LEDC HORNSBY TRACT
F&T Project No. 231269

MASTER PLAN SUMMARY REPORT

Prepared By:

FORTE & TABLADA

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September 3rd, 2025

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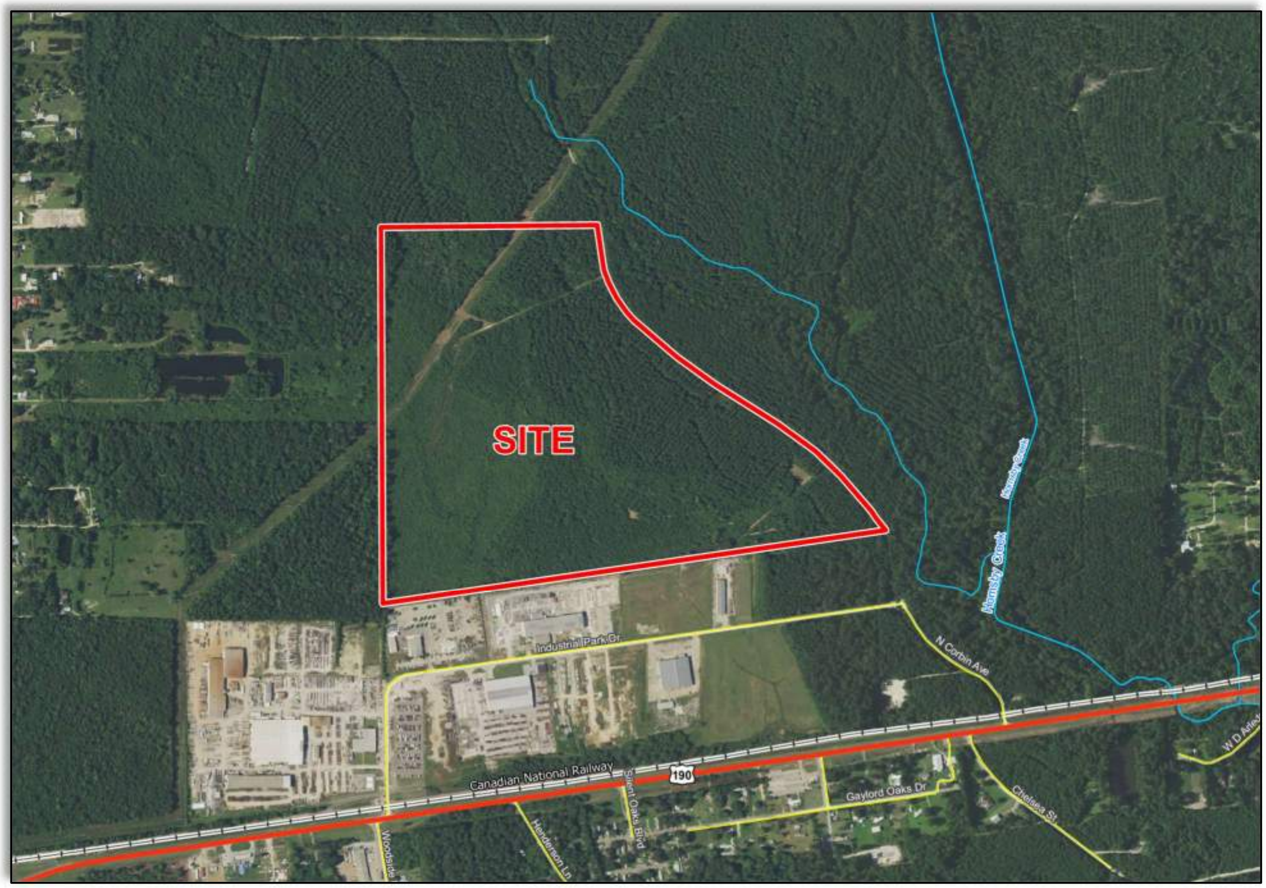
INTRODUCTION

The Hornsby Tract in Livingston Parish, Louisiana, represents a significant industrial development opportunity for Livingston Parish. The site benefits from proximity to US Highway 190, Interstate 12, potential rail connections, and is further supported by nearby City of Walker utilities. It well-suited for logistics, warehousing, and manufacturing users.

As part of LEDC's due diligence and planning efforts, Forte & Tablada has completed a drainage study, developed multiple conceptual site layouts, and coordinated geotechnical exploration for the purposes of roadway typical section recommendations. This Master Plan Summary provides an overview of findings to date, offering LEDC and its stakeholders a framework to guide future decision-making and marketing of the property.



Source: Louisiana Economic Development Site Selection, Hornsby Tract (2025)
Figure 1: Project Site

SITE CONTEXT

The Hornsby Tract encompasses approximately 127 acres located north of US 190 in Livingston Parish, just outside the City limits of Walker, adjacent to Industry Way and Hornsby Creek. The property benefits from excellent proximity to major transportation infrastructure, including US Highway 190 (0.3 miles), Interstate 12 (2.4 miles), and the Canadian National (CN) rail mainline (0.3 miles). There are multiple regional airports and ports are within a 20–35 mile radius. These multimodal connections support long-term flexibility for logistics, manufacturing, and distribution uses.

The tract is LED Certified, meaning it has passed due diligence reviews for environmental, wetlands, cultural resources, title, and soils, making it a 'shovel-ready' property for development. Certification documentation, including wetlands delineations, cultural resources reports, and utility service maps, has already been compiled through LED. This information is all available online through the LED Partners.

Main site utilities are provided by the City of Walker and Entergy, with natural gas, electric, water, sewer, and telecommunications infrastructure available along Industry Way. Existing service provides a baseline level of support for development; however, future phases may require upgrades to meet the demands of large-scale users. The City of Walker continues to be supportive of utility expansions necessary for development.

From a planning perspective, the Hornsby Tract’s location, certification status, and infrastructure framework provide a solid foundation for a large scale development.

DRAINAGE & FLOODPLAIN INFORMATION

The Hornsby Tract lies within the Hornsby Creek watershed, an area historically prone to flooding even prior to the 2016 parish wide flood. Hornsby Creek (due east of the site) has limited capacity and frequently overtops its channel during major rainfall events. Because of this, any new development must carefully account for fill mitigation, floodplain storage, and downstream impacts. The site BFE ranges from 48 ft to 50 ft at the northern end of the property. Average property elevation is between 46’-47’.

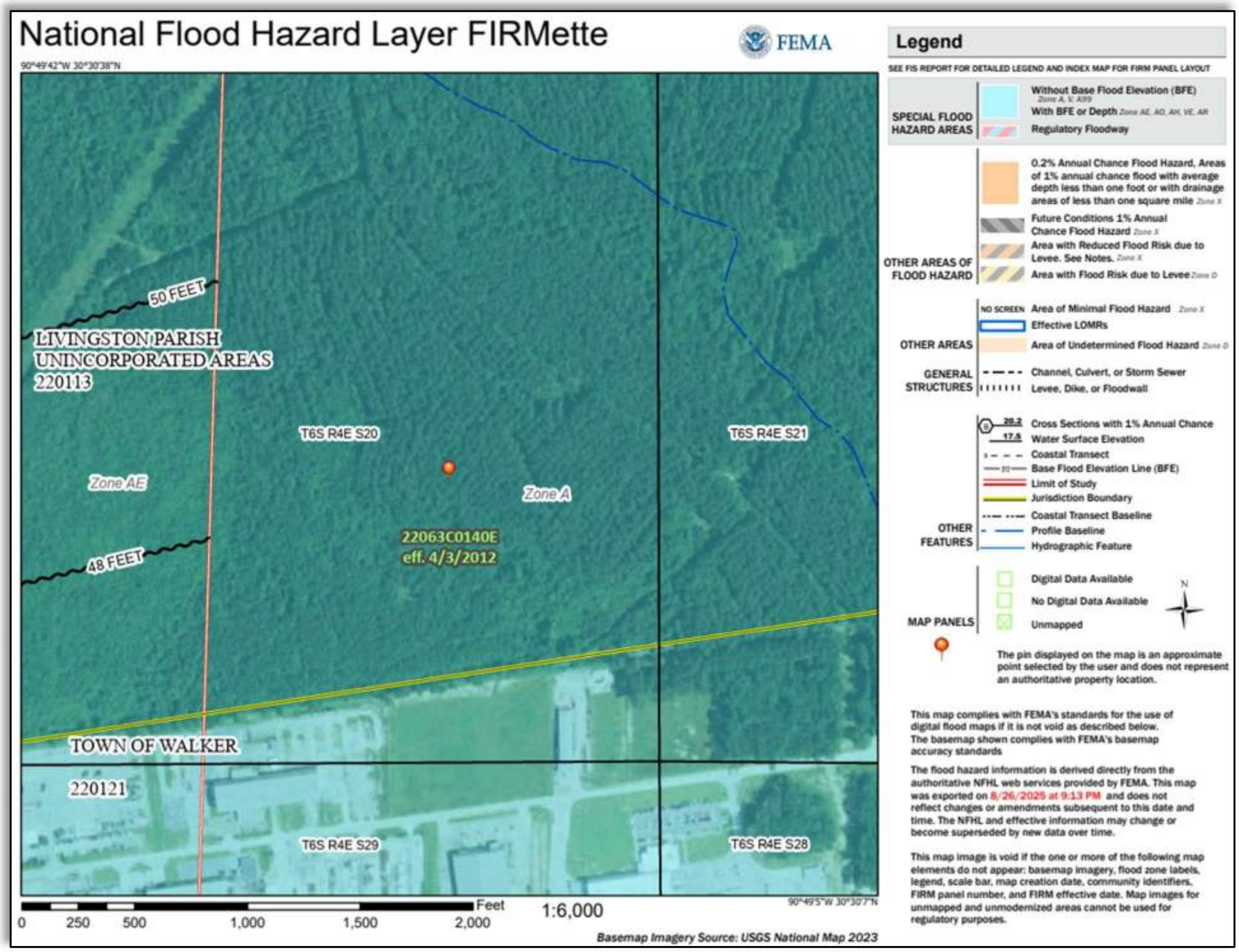


Figure 2 - FEMA FIRMette for Hornsby Site

Floodplain Requirements: Livingston Parish requires that new construction be elevated a minimum of 2 feet above Base Flood Elevation (BFE). To achieve this, a significant volume of fill is anticipated across portions of the site. Parish rules also require on-site mitigation ponds to offset fill placed within the floodplain.

Watershed Connectivity: The tract's drainage ties into Hornsby Creek to the east, which flows south to Colyell Creek, then ultimately drains to the Amite River, near the Port Vincent area. An approximate 25-foot-wide existing channel adjacent to the site (south property boundary) provides an outlet connection for proposed detention ponds to Hornsby Creek, creating a feasible stormwater management strategy.

The site is located within a sensitive floodplain environment but has been carefully studied to demonstrate that industrial development is possible with mitigation. Fill requirements, detention ponds, and regulatory compliance will be the driving factors shaping site layouts. Drainage improvements at Hornsby also present an opportunity to add community-wide resilience benefits by improving storage and reducing peak flows downstream. This is due to the fact that the detention ponds will be sized for fill mitigation, rather than sized by development runoff and detention requirements.

H&H Study Findings: Modeling of the site under multiple storm scenarios confirmed that, with properly sized mitigation ponds, development can occur without adverse impacts downstream. Two fill pond sizes (32 acres and 14 acres) were analyzed; both scenarios produced negligible changes in water surface elevations, with minor increases limited to undeveloped areas north of the site. Additional informaiton can be found in the referenced Hornsby Tract Drainage Hydrologic and Hydraulic Report (Attachment 8).

Key Results:

- With properly designed fill mitigation ponds, the site development is not expected to negatively impact surrounding developed areas.
- Two fill mitigation pond scenarios were tested:
    - 32-acre pond (max fill mitigation): Negligible local changes in water surface elevation (-0.035' to +0.005'). (See Figures 2 and 3 – following pages)
    - 14-acre pond (1.5M SF building scenario): Similarly negligible local changes in water surface elevation (-0.024' to +0.03'). (See Figure 4 and 5 – following pages)
- Any large scale increases in water surface elevation are minor (<0.2 ft) and restricted to undeveloped areas north of the site, but could likely be mitigated through design.
- Downstream impacts are expected to be neutral to slightly beneficial.

Further, while our modeling efforts and proposed alternatives were based on existing parish fill mitigation requirements, we did have some coordination with officials in determining the BFE for the site. Due to the site being denoted as majority Zone A, the site's BFE was previously determined based on BFE elevations of an adjacent watershed. It was noted during those conversations it would be possible to get the sites' BFE reduced so long as an appropriate model was provided to the Parish (ultimately for USACE approval) showing the updated 100 year flood elevations represented over the project site.

It may be possible to use the existing conditions of the model provided to help in this effort. It is estimated based on our model that the BFE of the site should be approximately 2-2.5 ft lower than what was previously determined thus reducing the amount of on-site fill mitigation required. Regardless, all modeling efforts were completed assuming this was NOT the case, in order to be conservative.

- See Next Page -

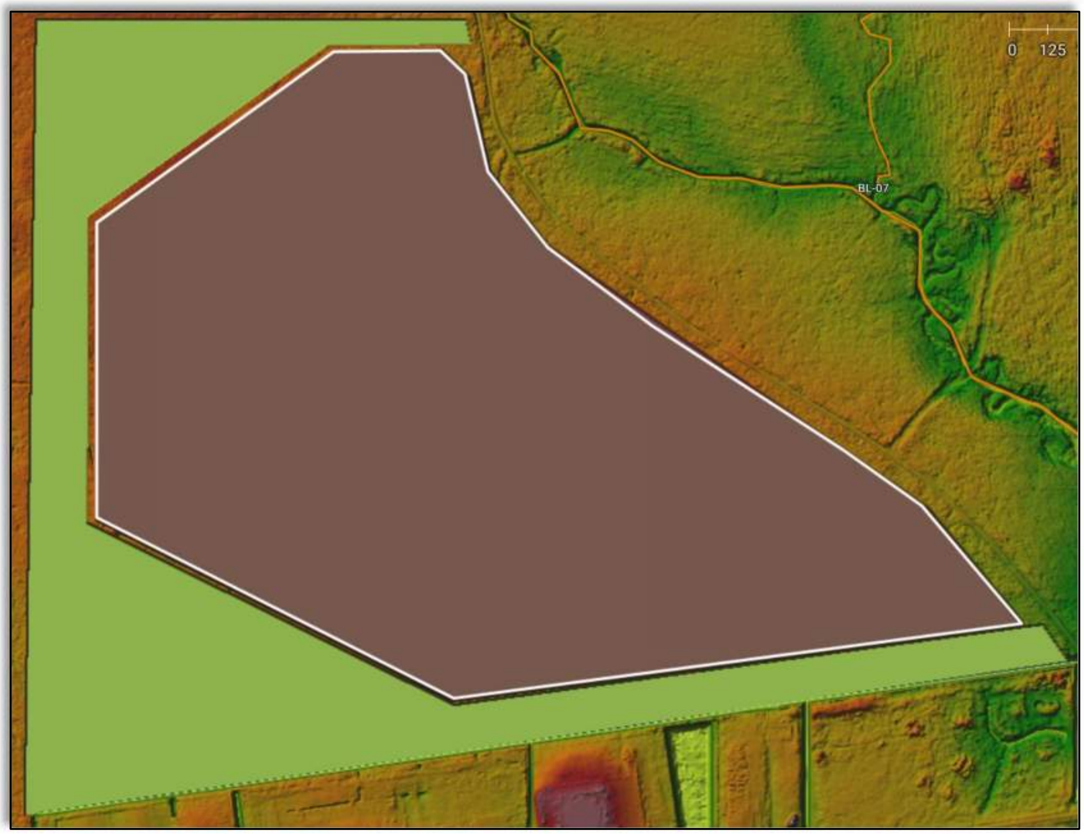


Figure 3 – Potential Layout Alternative 1 (Maximum Allowable Fill Area While Still Meeting Fill Mitigation Requirements)

Figure 4 – Water Surface Elevation Difference (Existing vs. Proposed 1) for Northern Portion of Model

Figure 5 – Potential Layout 2 (1,500,000 sq ft Building footprint and Required Fill Mitigation Pond)

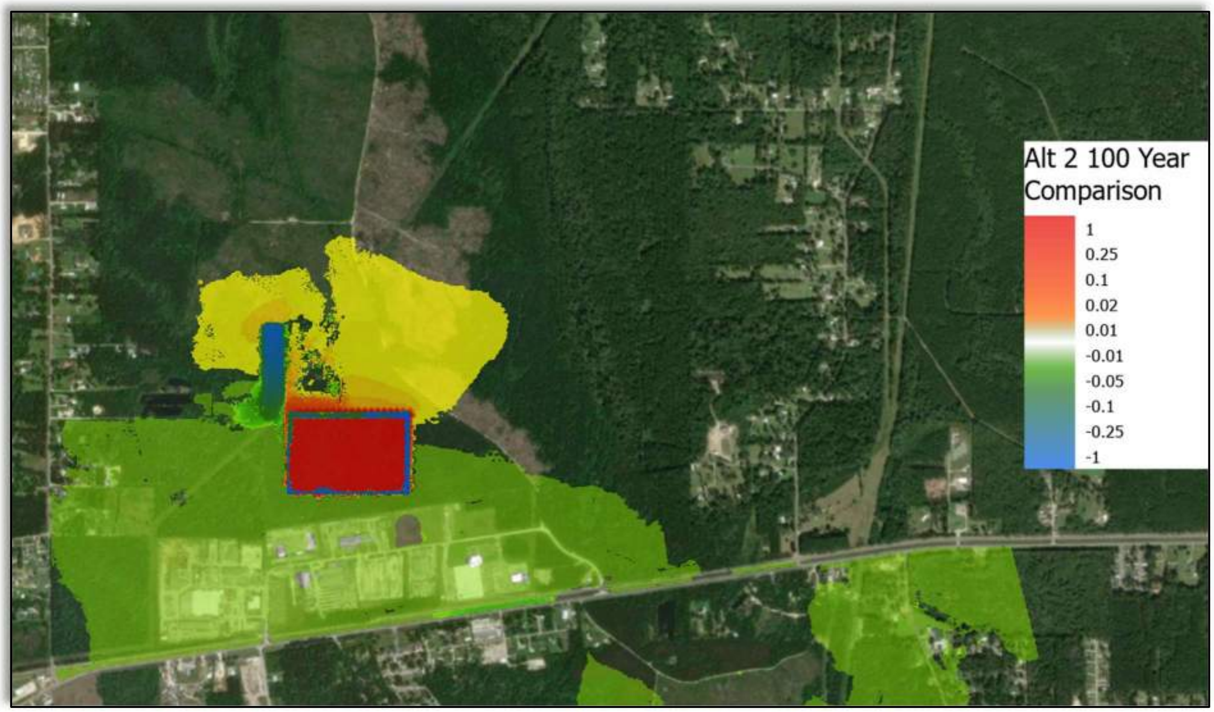


Figure 6 – Water Surface Elevation Difference (Existing vs. Proposed 2) for Northern Portion of Model

Conceptual Site Layout Options

Three preliminary layouts were prepared to illustrate flexibility of the potential site development options. In all cases they depict a developed site that accommodates the fill mitigation and detention needs, while considering concept level building and parking layouts. Because of the fill necessary and pond and drainage locations, all layouts are expected to accommodate onsite stormwater drainage (sub-surface) as needed for building and parking layouts.

Mega Industrial Warehouse (Non-Rail, 1M SF) – Exhibit 1 (Attachment 1)

- Single large footprint option <u>without</u> rail service, focusing on regional trucking.
- Maximizes efficiency and bulk storage potential. Shows 43 acres of parking and/or storage laydown outside of building.
- Pond size based on maximum fill mitigation requirements (conservative)
- Proposed roadway (and utility) access on east side of property, following existing Industry Way connection to US 190.

Multi-Tenant Warehousing Concept (40k–100k SF buildings) Exhibit 2 (Attachment 2)

- Multiple mid-sized buildings with shared access and stormwater facilities.
- Appeals to distribution and light-industrial tenants requiring 10–20 acre parcels (as shown). Could be parceled into any number of lots for various needs.
- Pond size based on maximum fill mitigation requirements (conservative). Likely could be significantly reduced based on tenant buildout needs.
- Proposed roadway (and utility) access on east side of property, following existing Industry Way connection to US 190.

Mega Industrial Warehouse (Rail-Served, 1M SF) Exhibit 3 (Attachment 3)

- Single large building footprint with rail access possibility shown.
- Targets large-scale logistics or advanced manufacturing operations. Shows 41 acres of parking and/or staging outside of building.
- Pond size based on maximum fill mitigation requirements (conservative)
- Proposed roadway (and utility) access on east side of property, following existing Industry Way connection to US 190.

Geotechnical and Roadway Considerations

Premier Geotech and Testing, LLC (Premier) completed a subsurface exploration and geotechnical engineering report, a summary and discussion of which is found below, with the full report included as Attachment 7.

Subsurface Conditions

Borings across the Hornsby Tract encountered predominantly lean and fat clays to depths of ~13 feet, underlain in places by very soft lean clay and medium dense silty sands. These soils are moisture-sensitive, with potential for instability under wet construction conditions. Groundwater was recorded between 5 and 8 feet below existing grade, consistent with proximity to Hornsby Creek and seasonal fluctuations.

Culvert Crossings

Two roadway culvert crossings were planned for in the attached report. The western culvert crossing, expected to be Four (4) – 5'W x4'H Reinforced Concrete Box Culverts, and the eastern crossing at the existing logging road, expected to be Three (3) 6'Wx5'H Reinforced Concrete Box Culverts.

Based on borings near the culvert locations, Premier recommends:

- Allowable bearing pressure: ~1,150 psf at 6–8 feet below grade.
- Culvert foundation system: Reinforced Concrete Box (RCB) culverts sized at four 5'x4' units (west crossing) and three 6'x5' units (east crossing).
- Bedding system: "Burrito-wrapped" system of geotextile + geogrid + 12" limestone bedding to stabilize foundations and prevent migration of fines.

Pavement Recommendations

Using warehousing traffic assumptions (~1,780 ADT, with 30% truck traffic), Premier recommends the following paving section (minimum):

- **8.5" Portland Cement Concrete (PCC) over 8" compacted aggregate base, placed on geotextile fabric / proof-rolled subgrade.**
- Class II crushed stone or recycled crushed concrete, compacted to 95% Standard Proctor density.

Earthwork & Fill Placement

Because the site soils (fat/lean clays) are highly moisture-sensitive, they will rut or deflect if worked wet. Construction should be mindful that over-excavation and replacement with structural fill may be required, particularly during wet months. The report notes that for estimating and planning purposes an average ground stripping depth of 4” to 8” should be anticipated. It is expected that roadways may require additional sub-base conditioning or replacement as well due to soil conditions.

Summary

The Hornsby Tract subsurface conditions are typical for south Louisiana: clays with high plasticity, sensitive to moisture, and shallow groundwater. With proper preparation (proof rolling, structural fill, stabilized bases, and geosynthetic reinforcement), the soils are suitable for supporting industrial roadways, heavy truck traffic, and culvert crossings. Successful construction will depend on strict moisture control, timing earthwork in dry conditions, and adherence to geotechnical monitoring during fill and bedding placement.

Utility Infrastructure Summary

Based on information previously provided by the City of Walker, and our system familiarity in working with their water and sewer teams.

Water

The existing (nearby) water system is comprised of an 8” line through the Industrial Park, along Industry Way, with adequate expansion capacity. Should a development require significant upgrades, the City of Walker has been willing to provide support and system expansion as needed, with appropriate development assistance.

- Existing production capacity of ~800–900 gpm at ~40 psi residual pressures within the park.
- 12,500-gal pressure tank and 100,000-gal storage tank located on Industry Way (supports steady pressures and additional fire suppression capacity).
- Full development or industry buildout may require additional on-site storage tanks, or booster pumps, to support fire suppression needs.
- See Attachment 4 – Water Utility Exhibit for location information

Wastewater

The existing (nearby) wastewater system is comprised of 8” gravity main along Industrial Way feeding Lift Stations #12 and #24. Should a development require significant upgrades, the City of Walker has been willing to provide support and system expansion as needed, with appropriate development assistance.

