fence and natural barriers are located along the permit boundary limits to prevent unauthorized access to the site.

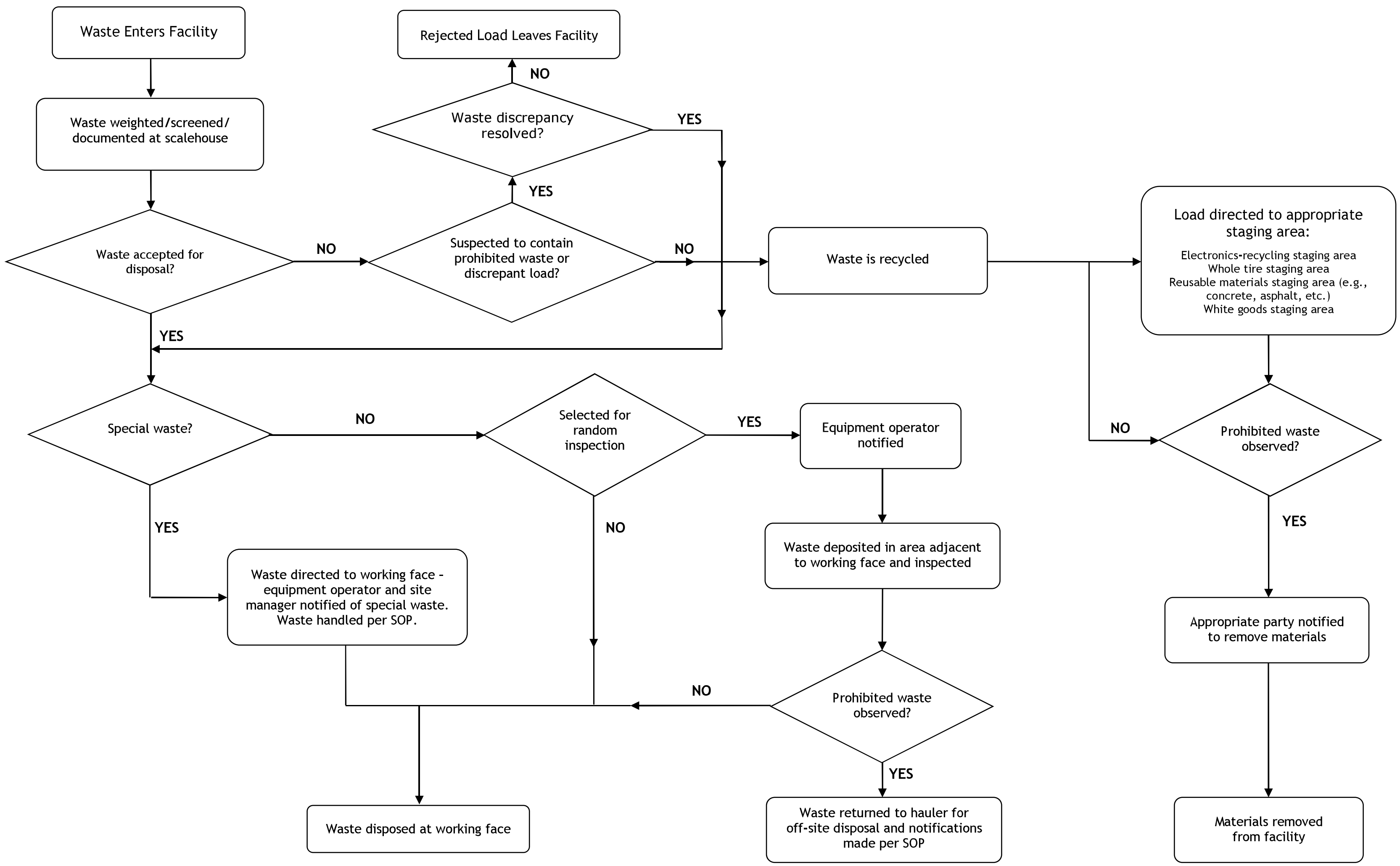
Pine Hill Farms Landfill TX, LP will restrict entry to the landfill to designated site operations personnel, solid waste haulers authorized to use the facility, TCEQ personnel, and properly identified persons whose entry is authorized by the Landfill Manager or his designee. Pine Hill Farms Landfill TX, LP reserves the right to deny access to the landfill to persons not demonstrating a legitimate purpose for visiting. Visitors are allowed on the active area of the landfill only when accompanied by the Landfill Manager or his designee (refer to Part IV – SOP, Section 4.1 for additional information).

2.2 Waste Movement (§330.63(b)(2))

2.2.1 Waste Movement Flow Diagram (§330.63(b)(2)(A))

Waste movement at the facility will remain unchanged from existing operations. Figure III-1 (shown on the following page) provides the existing waste movement flow diagram for the facility. The flow diagram provides a summary of the disposal sequence for waste that is accepted at the facility. Detailed waste acceptance procedures are detailed in Part IV – SOP.

Figure III-1
Waste Movement Flow Diagram



2.2.2 Waste Disposal Schematic View (§330.63(b)(2)(B))

A schematic view of the facility operations including detailed drawings of the various phases of site sequencing and development are provided in Parts I/II, Appendix I/IIA; Part III, Appendix IIIA; and throughout the SDP.

2.2.3 Ventilation and Odor Control (§330.63(b)(2)(C))

Landfill disposal operation will occur in open areas within the permitted waste disposal footprint; therefore, adequate ventilation will be provided. The site will comply with all the applicable air quality rules and regulations. The site will be required to operate in accordance with the New Source Performance Standards (NSPS) for MSW landfills.

Steps will be taken to limit the impact of the facility's operation on air quality. Among the measures set forth in Part IV – SOP to be employed are the following:

- Accidental fires will be controlled.
- Open burning of waste will not be permitted.
- Incoming waste will be promptly compacted into the working face area.
- Ponded water at the site will be controlled.

Odors shall be controlled at the site and will be reduced if they occur in accordance with this Odor Management Plan. A detailed Odor Management Plan is included in Part IV – SOP (Section 4.10). Sources of landfill odor can vary considerably and may include the wastes being delivered to the landfill, the open working face, surface emissions from the covered portion of the landfill, or the leachate collection system. Many of the wastes received at a landfill are a source of odor upon receipt, such as sludge and dead animals. Other wastes have the potential for becoming a source of odor by their biodegradable characteristics, generating gases as they advance through the decomposition process. Leachate may also be a source of odor if not properly handled or disposed of in a timely manner. Among the measures listed in Part IV – SOP that may be employed to reduce potential odors are the following.

- Minimize the size of the working face area.
- Increase the thickness of soil daily cover and/or ADC applied to the working face.
- Prevent ponded water.
- Assess the effectiveness of the LFG extraction system, if applicable, and make all necessary repairs to the system or expand the system, as needed, to control odors.
- Identify any waste stream that requires special attention to control odor. If the Scale Operator notes a load with significant odors, they will notify the

working face personnel. The load will be promptly covered with soil or solid waste when it arrives at the working face.

- Inspect the leachate collection and storage system to confirm that it is functioning as designed (e.g., inspect piping and storage tank system to verify no leaks have occurred).

2.2.4 Generalized Construction Details (§330.63(b)(2)(D))

Generalized construction details for the landfill are included in Parts I/II, Appendix I/IIA and in this SDP (e.g., Appendix IIIA). Details of the leachate management system are included in Appendix IIIC.

2.3 Water Pollution Control (§330.63(b)(4))

The site is designed to prevent discharge of pollutants into waters of the state or waters of the United States, as defined by the Texas Water Code and the Federal Clean Water Act, respectively. The Royal Oaks Landfill is subject to TCEQ's storm water permit requirements. A copy of the TPDES permit is included in Appendix I/IIE. Surface water monitoring will be conducted consistent with TPDES requirements.

2.4 Protection of Endangered Species (§330.63(b)(5))

Information regarding the protection of endangered species in accordance with Title 30 TAC §330.61(n) and §330.63(b)(5) is provided in Parts I/II, Section 12 – Protection of Endangered Species; and Part IV, Section 4.14. No endangered or threatened species have been documented at the site nor has a critical habitat for such species been identified at the site. Neither the facility nor its operation will result in the destruction or adverse modification of the critical habitat of endangered or threatened species. If endangered or threatened species are encountered during site operations, Texas Parks and Wildlife and U.S. Fish and Wildlife will be notified. A site specific Threatened and Endangered Species Habitat Assessment is included in Parts I/II, Appendix I/IIB (refer to the TPWD and FWS tabs).

3 FACILITY SURFACE WATER DRAINAGE REPORT (§330.63(C))

3.1 General

This facility has been designed to comply with the requirements of Title 30 TAC §330.303 and §330.63(c). Part III, Appendix IIIF contains the Surface Water Drainage Plan and permit information for the portion of the facility.

In accordance with Title 30 TAC §330.15(h), the facility has been designed to prevent discharge of pollutants into waters of the State or waters of the United States, as follows:

- No discharge of solid waste or pollutants into or adjacent to waters of the State, including wetlands, that is in violation of the requirements of the Texas Water Code, §26.121 will occur. During the active life of the facility all stormwater coming into contact with solid waste will be retained as contaminated water and treated or disposed of as outlined in Part III, Appendix IIIC - Leachate and Contaminated Water Management Plan.
- No discharge of pollutants into or adjacent to waters of the United States, including wetlands, that violates any requirement of the Clean Water Act, including, but not limited to, the TPDES requirements, pursuant to §402 as amended, and demonstrated in Part III, Appendix IIIF – Surface Water Drainage Plan, will occur. A copy of the TPDES permit is included in Parts I/II, Appendix I/IIE. Surface water monitoring will be conducted consistent with the TPDES requirements.
- No discharge of nonpoint source pollutants to waters of the United States, including wetlands, that violates any requirement of an area-wide or statewide water quality management plan that has been approved under the Federal Clean Water Act, §208 or §319, as amended will occur. The site will comply with §208 of the Federal Clean Water Act.
- No discharge of dredged or fill materials to waters of the United States, including wetlands, that is in violation of the requirements under the Federal Clean Water Act, §404, as amended, as demonstrated in Parts I/II, Appendix I/IIB (USACE coordination letter) will occur.

3.2 Site Drainage Patterns

The permit boundary encompasses approximately 144.0 acres located east of U.S. Highway 69, north of Ragsdale Creek, west of Baber Branch and south of County Road 4102. The site discharges east to Barbers Branch and south to Keys Creek. Which both outfall downstream into Ragsdale Creek.

The final cover system includes erosion control structures to effectively minimize erosion of final cover soils. The drainage system also includes a perimeter channel system that will convey stormwater collected from the landfill area to detention ponds. The stormwater detention ponds are designed to attenuate stormwater flow before stormwater is discharged into existing drainage features located downstream of the site. As discussed in Appendix IIIF, the site's stormwater management system is designed to not adversely alter existing permitted drainage patterns or have any adverse impact on offsite drainage features.

3.3 Perimeter Drainage System

The stormwater controls for the landfill have been designed consistent with the TCEQ regulations for Type I MSW landfills. The runon/runoff stormwater controls have been designed for a 25-year storm event. These include drainage controls for the final cover, perimeter drainage channels, and culverts. Details for the perimeter drainage system and associated calculations are included in Part III, Appendix IIIF-B.

The drainage system is detailed in Part III, Drawing IIIF.1 – Drainage Structure Plan. Drainage from the landfill itself is directed through a system of swales, chutes, and perimeter channels towards detention ponds and ultimately discharges to the Barbers Branch and Keys Creek. The drainage and outlet structures are detailed in Part III, Appendix IIIF – Surface Water Drainage Plan.

3.4 Below Grade Stormwater Controls

Control of stormwater runon and runoff within excavation areas will be achieved using temporary stormwater control structures (e.g., diversion berms, channels, and containment areas) as needed. The temporary stormwater control structures are used to divert uncontaminated stormwater runoff into temporary storage areas as shown in Parts I/II, Drawings I/IIA.4 through I/IIA.7 – Sector Development Plans. The uncontaminated stormwater will be used for liner construction, control of dust, and establishing vegetation. If discharge of uncontaminated stormwater is required, it will be discharged consistent with TPDES requirements.

Contaminated stormwater consists of stormwater that has come into contact with waste. Control of the contaminated stormwater will be provided through temporary diversion berms, channels, and containment areas. Temporary runon and runoff controls are detailed in Part III, Appendix IIIF-F – Erosion Control Plan for All Phases of Landfill Operations and detailed in Appendix IIIC – Leachate and Contaminated Water Management Plan, Appendix IIIC-C – Containment Berm and Diversion Berm Calculations. Leachate may be recirculated on areas where a composite liner and LCS are in place. Contaminated stormwater will be diverted and contained on approved areas only. Contaminated stormwater and leachate will be managed in accordance with the guidelines set forth in Appendix IIIC – Leachate and Contaminated Water Management Plan.

3.5 Aerial Fill Stormwater Controls

Additional stormwater controls will be necessary as the site is brought above grade. Temporary diversion berms, channels, and containment areas will continue to be used for control of uncontaminated and contaminated stormwater runon and runoff. Runon and runoff temporary diversion berm sizing is provided in Part III, Appendix IIIC – Leachate and Contaminated Water Management Plan, Appendix IIIC-C – Containment Berm and Diversion Berm Calculations. Separation of the contaminated stormwater and uncontaminated stormwater runoff will be provided. Diversion berms, channels, and containment areas will be implemented for the aerial fill portions of the landfill. Erosion control plans for above grade scenarios are presented in Part III, Appendix IIIF-F – Erosion Control Plan for All Phases of Landfill Operation.

The final cover will incorporate drainage swales and letdown structures or chutes for conveyance of stormwater off of the final cover. These swales and chutes have been designed to protect the final cover from erosion. As areas of the final cover are completed, vegetation will be established to provide additional erosion protection. Details of the final cover design are provided in Part III, Appendix IIIA. Drainage details are provided in Part III, Appendix IIIF – Surface Water Drainage Plan.

Surface water runon and runoff will be managed consistent with the TCEQ regulations. Specifically, areas that have received waste but will be inactive for longer than 180 days will be provided with intermediate cover. As such, runoff from these areas will be considered uncontaminated. Also, the site design and proper operating practices will minimize contaminated water. Routine daily cover, in combination with the other operating practices, will minimize the generation of contaminated water. Contaminated water will be managed consistent with the practices outlined in Part III, Appendix IIIC – Leachate and Contaminated Water Management Plan.

The Royal Oaks Landfill will use various interim and permanent erosion and sedimentation controls throughout the life of the site. The interim controls will be used around active areas and external embankment sideslopes and top dome surfaces. These controls will include temporary letdown structures, soil berms, and vegetation of intermediate cover areas to minimize the erosion potential from these areas. These interim controls will be used during all phases of landfill development to provide effective erosion stability for the external sideslopes and top dome surfaces. Refer to Appendix IIIF-F – Erosion Control Plan for All Phases of Landfill Operation for more information.

3.6 Erosion and Sedimentation Control

Erosion and sedimentation control is provided on site during construction activities and is incorporated into the design of the perimeter drainage system and final cover system. During construction of the various sectors, perimeter berms, perimeter drainage channels, and detention ponds, erosion and sedimentation control will be provided through the use of temporary diversion berms, drainage channels, silt fences, and hay bales. These measures will provide for control of erosion and sediment prior to stormwater flows leaving the site. An erosion and sedimentation control plan is presented in Part III, Appendix IIIF – Surface Water Drainage Plan.

Permanent erosion control features have been included in the site design. These features include design of perimeter channels for non-erodible velocities. In areas where erosion has been anticipated, erosion protection of the channels in the form of gabions, rock riprap, or turf reinforcement matting is provided. Permanent erosion protection measures are also shown in Appendix IIIF – Surface Water Drainage Plan. In addition to grass cover, permanent erosion features included in the final cover design are drainage swales and chutes shown on the landfill completion plan included in Part III, Appendix IIIA-A.

3.7 Floodplain Information (§330.63(c)(2))

As shown on Figure I/II-11.1 in Parts I/II, the proposed landfill waste boundary is outside the 100-year floodplain a defined by the Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map (FIRM) for Cherokee County, Texas and incorporated areas (Map Number 48073C01751).

3.8 Wetlands Information

The Royal Oaks Landfill property was examined for compliance with wetlands issues as described in Title 30 TAC §330.553, which states that new MSWLF units, lateral expansions, and material recovery operations from a landfill shall not be located in wetlands, unless the owner or operator makes appropriate demonstrations involving wetlands. As noted in Parts I/II – Section 11.2, the proposed expansion of the landfill will not require USACE authorization under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act of 1899, and a USACE Permit is not required (refer to Parts I/II – Section 11.2 for additional wetlands information).

4 LANDFILL UNIT DESIGN (§330.63(D)(4))

Consistent with Title 30 Texas Administrative Code (TAC) §330.63(d)(4), this Site Development Plan was prepared to address the requirements for the landfill unit at the Royal Oaks Landfill. The following subsections discuss provisions for all-weather operations and access, the proposed landfill method, minimum and maximum design elevations, solid waste acceptance rates, site life, cross-sections and design details, and a liner quality control plan. In addition to these items as required by §330.63(d)(4), additional information regarding the geotechnical analyses, the liner design, and leachate management are also presented.

4.1 All-Weather Operation (§330.63(d)(4)(A))

The landfill perimeter roads, haul road, and interior access roads will be constructed of crushed stone, gravel, or other suitable material and will provide access from the entrance road to the fill area. The perimeter road around the site is a minimum of 15 feet wide. Heath Lane is a paved roadway that provides access to the entrance facilities. From the entrance facilities, the landfill haul road is a crushed stone road. The paved access roads and crushed stone haul roads will serve as mud control for waste hauling vehicles prior to exiting the site and returning to the site access roads. The crushed stone haul road and perimeter road will be maintained for all-weather access by site personnel. Additional mud control measures will be taken if these mud control measures do not effectively minimize tracking of mud onto public roads.

On-site stockpiles of crushed stone, concrete rubble, masonry demolition debris, or other similar material will be provided as needed for use in maintaining passable access roads. Grading equipment or other appropriate equipment will be used, as necessary, to control or remove mud accumulations on the perimeter access road around the landfill, the landfill haul road, and the paved entrance facility area.

The landfill haul road and perimeter roads will be passable under inclement weather conditions to allow access to the working face area.

4.2 Landfill Methods (§330.63(d)(4)(B))

The proposed landfill development method for the site is a combination of area-excavation fill followed by aerial fill to the proposed landfill completion height.

The landfill drawings depicting existing site conditions, excavation, final fill height, sector fill layout, sector sections, sequence of development plans, site contour maps, and landfill completion plan are included in Parts I/II, Appendix I/IIA – Facility Layout Maps.

The excavation side slopes will be no steeper than 3 horizontal to 1 vertical (3H:1V), the aerial fill side slopes will be approximately 4H:1V, and the aerial fill top slope will be approximately 4 percent. Final cover placement will generally follow the sequence of development as shown in Parts I/II, Appendix I/IIA, and will be ongoing as the site is developed. Sectors will be closed according to the closure plan provided in Part III, Appendix IIIJ – Closure Plan.

4.3 Liner and Final Cover System Design (§330.63(d)(4)(C))

4.3.1 Liner System for the Undeveloped Portion of the Solid Waste Disposal Area

The proposed composite liner systems are designed to meet the requirements of Title 30 TAC §330.331(a)(1), §330.331(a)(2), and §330.331(e). The composite liner system options that will be constructed within the undeveloped sectors are described below.

Table III-1
Liner System Components

Standard Composite Liner System	Alternative Composite Liner System
24-inch-thick Soil Protective Cover	24-inch-thick Soil Protective Cover
Drainage Geocomposite Leachate Collection System Layer	Drainage Geocomposite Leachate Collection System Layer
60-mil HDPE Geomembrane	60-mil HDPE Geomembrane
2-foot-thick Compacted Clay Liner (CCL)	Geosynthetic Clay Liner (GCL)

A summary of the liner system design and details are included in Part III, Appendix IIIA – Landfill Unit Design Information. Information regarding liner materials and construction quality assurance are included in Part III, Appendix IIID – Liner Quality Control Plan. The elevation of the deepest excavation is 506.0 ft-msl.

