11 December 2020

State of Louisiana
Coastal Protection and Restoration Authority
150 Terrace Avenue
Baton Rouge, Louisiana 70802

Attention Ms. Jessica Diez

Ladies and Gentlemen:

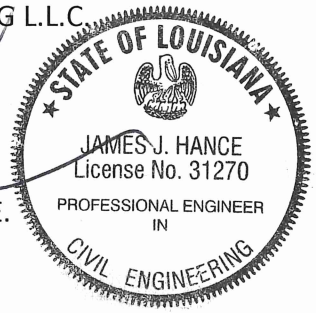
Geotechnical Data Report
Phase I – Professional Geotechnical Services
State of Louisiana
Coastal Protection and Restoration Authority (CPRA)
East Delacroix Marsh Creation Project
St. Bernard Parish, Louisiana
Contract No. 4400015385
CPRA Project No. BS-0037, Task No. 4
Eustis Engineering Project No. 24431

We are transmitting an electronic copy of our geotechnical data report covering a geotechnical exploration for the subject project. Hard copies are available upon request.

Thank you for asking us to perform these services.

Yours very truly,

EUSTIS ENGINEERING L.L.C.



JAMES J. HANCE, P.E.

JMW:sh

GEOTECHNICAL DATA REPORT

PHASE I – PROFESSIONAL GEOTECHNICAL SERVICES

STATE OF LOUISIANA

COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA)

EAST DELACROIX MARSH CREATION PROJECT

ST. BERNARD PARISH, LOUISIANA

CONTRACT NO. 4400015385

CPRA PROJECT NO. BS-0037, TASK NO. 4

EUSTIS ENGINEERING PROJECT NO. 24431

FOR
COASTAL PROTECTION AND RESTORATION AUTHORITY
BATON ROUGE, LOUISIANA

By
Eustis Engineering L.L.C.
Metairie, Louisiana

11 DECEMBER 2020

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GEOTECHNICAL DATA REPORT

PHASE I – PROFESSIONAL GEOTECHNICAL SERVICES

STATE OF LOUISIANA

COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA)

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INTRODUCTION

1. This report contains the results of geotechnical field and laboratory test data obtained for the proposed East Delacroix Marsh Creation Project (Project No. BS-0037). This project is located in Region 2, Breton Basin, St. Bernard Parish, along the east side of the island of Delacroix. Refer to Figure 1 for a site vicinity map. Our geotechnical services for the project were performed in accordance with our revised proposal, dated 30 July 2020. The project is funded under the Coastal Wetland Planning Protection and Restoration Act (CWPPRA) in Priority List 28. Authorization to proceed with these services was provided from the Coastal Protection and Restoration Authority (CPRA) in partnership with National Oceanic and Atmospheric Administration (NOAA). Notice to proceed was received from CPRA on 30 July 2020.

PURPOSE

2. The objective of this project is to create, maintain, and nourish existing deteriorating wetlands by hydraulic dredging material from an inland borrow source located in Lake

Lery. Specifically, four hundred six (406) acres of confined marsh will be placed in designated marsh creation areas formed by constructing earthen containment dikes around the perimeter. Existing berms and the east Delacroix tidal protection levee will also be used as containment. Approximately 12,950 linear feet of terraces will also be strategically designed to serve as sediment retention features and reduce wake erosion adjacent to the marsh creation areas. Proposed terraces will be constructed to el +2.5 (NAVD88). A slight raise to the existing tidal levee along the east side of Delacroix island is also anticipated. Furnished information showing proposed project feature locations is provided in Appendix I.

SCOPE OF SERVICE

3. The scope of service for the Phase I portion of the project comprises a geotechnical exploration and subsequent laboratory testing. A separate Phase II scope of service for geotechnical engineering analyses will be developed after review of the results of Phase I by CPRA. Geotechnical exploration to determine subsurface conditions and stratification, and to obtain samples of the various substrata included 37 exploration locations. These locations generally correspond to those identified in a Coastal Use Permit (CUP) obtained by the CPRA. A summary of the locations and designations for the marsh creation area, terrace field, and Lake Lery borrow area is given in Table 1. Our exploration included geotechnical soil borings and cone penetration tests (CPT).

4. Soil mechanics laboratory tests, performed on samples obtained from the soil borings, were used to evaluate the physical properties of the subsoils.

TABLE 1: SUMMARY OF EXPLORATION PLAN

FEATURE	BORING DESIGNATION	CPT DESIGNATION	PROPOSED EXPLORATION DEPTH IN FEET
Lake Lery Borrow Area	BA-1	-	15
	BA-2		
	BA-3		
	BA-4		
	BA-5		
	BA-6		
	BA-7		
	BA-8		
	BA-9		
	BA-10		
	BA-11		
	BA-12		
Delacroix Tidal Levee	TB-4* (Originally Called L-1 and Co-located with LCPT-3; Moved and Renamed in the Field)	LCPT-1	40
		LCPT-2	
		LCPT-3	
		LCPT-4*	
		LCPT-5	
		LCPT-6	
Marsh Creation Area and Terrace Field	B-1*	CPT-1*	30
	B-2*	CPT-2*	
	B-3*	CPT-3*	
	B-4	CPT-4	
	B-5	CPT-5	
	-	CPT-6	
		CPT-7	
		CPT-8	
		CPT-9	
		CPT-10	
	B-6*	CPT-11*	
	-	CPT-12	

*Co-located

MAGNETOMETER SURVEY

5. T. Baker Smith, LLC performed a magnetometer survey at each boring and CPT location to ensure no pipelines or obstructions existed at the proposed geotechnical exploration points before Eustis Engineering's field operations. T. Baker Smith ran a closed loop path with the magnetometer. This path completely enclosed the exploration locations at the

center and maintained a minimum path over a 25-ft by 25-ft area. T. Baker Smith staked each boring and CPT location. The T. Baker Smith survey crew used an RTK unit at each boring/CPT location and recorded water depth and mudline elevation. Elevations are referenced to North American Vertical Datum of 1988 (NAVD 88) Geoid 12A. T. Baker Smith also installed a tide staff referenced to NAVD88, Geoid 12A in the project area. The topographic and magnetometer survey results by T. Baker Smith are provided in Appendix II.

FIELD EXPLORATION

General

6. Prior to commencing field operations, Eustis Engineering completed the following tasks as noted in the scope of service document provided by CPRA:

- contact the landowner identified by the CPRA by telephone;
- coordinate with the landowners during waterfowl hunting and alligator nesting seasons, as applicable (Teal season in September);
- coordinate with St. Bernard Parish Public Works Department for locations within the tidal levee;
- contact Louisiana One Call to clear underground utilities; and
- perform magnetometer and hazard surveys (performed by T. Baker Smith) at the proposed soil boring and CPT locations.

7. Exploration Locations and Depths. Refer to Appendix II for a summary of the boring and CPT depths and locations. These locations are generally consistent with the CUP provided by CPRA and are based on the furnished location plan provided in Appendix I. T. Baker Smith staked boring locations in Lake Lery and the marsh creation areas based on the

location plan provided in the scope of service document. Note, the boring on the Tidal Levee was moved from the location of LCPT-3 to the location of LCPT-4. GPS coordinates for the boring and CPT locations are shown on the boring and CPT logs in terms of latitude and longitude in Appendices III and IV.

8. The undisturbed type soil test borings within the Lake Lery Borrow were drilled between 3 and 4 September 2020 using a drill rig mounted on pontoons. Airboat mounted equipment was utilized to complete the marsh creation and terrace field borings and CPTs between 8 and 11 September 2020. This third-party equipment was provided by Specialized Environmental Resources, Inc. (SER). CPTs along the tidal levee were completed using our track mounted cone rig between 20 and 21 October 2020. The tidal levee boring was completed using a track mounted Geoprobe® rig on 9 November 2020. Upon completion of the drilling operations, each boring was backfilled with cement-bentonite grout mix in accordance with current State of Louisiana requirements.

Undisturbed Soil Borings

9. Undisturbed samples of cohesive or semi-cohesive subsoils were obtained continuously for the first 20 feet and then at intervals of 5 feet, or changes in stratum, thereafter, using a 3-in. diameter thinwall Shelby tube sampler in accordance with ASTM D1587. Soil samples were retained within the Shelby tubes and transported to our laboratory located in Metairie, Louisiana. The samples were extruded in our laboratory in an effort to preserve sample quality. Detailed descriptive logs of the borings are shown in both tabular and graphical form in Appendix III.

10. Pocket penetrometer tests were performed on the soil samples to give a general indication of their shear strength or consistency. The results of these tests are shown on the boring logs under the column heading “PP.”

11. Samples of cohesionless and semi-cohesive materials were obtained during the performance of in situ Standard Penetration Tests. This test consists of driving a 2-in. diameter sampler 1 foot into the soil after first seating it 6 inches. A 140-lb weight dropped 30 inches is used to advance the sampler. The number of blows required to drive the sampler is indicative of the relative density of cohesionless soils and the consistency of cohesive soils. The results of the Standard Penetration Tests are shown on the boring logs under the column heading "SPT."

Cone Penetration Tests

12. The CPTs were performed using a 10-cm^2 cross-sectional area cone with a 60° apex angled tip and 150-cm^2 sleeve area. The soundings were hydraulically advanced into the ground at a rate of approximately 2 cm/sec. The sleeve friction was measured directly using a tension load cell. The testing was performed in accordance with methods and procedures outlined in ASTM D5778-12. During CPT testing, CPT parameters (tip resistance, friction resistance, and pore pressure) were recorded at 5-cm depth intervals.

13. Undrained shear strengths in cohesive and semi-cohesive strata and standard penetration blow counts in granular strata are interpreted from the CPT soundings using available software. These CPT plots provide measurements of corrected cone tip resistance (q_t), sleeve friction resistance (f_s), and pore pressure behind the cone tip (u_2). The plots also provide interpreted data based on the measured parameters: undrained shear strength (S_u), equivalent blow count from a SPT (N_{60}), and soil behavior type. These values are interpreted from correlations developed by Robertson et al. (1986) and Lunne, Robertson and Powell (1997), and our engineering experience in southeastern Louisiana. Our standard practice, and that of others in the southeastern Louisiana area, has been to use one site specific correction factor based on a study performed by the U.S. Army Corps of Engineers entitled "Cone Penetration Test Correlations in New Orleans Area Practice,

Report Submitted to the New Orleans District, USACE," by the Department of Civil and Environmental Engineering, Virginia Tech, Blacksburg, Virginia, dated November 2010, and other projects where CPT and 5-in. diameter undisturbed borings were performed. Two correlation methods for interpreting undrained shear strength are presented on the CPT logs. These include $(S_u)(2)$ and $(S_u)(6)$ based on cone factors of $N_k = 15$ and $N_c = 20$, respectively. The plots of interpreted shear strength are included in Appendix IV.

LABORATORY TESTS

14. Soil mechanics laboratory tests, consisting of natural water content, unit weight, and one-point unconsolidated undrained triaxial compression shear (OB), were performed on undisturbed samples obtained from the borings. Atterberg liquid limits (LL), plastic limits (PL), organic content tests (ORG), and tests to determine the percent passing the #200 (-200) sieve were performed on selected representative samples to aid in classification of the subsoils and to give an indication of their relative compressibility. The results of these laboratory tests are tabulated on the boring logs in Appendix III.

15. In addition, consolidation tests (CONS) were performed on selected representative samples from the borings performed at the project site. These tests were performed to help define the stress history of the site and to develop settlement parameters. The results of these tests are provided on the CONS report sheets in Appendix V.

16. Grain size distribution from sieve and hydrometer testing was completed from select samples. The results of these tests are provided in Appendix VI.

17. Settling Column. To evaluate the hydraulically dredged material from the proposed borrow area (shown on Figure 2), we performed one settling column test on a composite sample. The samples used to make the composite mixture were determined by CPRA.

The soil and water samples were combined to generate a composite slurry with an approximate concentration of 150 g/L. The test results are presented in Appendix VI. The test was performed in an 8-in. diameter by 8-ft high column. In addition, a particle size distribution curve was obtained for the composite sample used for the settling column test. The settling column data and other additional information are also provided in Appendix VII. The settling column test results will be evaluated and incorporated into the settlement analyses to determine the amount of marsh fill required to be pumped into the marsh creation areas to meet final elevation criterion.

18. Low Pressure Consolidation. We performed one low pressure consolidation test on the same composite material that was used for the settling column test to further define the borrow material's self-weight consolidation properties. A higher concentration of approximately 420 g/L was used for the low-pressure consolidation test. Compression ratios and coefficients of vertical consolidation and estimates of permeability were determined as a function of initial void ratio for each load step to assist in the evaluation of long term self-weight consolidation of the marsh creation fill. The results of this test are provided in Appendix VIII. The low-pressure consolidation test results will be evaluated and incorporated into the settlement analyses to determine the amount of marsh fill required to be pumped into the marsh creation areas to meet final elevation criterion.

DESCRIPTION OF SUBSURFACE SOIL CONDITIONS

Area Geology

19. The project area is located east of Delacroix Island. Surface geology maps available for the project area indicate the marsh creation area is primarily deposits of the St. Bernard delta lobe of the Mississippi River. These deposits are composed of cyclically interbedded

interdistributary peat and clay; natural levee silt and clay; distributary sand; delta front sand; and prodelta mud and clay. The near surface soils within the marsh creation area encountered are consistent with relatively recent saline marsh deposits. The saline marsh deposits are composed of extremely soft to very soft organic clays, peat, and humus.

20. The island of Delacroix and the subsurface of the adjacent tidal levee are primarily deposits of a meander belt of the distributary course of the Plaquemines and Balize Delta lobes of the Mississippi River. These deposits comprise sandy point bar deposits and natural levee deposits.

21. Figures 3, 4 and 5 present the general subsoil profile across the project site for the borrow area, marsh creation area, and tidal levee, respectively.

Stratigraphy

22. Marsh Creation and Terrace Borings and CPTs. A review of borings B-1 through B-6 cones CPT-1 through CPT-11 indicates the general stratigraphy for the project area comprises extremely soft to soft gray and brown humus, peat and organic clay to approximate depths of 0 to 5 feet below the mudline. These organic clays were underlain by extremely soft to soft gray clay and silty clay with interbedded strata of very loose to loose gray silty sand, clayey sand, and fine sand and very loose to loose sandy silt and clayey silt to boring termination depths of 30 feet below the mudline. Should these sand layers become problematic or should a more thorough mapping of these layers be necessary prior to construction, a geophysical survey should be implemented. Pockets of shells and shell fragments were also encountered across the site.

23. Borrow Area Borings. A review of boring BA-1 through BA-12 indicate a general stratigraphy of alternating stratum of extremely soft to soft dark gray, gray, and brown

humus/organic clay and extremely soft to soft gray clay. Some interbedded strata of very loose gray silty sand and gray silt were also encountered in some of the borrow borings. Pockets of shells and shell fragments were encountered in all borings in the borrow area.

24. Tidal Levee Boring and CPTs. A review of borings LB-4 and cones LCPT-1 through LCPT-6 indicates approximately 5-8 feet of existing levee fill. Geotextile reinforcement was encountered in LB-4. Beneath these stiffer fill materials, we encountered soft gray and tan clay and silty clay. A strata of loose gray silty sand to loose gray clayey silt was encountered in LB-4 at an approximate depth of 19-25 feet below the existing levee crown. Based on the completed CPTs this appears to be a continuous strata of loose coarse grained material that was encountered along the existing levee alignment. Thin layers of black or brown organic clay were also encountered. CPTs 2, 3, 5, and 6 also encountered a second coarse grained stratum approximately 35 to 38 feet below the existing levee crown.

Depth to Mudline/Depth to Groundwater

25. Standing water was encountered at most boring and CPT locations during the duration of our field work, as summarized in Table 2. Please note that the approximate depth presented below corresponds to the depth at the time of our exploration. Slight differences to the depths presented in Appendix II are anticipated. The site survey by T. Baker Smith was conducted when the mean water level in the vicinity of the site was approximately el 0.5 ft (NAVD88).

TABLE 2: DEPTH OF STANDING WATER

PROJECT FEATURE	EQUIPMENT TYPE	FIELD EXPLORATION POINT DESIGNATION	APPROXIMATE DEPTH OF STANDING WATER IN FEET
Borrow Area	Pontoon Mounted Drill Rig	BA-1	5’
		BA-2	4’
		BA-3	4.17’
		BA-4	4.17’
		BA-5	5’
		BA-6	5’
		BA-7	5.75’
		BA-8	7.5’
		BA-9	4.67’
		BA-10	5.92’
		BA-11	3.33’
		BA-12	5’
Marsh Creation/ Terrace Areas	Airboat Mounted Drill/CPT Rig	B-1/CPT-1	4’/3’
		B-2/CPT-2	3.5’/3.5’
		B-3/CPT-3	4’/3.25’
		B-4	3.33’
		B-5	3’
		CPT-4	3.5’
		CPT-5	4’
		CPT-6	3.5’
		CPT-7	2.5’
		CPT-8	2.5’
		CPT-9	4.5’
		CPT-10	2.5’
		B-6/CPT-11	5.42’/4’
		CPT-12	4’

26. Borings and CPTs along the tidal levee were completed along the levee centerline. The depth to groundwater was only recorded for TB-4 after a 15-minute waiting period. Water was initially encountered at a depth of 9 feet and had risen to 8 feet after 15 minutes. This time period was not sufficient to determine the stabilized depth to ground water.

27. The water depth/depth to ground water will vary with tidal fluctuations; climatic conditions; drainage improvements; and other factors. The water level and site

conditions should be investigated by those persons responsible for construction immediately prior to beginning work.

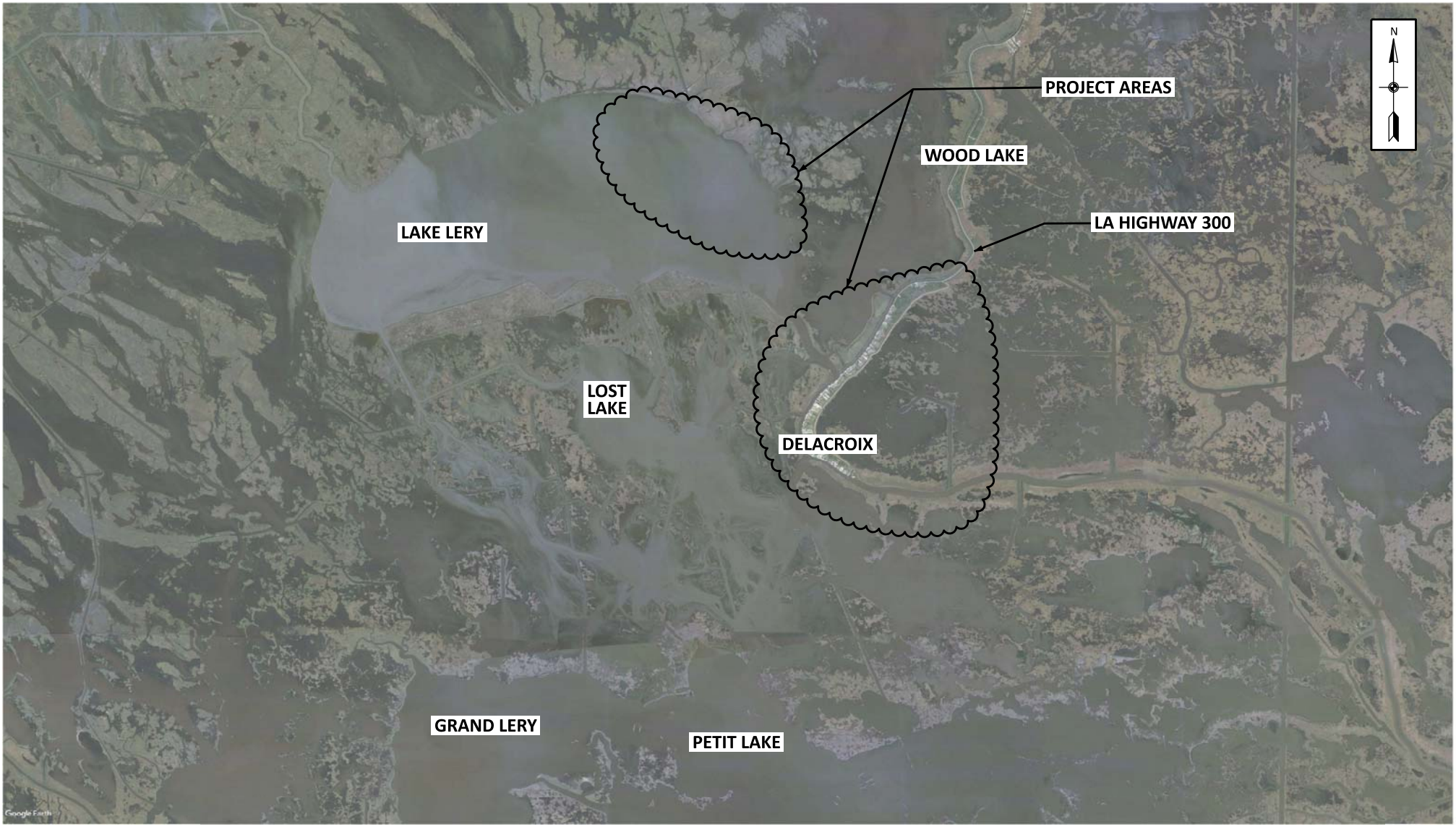
LIMITATIONS

28. This report has been prepared in accordance with generally accepted geotechnical engineering practice for the exclusive use of CPRA for specific application to the subject site. In the event of any changes in the nature or location of the proposed marsh creation and ridge restoration features, the information contained in this report shall not be considered valid unless the changes are reviewed and this report is modified and verified in writing. Should these data be used by anyone other than CPRA, the user should contact Eustis Engineering for interpretation of data and to secure any other information pertinent to this project.

29. Our findings in this report are based on selected points of field exploration, laboratory testing, and our understanding of the proposed project. Further variations in soil or ground water conditions could exist between and beyond the exploration points. The nature and extent of these variations may not become evident until construction. Variations in soil or ground water may require additional studies, consultation, and possible revisions to our recommendations.

30. Eustis Engineering has striven to provide our services in accordance with accepted geotechnical engineering practices in this locality at this time. No warranty or guarantee is expressed or implied. The results of the soil borings, CPTs, and laboratory tests contained in Appendices I through VI of this report may be included in the plans and specifications.

31. The scope of our services does not include an environmental assessment or an investigation for the presence or absence of wetlands and hazardous or toxic materials in the soil; surface water; ground water; or air on, below, or adjacent to the subject property. Furthermore, the scope does not include the investigation or detection of biological pollutants at the site. The term “biological pollutants” includes but is not limited to molds, fungi, spores, bacteria, viruses, and the byproducts of any such biological organisms.



SATELLITE IMAGERY DATED: 15 NOVEMBER 2019

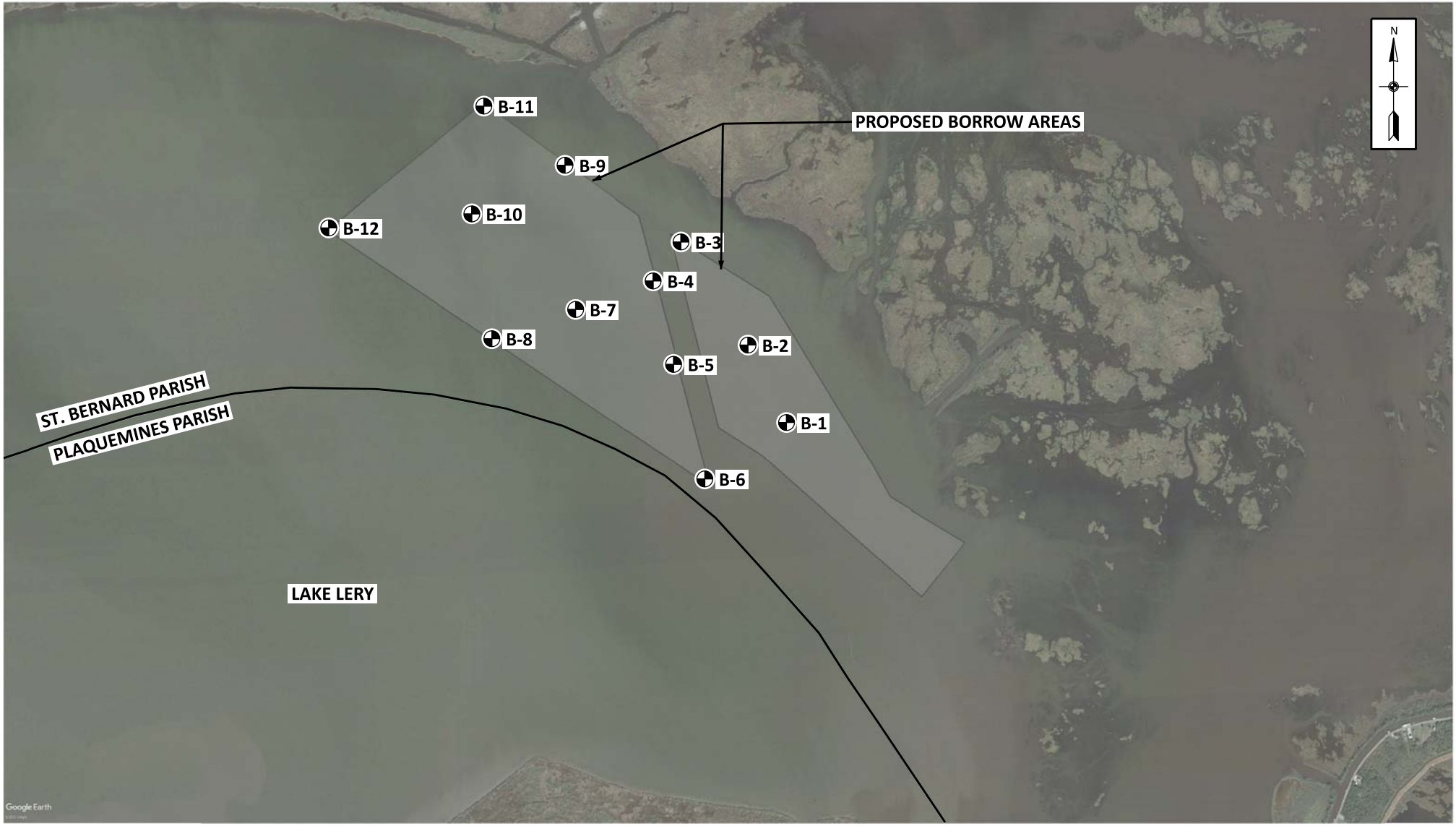
NOT TO SCALE

SITE VICINITY MAP

STATE OF LOUISIANA
COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA)
EAST DELACROIX MARSH CREATION PROJECT
ST. BERNARD, LOUISIANA
CONTRACT NO. 4400015385
PROJECT NO. BS-0037
TASK NO. 4

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: S.T.S.	JOB NO.: 24431
CHECKED BY: J.M.W.	DATE: 23 NOV 2020
CADD FILE: VICINITY PLAN.DGN	FIGURE 1



SATELLITE IMAGERY DATED: 15 NOVEMBER 2019

NOT TO SCALE

◓ DENOTES LOCATIONS OF UNDISTURBED SOIL BORINGS DRILLED ON 3 AND 4 SEPTEMBER 2020

BORING AND CPT LOCATION PLAN
BORROW AREA

STATE OF LOUISIANA
COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA)
EAST DELACROIX MARSH CREATION PROJECT
ST. BERNARD, LOUISIANA
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EUSTIS ENGINEERING L.L.C. SINCE 1946

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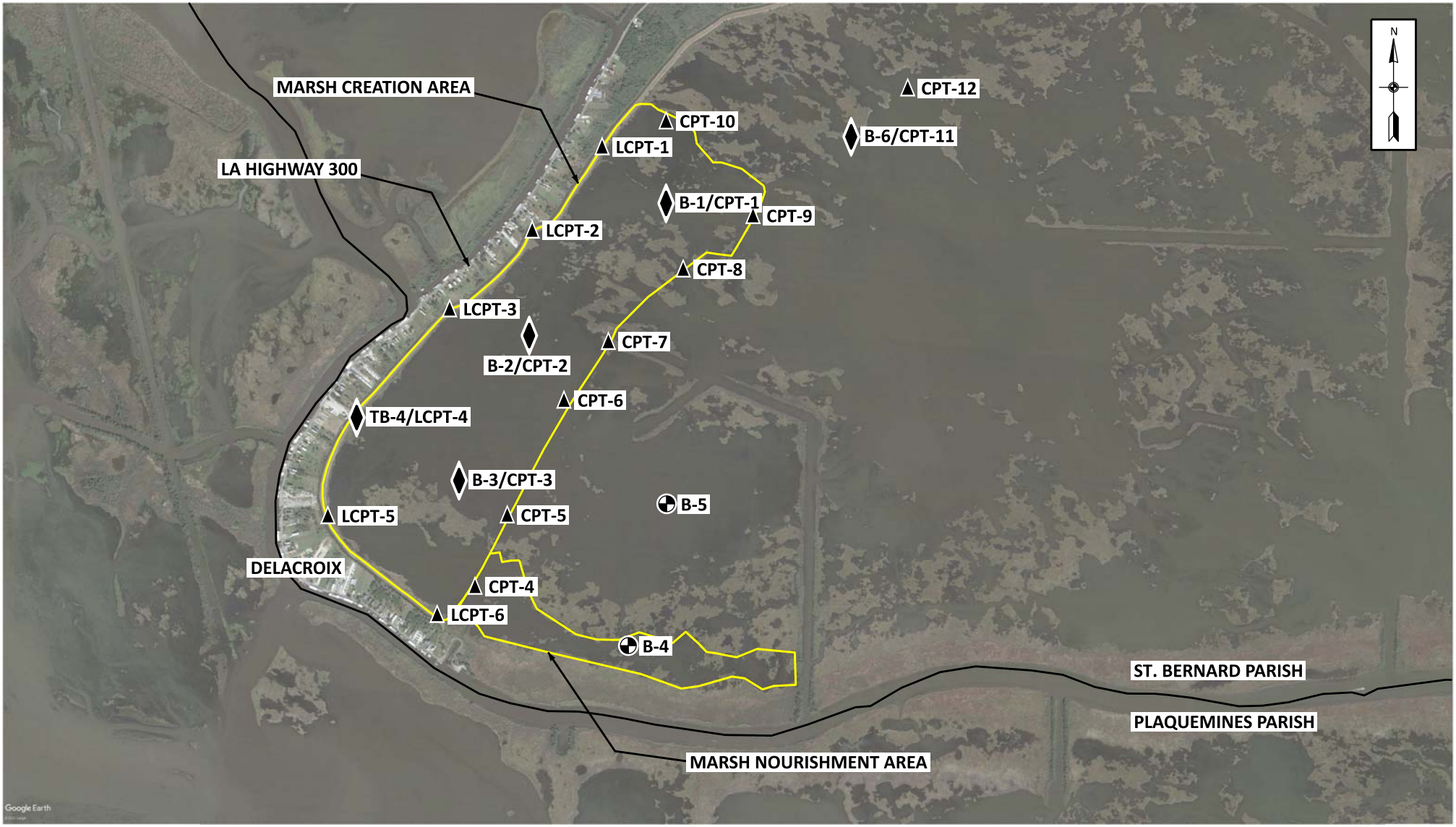
CADD FILE: LOCATION PLAN 1.DGN	FIGURE 2 (SHEET 1 OF 2)



SATELLITE IMAGERY DATED: 15 NOVEMBER 2019

NOT TO SCALE

- ◓ DENOTES LOCATIONS OF UNDISTURBED SOIL BORINGS DRILLED ON 8 AND 9 SEPTEMBER 2020
- ▲ DENOTES LOCATIONS OF CONE PENETRATION TESTS PERFORMED BETWEEN 10 SEPTEMBER AND 21 OCTOBER 2020
- ◆ DENOTES LOCATIONS OF CO-LOCATED UNDISTURBED SOIL BORINGS AND CONE PENETRATION TESTS PERFORMED ON 8 SEPTEMBER AND OCTOBER 21 2020

BORING AND CPT LOCATION PLAN
MARSH CREATION

STATE OF LOUISIANA
COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA)
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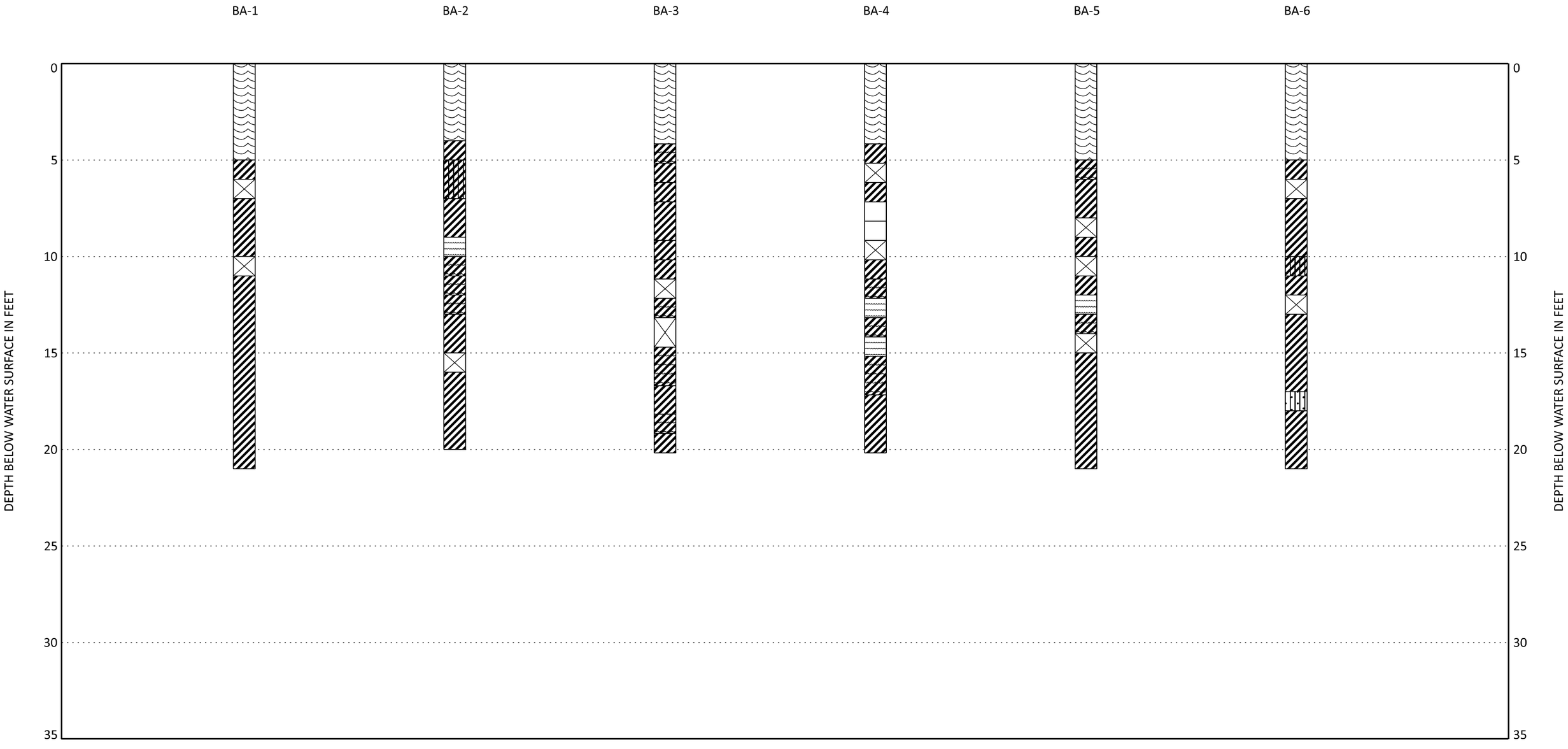
CADD FILE: LOCATION PLAN 2.DGN	FIGURE 2 (SHEET 2 OF 2)



BORING MATERIAL GRAPHICS

- CLAY
- SILTY CLAY
- SILTY SAND
- ORGANIC CLAY
- PEAT/HUMUS
- WATER
- NO SAMPLE

NOTES:

1. APPROXIMATE WATER SURFACE ELEVATION OF +0.5 FT (NAVD88) FURNISHED BY T. BAKER SMITH.
2. SURVEYED MUDLINE SURFACE ELEVATIONS, LATITUDE, AND LONGITUDE FROM SURVEY FURNISHED IN APPENDIX II.