- Existing total system capacity ~175 gpm, available capacity expected to be approximately less than 50%.
- For a large scale sewer user, system upgrades are likely necessary, such as pump station upgrades and/or force main installations.
- Overall city system has capacity for future upgrades, and City has noted willingness to discuss treatment plant options nearby as necessary to support development.
- See Attachment 5 – Wastewater Utility Exhibit for location information

Natural Gas

The existing natural gas system within the park consists of a 4” high-pressure line (200# MAOP, ~150 psi) with secondary 2” low-pressure lines serving the park at ~35 psi. The City of Walker has been willing to provide support and system expansion in the past, and should be contacted for energy needs.

- Existing pressures are adequate for typical warehouse and light manufacturing.
- Energy-intensive users should coordinate with City of Walker. Further, industrial gas rates are negotiated.
- See Attachment 6 – Gas Utility Exhibit for location information

Attachment 1

NOTES:

1. BASE FLOOD ELEVATION (BFE) IS 50.0 FEET AT THE NORTH END OF THE SITE AND 48.0 FEET AT THE SOUTH END. FINISHED FLOOR ELEVATION (FFE) FOR THE BUILDINGS HAS THEREFORE BEEN ASSUMED TO BE 51.0 FEET.

ACRES	DESCRIPTION	LEGEND
127	TOTAL ACREAGE OF THE HORNSBY TRACT	
43	PARKING	(yellow)
40	DETENTION BASIN	(blue)
27	WAREHOUSE/STORAGE FACILITY	(hatched)
14	GREEN SPACE	(green)
3	ROADWAY	(red)

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Nicholas J. Falgout, P.E.
LA License No. 46785
Forte and Tablada, Inc.

REVISIONS

FORTE & TABLADA
1010 Marshall Street
Shreveport, LA 71101
318.798.3344

HORNSBY TRACT
LIVINGSTON PARIISH, LOUISIANA

MEGA INDUSTRIAL WAREHOUSE CONCEPT (1M S.F.)

ATTENTION:
THIS BAR = 1 INCH ON ORIGINAL DRAWING.
ADJUST SCALE IF THIS BAR ≠ 1 INCH.

PROJECT NO: 231269

DATE: JUNE, 2025

SHEET NO. EX. 1

231269 HORNSBY EXHIBIT 1

Attachment 2

NOTES:

1. BASE FLOOD ELEVATION (BFE) IS 50.0 FEET AT THE NORTH END OF THE SITE AND 48.0 FEET AT THE SOUTH END. FINISHED FLOOR ELEVATION (FFE) FOR THE BUILDINGS HAS THEREFORE BEEN ASSUMED TO BE 51.0 FEET.

ACRES	DESCRIPTION	LEGEND
127	TOTAL ACREAGE OF THE HORNSBY TRACT	
14	PARKING/ROADWAY	
40	DETENTION BASIN	
20	WAREHOUSE FACILITIES	
53	GREEN SPACE	

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HORNSBY TRACT
LIVINGSTON PARIISH, LOUISIANA
MULTI TENANT WAREHOUSE CONCEPT (40K-100K S.F.)

ATTENTION: THIS BAR = 1 INCH ON ORIGINAL DRAWING. ADJUST SCALE IF THIS BAR ≠ 1 INCH.

PROJECT NO: 231269

DATE: JUNE, 2025

SHEET NO. EX. 2

231269 HORNSBY EXHIBIT 2

Attachment 3

NOTES:

1. BASE FLOOD ELEVATION (BFE) IS 50.0 FEET AT THE NORTH END OF THE SITE AND 48.0 FEET AT THE SOUTH END. FINISHED FLOOR ELEVATION (FFE) FOR THE BUILDINGS HAS THEREFORE BEEN ASSUMED TO BE 51.0 FEET.

ACRES	DESCRIPTION	LEGEND
127	TOTAL ACREAGE OF THE HORNSBY TRACT	
41	PARKING	
40	DETENTION BASIN	
27	WAREHOUSE/STORAGE FACILITY	
14	GREEN SPACE	
6	RAIL	
3	ROADWAY	

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HORNSBY TRACT
LIVINGSTON PARIISH, LOUISIANA

MEGA INDUSTRIAL WAREHOUSE CONCEPT (RAIL)
(1M S.F.)

ATTENTION:
THIS BAR = 1 INCH ON ORIGINAL DRAWING. ADJUST SCALE IF THIS BAR ≠ 1 INCH.
1"

PROJECT NO: 231269

DATE: JUNE, 2025

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231269 HORNSBY EXHIBIT 3

Attachment 4

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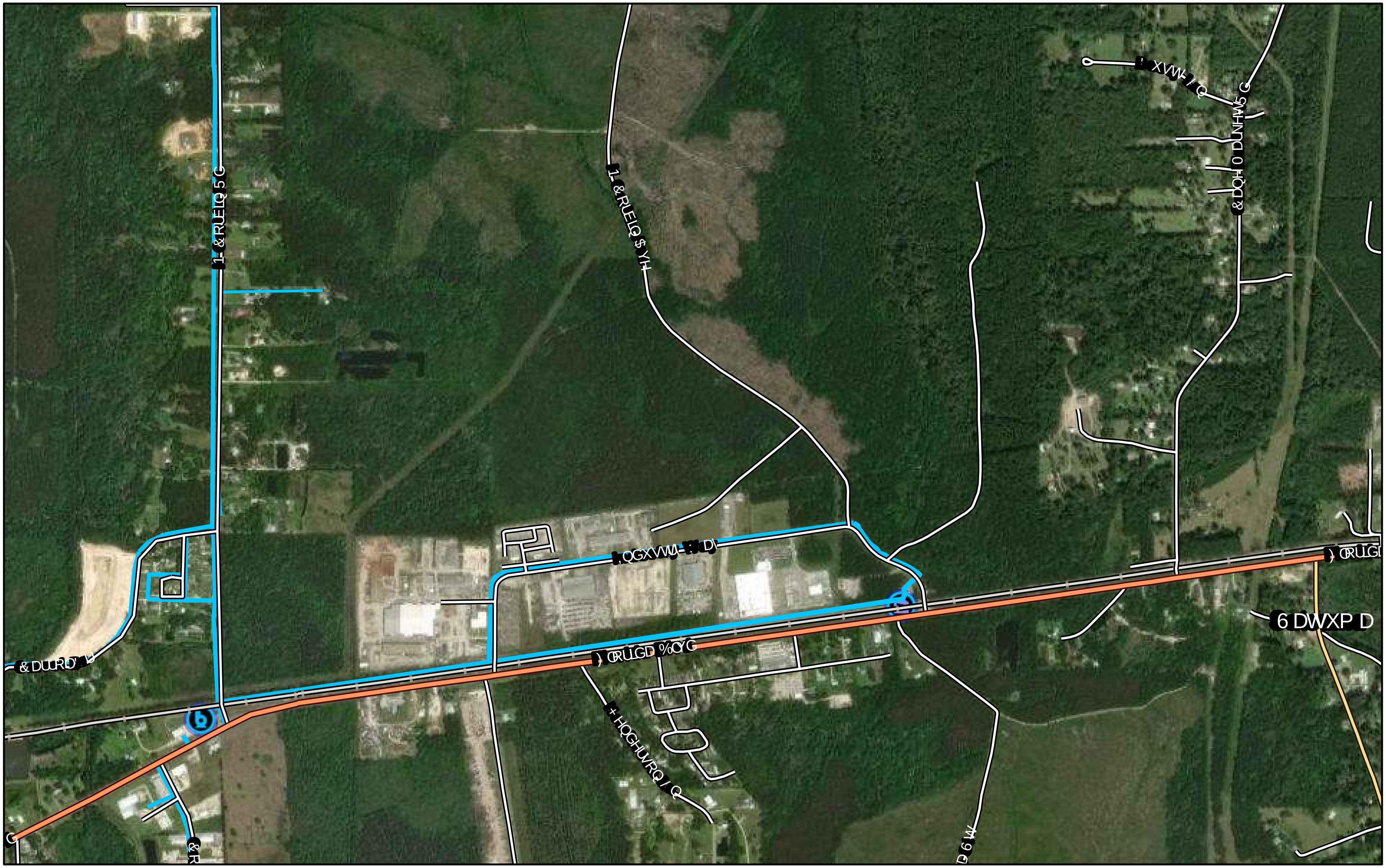

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Attachment 5

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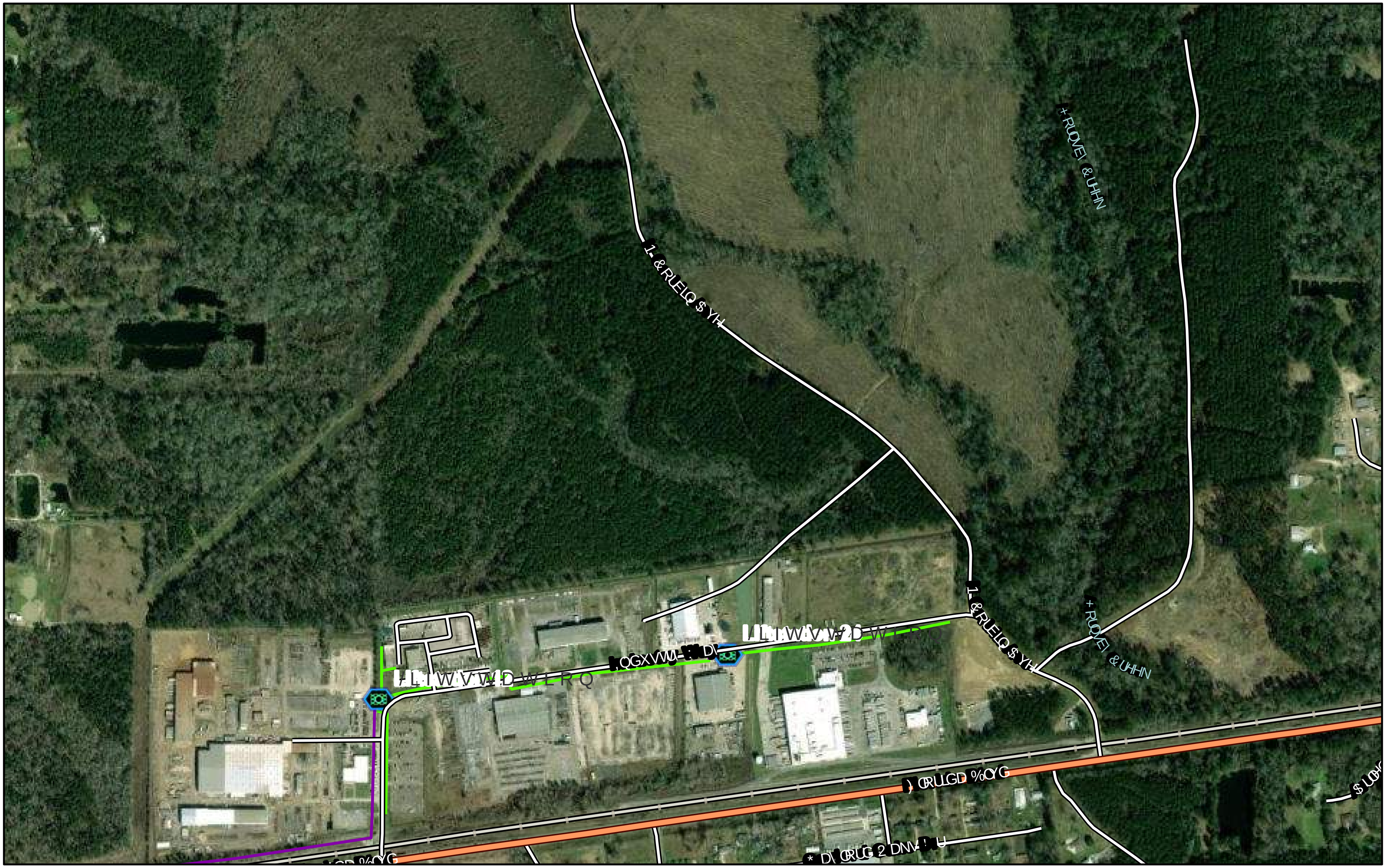

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Attachment 6

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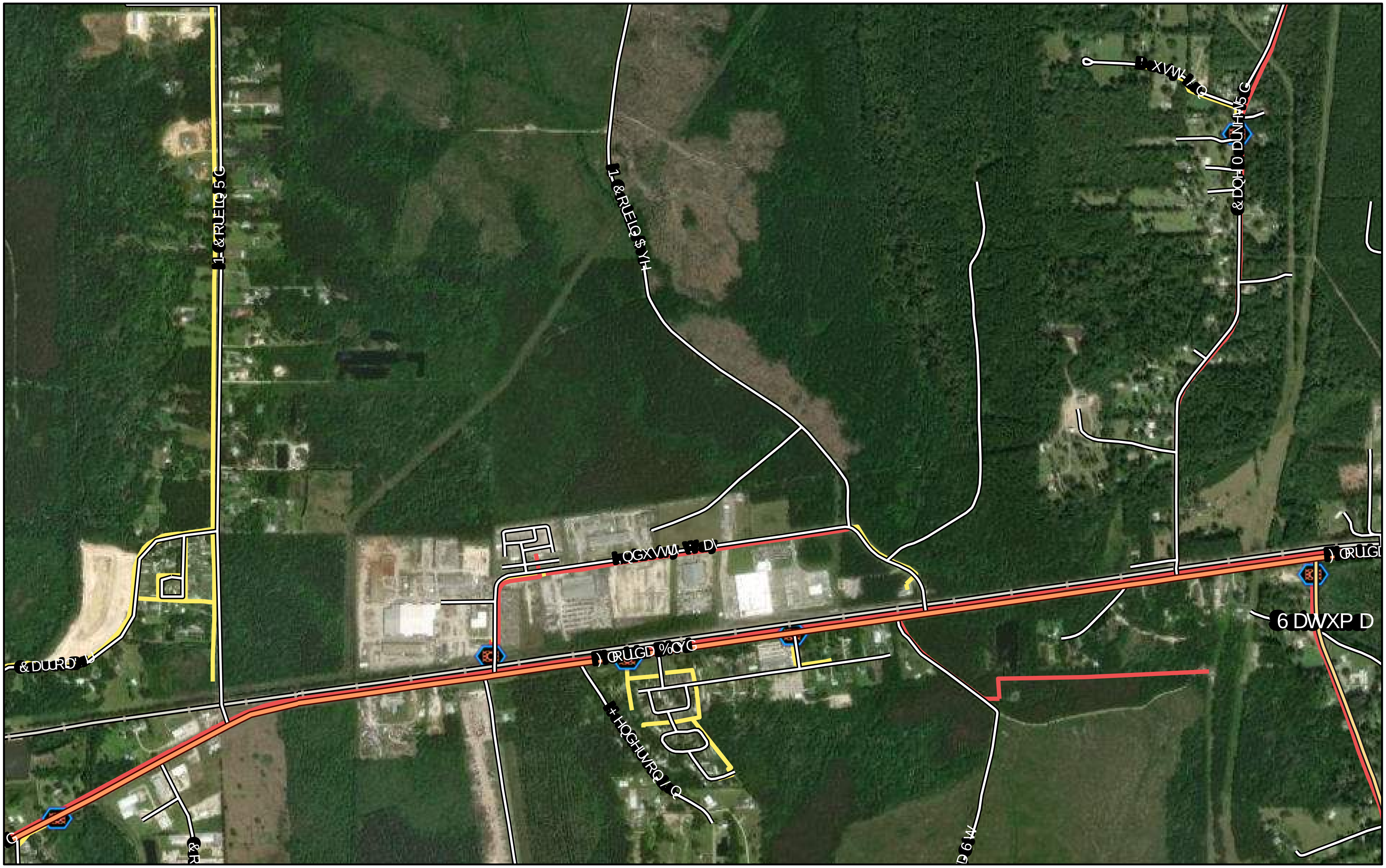

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6RXUFHV (VUL 7RP7RP *DUPLQ)$2 12$$ 86*6 ‹
FRQWULEXWRUV DQG WKH *,6 8VHU &RPPXQLW\ 0D[DU

Attachment 7

Premier GEOTECH AND TESTING, LLC

Subsurface Exploration and Geotechnical Engineering Report

Proposed Hornsby Tract Project
Walker, Louisiana
F&T Project No.: 231269
Premier File No.: 24-0486

Prepared for:

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Prepared by:

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CIVIL ENGINEERING

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Paris J. Du Vernay III, E.I.
Geotechnical Engineer Intern

Ryan A. Williamson, P.E.
Geotechnical Project Engineer

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INTRODUCTION

Premier Geotech and Testing, LLC (Premier) is pleased to present this Subsurface Exploration and Geotechnical Engineering Report for the Hornsby Tract Project located in Walker, Louisiana. Our services were performed in general accordance with the executed agreement between Premier and Forte and Tablada, Inc., signed by Mr. Chad Bacas on June 9, 2025.

PROJECT DESCRIPTION

The proposed project will consist of the design and construction of new, industrial-focused roadways with proposed reinforced concrete box (RCB) culverts (with headwalls and/or wingwalls) placed within an existing ditch at two separate crossings. The proposed project site is north of US Highway 190 (Florida Boulevard) just north of Industry Way in Walker, Louisiana.

Premier drilled and sampled four (4) soil borings to depths ranging from approximately ten (10) to twenty-five (25) feet below the existing top of pavement/grade. The borings were sampled at 2-foot intervals to 10 feet and thereafter at 5-foot intervals to boring termination depth. Sampling was completed using thin-walled Shelby tubes or split spoon samplers in general accordance with ASTM procedures. See the Test Location Plan in the Appendix for soil boring locations.

The geotechnical recommendations presented in this report are based on the available project information at the time of this report and the subsurface materials information obtained from the subsurface exploration performed for the project as described herein. If any of the information included in this report is incorrect, please inform Premier in writing so that we can amend the recommendations presented in this report if appropriate and if desired by the Client. Premier will not be responsible for the implementation of its recommendations when it is not notified of changes in the project.

SITE CONDITIONS

Subsurface Conditions

The encountered subsurface soil generally consists of alternating layers of medium stiff to very stiff lean and fat clays to a depth of about thirteen (13) feet. Below thirteen (13) feet, the soil borings showed differing soil profiles. At B-1, medium stiff fat clay was encountered from about thirteen (13) to twenty-five (25) feet, the maximum depth explored. At B-2, a very soft layer of lean clay was encountered from thirteen (13) feet to eighteen (18) feet followed by a layer of medium dense silty sand to twenty-five (25) feet, the maximum depth explored.

The above subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring logs included in the Appendix should be reviewed for specific information at individual boring locations. These records include soil descriptions, stratifications, and laboratory test data. The stratifications shown on the boring tables are approximate and represent the conditions at the actual boring locations only. Variations may occur and should be expected between test locations. The stratifications represent the approximate boundary between subsurface materials, and the actual transition may be gradual. Samples not altered by laboratory testing will be retained for a period of thirty (30) days from the date on this report and then will be discarded.

Groundwater Conditions

Free groundwater was encountered at depths ranging from about **five (5) feet to eight (8) feet** below existing site grade at the time of our field exploration. However, it should be noted that groundwater level fluctuations may occur due to the water level in nearby Hornsby Creek, seasonal and climatic variations, alteration of drainage patterns, land usage, and ground cover, and could affect excavation activities. We recommend the Contractor determine the actual groundwater levels at the time construction activities begin.

CULVERT RECOMMENDATIONS

Allowable Soil Bearing Pressure

Our culvert recommendations are presented in this section. We mainly considered the subsurface soil conditions encountered in soil borings B-1 and B-2 performed near the proposed culvert locations as well as our experience with similar soil conditions and the provided/assumed design requirements to develop the recommendations discussed herein.

Based on the subsurface soil conditions encountered in our B-1 and B-2 soil boring locations and the project details discussed with the project design team, the proposed culverts may be designed for a net allowable bearing pressure as listed in the table below.

Boring Number	Allowable Bearing Pressure (psf)	Approximate Bearing Depth Below Existing Ground at Soil Boring (feet)	Recommended Bedding Material Thickness (inches)	Culvert Size/Type
B-1 (western crossing)	1,150	6 to 7	12	Four (4) – 5'W x 4'H x 60'L RCB Culverts
B-2 (eastern crossing)	1,150	7 to 8	12	Three (3) – 6'W x 5'H x 60'L RCB Culverts

The culvert excavations should be observed by a representative of Premier prior to placement in order to assess the condition of the subsurface materials is consistent with the materials discussed in this report. Soft or loose soil zones encountered at the bottom of the excavations should be removed and replaced with properly compacted structural fill as directed by the Geotechnical Engineer or a representative of Forte and Tablada.

After opening, excavations should be observed, and the culvert bedding material (discussed in the following section) should be placed as quickly as possible to avoid exposure of the subsurface material to wetting and drying. Surface run-off water should be drained away from the excavation and not be allowed to pond. The culvert bedding should be placed during the same day the excavation is made. If it is required that foundation excavations be left open for more than one day, they should be protected to reduce evaporation or entry of moisture.

Culvert Bedding and Backfill Recommendations

Based on the subsurface soils encountered in our soil borings, Premier recommends a geotextile/bedding system under the proposed culverts and headwalls/wingwalls consisting of one (1) layer of geofabric laid upon the exposed, stable subgrade overlaid by a geogrid (BX1200 or equivalent) overlaid by 12-inches of compacted 610 limestone bedding material. The geofabric placed on the stable subgrade should extend up the trench walls and extend/lay at least two (2) feet on top of the compacted 610 limestone base to create a 'burrito wrap' effect. Please refer to the table in the *Allowable Soil Bearing Pressure* section for anticipated culvert bearing depths. All geotextile fabric and grid installations must follow the manufacturer's recommendations.

Bedding and initial backfill material shall be placed in accordance with Section 726 and Section 701.08.3 using Type A backfill material, respectively, of the latest edition of the Louisiana Standard Specifications for Road and Bridges (LSSRB). Separating course granular backfill from fine granular backfill and separating granular backfill from natural materials in the trench sides and bottoms with geotextile fabric will prevent mixing and migration.

Bedding material should comprise of crushed limestone or RPCC and meet the requirements under Section 1003.10 in the latest edition of the LSSRB manual. Initial backfill material shall meet the requirements for Type A material as stated in Section 701.08.1 in the latest edition of the LSSRB. Both materials must be certified and approved by the Geotechnical Engineer prior to its use.

The bedding and backfill material shall be deposited in lifts of eight (8) inches of loose material. Each lift shall be compacted and certified by the Geotechnical Engineer or a representative prior to placement of other lifts. The passing criteria shall be 95% of the maximum dry density as determined by ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)), and a moisture content between +/- two (2) percentages of the optimum moisture content. In-place field density tests should be performed at a minimum frequency as listed in the "Fill Material Testing and Specifications" table in the *EARTHWORK RECCOMENDATIONS* section of this report. Since these testing services are within Premier's scope of activities, we urge that our firm be retained to assist during the earthwork phase of this project.

The above compaction and backfill requirements are for areas under and/or within five (5) feet from any existing infrastructure, edge of roadways or other traffic ways, and structures. For areas outside and away from the aforementioned infrastructure, the contractor should achieve no less than 90% of the maximum dry density (ASTM D698) for backfill materials.

PAVEMENT RECOMMENDATIONS

Pavement Sections

Actual anticipated traffic type and frequency were not known at the time of this report. However, based on experience with similar projects and assumptions from the ITE Trip Generation (8th edition) Warehousing (ITE Code 150), Premier assumed an **average two-way daily traffic (ADT) of 1,780 vehicles**, The ADT is assumed to consist of 70% passenger vehicles (FHWA Class 1, 2 and 3), 20% delivery truck traffic (FHWA Class 4, 5, and 6), and 10% semi-truck traffic (FHWA Class 8, 9, and 10). Premier assumed pavement-related design parameters that are considered typical for the existing soil types at the project site.