4.3.2 Leachate Collection System

A leachate collection system (LCS) has been designed to remove leachate from the Subtitle D areas of the landfill. The LCS layout is shown on Drawing A.1 –Top of Liner Plan in Appendix IIIA-A. Design of the proposed LCS and a demonstration of the adequacy of the existing LCS is discussed in Part III, Appendix IIIC – Leachate and Contaminated Water Management Plan. LCS details are provided in Part III, Appendix IIIA – Landfill Unit Design Information. Information regarding materials and construction quality assurance are included in Part III, Appendix IIID – Liner Quality Control Plan.

4.3.3 Final Cover System

The final cover systems for the site are summarized in Table III-3. The final cover systems will provide a low maintenance cover, protect against erosion, reduce rainfall percolation through the cover system, and subsequently minimize leachate generation within the landfill. As depicted on Parts I/II, Drawing I/IIA.8 – Landfill Completion Plan, a maximum of 4 percent top slopes and 4H:1V sideslopes are provided to minimize erosion and facilitate drainage of the landfill. The final cover system options are described in Table III-3 with layers listed from top to bottom.

A demonstration that the specified final cover design will provide effective long-term erosional stability is included in Part III, Appendix IIIF – Surface Water Drainage Plan (Appendix IIIF-D). The final cover system will be constructed as outlined in Part III, Appendix IIIJ – Closure Plan.

Landfill gas generated in the landfill will be collected by extraction wells, as discussed in Appendix IIII – Landfill Gas Management Plan. The landfill gas system will reduce gas pressure buildup under the final cover and control odor and gas emissions from the site. The maximum elevation of final cover is 776.5 ft-msl and the maximum waste elevation is 773 ft-msl (note that a 12-inch-thick intermediate cover layer is also included in this calculation).

Table III-3
Final Cover System Components

Composite Final Cover System		GCL Alternative Composite Final Cover System	
Top Slopes	**Side Slopes**	**Top Slopes**	**Side Slopes**
12-inch-thick erosion layer	12-inch-thick erosion layer	12-inch-thick erosion layer	12-inch-thick erosion layer
Single-sided drainage geocomposite	Double-sided drainage geocomposite	Single-sided drainage geocomposite	Double-sided drainage geocomposite
40 mil LLDPE geomembrane (smooth or textured)	40 mil LLDPE geomembrane (textured)	40 mil LLDPE geomembrane (smooth or textured)	40 mil LLDPE geomembrane (textured)
18-inch-thick compacted clay infiltration layer with $k \leq 10^{-5}$ cm/s	18-inch-thick compacted clay infiltration layer with $k \leq 10^{-5}$ cm/s	Geosynthetic Clay Liner (GCL)	Geosynthetic Clay Liner (GCL)

4.3.4 Groundwater Monitoring System

The purpose of the groundwater monitoring system is to verify the integrity of the containment systems discussed in the previous sections and to confirm that area groundwater is not adversely impacted by the landfill. This is accomplished by obtaining groundwater samples from the monitoring wells on the perimeter of the landfill, which are screened in the uppermost groundwater zone. Refer to Appendices IIIG and IIIH for additional information.

4.4 Estimated Rate of Solid Waste Deposition (§330.63(d)(4)(D))

The Royal Oaks Landfill primarily serves residences and businesses in Cherokee County and surrounding areas. The Royal Oaks Landfill estimated a waste inflow increase to 178,800 tons per year (625 tons per day based on a 286-day operating schedule) in 2023. After 2023, the waste inflow rate is assumed to increase consistent with the projected growth rate for the facility's general service area.

The projections are based on current market conditions and may vary as market conditions change. Using the average annual waste inflow, it is projected that this service area generates approximate 184,756 tons per year or 258,218 cubic yards (assuming an in-place density of 1,431 lb/cy) of solid waste (646 tons per day based on a 286-day operating schedule).

The population equivalent, as defined in §330.3, is "the hypothetical population that would generate an amount of solid waste equivalent to that actually being managed based on a generation rate of five pounds per capita per day and applied to situations involving solid waste not necessarily generated by individuals." Based on this definition, the population equivalent for the average waste stream over the active life of the site (19.5 years – refer to Appendix IIIM) was calculated as follows:

$$\frac{(184{,}756^{1}\ \text{tons/year}) \times (2{,}000\ \text{pounds/ton})}{(5\ \text{pounds/person/day}) \times (365\ \text{days/year})} = 202{,}472\ \text{persons}$$

[1] Average yearly waste inflow (based on a 286-day operating year) was calculated using the average daily waste inflow rate over the life of the site (646 tons/day x 286 days/year = 1,298,726 tons/year). Refer to Appendix IIIM for more information.

The major classifications of solid waste to be accepted by this facility for disposal include both residential and commercial MSW. Such waste consists of household wastes, construction-demolition waste, and various non-hazardous industrial and special wastes as authorized by the TCEQ.

4.5 Typical Unit Cross-Sections (§§330.63(d)(4)(E) and (F))

Typical unit cross-sections are included in Appendix IIIA-B. The cross-sections are developed consistent with the requirements of Title 30 TAC §§330.63(d)(4)(E) and (F).

4.6 Liner Quality Control Plan (§330.63(d)(4)(G)

Information regarding liner materials and construction quality assurance are included in Part III, Appendix IIID – Liner Quality Control Plan.

5 COMPLIANCE WITH §330.63(E) THROUGH §330.63(J)

The following table provides references to each SDP appendix that was developed to meet the specified rule.

Rule	SDP Appendix
§330.63(e)	Appendix IIIG – Geology Report and Appendix IIIE – Geotechnical Report
§330.63(f)	Appendix IIIH – Groundwater Monitoring, Sampling, and Analysis Plan
§330.63(g)	Appendix IIII – Landfill Gas Management Plan
§330.63(h)	Appendix IIIJ – Closure Plan
§330.63(i)	Appendix IIIK – Postclosure Care Plan
§330.63(j)	Appendix IIIL – Closure and Postclosure Care Cost Estimates

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1614B

MAJOR PERMIT AMENDMENT APPLICATION

PART III – SITE DEVELOPMENT PLAN
APPENDIX IIIA
LANDFILL UNIT DESIGN INFORMATION

Prepared for

Pine Hill Farms Landfill TX, LP

May 2024

STATE OF TEXAS
JASON E. EDWARDS
99336
LICENSED
PROFESSIONAL ENGINEER
05/20/2024

Prepared by

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WCG Project No. 0120-076-11-106

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CONTENTS

05/20/2024

TABLES

STATE OF TEXAS
JASON E. EDWARDS
99336
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PROFESSIONAL ENGINEER

05/20/2024

1 LANDFILL UNIT DESIGN INFORMATION

The purpose of this appendix is to present the details of the liner system, and final cover system consistent with Title 30 Texas Administrative Code (TAC) §330.331, §330.333, and §330.457. The following subsections have been developed to provide detailed information for the proposed liner systems, existing liner system, and final cover systems.

This appendix addresses §330.331, §330.333, and §330.457.

2 PROPOSED LINER SYSTEM FOR THE SUBTITLE D AREA

The proposed composite liner systems are designed to meet the requirements of Title 30 TAC §330.331(a)(2) and §330.331(e). The composite liner system that will be constructed within the undeveloped sectors is described below.

Table IIIA-1
Liner System Components

Standard Subtitle D Composite Liner System	Alternative Subtitle D Composite Liner System
24-inch-thick Soil Protective Cover	24-inch-thick Soil Protective Cover
Drainage Geocomposite Leachate Collection Layer	Drainage Geocomposite Leachate Collection Layer
60-mil HDPE Geomembrane	60-mil HDPE Geomembrane
2-foot-thick Compacted Clay Liner (CCL)	Geosynthetic Clay Liner (GCL)

Drawing A.1 (Appendix IIIA-A) presents the top of liner plan for the undeveloped areas at the Royal Oaks Landfill. This drawing also references the location of the various liner system details. Material specifications, construction, and testing requirements for the liner system are provided in Appendix IIID – LQCP.

As shown on Typical Sections A through F (Drawings B.4 through B.9 in Appendix IIIA-B) and on Drawing B.1 in Appendix IIIA-B, the existing permitted waste disposal area will be expanded with this major permit amendment application, resulting in a net increase in disposal area of approximately 28.6 acres.

A hydrostatic pressure relief system (dewatering) design is provided in Appendix IIID – LQCP to ensure that potential groundwater hydrostatic pressure at the base of the liner system will be controlled. The detailed design of the dewatering system along with ballast demonstrations are provided in Appendix IIID – LQCP.

The proposed liner system, as shown on Drawings A.3 through A.6 in Appendix IIIA-A, is designed with a leachate collection system. The design of the leachate collection system components, including the drainage geocomposite leachate collection layer, leachate collection piping, chimney drains, sumps, and pumps, is provided in Appendix IIIC – Leachate and Contaminated Water Management Plan. Material specifications, construction, and testing requirements for the leachate collection system are provided in Appendix IIID – LQCP. The alternative liner equivalency demonstration is provided in Appendix IIIB-C.

A geotechnical report including a stability demonstration for the liner system is provided in Appendix IIIE – Geotechnical Report. A summary of the liner design information that is included in the Geotechnical Report is provided below.

- **Excavation Stability.** The stability of the proposed excavation slopes was evaluated at critical sections. The excavation slopes were analyzed using undrained strength parameters (total stress) as well as drained strength parameters (effective stress). The slope stability analysis resulted in an acceptable factor of safety for each analyzed condition. All factors of safety generated were greater than the minimum recommended factor of safety of 1.3 for short-term and 1.5 for long-term conditions.
- **Liner System Stability.** In addition to the generalized slope stability summarized above, the interfaces of the components of the liner systems were evaluated using infinite slope stability analysis. All the calculated factor of safety values for interface slope stability are acceptable.
- **Liner System Settlement and Strain Analysis.** The liner system was evaluated for settlement and strain due to loading of liner soil, waste, and cover soils. The maximum strain on the liner system, caused by the estimated differential settlement, is within the acceptable range for each liner system component.

3 EXISTING LINER SYSTEMS

Cells 1, 2, 3, 4, 5, 6, 7, 8, and 9 were constructed to Subtitle D standards under Permit No. MSW-1614A. The existing composite liner systems for the developed Subtitle D sectors are described in Table IIIA-2.

Table IIIA-2
Existing Liner System Components

Cells 1, 2, 3, 4, 5, 6, 7, 8, and 9
24-inch-thick Soil Protective Cover
Drainage Geocomposite Leachate Collection Layer
60-mil HDPE Geomembrane Liner
Geosynthetic Clay Liner (CCL)

The existing composite liner systems for Cells 1, 2, 3, 4, 5, 6, 7, 8, and 9 include a hydrostatic pressure relief system, as discussed in the LQCP (Appendix IIID).

The impact of differential settlement on the performance of the currently constructed leachate collection systems in the Subtitle D areas is analyzed in Appendix IIIE-B and summarized in Table IIIA-3.

The existing pre-Subtitle D liner areas include Block A, which is approximately 13.8 acres, and Block B, which is approximately 1.4 acres. Since 1970, the Texas State Board of Health MSW Regulations required that a natural or artificial barrier be in place, which most commonly was the placement of a 3-foot-thick compacted clay or in-situ clay liner ($k \leq 1 \times 10^{-7}$ cm/s). The Texas Department of Health (TDH) permit for the site was issued in June 1983 (Permit No. 1614). Detailed liner requirements were listed in this permit for either a 3-foot-thick low-permeability compacted clay or in-situ liner ($k \leq 1 \times 10^{-7}$ cm/s).

Table IIIA-3
Leachate Collection Layer Analysis Summary
for the Undeveloped and Developed Subtitle D Areas

Cells	Design Slope between Cell Ridgeline and Leachate Collection Pipe	Design Slope of Leachate Collection Pipe	Post-Settlement Slope between Cell Ridgeline and Leachate Collection Pipe	Post-Settlement Slope of Leachate Collection Pipe
1 through 9	2.8%	2.0%	2.5	1.8
10 through 12	2.8%	2.0%	2.0	1.7

As shown, the slope change between (1) the cell ridgeline and the leachate collection pipe and (2) the slope of the leachate collection pipe from the upstream portion of the cell to the downstream portion of the cell is expected to be negligible due to the development of the landfill. The foundation/bottom liner settlement analysis is presented in Appendix IIIE-B-1 of Appendix IIIE. A demonstration that the existing leachate collection system will continue to function in a manner that meets all regulatory requirements is included in Appendix IIIC.

4 FINAL COVER SYSTEM

Once the site reaches the permitted waste fill grades, a final cover system will be installed to limit the infiltration of stormwater into the deposited waste. Two composite final cover systems have been designed for use at the site and are discussed in Section 4.1.

4.1 Final Cover System Options

The composite final cover system options that are applicable for the site are shown in Table IIIA-4. The landfill completion plan is shown on Drawing A.2 in Appendix IIIA-A. Details of the final cover system options are presented on Drawings A.10 through A.12 in Appendix IIIA-A. Material specifications along with construction and testing procedures for the final cover systems are provided in Appendix IIIJ-A – Final Cover System Quality Control Plan (FCSQCP).

Table IIIA-4
Final Cover System Components

Composite Final Cover System		GCL Alternative Composite Final Cover System	
Top Slopes	**Side Slopes**	**Top Slopes**	**Side Slopes**
12-inch-thick erosion layer	12-inch-thick erosion layer	12-inch-thick erosion layer	12-inch-thick erosion layer
Single-sided drainage geocomposite	Double-sided drainage geocomposite	Single-sided drainage geocomposite	Double-sided drainage geocomposite
40 mil LLDPE geomembrane (smooth or textured)	40 mil LLDPE geomembrane (textured)	40 mil LLDPE geomembrane (smooth or textured)	40 mil LLDPE geomembrane (textured)
18-inch-thick compacted clay infiltration layer with k ≤ 10^{-5} cm/s	18-inch-thick compacted clay infiltration layer with k ≤ 10^{-5} cm/s	Geosynthetic Clay Liner (GCL)	Geosynthetic Clay Liner (GCL)

Permanent final cover erosion control structures include swales and chutes that will be constructed upon installation of the final cover. The design of the final cover system erosion control structures is provided in Appendix IIIF – Surface Water Drainage Report. As part of the final cover construction, an erosion layer capable of sustaining native vegetation will be constructed. Areas that receive final cover will be seeded upon completion of final cover placement. A soil loss and sheet flow velocity demonstration for the erosion layer is included in Appendix IIIF-D. The erosion layer will include a vegetation layer that provides for a 95 percent ground coverage. If there are areas that do not maintain at least 95 percent coverage they will be re-seeded until at least 95 percent coverage is maintained.

The stormwater controls for the landfill have been designed consistent with the TCEQ regulations for Type I MSW landfills. The stormwater runon/runoff controls have been designed for a 25-year frequency storm event. These include drainage controls for the final cover, perimeter drainage channels, culverts, and detention ponds, including pond outfalls. Details for the perimeter drainage system and associated calculations are included in Appendix IIIF. The design of the final cover system erosion control structures is provided in Appendix IIIF-B.

4.2 Final Cover Stability Analysis

A stability analysis for the existing and proposed final cover systems is provided in Appendix IIIE – Geotechnical Report and is summarized below.

- **Final Cover Stability.** The stability of the proposed final cover slopes was evaluated at the most critical sections (e.g., where the 4H:1V slopes are the longest). The final cover slopes were analyzed using drained and undrained strength parameters (effective and total stress, respectively). The minimum factors of safety generated were all greater than the minimum recommended factor of safety of 1.3 (total stress analysis) and 1.5 (effective stress analysis).
- **Final Cover System Stability.** The interfaces of the components of each final cover system were evaluated using infinite slope stability analysis. The minimum factor of safety calculated for the final cover system is greater than the acceptable factor of safety of 1.5 for long-term stability.
- **Final Cover System and MSW Settlement and Strain Analysis.** Each final cover system was also evaluated for settlement and strain due to consolidation of the waste material within the landfill. The maximum strain calculated is negative, which indicates that all components are in compression and not subject to strain.

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1614B

MAJOR PERMIT AMENDMENT APPLICATION

PART III – SITE DEVELOPMENT PLAN
APPENDIX IIIA-A
LINER AND FINAL COVER
SYSTEM DETAILS

Prepared for

Pine Hill Farms Landfill TX, LP

May 2024

STATE OF TEXAS
JASON E. EDWARDS
99336
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05/20/2024

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CONTENTS

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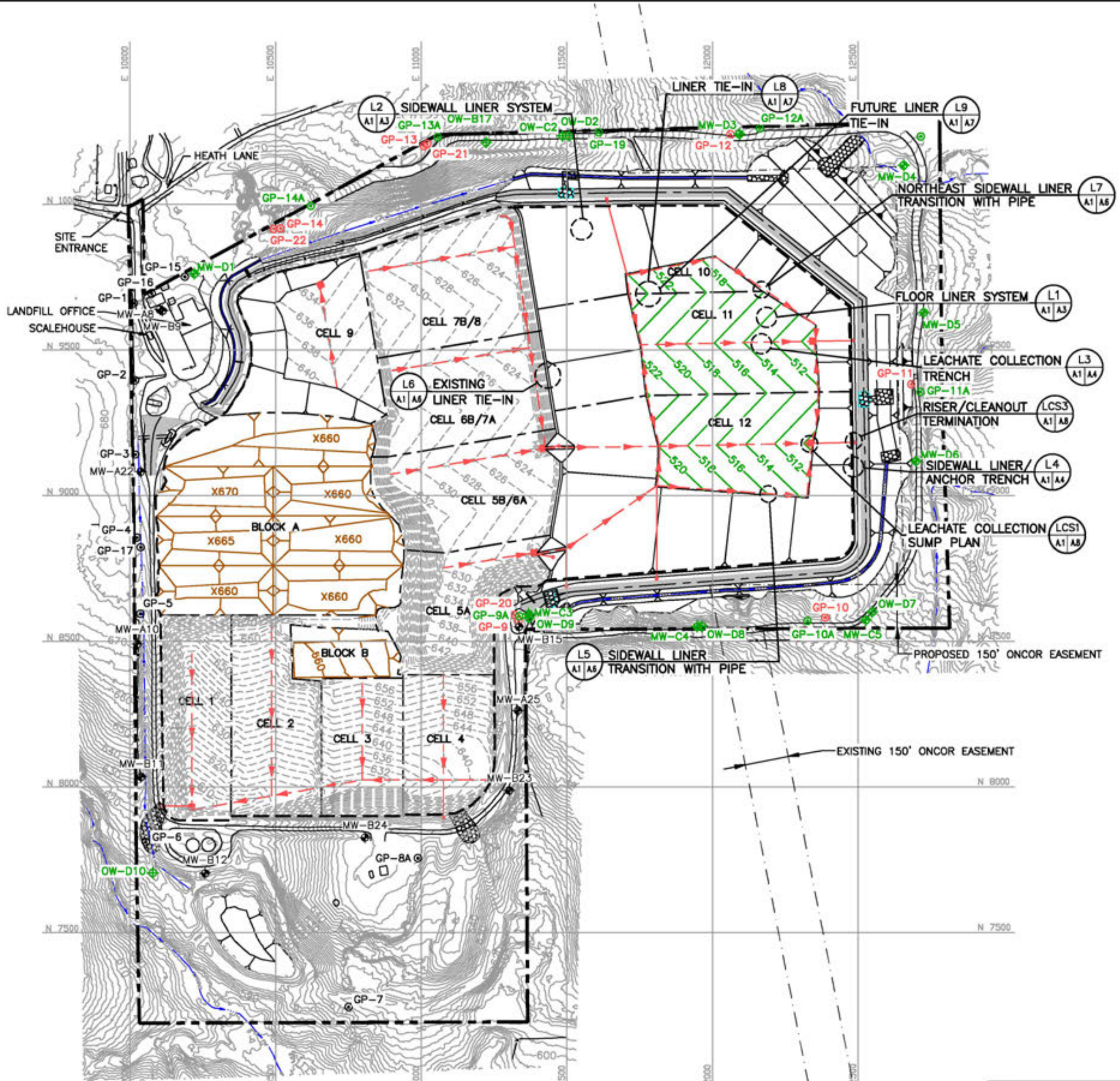

N
0 200 400
SCALE IN FEET

LEGEND

- PERMIT BOUNDARY
- LIMIT OF WASTE
- CELL BOUNDARY
- EXISTING EASEMENT
- PROPOSED EASEMENT
- E 10500 SITE GRID
- 610 EXISTING CONTOUR (SEE NOTE 1)
- 516 TOP OF LINER CONTOUR
- 630 AS-BUILT TOP OF LINER
- X660 APPROXIMATE TOP OF PRE-SUBTITLE D LINER (SEE NOTE 8)
- CHANNEL CENTERLINE
- LEACHATE COLLECTION PIPE
- LEACHATE COLLECTION SUMP
- LEACHATE RISER PIPE
- MW-10 EXISTING GROUNDWATER MONITORING WELL
- MW-D1 PROPOSED GROUNDWATER MONITORING WELL
- OW-D7 PROPOSED OBSERVATION WELL
- GP-1 EXISTING GAS PROBE
- GP-10A PROPOSED GAS PROBE

STATE OF TEXAS
JASON E. EDWARDS
99336
LICENSED
PROFESSIONAL ENGINEER
05/20/2024

NOTES:

1. EXISTING CONTOURS DEVELOPED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN NOVEMBER 10, 2022. THE GRID SYSTEM IS BASED ON A SITE GRID SYSTEM. ELEVATIONS ARE BASED ON NAVD 88.
2. EXCAVATION SLOPES AND SLOPES OUTSIDE THE LIMIT OF WASTE (e.g., CHANNELS) ARE TYPICALLY 3H:1V.
3. REFER TO APPENDIX IIIC FOR LEACHATE STORAGE INFORMATION.
4. ELEVATION OF DEEPEST EXCAVATION AT THE LCS SUMP IS 504.0 FT-MSL.
5. SEQUENCE OF SITE DEVELOPMENT IS PROVIDED IN PARTS I/II, APPENDIX I/IIA DRAWINGS I/IIA.4 THROUGH I/IIA.7.
6. REFER TO APPENDIX IIIF FOR DRAINAGE DESIGN INFORMATION.
7. PERMIT BOUNDARY WAS REPRODUCED FROM LEGAL DESCRIPTION PROVIDED BY STANGER SURVEYING COMPANY, DATED APRIL 1995.
8. TOP OF PRE-SUBTITLE D LINER ARE APPROXIMATE AND WAS REPRODUCED FROM CROSS-SECTIONS INCLUDED IN THE 1983 PERMIT APPLICATION PREPARED BY STOKES & ASSOCIATES.