SUBSURFACE PROFILE
B0RROW AREA

STATE OF LOUISIANA
COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA)
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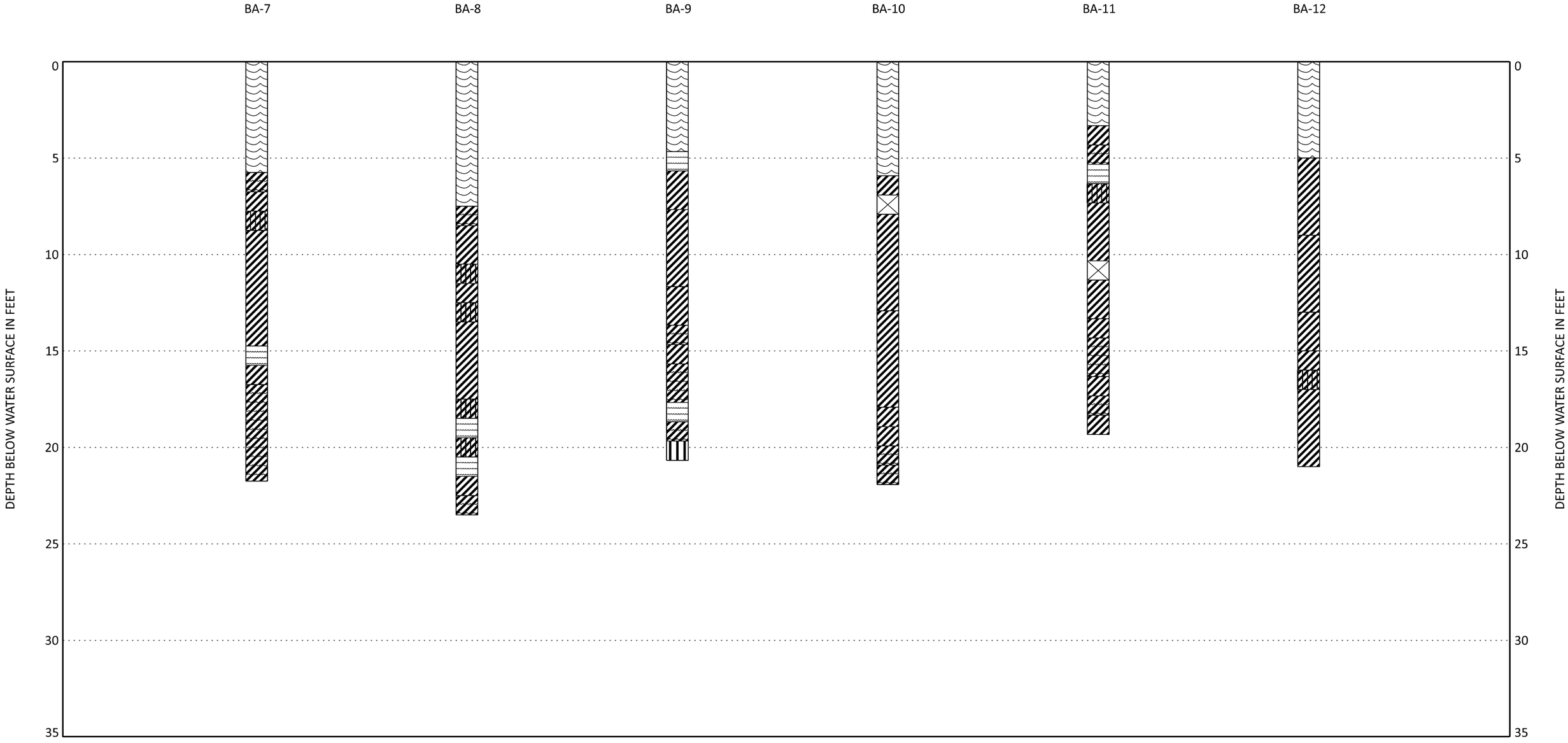
CHECKED BY: J.M.W.	DATE: 11 DEC 2020
CADD FILE: SUBSOIL 1.DGN	FIGURE 3 (SHEET 1 OF 2)



BORING MATERIAL GRAPHICS

- CLAY
- SILTY CLAY
- SILT
- ORGANIC CLAY
- PEAT/HUMUS
- WATER
- NO SAMPLE

NOTES:

1. APPROXIMATE WATER SURFACE ELEVATION OF +0.5 FT (NAVD88) FURNISHED BY T. BAKER SMITH.
2. SURVEYED MUDLINE SURFACE ELEVATIONS, LATITUDE, AND LONGITUDE FROM SURVEY FURNISHED IN APPENDIX II.

SUBSURFACE PROFILE
BORROW AREA

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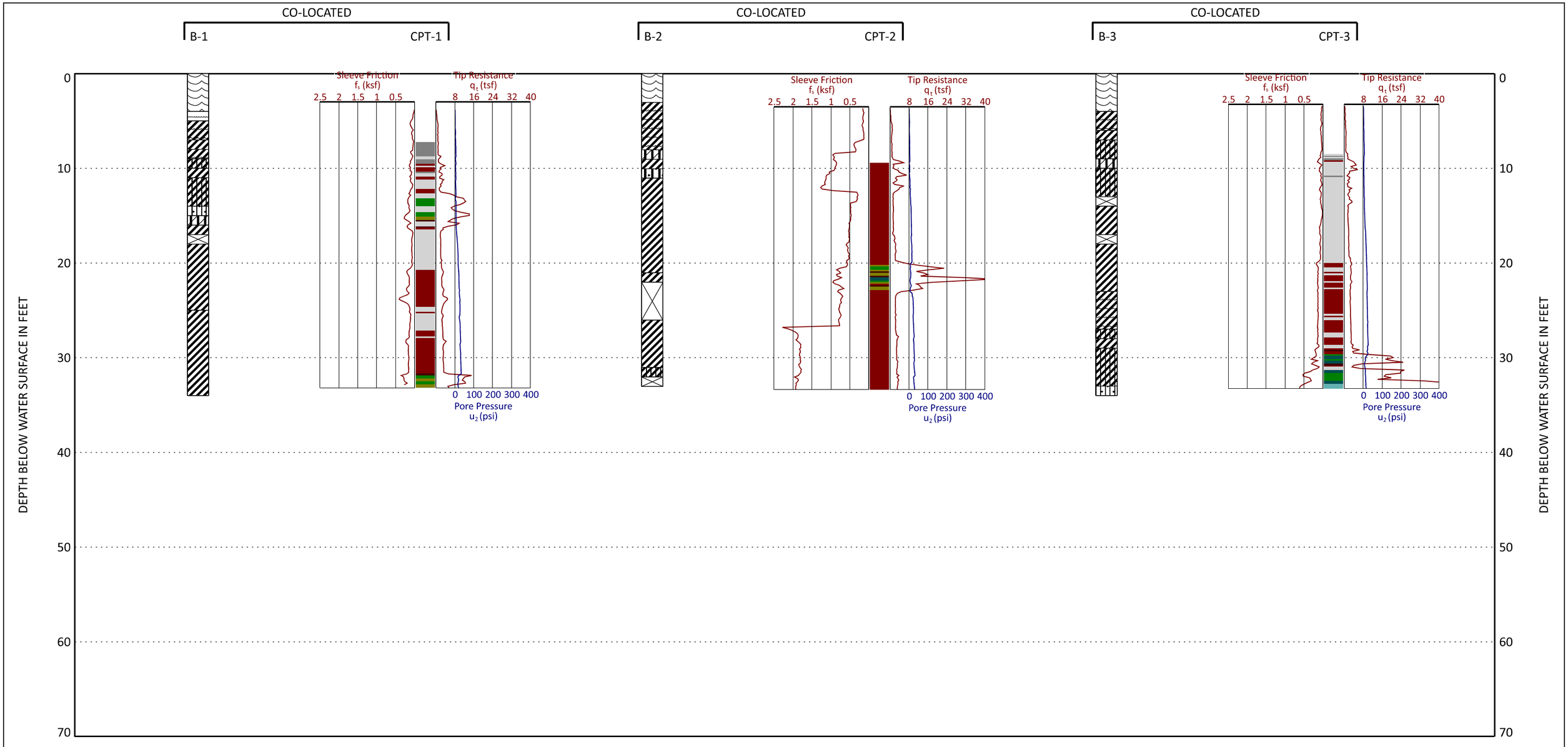
CHECKED BY: J.M.W.	DATE: 11 DEC 2020
CADD FILE: SUBSOIL 2.DGN	FIGURE 3 (SHEET 2 OF 2)



CPT MATERIAL GRAPHICS

- SENSITIVE FINE GRAINED
- ORGANIC SOILS, PEATS
- CLAY
- SILTY CLAY TO CLAY
- CLAYEY SILT TO SILTY CLAY
- SANDY SILT TO CLAYEY SILT
- SILTY SAND TO SANDY SILT
- SAND TO SILTY SAND
- SAND
- GRAVELLY SAND TO SAND
- VERY STIFF FINE GRAINED (*)
- SAND TO CLAYEY SAND (*)

* OVERCONSOLIDATED OR CEMENTED

Robertson et al (1986) $q_c$vs Rf

BORING MATERIAL GRAPHICS

- CLAY
- SILTY CLAY
- SILTY SAND
- SANDY SILT
- CLAYEY SILT
- ORGANIC CLAY
- PEAT/HUMUS
- WATER
- NO SAMPLE

NOTES:

1. APPROXIMATE WATER SURFACE ELEVATION OF +0.5 FT (NAVD88) FURNISHED BY T. BAKER SMITH.
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SUBSURFACE PROFILE
MARSH CREATION AREA

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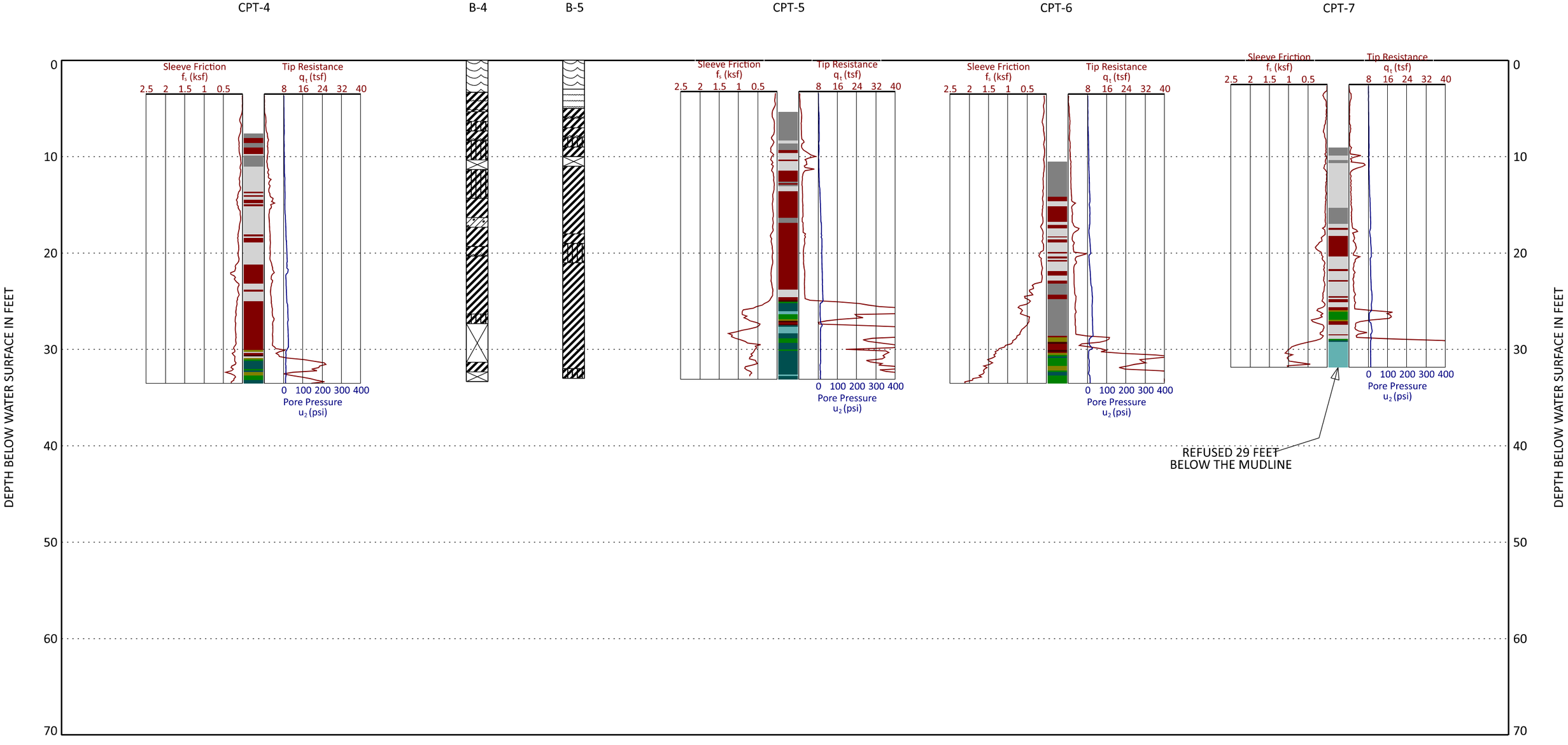
CHECKED BY: J.M.W.	DATE: 11 DEC 2020
CADD FILE: SUBSOIL 3.DGN	FIGURE 4 (SHEET 1 OF 3)



CPT MATERIAL GRAPHICS

- SENSITIVE FINE GRAINED
- ORGANIC SOILS, PEATS
- CLAY
- SILTY CLAY TO CLAY
- CLAYEY SILT TO SILTY CLAY
- SANDY SILT TO CLAYEY SILT
- SILTY SAND TO SANDY SILT
- SAND TO SILTY SAND
- SAND
- GRAVELLY SAND TO SAND
- VERY STIFF FINE GRAINED (*)
- SAND TO CLAYEY SAND (*)

* OVERCONSOLIDATED OR CEMENTED

Robertson et al (1986) $q_c$vs Rf

BORING MATERIAL GRAPHICS

- CLAY
- SILTY CLAY
- CLAYEY SAND
- ORGANIC CLAY
- PEAT/HUMUS
- WATER
- NO SAMPLE

NOTES:

1. APPROXIMATE WATER SURFACE ELEVATION OF +0.5 FT (NAVD88) FURNISHED BY T. BAKER SMITH.
2. SURVEYED MUDLINE SURFACE ELEVATIONS, LATITUDE, AND LONGITUDE FROM SURVEY FURNISHED IN APPENDIX II.

SUBSURFACE PROFILE
MARSH CREATION AREA

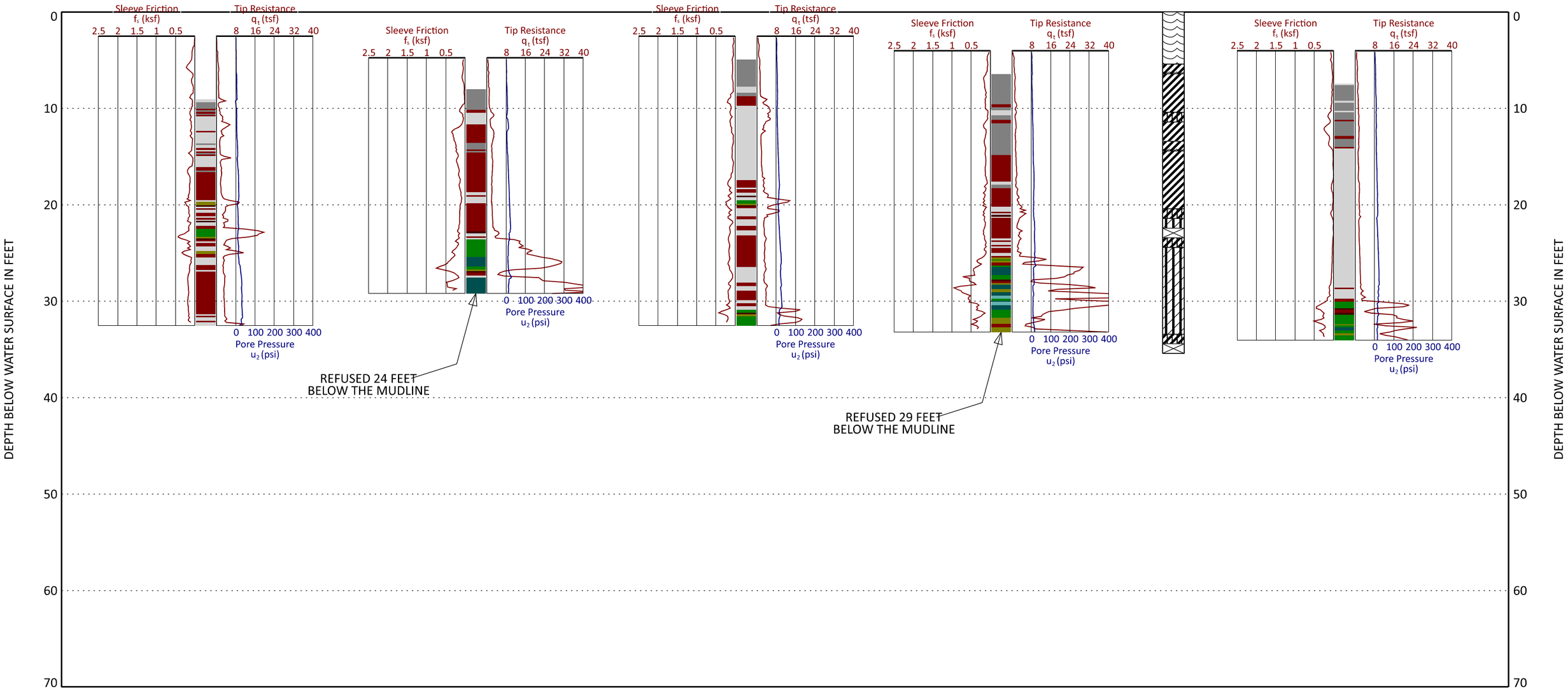
STATE OF LOUISIANA
COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA)
EAST DELACROIX MARSH CREATION PROJECT
ST. BERNARD PARISH, LOUISIANA
CONTRACT NO. 4400015385
PROJECT NO. BS-0037
TASK NO. 4

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: S.T.S.	JOB NO.: 24431
CHECKED BY: J.M.W.	DATE: 11 DEC 2020
CADD FILE: SUBSOIL 4.DGN	FIGURE 4 (SHEET 2 OF 3)

CO-LOCATED

CPT-8 | CPT-9 | CPT-10 | CPT-11 / B-6 | CPT-12



CPT MATERIAL GRAPHICS

- SENSITIVE FINE GRAINED
- ORGANIC SOILS, PEATS
- CLAY
- SILTY CLAY TO CLAY
- CLAYEY SILT TO SILTY CLAY
- SANDY SILT TO CLAYEY SILT
- SILTY SAND TO SANDY SILT
- SAND TO SILTY SAND
- SAND
- GRAVELLY SAND TO SAND
- VERY STIFF FINE GRAINED (*)
- SAND TO CLAYEY SAND (*)

* OVERCONSOLIDATED OR CEMENTED

Robertson et al (1986) q_c vs Rf

BORING MATERIAL GRAPHICS

- CLAY
- SILTY CLAY
- SILTY SAND
- WATER
- NO SAMPLE

NOTES:

1. APPROXIMATE WATER SURFACE ELEVATION OF +0.5 FT (NAVD88) FURNISHED BY T. BAKER SMITH.
2. SURVEYED MUDLINE SURFACE ELEVATIONS, LATITUDE, AND LONGITUDE FROM SURVEY FURNISHED IN APPENDIX II.

SUBSURFACE PROFILE
MARSH CREATION AREA

STATE OF LOUISIANA
COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA)
EAST DELACROIX MARSH CREATION PROJECT
ST. BERNARD PARISH, LOUISIANA
CONTRACT NO. 4400015385
PROJECT NO. BS-0037
TASK NO. 4

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: S.T.S.	JOB NO.: 24431
CHECKED BY: J.M.W.	DATE: 11 DEC 2020
CADD FILE: SUBSOIL 5.DGN	FIGURE 4 (SHEET 3 OF 3)

CO-LOCATED

LCPT-1
G.S.E. 2.70

LCPT-2
G.S.E. 5.30

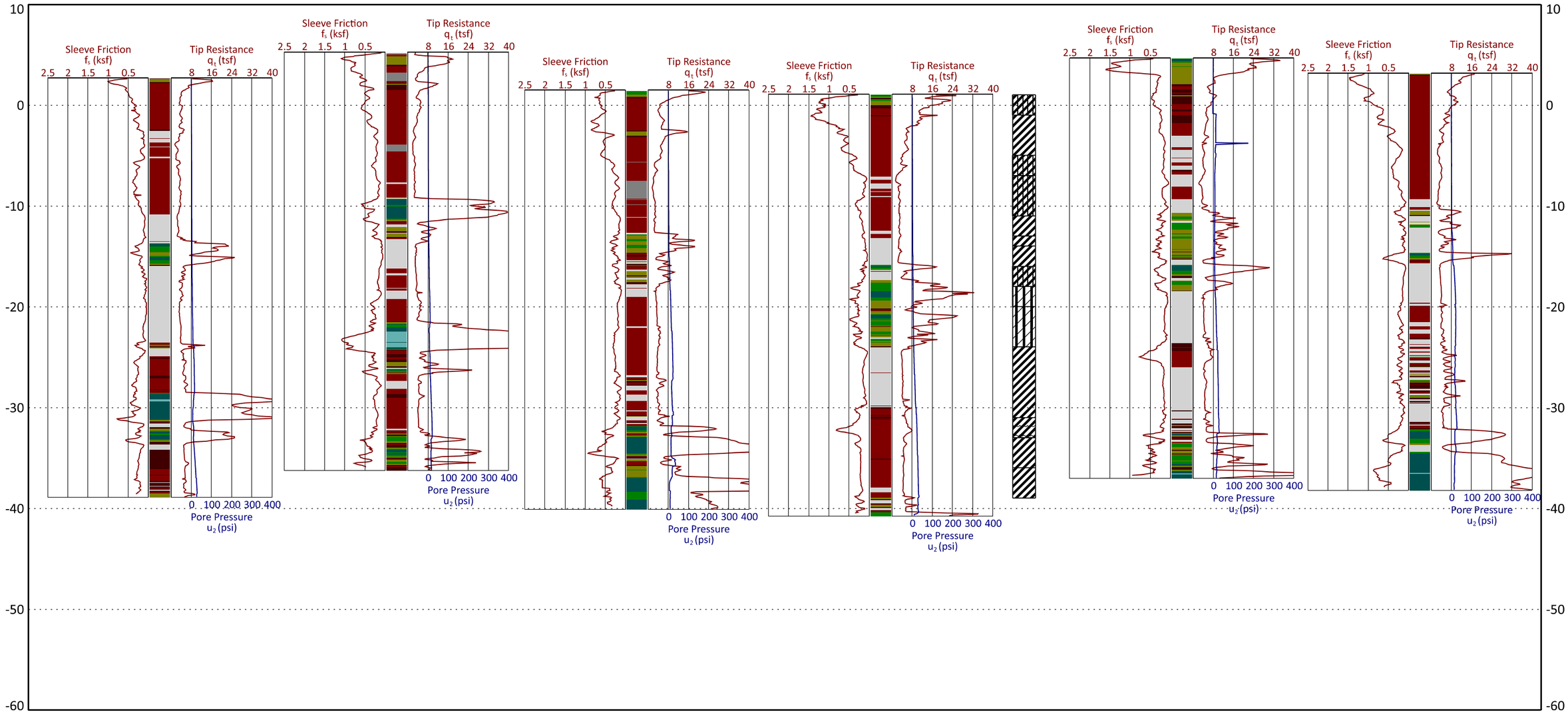
LCPT-3
G.S.E. 1.50

LCPT-4
G.S.E. 1.10

TB-4
G.S.E. 1.10

LCPT-5
G.S.E. 4.70

LCPT-6
G.S.E. 3.20



BORING MATERIAL GRAPHICS

- CLAY
- SILTY CLAY
- SILTY SAND
- CLAYEY SILT
- ORGANIC CLAY

NOTE:

1. G.S.E = GROUND SURFACE ELEVATION FURNISHED BY T. BAKER SMITH.

SUBSURFACE PROFILE
TIDAL LEVEE

STATE OF LOUISIANA
COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA)
EAST DELACROIX MARSH CREATION PROJECT
ST. BERNARD PARISH, LOUISIANA
CONTRACT NO. 4400015385
PROJECT NO. BS-0037
TASK NO. 4

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: S.T.S.	JOB NO.: 24431
CHECKED BY: J.M.W.	DATE: 11 DEC 2020
CADD FILE: SUBSOIL 6.DGN	FIGURE 5

APPENDIX I
FURNISHED INFORMATION

April 2019
Cost figures as of: aaaDatePadPad

East Delacroix Marsh Creation and Terracing (BS-37)

Project Status

Approved Date: 2019 **Project Area:** 597 acres
Approved Funds: $3.64 M **Total Est. Cost**: $39.8 M
Net Benefit After 20 Years: 314 acres
Status: Engineering and Design
Project Type: Marsh Creation
PPL #: 28

Location

This project is located in Region 2, Breton Basin, St. Bernard Parish.

Problems

Hurricanes Katrina and Rita caused the majority of wetland loss in the project area. Wind erosion and saltwater intrusion have resulted in loss of marsh vegetation and wetland soils. Marsh loss has increased exposure of Delacroix to flooding from the east/southeast. The 1984 to 2018 USGS loss rate is -1.58%/yr for the extended project boundary area.

Drone image of the marsh creation area facing northeast.

Restoration Strategy

The project goal is to create and nourish approximately 406 acres of marsh and construct approximately 12,950 linear feet of terraces (approximately 8 acres) utilizing a layout to help protect the community of Delacroix.

Sediment would be hydraulically dredged from Lake Lery and placed in two confined disposal areas creating 353 acres of marsh and nourishing 53 acres of existing marsh. Two creation cells allow a channel for the existing pump station. Approximately 12,950 ft of earthen terraces would be constructed. The side and crown of the terraces would be planted with appropriate bare root plants in one row per side and crown.

Two additional areas of deteriorating marsh south and east of the proposed project will be investigated should the project be considered for further evaluation. Therefore, data acquisitioned for Engineering & Design will include an additional 114 acres to allow flexibility for analysis of these alternate features.

Progress to Date

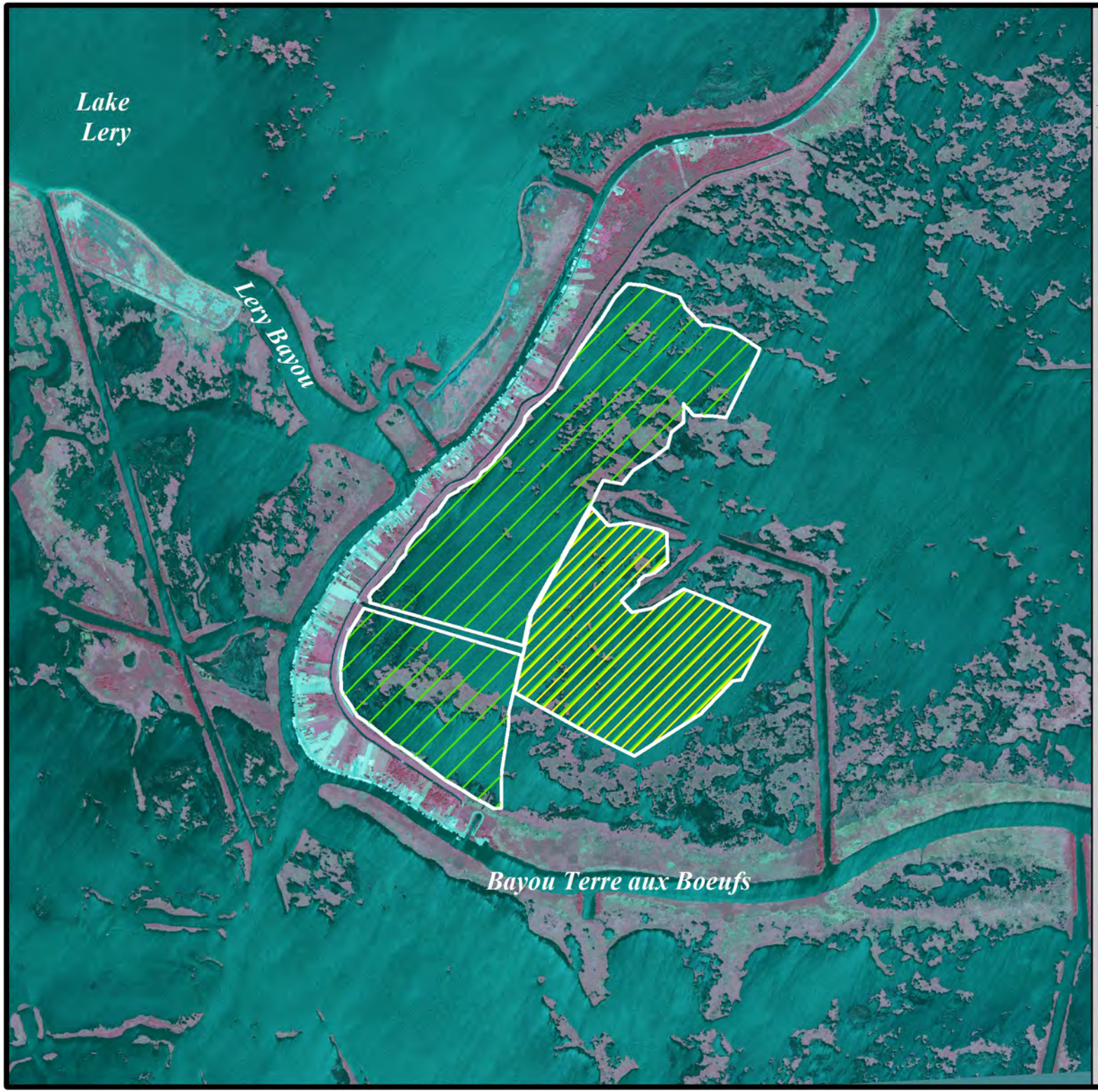
This project was approved for Phase I Engineering and Design in February 2019.

The project is on Priority Project List (PPL) 28.

For more information, please contact:

Federal Sponsor:
National Marine Fisheries Service
Baton Rouge, LA
(225) 389-0508

Local Sponsor:
Coastal Protection and Restoration Authority
Baton Rouge, LA
(225) 342-4733



East Delacroix Island Marsh Creation (BS-37)

- Terrace Field *
- Confined Disposal Marsh Creation & Nourishment *
- Project Boundary

*denotes proposed features

USGS
science for a changing world

0.2 0 0.2 0.4 Kilometers

0.2 0 0.2 0.4 Miles

Map Produced by:
U.S. Department of the Interior
U.S. Geological Survey
Wetland and Aquatic Research Center
Coastal and Ocean Restoration Branch
Baton Rouge, La.

Background Imagery:
2017 NAIP Photography

Map Date: February 20, 2019
Map ID: USGS-NWRC 2019-11-0008
Data accurate as of: February 14, 2019

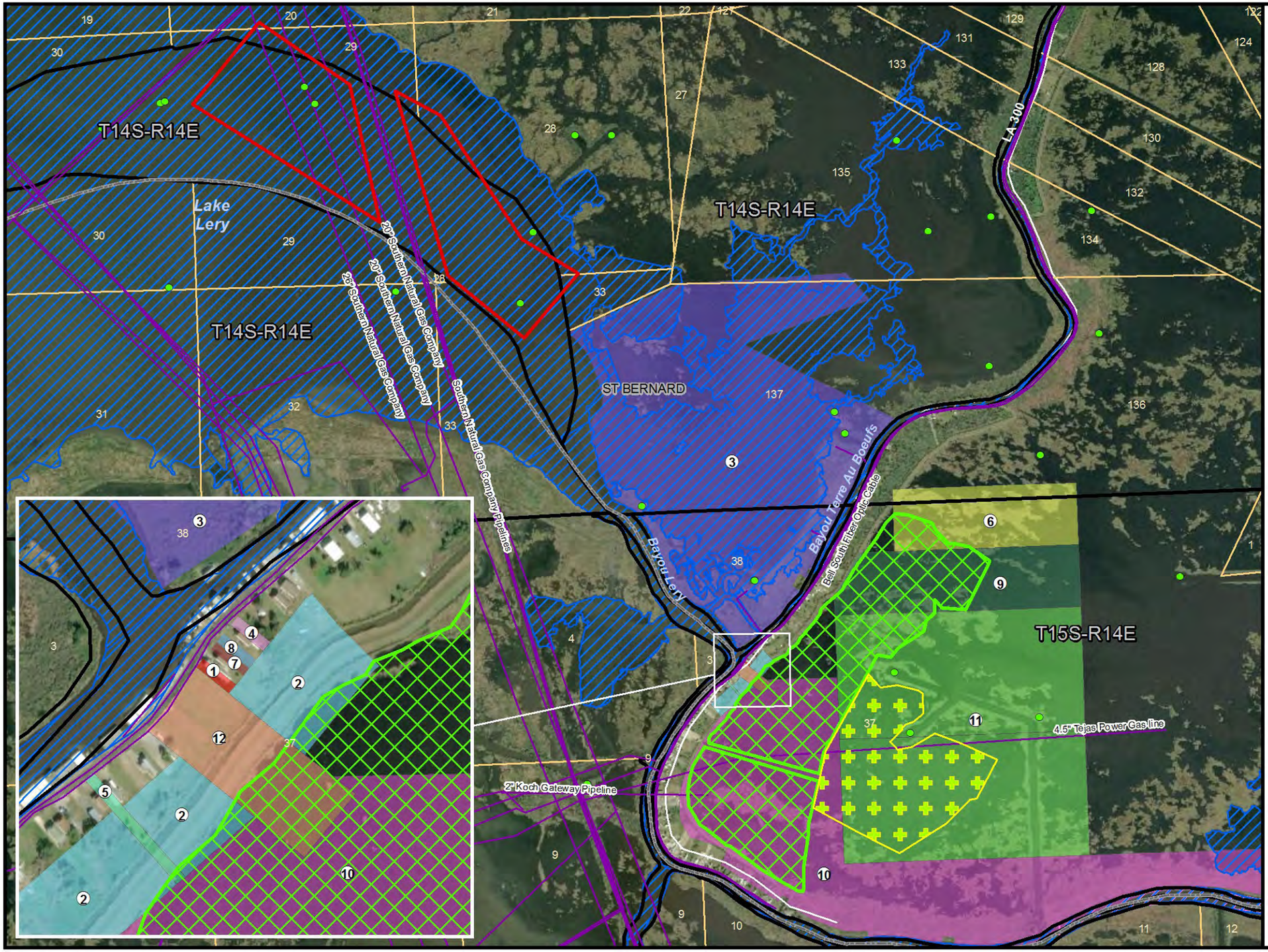


Exhibit A

East Delacroix Marsh Creation and Terracing, BS-0037
Landrights Map
Plaquemines & St. Bernard Parish, La

Legend

- Proposed Marsh Creation
- Proposed Terracing
- Borrow
- Pipeline/Utility
- Oyster Lease
- Township
- Section
- Parish Boundary

Owner Name

1. ALFONSO, NANCY PARKER
2. ARLENE & JOSEPH MERAUX
3. COASTAL CORP.
4. HAMBURGER, PAUL E.
5. HOFFMAN, EUGENE J. III
6. MC MANUS, ALBERTA VAUGHAN 26/54
7. MOLERO, MARY LOUISE MORALES 1/12
8. MORALES, ANNA MARIE
9. NETTLES, MARK 1/4
10. PLAQUEMINES REALTY, LLC
11. PORTIE, LOREN, JR. 6/25
12. ZUPPARDO, JOSEPH S., JR.