Below are project specific design parameters used to develop the recommended pavement sections using PaveXpress software and our discussion with the design team:

Rigid Pavement Design Parameters:

Design Period	20 years
Reliability	85%
Deviation	0.35
Initial Serviceability	4.2
Terminal Serviceability	2.0

Rigid Pavement Structure and Sub-Structure:

Modulus of Rupture	600 psi
Modulus of Subgrade Reactions, k	110 psi/in
Drainage Coefficient	1.0 Pavement; 0.9 Base
Base Modulus	21,000 psi – Class II Base
Slab/Base Friction Coefficient	1.1

With the aforementioned parameters, it is possible to use a typical “standard” pavement section consisting of the following:

USAGE	RIGID PAVEMENT (Concrete)
Industrial Vehicle Drives	8.5 inches of concrete over *8 inches compacted base course over **Nonwoven geotextile fabric on proof rolled stable subgrade
* See *Base and Sub-Base Recommendations* section below ** Mirafi 150N nonwoven geotextile or equivalent	

The pavement subgrade, subbase, base and pavement shall be prepared in accordance with the latest edition of the Louisiana Standard Specifications for Road and Bridges (LSSRB) and the recommendations provided in this report. The recommended pavement thicknesses presented above are considered typical and minimum for the encountered soils and given/assumed design parameters for this site. The Client, the Owner, and the Project Designers should be aware that thinner pavement/base sections may result in increased maintenance costs and lower than anticipated pavement life.

The use of recycled crushed concrete is an approved aggregate base alternative to crushed stone. The aggregate base shall meet the requirements of the latest edition of the LSSRB, Sections 1003.3.3.1 and 1003.3.2.

The subbase course shall be compacted to at least 95 percent of its maximum dry density at ±2 percent for cohesive material (±3 percent for cohesionless material) of the optimum moisture content in accordance with ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).

Pavement materials may be placed after the subgrade or structural fill has been properly proof rolled or compacted, and fine-graded. These activities shall be accomplished following the LSSRB construction guidelines.

Proper finishing of concrete pavement requires the use of appropriate construction joints to reduce cracking. Construction joints shall be designed in accordance with the current Portland Cement Association and the American Concrete Institute guidelines. Joints should be sealed to reduce the potential for water infiltration into the supporting soils. The design of steel reinforcement should be in accordance with current accepted codes.

Asphaltic concrete should meet the requirements of Part V of the latest edition of the LSSRB. The aggregate base should meet the requirements of Sub-Section 1003.03.1 or 1003.03.2 of the LSSRB. The base and structural fill should be compacted to at least 95 percent of the maximum dry density at ±2 percent for cohesive material (±3 percent for cohesionless material) of the optimum moisture content in accordance with ASTM D698.

Water should not be allowed to pond behind curbs and saturate the base. In down grade areas, the granular base shall extend through the slope to provide an exit path for any water accumulating under the pavement.

*Base and Sub-Base Recommendations

Crushed Stone/Recycled Concrete Aggregate Material

Properly graded crushed stone or recycled crushed concrete meeting the requirements of Class II base and Sections 1003.03.1 and 1003.03.2 of the LSSRB should be utilized beneath the pavements where specified in the *Recommended Pavement Sections* table presented in this report. The aggregate base material should be placed in accordance with LADOTD Section 302 and compacted to at least 95 percent of the maximum dry density as determined by ASTM

D698 using a smooth pad roller. Placement and compaction of the aggregate material should be near optimum moisture.

EARTHWORK RECOMMENDATIONS

Site Preparation

Silty soils and other moisture sensitive materials are commonly encountered in this area of Louisiana. Therefore, caution should be used when performing construction activities as this type of soil can become unstable, especially during the wetter portions of the year or when exposed to construction traffic. Therefore, over excavation and replacement with properly compacted structural fill material of these near surface silty and moisture sensitive soils within the roadway alignment, extending to at least (1) foot behind the back of curb, may be required to pass a proof-roll.

Premier recommends that all existing slabs, pavements, base course, topsoil, stumps, vegetation, roots, soft, organic, or unsuitable soils in the construction areas be stripped in its entirety from the site and either wasted or stockpiled for later use in non-structural areas. After stripping operations are completed, and prior to any fill placement, proof rolling of the subgrade is required as discussed later in this report. It should also be noted that it is not unusual for topsoil thickness to vary from the values stated in this report in the open field. Oftentimes, topsoil can be deeper in low-lying areas, where erosion, wind and precipitation can deposit this material. For estimating purposes, Premier anticipates an average stripping depth of approximately **4- to 8-inches**, but this shall be verified by the Contractor(s) prior to bidding and construction. There may be areas of the site that require additional, or possibly less stripping for the reasons discussed above. A representative of Premier or the design team should determine and document the depth of removal at the time of construction.

The in-situ soils encountered at this project site may undergo a significant loss of stability when construction activities are performed during wetter portions of the year. Premier anticipates that the soils in the project area can become easily disturbed if subjected to conventional rubber tire or narrow track-type equipment and excessive moisture. Soils that become disturbed would need to be excavated and replaced; however, this remedial excavation may expose progressively wetter soils with depth, thus compounding the problem condition. Thus, a normal approach to subgrade preparation may not be possible. Appropriate wide-track equipment selection should aid in minimizing potential disturbance. In addition, and for these reasons, it will be advantageous to perform earthwork and foundation construction activities during dry weather.

Proof Rolling

After stripping to the proposed subgrade level as required, the proposed pavement footprint, extending to at least one (1) foot of the back of curb or edge of pavement, areas should be proof-rolled with a 20-25-ton, half-loaded tandem axle dump truck or similar

heavy rubber-tired vehicle (typically with an axial load greater than nine (9) tons) and observed by a representative from Premier. Soils that are observed to rut or deflect greater than one (1) inch under the moving load should be undercut and replaced with properly compacted structural fill material or rendered stable by using a combination of lime/ fly ash/ kiln dust. The proof-rolling and undercutting activities should be witnessed by a representative of Premier and should be performed during a period of dry weather. Care should be taken during construction activities not to allow excessive drying or wetting of exposed soils. The subgrade soils should be scarified and compacted to at least 95% of the materials' Standard Proctor maximum dry density, in general accordance with ASTM procedures, to a depth of at least twelve (12) inches below existing subgrade.

If moisture sensitive or saturated soils are encountered during the proof roll, replacing this material with a low plasticity compacted soil or a dense positively drained graded crushed stone/concrete may be required. Alternatively, lime-treatment of highly plastic clay can be accomplished to reduce the plasticity index, improve workability, promote drying, and reduce shrink/swell potential. A representative of Premier's Geotechnical Engineer should observe the subgrade soils, perform plasticity index tests, and estimate the approximate extent of the exposed fat clays. If it is desirable to modify the fat clays with a commercially available Class "C" fly ash or lime product, Premier recommends the actual application percent be determined by conducting a laboratory Class "C" fly ash or lime series test. The Geotechnical Engineer's representative should observe the remediation procedures for compliance with the project plans and specifications.

Fill Material and Placement

After subgrade preparation, and proof rolling and observation have been completed, fill placement required to obtain the proposed roadway elevation may begin. A representative of Premier should be on-site to observe, test, and document all placement of the fill. If the fill is too dry, water should be uniformly applied and thoroughly mixed into the soil by disking or scarifying. Close moisture content control will be required to achieve the recommended degree of compaction. It should be noted that high plasticity clays are typically more difficult to compact and achieve the optimum moisture content during the placement of fill. The following table details the recommended specifications for fill placement, testing, etc.

Fill Material Testing Specifications

SPECIFICATION	REQUIREMENT
Lift Thickness	Maximum 8-inch loose lifts when compacted with large heavy compaction equipment; Maximum 6-inch loose lifts when compacted with lightweight compaction equipment (thinner lifts may be required in confined locations)
Density	Minimum of 95 percent of maximum dry density as defined by ASTM D698 at all locations and depths.
Moisture	± 2 percent of optimum moisture as defined by ASTM D698 for cohesive soils. For cohesionless soils with greater than 12 percent passing the US Standard No. 200 sieve, ± 3 of optimum moisture as defined above. Moisture requirement is waived for cohesionless soils with less than 12 percent passing the No. 200 sieve.
Density Testing Frequency	One test per 2,500 square feet in pavement areas with a minimum of 3 tests per lift. One test per 200 feet of trench backfill and/or culvert bedding with minimum of 3 tests per lift, or as required by local government agencies.

Clay Structural Fill and Backfill Material

Clay fill materials used to achieve the proposed road elevation should be free of organics or other deleterious materials and have a maximum particle size of less than three (3) inches. Clay fill soils are required to have a liquid limit (LL) less than forty (40) and plasticity index (PI) between twelve (12) and twenty-two (22) and plots below the A-line on the plasticity chart, or as accepted by the Geotechnical Engineer of Record.

Granular Structural Fill and Backfill Material

Granular material may be used as an alternative to structural clay fill. Granular fill placed beneath structural features or slabs should be free of organic or other deleterious materials and have a maximum particle size of less than three (3) inches. Additionally, less than 12% of this material should pass the No. 200 sieve. Material used as structural fill should be tested and evaluated by the Geotechnical Engineer of Record.

Utility Trench and Culvert Backfill

Excavation for utility trenches shall be performed in accordance with OSHA regulations as stated in 29 CFR Part 1926. It should be noted that utility trench excavations have the potential to degrade the properties of adjacent fill materials. Utility trench walls that are allowed to move laterally can lead to reduced bearing capacity and increased settlement of adjacent structural elements and overlying slabs.

Backfill for utility/culvert trenches is as important as the original subgrade preparation or structural fill placed to support either a foundation or slab. Therefore, it is imperative that the backfill for utility trenches be placed to meet the project specifications for the structural fill for this project. If on-site soils are placed as trench backfill, the backfill for the utility trenches should be placed in four (4) to six (6) inch loose lifts and compacted to a minimum of 95% of the maximum dry density achieved by the Standard Proctor test (ASTM D698). The backfill soil should be moisture conditioned to be within 2% of the optimum moisture content as determined by the Standard Proctor test. Up to four (4) inches of bedding material placed directly under the pipes or conduits placed in the utility trench can be compacted to the 90% compaction criteria with respect to the Standard Proctor. Backfill of utility trenches should not be performed with water standing in the trench. If granular material is used for the backfill of the utility trench, the granular material should have a gradation that will filter protect the backfill material from the adjacent soils. If this gradation is not available, a geosynthetic non-woven filter fabric should be used to reduce the potential for the migration of fines into the backfill material. Granular backfill material shall be compacted to meet the above compaction criteria. The clean granular backfill material should be compacted to achieve a relative density greater than 75% or as specified by the Geotechnical Engineer for the specific material used.

Excavations

Excavations are expected to extend to a depth of six (6) to eight (8) feet below existing site grades. Free groundwater was encountered at a depth ranging from about five (5) to eight (8) feet below existing pavement at the time of our field exploration. Groundwater infiltration should be expected during construction of the culvert and could present construction challenges. Therefore, sloping or bracing should be anticipated to maintain wall stability. If braced, Premier recommends designing the bracing to resist the lateral earth pressure per foot of bracing as calculated below, assuming an in-situ soil unit weight (γ_{sat}) of 130 pounds per cubic foot (pcf), unit weight of water (γ_w) of 62.4, an at-rest earth pressure coefficient (K_0) of 0.5, and an excavation depth (z) of 8 feet.

$$\gamma_h(z) = K_0 (\gamma_{sat} - \gamma_w)\, z + \gamma_w z = 0.5 * (130\, pcf) * 8\, ft + 62.4\, pcf * 8\, ft = 1{,}019.2\, psf$$

$$Resultant\ Force\ per\ Foot\ of\ Bracing, P = 0.5 * \gamma_h(z) * z = 0.5 * 1.019\, psf * 8\, ft = 4{,}076.8\, lb/ft$$

$$Applying\ a\ Factor\ of\ Safety\ (FS) of\ 2, P_{required} = 4{,}076.8\, lb/ft * 2 = \mathbf{8,153\ lb/ft}$$

$$Location\ of\ P_{required}, h = 0.33 * 8 = \mathbf{2.7\ ft}\ (\mathbf{above\ bottom\ of\ 8 - foot\ excavtion})$$

In addition, the bracing load computed above includes only lateral earth and hydrostatic pressures from horizontal, existing ground and does not include any surface surcharges. Construction equipment, spoil piles, adjacent foundations, utilities, or other temporary loads near the excavation can significantly increase brace forces and deformations. The Contractor's temporary shoring designer shall identify and include all applicable and appropriate surcharges in the design. Temporary shoring and dewatering methods of the Contractor should be designed and approved by a licensed Professional Engineer.

A sump pump, or similar, within a shallow pit or depression excavation should be used to remove surface and groundwater infiltration. Please note that bracing the excavation by installing steel sheet piling with a vibratory hammer or any pile driving operations could adversely affect the foundations of nearby structures resulting in foundation settlement. If there are structures near the proposed culvert areas, we recommend determining their foundation types prior to the installation of sheet piling and implementing vibration monitoring during pile driving activities. As an alternative to driven sheet pile, press-in-methods should be considered for installation of sheet piles.

In Federal Register, Volume 54, Number 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, part 1926, Subpart P". This document was issued to better enhance the safety of workers entering trenches or excavations. It is mandated by this federal regulation that excavations, whether they be utility trenches, basement excavation or footing excavations, be constructed in accordance with the new OSHA guidelines. It is Premier's understanding that these regulations are being strictly enforced and if they are not closely followed, the Owner and the Contractor could be liable for substantial penalties.

<u>The Contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. Slope stability analyses and the design of sheetpile retaining structures were outside of Premier's scope of work</u>. The Contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the Contractor's safety procedures. In no case should slope height, slope inclination or excavation depth, including utility trench excavation depth, exceed those specified in local, state and federal safety regulations.

Premier is providing this information solely as a service to our Client. Premier does not and will not assume responsibility for construction site safety or the Contractor's or other parties' compliance with local, state and federal safety or other regulations.

REPORT LIMITATIONS

The concept of risk is an important aspect of the geotechnical evaluation. The primary reason for this is that the analytical methods used to develop geotechnical recommendations do not comprise an exact science. The analytical tools which Geotechnical Engineers use are generally empirical and must be used in conjunction with engineering judgment and experience. Therefore, the solutions and recommendations presented in the geotechnical evaluation should not be considered risk-free and, more importantly, are not a guarantee that the interaction between the soils and the proposed structure will perform as planned. The engineering recommendations presented in the preceding sections constitute Premier's professional estimate of those measures that are necessary for the proposed structure(s) to perform according to the proposed design based on the information generated and referenced during this evaluation, and Premier's experience in working with those conditions.

The recommendations submitted in this report are based on furnished project information by the design team and the subsurface information obtained from borings drilled by Premier. If there are any revisions to the plans for this project, or if deviations from the subsurface conditions noted in this report are encountered during construction, Premier must be notified immediately to determine if changes in the foundation recommendations are required. If Premier is not notified in writing of such changes, Premier will not be responsible for the impact of those changes on the project.

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

After the plans and specifications are complete, the Geotechnical Engineer should be retained and provided the opportunity to review the final design plans and specifications to check that our geotechnical engineering recommendations have been properly incorporated into the design documents.

The scope of Premier's services did not include any geologic fault study, environmental assessment or investigation for the presence or absence of asbestos or hazardous or toxic materials in the soil, groundwater, or surface water within or beyond the site studied. Any statements in this report regarding odors, staining of soils, or other unusual conditions observed are strictly for the information of our Client.

This report and the information/data provided have been prepared for the exclusive use of Forte and Tablada, Inc., their design team, and their contractor for the specific application to the Hornsby Tract Project located in Walker, Louisiana. The information and data obtained and prepared (i.e., Instrument of Service) by Premier Geotech and Testing, LLC may not be used or relied on by any other entity, now or at any point in the future, without the express, written consent from Premier Geotech and Testing, LLC.

APPROXIMATE TEST LOCATION

N

PROPOSED HORNSBY TRACT
WALKER, LOUISIANA
PREMIER FILE NO.:24-0486

Premier GEOTECH AND TESTING, LLC

TEST LOCATION PLAN

KEY TO SYMBOLS

Symbol Description

<u>Strata symbols</u>

Low plasticity clay

High plasticity clay

Silty sand

<u>Misc. Symbols</u>

Water table during drilling

Unconfined Shear Strength

<u>Soil Samplers</u>

Undisturbed thin wall Shelby tube

Standard penetration test

<u>Notes:</u>

1. Boring locations were located using handheld GPS technology.
2. These logs are subject to the limitations, conclusions, and recommendations in this report.
3. Results of tests conducted on samples recovered are reported on the logs.

Premier GEOTECH AND TESTING, LLC

LOCATION: WALKER, LOUISIANA
COORDINATES: 30°30'16.11"N 90°49'15.24"W
SURFACE EL.: EXISTING GRADE

DEPTH, FT	WATER LEVEL	STRATUM DESCRIPTION	STRATUM DEPTH, FT	UNIT DRY WT, PCF	PASSING NO 200 SIEVE, %	WATER CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX (PI)	SHEAR STRENGTH (TONS PER SQ FT)
0		Tan and Light Gray LEAN CLAY (CL) with silt pockets				19.0	43	19	24	
		Tan and Light Gray FAT CLAY (CH)	2.0			18.2				
		Stiff, Tan and Light Gray LEAN CLAY (CL)	4.0	109.3		18.5	30	16	14	Unconfined ≈1.4
		Tan and Light Gray FAT CLAY (CH) with silt pockets	6.0			17.1				
	▽ (8')	Stiff, Tan and Light Gray LEAN CLAY (CL) with silt pockets	8.0	110.8		19.0	31	16	15	Unconfined ≈1.0
		Tan and Light Gray FAT CLAY (CH)	13.0			19.4				
		Medium, Tan and Light Gray FAT CLAY (CH) with silt pockets		102.9		23.4				Unconfined ≈0.9
		Tan and Light Gray FAT CLAY (CH)				21.0				
25		Boring Terminated at 25 Feet	25.0							

Shear strength legend: Penetrometer (□), Torvane (◇), Field Vane (△), Unconfined (■), Triaxial (●), Miniature Vane (▲). TONS PER SQ FT scale: 0.5, 1, 1.5, 2, 2.5

NOTES:

DRILLED DATE: 6/20/2025
DRILLER: PREMIER GEOTECH
LOGGER: T.G.
TOTAL DEPTH (Ft): 25
WATER LEVEL: 8'
BACKFILL: NATIVE SOIL CUTTINGS

LOG OF BORING B-1
PROPOSED HORNSBY TRACT PROJECT

PREMIER FILE# 24-0486

LOCATION: WALKER, LOUISIANA
COORDINATES: 30°30'17.39"N 90°49'5.47"W
SURFACE EL.: EXISTING GRADE

DEPTH, FT	WATER LEVEL	BLOWS PER FOOT	STRATUM DESCRIPTION	STRATUM DEPTH, FT	UNIT DRY WT, PCF	PASSING NO 200 SIEVE, %	WATER CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX (PI)
0			Brown LEAN CLAY (CL)				30.9			
			Medium, Brown, Tan and Light Gray LEAN CLAY (CL)		101.4		22.8	35	21	14
			Tan and Light Gray FAT CLAY (CH)	4.0			17.8			
5	▽									
			Medium, Tan and Light Gray LEAN CLAY (CL)	6.0	100.6		24.1	38	21	17
			Tan and Light Gray FAT CLAY (CH) with sand	8.0			15.2			
10										
			Very Soft, Tan, Brown and Light Gray LEAN CLAY (CL) BECOMING Tan and Light Gray SILTY SAND (SM)	13.0	105.8		20.0	34	18	16
15										
		13	Medium Dense, Tan and Light Gray SILTY SAND (SM)	18.0		16.7	17.6			
20										
		12	Medium Dense, Tan and Light Gray SILTY SAND (SM)			41.2	20.6			
25			Boring Terminated at 25 Feet	25.0						
30										
35										

SHEAR STRENGTH

□ Penetrometer ◇ Torvane △ Field Vane ■ Unconfined ● Triaxial ▲ Miniature Vane

TONS PER SQ FT: 0.5 1 1.5 2 2.5

NOTES:

DRILLED DATE: 6/20/2025
DRILLER: PREMIER GEOTECH
LOGGER: T.G.
TOTAL DEPTH (Ft): 25
WATER LEVEL: 5'
BACKFILL: NATIVE SOIL CUTTINGS

LOG OF BORING B-2
PROPOSED HORNSBY TRACT PROJECT

PLATE

PREMIER FILE# 24-0486

LOCATION: WALKER, LOUISIANA
COORDINATES: 30°30'15.01"N 90°49'15.16"W
SURFACE EL.: EXISTING GRADE

DEPTH, FT	WATER LEVEL	STRATUM DESCRIPTION	STRATUM DEPTH, FT	UNIT DRY WT, PCF	PASSING NO 200 SIEVE, %	WATER CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX (PI)	SHEAR STRENGTH (TONS PER SQ FT)
0		Tan, Brown and Light Gray FAT CLAY (CH) with silt pockets				16.4				
		Very Stiff, Tan and Light Gray LEAN CLAY (CL)	2.0	109.0		20.4	44	18	26	Unconfined ■ (~1.2)
5	▽	Tan and Light Gray FAT CLAY (CH)	4.0			19.2				
		Tan and Light Gray LEAN CLAY (CL) with calcium nodules	6.0			19.3	36	18	18	
		Tan and Light Gray FAT CLAY (CH)	8.0			18.0				
10		Boring Terminated at 10 Feet	10.0							

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35

Shear strength legend: □ Penetrometer; ◇ Torvane; △ Field Vane; ■ Unconfined; ● Triaxial; ▲ Miniature Vane

TONS PER SQ FT: 0.5, 1, 1.5, 2, 2.5

NOTES:

DRILLED DATE: 6/20/2025
DRILLER: PREMIER GEOTECH
LOGGER: T.G.
TOTAL DEPTH (Ft): 10
WATER LEVEL: 5'
BACKFILL: NATIVE SOIL CUTTINGS

LOG OF BORING P-1
PROPOSED HORNSBY TRACT PROJECT

PREMIER FILE# 24-0486

Premier GEOTECH AND TESTING, LLC

LOCATION: WALKER, LOUISIANA
COORDINATES: 30°30'16.56"N 90°49'5.54"W
SURFACE EL.: EXISTING GRADE

DEPTH, FT	WATER LEVEL	SYMBOL	SAMPLES	BLOWS PER FOOT	STRATUM DESCRIPTION	STRATUM DEPTH, FT	UNIT DRY WT, PCF	PASSING NO 200 SIEVE, %	WATER CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX (PI)	SHEAR STRENGTH (TONS PER SQ FT)
0					Stiff, Tan and Brown LEAN CLAY (CL)		100.8		20.4	40	21	19	Unconfined ≈ 0.9
					Tan and Light Gray FAT CLAY (CH)	2.0			18.9				
5					Tan and Brown LEAN CLAY (CL) with ferrous nodules	4.0			20.5	40	18	22	
	▽				Tan and Light Gray FAT CLAY (CH) with sand pockets	6.0			15.4				
					Tan and Light Gray LEAN CLAY (CL) with sand	8.0			21.1	35	14	21	
10					Boring Terminated at 10 Feet	10.0							

Shear strength legend: □ Penetrometer; ◇ Torvane; △ Field Vane; ■ Unconfined; ● Triaxial; ▲ Miniature Vane

TONS PER SQ FT: 0.5, 1, 1.5, 2, 2.5

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35

NOTES:

DRILLED DATE: 6/20/2025
DRILLER: PREMIER GEOTECH
LOGGER: T.G.
TOTAL DEPTH (Ft): 10
WATER LEVEL: 6'
BACKFILL: NATIVE SOIL CUTTINGS

LOG OF BORING P-2
PROPOSED HORNSBY TRACT PROJECT

Attachment 8

LEDC HORNSBY TRACT DRAINAGE INVESTIGATION
F&T Project No. 231269

HYDROLOGIC AND HYDRAULIC REPORT

Prepared By:

Forte and Tablada, Inc.
1234 Del Este Ave. – Suite 601
Denham Springs, LA 70726
225-665-1021

July 8th, 2025

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1. INTRODUCTION

The City of Walker, and more specifically for this project, Hornsby Creek Watershed, has been the subject of flooding issues even before the 2016 flood that devastated Livingston Parish. On a regular basis, Hornsby Creek exceeds its capacity while conveying the water it needs to drain. The goal of this investigation is to verify the impacts of a potential development to the surrounding watershed. According to Parish regulations, the property is being elevated such that any new construction can be a minimum of 2' above BFE. Additionally, a pond is being dug around the elevated ground with an equivalent volume of dirt moved to accommodate any fill mitigation requirement, and ensure no downstream impact from the proposed development area.