☐ DRAFT	
☒ FOR PERMITTING PURPOSES ONLY	
☐ ISSUED FOR CONSTRUCTION	
DATE: 05/2024	DRAWN BY: JDW
FILE: 0120-76-11	DESIGN BY: BPY
CAD: A.1-LINER PLAN.DWG	REVIEWED BY: JAE

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION

MAJOR PERMIT AMENDMENT
TOP OF LINER PLAN

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

WWW.WCGRP.COM
DRAWING A.1

SHEET IIIA-A.1

0 200 400

SCALE IN FEET

LEGEND

- PERMIT BOUNDARY
- LIMIT OF WASTE
- EXISTING EASEMENT
- PROPOSED EASEMENT
- E 10500 SITE GRID
- 610 EXISTING CONTOUR (SEE NOTE 1)
- 624 PROPOSED FINAL COVER CONTOUR
- DRAINAGE SWALE
- DRAINAGE LETDOWN
- CHANNEL CENTERLINE
- MW-10 EXISTING GROUNDWATER MONITORING WELL
- MW-D1 PROPOSED GROUNDWATER MONITORING WELL
- OW-D7 PROPOSED OBSERVATION WELL
- GP-1 EXISTING GAS PROBE
- GP-10A PROPOSED GAS PROBE

STATE OF TEXAS
JASON E. EDWARDS
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NOTES:

1. EXISTING CONTOURS DEVELOPED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN NOVEMBER 10, 2022. THE GRID SYSTEM IS BASED ON A SITE GRID SYSTEM. ELEVATIONS ARE BASED ON NAVD 88.
2. REFER TO APPENDIX IIIF-SURFACE WATER DRAINAGE PLAN FOR DRAINAGE DESIGN INFORMATION.
3. MAXIMUM FINAL COVER ELEVATION IS 776.5 FT-MSL. MAXIMUM TOP OF WASTE ELEVATION IS 773.0 FT-MSL.
4. TYPICAL SIDESLOPES ARE 4H:1V. TYPICAL TOPSLOPE IS 4%.
5. PERMIT BOUNDARY WAS REPRODUCED FROM LEGAL DESCRIPTION PROVIDED BY STANGER SURVEYING COMPANY, DATED APRIL 1995.

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☐ ISSUED FOR CONSTRUCTION

DATE: 05/2024 | DRAWN BY: JDW
FILE: 0120-76-11 | DESIGN BY: BPY
CAD: A.2-COMPLETION PLAN.DWG | REVIEWED BY: JAE

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION

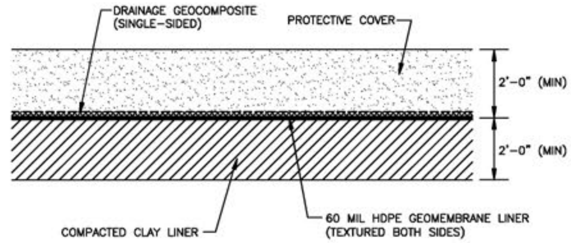
MAJOR PERMIT AMENDMENT LANDFILL COMPLETION PLAN

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

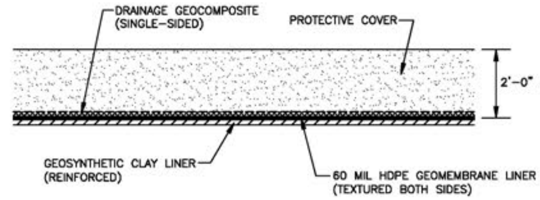
WWW.WCGRP.COM | DRAWING A.2

SHEET IIIA-A.2

O:\0120\76\EXPANSION 2023\PART III\IIIA\A.2-COMPLETION PLAN.dwg, byoung, 1:2



COMPACTED CLAY LINER OPTION

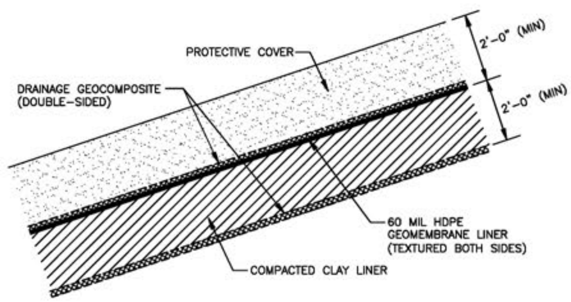


GCL OPTION

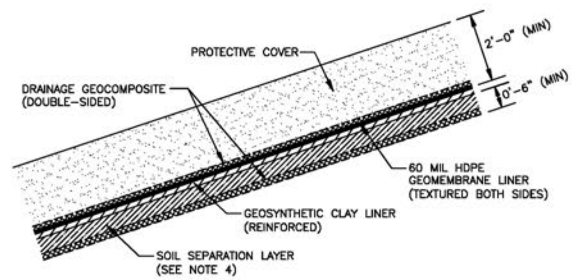
FLOOR LINER SYSTEM (TYP) L1 A.3

0 2 4
SCALE IN FEET

A.1,A.4,A.6,A.7



COMPACTED CLAY LINER OPTION



GCL OPTION

SIDEWALL LINER SYSTEM (TYP) L2 A.3

0 2 4
SCALE IN FEET

A.1,A.4,A.5,A.6,A.8

STATE OF TEXAS
JASON E. EDWARDS
99336
LICENSED
PROFESSIONAL ENGINEER
05/20/2024

NOTES:

1. SUBGRADE PREPARATION, CONSTRUCTION OF COMPACTED CLAY LINER, GEOSYNTHETIC CLAY LINER, GEOMEMBRANE LINER, AND PLACEMENT OF PROTECTIVE COVER WILL BE IN ACCORDANCE WITH APPENDIX IIID–LQCP.
2. DESIGN INFORMATION FOR THE LEACHATE COLLECTION SYSTEM (LCS) COMPONENTS ARE INCLUDED IN APPENDIX IIIC–LEACHATE AND CONTAMINATED WATER MANAGEMENT PLAN. SPECIFICATIONS FOR LCS COMPONENTS ARE INCLUDED IN APPENDIX IIID–LQCP.
3. REFER TO APPENDIX IIID, APPENDIX IIID–C FOR UNDERDRAIN DEWATERING SYSTEM DESIGN INFORMATION.
4. SOIL SEPARATION LAYER WILL BE A MINIMUM 6 INCHES IN THICKNESS, AND WILL BE PLACED IN A MANNER THAT DOES NOT SHOVE, DISPLACE OR DAMAGE UNDERLYING GEOCOMPOSITE. SOIL SEPARATION LAYER MAY BE COMPRISED OF GENERAL FILL SOILS WITH NO STONES, ROOTS, OR DEBRIS LARGER THAN 2 INCHES THAT MIGHT DAMAGE GEOCOMPOSITE.

SHEET IIIA–A.3

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DATE: 05/2024
FILE: 0120–76–11
CAD: A.3 LINER SYSTEM.DWG

DRAWN BY: JDW
DESIGN BY: BPY
REVIEWED BY: JAE

Weaver Consultants Group
TBPE REGISTRATION NO. F–3727

PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION

MAJOR PERMIT AMENDMENT
LINER SYSTEM DETAILS

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

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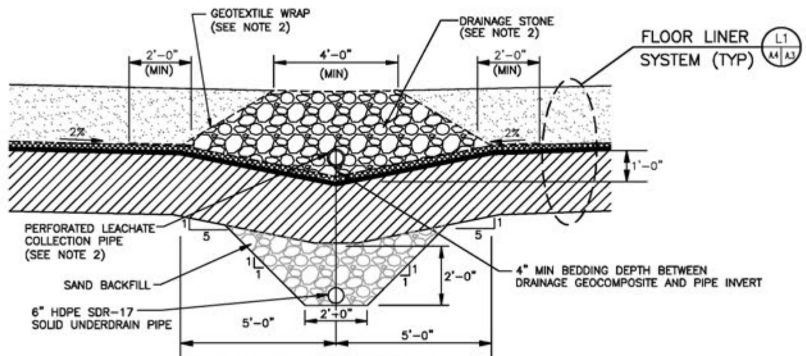
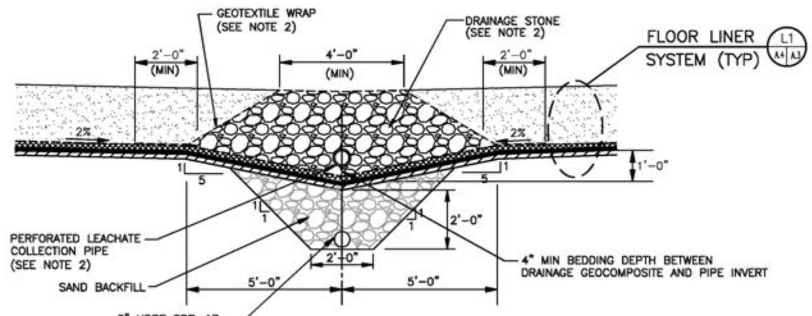
DRAWING A.3



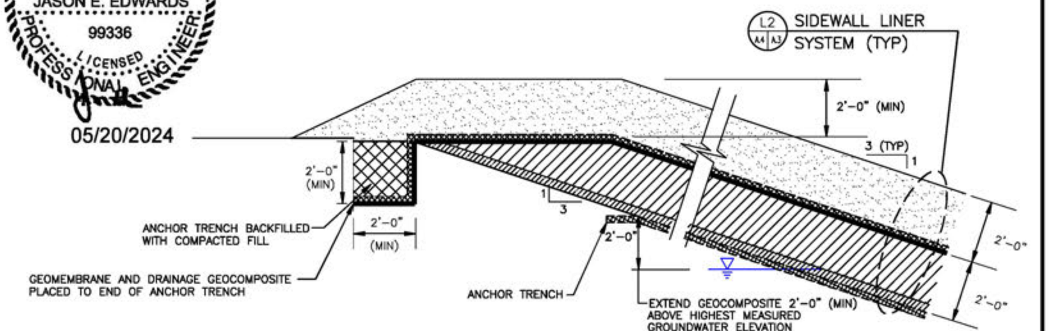
COMPACTED CLAY LINER OPTION



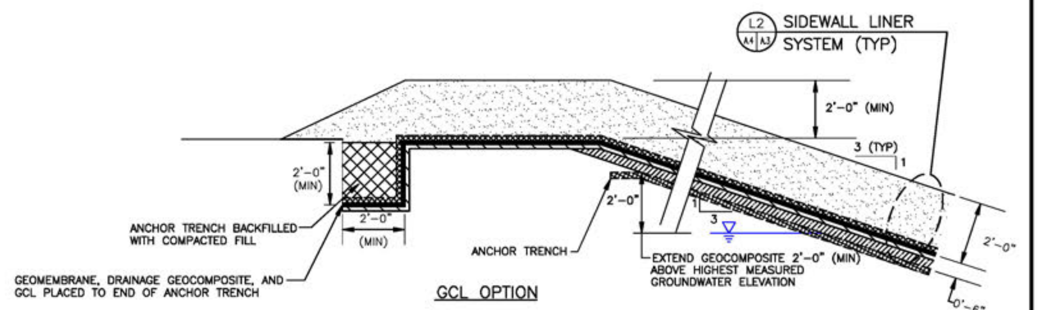
GCL OPTION

LEACHATE COLLECTION TRENCH L3 A1 A4

SCALE IN FEET (0 2 4)



COMPACTED CLAY LINER OPTION



GCL OPTION

SIDEWALL LINER/ANCHOR TRENCH L4 A4 A.1,A.12

SCALE IN FEET (0 2 4)

NOTES:

1. SUBGRADE PREPARATION, CONSTRUCTION OF COMPACTED CLAY LINER, GEOSYNTHETIC CLAY LINER, GEOMEMBRANE LINER, AND PLACEMENT OF PROTECTIVE COVER WILL BE IN ACCORDANCE WITH APPENDIX IIID–LQCP.
2. DESIGN INFORMATION FOR THE LEACHATE COLLECTION SYSTEM (LCS) COMPONENTS ARE INCLUDED IN APPENDIX IIIC–LEACHATE AND CONTAMINATED WATER MANAGEMENT PLAN. SPECIFICATIONS FOR LCS COMPONENTS ARE INCLUDED IN APPENDIX IIID–LQCP.
3. REFER TO APPENDIX IIID, APPENDIX IIID–C FOR DEWATERING SYSTEM DESIGN INFORMATION AND DETAIL DRAWINGS.

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DATE: 05/2024 — DRAWN BY: JDW
FILE: 0120–78–11 — DESIGN BY: BPY
CAD: A.4 LINER SYSTEM.DWG — REVIEWED BY: JAE

PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION

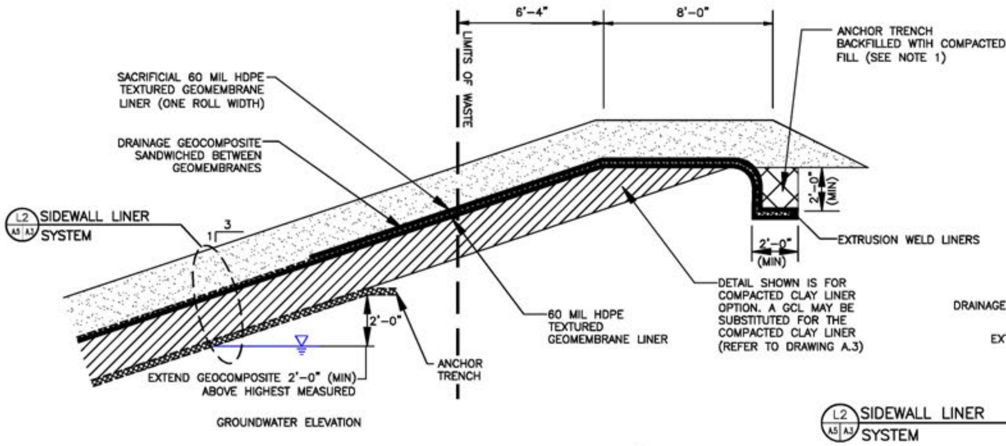
Weaver Consultants Group
TBPE REGISTRATION NO. F–3727

MAJOR PERMIT AMENDMENT
LINER SYSTEM DETAILS

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

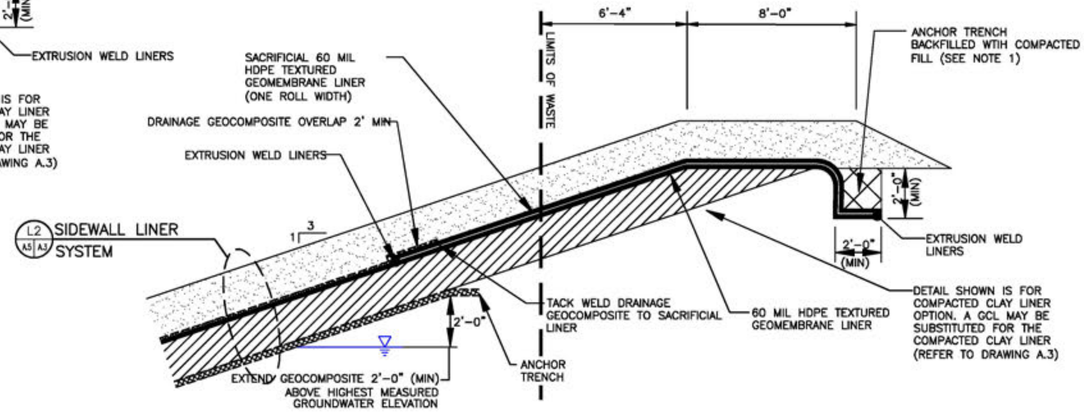
WWW.WCGRP.COM — DRAWING A.4

SHEET IIIA–A.4



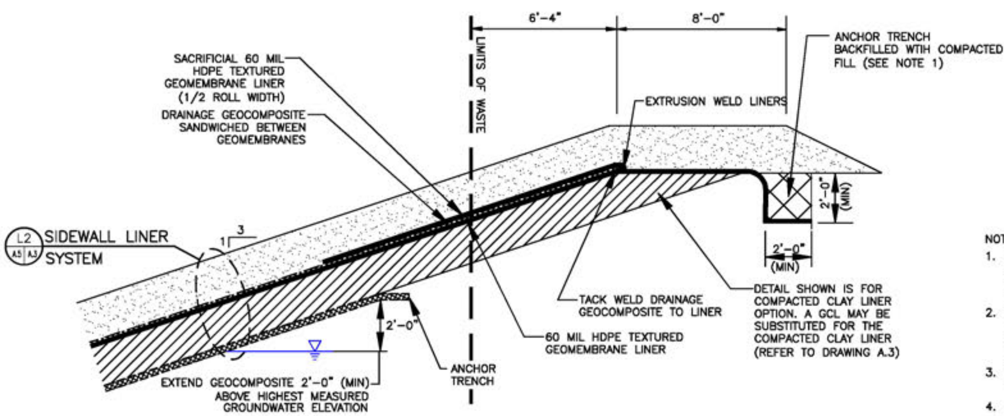
SIDEWALL LINER/ANCHOR TRENCH (OPTION 2) L4A A1 A5

0 3 6
SCALE IN FEET



SIDEWALL LINER/ANCHOR TRENCH (OPTION 4) L4C A1 A5

0 3 6
SCALE IN FEET



SIDEWALL LINER/ANCHOR TRENCH (OPTION 3) L4B A1 A5

0 3 6
SCALE IN FEET

NOTES:

1. SUBGRADE PREPARATION, CONSTRUCTION OF THE COMPACTED CLAY LINER, GEOSYNTHETIC CLAY LINER, GEOMEMBRANE LINER, AND PLACEMENT OF PROTECTIVE COVER WILL BE IN ACCORDANCE WITH APPENDIX IIID–LQCP.
2. DESIGN INFORMATION FOR THE LEACHATE COLLECTION SYSTEM (LCS) COMPONENTS ARE INCLUDED IN APPENDIX IIIC–LEACHATE AND CONTAMINATED WATER MANAGEMENT PLAN. SPECIFICATIONS FOR LCS COMPONENTS ARE INCLUDED IN APPENDIX IIID–LQCP.
3. REFER TO APPENDIX IIID, APPENDIX IIID–C FOR DEWATERING SYSTEM DESIGN INFORMATION AND DETAIL DRAWINGS.
4. ANCHOR TRENCH DESIGN IS ALSO APPLICABLE TO THE GCL OPTION (SEE DETAIL L4 ON DRAWING A.4).