- State-Claimed Waterbottom

Wells

- Active Wells
- Inactive Wells
- Orphan Wells
- Shut In Wells
- Other Wells

All project features are graphical representations only, are subject to change, and may not reflect true location or dimension

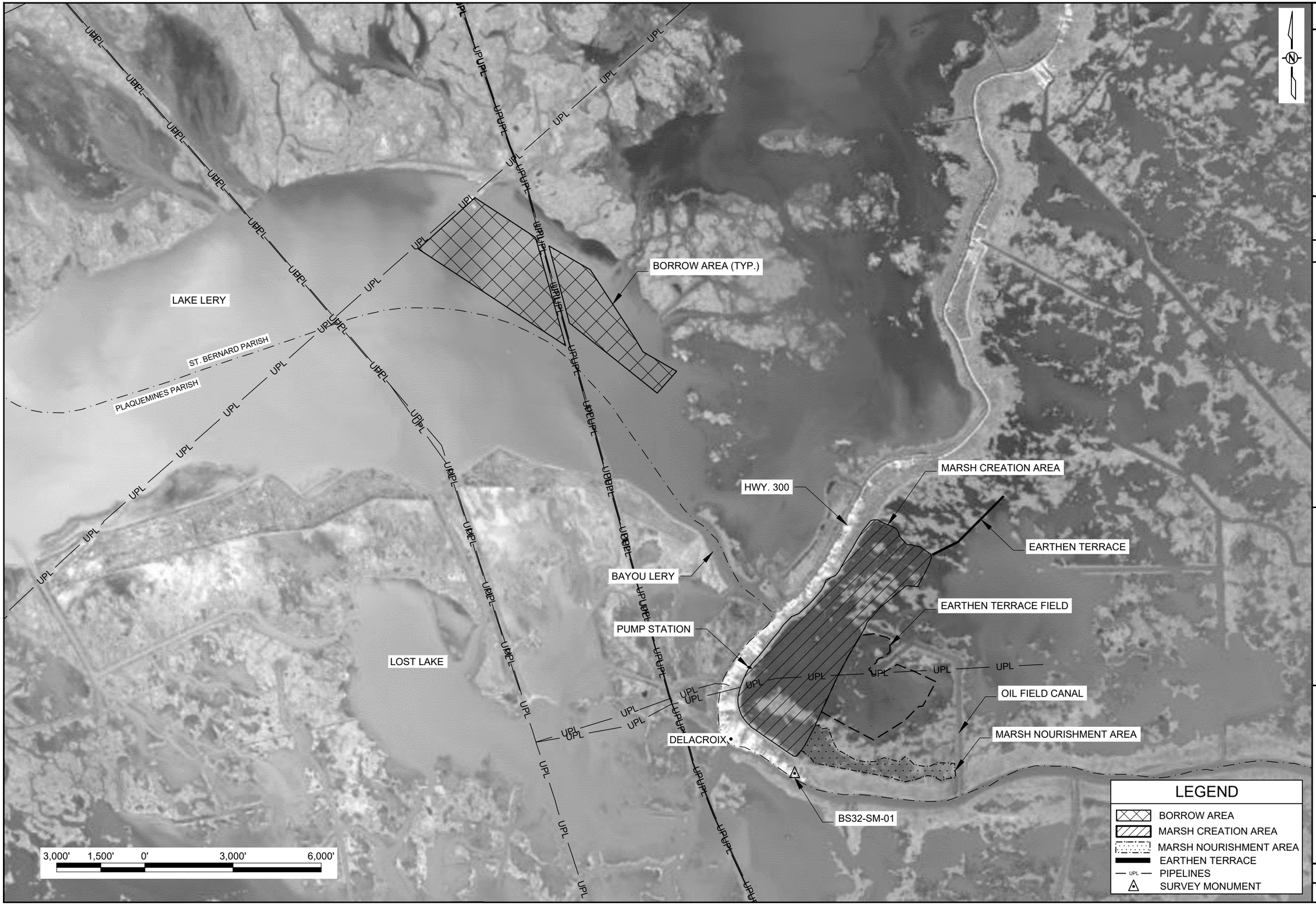
0 ½ 1 Miles

0 ½ 1 Kilometers

1:30,000

N

Source:
Coastal Protection and Restoration Authority of Louisiana
Imagery: ESRI World
Map Date: April 3, 2019
//2019040196



REV.	DATE	DESCRIPTION	BY

COASTAL PROTECTION AND RESTORATION AUTHORITY
150 TERRACE AVENUE
BATON ROUGE, LOUISIANA 70802

PROJECT LAYOUT

DESIGNED BY: STEPHEN COOK, E.I.

APPROVED BY: SHANNON HAYNES, P.E.

EAST DELACROIX
MARSH CREATION & TERRACING

STATE PROJECT NUMBER: BS-0037

DRAWN BY: SHANE FAUST

DATE: JUNE 2020

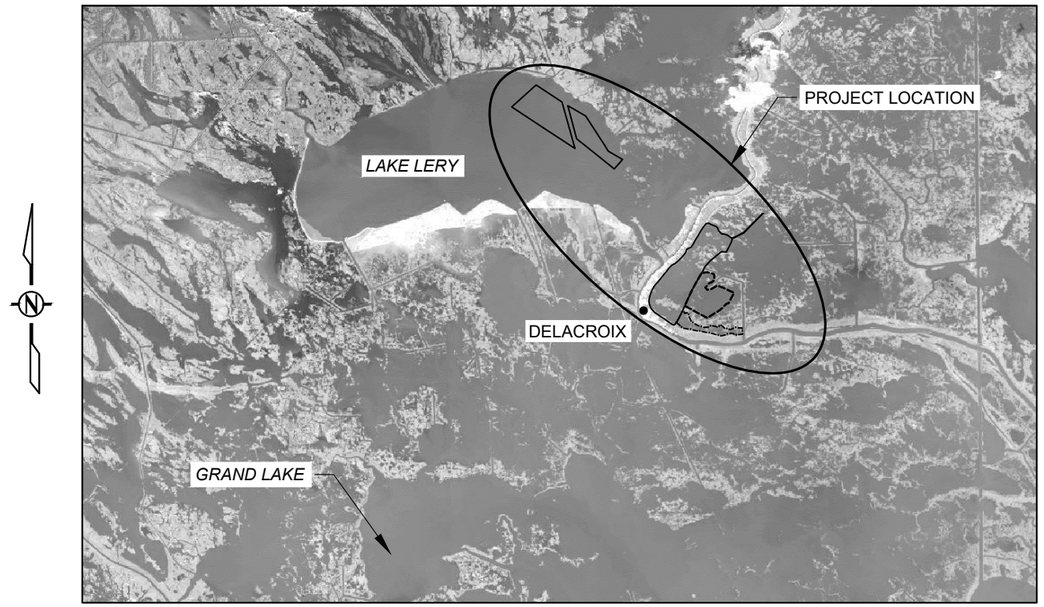
SHEET 2 OF 4

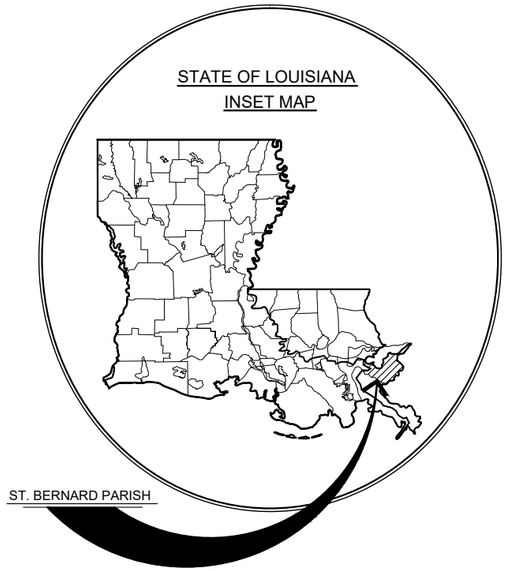
INDEX TO SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	PROJECT LAYOUT
3	BORROW AREA SOIL BORING LAYOUT
4	MARSH CREATION AREA SOIL BORING AND CPT LAYOUT

STATE OF LOUISIANA
COASTAL PROTECTION AND RESTORATION AUTHORITY

EAST DELACROIX
MARSH CREATION & TERRACING
BS-0037
ST. BERNARD PARISH





LICENSURE CLASSIFICATION REQUIREMENTS
MAJOR CLASSIFICATION: HEAVY CONSTRUCTION
SUBCLASSIFICATION: DREDGING

GEOTECHNICAL SOIL BORINGS

DOCUMENTS ARE NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES, OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT.

REV.	DATE	DESCRIPTION	BY

COASTAL PROTECTION AND RESTORATION AUTHORITY
150 TERRACE AVENUE
BATON ROUGE, LOUISIANA 70802

TITLE SHEET

EAST DELACROIX
MARSH CREATION & TERRACING

DESIGNED BY: STEPHEN COOK, E.I.
APPROVED BY: SHANNON HAYNES, P.E.
STATE PROJECT NUMBER: BS-0037
DRAWN BY: SHANE FAUST

DATE: JUNE 2020

SOIL BORING COORDINATES

POINT	EASTING	NORTHING	DEPTH
BA-1	3,765,759.16	476,221.82	15'
BA-2	3,765,201.84	477,284.32	15'
BA-3	3,764,248.55	478,667.26	15'
BA-4	3,763,865.64	478,130.11	15'
BA-5	3,764,160.05	477,009.59	15'
BA-6	3,764,601.86	475,465.31	15'
BA-7	3,762,786.84	478,097.66	15'
BA-8	3,761,742.25	477,400.89	15'
BA-9	3,762,658.84	479,641.86	15'
BA-10	3,761,450.03	478,946.39	15'
BA-11	3,761,580.78	480,368.06	15'
BA-12	3,759,758.52	478,711.91	15'

BA-11
BA-9
BA-10
BA-12
BA-3
BA-7
BA-4
BA-8
BA-2
BA-5
BA-1
BA-6

ST. BERNARD PARISH
PLAQUEMINES PARISH
LAKE LERY

1,200' 600' 0' 1,200' 2,400'

LEGEND

- BORROW AREA
- UPL — PIPELINES
- SOIL BORINGS

REV.	DATE	DESCRIPTION	BY

COASTAL PROTECTION AND RESTORATION AUTHORITY
150 TERRACE AVENUE
BATON ROUGE, LOUISIANA 70802

BORROW AREA
SOIL BORING LAYOUT

DESIGNED BY: STEPHEN COOK, E.I.
APPROVED BY: SHANNON HAYNES, P.E.

EAST DELACROIX
MARSH CREATION & TERRACING

STATE PROJECT NUMBER: BS-0037
DRAWN BY: SHANE FAUST

DATE: JUNE 2020

SHEET 3 OF 4

SOIL BORING COORDINATES			
POINT	EASTING	NORTHING	DEPTH
B-1	3,775,599.83	467,973.59	30'
B-2	3,773,586.18	465,836.93	30'
B-3	3,772,618.90	463,579.41	30'
B-4	3,775,278.88	461,180.25	30'
B-5	3,775,827.75	463,370.63	30'
B-6	3,778,400.59	469,177.57	30'
L-1	3,772,335.89	466,181.58	40'

CPT COORDINATES			
POINT	EASTING	NORTHING	DEPTH
CPT-1	3,775,599.83	467,973.59	30'
CPT-2	3,773,586.18	465,836.93	30'
CPT-3	3,772,618.90	463,579.41	30'
CPT-4	3,772,947.95	461,943.28	30'
CPT-5	3,773,389.67	463,070.12	30'
CPT-6	3,774,174.46	464,863.49	30'
CPT-7	3,774,813.41	465,789.33	30'
CPT-8	3,775,920.11	466,964.66	30'
CPT-9	3,776,962.52	467,829.42	30'
CPT-10	3,775,548.04	469,221.82	30'
CPT-11	3,778,400.59	469,177.57	30'
CPT-12	3,779,226.85	469,918.80	30'

CPT COORDINATES			
POINT	EASTING	NORTHING	DEPTH
LCPT-1	3,774,559.96	468,776.63	40'
LCPT-2	3,773,551.21	467,424.93	40'
LCPT-3	3,772,335.89	466,181.58	40'
LCPT-4	3,770,933.08	464,476.61	40'
LCPT-5	3,770,614.44	462,926.88	40'
LCPT-6	3,772,384.07	461,493.88	40'

MARSH CREATION AREA
BAYOU LERY
BAYOU TERRE AUX BOEUFS
DELACROIX
BS32-SM-01
EARTHEN TERRACE
EARTHEN TERRACE FIELD
OIL FIELD CANAL
MARSH NOURISHMENT AREA
ST. BERNARD PARISH
PLAQUEMINES PARISH

1,400' 700' 0' 1,400' 2,800'

LEGEND

- MARSH CREATION AREA
- MARSH NOURISHMENT AREA
- EARTHEN TERRACE
- UPL — PIPELINES
- SOIL BORINGS
- CONE PENETRATION TEST
- SURVEY MONUMENT

REV.	DATE	DESCRIPTION	BY

COASTAL PROTECTION AND RESTORATION AUTHORITY
150 TERRACE AVENUE
BATON ROUGE, LOUISIANA 70802

MARSH CREATION AREA
SOIL BORING AND CPT LAYOUT

DESIGNED BY: STEPHEN COOK, E.I.

APPROVED BY: SHANNON HAYNES, P.E.

EAST DELACROIX
MARSH CREATION & TERRACING

STATE PROJECT NUMBER: BS-0037

DRAWN BY: SHANE FAUST

DATE: JUNE 2020

SHEET 4 OF 4

APPENDIX II
SITE SURVEY

I CERTIFY THAT THE HAZARD SURVEY DEPICTED ON THIS PLAT WAS PERFORMED ON THE GROUND UNDER MY SUPERVISION IN ACCORDANCE WITH GENERALLY ACCEPTED SURVEY PRACTICES. THIS SURVEY DOES NOT MEET THE STANDARDS OF PRACTICE FOR BOUNDARY SURVEYS AS SET FORTH BY THE LOUISIANA PROFESSIONAL ENGINEERING AND LAND SURVEYING BOARD.

STATE OF LOUISIANA — JAMES B. PELLEGRIN — REG. NO. 4828 — REGISTERED PROFESSIONAL — LAND SURVEYOR

9/17/2020

APPROVED: _____

JAMES B. PELLEGRIN
LA. LAND SURVEYOR REG. NO. 4828

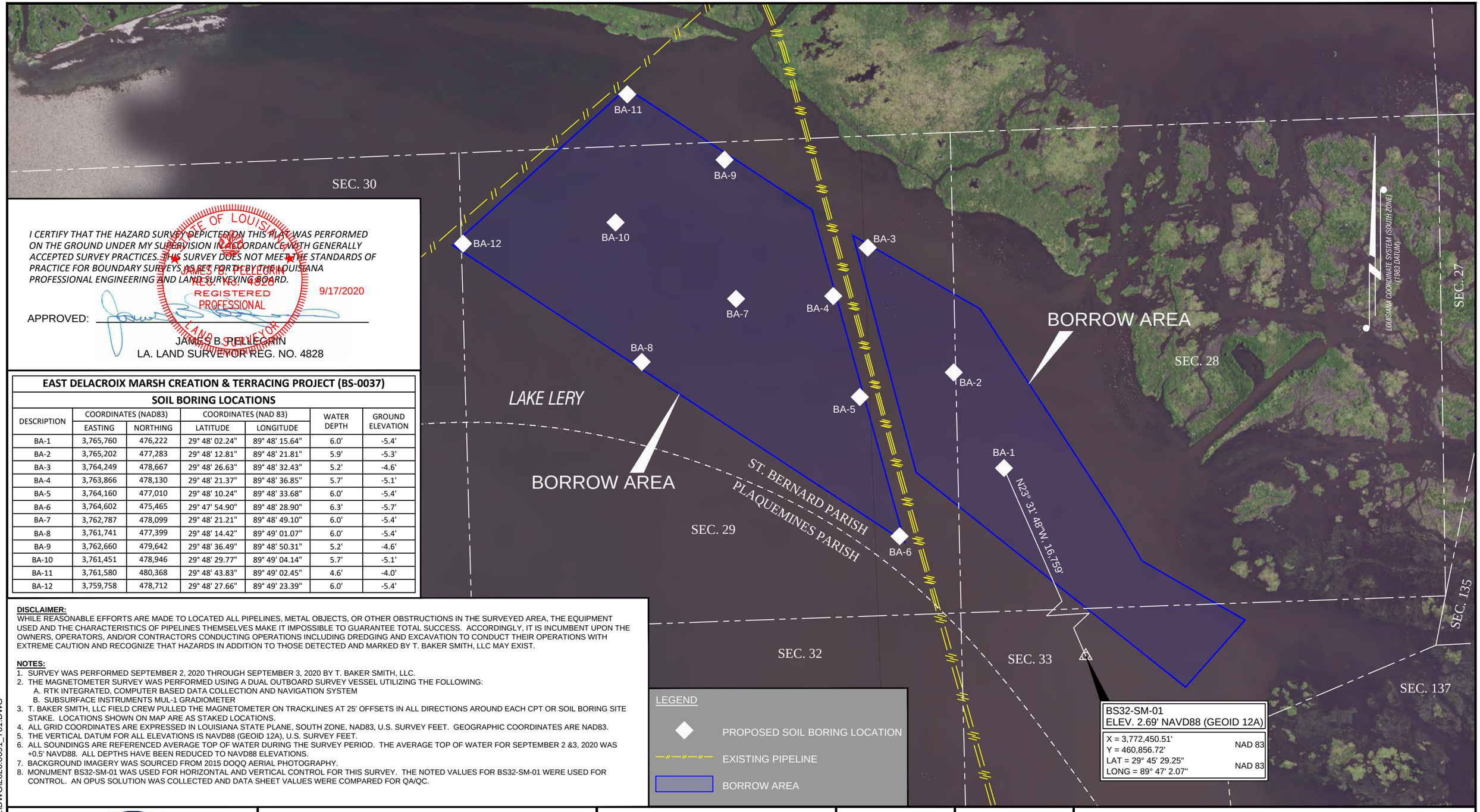
EAST DELACROIX MARSH CREATION & TERRACING PROJECT (BS-0037)

SOIL BORING LOCATIONS

DESCRIPTION	COORDINATES (NAD83)		COORDINATES (NAD 83)		WATER DEPTH	GROUND ELEVATION
	EASTING	NORTHING	LATITUDE	LONGITUDE		
BA-1	3,765,760	476,222	29° 48' 02.24"	89° 48' 15.64"	6.0'	-5.4'
BA-2	3,765,202	477,283	29° 48' 12.81"	89° 48' 21.81"	5.9'	-5.3'
BA-3	3,764,249	478,667	29° 48' 26.63"	89° 48' 32.43"	5.2'	-4.6'
BA-4	3,763,866	478,130	29° 48' 21.37"	89° 48' 36.85"	5.7'	-5.1'
BA-5	3,764,160	477,010	29° 48' 10.24"	89° 48' 33.68"	6.0'	-5.4'
BA-6	3,764,602	475,465	29° 47' 54.90"	89° 48' 28.90"	6.3'	-5.7'
BA-7	3,762,787	478,099	29° 48' 21.21"	89° 48' 49.10"	6.0'	-5.4'
BA-8	3,761,741	477,399	29° 48' 14.42"	89° 49' 01.07"	6.0'	-5.4'
BA-9	3,762,660	479,642	29° 48' 36.49"	89° 48' 50.31"	5.2'	-4.6'
BA-10	3,761,451	478,946	29° 48' 29.77"	89° 49' 04.14"	5.7'	-5.1'
BA-11	3,761,580	480,368	29° 48' 43.83"	89° 49' 02.45"	4.6'	-4.0'
BA-12	3,759,758	478,712	29° 48' 27.66"	89° 49' 23.39"	6.0'	-5.4'

DISCLAIMER:
WHILE REASONABLE EFFORTS ARE MADE TO LOCATED ALL PIPELINES, METAL OBJECTS, OR OTHER OBSTRUCTIONS IN THE SURVEYED AREA, THE EQUIPMENT USED AND THE CHARACTERISTICS OF PIPELINES THEMSELVES MAKE IT IMPOSSIBLE TO GUARANTEE TOTAL SUCCESS. ACCORDINGLY, IT IS INCUMBENT UPON THE OWNERS, OPERATORS, AND/OR CONTRACTORS CONDUCTING OPERATIONS INCLUDING DREDGING AND EXCAVATION TO CONDUCT THEIR OPERATIONS WITH EXTREME CAUTION AND RECOGNIZE THAT HAZARDS IN ADDITION TO THOSE DETECTED AND MARKED BY T. BAKER SMITH, LLC MAY EXIST.

NOTES:
1. SURVEY WAS PERFORMED SEPTEMBER 2, 2020 THROUGH SEPTEMBER 3, 2020 BY T. BAKER SMITH, LLC.
2. THE MAGNETOMETER SURVEY WAS PERFORMED USING A DUAL OUTBOARD SURVEY VESSEL UTILIZING THE FOLLOWING:
   A. RTK INTEGRATED, COMPUTER BASED DATA COLLECTION AND NAVIGATION SYSTEM
   B. SUBSURFACE INSTRUMENTS MUL-1 GRADIOMETER
3. T. BAKER SMITH, LLC FIELD CREW PULLED THE MAGNETOMETER ON TRACKLINES AT 25' OFFSETS IN ALL DIRECTIONS AROUND EACH CPT OR SOIL BORING SITE STAKE. LOCATIONS SHOWN ON MAP ARE AS STAKED LOCATIONS.
4. ALL GRID COORDINATES ARE EXPRESSED IN LOUISIANA STATE PLANE, SOUTH ZONE, NAD83, U.S. SURVEY FEET. GEOGRAPHIC COORDINATES ARE NAD83.
5. THE VERTICAL DATUM FOR ALL ELEVATIONS IS NAVD88 (GEOID 12A), U.S. SURVEY FEET.
6. ALL SOUNDINGS ARE REFERENCED AVERAGE TOP OF WATER DURING THE SURVEY PERIOD. THE AVERAGE TOP OF WATER FOR SEPTEMBER 2 &3, 2020 WAS +0.5' NAVD88. ALL DEPTHS HAVE BEEN REDUCED TO NAVD88 ELEVATIONS.
7. BACKGROUND IMAGERY WAS SOURCED FROM 2015 DOQQ AERIAL PHOTOGRAPHY.
8. MONUMENT BS32-SM-01 WAS USED FOR HORIZONTAL AND VERTICAL CONTROL FOR THIS SURVEY. THE NOTED VALUES FOR BS32-SM-01 WERE USED FOR CONTROL. AN OPUS SOLUTION WAS COLLECTED AND DATA SHEET VALUES WERE COMPARED FOR QA/QC.



NOTES:

CPRA

T. BAKER SMITH
A CENTURY OF SOLUTIONS
412 South Van Ave, Houma, LA 70363
(985)868-1050 - tbsmith.com

SCALE: 1" = 1000'
1000' 500' 0' 1000'

REV. NO:	REV. DATE:	REV. BY:
00	--/--/--	---

REVISION DESCRIPTION:
--

DRAWN BY:	CJL	APPROVED BY:	KAK
DATE:	9/17/2020	JOB NO:	2020.0691
DRAWING NAME:	2020.0691_T01.DWG		

PROJECTION: LA SOUTH 1702
GEO. DATUM: NAD83 | VERT. DATUM: NAVD88 (GEOID12A)
GRID UNITS: US SURVEY FEET

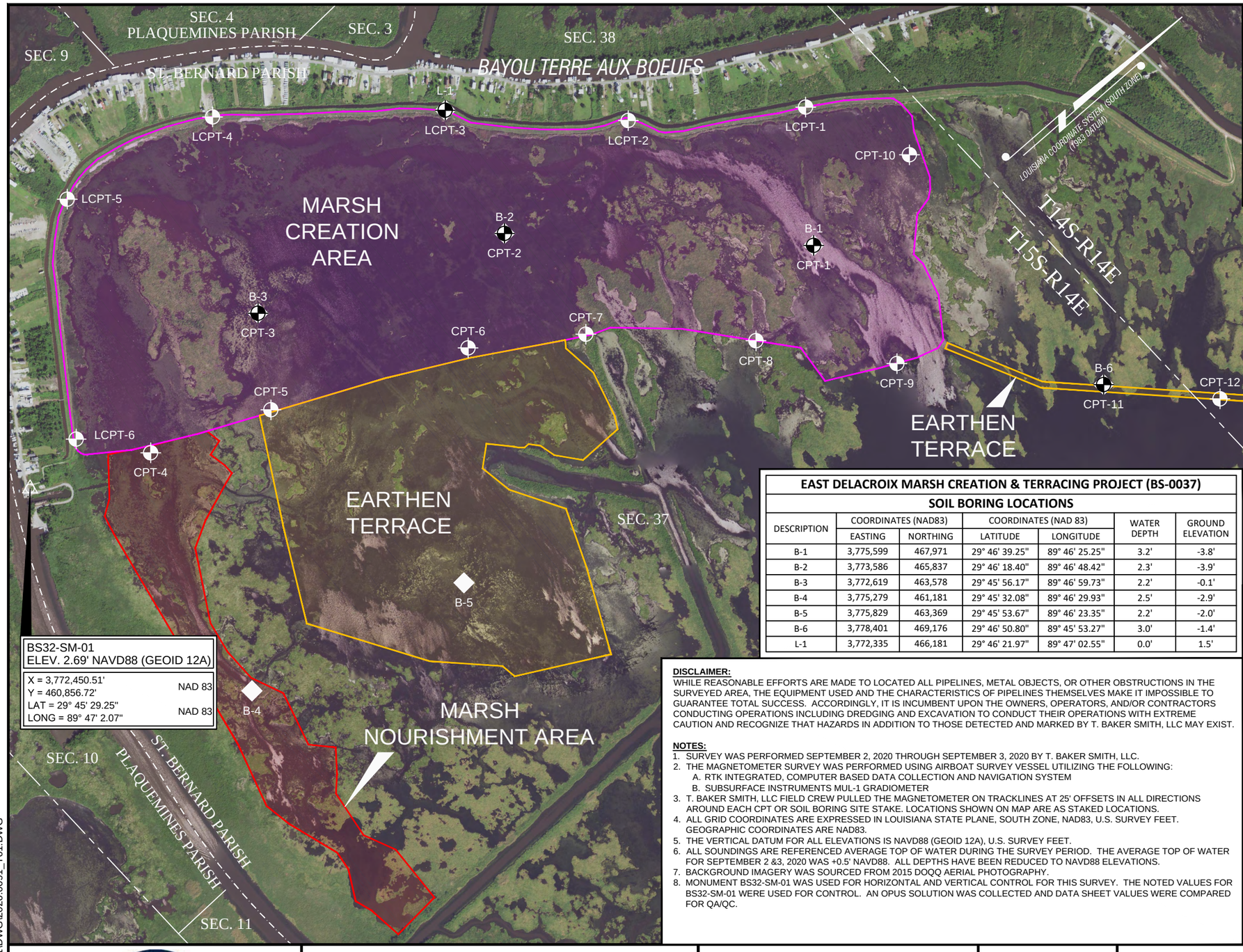
SHEET NO: 1 OF 2

HAZARD SURVEY

EUSTIS ENGINEERING

MAGNETOMETER SURVEY FOR PROPOSED SOIL BORING AND CONE PENETRATION TEST LOCATIONS FOR COASTAL PROTECTION AND RESTORATION AUTHORITY
EAST DELACROIX MARSH CREATION & TERRACING PROJECT (BS-0037)
ST. BERNARD PARISH, LOUISIANA

P:\Y-2020\2020.0691\DWG\2020.0691_T01.DWG



BS32-SM-01
ELEV. 2.69' NAVD88 (GEOID 12A)

X = 3,772,450.51'	NAD 83
Y = 460,856.72'	
LAT = 29° 45' 29.25"	NAD 83
LONG = 89° 47' 2.07"	

I CERTIFY THAT THE HAZARD SURVEY DEPICTED ON THIS PLAT WAS PERFORMED ON THE GROUND UNDER MY SUPERVISION IN ACCORDANCE WITH GENERALLY ACCEPTED SURVEY PRACTICES. THIS SURVEY DOES NOT MEET THE STANDARDS OF PRACTICE FOR BOUNDARY SURVEYS AS SET FORTH BY THE LOUISIANA PROFESSIONAL ENGINEERING AND LAND SURVEYING BOARD.

STATE OF LOUISIANA
JAMES B. TELLEGRIN
REG. NO. 4828
REGISTERED
PROFESSIONAL
LAND SURVEYOR

9/17/2020

APPROVED: _____

JAMES B. TELLEGRIN
LA. LAND SURVEYOR REG. NO. 4828

LEGEND

- PROPOSED SOIL BORING LOCATION
- PROPOSED CONE PENETRATION TEST LOCATION
- PROPOSED SOIL BORING & CONE PENETRATION TEST LOCATION
- MARSH CREATION AREA
- MARSH NOURISHMENT AREA
- EARTHEN TERRACE

EAST DELACROIX MARSH CREATION & TERRACING PROJECT (BS-0037)
SOIL BORING LOCATIONS

DESCRIPTION	COORDINATES (NAD83)		COORDINATES (NAD 83)		WATER DEPTH	GROUND ELEVATION
	EASTING	NORTHING	LATITUDE	LONGITUDE		
B-1	3,775,599	467,971	29° 46' 39.25"	89° 46' 25.25"	3.2'	-3.8'
B-2	3,773,586	465,837	29° 46' 18.40"	89° 46' 48.42"	2.3'	-3.9'
B-3	3,772,619	463,578	29° 45' 56.17"	89° 46' 59.73"	2.2'	-0.1'
B-4	3,775,279	461,181	29° 45' 32.08"	89° 46' 29.93"	2.5'	-2.9'
B-5	3,775,829	463,369	29° 45' 53.67"	89° 46' 23.35"	2.2'	-2.0'
B-6	3,778,401	469,176	29° 46' 50.80"	89° 45' 53.27"	3.0'	-1.4'
L-1	3,772,335	466,181	29° 46' 21.97"	89° 47' 02.55"	0.0'	1.5'

EAST DELACROIX MARSH CREATION & TERRACING PROJECT (BS-0037
CONE PENETRATION TEST (CPT) LOCATIONS

DESCRIPTION	COORDINATES (NAD83)		COORDINATES (NAD 83)		WATER DEPTH	GROUND ELEVATION
	EASTING	NORTHING	LATITUDE	LONGITUDE		
LCPT-1	3,774,560	468,777	29° 46' 47.36"	89° 46' 36.91"	0.0'	2.7'
LCPT-2	3,773,551	467,425	29° 46' 34.12"	89° 46' 48.57"	0.0'	5.3'
LCPT-3	3,772,335	466,181	29° 46' 21.97"	89° 47' 02.55"	0.0'	1.5'
LCPT-4	3,770,933	464,477	29° 46' 05.28"	89° 47' 18.73"	0.0'	1.1'
LCPT-5	3,770,615	462,926	29° 45' 49.98"	89° 47' 22.57"	0.0'	4.7'
LCPT-6	3,772,384	461,494	29° 45' 35.57"	89° 47' 02.72"	0.0'	3.2'
CPT-1	3,775,599	467,971	29° 46' 39.25"	89° 46' 25.25"	3.2'	-2.7'
CPT-2	3,773,586	465,837	29° 46' 18.40"	89° 46' 48.42"	2.3'	-1.8'
CPT-3	3,772,619	463,578	29° 45' 56.17"	89° 46' 59.73"	2.2'	-1.7'
CPT-4	3,772,948	461,942	29° 45' 39.92"	89° 46' 56.26"	2.2'	-1.7'
CPT-5	3,773,390	463,068	29° 45' 51.01"	89° 46' 51.07"	2.1'	-1.6'
CPT-6	3,774,176	464,863	29° 46' 08.68"	89° 46' 41.87"	2.3'	-1.8'
CPT-7	3,774,814	465,790	29° 46' 17.76"	89° 46' 34.50"	1.8'	-1.3'
CPT-8	3,775,920	466,965	29° 46' 29.24"	89° 46' 21.76"	1.5'	-1.0'
CPT-9	3,776,962	467,829	29° 46' 37.66"	89° 46' 09.81"	2.7'	-2.2'
CPT-10	3,775,548	469,221	29° 46' 51.62"	89° 46' 25.63"	2.8'	-2.3'
CPT-11	3,778,401	469,176	29° 46' 50.80"	89° 45' 53.27"	3.0'	-2.5'
CPT-12	3,779,227	469,918	29° 46' 58.03"	89° 45' 43.78"	3.0'	-3.0'

DISCLAIMER:
WHILE REASONABLE EFFORTS ARE MADE TO LOCATED ALL PIPELINES, METAL OBJECTS, OR OTHER OBSTRUCTIONS IN THE SURVEYED AREA, THE EQUIPMENT USED AND THE CHARACTERISTICS OF PIPELINES THEMSELVES MAKE IT IMPOSSIBLE TO GUARANTEE TOTAL SUCCESS. ACCORDINGLY, IT IS INCUMBENT UPON THE OWNERS, OPERATORS, AND/OR CONTRACTORS CONDUCTING OPERATIONS INCLUDING DREDGING AND EXCAVATION TO CONDUCT THEIR OPERATIONS WITH EXTREME CAUTION AND RECOGNIZE THAT HAZARDS IN ADDITION TO THOSE DETECTED AND MARKED BY T. BAKER SMITH, LLC MAY EXIST.

NOTES:
1. SURVEY WAS PERFORMED SEPTEMBER 2, 2020 THROUGH SEPTEMBER 3, 2020 BY T. BAKER SMITH, LLC.
2. THE MAGNETOMETER SURVEY WAS PERFORMED USING AIRBOAT SURVEY VESSEL UTILIZING THE FOLLOWING:
   A. RTK INTEGRATED, COMPUTER BASED DATA COLLECTION AND NAVIGATION SYSTEM
   B. SUBSURFACE INSTRUMENTS MUL-1 GRADIOMETER
3. T. BAKER SMITH, LLC FIELD CREW PULLED THE MAGNETOMETER ON TRACKLINES AT 25' OFFSETS IN ALL DIRECTIONS AROUND EACH CPT OR SOIL BORING SITE STAKE. LOCATIONS SHOWN ON MAP ARE AS STAKED LOCATIONS.
4. ALL GRID COORDINATES ARE EXPRESSED IN LOUISIANA STATE PLANE, SOUTH ZONE, NAD83, U.S. SURVEY FEET. GEOGRAPHIC COORDINATES ARE NAD83.
5. THE VERTICAL DATUM FOR ALL ELEVATIONS IS NAVD88 (GEOID 12A), U.S. SURVEY FEET.
6. ALL SOUNDINGS ARE REFERENCED AVERAGE TOP OF WATER DURING THE SURVEY PERIOD. THE AVERAGE TOP OF WATER FOR SEPTEMBER 2 &3, 2020 WAS +0.5' NAVD88. ALL DEPTHS HAVE BEEN REDUCED TO NAVD88 ELEVATIONS.
7. BACKGROUND IMAGERY WAS SOURCED FROM 2015 DOQQ AERIAL PHOTOGRAPHY.
8. MONUMENT BS32-SM-01 WAS USED FOR HORIZONTAL AND VERTICAL CONTROL FOR THIS SURVEY. THE NOTED VALUES FOR BS32-SM-01 WERE USED FOR CONTROL. AN OPUS SOLUTION WAS COLLECTED AND DATA SHEET VALUES WERE COMPARED FOR QA/QC.

NOTES:

CPRA

T. BAKER SMITH
A CENTURY OF SOLUTIONS
412 South Van Ave, Houma, LA 70363
(985)868-1050 - tbsmith.com

SCALE: 1" = 1000'
1000' 500' 0' 1000'

REV. NO:	REV. DATE:	REV. BY:
00	--/--/--	---

REVISION DESCRIPTION:
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DRAWN BY:	CJL	APPROVED BY:	KAK
DATE:	9/17/2020	JOB NO:	2020.0691
DRAWING NAME:	2020.0691_T01.DWG		

PROJECTION: LA SOUTH 1702
GEO. DATUM: NAD83 | VERT. DATUM: NAVD88 (GEOID12A)
GRID UNITS: US SURVEY FEET

SHEET NO: 2 OF 2

HAZARD SURVEY

EUSTIS ENGINEERING

MAGNETOMETER SURVEY FOR PROPOSED SOIL BORING AND CONE PENETRATION TEST LOCATIONS FOR COASTAL PROTECTION AND RESTORATION AUTHORITY
EAST DELACROIX MARSH CREATION & TERRACING PROJECT (BS-0037)
ST. BERNARD PARISH, LOUISIANA

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APPENDIX III
BORING LOGS

EUSTIS ENGINEERING SINCE 1946

LEGEND AND NOTES FOR LOG OF BORING AND TEST RESULTS

PP Pocket penetrometer: Resistance in tons per square foot

SPT Standard Penetration Test: Number of blows of a 140-lb hammer dropped 30 inches required to drive 2-in. O.D., 1.4-in. I.D. sampler a distance of 1 foot into the soil after first seating it 6 inches. Values shown have not been corrected.