- **Preparers' name, company name, telephone number, and email:**
  Drake W. Cowart P.E., Forte and Tablada, (225)-665-1021, Email: dcowart@forteandtablada.com
- **Location and description of the watershed and study area:**
  The project is located in the Hornsby Creek watershed within the city limits of Walker, LA. This watershed includes some developed urban areas, rural developed areas, and large sections of undeveloped tracts of land spaced throughout. The proposed development will be required to have the building footprint above the BFE and thus a large volume of fill will need to be mitigated on site via fill mitigation detention. The pond will be located in an undeveloped area on the northern side of Industry Way behind the existing businesses. The proposed pond geometry will change between alternatives, but will retain an invert elevation of 37.5'. The proposed pond will need to be an appropriate size in order to offset the parish's fill mitigation requirements. These ponds will connect into an existing 25' wide channel, located immediately to the south of the proposed pond, which flows into Hornsby Creek. According to NWI Wetlands data, dated May 2018, there are existing wetlands on the property.
- **Name and type of project:**
  LEDC Hornsby Tract. The project aims to identify if the proposed improvements will have any negative impacts on the surrounding area.
- **Describe and define study limits:**
  Figure 1 shows the proposed project locations. Hornsby Creek is located in the central part of Livingston Parish. The project includes two proposals. The first involves approximately 32 acres of detention area accompanying the associated development while the second involves approximately 14 acres of detention area to support a smaller development area. The proposed detention area will tie into an existing channel which is located to the south of the proposed pond.

- **Locate and describe where flood discharges were estimated:**

  The modeling and analysis determined the estimated changes in surface runoff patterns, flood levels, and flood inundation extents throughout the watershed as shown in Figure 2.

- **Name all associated USGS gaging stations:**

  No applicable USGS gaging stations are available at this location. Next closest station is located downstream on the Amite River at Port Vincent, LA.

- **Describe the climatic data, hydrologic features, and any other information that supports the hydrologic analyses:**

  The hydrologic modeling approach used the USACE HEC-HMS software to compute rainfall hyetographs for five different storm events. The TR-55 methodology was used to develop these hyetographs along with NOAA Atlas 14 Rainfall Data. Initial abstractions and curve numbers were derived from the available National Land Cover Database (NLCD) and National Resources Conservation Service (NRCS) Soils data.

- **Describe the watercourse and location of investigation:**

  Hornsby Creek is a waterway within the Colyell Creek watershed that flows into the Amite River. The average slope of the waterway is approximately 0.002 ft/ft, while the overland slope averages 0.0011 ft/ft. The creek primarily flows through rural areas but intersects more developed regions within the City of Walker, particularly around U.S. Hwy 190 near South Satsuma Road, near the approximate center of the watershed. The proposed improvement areas are generally wooded, undeveloped zones located adjacent to or along the flow path of Hornsby Creek.

- **Name for whom the report is being prepared:**

  City of Walker, NFIP Community ID #220121

- **Date of report and topographic data used in model:**

  Terrain data is based on LiDAR data collected by LADOTD for the Amite River Watershed in 2018. Lidar Data was supplemented with survey data collected by Forte & Tablada as part of this project for the site north of Industry Way to the property boundary at Hornsby Creek.

- **Describe the scope of investigation including the alternatives analyzed and evaluated:**

  Multiple storm events based on available NOAA Atlas 14 data were evaluated for different scenarios including 5-year, 10-year, 25-year, 50-year, and 100-year. These events were used to analyze both the pre-and-post conditions of the watershed and potential improvements.

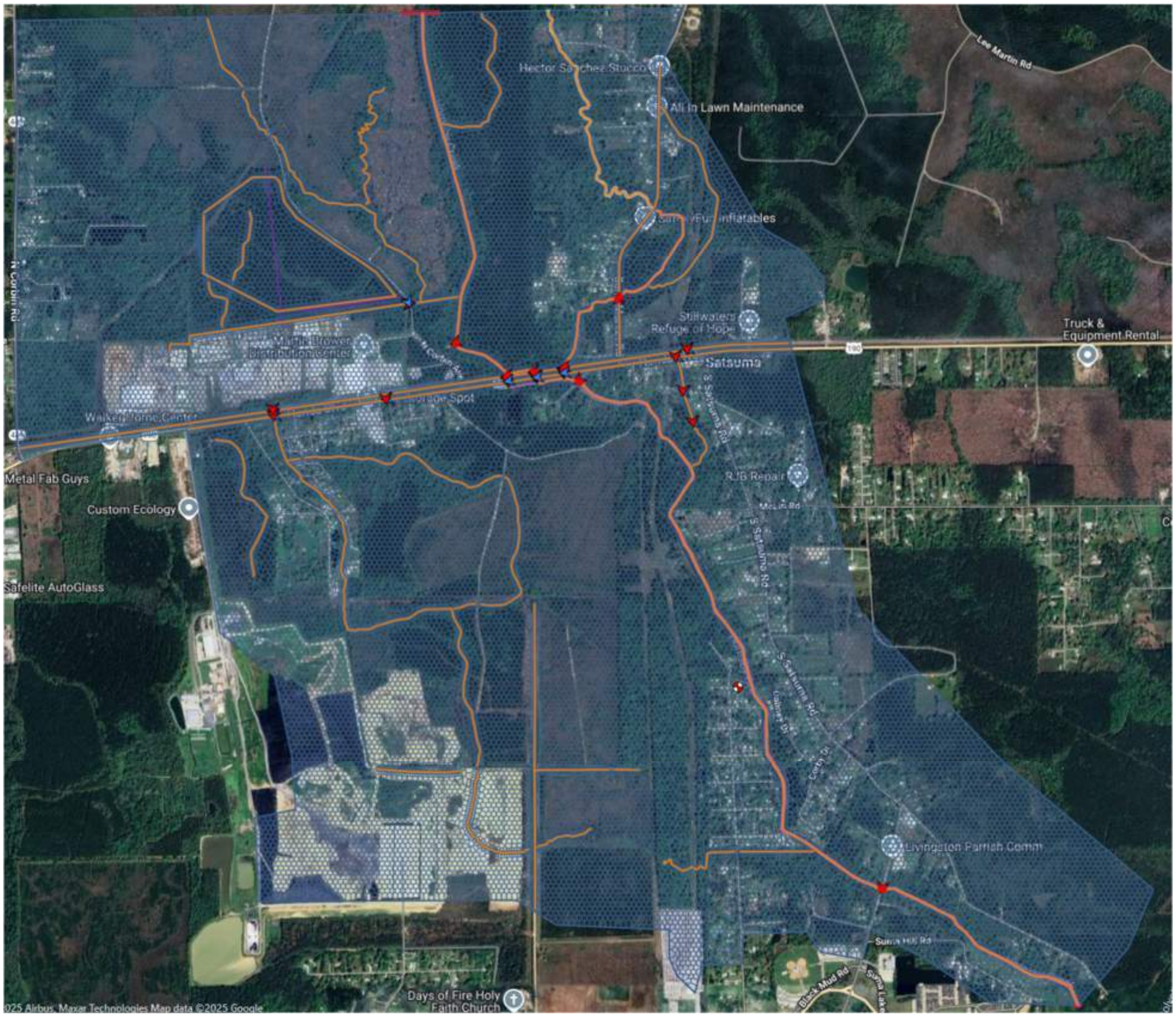
- **Describe the scope of the analysis:**

The model encompasses approximately 5.78 square miles of the Horsby Creek watershed, starting approximately 1.1 miles north of US 190 and ending on the north side of Interstate 12. The scope of the project focuses on evaluating and mitigating any potential impacts from the proposed development. During the preliminary investigation of the project's original scope, a 32-acre pond size was used based on the fill mitigation requirements for the parish assuming the site would be filled entirely to the BFE.

- **Identify any existing studies or any history of work on the watercourse in the vicinity of the project including past flooding events:**

  This study was calibrated using an existing FEMA HEC-2 Model which utilized relatively older LiDAR data that did not have the definition of modern available data for the area. Although this LiDAR data is relatively old, it lined up well with modern modeling efforts, allowing there to be consistent calibration.

Figure 1 – Proposed Project Site



*Red and blue arrows represent culverts and SA-2D connections respectively

Figure 2 – 2D Area of HEC-RAS Model

2. METHOD OF ANALYSIS

Hornsby Creek is a tributary of Colyell Creek that flows through the outskirts of the City of Walker, through Livingston Parish. To better understand and manage the creek's behavior, a 2D hydraulic model was developed using GeoHEC-RAS version 5.1 software and ran on the USACE HEC-RAS Engine version 6.4.1. This software is based on the U.S. Army Corps of Engineers' (USACE) HEC-RAS program and provides equivalent outputs. The 2D model covers approximately 5.78 square miles, or 3700 acres, stretching from approximately 1.1 miles north of US 190 to the northern side of Interstate 12. The 2D model was chosen due to the extremely flat terrain to the north of US 190 as well as how water was able to jump back and forth between the tributaries in their overbanks. Figure 2 shows the limits of the 2D model in GeoHEC-RAS. The model includes all relevant culverts and bridges that Hornsby Creek flows through. To estimate rainfall in the area, a separate model using USACE HEC-HMS version 4.10 software was developed. The NRCS method (SCS Method) was used to generate rainfall hyetograph for rain on mesh analysis in HEC-RAS. NOAA Atlas 14 rainfall depths were used for these calculations. In addition, NRCS Soils Data along with a Land Cover Data layer developed based on observed land types were used to estimate the associated infiltration across the watershed. The watershed consisted of almost entirely Type D and C/D soils. Figure 3 depicts the landcover data for the HEC-HMS model of the area. Along with the associated rainfall data that was used for the RAS analysis, the HMS model was also used to generate flow hydrographs for the upper limits of the HECRAS model.

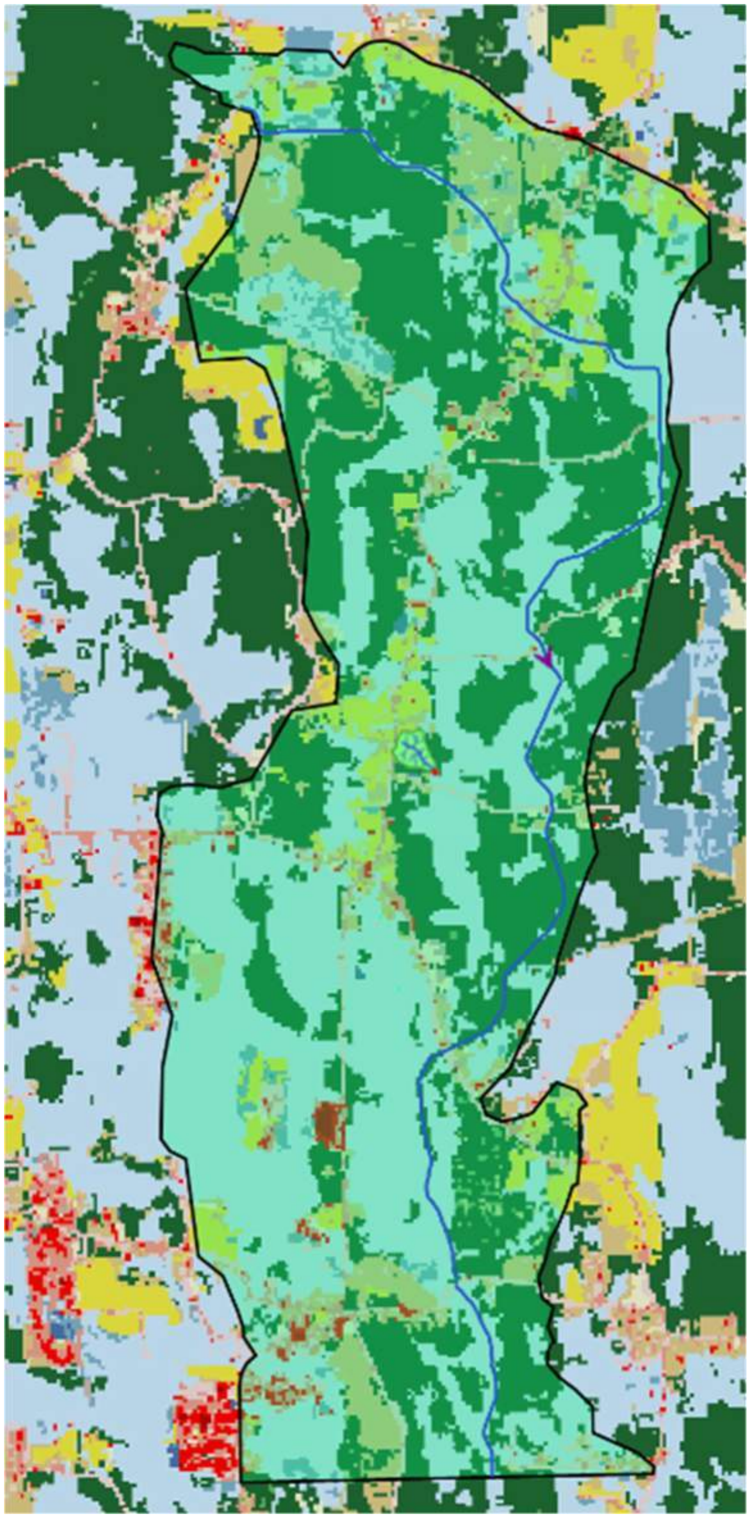


Figure 3 – Landcover Data for HMS Model

The model was developed to simulate five different hydrologic recurrence intervals for three scenarios: the "existing condition" and two different "proposed conditions." The existing conditions reflect the current state of the watershed, based on collected survey data, LiDAR data, and other visual information used to calibrate the model to known flood return events. The first iteration of the potential development aims to maximize the area of raised ground and includes a 32 acre pond, which was the sized based off fill mitigation requirements. The second iteration instead aims to minimize the raised ground to only accommodate an approximately 1.5 million square foot building and a reduced pond footprint of approximately 14 acres. These two proposed developments are shown in Figures 4 and 5. The pond for both potential developments will have an invert of 37.5' and will link directly into the adjacent ditch on the southern end of the project area, which leads to Hornsby Creek.

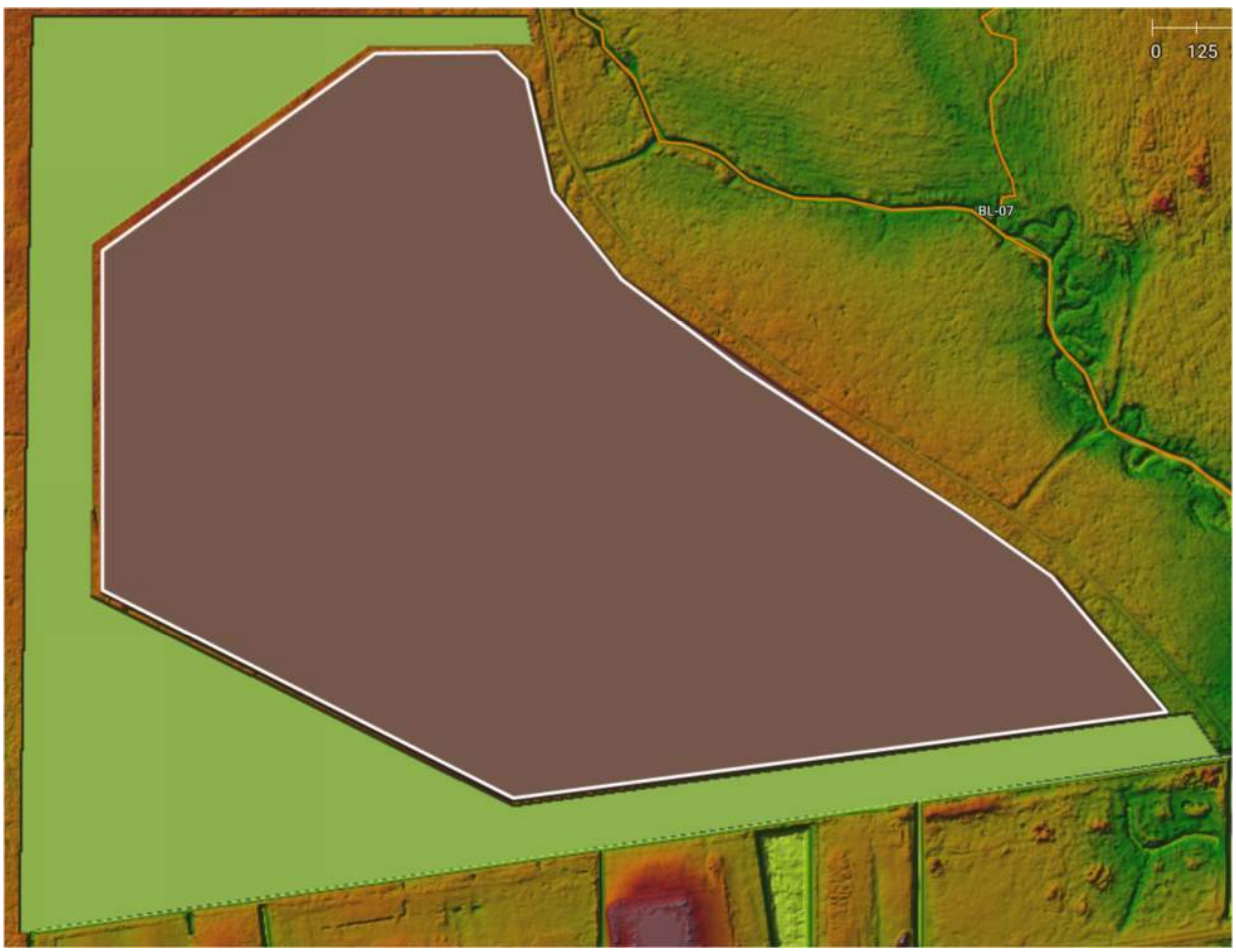


Figure 4 – Potential Layout Alternative 1 (Maximum Allowable Fill Area While Still Meeting Fill Mitigation Requirements)

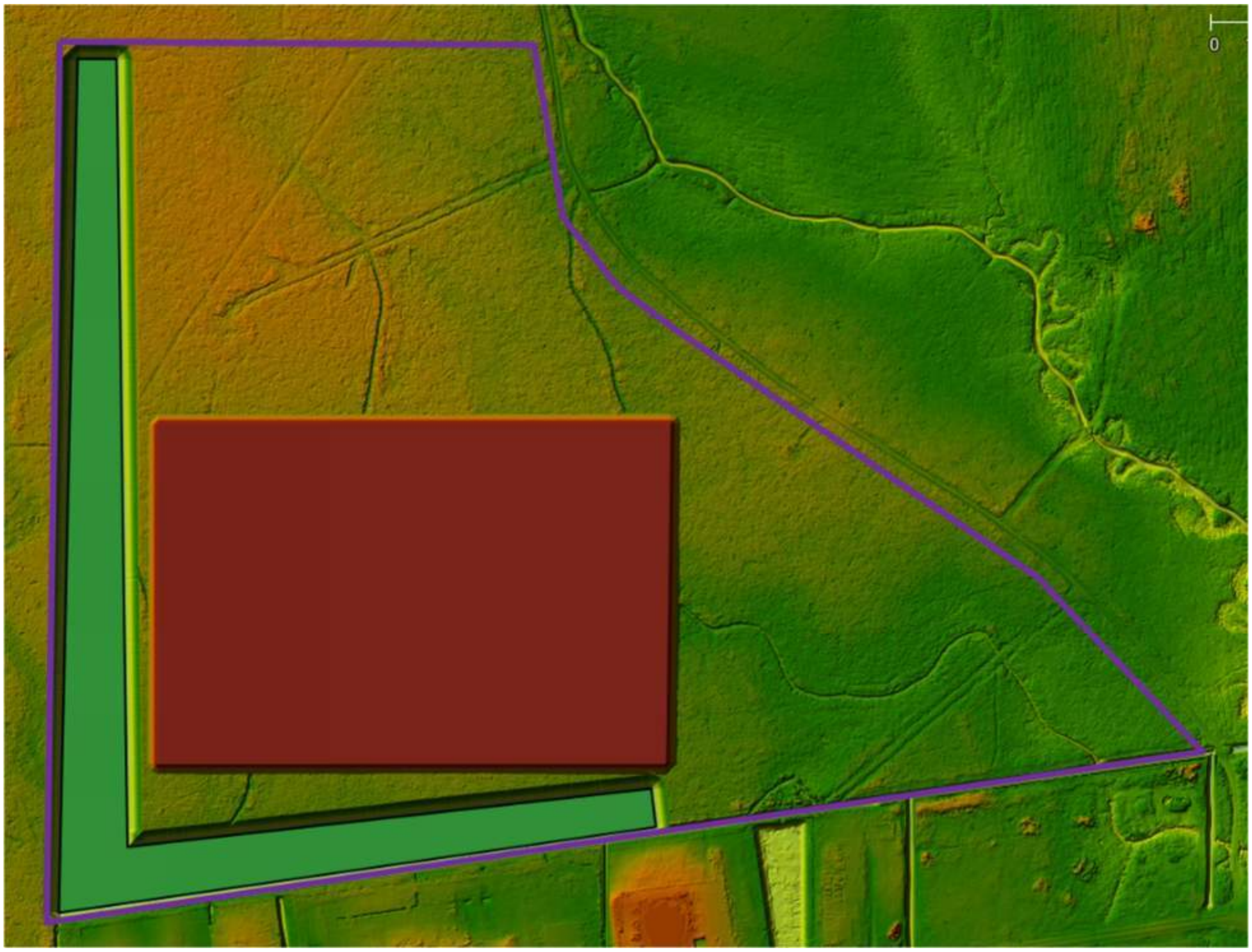


Figure 5 – Potential Layout 2 (1,500,000 sq ft Building and Required Fill Mitigation Pond)

Figure 6 displays the FEMA Flood Boundary Map for the existing watershed. The watershed is classified as two different flood zones: Flood Zone AE and Flood Zone A, with a large portion of the model falling into Flood Zone AE. It should also be noted that the FEMA flood levels north of US-190 on the West side have been assumed to be incorrect. The flood elevations at that location are assumed to have been carried over from an adjacent watershed and do not make logical sense in the context of this watershed.