05/20/2024

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☐ ISSUED FOR CONSTRUCTION

DATE: 05/2024
FILE: 0120-76-11
CAD: A.5 LINER SYSTEM.DWG

DRAWN BY: JDW
DESIGN BY: BPY
REVIEWED BY: JAE

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION

MAJOR PERMIT AMENDMENT
LINER SYSTEM DETAILS

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

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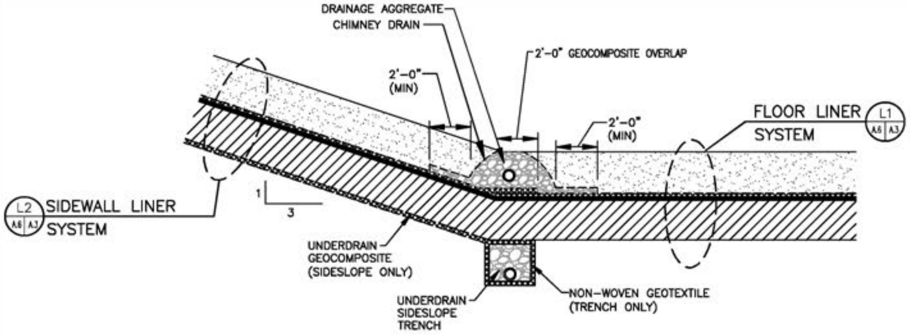
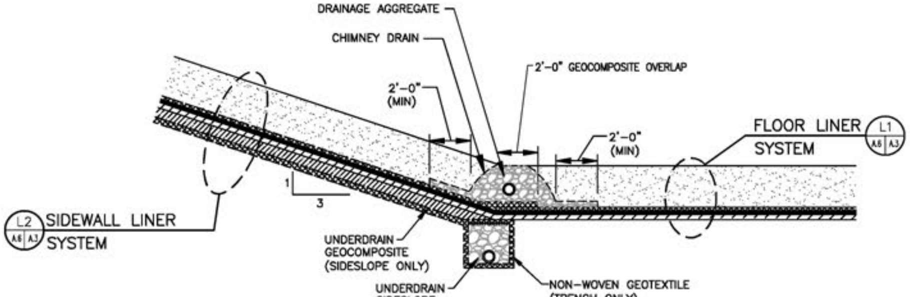
DRAWING A.5

SHEET IIIA–A.5



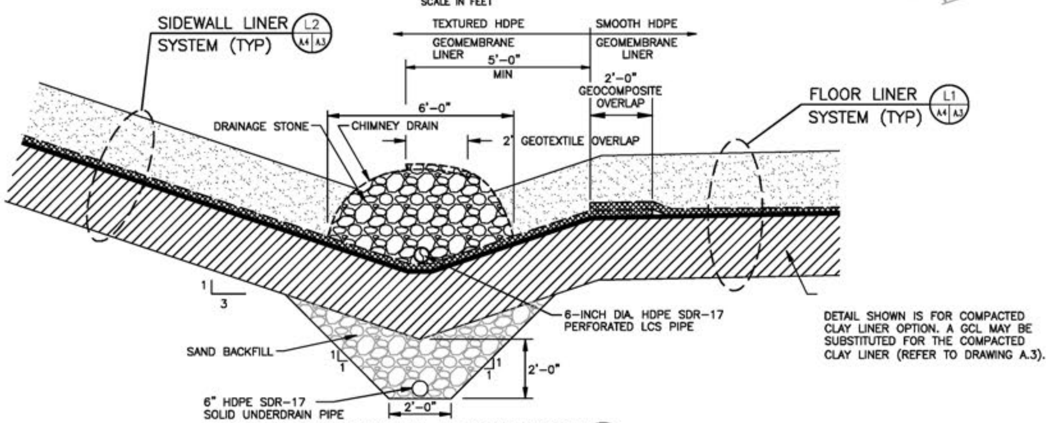
COMPACTED CLAY LINER OPTION



GCL OPTION

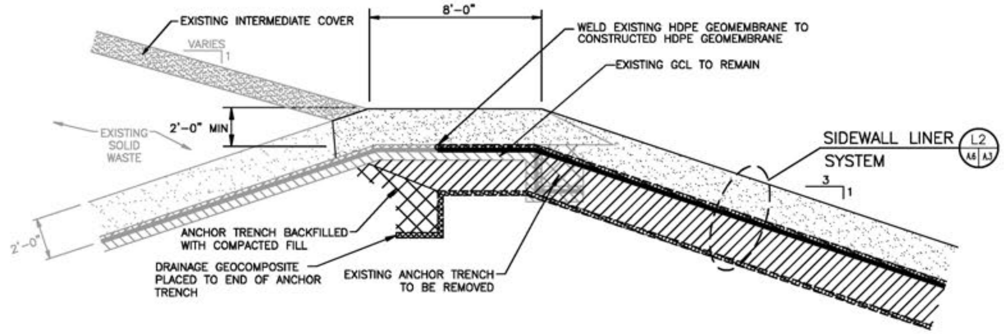
SIDEWALL LINER TRANSITION WITH PIPE L5 A1 A6

0 3 6
SCALE IN FEET

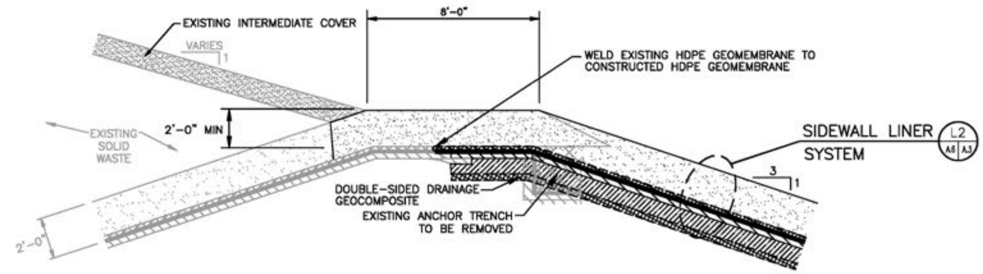


NORTHEAST SIDEWALL LINER TRANSITION WITH PIPE L7 A1 A6

0 2 4
SCALE IN FEET



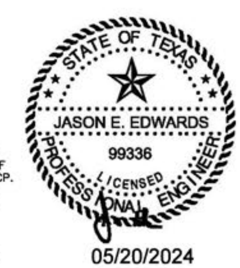
GCL LINER/COMPACTED CLAY LINER TIE-IN



GCL LINER/GCL LINER TIE-IN

EXISTING LINER TIE-IN L6 A1 A6

0 3 6
SCALE IN FEET



NOTES:

1. SUBGRADE PREPARATION, CONSTRUCTION OF COMPACTED CLAY LINER, GEOSYNTHETIC CLAY LINER, GEOMEMBRANE LINER, AND PLACEMENT OF PROTECTIVE COVER WILL BE IN ACCORDANCE WITH APPENDIX IIID-LQCP.
2. DESIGN INFORMATION FOR THE LEACHATE COLLECTION SYSTEM (LCS) COMPONENTS ARE INCLUDED IN APPENDIX IIIC-LEACHATE AND CONTAMINATED WATER MANAGEMENT PLAN. SPECIFICATIONS FOR LCS COMPONENTS ARE INCLUDED IN APPENDIX IIID-LQCP.
3. REFER TO APPENDIX IIID, APPENDIX IIID-C FOR DEWATERING SYSTEM DESIGN INFORMATION.

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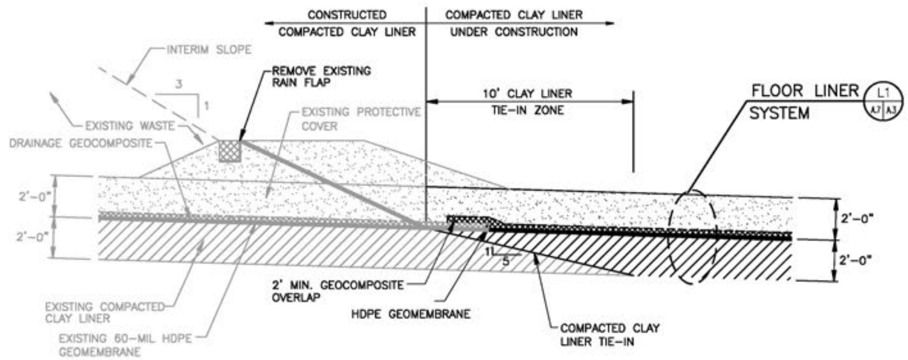
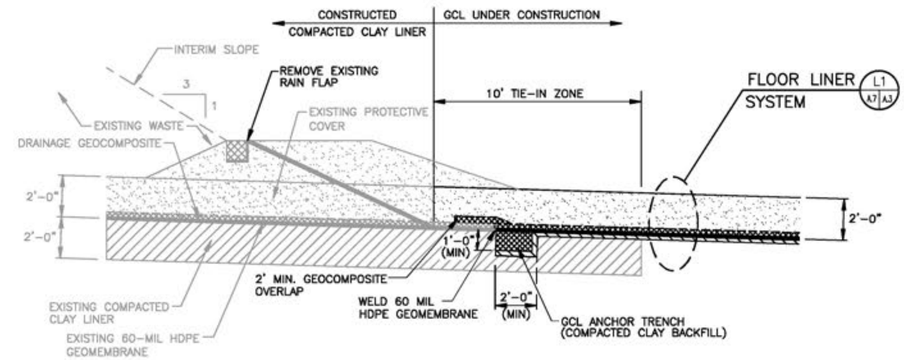
DATE: 05/2024 FILE: 0120-76-11 CAD: A.6 LINER SYSTEM.DWG	DRAWN BY: JDW DESIGN BY: BPY REVIEWED BY: JAE	REVISIONS NO. / DATE / DESCRIPTION	ROYAL OAKS LANDFILL CHEROKEE COUNTY, TEXAS
Weaver Consultants Group TBPE REGISTRATION NO. F-3727			WWW.WCGRP.COM — DRAWING A.6

SHEET IIIA-A.6

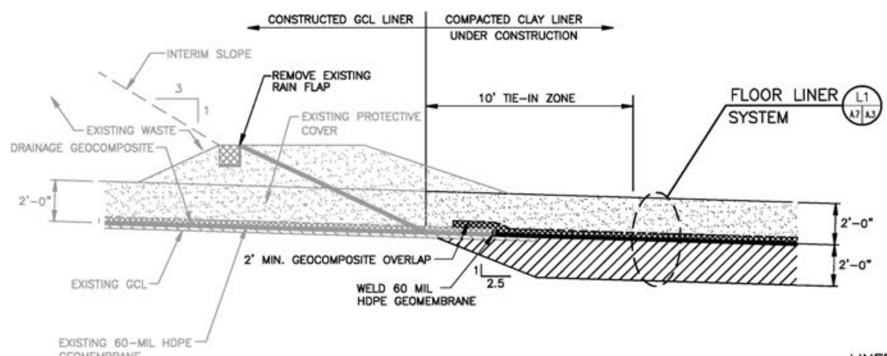
O:\0120\76\EXPANSION 2023\PART III\IIIA\A.6-LINER SYSTEM DETAILS.dwg, byoung, 1:2



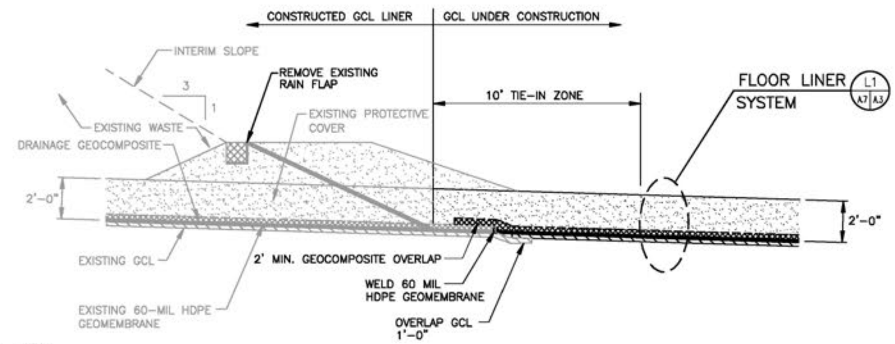
COMPACTED CLAY LINER/COMPACTED CLAY LINER TIE-IN



COMPACTED CLAY LINER/GCL LINER TIE-IN



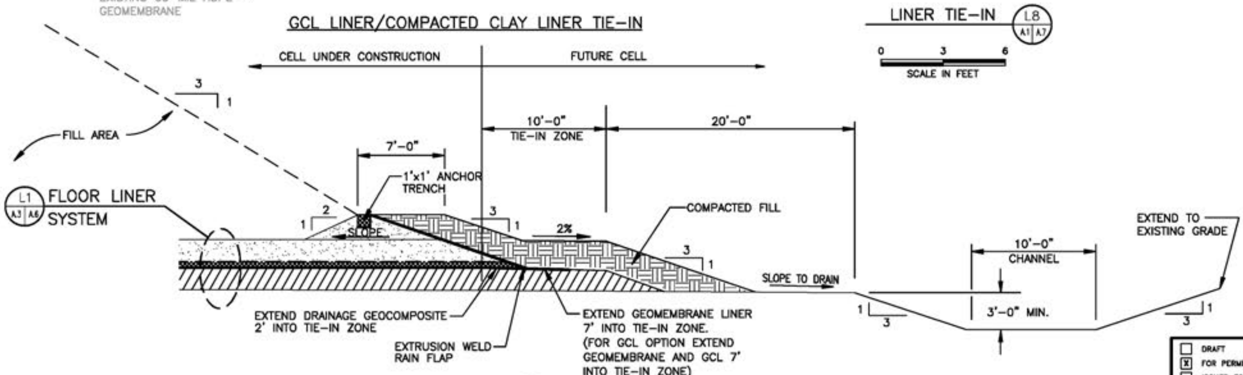
GCL LINER/COMPACTED CLAY LINER TIE-IN



GCL LINER/GCL LINER TIE-IN

LINER TIE-IN L8 A1 A7

0 3 6
SCALE IN FEET



FUTURE LINER TIE-IN L9 A1 A7

0 5 10
SCALE IN FEET

NOTES:

1. SUBGRADE PREPARATION, CONSTRUCTION OF COMPACTED CLAY LINER, GEOSYNTHETIC CLAY LINER, GEOMEMBRANE LINER, AND PLACEMENT OF PROTECTIVE COVER WILL BE IN ACCORDANCE WITH APPENDIX IIID–LQCP.
2. DESIGN INFORMATION FOR THE LEACHATE COLLECTION SYSTEM (LCS) COMPONENTS ARE INCLUDED IN APPENDIX IIIC–LEACHATE AND CONTAMINATED WATER MANAGEMENT PLAN. SPECIFICATIONS FOR LCS COMPONENTS ARE INCLUDED IN APPENDIX IIID–LQCP.
3. REFER TO APPENDIX IIID, APPENDIX IIID–C FOR DEWATERING SYSTEM DESIGN INFORMATION.
4. PREVIOUSLY CONSTRUCTED BOTTOM LINERS INCLUDE GEOSYNTHETIC CLAY LINER.

05/20/2024

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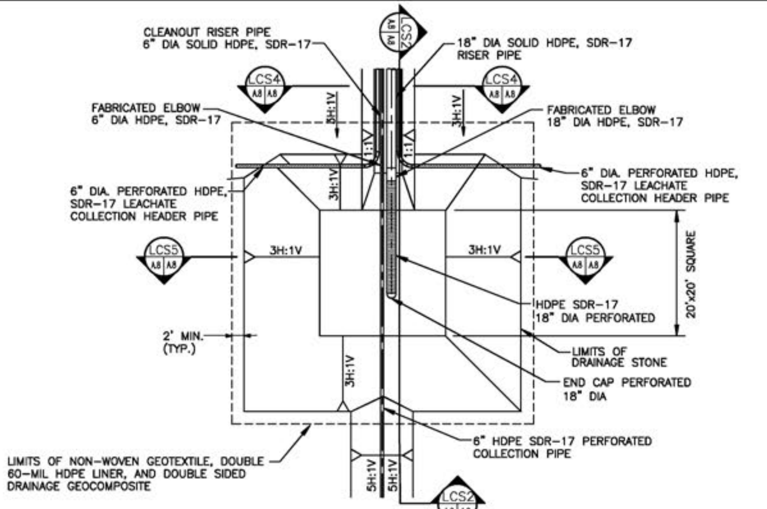
DATE: 05/2024 FILE: 0120-76-11 CAD: A.7 LINER SYSTEM.DWG DRAWN BY: JDW DESIGN BY: BPY REVIEWED BY: JAE	REVISIONS: NO. / DATE / DESCRIPTION	ROYAL OAKS LANDFILL CHEROKEE COUNTY, TEXAS
Weaver Consultants Group TBPE REGISTRATION NO. F-3727		WWW.WCGRP.COM — DRAWING A.7

SHEET IIIA–A.7

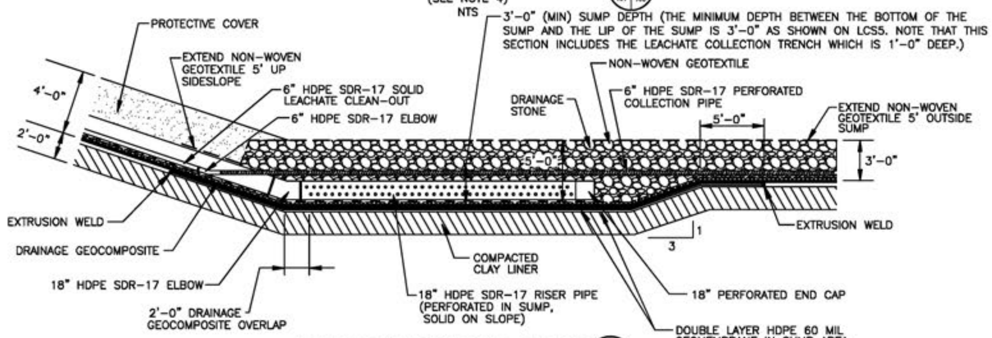
O:\0120\76\EXPANSION 2023\PART III\IIIA\A.7-LINER TIE-IN DETAILS.dwg, byoung, 1:2



LEACHATE COLLECTION SUMP PLAN LCS1 A1 A8

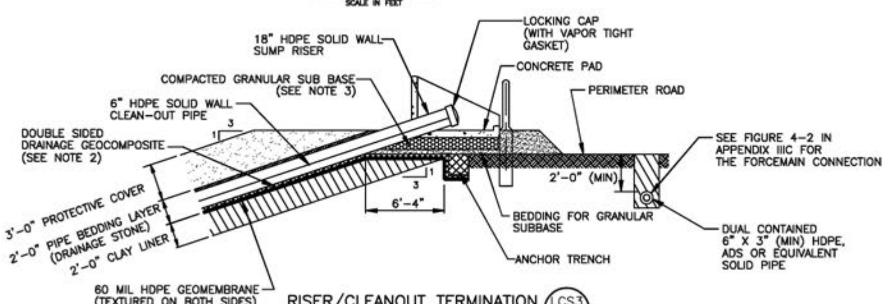
(SEE NOTE 4)

NTS



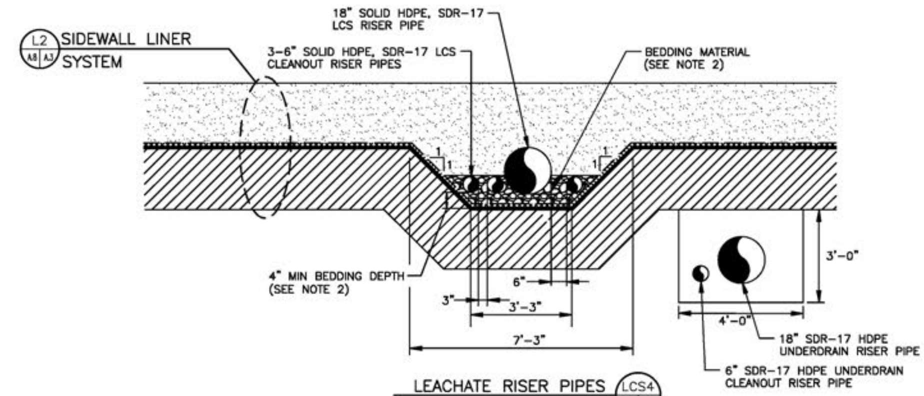
TYPICAL LEACHATE SUMP SECTION LCS2 A8 A8

0 5 10 SCALE IN FEET



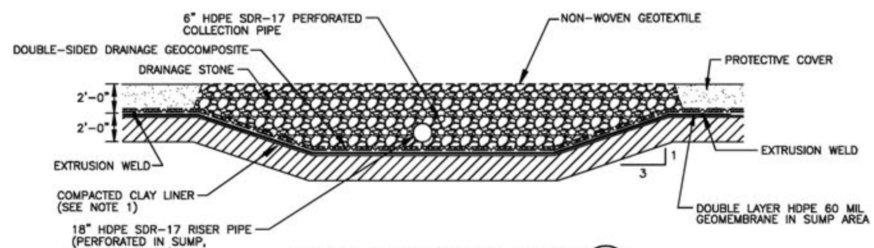
RISER/CLEANOUT TERMINATION LCS3 A1 A8

0 5 10 SCALE IN FEET



LEACHATE RISER PIPES LCS4 A8 A8

0 2 4 SCALE IN FEET



TYPICAL LEACHATE SUMP SECTION LCS5 A8 A8

0 5 10 SCALE IN FEET

NOTES:

1. SUBGRADE PREPARATION, CONSTRUCTION OF COMPACTED CLAY LINER, GEOSYNTHETIC CLAY LINER, GEOMEMBRANE LINER, AND PLACEMENT OF PROTECTIVE COVER WILL BE IN ACCORDANCE WITH APPENDIX IIID-LQCP.
2. DESIGN INFORMATION FOR THE LEACHATE COLLECTION SYSTEM (LCS) COMPONENTS ARE INCLUDED IN APPENDIX IIIC-LEACHATE AND CONTAMINATED WATER MANAGEMENT PLAN. SPECIFICATIONS FOR LCS COMPONENTS ARE INCLUDED IN APPENDIX IIID-LQCP.
3. REFER TO APPENDIX IIID, APPENDIX IIID-C FOR DEWATERING SYSTEM DESIGN INFORMATION AND DETAIL DRAWINGS.
4. DETAILS SHOWN ARE FOR COMPACTED CLAY LINER OPTION. A GCL MAY BE SUBSTITUTED FOR THE COMPACTED CLAY LINER (REFER TO DRAWING A.4).
5. SEE DRAWING A.9 FOR UNDERDRAIN SUMP DETAILS.