SPLR Type of Sampling  Shelby  SPT  Auger  Vibracore  No sample

SYMBOL Clay  Silt  Sand  Peat/Humus  Shells  Stone/Gravel 

Predominant type shown heavy; modifying type shown light

USC Unified Soil Classification

DENSITY Unit weight in pounds per cubic foot

SHEAR TESTS

TYPE

- UC Unconfined compression shear
- OB Unconsolidated undrained triaxial compression shear on one specimen confined at the approximate overburden pressure
- UU Unconsolidated undrained triaxial compression shear
- CU Consolidated undrained triaxial compression shear
- DS Direct shear

- ϕ Angle of internal friction in degrees
- c Cohesion in pounds per square foot

ATTERBERG LIMITS

- LL Liquid Limit
- PL Plastic Limit
- PI Plasticity Index

OTHER TESTS

- CON Consolidation
- -#200 Percent passing a U.S. No. 200 sieve
- SV Particle size distribution (sieve only)
- PD Particle size distribution (sieve and hydrometer)
- k Coefficient of permeability in centimeters per second
- SP Swelling pressure in pounds per square foot

Other laboratory test results reported on separate figures

GENERAL NOTES

(1) If a ground water depth is shown on the boring log, these observations were made at the time of drilling and were measured below the existing ground surface. These observations are shown on the boring logs. However, ground water levels may vary due to seasonal fluctuations and other factors. If important to construction, the depth to ground water should be determined by those persons responsible for construction immediately prior to beginning work.

(2) While the individual logs of borings are considered to be representative of subsurface conditions at their respective locations on the dates shown, it is not warranted that they are representative of subsurface conditions at other locations and times.

EUSTIS ENGINEERING SINCE 1946

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

LOG OF BORING AND TEST RESULTS

Boring: B-1

Project No: 24431
Date: 09/09/2020
Latitude: 29.77758°
Longitude: -89.77368°

Water Depth: See Text
Total Depth: 34.0 ft

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					4' Water		NS	0											
					Very soft brown peat w/roots	Pt	1A	4	563										
5					Very soft gray organic clay w/decayed wood & roots	OH	1B	5	171	30	81				207	38	169		ORG = 14.6%; MINI VANE = 297 PSF
					w/trace of humus		2A	6	234										
					Extremely soft gray clay w/few silt pockets & roots	CH	2B	7	125	39	87	OB	0	50	167	42	125		
					Very soft gray & brown organic clay w/trace of clay pockets & silt	OH	3A	8	149										
					Soft gray silty clay w/fine sand pockets & trace of organic matter	CL	3B	9	35						33	20	13		
10					Very soft gray clay w/trace of humus pockets, decayed wood, & silt	CH	4A	10	127										
	0.25				Very soft gray silty clay w/trace of shell fragments	CL	4B	11	33										
					w/clayey silt, trace of fine sand pockets, & shell fragments		5A	12	36	83	112	OB	0	184	30	19	11		
	0.25				w/ trace of shell fragments & fine sand pockets		5B	13	34										
					Medium dense gray silty sand w/trace of clay & shell fragments	SM	6A	14	30										-#200 = 27.1% -#200 = 27.1%
15					Medium compact gray clayey silt w/few sand pockets & lenses	ML	6B	15	26										
					Very soft gray clay w/few silt pockets & lenses, trace of shell fragments, & decayed wood	CH	7A	16	59										
					No sample		7B	17											
					Very soft gray & dark gray clay w/trace of organic clay lenses, silt pockets, & shell fragments	CH	8A	18	119	39	86	OB	0	185	171	30	141		
					w/trace of silt pockets & organic matter		8B	19	61										
20					w/trace of organic matter		9A	20	80										
					w/trace of silt pockets, roots, & organic matter		9B	21	106	44	90	OB	0	289	142	42	100		
					w/few shell fragments & trace of silt pockets		10A	22	89										
					w/few shell fragments, trace of silt pockets & organic matter		10B	23	110										
25																			

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

LOG OF BORING AND TEST RESULTS

Boring: B-1

Project No: 24431
Date: 09/09/2020
Latitude: 29.77758°
Longitude: -89.77368°

Water Depth: See Text
Total Depth: 34.0 ft

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
25					Very soft gray & dark gray clay w/few shell fragments, trace of silt pockets & organic matter	CH													
					w/shell fragments & trace of silt pockets		11A	27	106										
					w/shell fragments, silt pockets & lenses, & trace of organic matter		11B	28	50										
30																			
					w/trace of silt pockets & lenses		12A	32	70	56	96				73	28	45		MINI VANE = 145 PSF
					w/trace of silt pockets & lenses, trace of decayed wood, & concretions		12B	33	77										
35																			
40																			
45																			
50																			

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

LOG OF BORING AND TEST RESULTS

Boring: B-2

Project No: 24431
Date: 09/09/2020
Latitude: 29.77178°
Longitude: -89.78012°

Water Depth: See Text
Total Depth: 33.0 ft

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					3'5" Water		NS	0											
					Extremely soft gray & brown organic clay w/wood & roots	OH	1A	3.04	159										
					w/wood & roots		1B	4.04	218	24	77				231	49	182		ORG% = 19.8% MINI VANE = 388 PSF
5					w/trace of humus		2A	5.04	270										
							2B	6.04	188										
							3A	7.04	215										
					Medium compact gray clayey silt w/fine sand pockets & lenses, few clay pockets & lenses, trace of decayed wood, organic matter, & shell fragments	ML	3B	8.04	30										-#200 = 70.6% SV
						CH	4A	9.04	51										
10					Very soft gray clay w/trace of silt pockets, decayed wood, & shell fragments	ML	4B	10.04	30										-#200 = 67.9% SV
					Loose gray sandy silt w/trace of clay pockets, shell fragments, & organic matter	CH	5A	11.04	64						64	27	37		
	0.25				Extremely soft gray clay w/trace of silt pockets & lenses & trace of shell fragments		5B	12.04	86	51	95	OB	0	57	88	20	68		
					w/trace of silt pockets & organic matter		6A	13.04	63										
	0.25				w/silty sand pockets & few shell fragments		6B	14.04	66										
15					w/few shell fragments, trace of silty sand pockets & lenses, & trace of organic matter		7A	15.04	68										
	0.25				w/trace of silt pockets		7B	16.04	84										
					w/trace of silty sand pockets & lenses, trace of organic matter, & shell fragments		8A	17.04	81										
	0.25				w/trace of silty sand pockets & lenses & trace of shell fragments		8B	18.04	82	53	96	OB	0	90	93	28	65		
					w/trace of silt pockets & trace of shell fragments		9A	19.04	64										
20	0.25				w/trace of silty sand pockets & lenses & trace of shell fragments		9B	20.04	85										
					w/trace of silty sand pockets & lenses		10A	21.04	109										
					Extremely soft gray & tan clay w/trace of silt pockets & decayed wood	CH													
	0.25				No sample		10B	22.04											
25																			

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

LOG OF BORING AND TEST RESULTS

Boring: B-2

Project No: 24431
Date: 09/09/2020
Latitude: 29.77178°
Longitude: -89.78012°

Water Depth: See Text
Total Depth: 33.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
25					No sample														
					Extremely soft gray clay w/trace of fine sand pockets & lenses, trace of decayed wood, & shell fragments	CH	11A	26.04	62										
	0.25				w/trace of silt pockets & shell fragments		11B	27.04	83	51	93				98	24	74		
30					Extremely soft gray silty clay w/few fine sand pockets & trace of decayed wood	CL	12A	31.04	60										
	0.25				No sample		12B	32.04											
35																			
40																			
45																			
50																			

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

LOG OF BORING AND TEST RESULTS

Boring: B-3

Project No: 24431
Date: 09/08/2020
Latitude: 29.76560°
Longitude: -89.78326°

Water Depth: See Text
Total Depth: 34.0 ft

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Other Tests
0					4' Water		NS	0										
					Extremely soft gray & dark gray organic clay w/wood, roots, humus pockets, & shell fragments	OH	1A	4	233									
5					w/humus lenses & layers		1B	5	327	16	67	OB	0	121	338	52	286	ORG = 27.4%
					Very soft gray clay w/few silt pockets, organic matter, & roots	CH	2A	6	96									
					Extremely soft gray silty clay w/few silt pockets, organic matter, & roots	CL	2B	7	92						37	21	16	
					w/some organic matter		3A	8	41									
					Loose gray clayey silt w/trace of shell fragments	ML	3B	9	33									
10					Extremely soft gray silty clay w/trace of silt pockets & shell fragments	CL	4A	10	34									
					w/trace of silt & clay lenses, & shell fragments		4B	11	41	79	112				34	22	12	
					w/trace of shell fragments		5A	12	36									
					No sample		5B	13										
					Extremely soft gray clay w/silt pockets & shell fragments	CH	6A	14	60									
15					w/silty sand pockets & lenses, & trace of shell fragments		6B	15	65	61	100	OB	0	165	59	21	38	
					w/few silt pockets & trace of shell fragments		7A	16	91									
					No sample		7B	17										
					Extremely soft gray clay w/few silt pockets & shell fragments	CH	8A	18	82									
	0.25				w/silty sand pockets & lenses, & trace of shell fragments		8B	19	58	63	100	OB	0	124	64	22	42	
20					w/trace of silt pockets		9A	20	95									
	0.25				w/trace of silt pockets		9B	21	94									
					w/trace of silt pockets & shell fragments		10A	22	96									
	0.25				Extremely soft gray organic clay w/few silt pockets, organic matter, roots, & trace of shell fragments	OH	10B	23	122	38	84	OB	0	82	176	55	121	
25																		

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

LOG OF BORING AND TEST RESULTS

Boring: B-3

Project No: 24431
Date: 09/08/2020
Latitude: 29.76560°
Longitude: -89.78326°

Water Depth: See Text
Total Depth: 34.0 ft

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
25					Extremely soft gray organic clay w/few silt pockets, organic matter, roots, & trace of shell fragments	OH													
					Extremely soft gray silty clay w/organic matter, decayed wood, & shells	CL	11A	27	82										
	0.25				Extremely soft gray clay w/few silt pockets & trace of organic matter	CH	11B	28	77										
30					Extremely soft gray silty clay w/fine sand	CL													
							12A	32	56										
	0.25				Loose gray silty sand w/few clay lenses & layers, trace of organic matter, & wood	SM	12B	33	30										-#200 = 37.6% SV
35																			
40																			
45																			
50																			

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

LOG OF BORING AND TEST RESULTS

Boring: B-4

Project No: 24431
Date: 09/08/2020
Latitude: 29.75891°
Longitude: -89.77498°

Water Depth: See Text
Total Depth: 33.3 ft

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests Φ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Other Tests
0					40" Water		NS	0										
					Extremely soft brown & gray organic clay w/roots & humus pockets	OH	1A	3.33	231									
							1B	4.33	167	30	80	OB	0	179	136	42	94	ORG = 17.7%
5					Extremely soft gray clay w/organic matter & wood	CH	2A	5.33	152									
					Extremely soft gray silty clay w/organic matter & wood	CL	2B	6.33	76									
					Extremely soft gray & brown organic clay w/silt pockets & wood	OH	3A	7.33	89									
					Extremely soft gray silty clay w/some organic matter & trace of organic clay pockets	CL	3B	8.33	114									
					w/silt pockets & lenses		4A	9.33	45	76	111	OB	0	146	42	13	29	
10					No sample		4B	10.33										
					Extremely soft gray silty clay	CL	5A	11.33	40									
					w/trace of silt pockets & organic matter		5B	12.33	44						36	19	17	
					w/trace of shell fragments		6A	13.33	55									
	0.25				Extremely soft gray clay w/trace of silt pockets & shell fragments	CH	6B	14.33	60	61	98	OB	0	118	70	20	50	
15					w/some shell fragments		7A	15.33	65									
	0.25				Gray clay & gray & white reef shell fragment mixture	SC	7B	16.33	26									-#200 = 24.3% SV
					Extremely soft to soft gray clay w/silt pockets & trace of shell fragments	CH	8A	17.33	57									
	0.25				w/silt pockets & trace of shell fragments		8B	18.33	59									
					Soft gray organic clay w/few shell fragments & trace of silt pockets	OH	9A	19.33	118	39	85	OB	0	273	142	34	108	
20	0.25				Gray clay w/gray & white reef shell & shell fragments, trace of fine sand pockets, & organic matter	CH	9B	20.33	72									-#200 = 65.1% SV
					w/some shell fragments & few silt pockets		10A	21.33	77									
	0.25				w/trace of silt pockets & organic matter		10B	22.33	61	64	103	OB	0	144	75	31	44	
25																		

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

LOG OF BORING AND TEST RESULTS

Boring: B-4

Project No: 24431
Date: 09/08/2020
Latitude: 29.75891°
Longitude: -89.77498°

Water Depth: See Text
Total Depth: 33.3 ft

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
25					Gray clay w/gray & white reef shell & shell fragments, trace of fine sand pockets, & organic matter	CH													
					Extremely soft gray silty clay w/shell fragments	CL	11A	26.33	54										
	0.25				No sample		11B	27.33											
30																			
					Extremely soft gray clay w/silty sand pockets & shell fragments	CH	12A	31.33	83						67	18	49		
	0.25				No sample		12B	32.33											
35																			
40																			
45																			
50																			

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

LOG OF BORING AND TEST RESULTS

Boring: B-5

Project No: 24431
Date: 09/08/2020
Latitude: 29.76491°
Longitude: -89.77316°

Water Depth: See Text
Total Depth: 33.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					3' Water		NS	0											
					Extremely soft brown humus w/roots	Pt	1A	3	541										
					w/roots		1B	4	538										ORG% = 53.8%
5					Extremely soft brown & gray organic clay	OH	2A	5	333										
					Extremely soft gray & dark gray clay w/trace of silt pockets, organic matter, & shell fragments	CH	2B	6	130	37	86	OB	0	34	97	23	74		ORG% = 8.7%
					Extremely soft gray & brown organic clay w/decayed wood & trace of humus pockets	OH	3A	7	367										
					Extremely soft gray silty clay w/organic matter	CL	3B	8	50										
					Extremely soft gray clay w/few shell fragments, trace of silt pockets, & sandy silt lenses	CH	4A	9	68	59	100	OB	0	56	66	26	40		
10					No sample		4B	10											
					Extremely soft gray clay w/shell fragments & organic matter	CH	5A	11	97										
					w/trace of silt pockets, shell fragments, & organic matter		5B	12	73	57	98	OB	0	107	78	21	57		
					w/silt pockets, trace of organic matter, & shell fragments		6A	13	82										
					w/trace of silt pockets & shell fragments		6B	14	83						95	18	77		
15					w/some organic matter, shell fragments, & few silt pockets		7A	15	83										
					w/trace of silt pockets & organic matter		7B	16	95										
					w/trace of silt pockets, roots, organic matter, & shell fragments		8A	17	94	48	93	OB	0	139	102	36	66		
					Extremely soft gray & tan clay w/few silty sand pockets, & trace of decayed wood	CH	8B	18	99										
					Very soft gray silty clay w/trace of organic matter	CL	9A	19	67										
20	0.25				w/trace of silt & clayey silt lenses, & trace of organic matter		9B	20	44	77	111	OB	0	132	43	22	21		
					Very soft gray clay w/silt pockets & trace of shell fragments	CH	10A	21	83										
	0.25				w/silt pockets & trace of shell fragments		10B	22	70										
25																			

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

LOG OF BORING AND TEST RESULTS

Boring: B-5

Project No: 24431
Date: 09/08/2020
Latitude: 29.76491°
Longitude: -89.77316°

Water Depth: See Text
Total Depth: 33.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
25					Very soft gray clay w/silt pockets & trace of shell fragments	CH													
					w/trace of silt pockets & organic matter		11A	26	82	52	96	OB	0	69	97	26	71		
	0.25				w/silt pockets		11B	27	94										
30																			
					w/few silt pockets & trace of shell fragments		12A	31	92										
	0.25				Very soft gray silty clay	CL	12B	32	44	77	111	OB	0	207	37	18	19		
35																			
40																			
45																			
50																			

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

Boring: B-6

Project No: 24431
Date: 09/09/2020
Latitude: 29.78078°
Longitude: -89.76480°

Water Depth: See Text
Total Depth: 35.4 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					5'5" Water		NS	0											
5					Extremely soft brown organic clay w/humus pockets	OH	1A	5.42	159										ORG = 8.6%
					Extremely soft gray clay w/silt pockets, decayed wood, & trace of roots	CH	1B	6.42	61										
					w/trace of silt pockets, organic matter, & decayed wood		2A	7.42	64	62	102				79	21	58		
					w/trace of silt pockets, decayed wood, & roots		2B	8.42	87										
					w/trace of silty sand pockets & lenses, trace of decayed wood, & organic matter		3A	9.42	78										
10					Extremely soft gray silty clay w/trace of decayed wood	CL	3B	10.42	75										
					Extremely soft gray clay w/trace of silty sand pockets & lenses, trace of decayed wood, & organic matter	CH	4A	11.42	106										
	0.25				w/few silt pockets, trace of shell fragments, & organic matter		4B	12.42	41	80	113	OB	0	112	42	13	29		
					Extremely soft gray & brown organic clay w/trace of clay pockets	OH	5A	13.42	137										
15					Extremely soft gray & brown clay w/trace of silt pockets & organic matter	CH	5B	14.42	55										
					w/few organic matter & humus		6A	15.42	131										
					w/few organic matter, & trace of silty sand pockets & lenses		6B	16.42	113										
					w/silt pockets, few roots, & organic matter		7A	17.42	74	56	98	OB	0	100	101	26	75		
	0.25				w/trace of silt pockets & decayed wood		7B	18.42	95										
20					w/trace of organic clay pockets, organic matter, & decayed wood		8A	19.42	107						137	44	93		
	0.25				Extremely soft gray silty clay w/trace of decayed wood	CL	8B	20.42	39										
					Very loose gray clayey silt w/trace of silty clay, decayed wood, & organic matter	ML	9A	21.42	42	79	112	OB	0	181					
	0.25				No sample		9B	22.42											
					Extremely soft gray silty clay	CL	10A	23.42	56										
25	0.25					ML	10B	24.42	35	87	117	OB	0	553					

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

LOG OF BORING AND TEST RESULTS

Boring: B-6

Project No: 24431
Date: 09/09/2020
Latitude: 29.78078°
Longitude: -89.76480°

Water Depth: See Text
Total Depth: 35.4 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
25					Loose gray clayey silt w/trace of silty clay pockets & lenses	ML													
					w/fine sand pockets & trace of clay pockets		11A	28.42	28										-#200 = 76.3% SV
30	0.25				w/fine sand pockets & trace of clay pockets		11B	29.42	28										
					Very stiff gray silty clay w/fine sand & clayey silt pockets	CL	12A	33.42	25	101	126	OB	0	3038	42	24	18		-#200 = 82.8% -#200 = 82.8%
35	0.25				No sample		12B	34.42											
40																			
45																			
50																			

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

Boring: BA-1

Project No: 24431
Date: 09/04/2020
Latitude: 29.80062°
Longitude: -89.80435°

Water Depth: See Text
Total Depth: 21.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Other Tests
0					5' Water		NS	0										
5					Extremely soft gray & dark gray clay w/few shells, shell fragments, few sand pockets, roots, & trace of decayed wood	CH	1A	5	105	41	84				79	35	44	ORG = 7.0%
					No sample		NS	6										
					Extremely soft gray clay w/few sand pockets, organic matter, & trace of shell fragments	CH	2A	7	76	50	89				62	20	42	-#200 = 94.1% PD
					w/few silt pockets, organic matter, & trace of shell fragments		2B	8	80	55	99							
					w/few silt pockets, organic matter, & roots		3A	9	70	62	105				79	21	58	
10					No sample		NS	10										
					Extremely soft gray clay w/few silt pockets, trace of roots, & organic matter	CH	4A	11	59	66	105				78	21	57	
					w/few silt pockets & trace of organic matter		4B	12	57	68	107							
					w/few silt pockets & trace of organic matter		5A	13	78	58	104				111	36	75	
					w/few silt pockets & trace of organic matter		5B	14	77	56	99							
15					w/few silt pockets & trace of organic matter		6A	15	81	55	100				101	22	79	
					w/few silt pockets & trace of organic matter		6B	16	77	54	95							
					w/few silt pockets & trace of organic matter		7A	17	95	50	98				105	23	82	
					w/few silt pockets & trace of organic matter		7B	18	97	48	94							
					w/silt pockets, wood, & trace of fine sand		8A	19	97	49	97				89	25	64	-#200 = 98.4% PD
20					w/silt pockets, wood, & organic matter		8B	20	82	55	99							
25																		

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

Boring: BA-2

Project No: 24431
Date: 09/04/2020
Latitude: 29.80356°
Longitude: -89.80606°

Water Depth: See Text
Total Depth: 20.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Other Tests
0					4" Water		NS	0										
					Extremely soft gray & dark gray clay w/few silt pockets, organic matter, shells, & shell fragments	CH	1A	4	152	40	101				120	26	94	
5					Extremely soft gray silty clay w/few silt pockets, organic matter, & shell fragments	CL	1B	5	58	69	109							
					w/few organic matter & shell fragments		2A	6	56	69	107				47	19	28	-#200 = 98.1% PD
					Extremely soft gray clay w/few silt pockets, organic matter, & shell fragments	CH	2B	7	67	62	103							
					w/silty sand pockets, organic matter, & shell fragments		3A	8	77	53	94							
10					Extremely soft gray & brown humus w/trace of organic clay lenses & clay pockets	Pt	3B	9	221	26	82				347	69	278	ORG = 38.8%
					Extremely soft gray & dark gray organic clay w/organic matter, shell fragments, fine sand pockets, trace of roots, & decayed wood	OH	4A	10	85	48	88				76	20	56	
					Extremely soft gray & tan organic clay w/silt pockets & organic matter	OH	4B	11	147	33	81							
					Extremely soft gray & dark gray organic clay w/tan & brown humus lenses & layers, organic matter, & wood	OH	5A	12	130	33	77				320	110	210	ORG = 30.7%
15					Extremely soft gray clay w/organic matter & wood	CH	5B	13	136	35	83							
					w/wood, roots, & trace of shell fragments		6A	14	125	30	68				134	29	105	-#200 = 96.6% PD
					No sample		NS	15										
					Extremely soft gray clay w/few silt pockets, decayed wood, & roots	CH	7A	16	131	38	89				140	30	110	
					w/few silt pockets, decayed wood, & roots		7B	17	124	39	88							
					w/wood & roots		8A	18	101	44	88				129	41	88	
20					w/wood & roots		8B	19	118	42	92							
25																		

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

Boring: BA-3

Project No: 24431
Date: 09/04/2020
Latitude: 29.80740°
Longitude: -89.80901°

Water Depth: See Text
Total Depth: 20.2 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Other Tests
0					4'2" Water		NS	0										
5					Extremely soft gray & brown organic clay w/shell fragments & trace of roots	OH	1A	4.17	117	34	74				111	27	84	-#200 = 99.7% PD
					Extremely soft gray clay w/silty sand pockets, organic matter, & shell fragments	CH	1B	5.17	62	52	85							
					Extremely soft gray & dark gray clay w/organic matter & roots	CH	2A	6.17	159	36	93				56	18	38	
					Extremely soft gray clay w/organic matter & roots	CH	2B	7.17	75	57	99							
							3A	8.17	69	61	104							
10					Extremely soft dark gray clay w/shell fragments & trace of organic clay layers	CH	3B	9.17	193	27	80				83	21	62	ORG = 4.6%
					Extremely soft gray clay w/shell fragments & organic matter	CH	4A	10.17	78	58	104				55	19	36	
					No sample		NS	11.17										
					Extremely soft gray organic clay w/organic matter, roots, & trace of shell fragments	OH	5A	12.17	113	44	93				191	86	105	-#200 = 94.1% PD
					No sample		NS	13.17										
15							6A	14.17	225	23	74				239	52	187	ORG = 14.6%
					Extremely soft gray & dark gray organic clay w/few decayed wood	OH	6B	15.17	210	25	78							
							7A	16.17	118	44	95				104	38	66	
					Extremely soft gray clay w/silt pockets & some organic matter	CH	7B	17.17	121	42	92							
					Extremely soft dark gray organic clay w/decayed wood & trace of gray clay	OH	8A	18.17	203	28	84				193	78	115	
20					Extremely soft gray clay w/silt pockets, trace of organic matter, & shell fragments	CH	8B	19.17	107	46	94							
25																		

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

LOG OF BORING AND TEST RESULTS

Boring: BA-4

Project No: 24431
Date: 09/04/2020
Latitude: 29.80594°
Longitude: -89.81024°

Water Depth: See Text
Total Depth: 20.1 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Other Tests
0					4'2" Water		NS	0										
					Extremely soft gray clay w/silt pockets, few organic matter, trace of clay pockets, & shell fragments	CH	1A	4.17	67	48	80				54	18	36	
5							NS	5.17										
					No sample		2A	6.17	85	46	85				73	17	56	
					Extremely soft gray clay w/few silt pockets & shell fragments	CH	2B	7.17	79	49	88							
					w/few silt pockets & shell fragments		3A	8.17	62	58	94				54	21	33	
					No sample		NS	9.17										
10					Extremely soft gray clay w/silt, organic matter, & shell fragments	CH	4A	10.17	58	57	90				60	17	43	
					Extremely soft dark gray organic clay w/trace of humus pockets & gray clay	OH	4B	11.17	210	26	81							
					Extremely soft gray & dark gray humus w/trace of organic clay	Pt	5A	12.17	268	21	76				322	72	250	ORG = 26.5%
					Extremely soft dark gray organic clay w/trace of gray clay lenses & roots	OH	5B	13.17	212	23	71							
					Extremely soft brown & gray humus w/trace of organic clay & gray clay pockets	Pt	6A	14.17	296	19	75				313	76	237	
15							6B	15.17	249	21	75							
					Extremely soft brown & gray organic clay w/trace of humus & gray clay pockets	OH	7A	16.17	232	25	83				118	28	90	-#200 = 92.2% PD
					w/trace of decayed wood & shell fragments		7B	17.17	107	42	88							
					Extremely soft to soft gray clay w/trace of wood & shell fragments	CH	8A	18.17	94	47	91							
					w/few silt pockets		8B	19.17	32	77	101				57	21	36	-#200 = 93.0% PD
20					w/clayey silt layers & fine sand lenses													
25																		

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

Boring: BA-5

Project No: 24431
Date: 09/04/2020
Latitude: 29.80284°
Longitude: -89.80936°

Water Depth: See Text
Total Depth: 21.0 ft

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					5' Water		NS	0											
5					Extremely soft brown & gray organic clay w/silty sand pockets, organic matter, & shell fragments	OH	1A	5	89	44	83				124	27	97		
						CH	1B	6	93	44	85								
					Extremely soft gray clay w/silty sand pockets, organic matter, & shell fragments		2A	7	64	63	104				51	18	33		-#200 = 97.6% PD
					No sample		NS	8											
					Extremely soft gray clay w/few silty sand pockets, organic matter, & shell fragments	CH	3A	9	73	58	100				59	18	41		
10					No sample		NS	10											
					Extremely soft gray clay w/few silty sand pockets & shell fragments	CH	4A	11	56	64	99				64	26	38		
					Extremely soft brown humus w/gray clay & shell fragments	Pt	4B	12	204	29	87								
					Extremely soft dark gray organic clay w/decayed wood & trace of gray clay	OH	5A	13	222	28	89				173	58	115		ORG = 11.1%
					No sample		NS	14											
15					Extremely soft gray clay w/organic matter, roots, & silty sand pockets	CH	6A	15	118	40	87				155	48	107		-#200 = 93.4% PD
					w/few silt pockets & trace of organic matter		6B	16	93	48	93								
					w/silty sand pockets & decayed wood		7A	17	130	42	95				117	44	73		
					w/trace of decayed wood & shell fragments		7B	18	79	58	104								
					w/few silty sand & trace of shell fragments		8A	19	88	54	101				96	28	68		
20					w/few shell fragments & trace of organic matter		8B	20	67	49	83								
25																			

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

LOG OF BORING AND TEST RESULTS

Boring: BA-6

Project No: 24431
Date: 09/04/2020
Latitude: 29.79858°
Longitude: -89.80803°

Water Depth: See Text
Total Depth: 21.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Other Tests
0					5' Water		NS	0										
5					Extremely soft gray & dark gray clay w/shell fragments, trace of shells, & silt pockets	CH	1A	5	62	58	95				72	23	49	
					No sample		NS	6										
					Extremely soft gray clay w/few silt pockets, organic matter, & shell fragments	CH	2A	7	130	37	86				75	19	56	
					w/few silt pockets, organic matter, & shell fragments		2B	8	72	55	95							
					w/shell fragments & roots		3A	9	80	53	95							
10					Extremely soft gray silty clay w/shell fragments & roots	CL	3B	10	41	67	95				42	22	20	
					Extremely soft gray clay w/silt pockets, shell fragments, & organic matter	CH	4A	11	99	41	83				50	17	33	
					No sample		NS	12										
					Extremely soft gray clay w/organic matter, silt, wood, & shell fragments	CH	5A	13	60	64	103				56	27	29	-#200 = 82.3% PD
					w/organic matter, wood, & shell fragments		5B	14	91	48	91							
15					w/silty sand pockets, shell fragments, & organic matter		6A	15	68	68	114							
					w/silty sand pockets, shell fragments, & organic matter		6B	16	50	64	96				69	22	47	
					Loose gray silty sand w/few clay pockets & shell fragments	SM	7A	17	28	92	118							-#200 = 22.3% SV
					Extremely soft gray clay w/few fine sand pockets & lenses, & few shell fragments	CH	7B	18	84	56	103							
					w/few fine sand pockets & trace of shell fragments		8A	19	69	57	96				65	22	43	
20					w/few fine sand pockets & trace of shell fragments		8B	20	63	62	101							
25																		

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

Boring: BA-7

Project No: 24431
Date: 09/03/2020
Latitude: 29.80486°
Longitude: -89.81354°

Water Depth: See Text
Total Depth: 21.8 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Other Tests
0					5'9" Water		NS	0										
5					Extremely soft brown & dark gray organic clay w/many roots, vegetation, & trace of humus lenses	OH	1A	5.75	131	34	79				100	29	71	ORG = 7.0%
						CH	1B	6.75	64	58	95							
					Extremely soft gray clay w/silt pockets, organic matter, shell fragments, & trace of roots	CL	2A	7.75	88	54	101				41	17	24	
					Extremely soft gray silty clay w/clay layers, organic matter, roots, & shell fragments	CH	2B	8.75	59	67	107				57	17	40	
10					Extremely soft gray clay w/trace of sand lenses & pockets, organic matter, roots, & shell fragments		3A	9.75	61	61	99				53	23	30	-#200 = 95.5% PD
					w/shells & shell fragments		3B	10.75	87	53	99							
					w/shell fragments		4A	11.75	58	65	102				69	25	44	-#200 = 95.5% PD
					w/silt, few fine sand, organic matter, roots, & shell fragments		4B	12.75	65	61	100							
					w/few silt pockets, roots & shell fragments		5A	13.75	68	63	105				56	20	36	
15					w/silty sand pockets, roots, & shell fragments		5B	14.75	245	20	70							ORG = 9.0%
					Soft brown & gray humus w/organic clay lenses	Pt	6A	15.75	115	35	76				275	58	217	
					Soft gray & brown clay w/organic clay lenses, silt pockets, decayed wood, shell fragments, & trace of organic matter pockets	CH	6B	16.75	159	30	77							
					Very soft to soft gray, tan, & brown organic clay w/silt pockets, decayed wood, humus pockets, & shell fragments	OH	7A	17.75	144	34	83				275	73	202	
					w/few silt pockets, wood, roots, & trace of clay pockets		7B	18.75	157	30	76							
20					w/few silt pockets, wood, & roots		8A	19.75	156	33	84				143	30	113	
					w/few silt pockets, wood, & trace of clay lenses		8B	20.75	130	42	97							
					w/few silt pockets & wood														
25																		

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NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

Boring: BA-8

Project No: 24431
Date: 09/03/2020
Latitude: 29.80379°
Longitude: -89.81701°

Water Depth: See Text
Total Depth: 22.5 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Other Tests
0					7'6" Water		NS	0										
					Extremely soft dark gray & gray organic clay w/trace of shell fragments & silt pockets	OH	1A	7.5	127	33	74				144	26	118	
						CH	1B	8.5	107	38	79							
					Extremely soft dark gray & gray clay w/silt pockets & shell fragments w/trace of silty clay lenses		2A	9.5	75	55	95				118	23	95	
					Extremely soft dark gray & gray silty clay w/trace of clay lenses, roots, & shell fragments	CL	2B	10.5	70	59	101							
						CH	3A	11.5	81	56	102				53	18	35	
					Extremely soft gray clay w/organic matter & trace of shell fragments	CL	3B	12.5	75	58	102							-#200 = 92.9% PD
					Extremely soft gray silty clay w/organic matter, few fine sand, & trace of shell fragments	CH	4A	13.5	77	56	98				62	17	45	
					Extremely soft gray clay w/trace of shell fragments, silt pockets, & organic matter w/trace of shell fragments & silt		4B	14.5	76	56	99							
15					w/fine sand, trace of shell fragments, & organic matter		5A	15.5	77	52	92				60	18	42	-#200 = 88.6% PD
					w/wood, trace of shell fragments, & organic matter		5B	16.5	81	52	93							
					Extremely soft gray silty clay w/trace of decayed wood & shell fragments	CL	6A	17.5	67	61	101							
					Extremely soft gray & brown humus w/wood & shell fragments	Pt	6B	18.5	262	22	80				303	89	214	
					Extremely soft gray silty clay w/few clay pockets, shell fragments, & organic matter	CL	7A	19.5	77	55	98				48	18	30	
20						Pt	7B	20.5	241	23	78							ORG = 21.4%
					Extremely soft brown humus w/trace of gray clay & decayed wood	CH	8A	21.5	78	57	101				66	19	47	
					Extremely soft gray clay w/some shell fragments	OH	8B	22.5	199	28	82							
					Extremely soft brown & gray organic clay w/fine sand layers, trace of organic matter, & shell fragments													
25																		

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

Boring: BA-9

Project No: 24431
Date: 09/03/2020
Latitude: 29.81014°
Longitude: -89.81398°

Water Depth: See Text
Total Depth: 20.7 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Other Tests
0					4'8" Water		NS	0										
5					Extremely soft dark gray humus w/roots	Pt	1A	4.67	486	11	67				399	75	324	ORG = 29.1%
					Extremely soft dark gray & gray clay w/few roots, fine sand pockets, shells & shell fragments	CH	1B	5.67	127	44	100							
					w/silty clay layers & shell fragments		2A	6.67	68	55	93				52	19	33	-#200 = 95.7% PD
					Extremely soft gray clay w/trace of wood, shell fragments, & concretions	CH	2B	7.67	82	53	96							
					w/wood, fine sand lenses, trace of shell fragments, & organic matter		3A	8.67	73	56	98							
10					w/organic matter, shell fragments, & trace of sandy clay lenses & pockets		3B	9.67	43	62	88				61	24	37	
					w/some wood, organic matter, & shell fragments		4A	10.67	76	52	91							
					Extremely soft dark gray & gray clay w/organic clay pockets, trace of shell fragments, & roots	CH	4B	11.67	132	32	75				99	33	66	
					w/organic clay pockets, organic matter, & wood		5A	12.67	136	35	82							
					Extremely soft gray & dark gray organic clay w/organic matter, clay lenses, trace of humus pockets, & roots	OH	5B	13.67	217	24	75				172	44	128	ORG = 10.3%
15					Extremely soft gray & dark gray clay w/organic matter, wood, & trace of shell fragments	CH	6A	14.67	139	34	82				99	22	77	
					Extremely soft gray organic clay w/humus pockets	OH	6B	15.67	208	25	78							
					w/wood & gray clay layers		7A	16.67	138	37	89				119	29	90	
					Extremely soft dark gray & gray humus w/wood & trace of shell fragments	Pt	7B	17.67	238	24	81							
					Extremely soft dark gray & gray organic clay w/gray clay layers, wood, & trace of shell fragments	OH	8A	18.67	156	33	86				180	34	146	
20					Very loose gray silt w/fine sand & clay lenses	ML	8B	19.67	30	85	110							-#200 = 87.4% PD
25																		