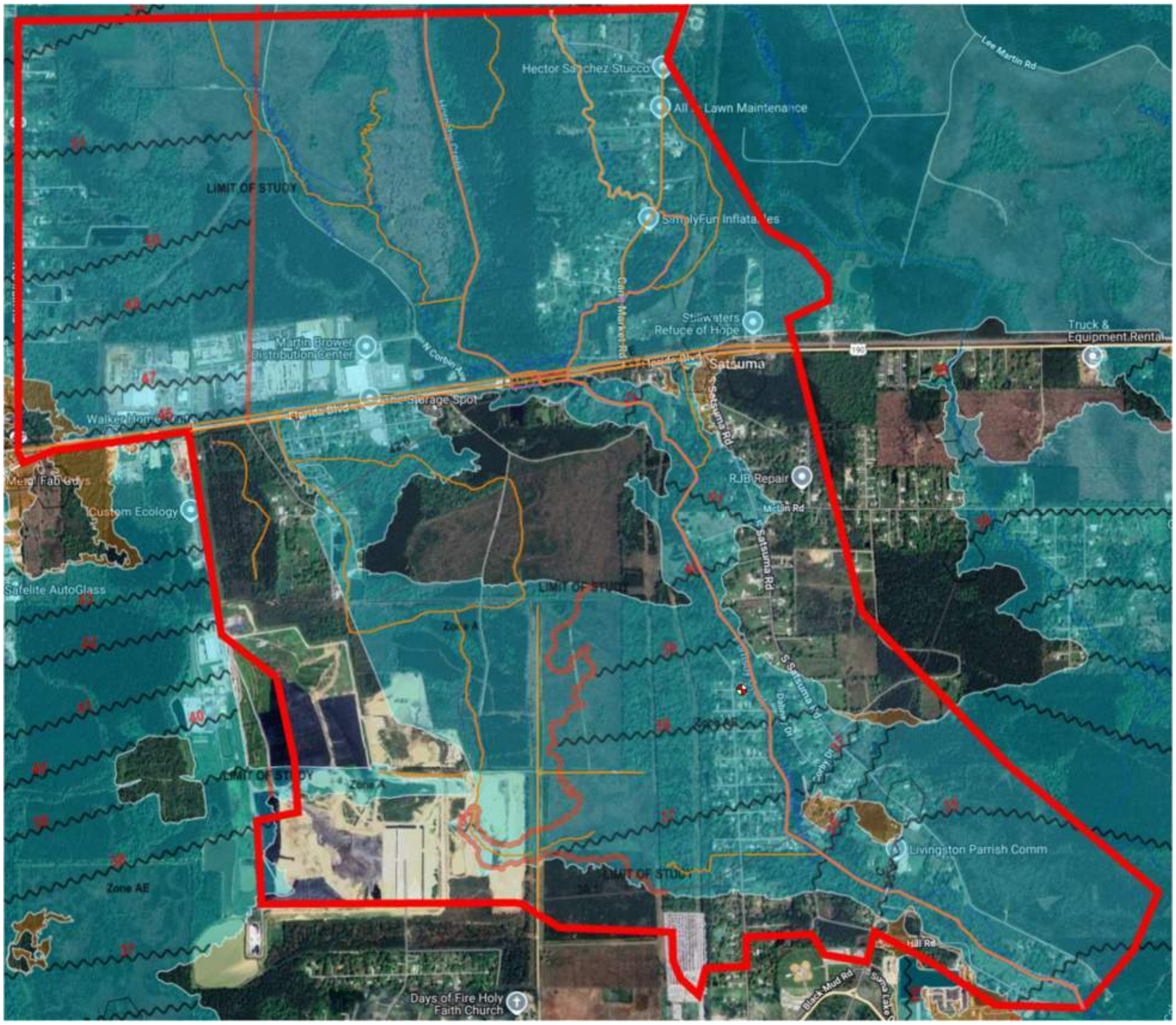


Figure 6 – FEMA Flood Boundary Map

Five different 24-hour storm intensities were simulated across two different geometry scenarios in the 2D model: the “existing conditions” and “proposed conditions” model. The storm events included the 5-year, 10-year, 25-year, 50-year, and 100-year recurrence intervals. The following scenarios were created in the program:

- **5-year Storm:**
  - **Existing Conditions: LEDC_EX_05**
  - **Proposed Conditions: LEDC_PR01_05**
  - **Proposed Conditions: LEDC_PR02_05**
- **10-year Storm:**
  - **Existing Conditions: LEDC_EX_10**
  - **Proposed Conditions: LEDC_PR01_10**
  - **Proposed Conditions: LEDC_PR02_10**
- **25-year Storm:**
  - **Existing Conditions: LEDC_EX_25**
  - **Proposed Conditions: LEDC_PR01_25**
  - **Proposed Conditions: LEDC_PR02_25**
- **50-year Storm:**
  - **Existing Conditions: LEDC_EX_50**
  - **Proposed Conditions: LEDC_PR01_50**
  - **Proposed Conditions: LEDC_PR02_50**
- **100-year Storm:**
  - **Existing Conditions: LEDC_EX_100**
  - **Proposed Conditions: LEDC_PR01_100**
  - **Proposed Conditions: LEDC_PR02_100**

3. UPSTREAM AND DOWNSTREAM MODELING LIMITS

The model established two boundary conditions, as shown in Figures 7 and 8 on the following page. The northern boundary conditions utilizes a flow hydrograph generated from the HEC-HMS model to accurately capture the unsteady flow at the upstream boundary of Hornsby Creek and by normal depth at the downstream boundary. The downstream boundary condition was set to normal depth at a slope of .01067 ft/ft based existing terrain/stream data. A sensitivity analysis was done on the slope as part of the calibration process to determine the effects of adjustments to this slope to the water surfaces within the model. It was determined that alterations to the slope associated with the downstream boundary would not propagate upstream enough to affect the results in the benefiting areas.

Figure 7 – Hornsby Upstream Boundary Location

Figure 8 – Hornsby Downstream Boundary Location

Figure 9 shows the precipitation rates used for the 100-year, 24-hour rainfall event. Precipitation data for all other rainfall events are shown below in Table 1. These hyetographs were generated in HEC-HMS and then input into the 2D HEC-RAS model to simulate upstream flow into our 2D model area. The same precipitation values, listed in Table 1 below, were applied to both the existing and proposed conditions.

NOAA Atlas 14 Average Rainfall Totals	
Event	Rainfall Total (in.)
5 Year 24 Hr	6.40
10 Year 24 Hr	7.56
25 Year 24 Hr	9.28
50 Year 24 Hr	10.70
100 Year 24 Hr	12.20

Table 1: Average Rainfall Totals for Modeled Storm Events

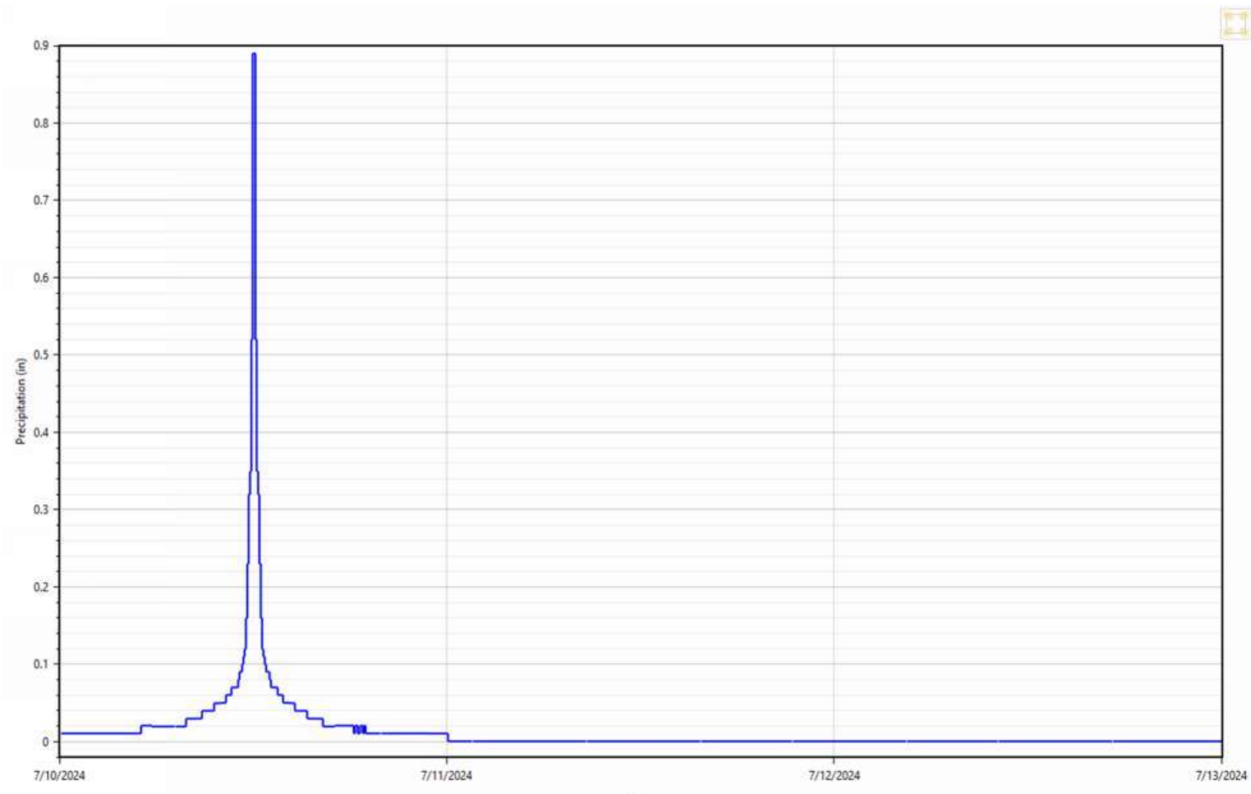


Figure 9 – 2D Precipitation (inches) for 100-year, 24-Hour Rainfall Event

Figure 10 below shows the incoming flows from the HMS model used as the upstream boundary condition in the HECRAS model. The same boundary conditions were utilized for both the existing and proposed scenarios.

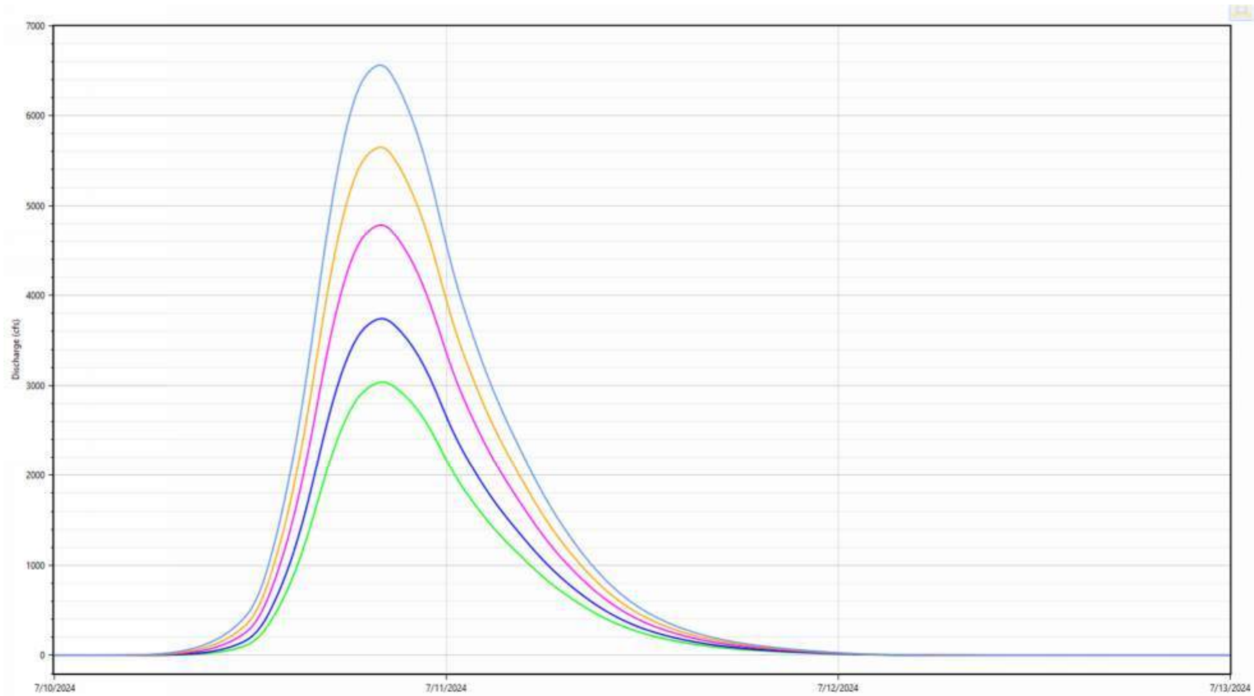


Figure 10 – Runoff from HMS

Regarding calibration, our model was calibrated to the existing FEMA Flood Insurance Study dated from 2012. It is worth noting a few things with regard to our calibrations.

While this study is only 13 years old, the existing model from FEMA for the Hornsby watershed is a HEC-2 Model and utilizes relatively older LiDAR data that does not have the definition of modern available data for the area. Despite this, it was relatively easy to calibrate the model as the FEMA data lined up to more recent modeling efforts. Due to the limitations of the FEMA model, we were only able to calibrate our model for the areas south of US 190 due to this being the limits of the existing FEMA Model. The values from the FEMA model generally stay within approximately a foot of water when compared to our model for the 100-year storm event.

4. VARIABLES, COEFFICIENTS, AND MODELING STRATEGIES

The Hornsby Creek watershed covers approximately 5.78 square miles near the City of Walker. While some of the area is developed for residential, commercial, and industrial use, large portions remain undeveloped. According to available NRCS soils data, the majority of the watershed consists of soil group D and C/D. Rainfall depths used in the model are based on NOAA Atlas 14 precipitation frequency estimates, with one representative distribution applied to the entire watershed.

Survey data was collected for a significant portion of the area and was considered more accurate than the available LiDAR data. All model layouts have been developed referencing North American Vertical Datum 1988 (NAVD 88) GEOID 12B for vertical measurements and North American Datum 1983 NAD83 (LA_S,FIPS 1702) for horizontal measurements, both in US ft. Survey data was collected for a significant portion of the area and was considered more accurate than the available LiDAR data.

Roadway crossings were modeled using the HEC-RAS Bridge/Culvert data tool, incorporating deck/roadway elevations, pier layouts, sizes, low chord elevations, and any flow obstructions based on available information. Where survey data was missing, general assumptions were made, including engineering estimates for some culverts and roadway crossings in the Hornsby Creek area. Site inspections were conducted to determine pipe sizes, materials, and approximate invert elevations.

The 2D Flow Areas were modeled using a hexagonal mesh with approximately 80’ cell spacing. Breaklines were added where tighter spacing or point adjustments were needed, such as in areas with significant elevation changes (e.g., roadways, large ditches, ridges, and bodies of water). The initial terrain elevation mesh was created using the 2018 USGS Amite River Study LiDAR data.

Manning's 'n' roughness values for overland flow areas were assigned using data from a land cover grid created by observing the level of development across the model. Each land cover type was assigned an appropriate Manning's roughness value based on the characteristics of the terrain. Figure 11 and Table 2 on the following pages show the distribution of Manning's 'n' values and the corresponding roughness values for each terrain type. While the land cover data provided a reasonable general representation of the overbank areas in the watershed, it did not accurately reflect many of the drainage features that channel water through the watershed. Specifically in the main channel, Manning's 'n' values were adjusted based on available photographs, aerial imagery, and field inspections to more accurately model the existing conditions. The channel itself was adjusted to a value of 0.070.

Infiltration values were assigned based on the previously mentioned land cover grid. This layer accounted for water absorbed by the ground and depended on terrain type. Figure 12 depicts a visual representation of the layer with infiltration curve numbers ranging from 0.55 to 0.99.

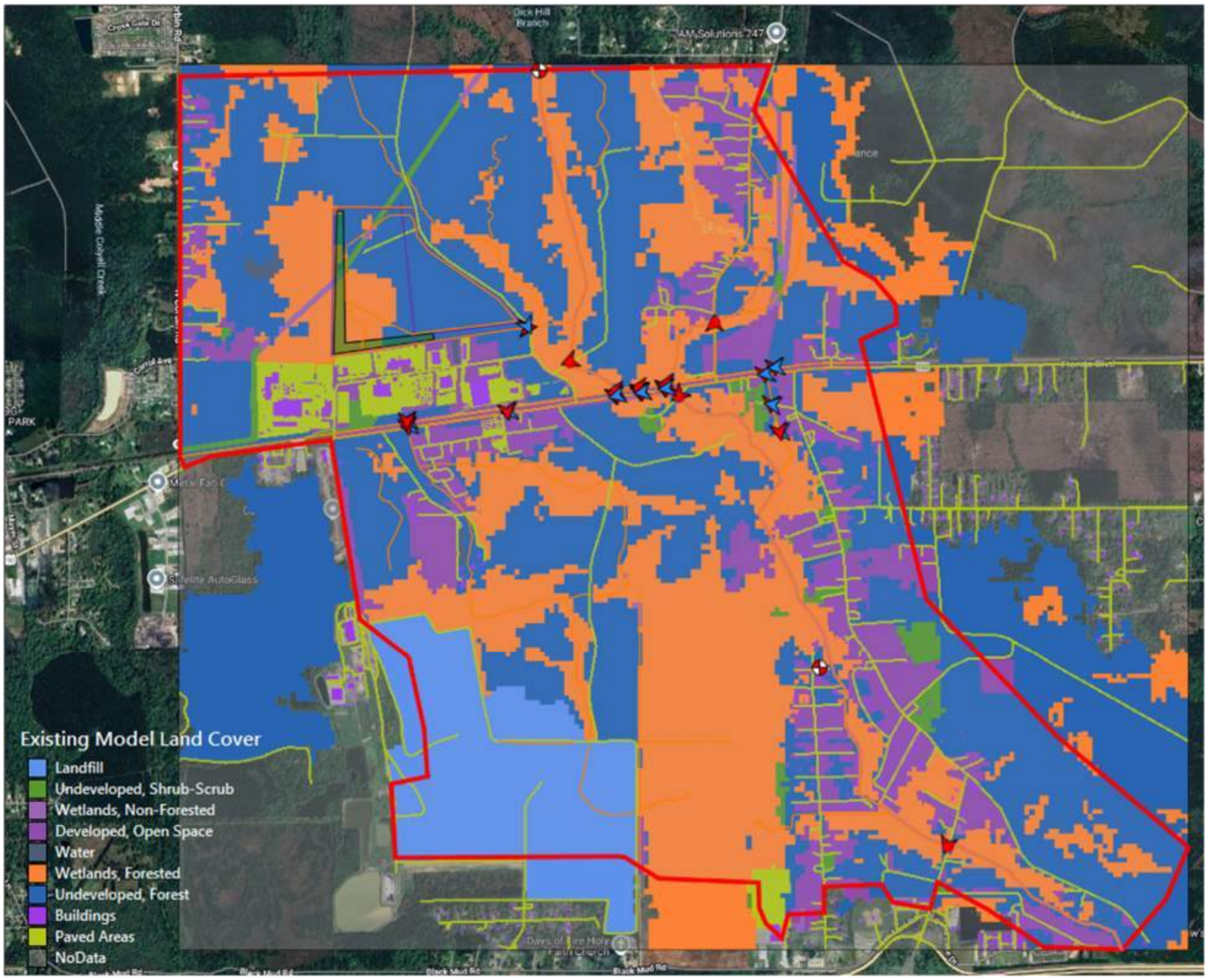


Figure 11 – Mannings n Value Layer Distribution

NLCD Land Cover Manning's Values (NLCD 2021)	
Land Cover Type	Manning's n Value
Open Water	0.043
Buildings	0.100
Undeveloped, Forest	0.100
Wetlands, Forested	0.100
Water	0.030
Developed, Open Space	0.035
Wetlands, Non-Forested	0.060
Undeveloped, Shrub-Shrub	0.080
Landfill	0.100

Table 2 – Manning Values Per Terrain

Figure 12 – Infiltration Values Per Terrain

Table 3 below lists the HEC-RAS unsteady computation options that were selected and used across all simulations. These were either kept at their default values or only adjusted where needed to resolve any errors within the model where applicable.

Parameter	Value
2D Flow Options	
Theta	1
Theta warm up	1
Water surface tolerance (ft)	0.02
Volume tolerance (ft)	0.02
Equation set	Diffusion Wave

Table 3 – HEC-RAS Computational Options

5. DISCUSSION

It is important to note that the developments shown are just samples of what could potentially be done based on normal development or worst case scenarios given the current mitigation requirements of the parish. However, should a developer need to model alternative proposals, this model and information can be provided through LEDC for that use.

Figures 13 and 14 below show the water surface elevation comparison of the development site between a simulated 100-year storm event under current conditions and each of the proposed conditions. Areas in shades of blue indicate decreases and areas in red indicate increases. These values are greater the darker the color appears. The first proposed alternative is estimated to result in an average local change in water surface elevation ranging from -0.035' to 0.005’, with the only major increase in water surface elevation completely relegated to a small portion of undeveloped land to the north of the detention pond with a maximum of 0.19’. The second proposed alternative is estimated to result in an average local change in water surface elevation ranging from -0.024' to 0.03’, with the only major increase in water surface elevation completely relegated to a small portion of undeveloped land with a maximum of 0.075’. Additionally, water surface elevations on the downstream portion of the model for both alternatives were shown to have minor decreases from what was shown in the existing conditions ranging from .01’-0.03’.

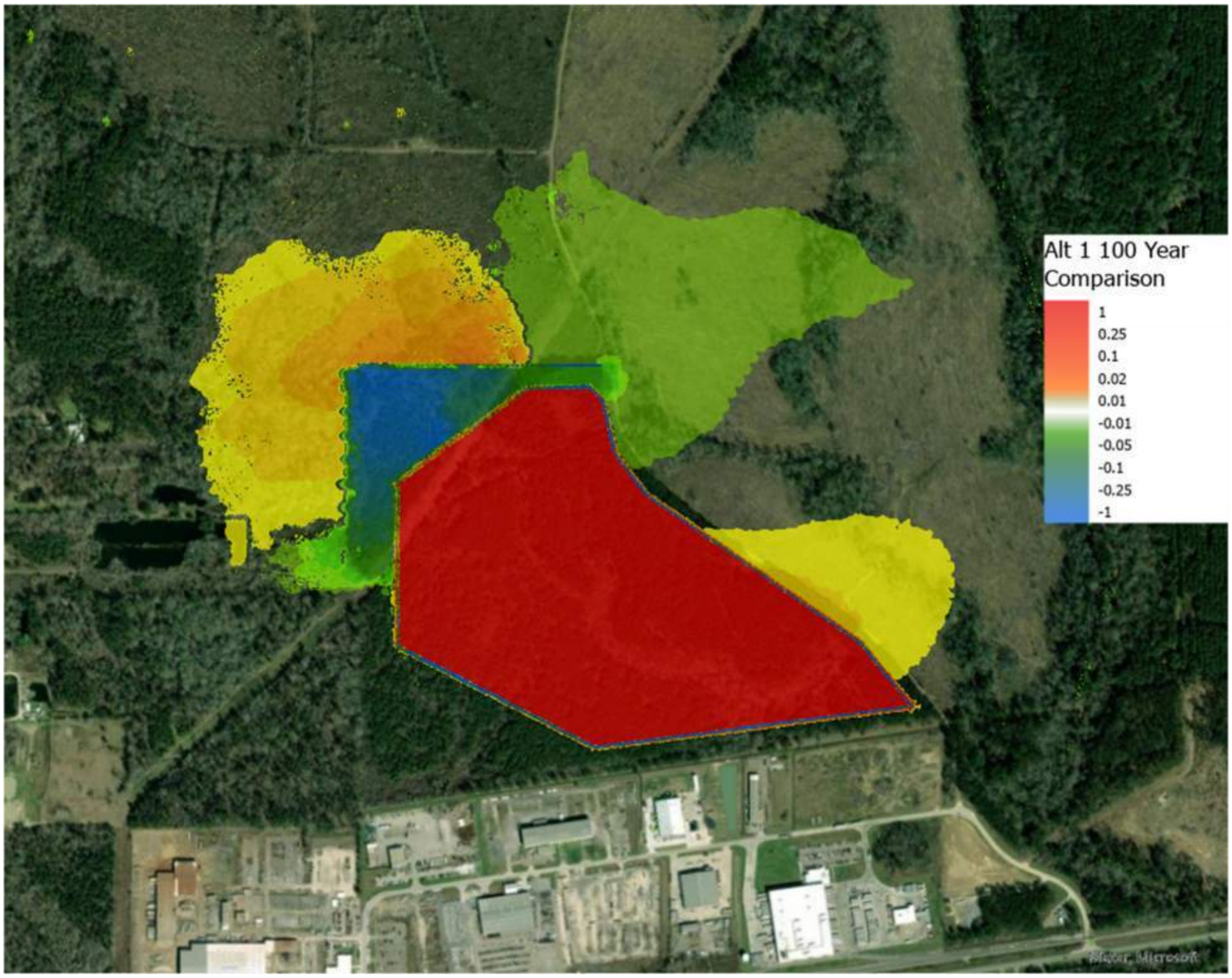


Figure 13 – Water Surface Elevation Comparison for 100-Year Event for Existing and Proposed Conditions