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DATE: 05/2024 DRAWN BY: JDW
FILE: 0120-76-11 DESIGN BY: BPY
CAD: A.8 LEACHATE COL SYSTEM.DWG REVIEWED BY: JAE

PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION

MAJOR PERMIT AMENDMENT
LEACHATE COLLECTION SYSTEM DETAILS

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

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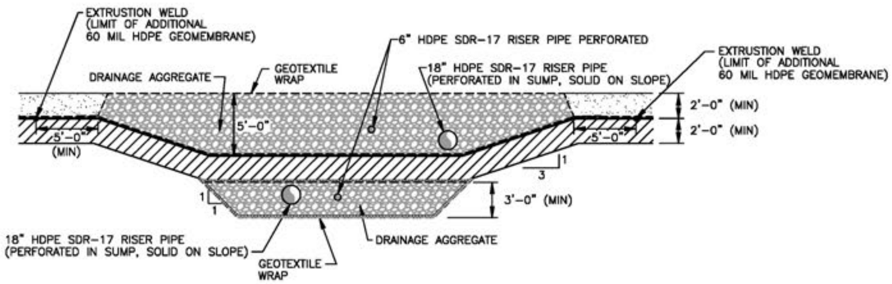
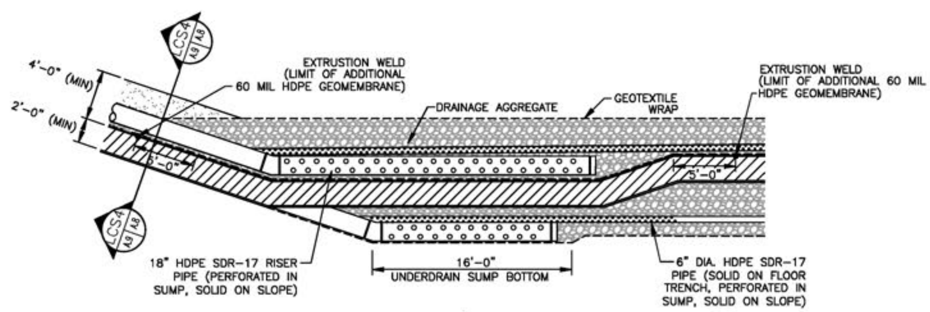
DRAWING A.8

SHEET IIIA-A.8



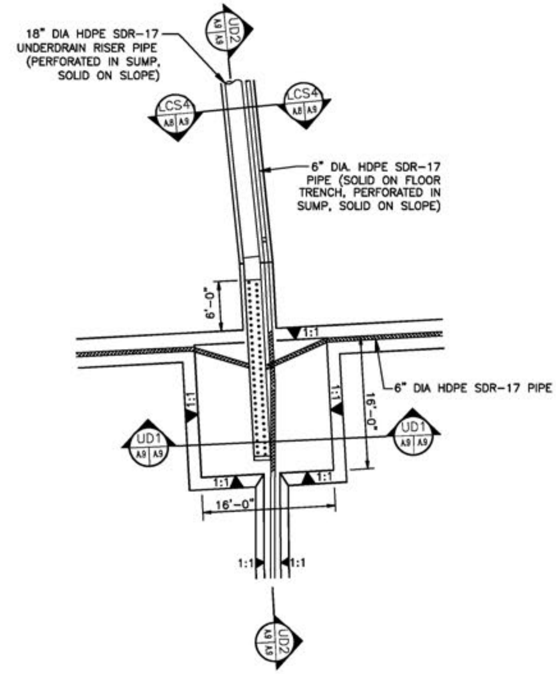
TYPICAL LEACHATE/UNDERDRAIN SUMP SECTION UD1 A.9 A.9

0 5 10
SCALE IN FEET



TYPICAL LEACHATE/UNDERDRAIN SUMP SECTION UD2 A.9 A.9

0 5 10
SCALE IN FEET



UNDERDRAIN
COLLECTION SUMP PLAN UD3 A.1 A.9

0 7.5 15
SCALE IN FEET

STATE OF TEXAS
JASON E. EDWARDS
99336
LICENSED
PROFESSIONAL ENGINEER
05/20/2024

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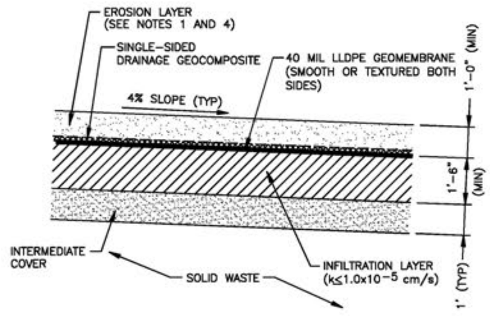
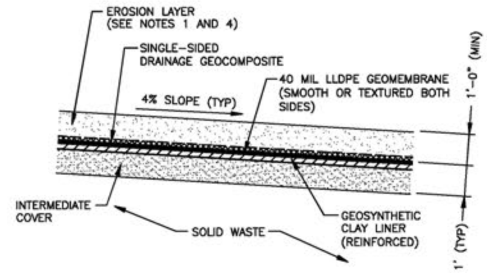
DATE: 05/2024 FILE: 0120-76-11 CAD: A.9 LEACHATE COL SYSTEM.DWG DRAWN BY: JDW DESIGN BY: BPY REVIEWED BY: JAE	REVISIONS NO. | DATE | DESCRIPTION	ROYAL OAKS LANDFILL CHEROKEE COUNTY, TEXAS
Weaver Consultants Group TBPE REGISTRATION NO. F-3727		WWW.WCGRP.COM | DRAWING A.9

SHEET IIIA-A.9



COMPOSITE FINAL COVER OPTION

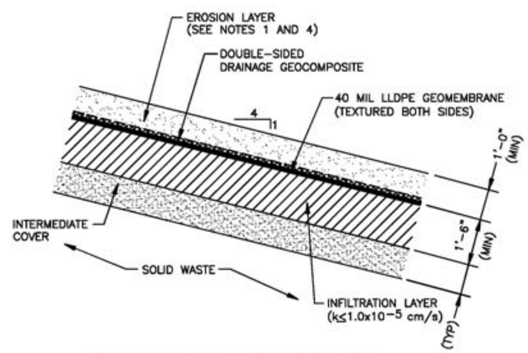


GCL OPTION

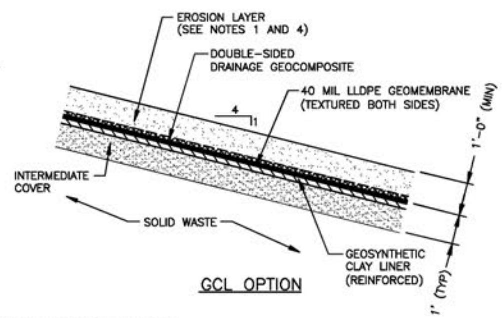
COMPOSITE FINAL COVER–TOPSLOPE FC1 A.10

A.2,A.11

0 2 4 SCALE IN FEET



COMPOSITE FINAL COVER OPTION



GCL OPTION

COMPOSITE FINAL COVER–SIDESLOPE FC2 A.10

A.2,A.11,A.12

0 2 4 SCALE IN FEET

05/20/2024

NOTES:

1. FINAL COVER EROSION LAYER WILL BE CAPABLE OF SUSTAINING SELECTED VEGETATION.
2. DRAINAGE LAYER CONSISTS OF A 250-MIL GEOCOMPOSITE-HDPE GEONET OVERLAIN BY A 6 OZ/SY GEOTEXTILE LINER (SINGLE-SIDED ON TOPSLOPES AND DOUBLE-SIDED ON SIDESLOPES), OR ENGINEER APPROVED EQUIVALENT.
3. FINAL COVER COMPONENTS WILL BE CONSTRUCTED ACCORDING TO FCSQCP (APPENDIX IIIJ-A).
4. EROSION LAYER MAY CONSIST OF BOTH ONSITE AND OFF-SITE SOILS. BORROW SOURCE TO BE SELECTED BY OWNER PRIOR TO CONSTRUCTION.

☐ DRAFT
☒ FOR PERMITTING PURPOSES ONLY
☐ ISSUED FOR CONSTRUCTION

PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

DATE: 05/2024	DRAWN BY: JDW
FILE: 0120-76-11	DESIGN BY: BPY
CAD: A.10 FINAL COVER DETAILS.DWG	REVIEWED BY: JAE

REVISIONS

NO.	DATE	DESCRIPTION

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

MAJOR PERMIT AMENDMENT
COMPOSITE FINAL COVER DETAILS

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

WWW.WCGRP.COM

DRAWING A.10

SHEET IIIA-A.10

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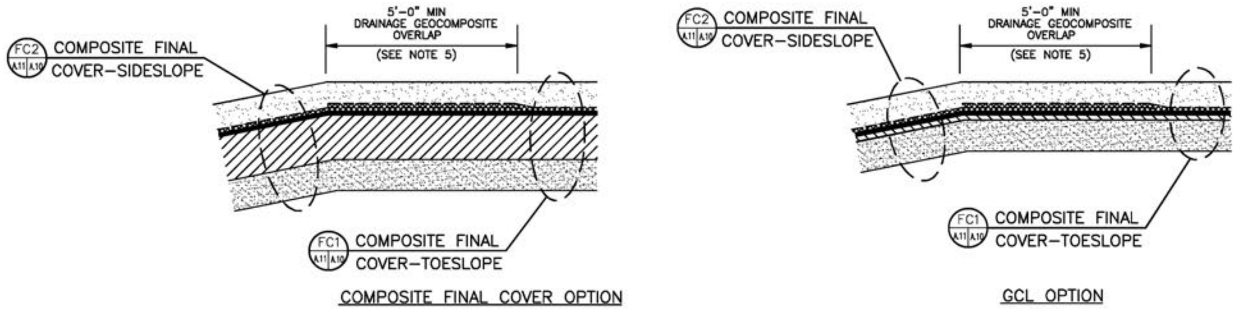
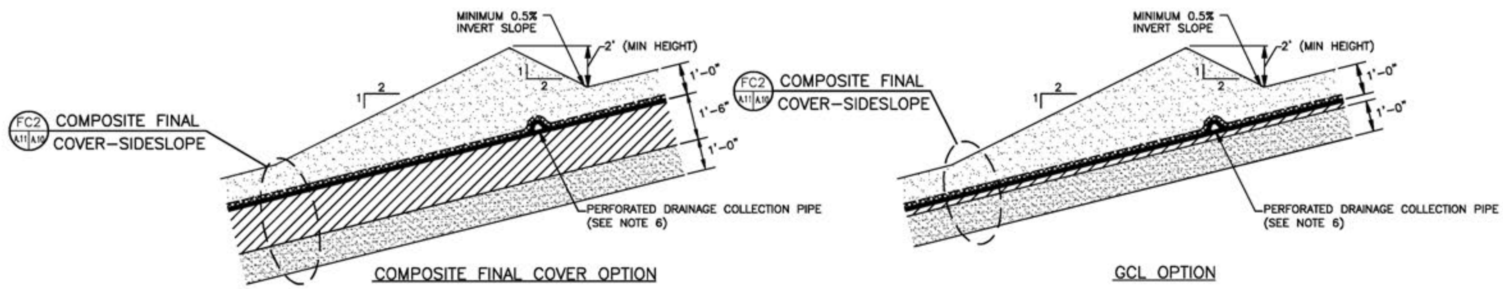


COMPOSITE FINAL COVER–TOP/SIDESLOPE TRANSITION (FC3 A.2 A.11)

0 2 4
SCALE IN FEET



COMPOSITE FINAL COVER–SWALE (TYP) (FC4 A.2 A.11)

0 2 4
SCALE IN FEET

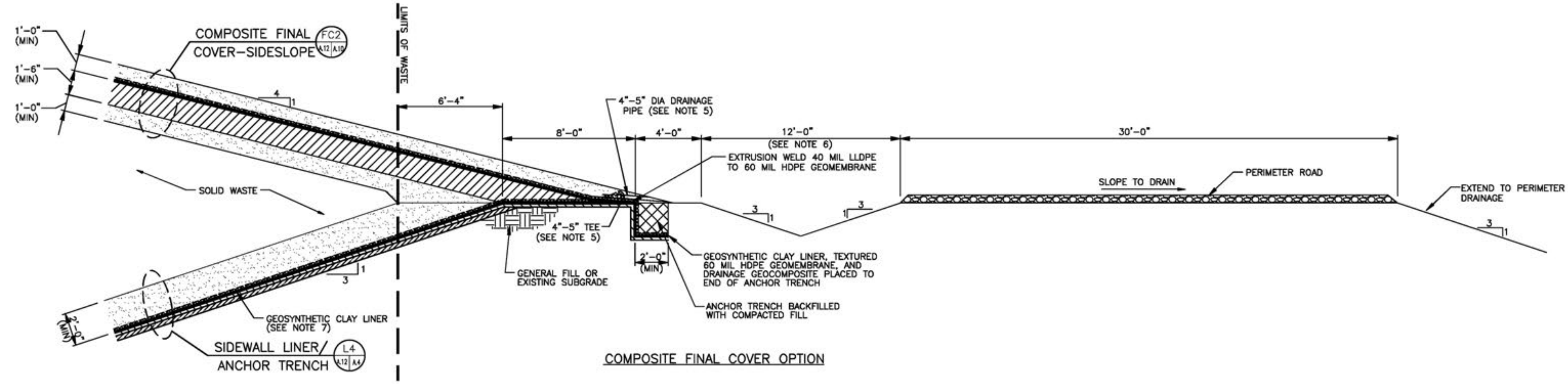
05/20/2024

NOTES:

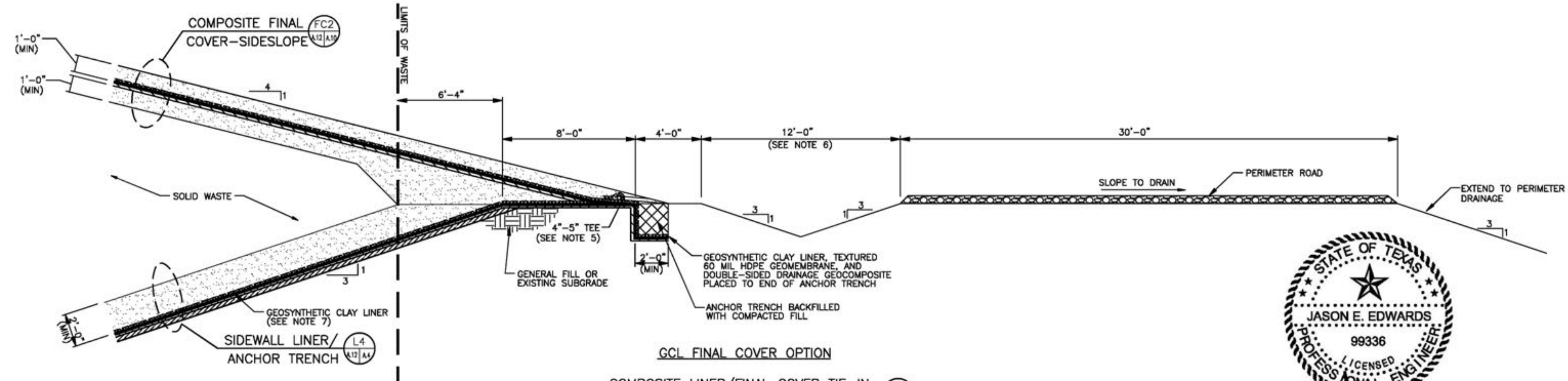
1. FINAL COVER EROSION LAYER WILL BE CAPABLE OF SUSTAINING SELECTED VEGETATION.
2. DRAINAGE LAYER CONSISTS OF A 250–MIL GEOCOMPOSITE–HDPE GEONET OVERLAIN BY A 6 OZ/SY GEOTEXTILE LINER (SINGLE–SIDED ON TOPSLOPES AND DOUBLE–SIDED ON SIDESLOPES), OR ENGINEER APPROVED EQUIVALENT.
3. FINAL COVER COMPONENTS WILL BE CONSTRUCTED ACCORDING TO FCSQCP (APPENDIX IIIJ–A).
4. EROSION LAYER MAY CONSIST OF BOTH ONSITE AND OFF–SITE SOILS. BORROW SOURCE TO BE SELECTED BY OWNER PRIOR TO CONSTRUCTION.
5. SINGLE–SIDED DRAINAGE GEOCOMPOSITE WILL OVERLAP THE DOUBLE–SIDED DRAINAGE GEOCOMPOSITE WITHIN THE FINAL COVER SLOPE TRANSITION FOR PERSPECTIVE FINAL COVER OPTION.
6. REFER TO APPENDIX IIIJ–A–A FOR THE DRAINAGE COLLECTION PIPE DESIGN. AS AN OPTION TO THE DRAINAGE COLLECTION PIPE, THE DRAINAGE GEOCOMPOSITE MAY BE DAYLIGHTED 2 FEET ABOVE THE SWALE FLOWLINE.