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

LOG OF BORING AND TEST RESULTS

Boring: BA-10

Project No: 24431
Date: 09/03/2020
Latitude: 29.80827°
Longitude: -89.81782°

Water Depth: See Text
Total Depth: 21.9 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Other Tests
0					5'11" Water		NS	0										
5					Extremely soft gray clay w/silt pockets, organic matter, shell fragments, roots, & dark gray organic clay	CH	1A	5.92	156	35	90				151	24	127	
							NS	6.92										
					No sample													
					Extremely soft gray clay w/silt pockets, shell fragments, & roots	CH	2A	7.92	67	62	103				151	26	125	
					w/silt pockets & shell fragments		2B	8.92	74	59	103							
10					w/few silt pockets, roots, & shell fragments		3A	9.92	68	63	105							
					w/shell fragments & sand pockets		3B	10.92	57	63	100				67	17	50	
					w/silty sand pockets, shell fragments, organic matter pockets, & thin lenses		4A	11.92	70	60	102				80	17	63	-#200 = 72.1% PD
					Extremely soft gray & dark gray clay w/silty sand pockets & wood	CH	4B	12.92	122	39	85							
					w/few silt pockets, wood, & shell fragments		5A	13.92	101	47	94				132	27	105	
15					w/few silt pockets & shell fragments		5B	14.92	116	44	94							
					w/silt pockets, wood, & trace of shell fragments		6A	15.92	89	47	89				138	40	98	
					w/silt pockets, wood, & shell fragments		6B	16.92	113	44	94							
					Extremely soft gray & tan clay w/few organic clay pockets & shell fragments	CH	7A	17.92	158	35	91				124	29	95	ORG = 9.0%
					Extremely soft gray & tan clay w/few silt, organic clay pockets, & shell fragments	CH	7B	18.92	144	40	98							
20					Extremely soft gray & tan organic clay w/gray clay lenses, organic matter, & shell fragments	OH	8A	19.92	136	39	92				196	26	170	
						OH	8B	20.92	167	37	99							
					Extremely soft gray & dark gray organic clay w/organic matter, shell fragments, & wood														
25																		

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NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

Boring: BA-11

Project No: 24431
Date: 09/03/2020
Latitude: 29.81217°
Longitude: -89.81735°

Water Depth: See Text
Total Depth: 19.3 ft

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					3'4" Water		NS	0											
					Extremely soft gray clay w/few silty clay pockets, shell fragments, & organic matter	CH	1A	3.33	79	57	103				123	21	102		
							1B	4.33	253	24	84								ORG = 15.5%
5					Extremely soft gray & brown organic clay w/organic matter, shell fragments, & trace of silty clay lenses	OH	2A	5.33	288	24	93				231	57	174		
					Extremely soft gray & brown humus w/clay layers, shell fragments, & trace of decayed wood	Pt	2B	6.33	58	62	98								
					Extremely soft gray silty clay w/silt pockets & organic matter	CL	3A	7.33	80	50	91				57	19	38		
					Extremely soft gray clay w/silt pockets, shell fragments, & trace of roots	CH	3B	8.33	60	68	108								
					w/silt pockets & shell fragments		4A	9.33	70	61	103				147	47	100		
10					w/few silt pockets, shell fragments, & roots		4B	10.33											
					No sample		5A	11.33	76	56	99				57	19	38		-#200 = 83.7% PD
					Extremely soft gray clay w/silt pockets, shell fragments, & trace of wood	CH	5B	12.33	122	37	82								
					w/silt pockets, shell fragments, & trace of wood		6A	13.33	140	36	85				116	38	78		
					Extremely soft dark gray & gray clay w/organic clay layers, silt pockets, organic matter, wood, & shell fragments	CH	6B	14.33	207	27	82								ORG = 11.9%
15					Extremely soft gray & brown organic clay w/shell fragments & decayed wood	OH	7A	15.33	97	46	91				150	32	118		
					w/few silty sand pockets, shell fragments, wood, & trace of clay lenses		7B	16.33	133	37	86								
					Very soft gray clay w/few silty sand pockets, shell fragments, & wood	CH	8A	17.33	188	30	88								
					Very soft gray & brown organic clay w/silt pockets, wood, & shell fragments	OH	8B	18.33	64	61	100				94	30	64		
					Very soft gray clay w/trace of silt pockets	CH													
20																			
25																			

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

LOG OF BORING AND TEST RESULTS

Boring: BA-12

Project No: 24431
Date: 09/03/2020
Latitude: 29.80765°
Longitude: -89.82345°

Water Depth: See Text
Total Depth: 21.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Other Tests
0					5' Water		NS	0										
5					Extremely soft gray clay w/silt pockets, shell fragments, & roots	CH	1A	5	101	41	83				96	21	75	
					w/silt pockets & shell fragments		1B	6	75	58	102							
					w/silt pockets & shell fragments		2A	7	122	44	99				58	21	37	
					w/silt pockets & shell fragments		2B	8	75	58	102							
10					Extremely soft gray clay w/silty sand pockets & shell fragments	CH	3A	9	86	59	109				54	18	36	-#200 = 97.8% PD
					w/silty sand pockets & shell fragments		3B	10	91	56	107							
					w/silty sand pockets & shell fragments		4A	11	83	55	101				80	18	62	
					w/silty sand pockets & shell fragments		4B	12	86	57	105							
					Extremely soft gray clay w/silt pockets, wood, & shell fragments	CH	5A	13	96	49	95				61	20	41	
					w/silt pockets, wood, & shell fragments		5B	14	57	67	105							
15					Extremely soft gray clay w/silty clay lenses, shell fragments, organic matter, & wood	CH	6A	15	70	58	99				71	17	54	
					Extremely soft gray silty clay w/clay pockets, shell fragments, organic matter, & wood	CL	6B	16	84	52	97							-#200 = 99.6% PD
					Extremely soft gray clay w/few silt pockets, organic matter, & shell fragments	CH	7A	17	70	67	114				79	26	53	
					w/trace of silt pockets, shell fragments, & concretions		7B	18	76	56	99							
20					w/few silty sand pockets, wood, & shell fragments		8A	19	94	57	111				73	19	54	
					w/few silty sand pockets, wood, & shell fragments		8B	20	97	52	102							
25																		

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Mudline Surface Elevation from the completed site survey is furnished in Appendix II. Elevations in Appendix II are based on water depth and water surface elevation measured in the field.

EUSTIS ENGINEERING SINCE 1946

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

LOG OF BORING AND TEST RESULTS

Boring: TB-4

Project No: 24431
Date: 11/09/2020
Latitude: 29.76813°
Longitude: -89.78839°

Elevation: 1.1
Datum: NAVD88
Water Depth: See Text
Total Depth: 40.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Other Tests
0					Soft brown silty clay w/roots, gravel, & shell fragments	CL	PB-1	0	39									
							2A	0.5	24									
							2B	1.5	32	85	113	UC	--	387	74	28	46	
					Stiff gray & brown clay w/shell fragments, silty sand pockets, & organic matter	CH	3A	2	30										
	1.50						NS	3										
5							4A	4	41	79	112	OB	0	357	58	28	30	
	1.25				Geotextile reinforcements		NS	5										
					Soft gray & brown silty clay w/wood, roots, & trace of clay pockets	CL	5A	6	47									
	1.00						NS	7										
					Soft gray silty clay w/silty sand pockets & trace of decayed wood	CL	6A	8	55	66	103	OB	0	301	64	20	44	
							6B	9	43	80	114	OB	0	311	43	15	28	
10							PB-7	10	36									
					Soft gray clay w/few silty sand pockets & trace of decayed wood (flocculated)	CH	8A	12	75	55	96	OB	0	303	98	28	70	
	0.50						8B	13	81									
					Soft black organic clay w/decayed wood & trace of gray clay pockets	OH	9A	14	188	32	91	OB	0	315	138	36	102	ORG = 16.3%
15					Soft gray & tan clay w/silt pockets, organic matter, & decayed wood	CH	9B	15	68									
							10A	16	73	56	98	OB	0	266	94	22	72	
					Soft gray silty clay w/few silty sand pockets & lenses, & few decayed wood	CL	10B	17	80									
							11A	18	40									
					Loose gray clayey silt w/fine sand, trace clay layers, & trace of shell fragments	ML	11B	19	32									-#200 = 76.7% SV
20																		
							12A	23	33									-#200 = 75.0%
25							12B	24	35									

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Ground Surface Elevation from survey furnished in Appendix II.

EUSTIS ENGINEERING SINCE 1946

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

LOG OF BORING AND TEST RESULTS

Boring: TB-4

Project No: 24431
Date: 11/09/2020
Latitude: 29.76813°
Longitude: -89.78839°

Elevation: 1.1
Datum: NAVD88
Water Depth: See Text
Total Depth: 40.0 ft

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Other Tests
25					Stiff gray clay w/few silt pockets & lenses, & trace of shell fragments	CH												
	0.50						13A	28	83	53	96	UC	--	222	100	29	71	
30							13B	29	80	54	97	OB	0	438				
					Stiff gray & brown organic clay w/trace of organic matter	OH												
							14A	33	150									ORG = 48.1%
	0.50				Medium stiff gray & brown clay w/trace of silt pockets & organic matter	CH	14B	34	111									
35																		
					Soft gray clay w/few silt pockets & trace of organic mater	CH												
							15A	38	76									
40							15B	39	56	65	102	OB	0	460	63	20	43	
45																		
50																		

EUSTIS GINT LIBRARY102620 H0013.GLB EE STANDARD BORING LOG 24431.GPJ 12/11/20

NOTES: Ground Surface Elevation from survey furnished in Appendix II.

APPENDIX IV
CONE PENETRATION TEST RESULTS

EUSTIS
ENGINEERING
SINCE 1946

CONE PENETRATION
SOIL BEHAVIOR TYPE LEGEND

*OVERCONSOLIDATED OR CEMENTED

EUSTIS ENGINEERING SINCE 1946

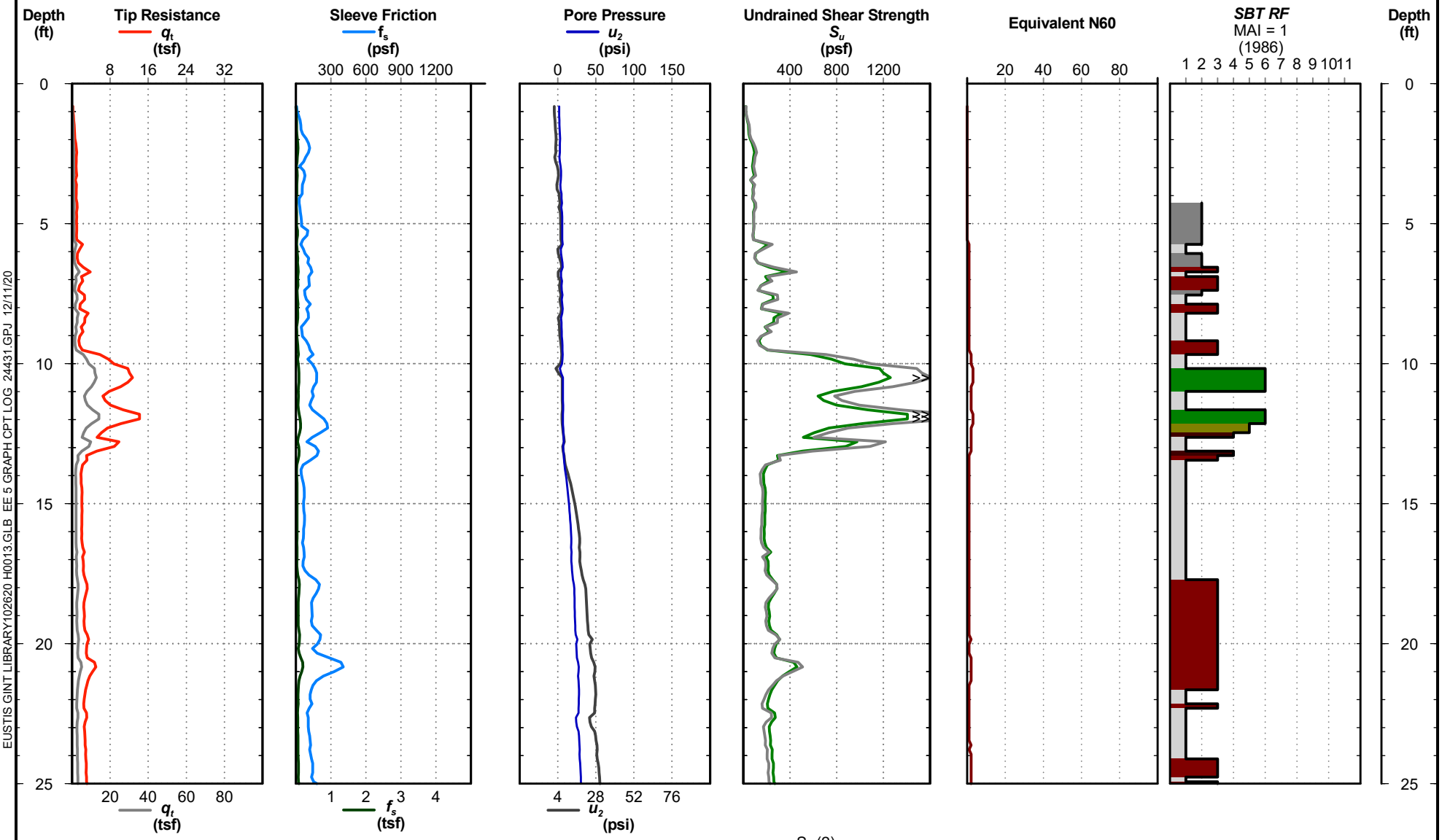
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-1

Project No: 24431
Date: 09/11/2020
Latitude: 29.77758°
Longitude: -89.77368°
CPT ID: DTA1043

Est. Water Depth: 0.0 ft
Total Depth: 30.2 ft
Operator: G. Reitmeyer



EUSTIS GINT LIBRARY102620 H0013.GLB EE 5 GRAPH CPT LOG 24431.GPJ 12/11/20

Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

EUSTIS ENGINEERING SINCE 1946

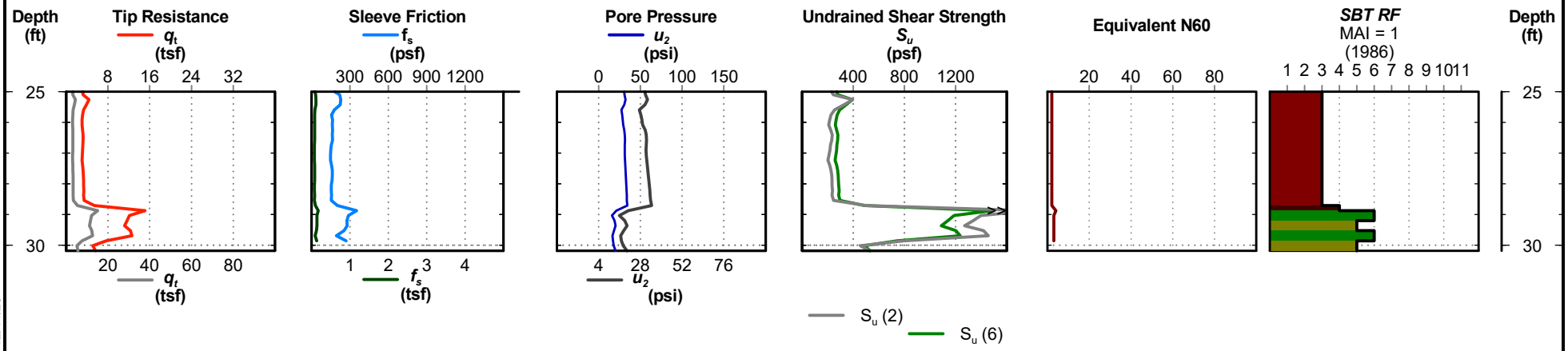
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-1

Project No: 24431
Date: 09/11/2020
Latitude: 29.77758°
Longitude: -89.77368°
CPT ID: DTA1043

Est. Water Depth: 0.0 ft
Total Depth: 30.2 ft
Operator: G. Reitmeyer



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

EUSTIS ENGINEERING SINCE 1946

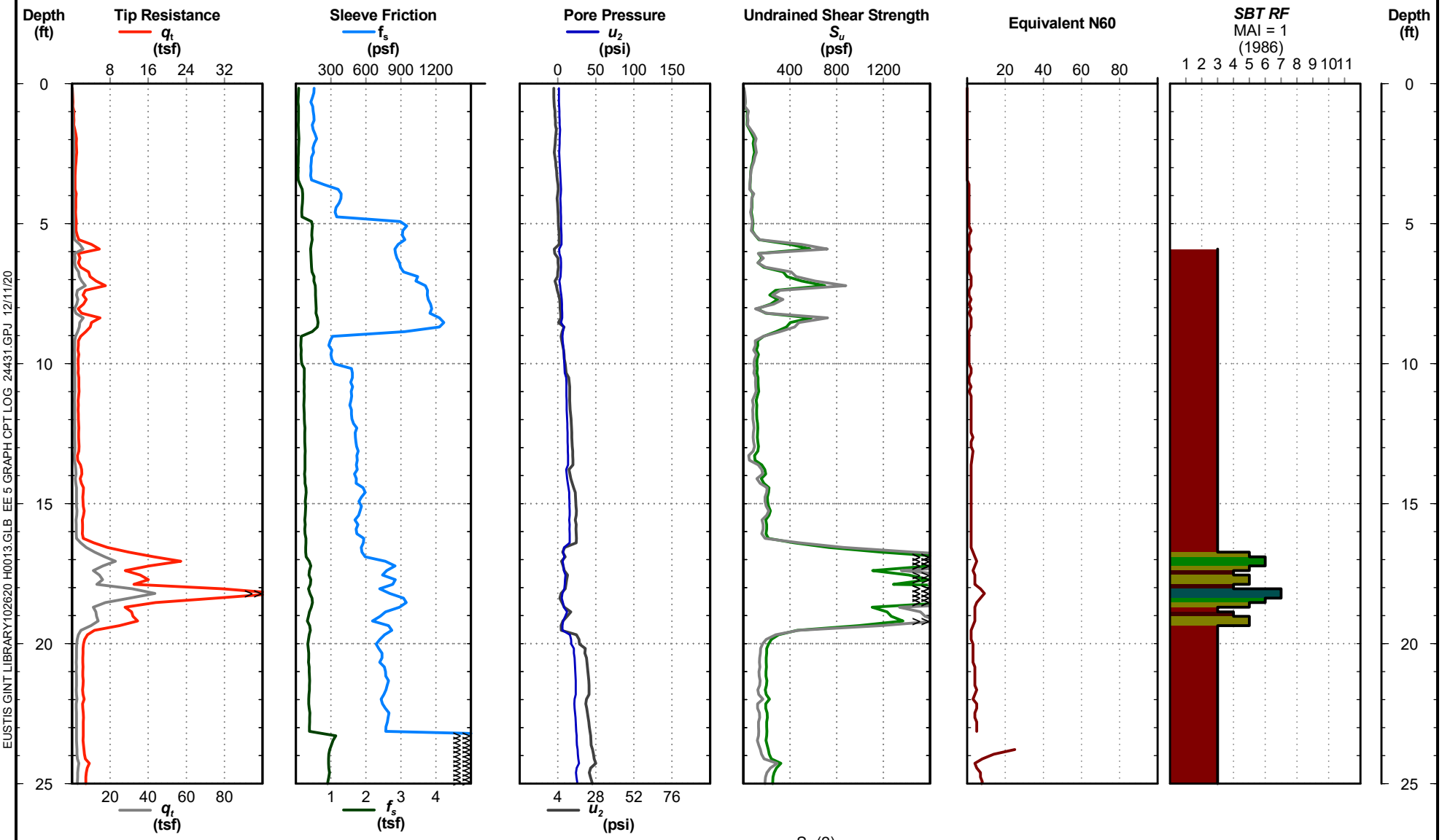
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-2

Project No: 24431
Date: 09/10/2020
Latitude: 29.77178°
Longitude: -89.78012°
CPT ID: DTA1061

Est. Water Depth: 0.0 ft
Total Depth: 29.9 ft
Operator: G. Reitmeyer



EUSTIS GINT LIBRARY102620 H0013.GLB EE 5 GRAPH CPT LOG 24431.GPJ 12/11/20

Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

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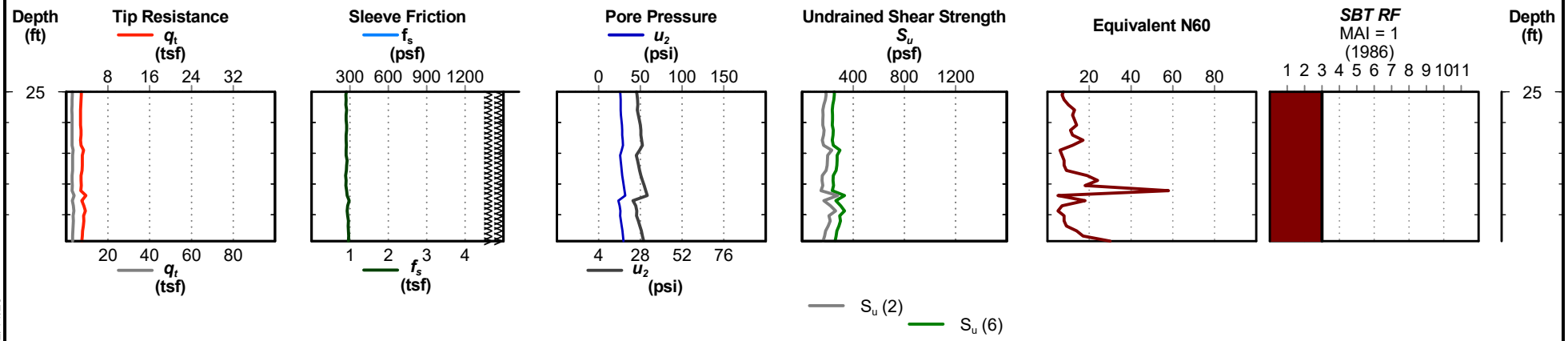
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-2

Project No: 24431
Date: 09/10/2020
Latitude: 29.77178°
Longitude: -89.78012°
CPT ID: DTA1061

Est. Water Depth: 0.0 ft
Total Depth: 29.9 ft
Operator: G. Reitmeyer



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

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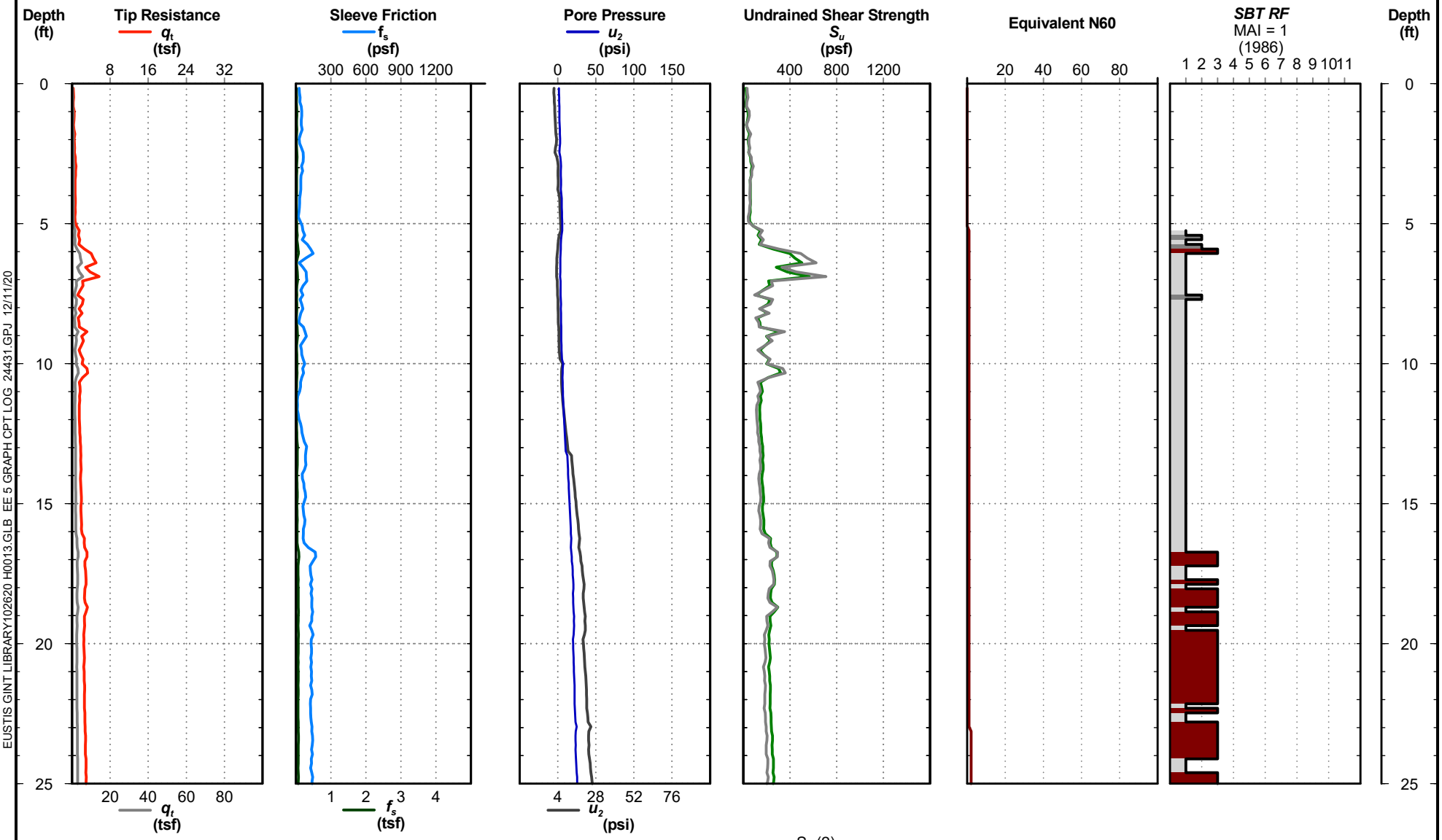
State of Louisiana Coastal Protection
and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-3x

Project No: 24431
Date: 09/10/2020
Latitude: 29.76560°
Longitude: -89.78326°
CPT ID: DTA1061

Est. Water Depth: 0.0 ft
Total Depth: 30.0 ft
Operator: G. Reitmeyer



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

Electronic Filename: 24431CPT-3x.cpt

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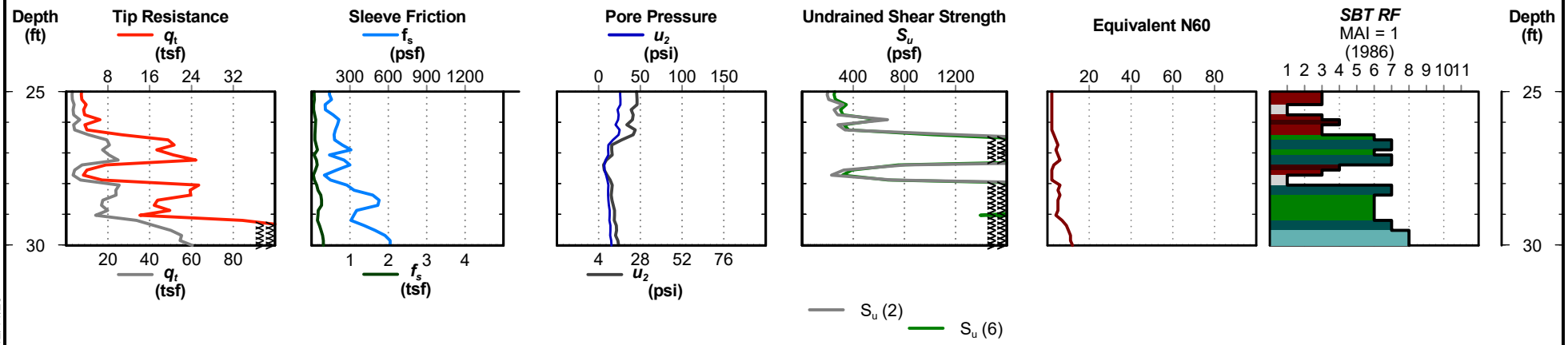
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-3x

Project No: 24431
Date: 09/10/2020
Latitude: 29.76560°
Longitude: -89.78326°
CPT ID: DTA1061

Est. Water Depth: 0.0 ft
Total Depth: 30.0 ft
Operator: G. Reitmeyer



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

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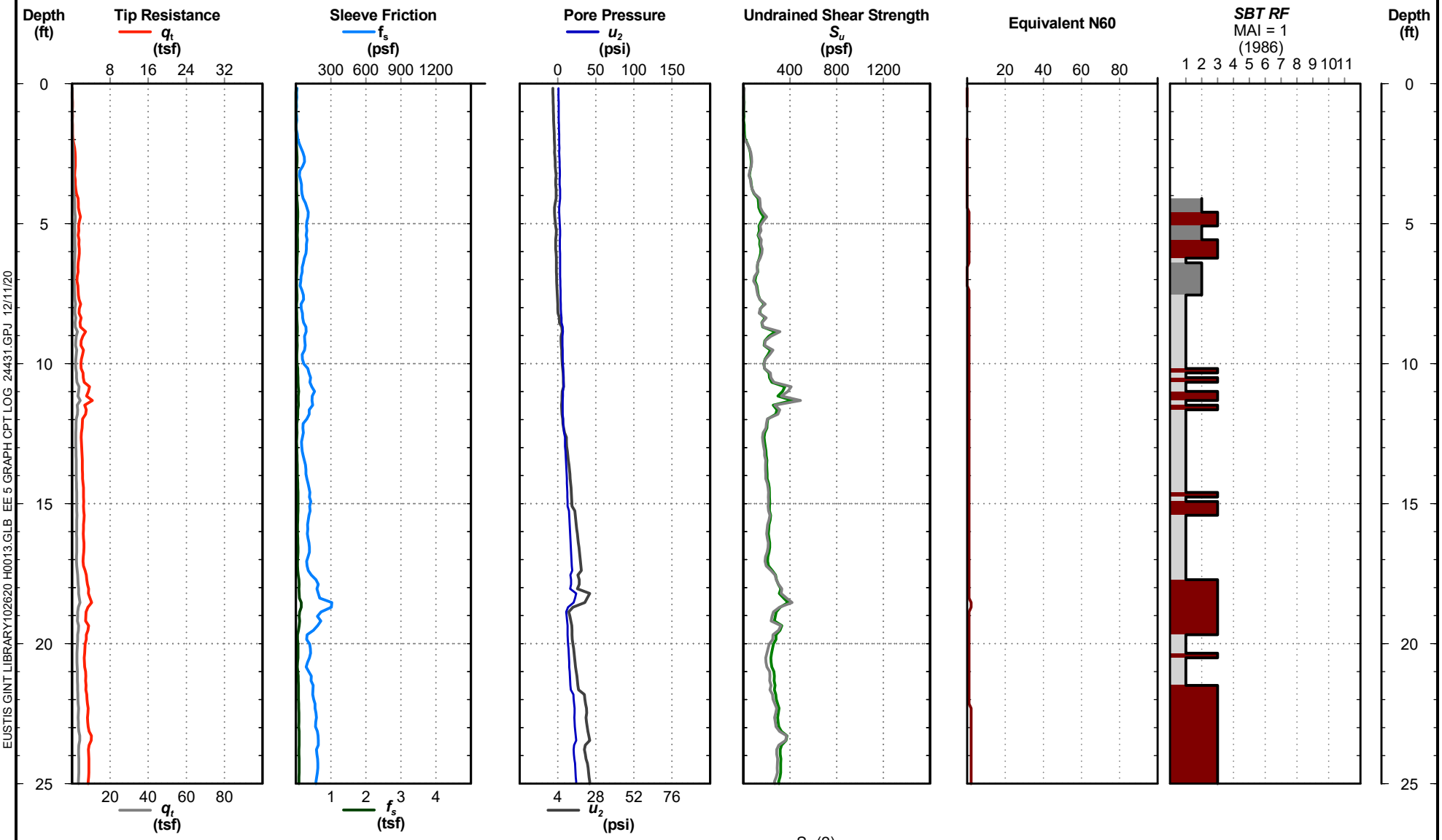
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-4

Project No: 24431
Date: 09/10/2020
Latitude: 29.76109°
Longitude: -89.78229°
CPT ID: DTA1061

Est. Water Depth: 0.0 ft
Total Depth: 30.0 ft
Operator: G. Reitmeyer



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

Electronic Filename: 24431CPT-4.cpt

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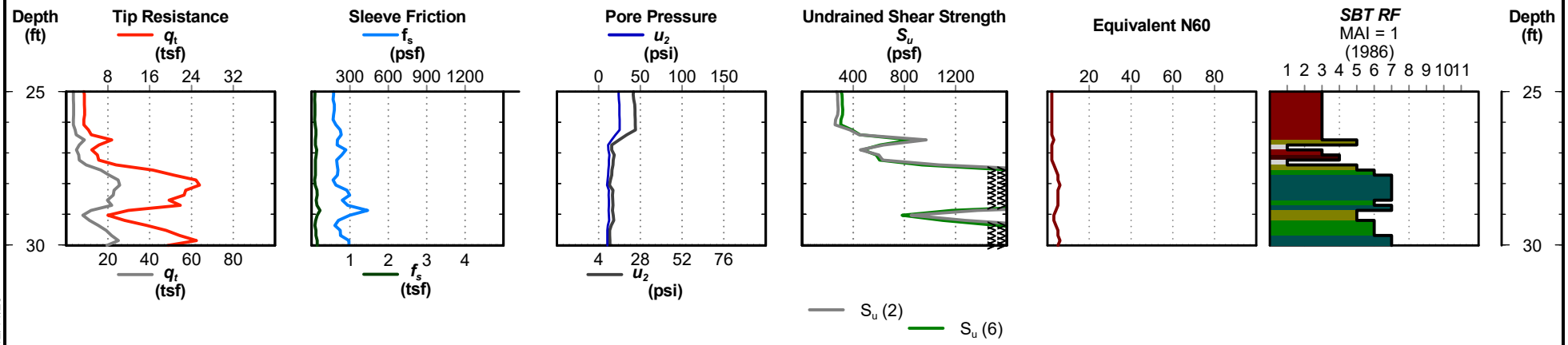
State of Louisiana Coastal Protection
and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-4

Project No: 24431
Date: 09/10/2020
Latitude: 29.76109°
Longitude: -89.78229°
CPT ID: DTA1061

Est. Water Depth: 0.0 ft
Total Depth: 30.0 ft
Operator: G. Reitmeyer



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

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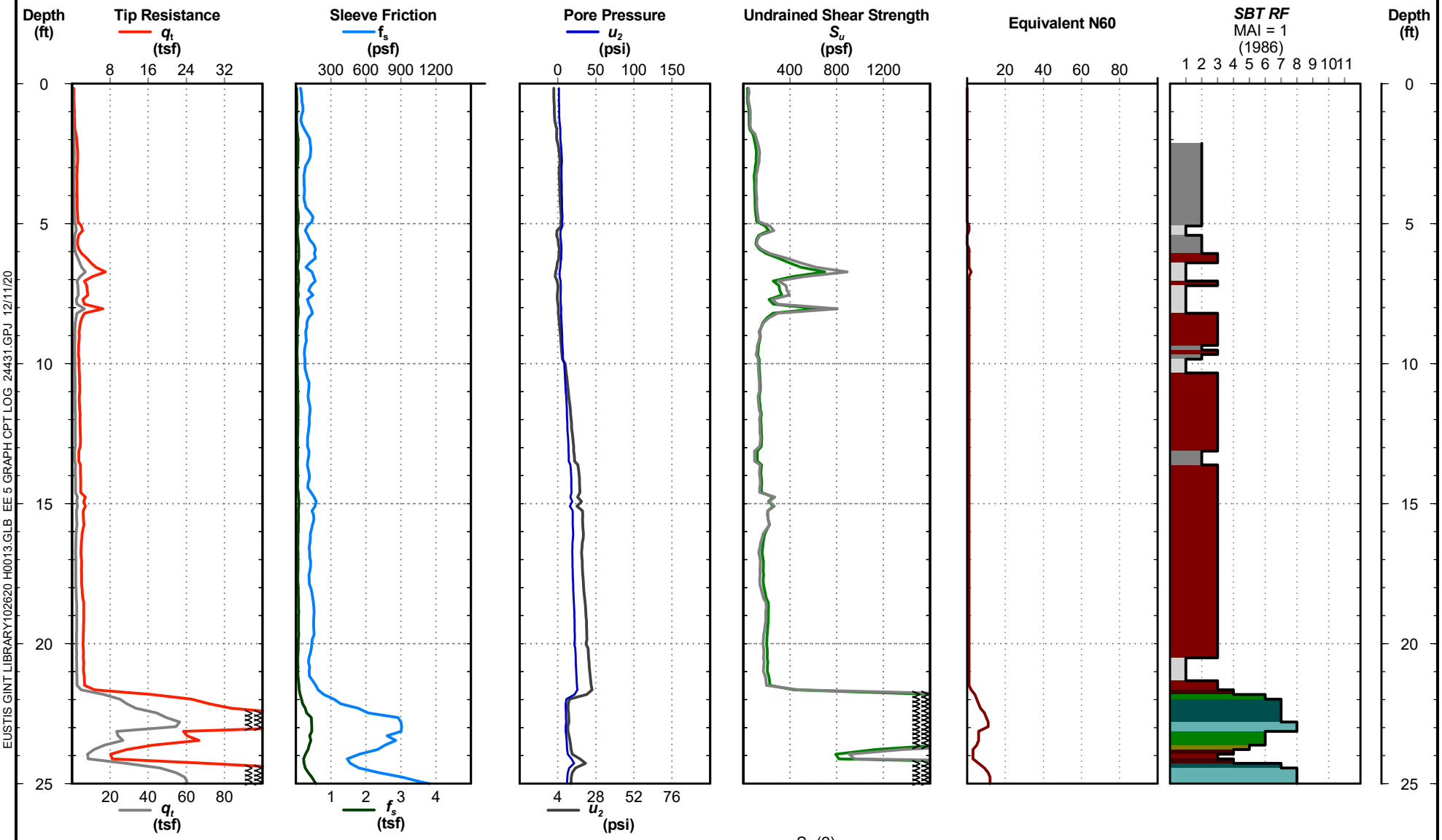
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-5x