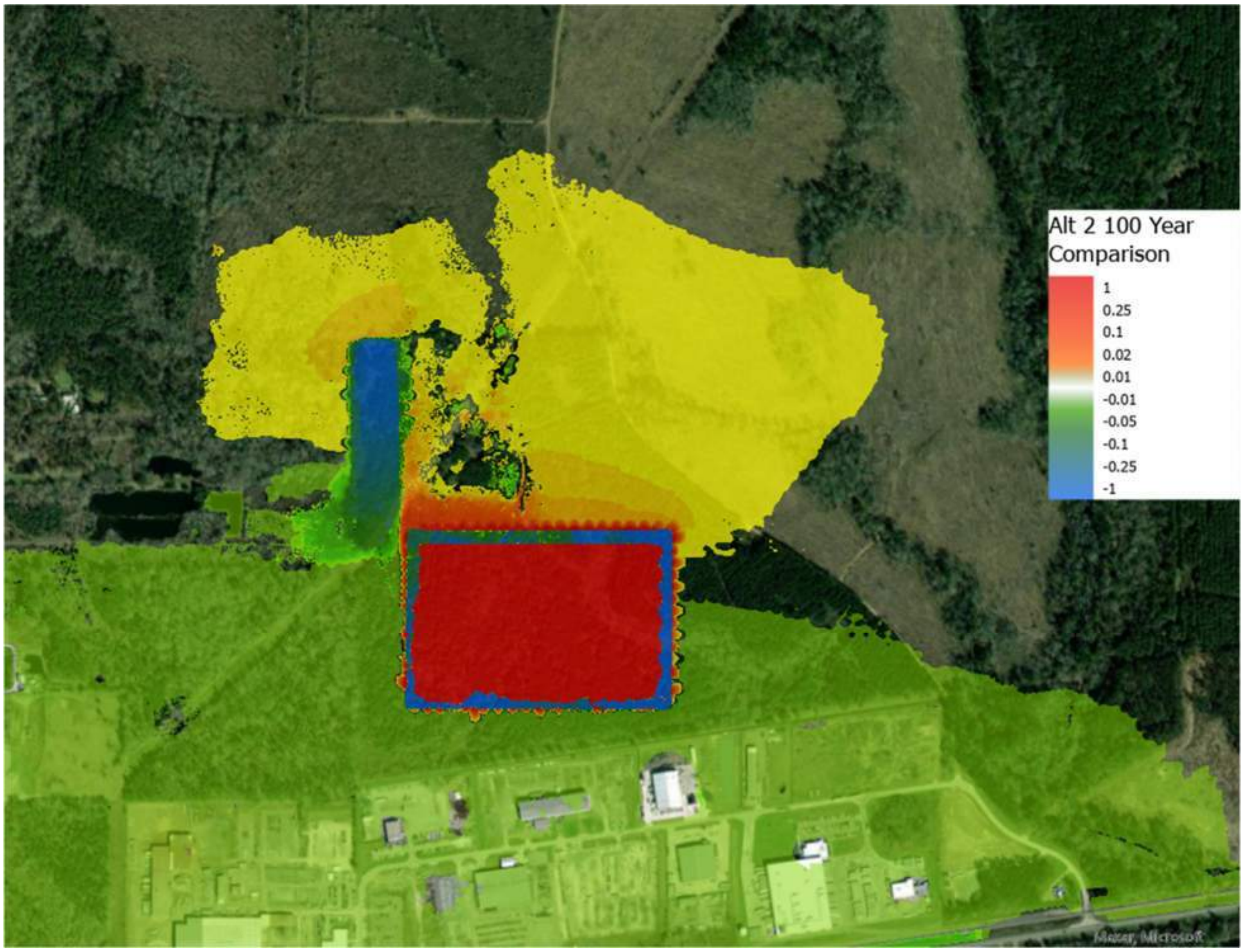


Figure 14 – Water Surface Elevation Comparison for 100-Year Event for Existing and 2nd Proposed Conditions

Figures 15 (a-d) displays the differences in water surface elevation between the existing and each of the proposed conditions in the same manner for the entire watershed. The yellow and red areas are entirely within undeveloped areas and are therefore considered acceptable by the scope of this project. It should also be noted that the area of raised ground for the new construction will always register as increased water surface elevation, but can be disregarded as no water will realistically stay on top of the platform.

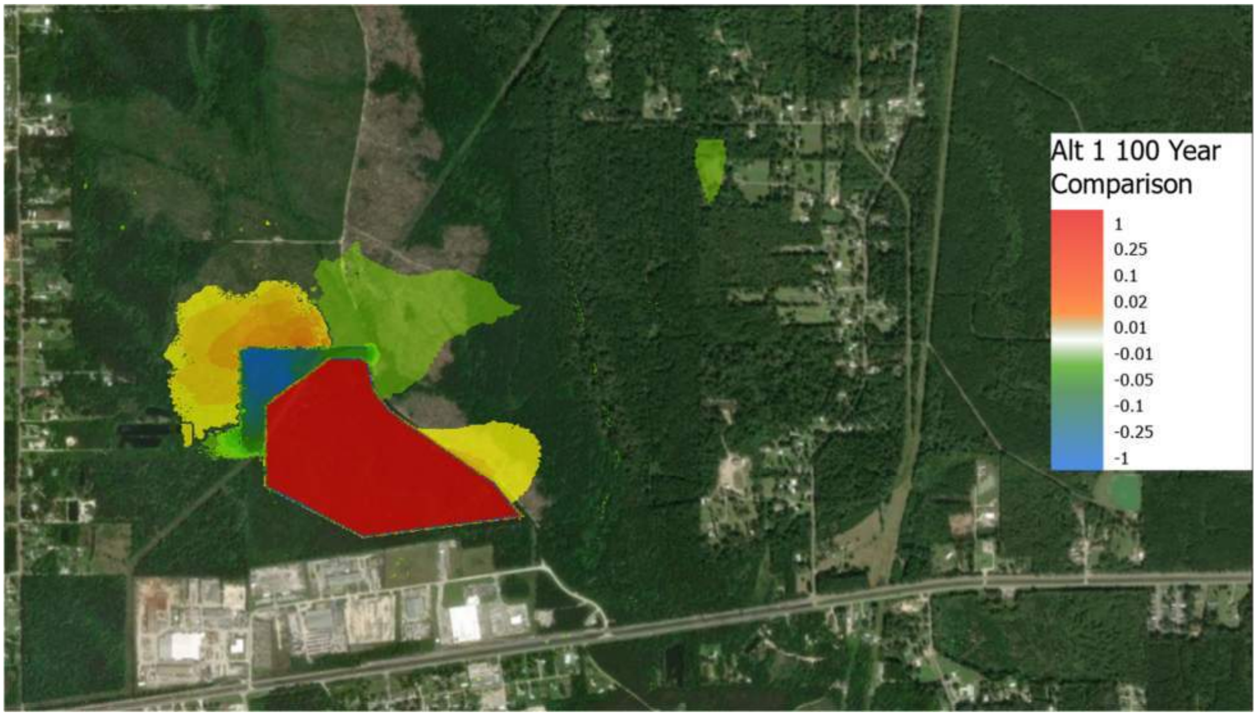


Figure 15a – Water Surface Elevation Difference (Existing vs. Proposed 1) for Northern Portion of Model

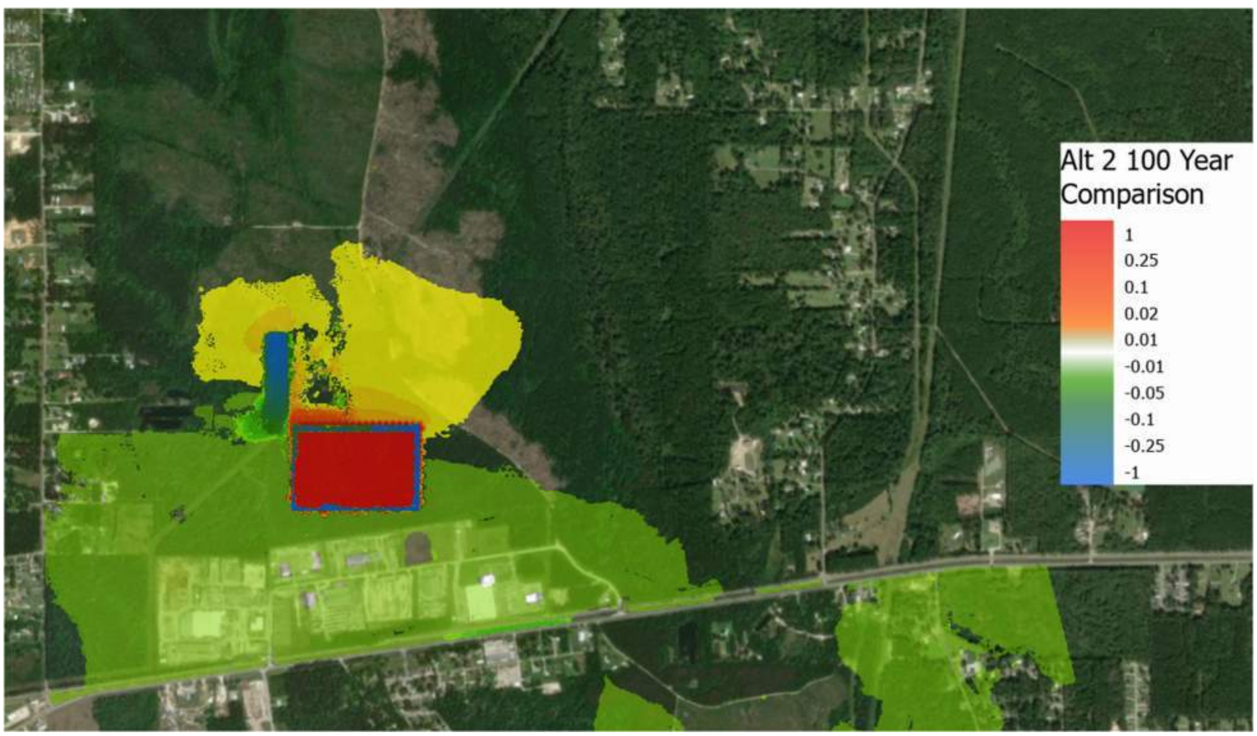


Figure 15b – Water Surface Elevation Difference (Existing vs. Proposed 2) for Northern Portion of Model

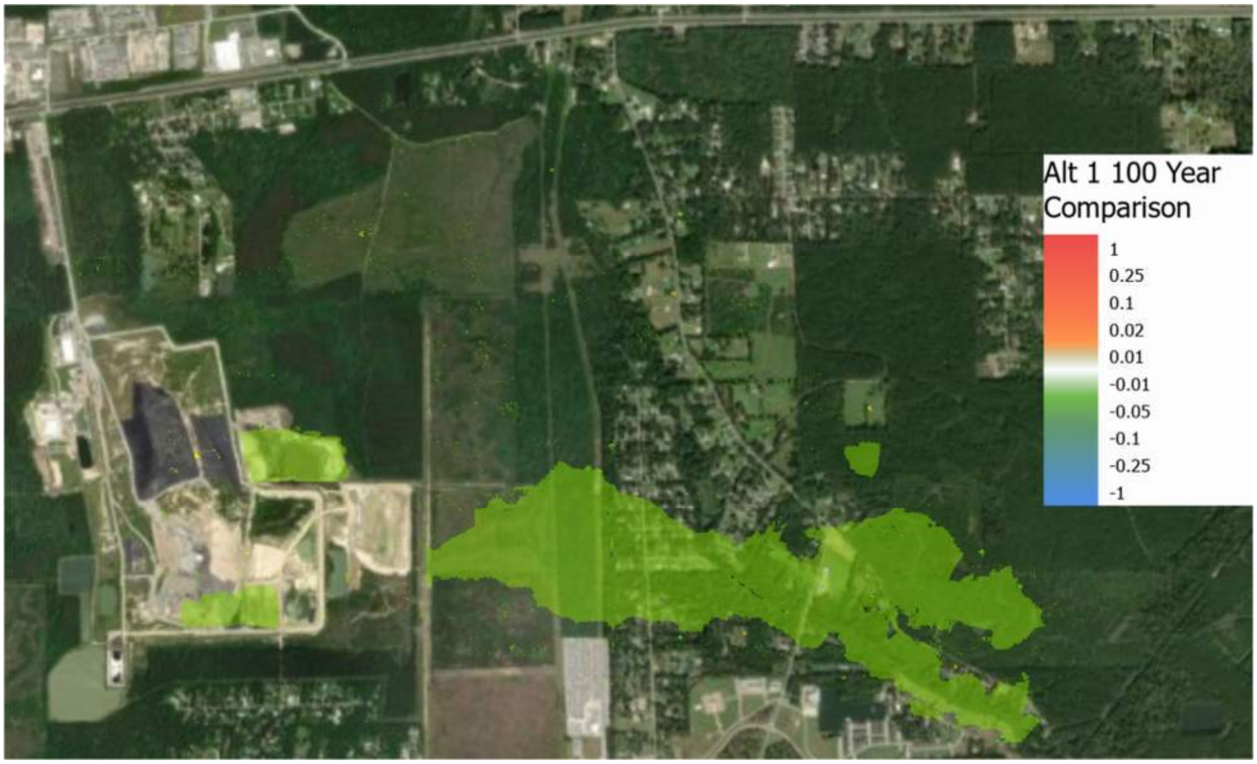


Figure 15c – Water Surface Elevation Difference (Existing vs. Proposed 1) for Southern Portion of Model

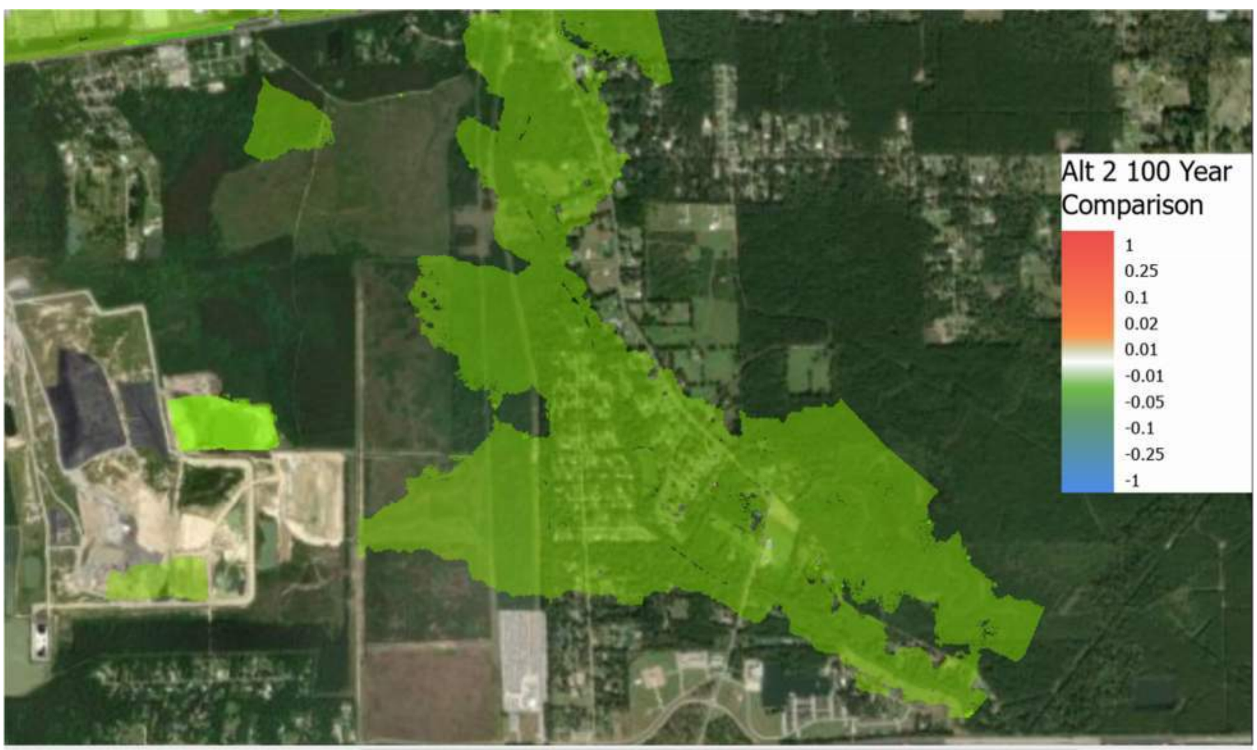


Figure 15d – Water Surface Elevation Difference (Existing vs. Proposed 2) for Southern Portion of Model

The only significant increase of water surface elevation for both scenarios occurs in an undeveloped wooded area north of the property.

In its current state, the model is stable. The model has an acceptable amount of volume accounting error which ranges from approx. **0.06% to 0.08%** across all modeled runs. However, there are several areas within the model that show some isolated instances where error is double or triple these values. These errors are primarily contained around a handful of culvert crossings that become fully submerged during the model run. As the water drains out of the system, errors would occur due to these crossings starting as stopping their associated weir flow as the water drained out. These errors were both minor (less than 0.05') and would occur significantly after the associated peak. Because of this, they appear to have no impact on the results of the model.

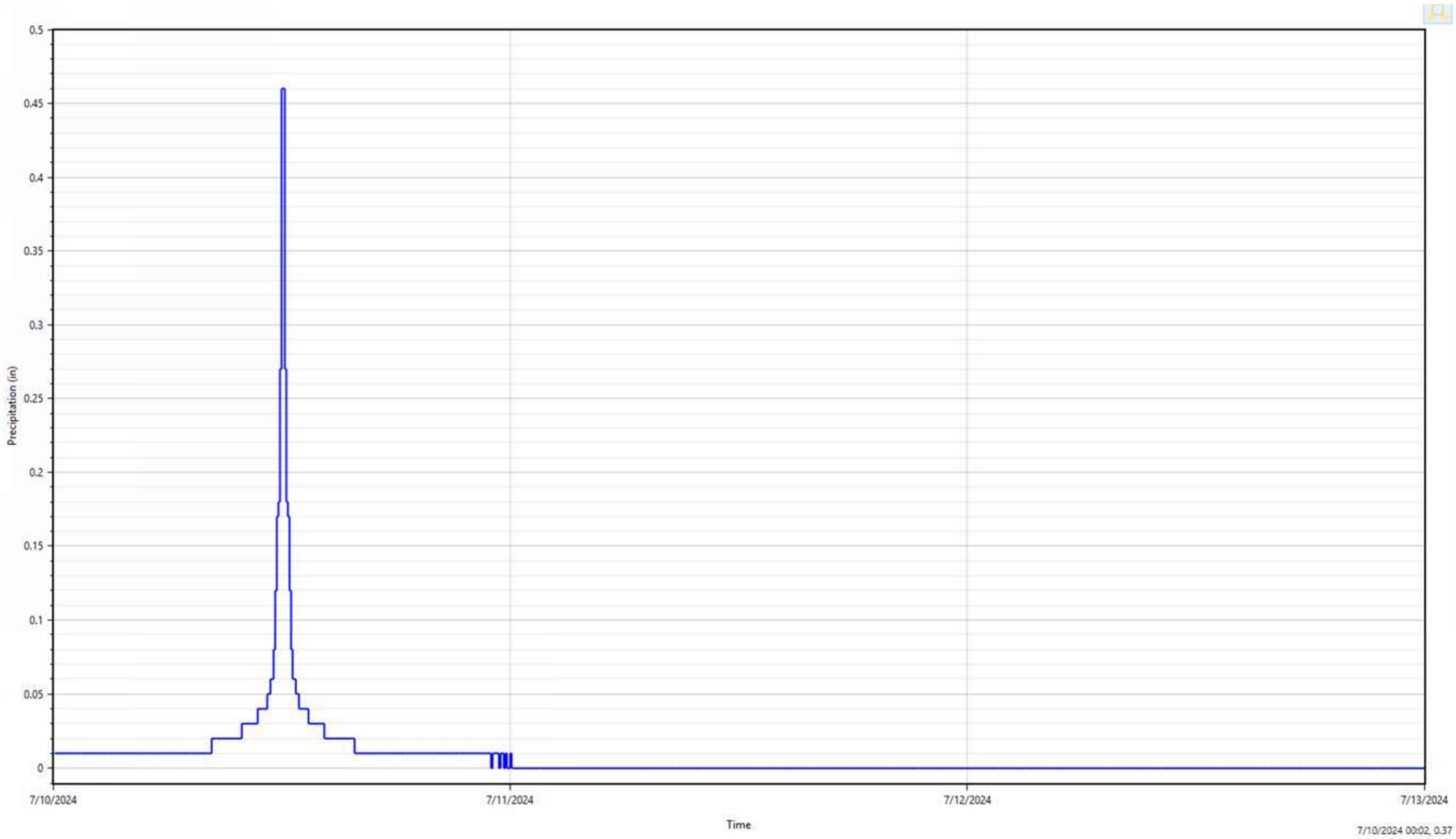
6. CONCLUSION

The proposed project is expected to not negatively impact the surrounding developed area if constructed based on the sample developed layouts. It should be noted that this report does not replace the need for a drainage impact study for any given development on this proposed site. A new construction would still require a study to ensure drainage routing is properly accommodated; this study would be expected to provide a head start toward these efforts.

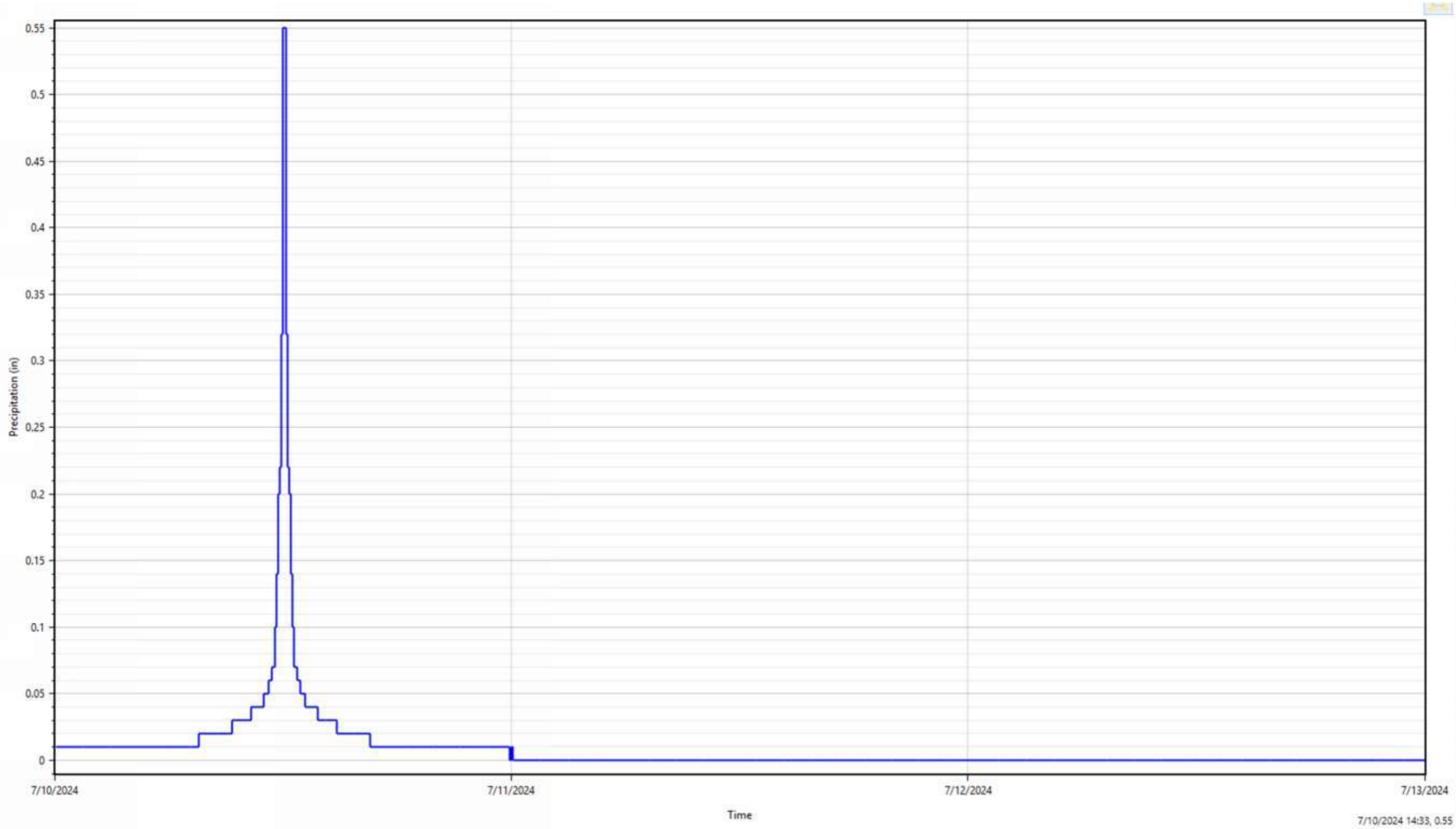
Additionally, we do not expect any adverse downstream effects beyond the model limits, as water surface elevations in the existing model do not increase at any point during the simulations. Based on the information available at the time this report was prepared, we conclude that if the proposed improvements are constructed as described, they should not adversely impact flood risk within the watershed for any of the storm events analyzed.