SHEET IIIA–A.11

☐ DRAFT ☒ FOR PERMITTING PURPOSES ONLY ☐ ISSUED FOR CONSTRUCTION	PREPARED FOR PINE HILL FARMS LANDFILL TX, LP	MAJOR PERMIT AMENDMENT COMPOSITE FINAL COVER DETAILS
DATE: 05/2024 FILE: 0120–76–11 CAD: A.11 FINAL COVER DETAILS.DWG DRAWN BY: JDW DESIGN BY: BPY REVIEWED BY: JAE	REVISIONS NO. / DATE / DESCRIPTION	ROYAL OAKS LANDFILL CHEROKEE COUNTY, TEXAS
Weaver Consultants Group TBPE REGISTRATION NO. F–3727		WWW.WCGRP.COM / DRAWING A.11



COMPOSITE FINAL COVER OPTION



GCL FINAL COVER OPTION

COMPOSITE LINER/FINAL COVER TIE–IN
FC5 A.2 A.12

0 3 6
SCALE IN FEET

STATE OF TEXAS
JASON E. EDWARDS
99336
LICENSED PROFESSIONAL ENGINEER
05/20/2024

NOTES:

1. FINAL COVER EROSION LAYER WILL BE CAPABLE OF SUSTAINING SELECTED VEGETATION.
2. DRAINAGE LAYER CONSISTS OF A 250–MIL GEOCOMPOSITE–HDPE GEONET OVERLAIN BY A 6 OZ/SY GEOTEXTILE LINER (SINGLE–SIDED ON TOPSLOPES AND DOUBLE–SIDED ON SIDESLOPES), OR ENGINEER APPROVED EQUIVALENT.
3. FINAL COVER COMPONENTS WILL BE CONSTRUCTED ACCORDING TO FCSQCP (APPENDIX IIIJ–A).
4. EROSION LAYER MAY CONSIST OF BOTH ONSITE AND OFF–SITE SOILS. BORROW SOURCE TO BE SELECTED BY OWNER PRIOR TO CONSTRUCTION.
5. REFER TO APPENDIX IIIJ–A–A FOR THE DRAINAGE COLLECTION PIPE DESIGN.
6. THE "V" CHANNEL WILL INTERCEPT FLOW COMING OFF THE LANDFILL BELOW THE LOWERMOST SWALE AND DIRECT IT TO THE DRAINAGE CHUTES, AND ULTIMATELY TO PERIMETER CHANNELS OR PONDS.
7. DETAILS SHOWN ARE FOR GEOSYNTHETIC CLAY LINER OPTION. A CCL MAY BE SUBSTITUTED FOR THE GEOSYNTHETIC CLAY LINER (REFER TO DRAWING A.4).

SHEET IIIA–A.12

☐ DRAFT ☒ FOR PERMITTING PURPOSES ONLY ☐ ISSUED FOR CONSTRUCTION	PREPARED FOR PINE HILL FARMS LANDFILL TX, LP	MAJOR PERMIT AMENDMENT COMPOSITE FINAL COVER DETAILS
DATE: 05/2024 FILE: 0120–76–11 CAD: A.12 FINAL COVER DETAILS.DWG DRAWN BY: JDW DESIGN BY: BPY REVIEWED BY: JAE	REVISIONS NO. / DATE / DESCRIPTION	ROYAL OAKS LANDFILL CHEROKEE COUNTY, TEXAS
Weaver Consultants Group TBPE REGISTRATION NO. F–3727		WWW.WCGRP.COM / DRAWING A.12

O:\0120\76\EXPANSION 2023\PART III\IIIA\A.12–COMPOSITE FINAL COVER DETAILS.dwg, byoung, 1:2

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1614B

MAJOR PERMIT AMENDMENT APPLICATION

PART III – SITE DEVELOPMENT PLAN
APPENDIX IIIA-B
LANDFILL UNIT CROSS SECTIONS

Prepared for

Pine Hill Farms Landfill TX, LP

May 2024

STATE OF TEXAS
JASON E. EDWARDS
99336
LICENSED
PROFESSIONAL ENGINEER

05/20/2024

Prepared by

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No. 0120-076-11-106

This document is intended for permitting purposes only.

CONTENTS

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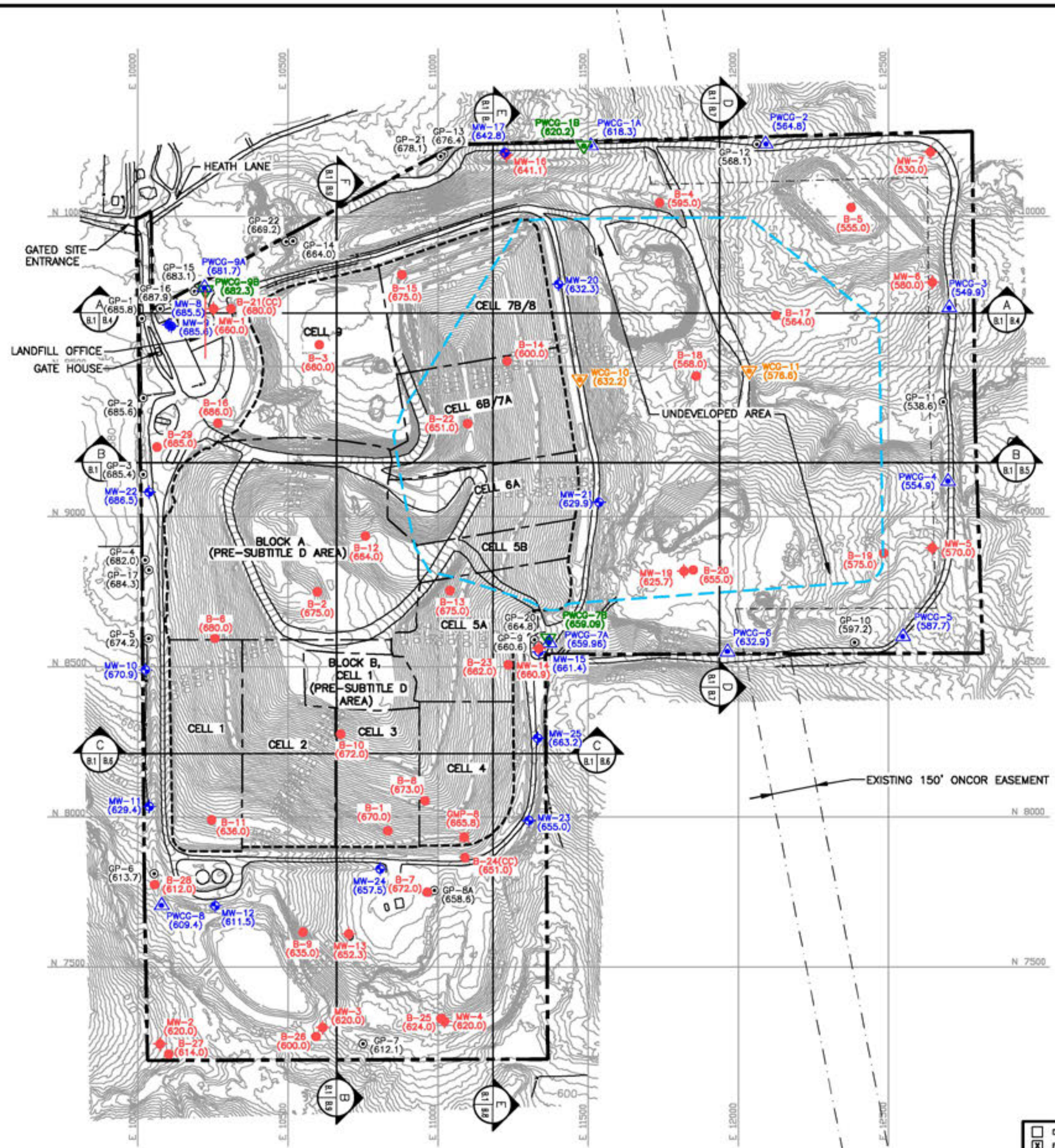

STATE OF TEXAS
JASON E. EDWARDS
99336
LICENSED PROFESSIONAL ENGINEER
05/20/2024

0 200 400
SCALE IN FEET

LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMIT OF WASTE
- NEWLY PERMITTED AIRSPACE LIMIT OF WASTE
- CELL BOUNDARY
- EXISTING EASEMENT
- PROPOSED EASEMENT
- E 10500 — SITE GRID
- 610 — EXISTING CONTOUR (SEE NOTE 1)
- B-3 (650.0) PREVIOUSLY ADVANCED BOREHOLE LOCATION
- MW-1 (681.0) FORMER GROUNDWATER MONITOR WELL LOCATION
- GP-8 (666.0) FORMER GAS MONITOR PROBE LOCATION
- MW-25 (663.2) EXISTING GROUNDWATER MONITOR WELL LOCATION
- GP-1 (686.0) EXISTING GAS MONITOR PROBE LOCATION
- PWCG-1A (618.3) 2023 DEEP EXPANSION BOREHOLE WITH PIEZOMETER
- PWCG-1B (620.2) 2023 SHALLOW EXPANSION BOREHOLE WITH PIEZOMETER
- WCG-10 (632.2) 2023 EXPANSION BOREHOLE

NOTES:

1. EXISTING CONTOURS DEVELOPED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN NOVEMBER 10, 2022. THE GRID SYSTEM IS BASED ON A SITE GRID SYSTEM. ELEVATIONS ARE BASED ON NAVD 88.
2. PERMIT BOUNDARY WAS REPRODUCED FROM LEGAL DESCRIPTION PROVIDED BY STANGER SURVEYING COMPANY, DATED APRIL 1995.

☐ DRAFT ☒ FOR PERMITTING PURPOSES ONLY ☐ ISSUED FOR CONSTRUCTION	PREPARED FOR PINE HILL FARMS LANDFILL TX, LP
DATE: 05/2024 FILE: 0120-76-11 CAD: B.1-SITE PLAN.DWG	DRAWN BY: JDW DESIGN BY: BPY REVIEWED BY: JAE

REVISIONS

NO.	DATE	DESCRIPTION

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

MAJOR PERMIT AMENDMENT TYPICAL SECTION LOCATIONS

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

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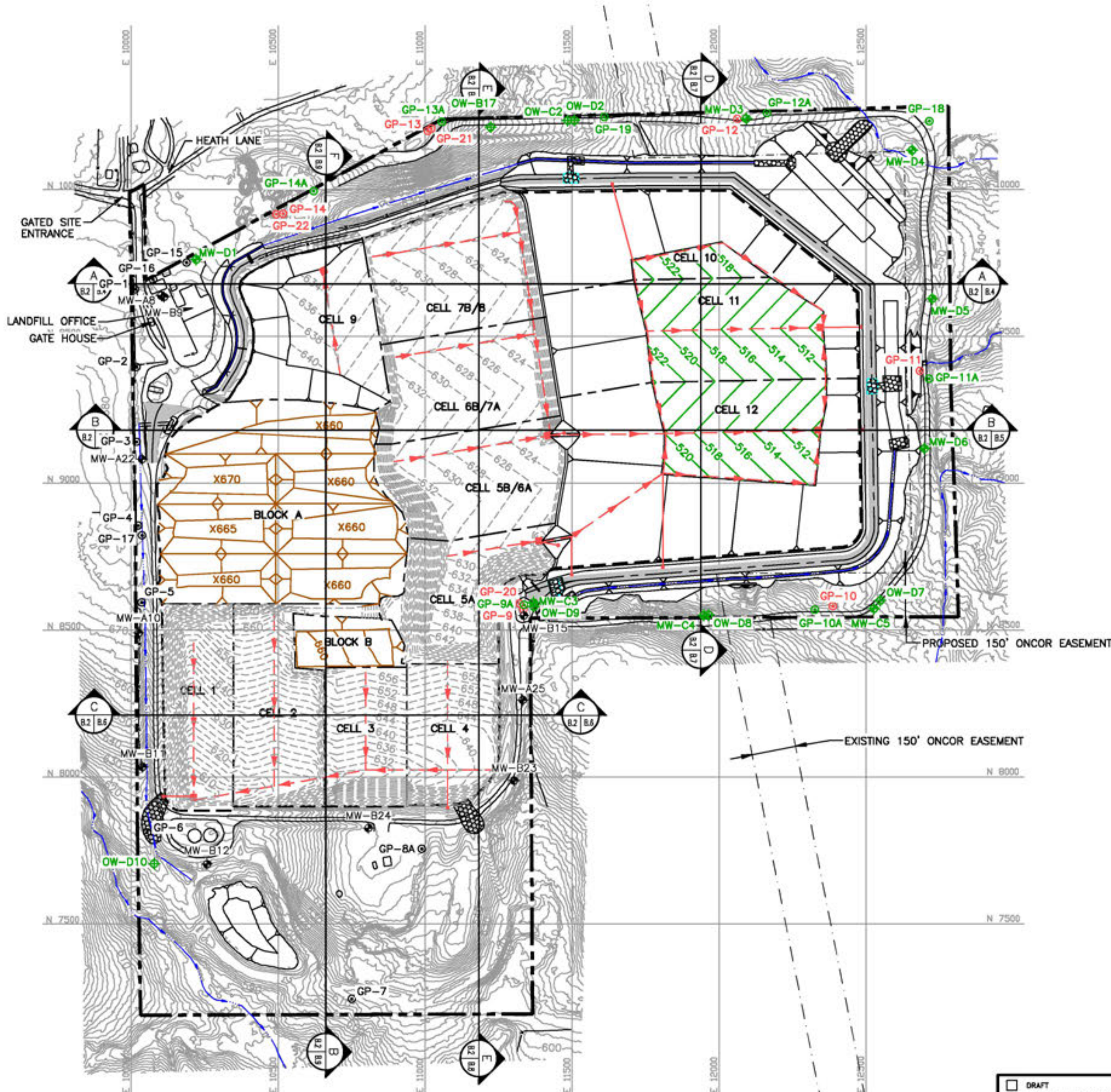
DRAWING B.1

SHEET IIIA-B.1

O:\0120\76\EXPANSION 2023\PART III\IIIA\B\B.1-SITE PLAN.dwg, byoung, 1:2



N

0 200 400
SCALE IN FEET

LEGEND

- PERMIT BOUNDARY
- LIMIT OF WASTE
- CELL BOUNDARY
- EXISTING EASEMENT
- PROPOSED EASEMENT
- E 10500 SITE GRID
- 610 EXISTING CONTOUR (SEE NOTE 1)
- 516 TOP OF LINER CONTOUR
- 630 AS-BUILT TOP OF LINER
- X660 APPROXIMATE TOP OF PRE-SUBTITLE D LINER (SEE NOTE 8)
- CHANNEL CENTERLINE
- LEACHATE COLLECTION PIPE
- LEACHATE COLLECTION SUMP
- LEACHATE RISER PIPE
- MW-10 EXISTING GROUNDWATER MONITORING WELL
- MW-D1 PROPOSED GROUNDWATER MONITORING WELL
- OW-D7 PROPOSED OBSERVATION WELL
- GP-1 EXISTING GAS PROBE
- GP-10A PROPOSED GAS PROBE

STATE OF TEXAS
JASON E. EDWARDS
99336
LICENSED
PROFESSIONAL ENGINEER
05/20/2024

NOTES:

1. EXISTING CONTOURS DEVELOPED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN NOVEMBER 10, 2022. THE GRID SYSTEM IS BASED ON A SITE GRID SYSTEM. ELEVATIONS ARE BASED ON NAVD 88.
2. EXCAVATION SLOPES AND SLOPES OUTSIDE THE LIMIT OF WASTE (e.g., CHANNELS) ARE TYPICALLY 3H:1V.
3. REFER TO APPENDIX IIIC FOR LEACHATE STORAGE INFORMATION.
4. ELEVATION OF DEEPEST EXCAVATION AT THE LCS SUMP IS 504.0 FT-MSL.
5. SEQUENCE OF SITE DEVELOPMENT IS PROVIDED IN PARTS I/II, APPENDIX I/IIA DRAWINGS I/IIA.4 THROUGH I/IIA.7.
6. REFER TO APPENDIX IIIF FOR DRAINAGE DESIGN INFORMATION.
7. PERMIT BOUNDARY WAS REPRODUCED FROM LEGAL DESCRIPTION PROVIDED BY STANGER SURVEYING COMPANY, DATED APRIL 1995.
8. TOP OF PRE-SUBTITLE D LINER ARE APPROXIMATE AND WAS REPRODUCED FROM CROSS-SECTIONS INCLUDED IN THE 1983 PERMIT APPLICATION PREPARED BY STOKES & ASSOCIATES.

- [ ] DRAFT
- [x] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION

DATE: 05/2024 | DRAWN BY: JDW
FILE: 0120-76-11 | DESIGN BY: BPY
CAD: A.1-LINER PLAN.DWG | REVIEWED BY: JAE

PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

MAJOR PERMIT AMENDMENT
TOP OF LINER PLAN

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

WWW.WCGRP.COM

DRAWING B.2

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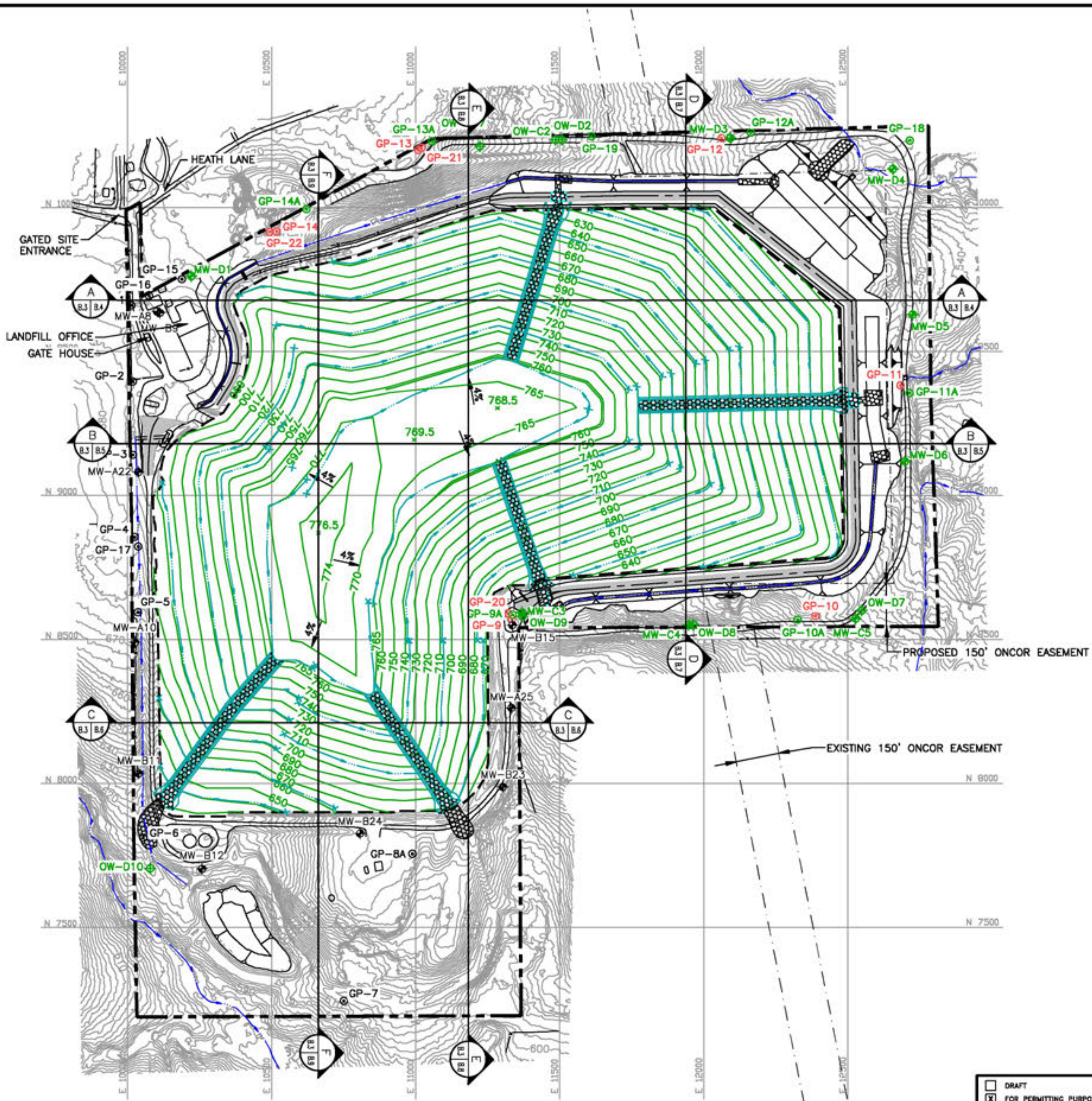

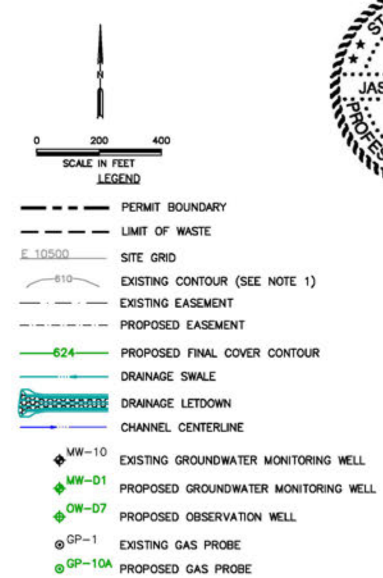

05/20/2024

NOTES:

1. EXISTING CONTOURS DEVELOPED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN NOVEMBER 10, 2022. THE GRID SYSTEM IS BASED ON A SITE GRID SYSTEM. ELEVATIONS ARE BASED ON NAVD 88.
2. REFER TO APPENDIX IIIF–SURFACE WATER DRAINAGE PLAN FOR DRAINAGE DESIGN INFORMATION.
3. MAXIMUM FINAL COVER ELEVATION IS 776.5 FT-MSL. MAXIMUM TOP OF WASTE ELEVATION IS 773.0 FT-MSL.
4. TYPICAL SIDESLOPES ARE 4H:1V. TYPICAL TOPSLOPE IS 4%.
5. PERMIT BOUNDARY WAS REPRODUCED FROM LEGAL DESCRIPTION PROVIDED BY STANGER SURVEYING COMPANY, DATED APRIL 1995.