Project No: 24431
Date: 09/11/2020
Latitude: 29.76407°
Longitude: -89.78116°
CPT ID: DTA1043

Est. Water Depth: 0.0 ft
Total Depth: 29.9 ft
Operator: G. Reitmeyer



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

Electronic Filename: 24431CPT-5x.cpt

EUSTIS ENGINEERING SINCE 1946

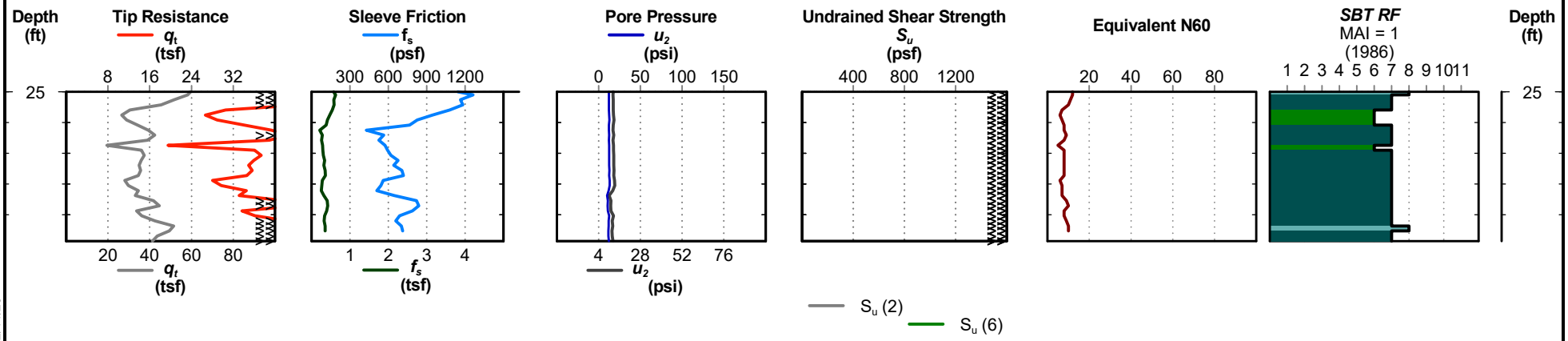
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-5x

Project No: 24431
Date: 09/11/2020
Latitude: 29.76407°
Longitude: -89.78116°
CPT ID: DTA1043

Est. Water Depth: 0.0 ft
Total Depth: 29.9 ft
Operator: G. Reitmeyer



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

Electronic Filename: 24431CPT-5x.cpt

EUSTIS ENGINEERING SINCE 1946

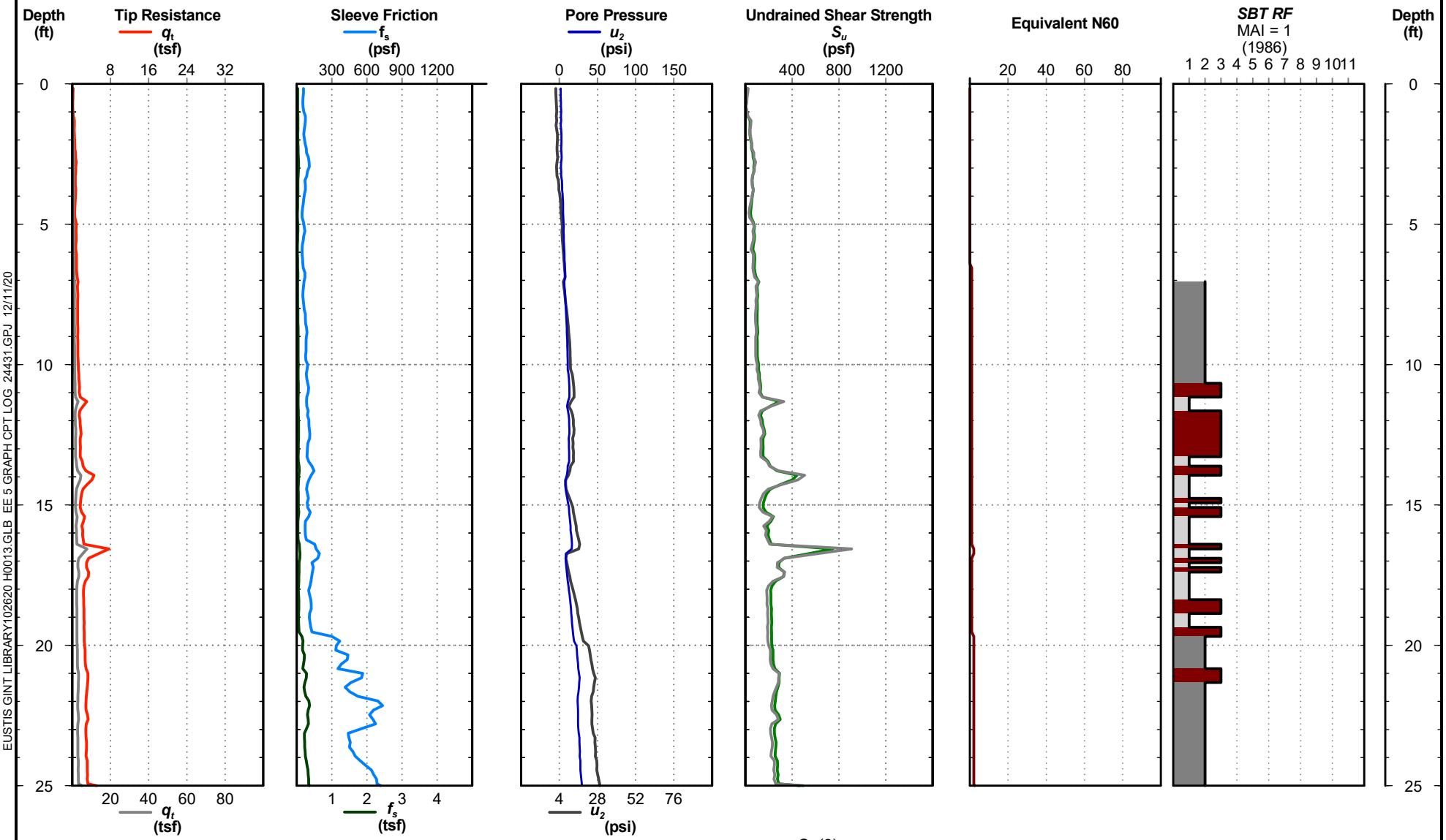
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-6

Project No: 24431
Date: 09/10/2020
Latitude: 29.76908°
Longitude: -89.77830°
CPT ID: DTA1061

Est. Water Depth: 0.0 ft
Total Depth: 30.0 ft
Operator: G. Reitmeyer



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

Electronic Filename: 24431CPT-6.cpt

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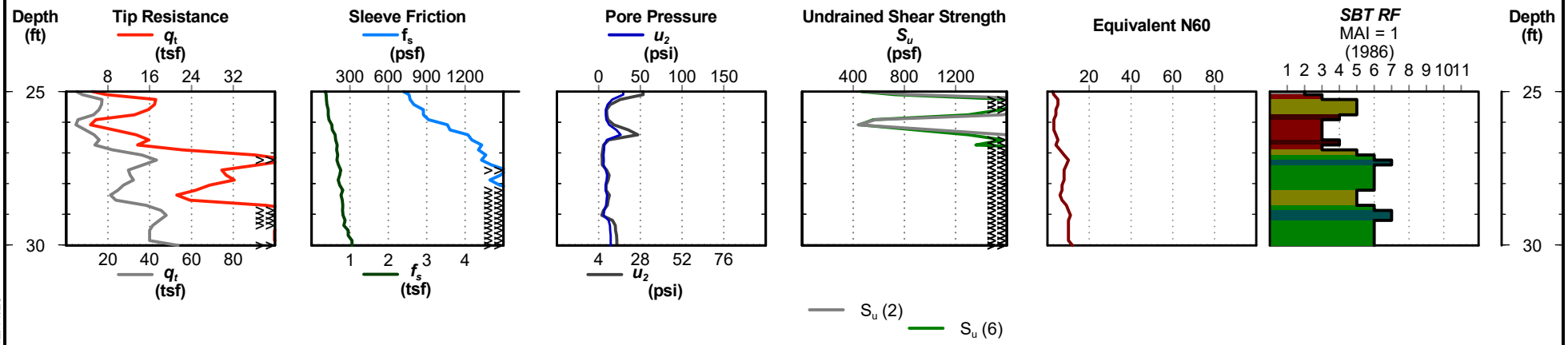
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-6

Project No: 24431
Date: 09/10/2020
Latitude: 29.76908°
Longitude: -89.77830°
CPT ID: DTA1061

Est. Water Depth: 0.0 ft
Total Depth: 30.0 ft
Operator: G. Reitmeyer



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

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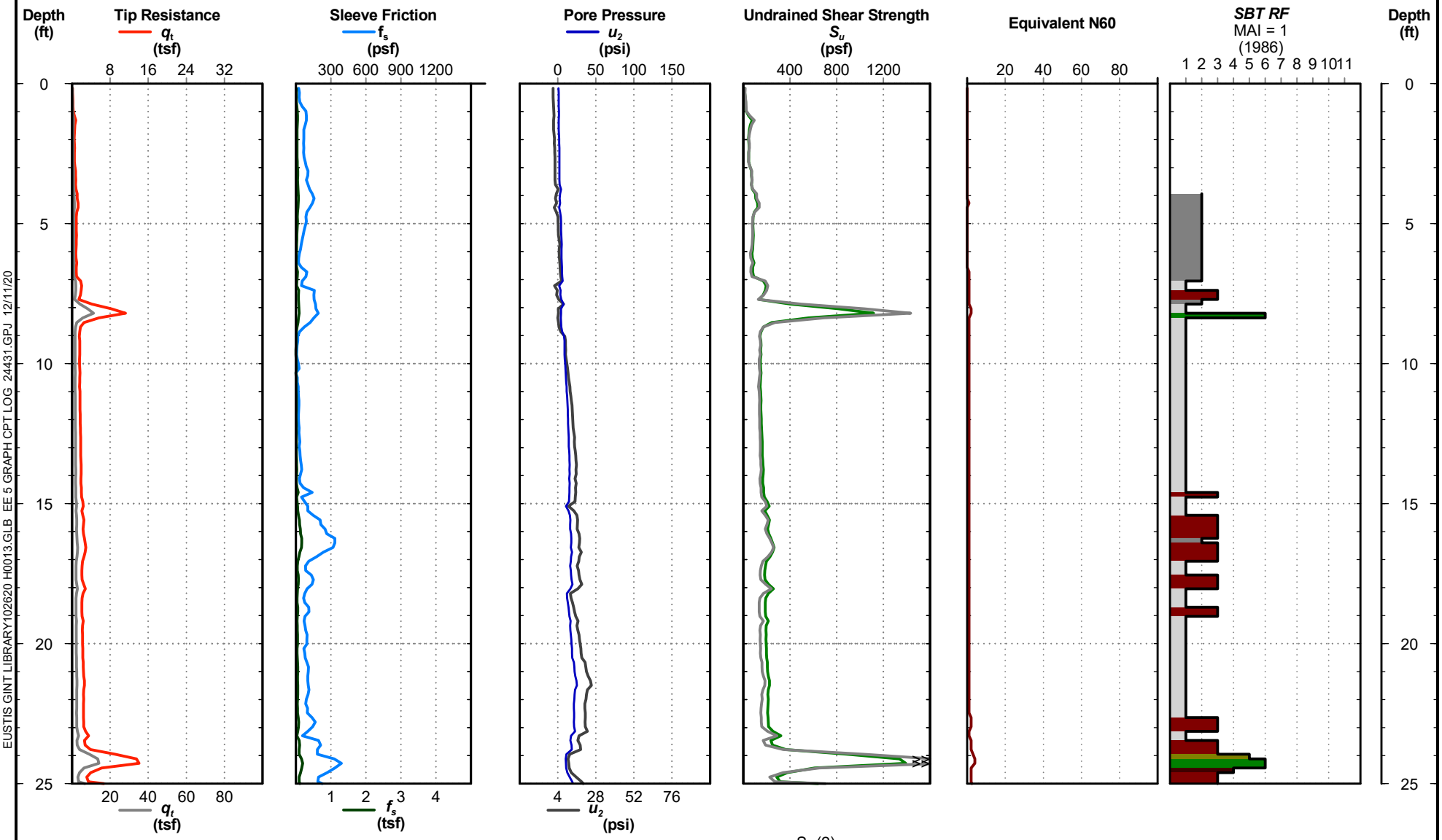
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-7x

Project No: 24431
Date: 09/11/2020
Latitude: 29.77513°
Longitude: -89.77277°
CPT ID: DTA1043

Est. Water Depth: 0.0 ft
Total Depth: 28.2 ft
Operator: G. Reitmeyer



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

Electronic Filename: 24431CPT-7x.cpt

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SINCE 1946

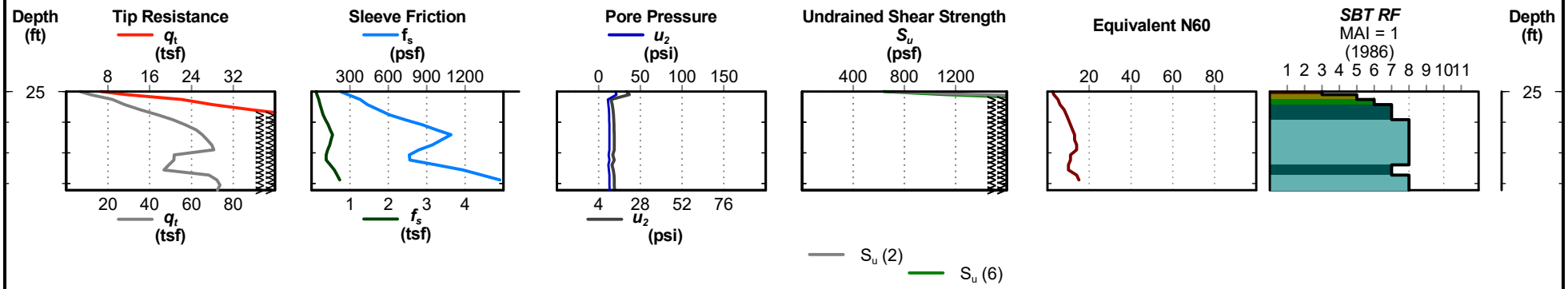
State of Louisiana Coastal Protection
and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-7x

Project No: 24431
Date: 09/11/2020
Latitude: 29.77513°
Longitude: -89.77277°
CPT ID: DTA1043

Est. Water Depth: 0.0 ft
Total Depth: 28.2 ft
Operator: G. Reitmeyer



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

EUSTIS ENGINEERING SINCE 1946

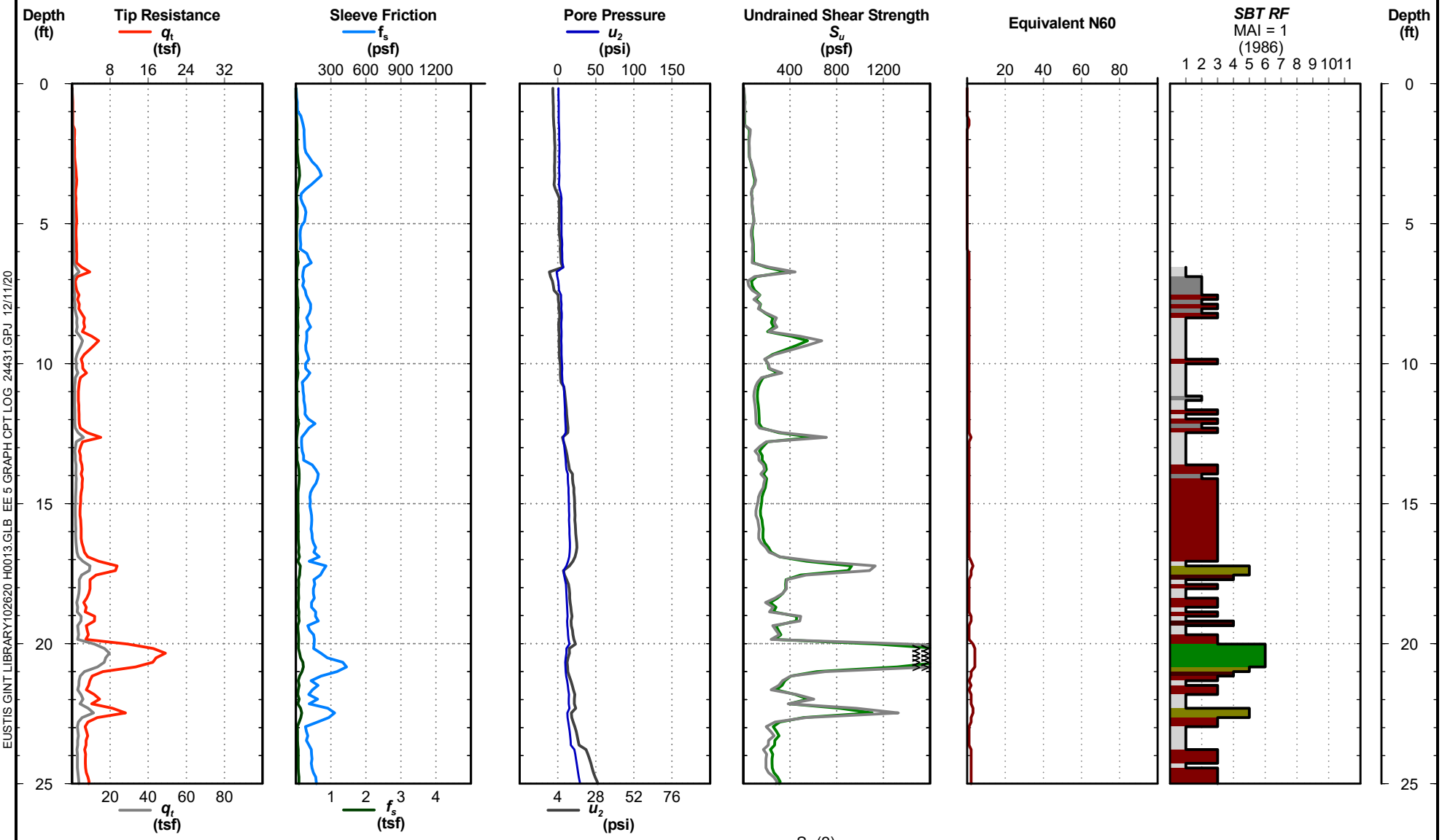
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-8

Project No: 24431
Date: 09/11/2020
Latitude: 29.77513°
Longitude: -89.77277°
CPT ID: DTA1043

Est. Water Depth: 0.0 ft
Total Depth: 30.0 ft
Operator: G. Reitmeyer



EUSTIS GINT LIBRARY102620 H0013.GLB EE 5 GRAPH CPT LOG 24431.GPJ 12/11/20

Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

EUSTIS ENGINEERING SINCE 1946

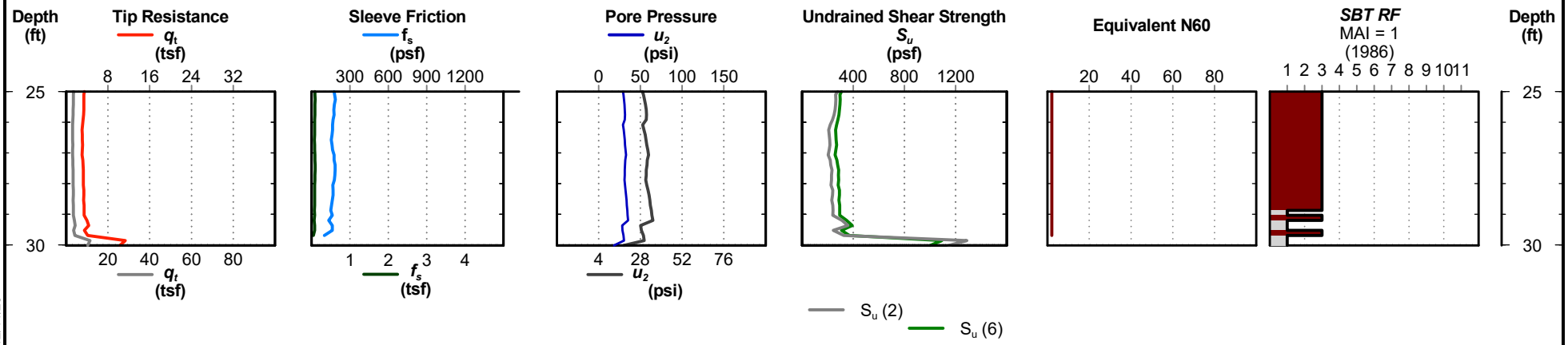
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-8

Project No: 24431
Date: 09/11/2020
Latitude: 29.77513°
Longitude: -89.77277°
CPT ID: DTA1043

Est. Water Depth: 0.0 ft
Total Depth: 30.0 ft
Operator: G. Reitmeyer



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

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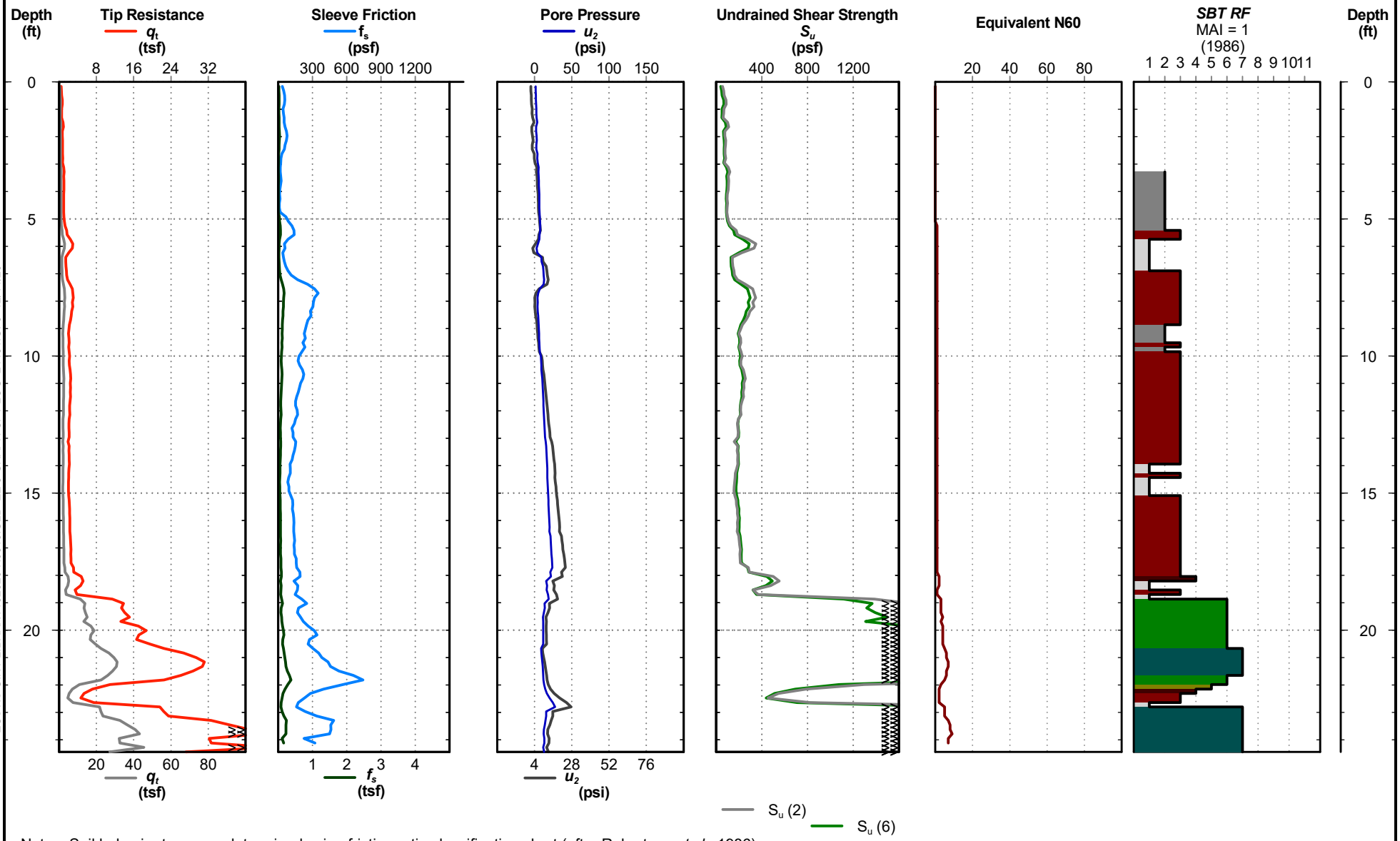
State of Louisiana Coastal Protection
and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-9

Project No: 24431
Date: 09/11/2020
Latitude: 29.77713°
Longitude: -89.76939°
CPT ID: DTA1043

Est. Water Depth: 0.0 ft
Total Depth: 24.4 ft
Operator: G. Reitmeyer



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

Electronic Filename: 24431CPT-9.cpt

EUSTIS ENGINEERING SINCE 1946

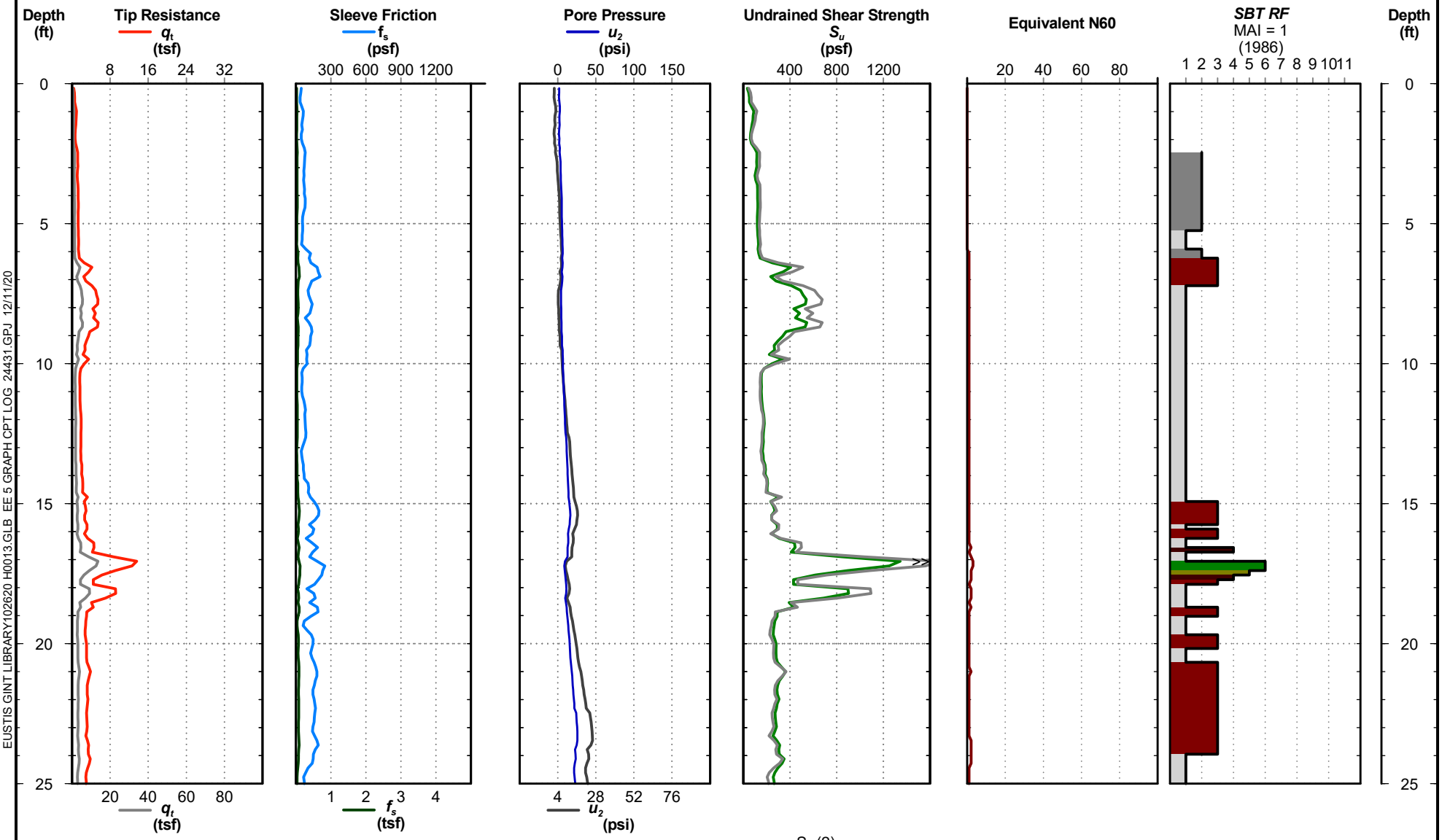
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-10

Project No: 24431
Date: 09/11/2020
Latitude: 29.78101°
Longitude: -89.77379°
CPT ID: DTA1043

Est. Water Depth: 0.0 ft
Total Depth: 30.0 ft
Operator: G. Reitmeyer



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

Electronic Filename: 24431CPT-10.cpt

EUSTIS ENGINEERING SINCE 1946

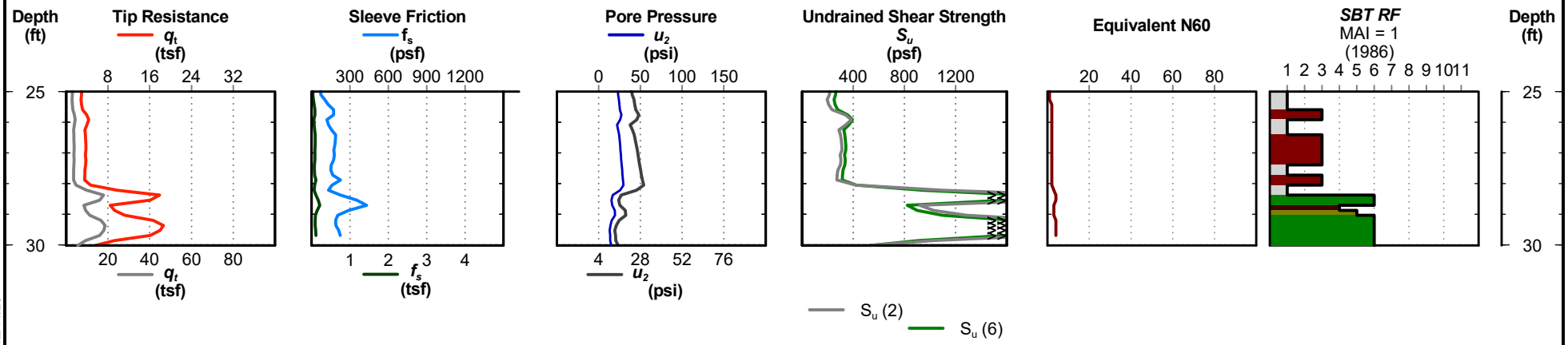
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-10

Project No: 24431
Date: 09/11/2020
Latitude: 29.78101°
Longitude: -89.77379°
CPT ID: DTA1043

Est. Water Depth: 0.0 ft
Total Depth: 30.0 ft
Operator: G. Reitmeyer



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

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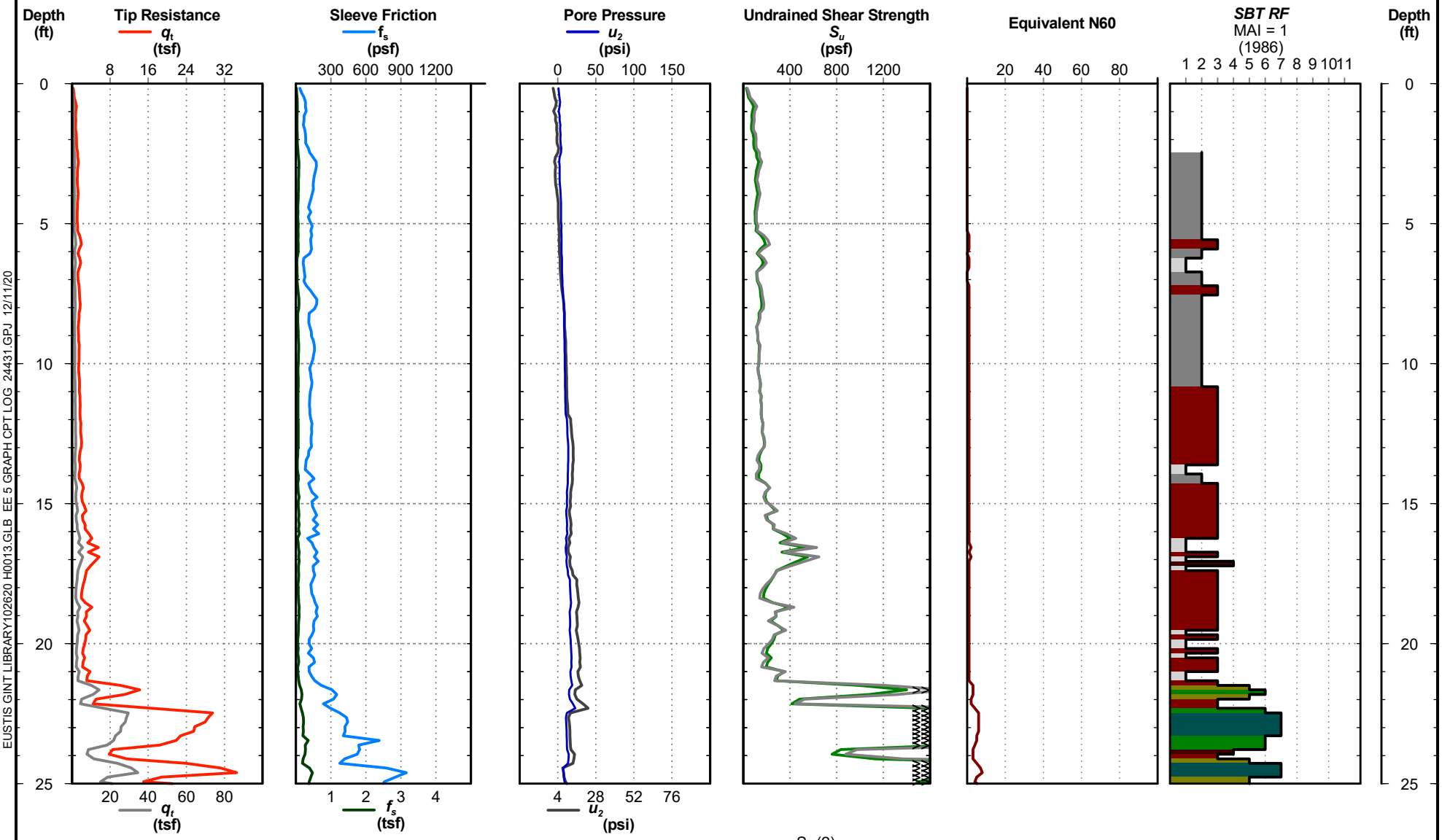
State of Louisiana Coastal Protection
and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-11