ATTACHMENT 1

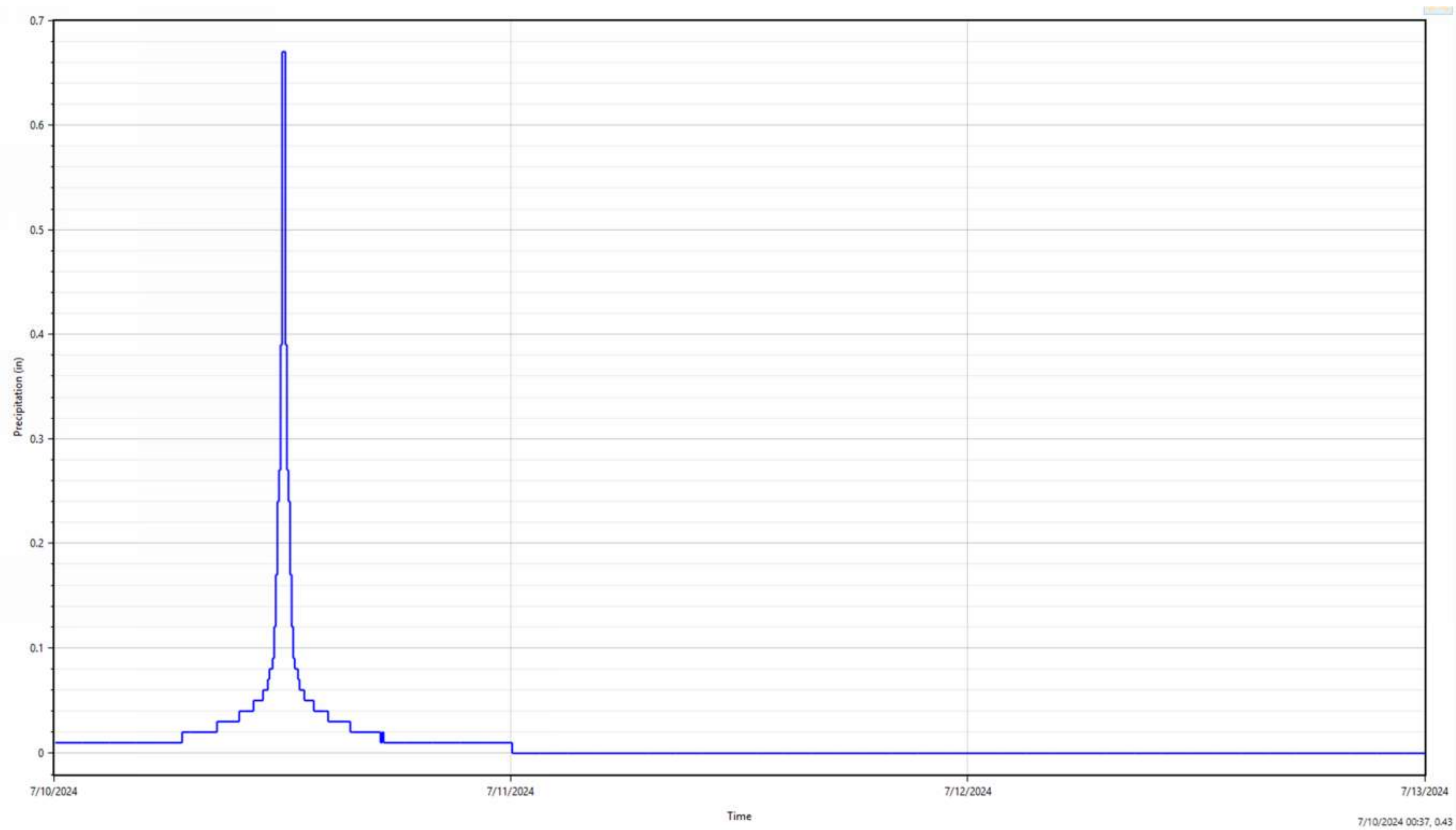
Hornsby 5 Year Storm Precipitation



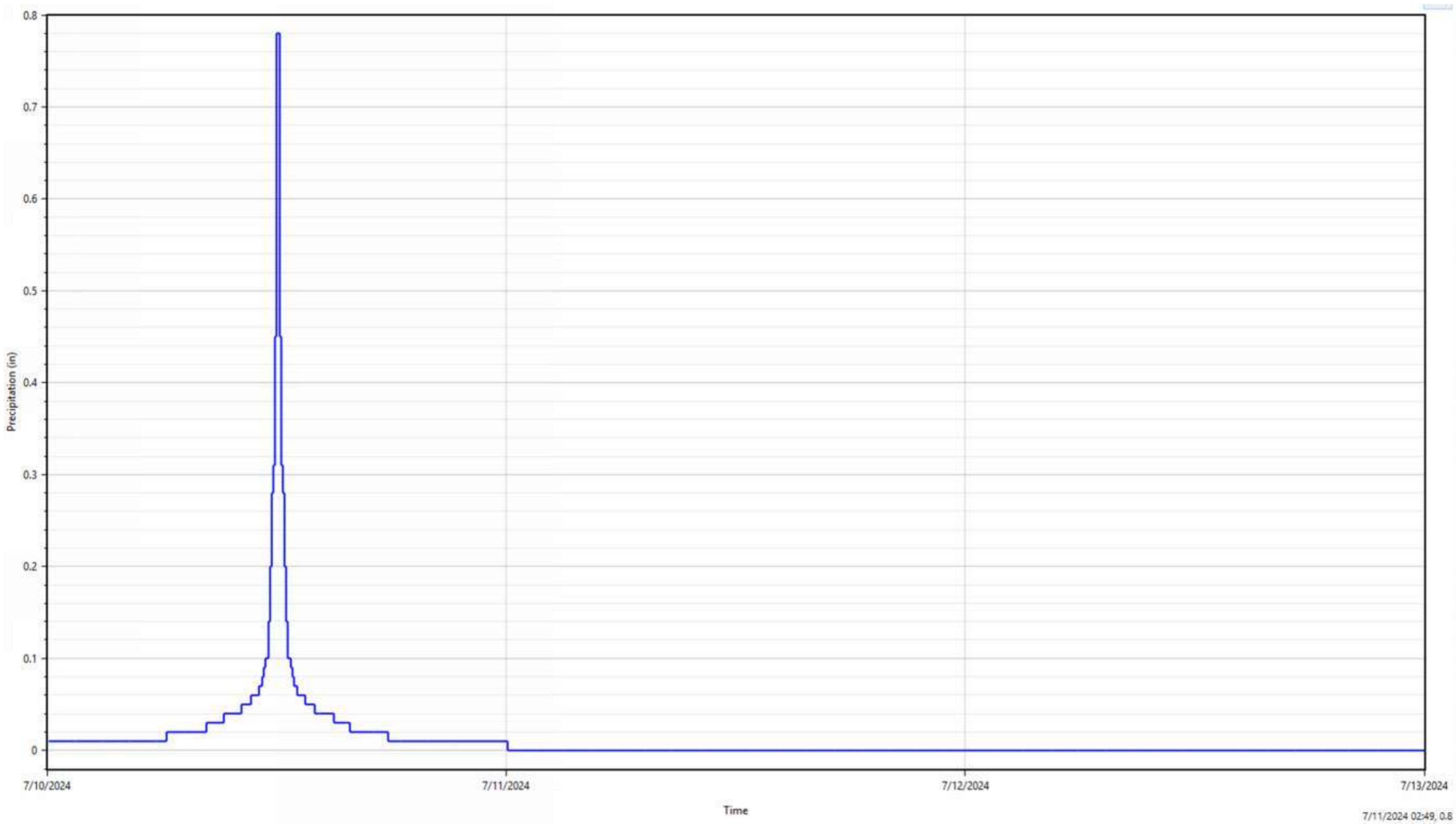
Hornsby 10 Year Storm Precipitation



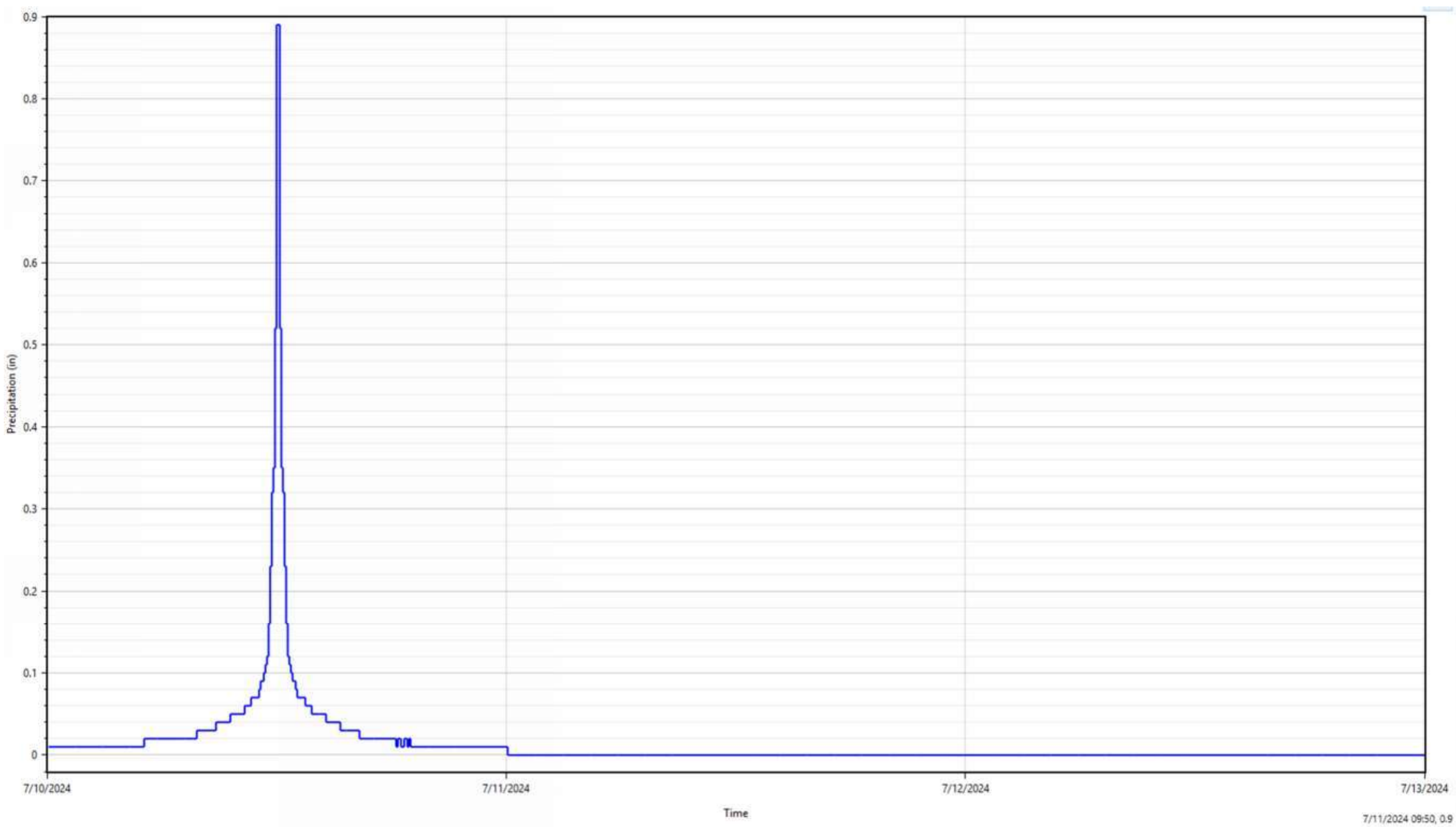
Hornsby 25 Year Storm Precipitation



Hornsby 50 Year Storm Precipitation



Hornsby 100 Year Storm Precipitation



ATTACHMENT 2

United States Department of Agriculture

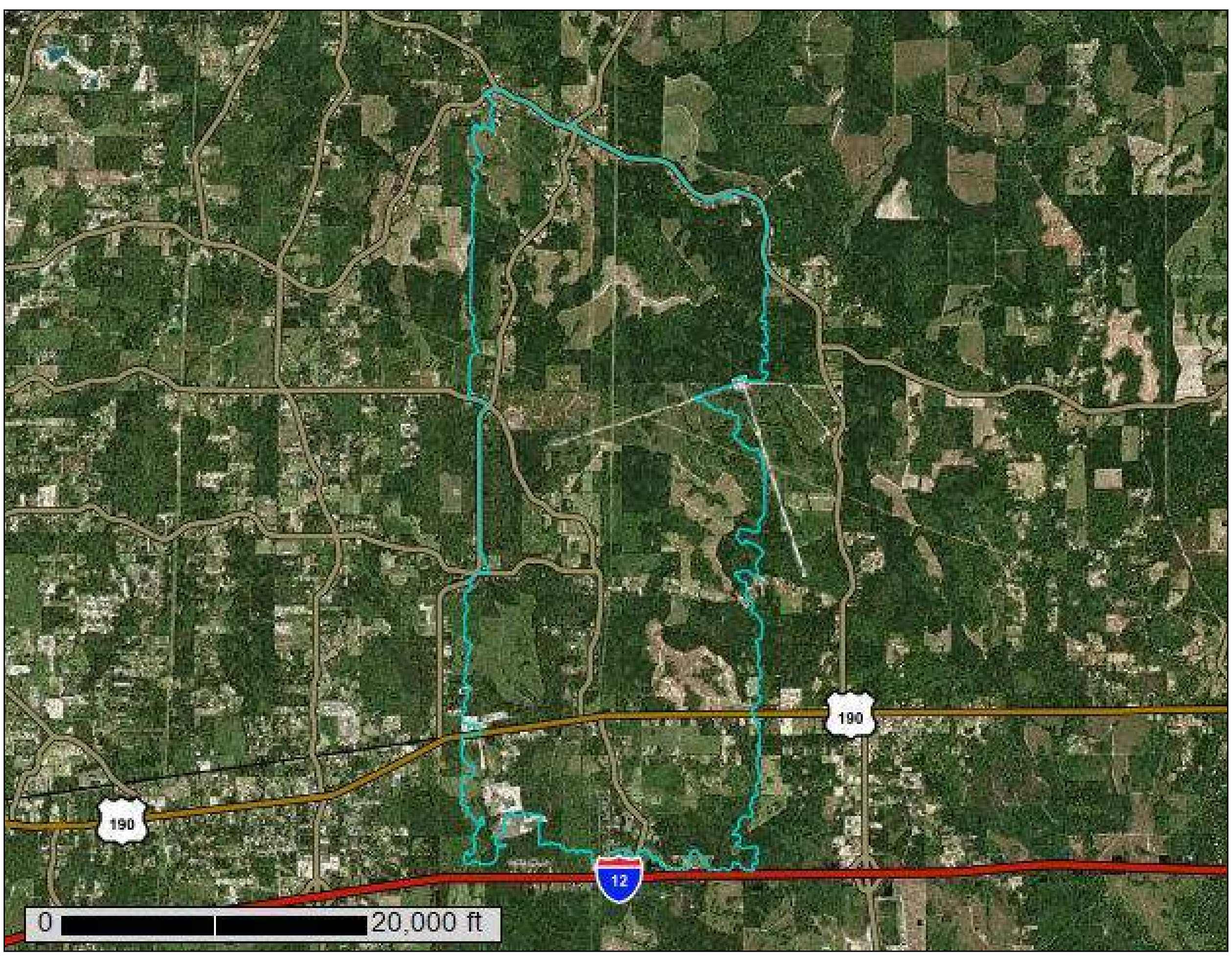
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Livingston Parish, Louisiana



July 7, 2025

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

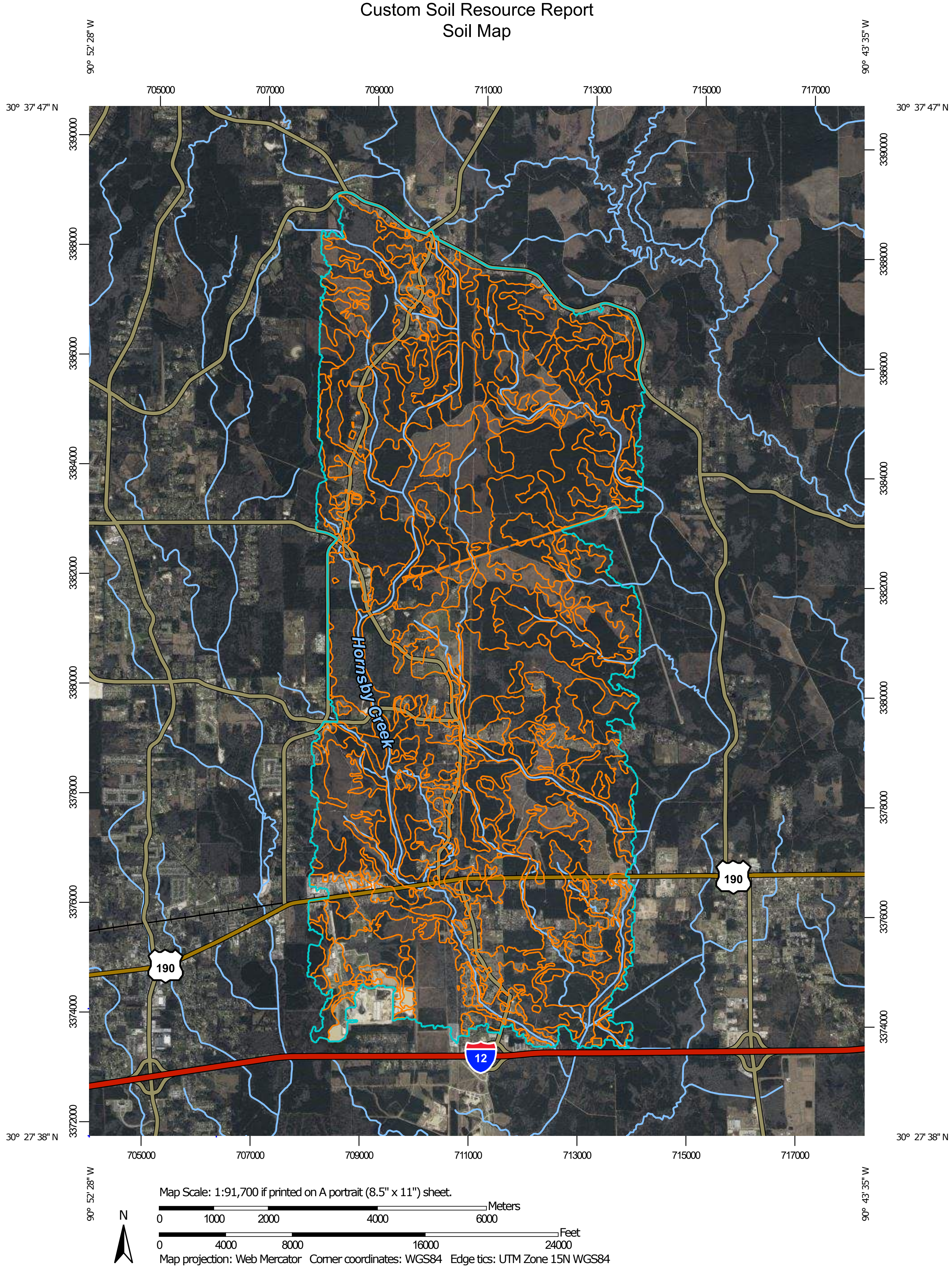
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map



Map Scale: 1:91,700 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 1000, 2000, 4000, 6000

Feet: 0, 4000, 8000, 16000, 24000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Livingston Parish, Louisiana
Survey Area Data: Version 19, Sep 5, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 12, 2023—Feb 18, 2023

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Co	Colyell silt loam, 1 to 3 percent slopes, rarely flooded	3.7	0.0%
Dv	Deerford-Verdun complex, 0 to 1 percent slopes	3,798.0	19.2%
Dx	Dexter very fine sandy loam, 1 to 3 percent slopes	8.4	0.0%
En	Encrow silt loam, occasionally flooded	3,952.5	20.0%
Gb	Gilbert silt loam	2,865.0	14.5%
Ge	Gilbert-Brimstone silt loams, occasionally flooded	3,942.1	19.9%
Mt	Myatt fine sandy loam, 0 to 1 percent slopes	11.1	0.1%
OU	Ouachita, Ochlockonee and Guyton soils, 0 to 3 percent slopes, frequently flooded	1,001.8	5.1%
Pa	Pits-Arents complex, 0 to 5 percent slopes	16.4	0.1%
Sa	Satsuma silt loam, 1 to 3 percent slopes	3,769.8	19.0%
Sp	Springfield silt loam	175.7	0.9%
St	Stough fine sandy loam	50.4	0.3%
Ve	Verdun silt loam	151.9	0.8%
W	Water	56.2	0.3%
Totals for Area of Interest		**19,802.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Livingston Parish, Louisiana

Co—Colyell silt loam, 1 to 3 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: 2w9x6
Elevation: 10 to 100 feet
Mean annual precipitation: 55 to 76 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 270 to 350 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Colyell and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Colyell

Setting

Landform: Stream terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Thin silty loess over late pleistocene silty and clayey fluviomarine deposits over late pleistocene silty and clayey marine deposits

Typical profile

A - 0 to 3 inches: silt loam
E - 3 to 8 inches: silt
EB - 8 to 12 inches: silt loam
2Bt/E - 12 to 15 inches: silty clay
2Bt - 15 to 39 inches: silty clay
3Btn - 39 to 60 inches: silty clay loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 11 to 12 inches
Frequency of flooding: Rare
Frequency of ponding: None
Maximum salinity: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: High (about 10.7 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: F134XY122LA - Baton Rouge Terrace Southern Loess Stream Terrace - PROVISIONAL

Hydric soil rating: No

Minor Components

Natalbany

Percent of map unit: 3 percent
Hydric soil rating: Yes

Springfield

Percent of map unit: 3 percent
Landform: Depressions
Ecological site: F134XY123LA - Baton Rouge Terrace Southern Loess Low Terrace - PROVISIONAL
Hydric soil rating: Yes

Verdun

Percent of map unit: 3 percent
Landform: Terraces
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F134XY124LA - Baton Rouge Terrace Southern Loess Terrace - PROVISIONAL
Hydric soil rating: No

Encrow

Percent of map unit: 1 percent
Ecological site: F134XY123LA - Baton Rouge Terrace Southern Loess Low Terrace - PROVISIONAL
Hydric soil rating: Yes

Dv—Deerford-Verdun complex, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2wk4p
Elevation: 10 to 50 feet
Mean annual precipitation: 62 to 64 inches
Mean annual air temperature: 64 to 79 degrees F
Frost-free period: 258 to 321 days
Farmland classification: Not prime farmland