☐ DRAFT ☒ FOR PERMITTING PURPOSES ONLY ☐ ISSUED FOR CONSTRUCTION	PREPARED FOR PINE HILL FARMS LANDFILL TX, LP	MAJOR PERMIT AMENDMENT LANDFILL COMPLETION PLAN ROYAL OAKS LANDFILL CHEROKEE COUNTY, TEXAS	
DATE: 05/2024 FILE: 0120-76-11 CAD: B.3-COMPLETION PLAN.DWG	DRAWN BY: JDW DESIGN BY: BPY REVIEWED BY: JAE	REVISIONS: NO. / DATE / DESCRIPTION	
Weaver Consultants Group TBPE REGISTRATION NO. F-3727		WWW.WCGRP.COM	DRAWING B.3

SHEET IIIA-B.3

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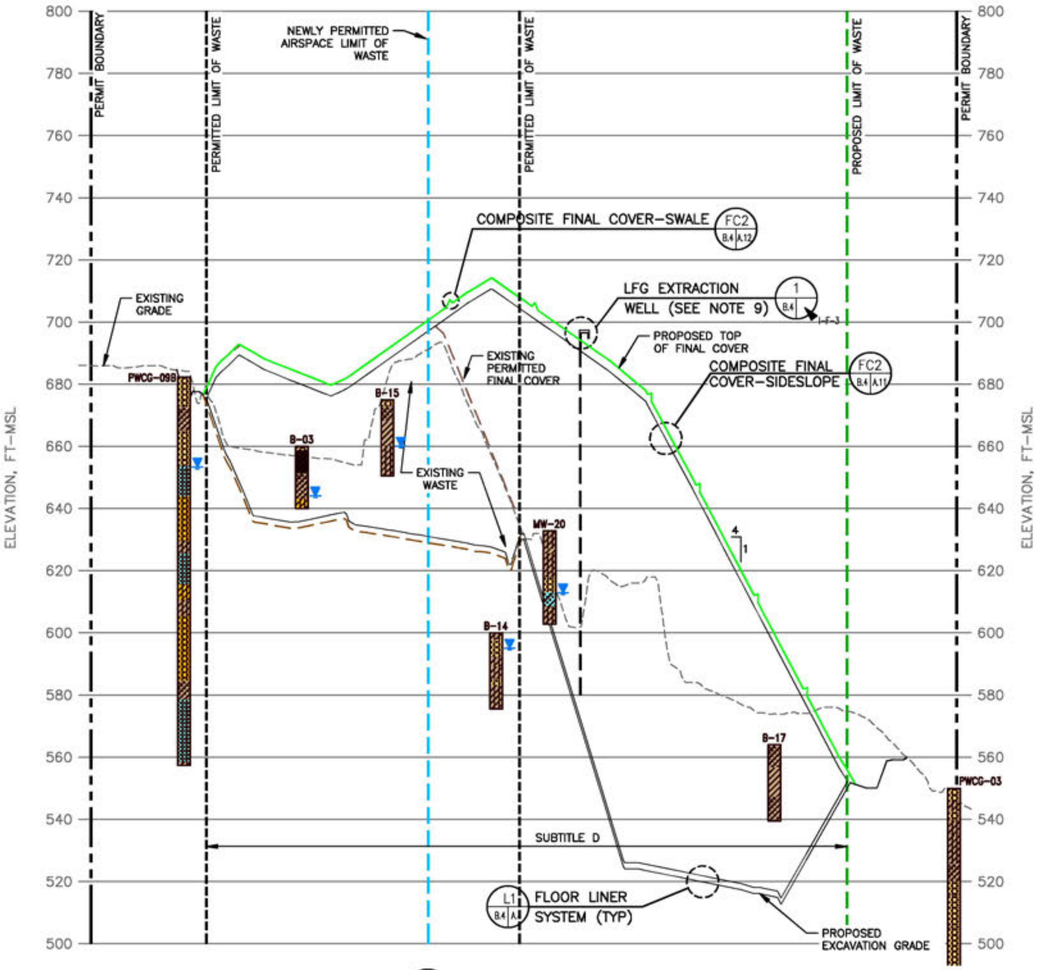


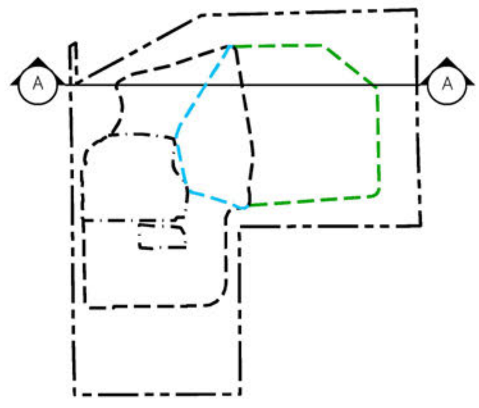
SECTION (EXAGGERATED VERTICAL SCALE) A B.1,B.2,B.3 B.4

VERTICAL SCALE IN FEET 0 20 40

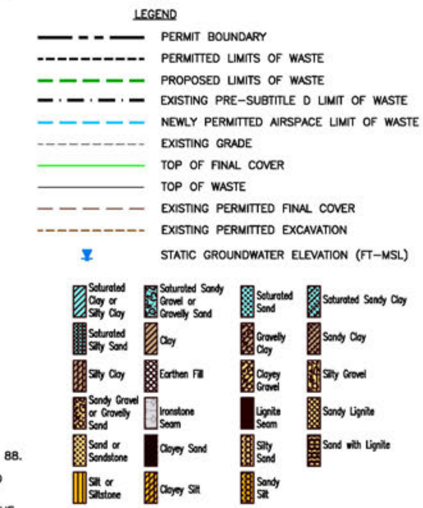
HORIZONTAL SCALE IN FEET 0 200 400

SECTION (1H:1V) A B.1,B.2,B.3 B.4

SCALE IN FEET 0 200 400



KEY LOCATION MAP
NTS



NOTES:

1. EXISTING CONTOURS DEVELOPED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN NOVEMBER 10, 2022. THE GRID SYSTEM IS BASED ON A SITE GRID SYSTEM. ELEVATIONS ARE BASED ON NAVD 88.
2. REFER TO APPENDIX IIIA-A FOR LINER, LEACHATE COLLECTION, AND FINAL COVER SYSTEM DETAILS.
3. SEE APPENDIX IIIG FOR BORING DATA. BORINGS PROJECTED INTO THE LINE OF SECTION. SEE DRAWING B.1 FOR LOCATION.
4. AS SHOWN IN APPENDIX I/IIC, THE BUFFER ZONES VARY AROUND THE PERIMETER OF THE SITE, BUT IN NO CASE ARE THEY LESS THAN 50-FEET FOR EXISTING WASTE. THE BUFFER ZONE BETWEEN THE PERMIT BOUNDARY AND NEWLY PERMITTED (PERMIT NO. 1614B) WASTE DISPOSAL AIRSPACE IS AT LEAST 125-FEET.
5. REFER TO APPENDIX IIII, FOR DETAILS OF THE LANDFILL GAS MANAGEMENT PLAN.
6. DRAINAGE DESIGN INFORMATION IS PROVIDED IN APPENDIX IIIF-SURFACE WATER DRAINAGE PLAN.
7. ELEVATION OF DEEPEST EXCAVATION AT THE LCS SUMP IS 504.0 FT-MSL.
8. LOCATIONS OF TYPICAL LFG EXTRACTION WELLS CAN BE FOUND IN APPENDIX IIII.
9. TOP OF PRE-SUBTITLE D LINER ARE APPROXIMATE AND WAS REPRODUCED FROM CROSS-SECTIONS INCLUDED IN THE 1983 PERMIT APPLICATION PREPARED BY STOKES & ASSOCIATES.

05/20/2024

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DATE: 05/2024
FILE: 0120-76-11
CAD: B.4-B.9-SECTIONS.DWG

DRAWN BY: RAA
DESIGN BY: SSM
REVIEWED BY: JAE

PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

MAJOR PERMIT AMENDMENT
TYPICAL SECTION A

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

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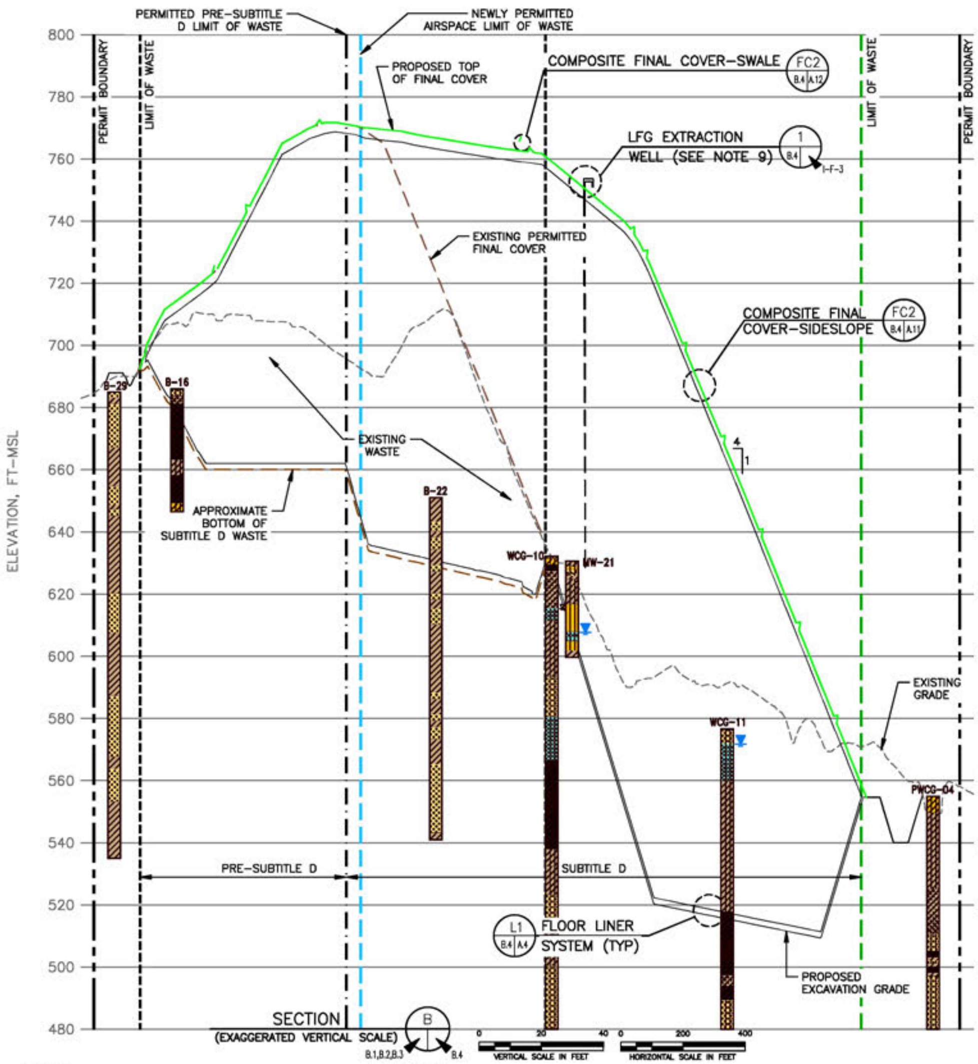
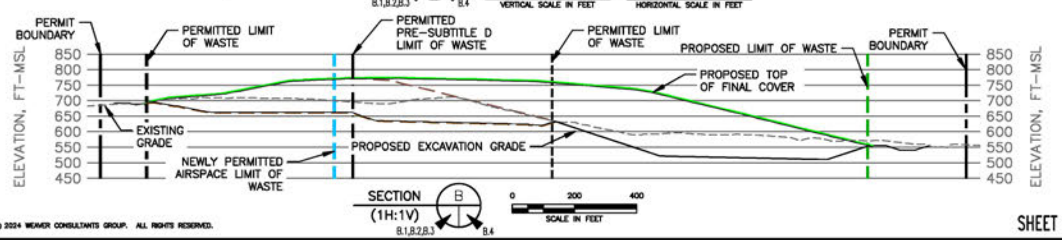
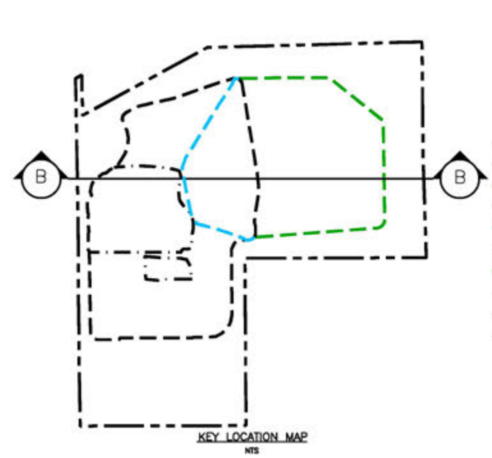
DRAWING B.4

SHEET IIIA-B.4







LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE
- EXISTING PRE-SUBTITLE D LIMIT OF WASTE
- NEWLY PERMITTED AIRSPACE LIMIT OF WASTE
- EXISTING GRADE
- TOP OF FINAL COVER
- TOP OF WASTE
- EXISTING PERMITTED FINAL COVER
- EXISTING PERMITTED EXCAVATION
- STATIC GROUNDWATER ELEVATION (FT-MSL)

Saturated Clay or Silty Clay	Saturated Sandy Gravel or Gravelly Sand	Saturated Sand	Saturated Sandy Clay
Saturated Silty Sand	Clay	Gravelly Clay	Sandy Clay
Silty Clay	Earthen Fill	Clayey Gravel	Silty Gravel
Sandy Gravel or Gravelly Sand	Ironstone Seam	Lignite Seam	Sandy Lignite
Sand or Sandstone	Clayey Sand	Silty Sand	Sand with Lignite
Silt or Siltstone	Clayey Silt	Sandy Silt	

NOTES:

1. EXISTING CONTOURS DEVELOPED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN NOVEMBER 10, 2022. THE GRID SYSTEM IS BASED ON A SITE GRID SYSTEM. ELEVATIONS ARE BASED ON NAVD 88.
2. REFER TO APPENDIX IIIA-A FOR LINER, LEACHATE COLLECTION, AND FINAL COVER SYSTEM DETAILS.
3. SEE APPENDIX IIIG FOR BORING DATA. BORINGS PROJECTED INTO THE LINE OF SECTION. SEE DRAWING B.1 FOR LOCATION.
4. AS SHOWN IN APPENDIX I/IIC, THE BUFFER ZONES VARY AROUND THE PERIMETER OF THE SITE, BUT IN NO CASE ARE THEY LESS THAN 50-FEET FOR EXISTING WASTE. THE BUFFER ZONE BETWEEN THE PERMIT BOUNDARY AND NEWLY PERMITTED (PERMIT NO. 1614B) WASTE DISPOSAL AIRSPACE IS AT LEAST 125-FEET.
5. REFER TO APPENDIX IIII, FOR DETAILS OF THE LANDFILL GAS MANAGEMENT PLAN.
6. DRAINAGE DESIGN INFORMATION IS PROVIDED IN APPENDIX IIIF-SURFACE WATER DRAINAGE PLAN.
7. ELEVATION OF DEEPEST EXCAVATION AT THE LCS SUMP IS 504.0 FT-MSL.
8. LOCATIONS OF TYPICAL LFG EXTRACTION WELLS CAN BE FOUND IN APPENDIX IIII.
9. TOP OF PRE-SUBTITLE D LINER ARE APPROXIMATE AND WAS REPRODUCED FROM CROSS-SECTIONS INCLUDED IN THE 1983 PERMIT APPLICATION PREPARED BY STOKES & ASSOCIATES.

05/20/2024

SHEET IIIA-B.5

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DATE: 05/2024
FILE: 0120-76-11
CAD: B.4-B.9-SECTIONS.DWG

DRAWN BY: RAA
DESIGN BY: SSM
REVIEWED BY: JAE

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION

MAJOR PERMIT AMENDMENT
TYPICAL SECTION B

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

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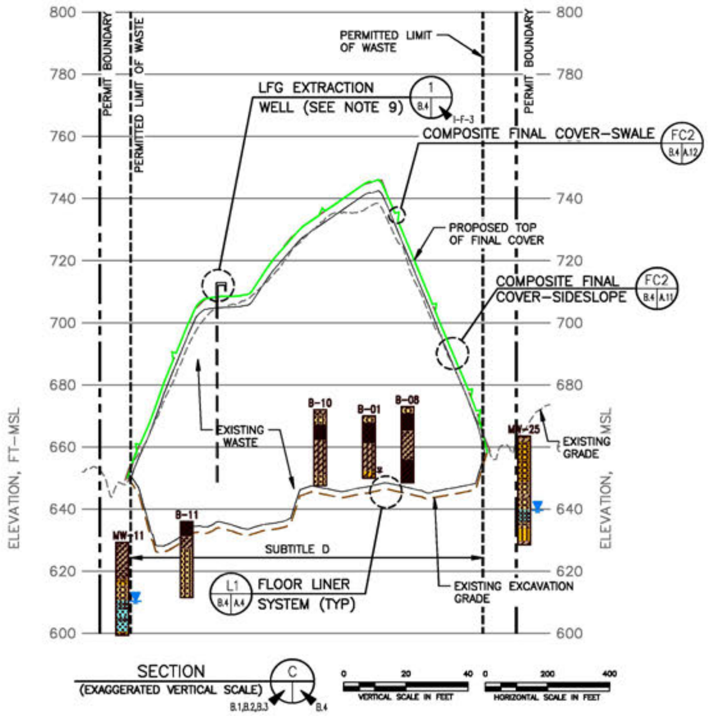

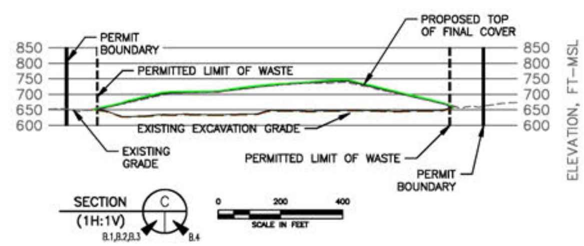

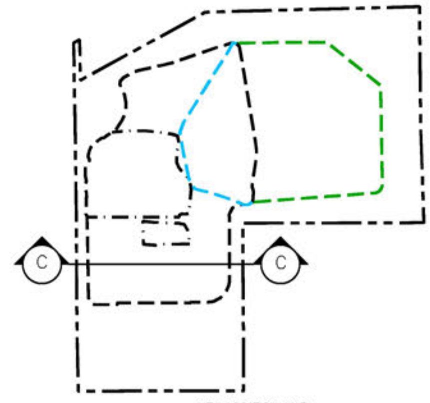

KEY LOCATION MAP
NTS

LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE
- EXISTING PRE-SUBTITLE D LIMIT OF WASTE
- NEWLY PERMITTED AIRSPACE LIMIT OF WASTE
- EXISTING GRADE
- TOP OF FINAL COVER
- TOP OF WASTE
- EXISTING PERMITTED FINAL COVER
- EXISTING PERMITTED EXCAVATION
- STATIC GROUNDWATER ELEVATION (FT-MSL)

Saturated Clay or Silty Clay; Saturated Sandy Gravel or Gravelly Sand; Saturated Sand; Saturated Sandy Clay; Saturated Silty Sand; Clay; Gravelly Clay; Sandy Clay; Silty Clay; Earthen Fill; Clayey Gravel; Silty Gravel; Sandy Gravel or Gravelly Sand; Ironstone Seam; Lignite Seam; Sandy Lignite; Sand or Sandstone; Clayey Sand; Silty Sand; Sand with Lignite; Silt or Siltstone; Clayey Silt; Sandy Silt

NOTES:

1. EXISTING CONTOURS DEVELOPED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN NOVEMBER 10, 2022. THE GRID SYSTEM IS BASED ON A SITE GRID SYSTEM. ELEVATIONS ARE BASED ON NAVD 88.
2. REFER TO APPENDIX IIIA-A FOR LINER, LEACHATE COLLECTION, AND FINAL COVER SYSTEM DETAILS.
3. SEE APPENDIX IIIG FOR BORING DATA. BORINGS PROJECTED INTO THE LINE OF SECTION. SEE DRAWING B.1 FOR LOCATION.
4. AS SHOWN IN APPENDIX I/IIC, THE BUFFER ZONES VARY AROUND THE PERIMETER OF THE SITE, BUT IN NO CASE ARE THEY LESS THAN 50-FEET FOR EXISTING WASTE. THE BUFFER ZONE BETWEEN THE PERMIT BOUNDARY AND NEWLY PERMITTED (PERMIT NO. 1614B) WASTE DISPOSAL AIRSPACE IS AT LEAST 125-FEET.
5. REFER TO APPENDIX IIII, FOR DETAILS OF THE LANDFILL GAS MANAGEMENT PLAN.
6. DRAINAGE DESIGN INFORMATION IS PROVIDED IN APPENDIX IIIF-SURFACE WATER DRAINAGE PLAN.
7. ELEVATION OF DEEPEST EXCAVATION AT THE LCS SUMP IS 504.0 FT-MSL.
8. LOCATIONS OF TYPICAL LFG EXTRACTION WELLS CAN BE FOUND IN APPENDIX IIII.
9. TOP OF PRE-SUBTITLE D LINER ARE APPROXIMATE AND WAS REPRODUCED FROM CROSS-SECTIONS INCLUDED IN THE 1983 PERMIT APPLICATION PREPARED BY STOKES & ASSOCIATES.