Project No: 24431
Date: 09/11/2020
Latitude: 29.78078°
Longitude: -89.76480°
CPT ID: DTA1043

Est. Water Depth: 0.0 ft
Total Depth: 29.2 ft
Operator: G. Reitmeyer



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

Electronic Filename: 24431CPT-11.cpt

EUSTIS ENGINEERING SINCE 1946

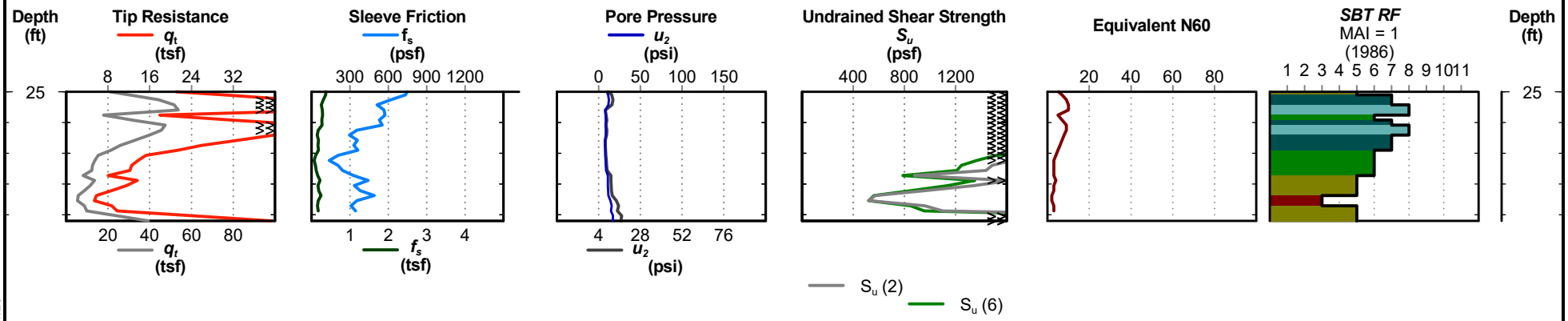
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-11

Project No: 24431
Date: 09/11/2020
Latitude: 29.78078°
Longitude: -89.76480°
CPT ID: DTA1043

Est. Water Depth: 0.0 ft
Total Depth: 29.2 ft
Operator: G. Reitmeyer



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

EUSTIS ENGINEERING SINCE 1946

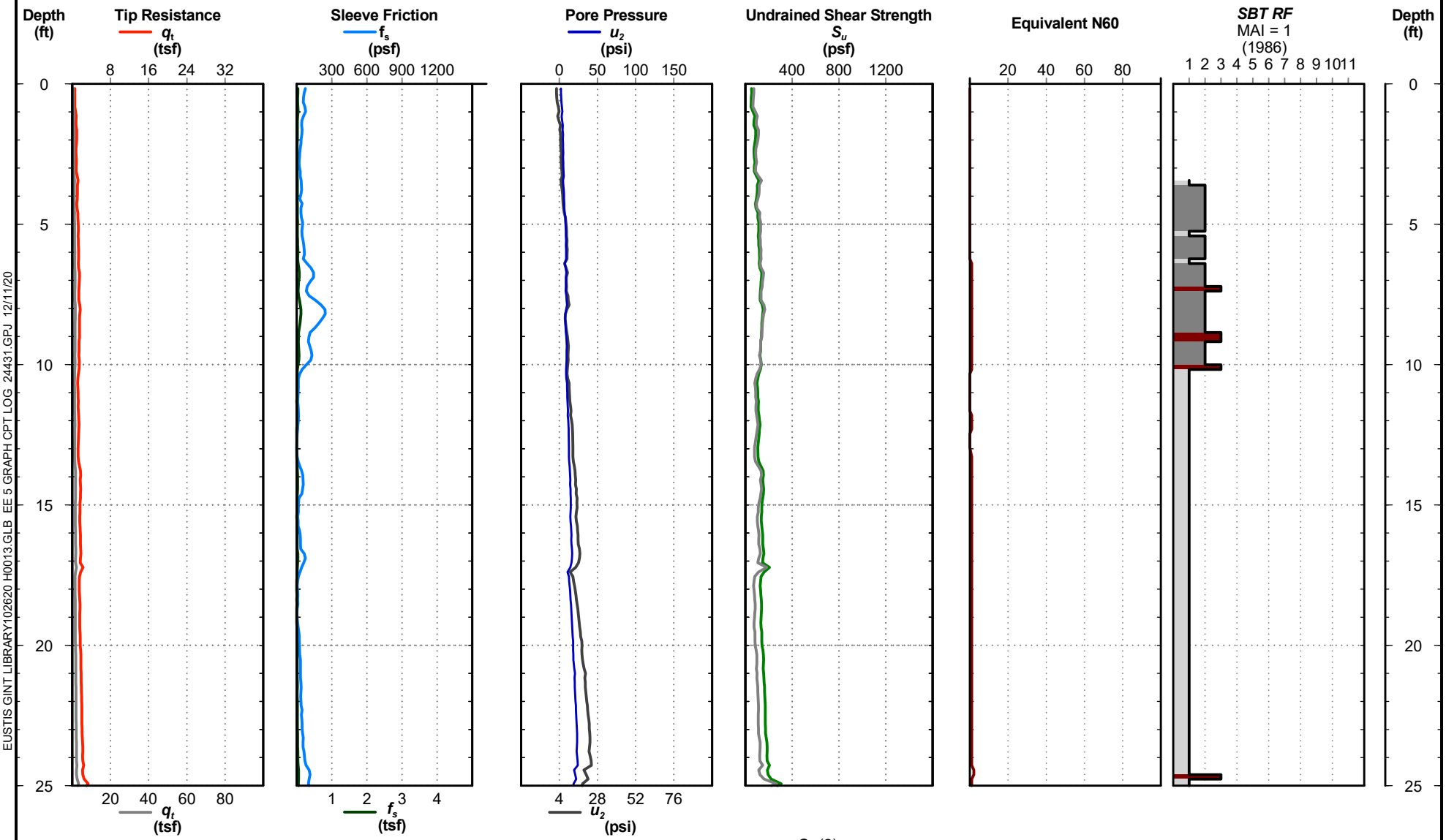
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-12

Project No: 24431
Date: 09/11/2020
Latitude: 29.78279°
Longitude: -89.76216°
CPT ID: DTA1043

Est. Water Depth: 0.0 ft
Total Depth: 30.0 ft
Operator: G. Reitmeyer



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

Electronic Filename: 24431CPT-12.cpt

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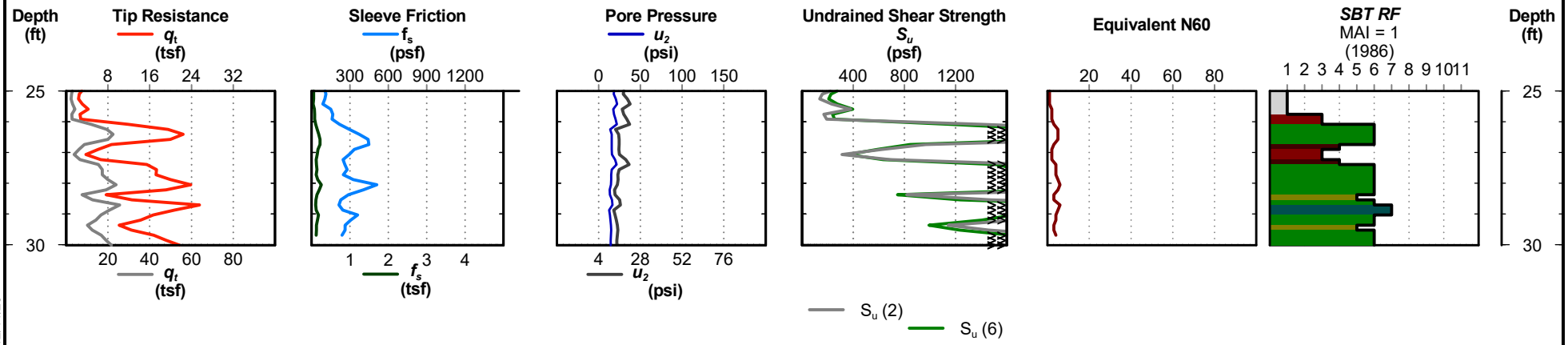
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

CPT-12

Project No: 24431
Date: 09/11/2020
Latitude: 29.78279°
Longitude: -89.76216°
CPT ID: DTA1043

Est. Water Depth: 0.0 ft
Total Depth: 30.0 ft
Operator: G. Reitmeyer



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

EUSTIS ENGINEERING SINCE 1946

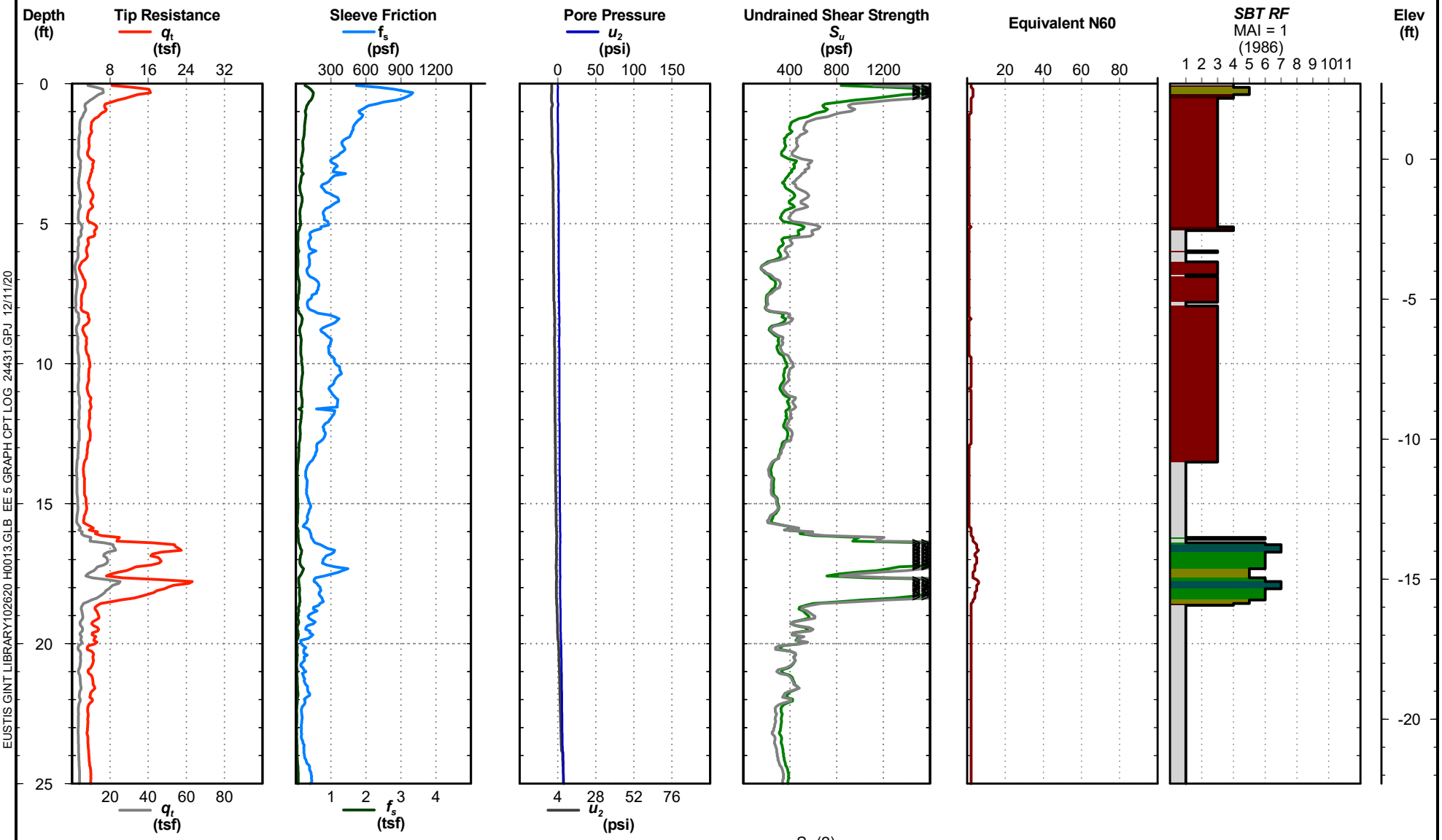
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

LCPT-1

Project No: 24431
Date: 10/21/2020
Latitude: 29.77982°
Longitude: -89.77692°
CPT ID: 5389

Elevation: 2.7
Datum: NAVD88
Est. Water Depth:
Total Depth: 41.6 ft
Operator: ELH



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

Electronic Filename: 24431-LCPT-1.cpt

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EUSTIS ENGINEERING SINCE 1946

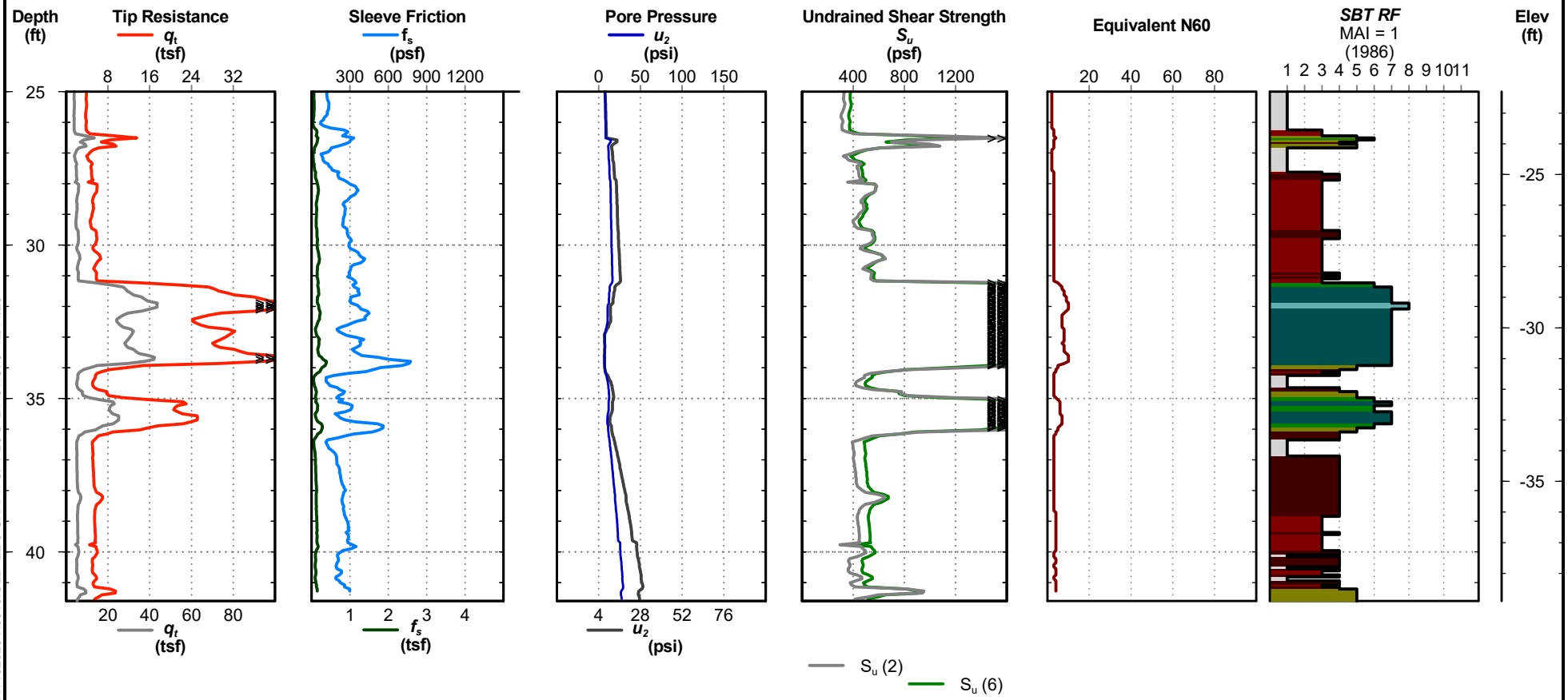
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

LCPT-1

Project No: 24431
Date: 10/21/2020
Latitude: 29.77982°
Longitude: -89.77692°
CPT ID: 5389

Elevation: 2.7
Datum: NAVD88
Est. Water Depth:
Total Depth: 41.6 ft
Operator: ELH



EUSTIS GINT LIBRARY102620 H0013.GLB EE 5 GRAPH CPT LOG 24431.GPJ 12/11/20

Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

Electronic Filename: 24431-LCPT-1.cpt

EUSTIS ENGINEERING SINCE 1946

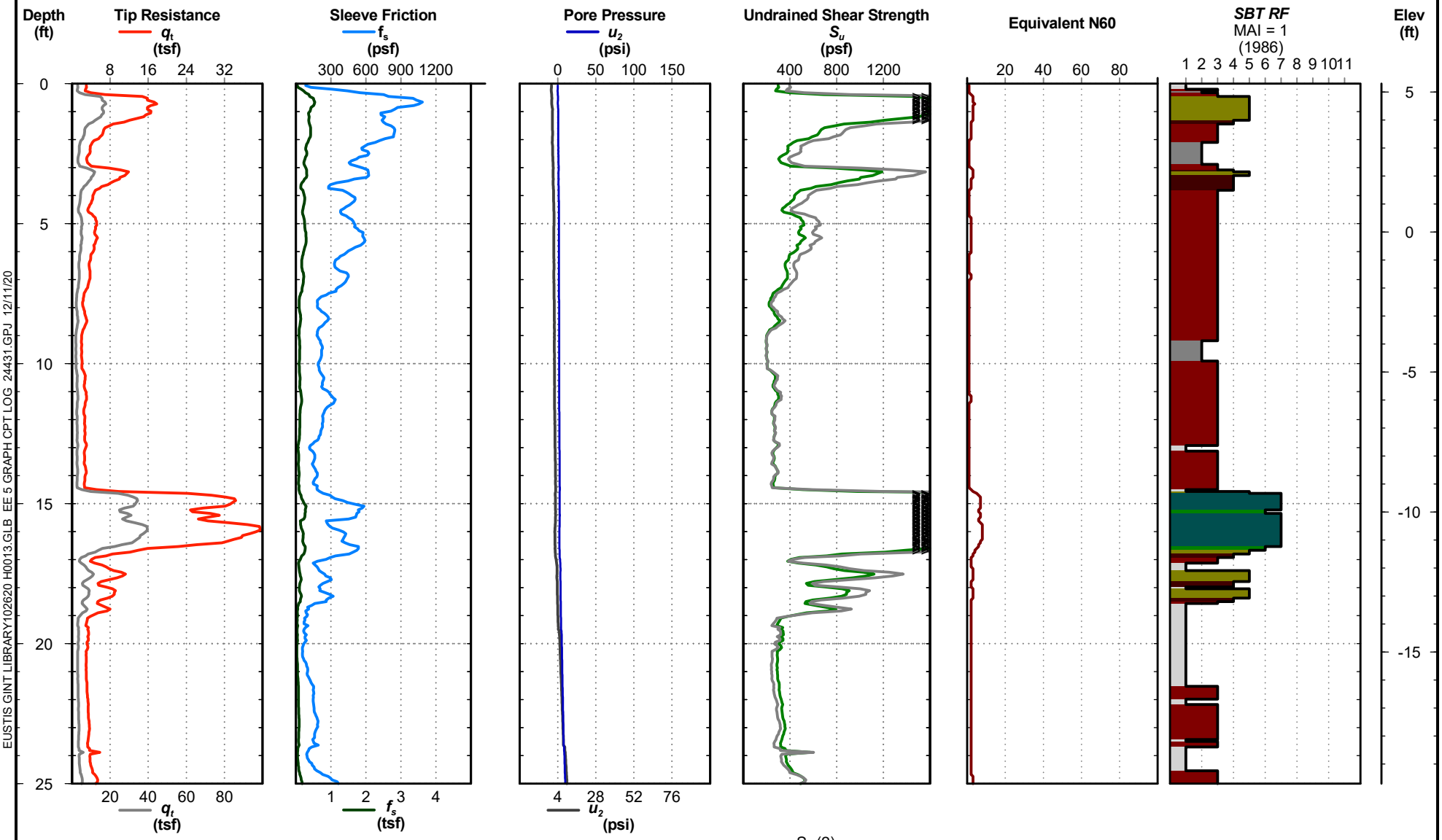
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

LCPT-2

Project No: 24431
Date: 10/21/2020
Latitude: 29.77614°
Longitude: -89.78016°
CPT ID: 5389

Elevation: 5.3
Datum: NAVD88
Est. Water Depth:
Total Depth: 41.5 ft
Operator: ELH



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

Electronic Filename: 24431-LCPT-2.cpt

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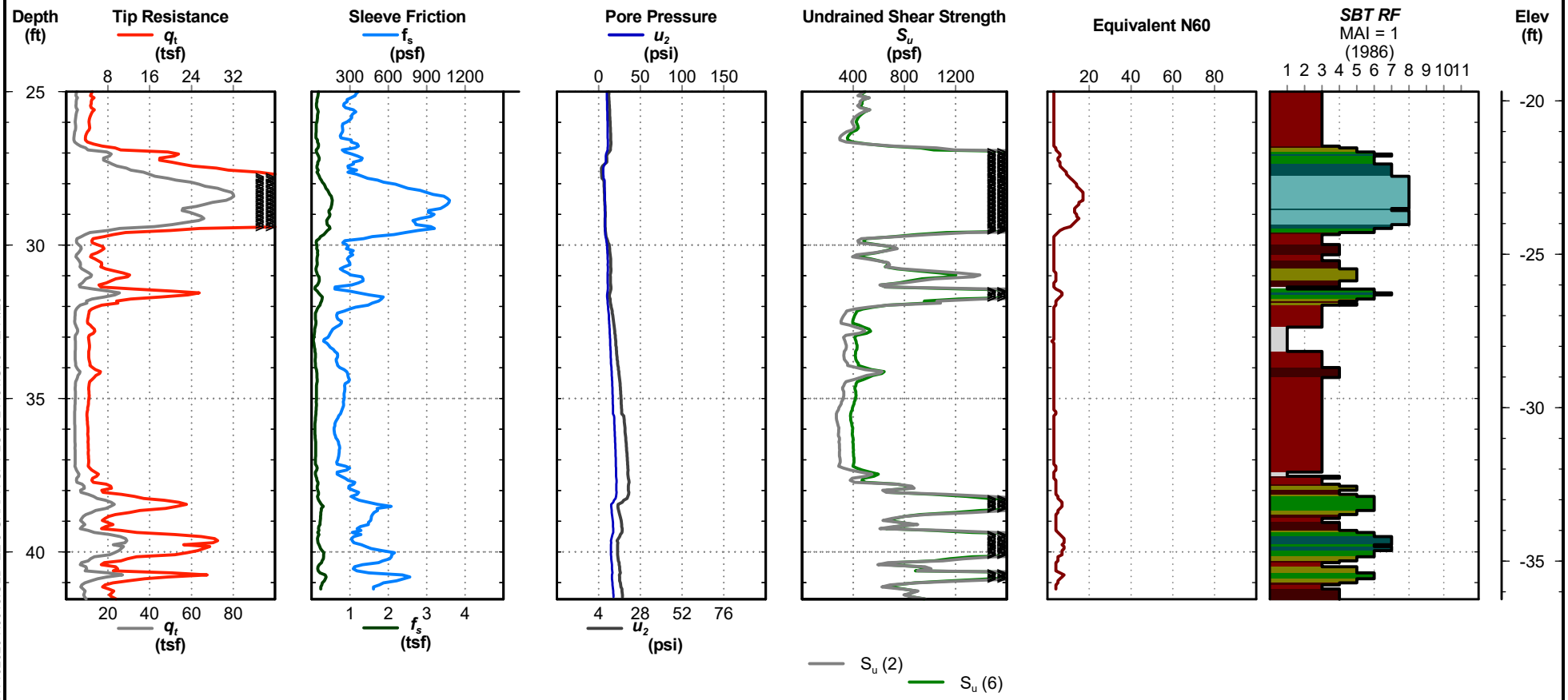
State of Louisiana Coastal Protection
and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

LCPT-2

Project No: 24431
Date: 10/21/2020
Latitude: 29.77614°
Longitude: -89.78016°
CPT ID: 5389

Elevation: 5.3
Datum: NAVD88
Est. Water Depth:
Total Depth: 41.5 ft
Operator: ELH



EUSTIS GINT LIBRARY102620 H0013.GLB EE 5 GRAPH CPT LOG 24431.GPJ 12/11/20

Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

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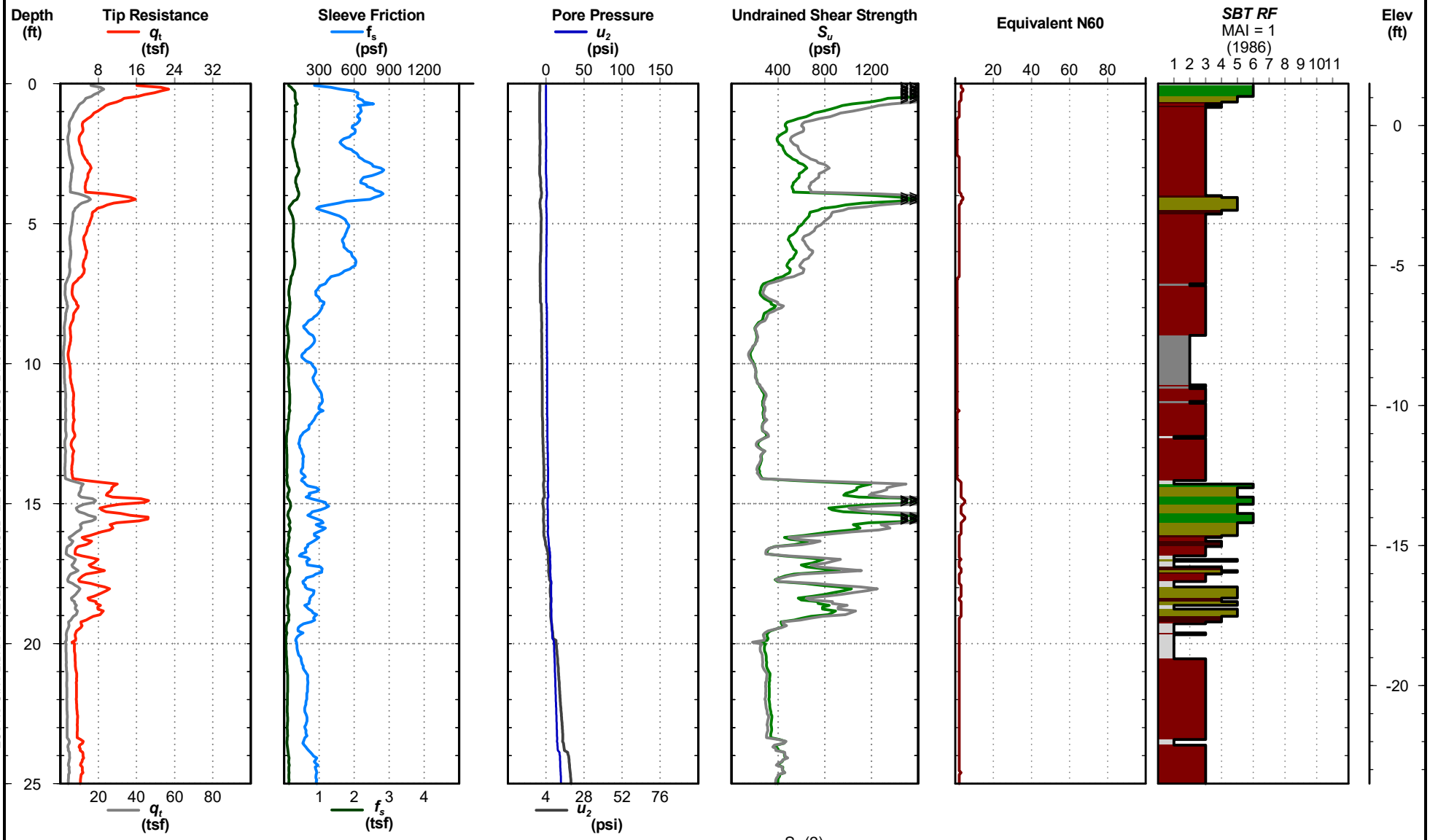
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

LCPT-3

Project No: 24431
Date: 10/20/2020
Latitude: 29.77277°
Longitude: -89.78404°
CPT ID: 5389

Elevation: 1.5
Datum: NAVD88
Est. Water Depth:
Total Depth: 41.6 ft
Operator: ELH



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

Electronic Filename: 24431-LCPT-3.cpt

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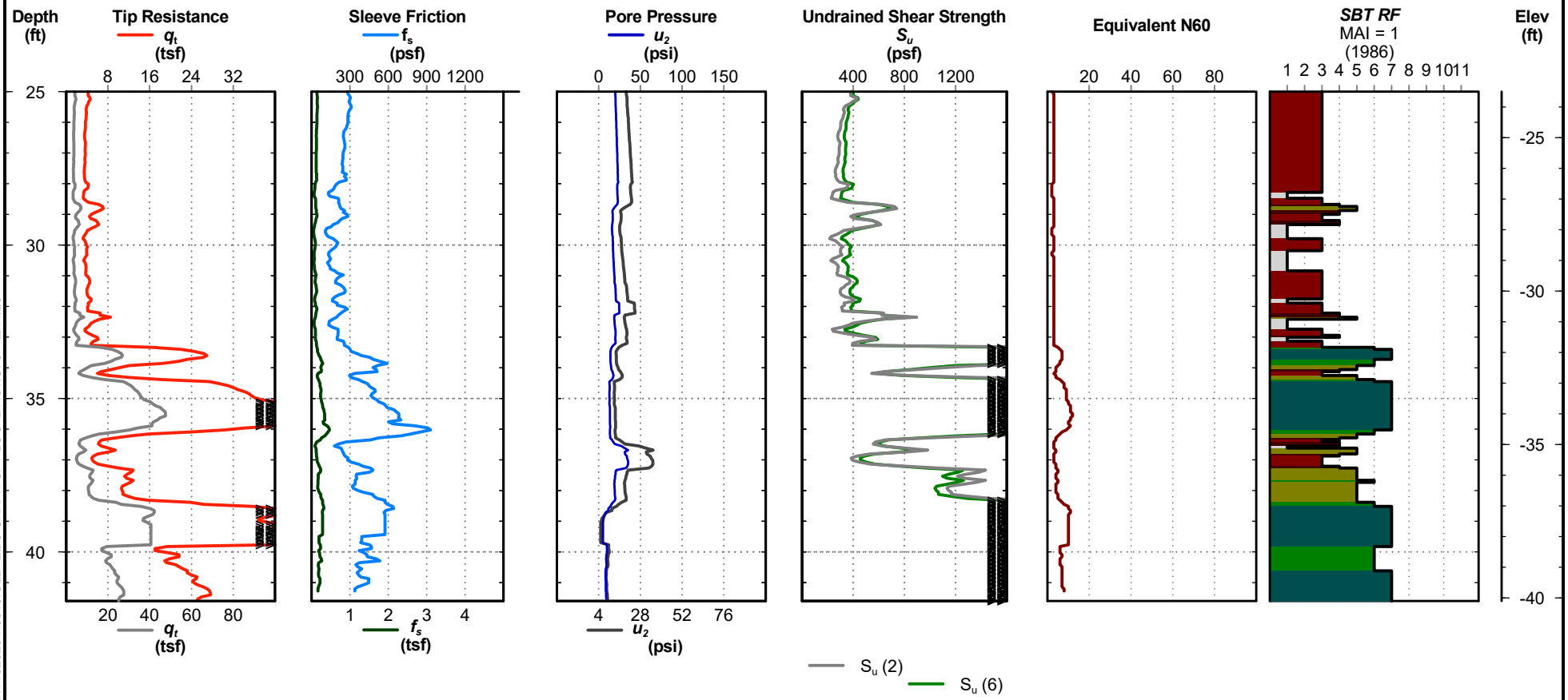
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

LCPT-3

Project No: 24431
Date: 10/20/2020
Latitude: 29.77277°
Longitude: -89.78404°
CPT ID: 5389

Elevation: 1.5
Datum: NAVD88
Est. Water Depth:
Total Depth: 41.6 ft
Operator: ELH



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

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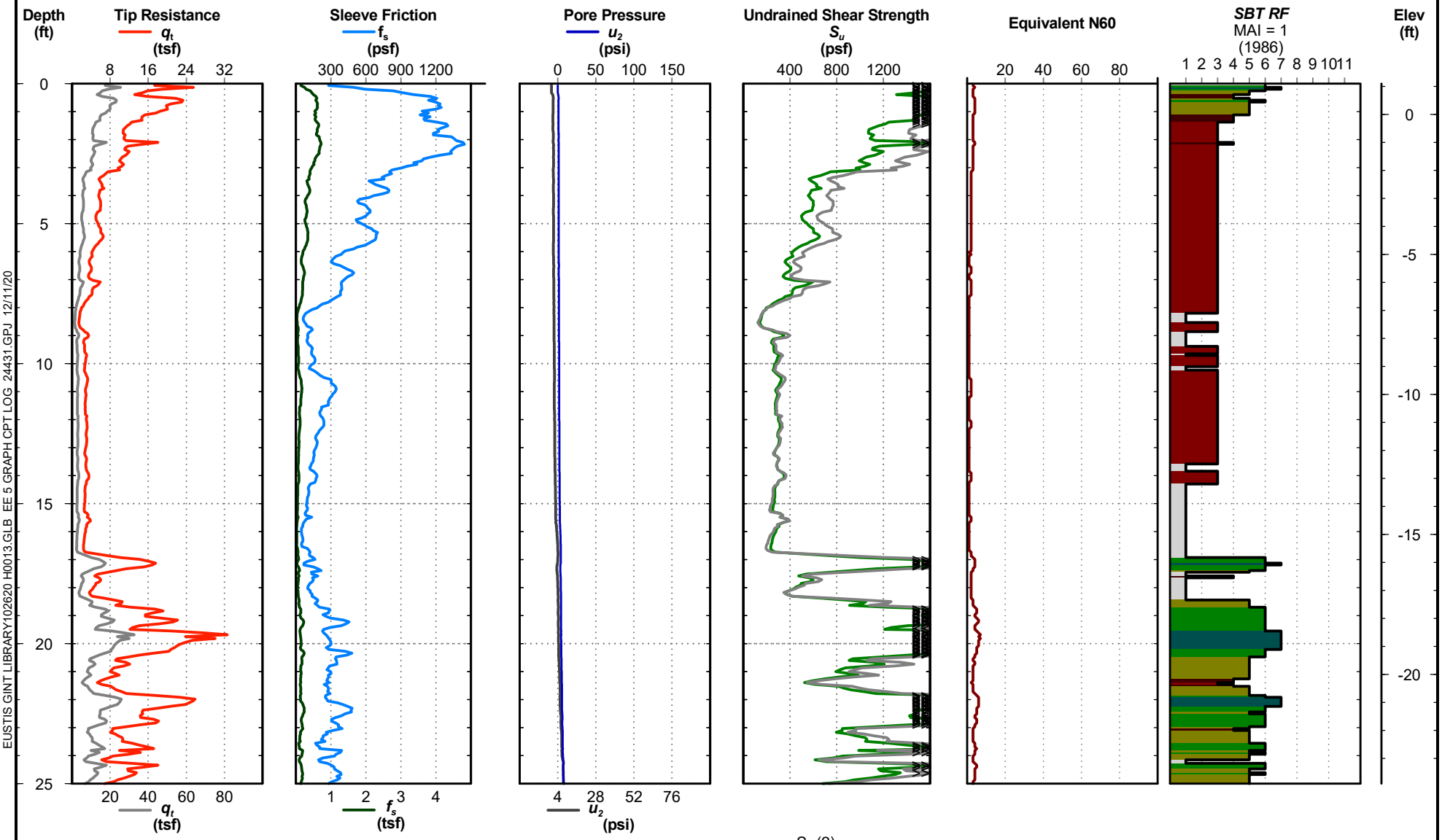
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

LCPT-4

Project No: 24431
Date: 10/20/2020
Latitude: 29.76813°
Longitude: -89.78854°
CPT ID: 5389