Map Unit Composition

Deerford and similar soils: 50 percent
Verdun and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Deerford

Setting

Landform: Terraces

Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 4 inches: silt loam
E/Bg - 4 to 23 inches: silt loam
Btn1 - 23 to 30 inches: silty clay loam
Btn2 - 30 to 38 inches: silt loam
B'tn - 38 to 92 inches: silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 17 to 24 inches to natric
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: About 6 to 8 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F134XY124LA - Baton Rouge Terrace Southern Loess Terrace - PROVISIONAL
Hydric soil rating: No

Description of Verdun

Setting

Landform: Terraces
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 5 inches: silt loam
B/E - 5 to 9 inches: silt loam
Btn1 - 9 to 16 inches: silty clay loam
Btn2 - 16 to 40 inches: silt loam
Cn - 40 to 80 inches: silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 9 inches to natric
Drainage class: Somewhat poorly drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: About 6 to 10 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A/D
Ecological site: F134XY124LA - Baton Rouge Terrace Southern Loess Terrace - PROVISIONAL
Hydric soil rating: No

Minor Components

Frost

Percent of map unit: 10 percent
Landform: Terraces
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R134XY402LA - Southwestern Loess Terrace Prairie - PROVISIONAL
Hydric soil rating: Yes

Dx—Dexter very fine sandy loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: m3vq
Elevation: 20 to 80 feet
Mean annual precipitation: 55 to 76 inches
Mean annual air temperature: 55 to 79 degrees F
Frost-free period: 221 to 277 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Dexter and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dexter

Setting

Landform: Terraces

Down-slope shape: Convex

Typical profile

A - 0 to 6 inches: very fine sandy loam
Bt - 6 to 32 inches: clay loam
2BC - 32 to 59 inches: fine sandy loam
C - 59 to 66 inches: fine sandy loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 12.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Gilbert

Percent of map unit: 10 percent
Landform: Depressions
Hydric soil rating: Yes

En—Encrow silt loam, occasionally flooded

Map Unit Setting

National map unit symbol: m3vr
Elevation: 0 to 150 feet
Mean annual precipitation: 55 to 76 inches
Mean annual air temperature: 55 to 79 degrees F
Frost-free period: 221 to 277 days
Farmland classification: Not prime farmland

Map Unit Composition

Encrow and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Encrow

Setting

Landform: Terraces

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Typical profile

A - 0 to 4 inches: silt loam
Eg, E/Bg - 4 to 27 inches: silt loam
2Btg - 27 to 48 inches: silty clay
2BCng - 48 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: F134XY123LA - Baton Rouge Terrace Southern Loess Low Terrace - PROVISIONAL
Hydric soil rating: Yes

Minor Components

Colyell, frequently floodded

Percent of map unit: 4 percent
Landform: Stream terraces
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F134XY122LA - Baton Rouge Terrace Southern Loess Stream Terrace - PROVISIONAL
Hydric soil rating: Yes

Natalbany, frequently flooded

Percent of map unit: 4 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Springfield

Percent of map unit: 4 percent
Landform: Terraces
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F134XY123LA - Baton Rouge Terrace Southern Loess Low Terrace - PROVISIONAL
Hydric soil rating: Yes

Deerford

Percent of map unit: 3 percent

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F134XY124LA - Baton Rouge Terrace Southern Loess Terrace - PROVISIONAL
Hydric soil rating: No

Gb—Gilbert silt loam

Map Unit Setting

National map unit symbol: m3vs
Elevation: 10 to 80 feet
Mean annual precipitation: 55 to 76 inches
Mean annual air temperature: 55 to 79 degrees F
Frost-free period: 221 to 277 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Gilbert and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gilbert

Setting

Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

A - 0 to 6 inches: silt loam
Eg - 6 to 12 inches: silt loam
Btg - 12 to 28 inches: silty clay loam
Btng - 28 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D

Ecological site: F134XY123LA - Baton Rouge Terrace Southern Loess Low Terrace - PROVISIONAL
Hydric soil rating: Yes

Minor Components

Deerford

Percent of map unit: 4 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F134XY124LA - Baton Rouge Terrace Southern Loess Terrace - PROVISIONAL
Hydric soil rating: No

Satsuma

Percent of map unit: 4 percent
Landform: Ridges on stream terraces
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F134XY122LA - Baton Rouge Terrace Southern Loess Stream Terrace - PROVISIONAL
Hydric soil rating: No

Verdun

Percent of map unit: 4 percent
Landform: Terraces
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F134XY124LA - Baton Rouge Terrace Southern Loess Terrace - PROVISIONAL
Hydric soil rating: No

Myatt

Percent of map unit: 3 percent
Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F152AY100LA - Western Silty Flat
Hydric soil rating: Yes

Ge—Gilbert-Brimstone silt loams, occasionally flooded

Map Unit Setting

National map unit symbol: m3vt
Elevation: 0 to 130 feet

Mean annual precipitation: 55 to 76 inches
Mean annual air temperature: 55 to 79 degrees F
Frost-free period: 221 to 277 days
Farmland classification: Not prime farmland

Map Unit Composition

Gilbert and similar soils: 60 percent
Brimstone and similar soils: 25 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gilbert

Setting

Landform: Depressions
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

A - 0 to 6 inches: silt loam
Eg - 6 to 12 inches: silt loam
Btg - 12 to 28 inches: silty clay loam
Btng - 28 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Ecological site: F134XY123LA - Baton Rouge Terrace Southern Loess Low Terrace - PROVISIONAL
Hydric soil rating: Yes

Description of Brimstone

Setting

Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy fluviomarine deposits of late pleistocene age

Typical profile

A - 0 to 18 inches: silt loam
E/Btg - 18 to 24 inches: silt loam
Btg/E - 24 to 30 inches: silty clay loam
Btng - 30 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 10 to 30 inches to natric
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

Minor Components

Deerford

Percent of map unit: 4 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F134XY124LA - Baton Rouge Terrace Southern Loess Terrace - PROVISIONAL
Hydric soil rating: No

Verdun

Percent of map unit: 4 percent
Landform: Terraces
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F134XY124LA - Baton Rouge Terrace Southern Loess Terrace - PROVISIONAL
Hydric soil rating: No

Satsuma

Percent of map unit: 4 percent
Landform: Ridges on stream terraces
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F134XY122LA - Baton Rouge Terrace Southern Loess Stream Terrace - PROVISIONAL
Hydric soil rating: No

Olivier

Percent of map unit: 3 percent
Landform: Interfluves
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear

Ecological site: F134XY124LA - Baton Rouge Terrace Southern Loess Terrace - PROVISIONAL
Hydric soil rating: No

Mt—Myatt fine sandy loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2syw2
Elevation: 20 to 430 feet
Mean annual precipitation: 57 to 71 inches
Mean annual air temperature: 55 to 79 degrees F
Frost-free period: 215 to 291 days
Farmland classification: Not prime farmland

Map Unit Composition

Myatt and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Myatt

Setting

Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Pleistocene fluviomarine deposits

Typical profile

A - 0 to 16 inches: fine sandy loam
Btg - 16 to 50 inches: sandy clay loam
Cg - 50 to 64 inches: sandy clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 0 to 11 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: B/D
Ecological site: F152AY100LA - Western Silty Flat
Hydric soil rating: Yes

Minor Components

Fluker

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Stough

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F152AY100LA - Western Silty Flat
Hydric soil rating: No

OU—Ouachita, Ochlockonee and Guyton soils, 0 to 3 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2w8y5
Elevation: 10 to 280 feet
Mean annual precipitation: 57 to 69 inches
Mean annual air temperature: 61 to 70 degrees F
Frost-free period: 215 to 270 days
Farmland classification: Not prime farmland

Map Unit Composition

Ouachita and similar soils: 40 percent
Ochlockonee and similar soils: 35 percent
Guyton and similar soils: 20 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ouachita

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear

Parent material: Loamy alluvium

Typical profile

A - 0 to 4 inches: silt loam
Bw1 - 4 to 40 inches: silt loam
Bw2 - 40 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B
Hydric soil rating: Yes

Description of Ochlockonee

Setting

Landform: Natural levees
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy alluvium

Typical profile

A - 0 to 5 inches: silt loam
C - 5 to 60 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 39 to 60 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Guyton

Setting

Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Late plisetocene age terraces with loamy alluvium derived from sedimentary rock

Typical profile

A - 0 to 3 inches: silt loam
E - 3 to 27 inches: silt loam
Btg/E - 27 to 41 inches: silty clay loam
Btg - 41 to 70 inches: silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 10.0
Available water supply, 0 to 60 inches: Very high (about 12.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Ecological site: F134XY101MS - Southern Rolling Plains Loess Drainways - PROVISIONAL
Hydric soil rating: Yes

Minor Components

Cahaba

Percent of map unit: 5 percent
Landform: Flood-plain steps
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Pa—Pits-Arents complex, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: m3w3
Elevation: 20 to 100 feet
Mean annual precipitation: 55 to 76 inches
Mean annual air temperature: 55 to 79 degrees F
Frost-free period: 221 to 277 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits: 65 percent
Arents and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits

Setting

Down-slope shape: Concave
Across-slope shape: Concave

Description of Arents

Setting

Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Pleistocene fluviomarine deposits

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Minor Components

Arents, flooded

Percent of map unit: 10 percent
Landform: Depressions
Hydric soil rating: Yes

Sa—Satsuma silt loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: m3w4
Elevation: 0 to 50 feet
Mean annual precipitation: 55 to 76 inches
Mean annual air temperature: 55 to 79 degrees F
Frost-free period: 221 to 277 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Satsuma and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Satsuma

Setting

Landform: Ridges on stream terraces
Down-slope shape: Convex
Across-slope shape: Linear

Typical profile

Ap - 0 to 4 inches: silt loam
EB - 4 to 12 inches: silt loam
Bt/E - 12 to 18 inches: silty clay loam
Btn - 18 to 28 inches: loam
2Btnx - 28 to 35 inches: clay loam
2Btnx - 35 to 65 inches: loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Ecological site: F134XY122LA - Baton Rouge Terrace Southern Loess Stream Terrace - PROVISIONAL
Hydric soil rating: No

Minor Components

Gilbert

Percent of map unit: 5 percent
Landform: Depressions
Ecological site: F134XY123LA - Baton Rouge Terrace Southern Loess Low Terrace - PROVISIONAL
Hydric soil rating: Yes

Sp—Springfield silt loam

Map Unit Setting

National map unit symbol: m3w5
Elevation: 10 to 150 feet
Mean annual precipitation: 55 to 76 inches
Mean annual air temperature: 55 to 79 degrees F
Frost-free period: 221 to 277 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Springfield and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Springfield

Setting

Landform: Terraces
Down-slope shape: Convex
Across-slope shape: Linear

Typical profile

A - 0 to 3 inches: silt loam
Eg - 3 to 13 inches: silt loam
Btg - 13 to 20 inches: silty clay
Bt - 20 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F134XY123LA - Baton Rouge Terrace Southern Loess Low Terrace - PROVISIONAL
Hydric soil rating: Yes

Minor Components

Colyell, frequently floodded

Percent of map unit: 4 percent
Landform: Stream terraces
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F134XY122LA - Baton Rouge Terrace Southern Loess Stream Terrace - PROVISIONAL
Hydric soil rating: Yes

Encrow, occasionally flooded

Percent of map unit: 2 percent
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F134XY123LA - Baton Rouge Terrace Southern Loess Low Terrace - PROVISIONAL
Hydric soil rating: Yes

Deerford

Percent of map unit: 2 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F134XY124LA - Baton Rouge Terrace Southern Loess Terrace - PROVISIONAL
Hydric soil rating: No

Verdun

Percent of map unit: 2 percent
Landform: Terraces
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F134XY124LA - Baton Rouge Terrace Southern Loess Terrace - PROVISIONAL
Hydric soil rating: No

St—Stough fine sandy loam

Map Unit Setting

National map unit symbol: m3w6
Elevation: 0 to 100 feet

Mean annual precipitation: 55 to 76 inches
Mean annual air temperature: 55 to 79 degrees F
Frost-free period: 221 to 277 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Stough and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stough

Setting

Landform: Ridges on stream terraces
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Pleistocene loamy fluviomarine deposits

Typical profile

A, E - 0 to 7 inches: fine sandy loam
Bt - 7 to 14 inches: loam
Btx - 14 to 60 inches: loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 6 to 12 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: F152AY100LA - Western Silty Flat
Hydric soil rating: No

Minor Components

Guyton

Percent of map unit: 5 percent
Landform: Depressions
Ecological site: F152AY100LA - Western Silty Flat
Hydric soil rating: Yes

Myatt

Percent of map unit: 5 percent
Landform: Depressions
Ecological site: F152AY100LA - Western Silty Flat
Hydric soil rating: Yes

Ve—Verdun silt loam

Map Unit Setting

National map unit symbol: m3w8
Elevation: 0 to 70 feet
Mean annual precipitation: 55 to 76 inches
Mean annual air temperature: 55 to 79 degrees F
Frost-free period: 221 to 277 days
Farmland classification: Not prime farmland

Map Unit Composition

Verdun and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Verdun

Setting

Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

A - 0 to 4 inches: silt loam
E/Btg - 4 to 12 inches: silt loam
Btng - 12 to 22 inches: silty clay loam
Btn - 22 to 60 inches: silty clay loam
Ckn - 60 to 70 inches: silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 6 to 16 inches to natric
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 6 to 12 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: F134XY124LA - Baton Rouge Terrace Southern Loess Terrace - PROVISIONAL
Hydric soil rating: No

Minor Components

Springfield

Percent of map unit: 10 percent
Landform: Depressions
Ecological site: F134XY123LA - Baton Rouge Terrace Southern Loess Low Terrace - PROVISIONAL
Hydric soil rating: Yes

W—Water

Map Unit Setting

National map unit symbol: 1tckl
Mean annual precipitation: 55 to 76 inches
Mean annual air temperature: 55 to 79 degrees F
Frost-free period: 221 to 277 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

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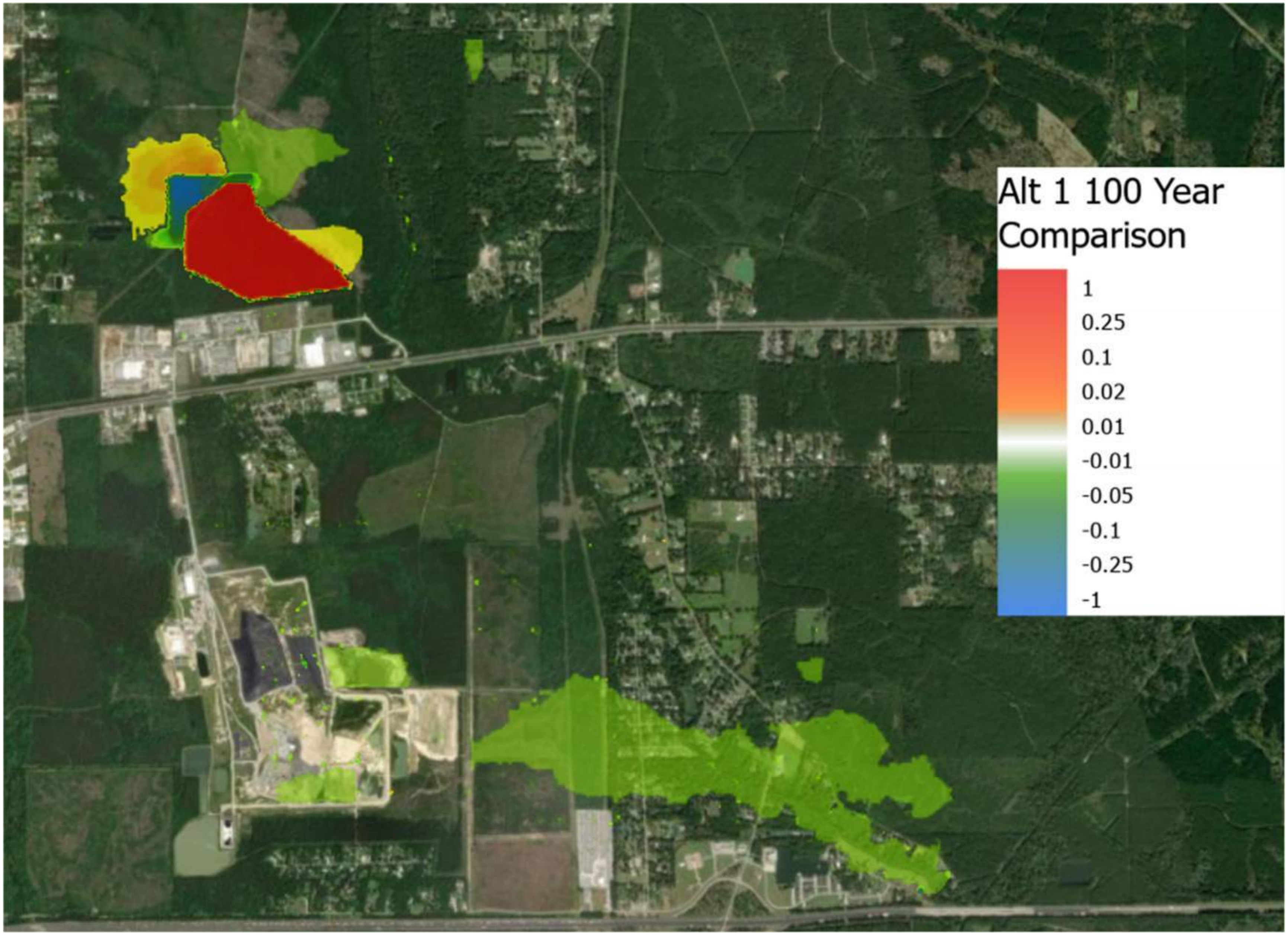
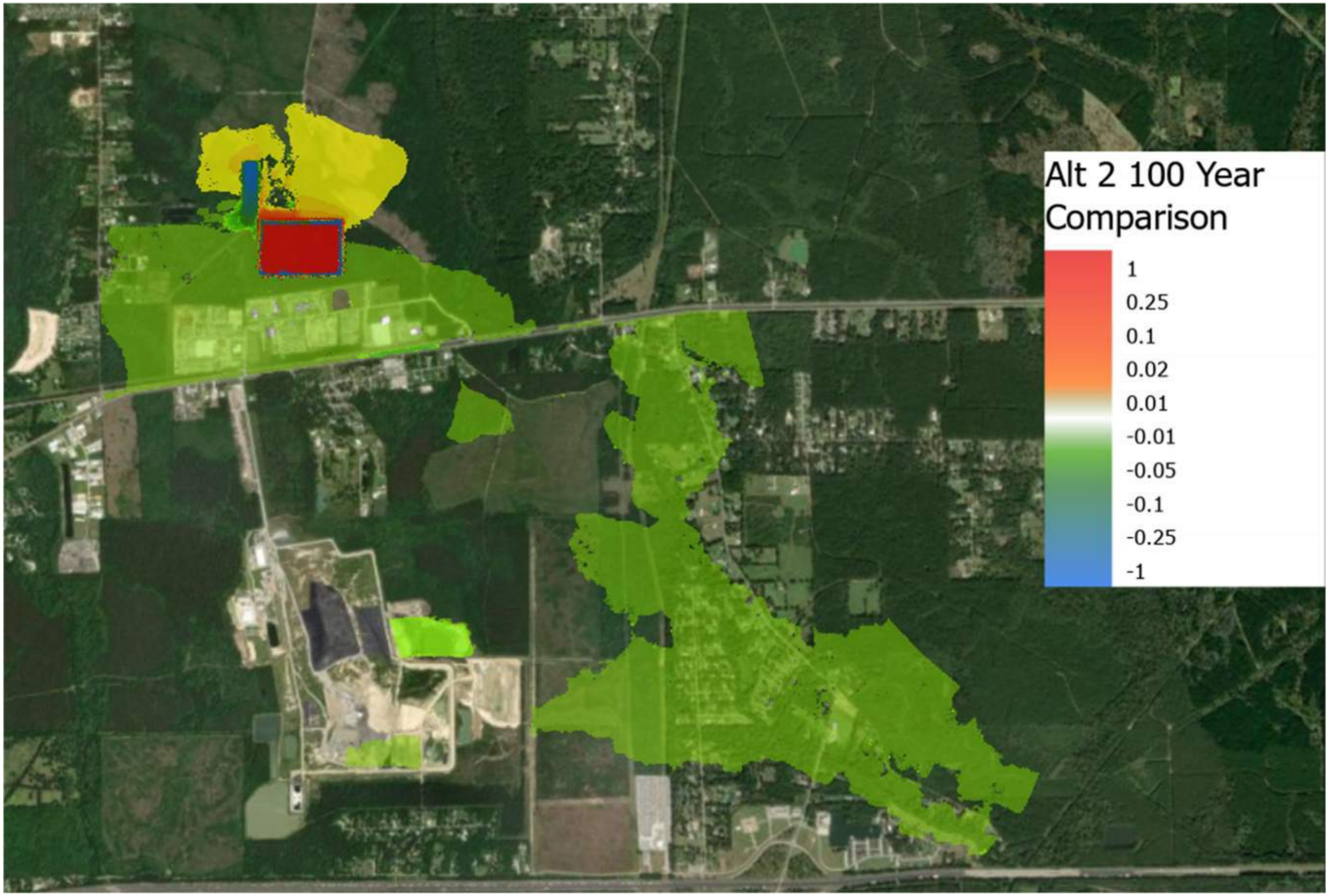
ATTACHMENT 3


Alt 1 100 Year Comparison
1
0.25
0.1
0.02
0.01
-0.01
-0.05
-0.1
-0.25
-1


Alt 2 100 Year Comparison
1
0.25
0.1
0.02
0.01
-0.01
-0.05
-0.1
-0.25
-1

ATTACHMENT 4

HECRAS Infiltration Values

Land type: Soil Group	Curve Number	Initial Abstraction Ratio	Min Infiltration Rate (in/hr)
NoData	85	0.35	0.12
NoData: D	87	0.3	0.12
NoData: C-D	82	0.44	0.12
NoData: B	75	0.67	0.12
Paved Areas: NoData	99	0.02	0.12
Paved Areas: D	99	0.02	0.12
Paved Areas: C-D	99	0.02	0.12
Paved Areas: B	99	0.02	0.12
Buildings: NoData	99	0.02	0.12
Buildings: D	99	0.02	0.12
Buildings: C-D	99	0.02	0.12
Buildings: B	99	0.02	0.12
Undeveloped, Forest: NoData	87	0.3	0.12
Undeveloped, Forest: D	77	0.6	0.12
Undeveloped, Forest: C-D	74	0.7	0.12
Undeveloped, Forest: B	55	1.64	0.12
Wetlands, Forested: NoData	78	0.56	0.12
Wetlands, Forested: D	78	0.56	0.12
Wetlands, Forested: C-D	78	0.56	0.12
Wetlands, Forested: B	78	0.56	0.12
Water: NoData	100	0	0.12
Water: D	100	0	0.12
Water: C-D	100	0	0.12
Water: B	100	0	0.12
Developed, Open Space: NoData	75	0.67	0.12
Developed, Open Space: D	84	0.38	0.12
Developed, Open Space: C-D	77	0.6	0.12

Developed, Open Space: B	55	1.64	0.12
Wetlands, Non-Forested: NoData	85	0.35	0.12
Wetlands, Non-Forested: D	85	0.35	0.12
Wetlands, Non-Forested: C-D	85	0.35	0.12
Wetlands, Non-Forested: B	85	0.35	0.12
Undeveloped, Shrub-Scrub: NoData	77	0.6	0.12
Undeveloped, Shrub-Scrub: D	77	0.6	0.12
Undeveloped, Shrub-Scrub: C-D	74	0.7	0.12
Undeveloped, Shrub-Scrub: B	56	1.57	0.12
Landfill: NoData	99	0.02	0.12
Landfill: D	99	0.02	0.12
Landfill: C-D	99	0.02	0.12
Landfill: B	99	0.02	0.12

Figure 16 - Infiltration Constants by Soil Type