STATE OF TEXAS
JASON E. EDWARDS
99336
LICENSED PROFESSIONAL ENGINEER
05/20/2024

☐ DRAFT
☒ FOR PERMITTING PURPOSES ONLY
☐ ISSUED FOR CONSTRUCTION

DATE: 05/2024
FILE: 0120-76-11
CAD: B.4-B.9-SECTIONS.DWG
DRAWN BY: RAA
DESIGN BY: SSM
REVIEWED BY: JAE

PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

MAJOR PERMIT AMENDMENT
TYPICAL SECTION C

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

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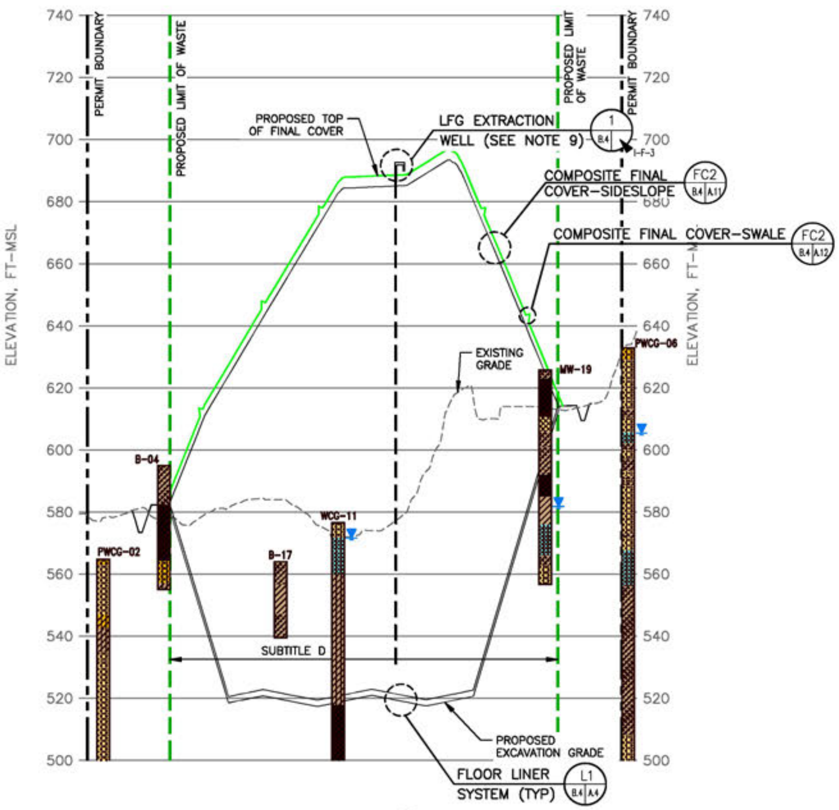
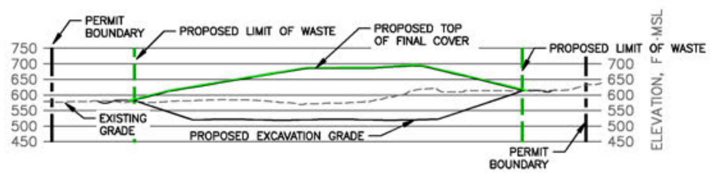
DRAWING B.6

SHEET IIIA-B.6



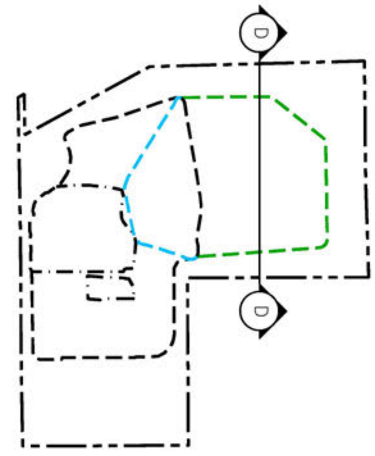
SECTION D
(EXAGGERATED VERTICAL SCALE)

VERTICAL SCALE IN FEET
HORIZONTAL SCALE IN FEET



SECTION D
(1H:1V)

SCALE IN FEET



KEY LOCATION MAP
NTS

LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE
- EXISTING PRE-SUBTITLE D LIMIT OF WASTE
- NEWLY PERMITTED AIRSPACE LIMIT OF WASTE
- EXISTING GRADE
- TOP OF FINAL COVER
- TOP OF WASTE
- EXISTING PERMITTED FINAL COVER
- EXISTING PERMITTED EXCAVATION
- STATIC GROUNDWATER ELEVATION (FT-MSL)

Saturated Clay or Silty Clay; Saturated Sandy Gravel or Gravelly Sand; Saturated Sand; Saturated Sandy Clay; Saturated Silty Sand; Clay; Gravelly Clay; Sandy Clay; Silty Clay; Earthen Fill; Clayey Gravel; Silty Gravel; Sandy Gravel or Gravelly Sand; Ironstone Seam; Lignite Seam; Sandy Lignite; Sand or Sandstone; Clayey Sand; Silty Sand; Sand with Lignite; Silt or Siltstone; Clayey Silt; Sandy Silt

NOTES:

1. EXISTING CONTOURS DEVELOPED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN NOVEMBER 10, 2022. THE GRID SYSTEM IS BASED ON A SITE GRID SYSTEM. ELEVATIONS ARE BASED ON NAVD 88.
2. REFER TO APPENDIX IIIA-A FOR LINER, LEACHATE COLLECTION, AND FINAL COVER SYSTEM DETAILS.
3. SEE APPENDIX IIIG FOR BORING DATA. BORINGS PROJECTED INTO THE LINE OF SECTION. SEE DRAWING B.1 FOR LOCATION.
4. AS SHOWN IN APPENDIX I/IIC, THE BUFFER ZONES VARY AROUND THE PERIMETER OF THE SITE, BUT IN NO CASE ARE THEY LESS THAN 50-FEET FOR EXISTING WASTE. THE BUFFER ZONE BETWEEN THE PERMIT BOUNDARY AND NEWLY PERMITTED (PERMIT NO. 1614B) WASTE DISPOSAL AIRSPACE IS AT LEAST 125-FEET.
5. REFER TO APPENDIX IIII, FOR DETAILS OF THE LANDFILL GAS MANAGEMENT PLAN.
6. DRAINAGE DESIGN INFORMATION IS PROVIDED IN APPENDIX IIIF-SURFACE WATER DRAINAGE PLAN.
7. ELEVATION OF DEEPEST EXCAVATION AT THE LCS SUMP IS 504.0 FT-MSL.
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STATE OF TEXAS
JASON E. EDWARDS
99336
LICENSED PROFESSIONAL ENGINEER
05/20/2024

☐ DRAFT
☒ FOR PERMITTING PURPOSES ONLY
☐ ISSUED FOR CONSTRUCTION

DATE: 05/2024 | DRAWN BY: RAA
FILE: 0120-76-11 | DESIGN BY: SSM
CAD: B.4-B.9-SECTIONS.DWG | REVIEWED BY: JAE

PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

REVISIONS

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Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

MAJOR PERMIT AMENDMENT
TYPICAL SECTION D

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

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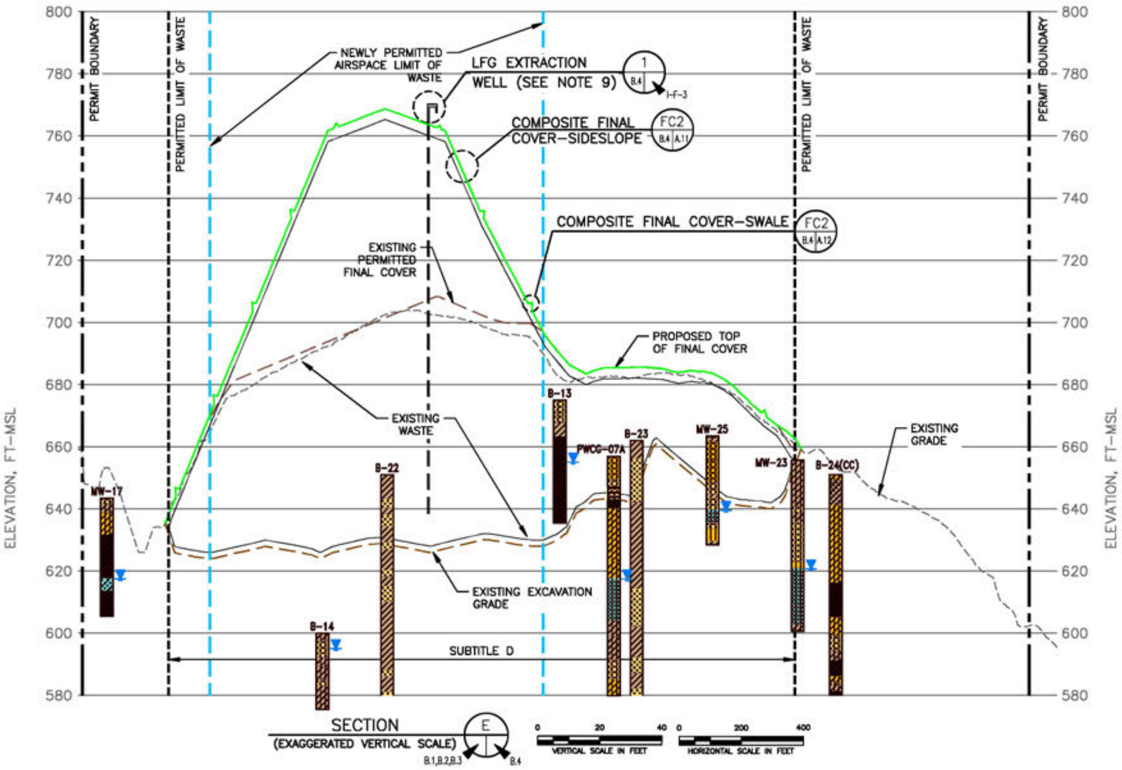
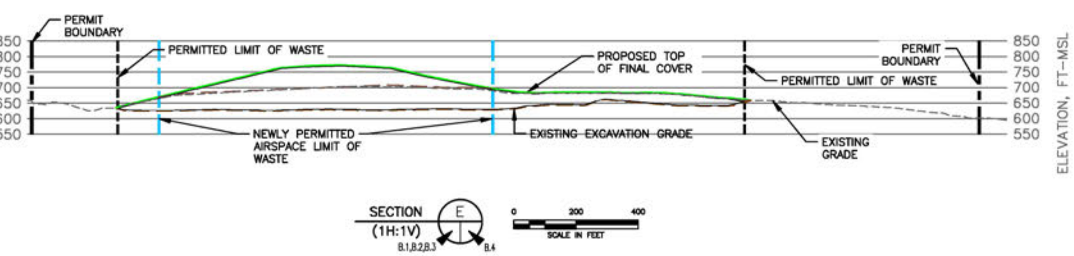
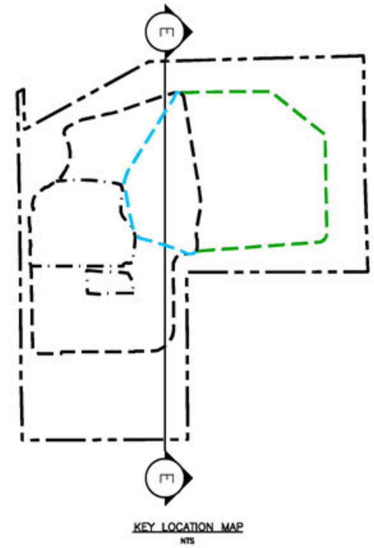
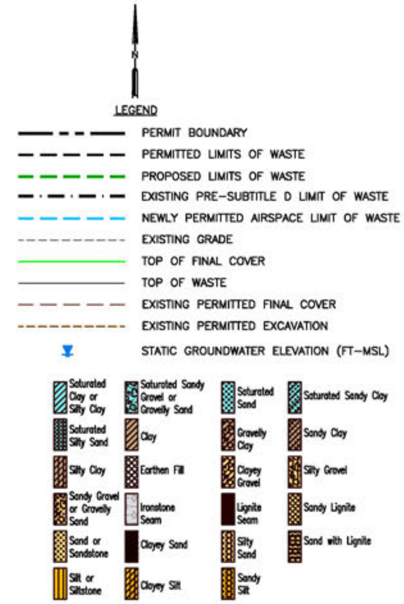
DRAWING B.7

SHEET IIIA-B.7









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05/20/2024

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DATE: 05/2024	DRAWN BY: RAA
FILE: 0120-76-11	DESIGN BY: SSM
CAD: B.4-B.9-SECTIONS.DWG	REVIEWED BY: JAE

PREPARED FOR
PINE HILL FARMS LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

MAJOR PERMIT AMENDMENT
TYPICAL SECTION E

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

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DRAWING B.8

SHEET IIIA-B.8

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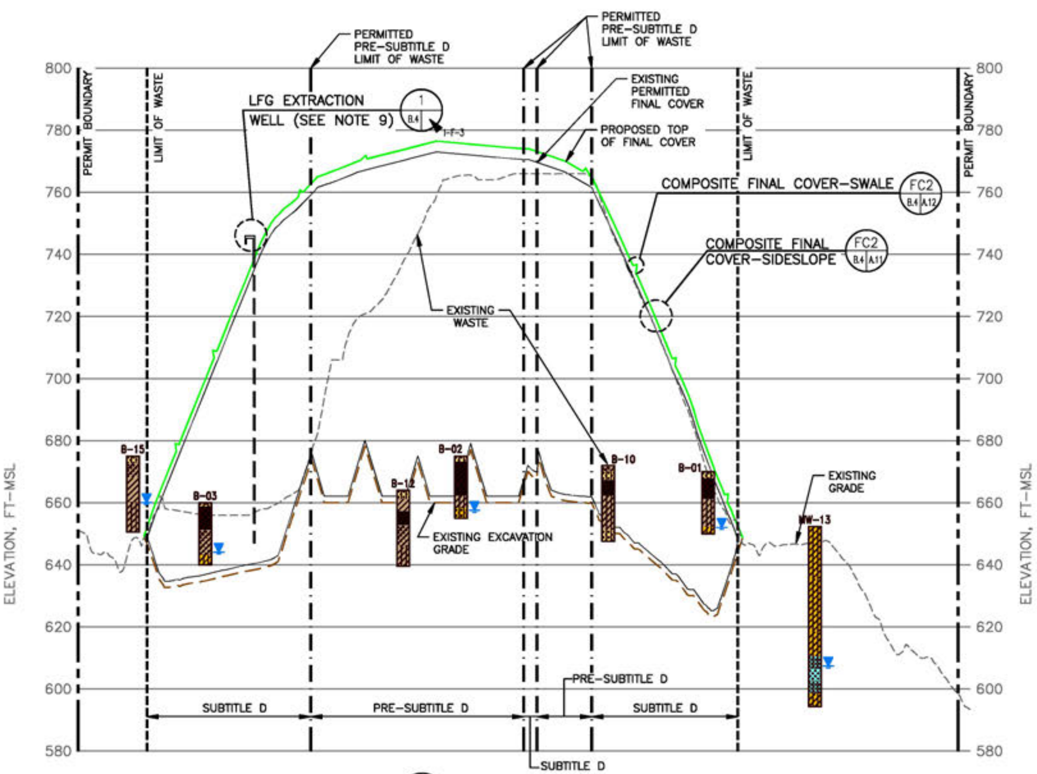
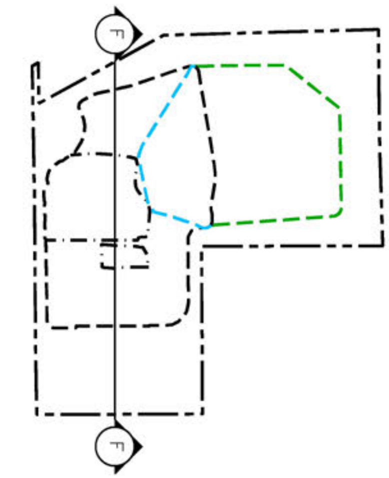


SECTION F (EXAGGERATED VERTICAL SCALE) B.1,B.2,B.3 B.4

VERTICAL SCALE IN FEET: 0 20 40

HORIZONTAL SCALE IN FEET: 0 200 400



KEY LOCATION MAP

NTS

LEGEND

- PERMIT BOUNDARY
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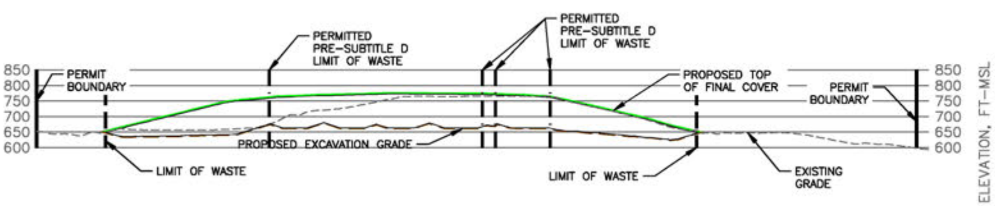

SECTION F (1H:1V) B.1,B.2,B.3 B.4

SCALE IN FEET: 0 200 400

STATE OF TEXAS
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TBPE REGISTRATION NO. F-3727

MAJOR PERMIT AMENDMENT
TYPICAL SECTION F

ROYAL OAKS LANDFILL
CHEROKEE COUNTY, TEXAS

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DRAWING B.9

SHEET IIIA-B.9

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