Elevation: 1.1
Datum: NAVD88
Est. Water Depth:
Total Depth: 41.9 ft
Operator: ELH



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

Electronic Filename: 24431-LCPT-4.cpt

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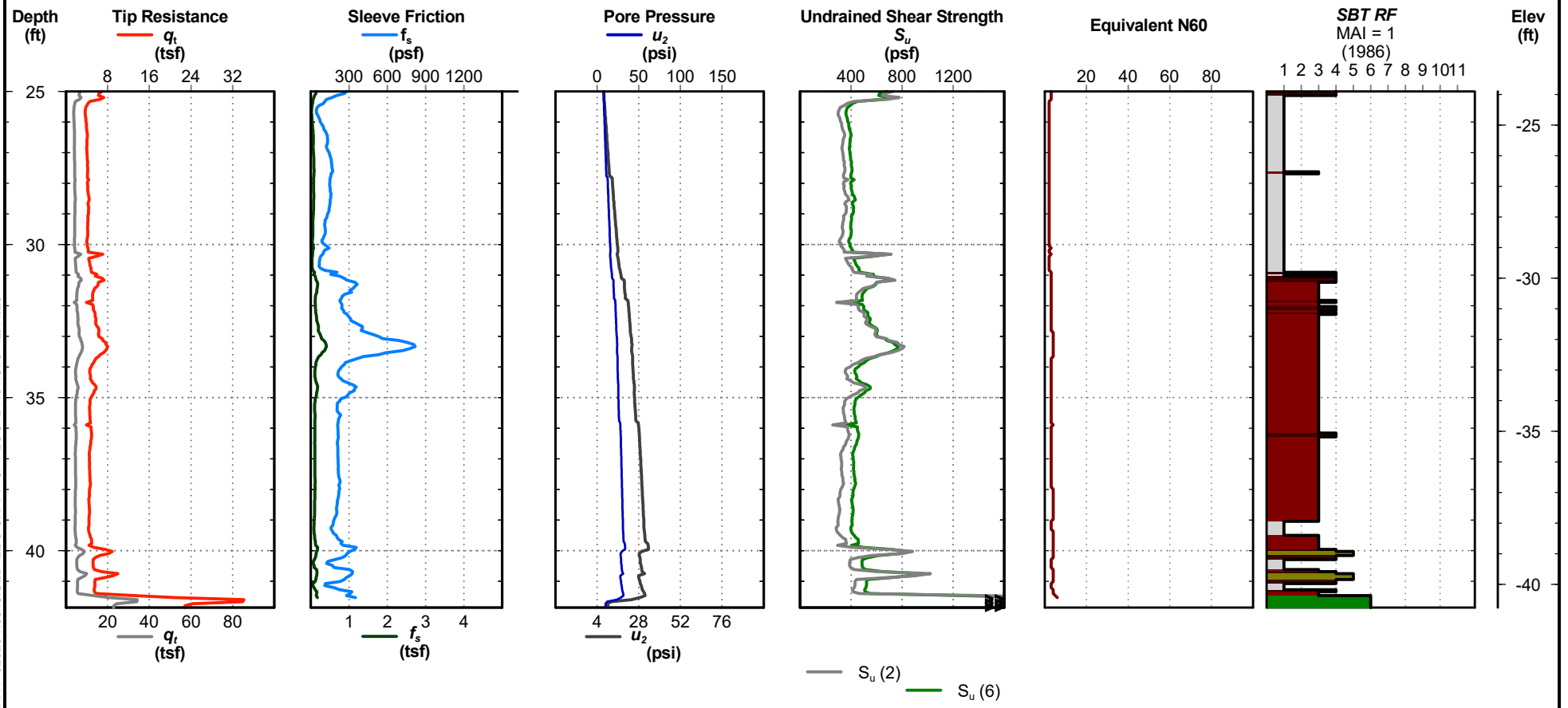
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

LCPT-4

Project No: 24431
Date: 10/20/2020
Latitude: 29.76813°
Longitude: -89.78854°
CPT ID: 5389

Elevation: 1.1
Datum: NAVD88
Est. Water Depth:
Total Depth: 41.9 ft
Operator: ELH



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

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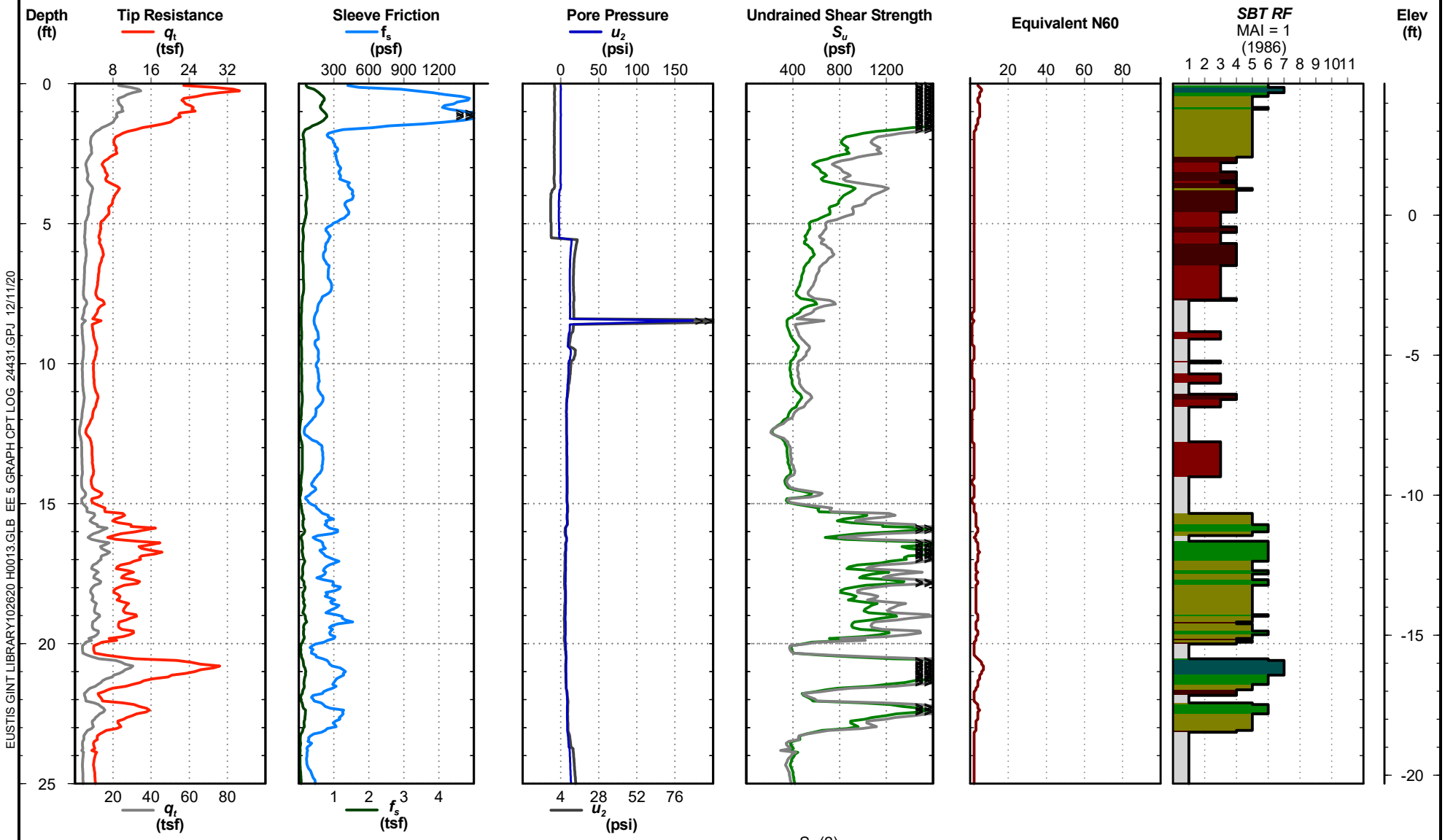
CONE PENETRATION TEST

State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

LCPT-5

Project No: 24431
Date: 10/20/2020
Latitude: 29.76388°
Longitude: -89.78961°
CPT ID: 5389

Elevation: 4.7
Datum: NAVD88
Est. Water Depth:
Total Depth: 41.7 ft
Operator: ELH



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

Electronic Filename: 24431-LCPT-5.cpt

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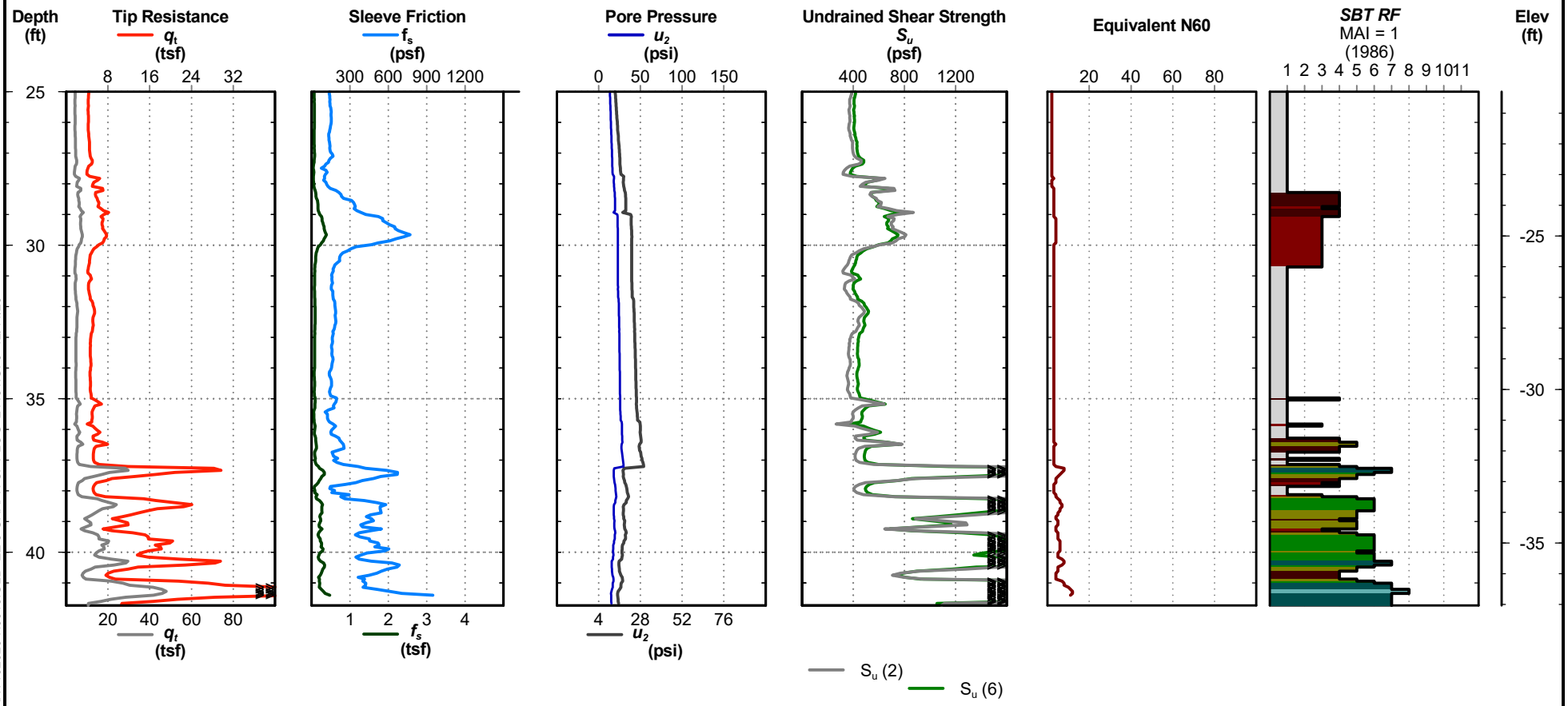
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

LCPT-5

Project No: 24431
Date: 10/20/2020
Latitude: 29.76388°
Longitude: -89.78961°
CPT ID: 5389

Elevation: 4.7
Datum: NAVD88
Est. Water Depth:
Total Depth: 41.7 ft
Operator: ELH



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

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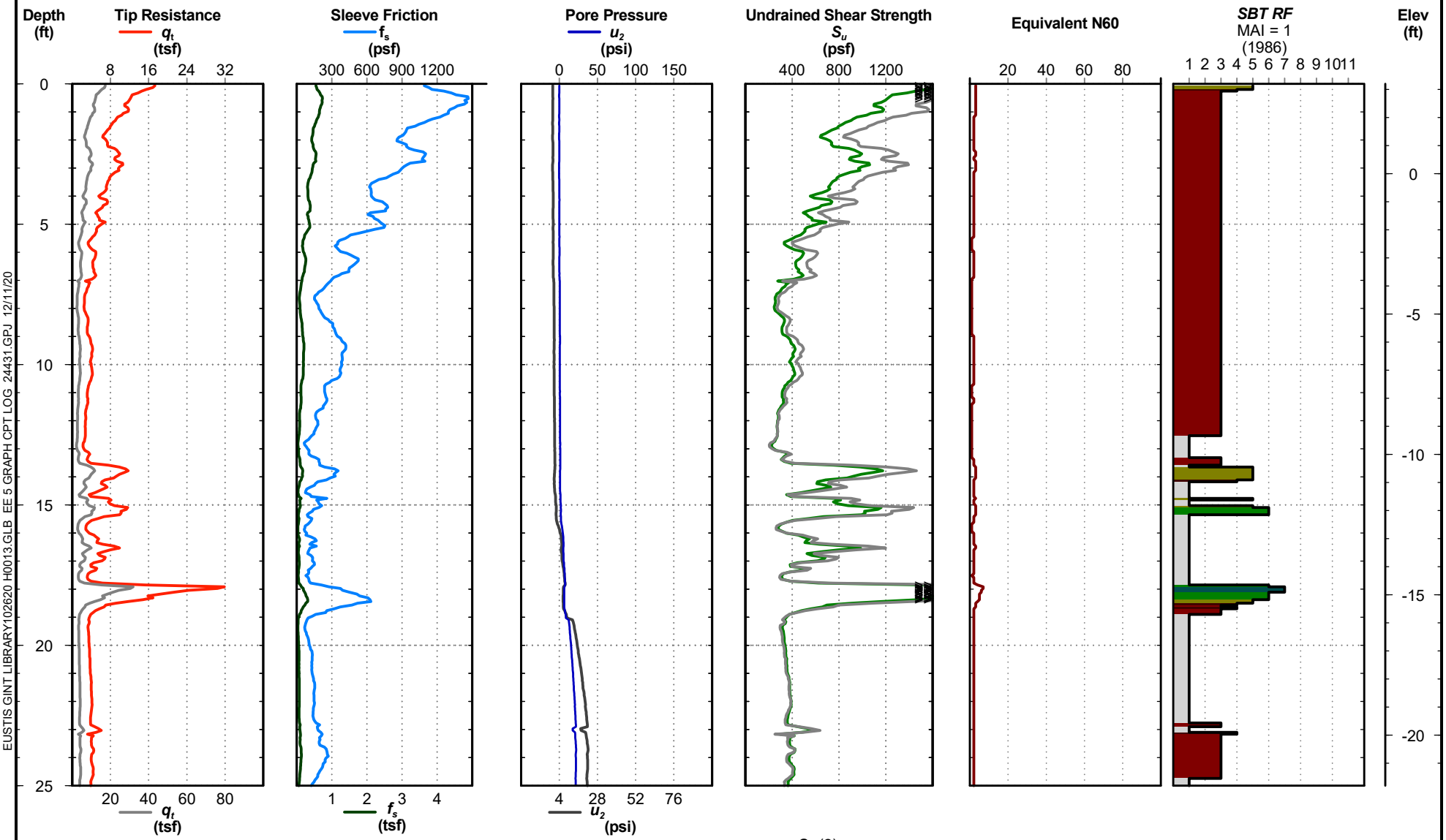
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

LCPT-6

Project No: 24431
Date: 10/20/2020
Latitude: 29.75988°
Longitude: -89.78409°
CPT ID: 5389

Elevation: 3.2
Datum: NAVD88
Est. Water Depth:
Total Depth: 41.4 ft
Operator: ELH



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

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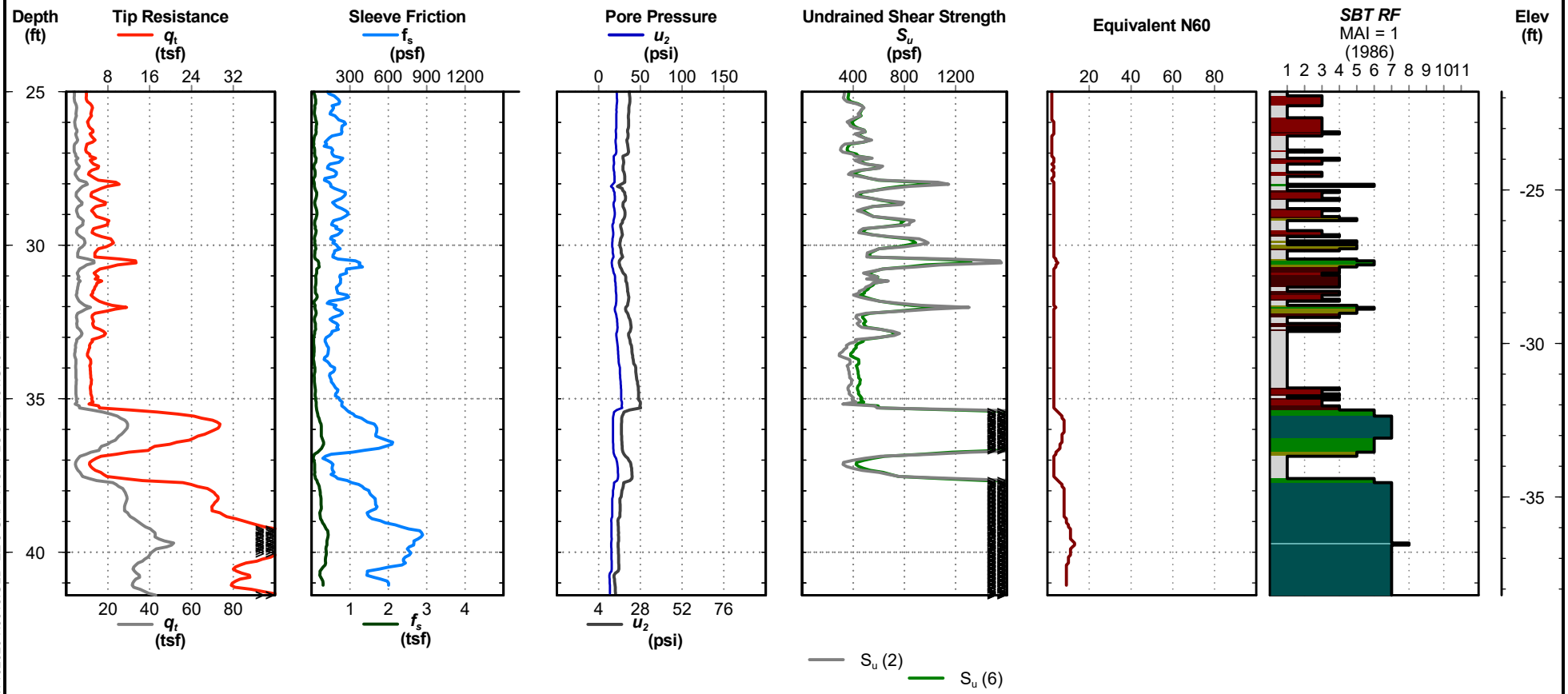
State of Louisiana Coastal Protection and Restoration Authority
East Delacroix Marsh Creation Project
CPRA Project No. BS-0037
St. Bernard Parish, Louisiana

CONE PENETRATION TEST

LCPT-6

Project No: 24431
Date: 10/20/2020
Latitude: 29.75988°
Longitude: -89.78409°
CPT ID: 5389

Elevation: 3.2
Datum: NAVD88
Est. Water Depth:
Total Depth: 41.4 ft
Operator: ELH



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-12.

CPT Correlations

References are in parenthesis next to the appropriate equation.

General

p_a=atmospheric pressure (for unit normalization)
q_t=corrected cone tip resistance (tsf)
f_s=friction sleeve resistance (tsf)
$R_f = 100\% \cdot (f_s/q_t)$
u_2=pore pressure behind cone tip (tsf)
u_0=hydrostatic pressure

$B_q = (u_2-u_0)/(q_t-\sigma_{vo})$
$Q_t=(q_t-\sigma_{vo})/ \sigma'_{vo}$
$F_r=100\% \cdot f_s/(q_t-\sigma_{vo})$
$I_c = ((3.47-\log Q_t)^2 + (\log F_r+1.22)^2)^{0.5}$ 2
$I_{SBT} = ((3.47-\log(q_c/p_a))^2+(\log F_r+1.22)^2)^{0.5}$ 23
$I_{c\ J\&D} = \sqrt{\{3 - \log(Q_t \cdot (1 - B_q)\}^2 + [1.5 + 1.3 \cdot \log(F_r)]^2}$ 27
$I_{c\ J\&B} = \sqrt{\{3 - \log(Q_t \cdot (1 - B_q) + 1\}^2 + [1.5 + 1.3 \cdot \log(F_r)]^2}$ 28

K_o

K_0 (1) $K_o = (1-\sin\varphi)OCR^{\sin\varphi}$
K_0 (2) $K_o = 0.1(Q_t)$ 1

Stress History

$OCR = \sigma_p'/\sigma'_{vo}$
OCR (1) $\sigma_p' = 0.33(q_t - \sigma_{vo})$ - clays 8
OCR (2) $\sigma_p' = 0.53(u_2 - u_o)$ - clays 9
OCR (3) $\sigma_p' = 0.60(q_t - u_2)$ - clays 9
OCR (4) $OCR = 0.25\ Q_t^{1.25}$ – clays 37
OCR (5) $OCR = \left[\frac{0.192*(q_t/p_a)^{0.22}}{(1-\sin(\emptyset')\cdot(\sigma'_{v0}/p_a{}^{0.31})}\right]^{\frac{1}{\sin(\emptyset'-0.27)}}$ – sands 35
OCR (6) $\sigma_p' = .101 \cdot p_a{}^{0.102} \cdot G_{max}{}^{0.478} \cdot \sigma'_{v0}{}^{0.420}$ – all soils 36

N-Value

$N_{60} = (q_t/p_a)/[8.5(1-I_c/4.6)]$ 6

Undrained Shear Strength

S_u (1) $S_u = (u_2 - u_o)/N_u$ where $7 \le N_u \le 9$ 10
S_u (2) $S_u = (q_t - \sigma_{vo})/N_{kT}$ where $15 \le N_{kT} \le 20$ 11
S_u (3) $S_u = 0.091 * ((\sigma'_{vo}{}^{0.2}) * (q_t - \sigma_{vo})^{0.8}$ 21
S_u (4) $S_u = (q_c - \sigma_{vo})/N_k$ where $15 \le N_k \le 20$ 11
S_u (5) $S_u = q_t/N_c$ where $XXX \le N_c \le YYY$
S_u (6) $S_u = q_c/N_c$ where $XXX \le N_c \le YYY$

Effective Cohesion

$c' = 0.02 * \sigma_p'$ 38

Drained Friction Angle

φ' (1)	$\varphi' = 17.6 + 11.0\text{Log}[q_t/(\sigma_{vo}')^{0.5}]$	1
φ' (2)	$\varphi' = \arctan[0.1 + 0.38\text{Log}(q_t/\sigma_{vo}')]$	13
φ' (3)	$\varphi' = 30.8\text{Log}[(f_s/\sigma_{vo}')+1.26]$ (for clays or sands)	14
φ' (4)	$\varphi' = 29.5\ B_q^{0.121}\ (0.256 + 0.33\ B_q + \text{Log}(Q_t))$	24

Unit Weight

$\rho = \gamma/\gamma_w$

$\rho = 0.8\text{Log}(V_s)$ V_s in m/sec 17

Relative Density and Void Ratio

D_R (1)	$D_R = 100(q_{c1}/305)^{1/2}$	where, $q_{c1} = q_c/(\sigma_{vo}')^{1/2}$	1
D_R (2)	$D_R = -1.292 + 0.268\ln(q_c \cdot (\sigma_{vo}'^{-0.5}))$		18
D_R (3)	$D_R = (1/2.41)\cdot\ln(q_{c1}/15.7)$		3
D_R (4)	$D_R = 1/2.91 * \ln((q_c/(61* \sigma'^{0.71}_{vo}))*100$		20
D_R (5)	$D_R = 100*(0.268*\ln((q_t/p_a)/(\sigma'_{vo}/p_a)\text{^}0.5) - 0.675)$		34

$e_o = 1.099 - 0.204\log(q_{c1})$ 1

$E_D = 5\ q_t$ $I_D = 2.0 - 0.14(R_f)$ $K_D = E_D/(34.7\cdot I_D\cdot \sigma_{vo}')$

Compressibility

$M(1) = R_m\ E_D$ where R_m= function(I_D, K_D) see the following table 22

$I_D <= 0.6$	$R_M = 0.14 + 2.36 \log K_D$
$I_D >= 3$	$R_M = 0.5 + 2 \log K_D$
$0.6 < I_D < 3$	$R_M = R_{M,D} + (2.5 - R_{M,D})\log K_D$
	$R_{M,D} = 0.14 + 0.15(I_D - 0.6)$
$K_D > 10$	$R_M = 0.32 + 2.18 \log K_D$
$R_M < 0.85$	$R_M = 0.85$

M (2)	$M = q_c\cdot 10^{(1.09-0.0075D}R^{)}$ *sands*	1
M (3)	$M = 8.25\ (q_t - \sigma_{vo})$ *clays*	1
M (4)	$M = \alpha \cdot G_{max}\ where\ 0.02 < \alpha < 2$ and $G_{max}\ is\ from\ Vs$	33

Rigidity Index

$I_R = exp\left[\left(\frac{1.5}{M} + 2.925\right)\cdot\left(\frac{q_t-\sigma_{vo}}{q_t-u_2}\right) - 2.925\right]$ where $M = 6\sin\emptyset'/(3-\sin\emptyset')$ 39

Sensitivity

S_t (1)	$S_t = 7.5/R_f$	2
S_t (2)	$S_t = (q_t - \sigma_{vo})/(15\cdot f_s)$	2

Fines Content

$FC = [(3.58-\log(q_t))^2+(1.43+\log(R_f))^2]^{1.8}$ 4

$FC = [5.31(I_{cfs})^{2.31}]+9.61$, where $I_{cfs} = [(1.95-\text{Log}Q_t)^2+(\log F_r+1.78)^2]^{0.5}$

Shear Wave Velocity

$V_s(1) = 277 \cdot q_t^{0.13} \cdot {\sigma'_{vo}}^{0.27}$ (sands) - m/s and MPa 29

$V_s(2) = 1.75 \cdot q_t^{0.627}$ (clays) - m/s and kPa 30

$V_s(3) = (10.1 \cdot \log q_t - 11.4)^{1.67} \cdot (\frac{f_s}{q_t} \cdot 100)^{0.3}$ (all soils) – m/s and kPa 31

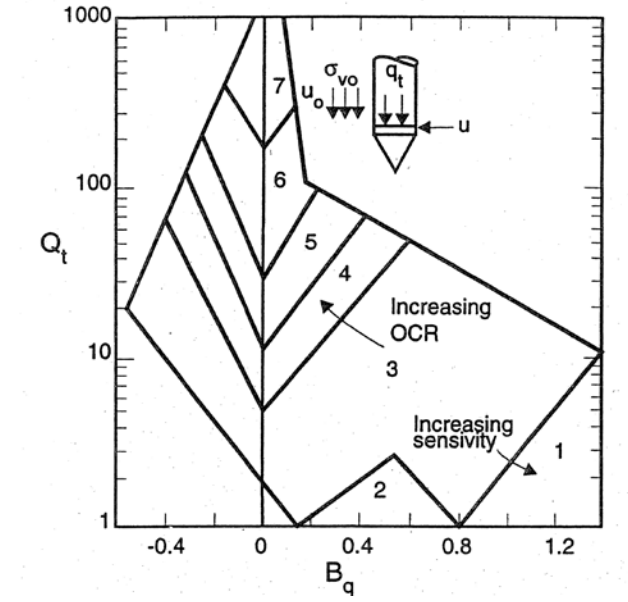
$V_s(4) = 118.8 \cdot \log f_s + 18.5$ (all soils) – m/s and kPa 32

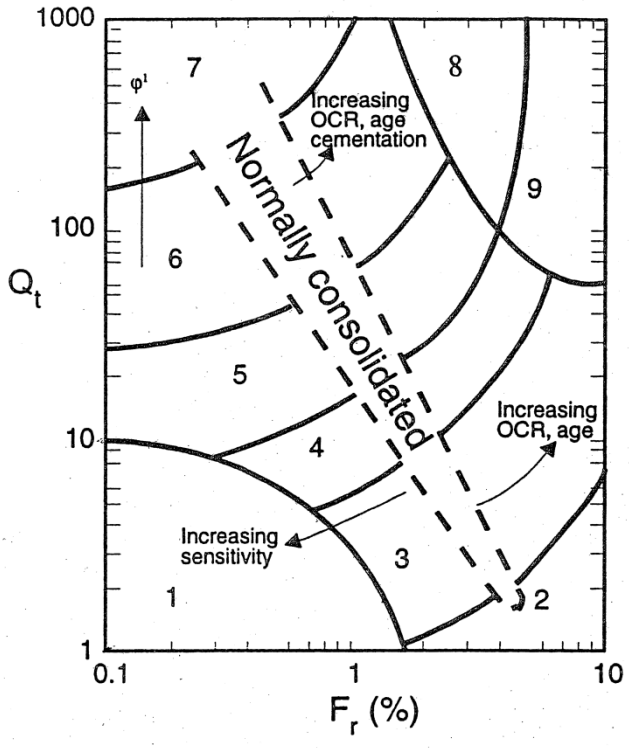
$G_{max} = \rho V_s^2$

Hydraulic Conductivity

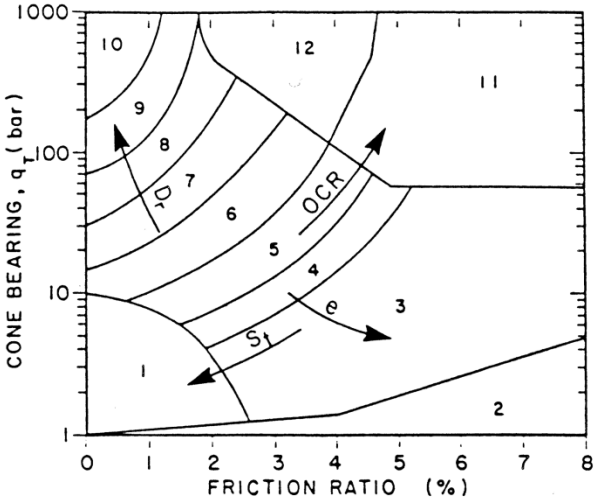
Lookup based on SBT and SBTn (1986 and 1990) 40

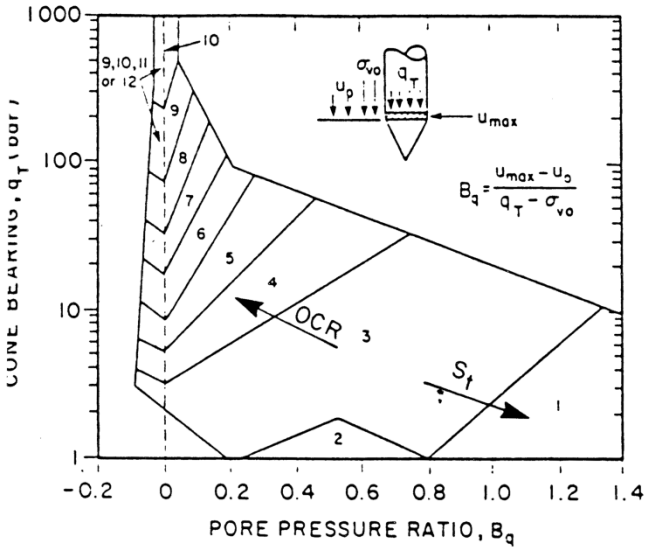
Normalized Soil Behavior Types - Robertson & Campanella (1990)





Non-Normalized Soil Behavior Types – Robertson & Campanella (1986)





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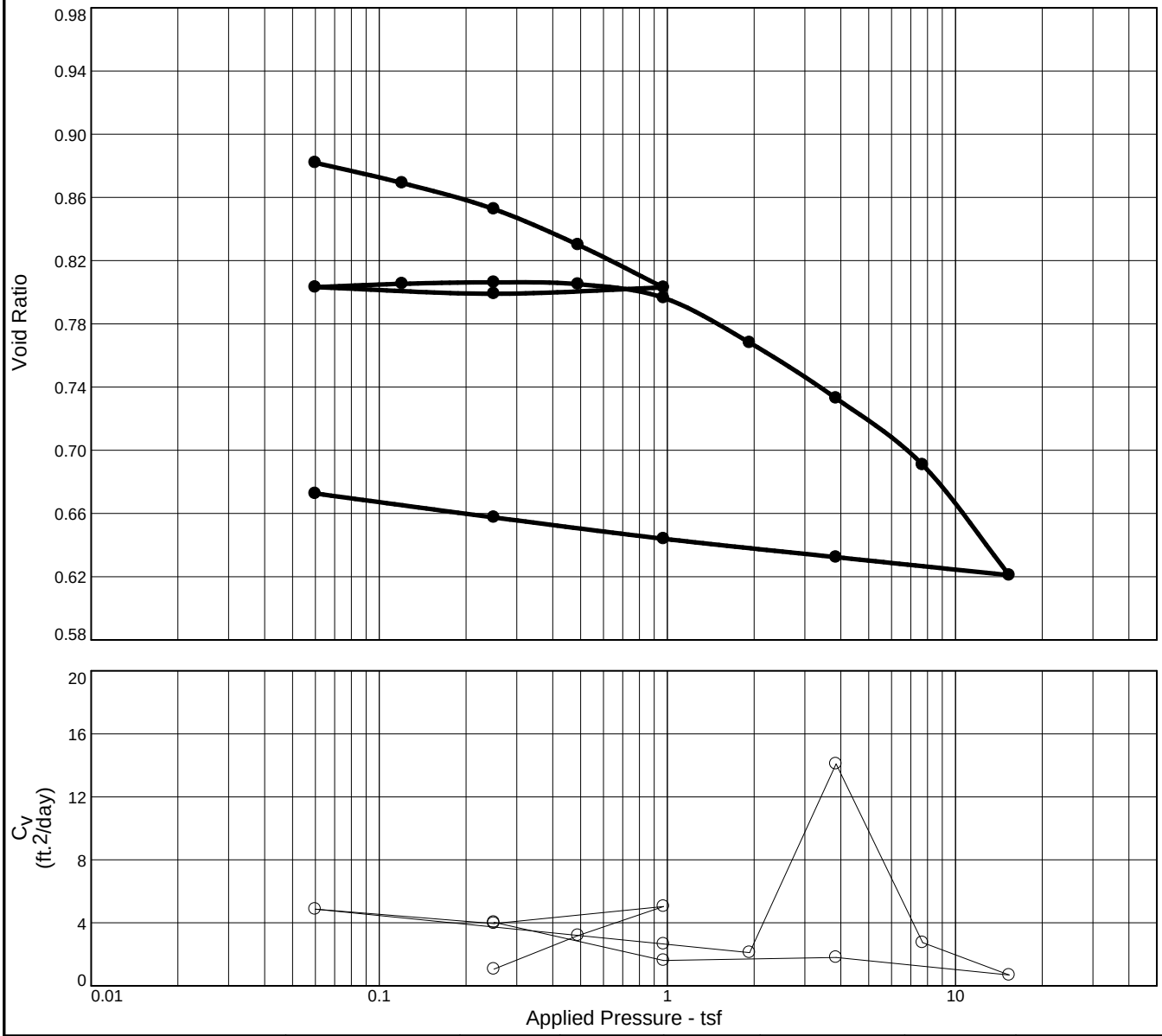
APPENDIX V
CONSOLIDATION TEST RESULTS

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	P_c (tsf)	C_c	Initial Void Ratio
Saturation	Moisture							
98.1 %	33.4 %	86.2	33	13	2.65	0.5	0.12	0.902

MATERIAL DESCRIPTION	USCS	AASHTO
SO G SICL W/ FISA POC, TR-OM	CL	

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

Source of Sample: B-1 **Depth:** 9 **Sample Number:** 3B

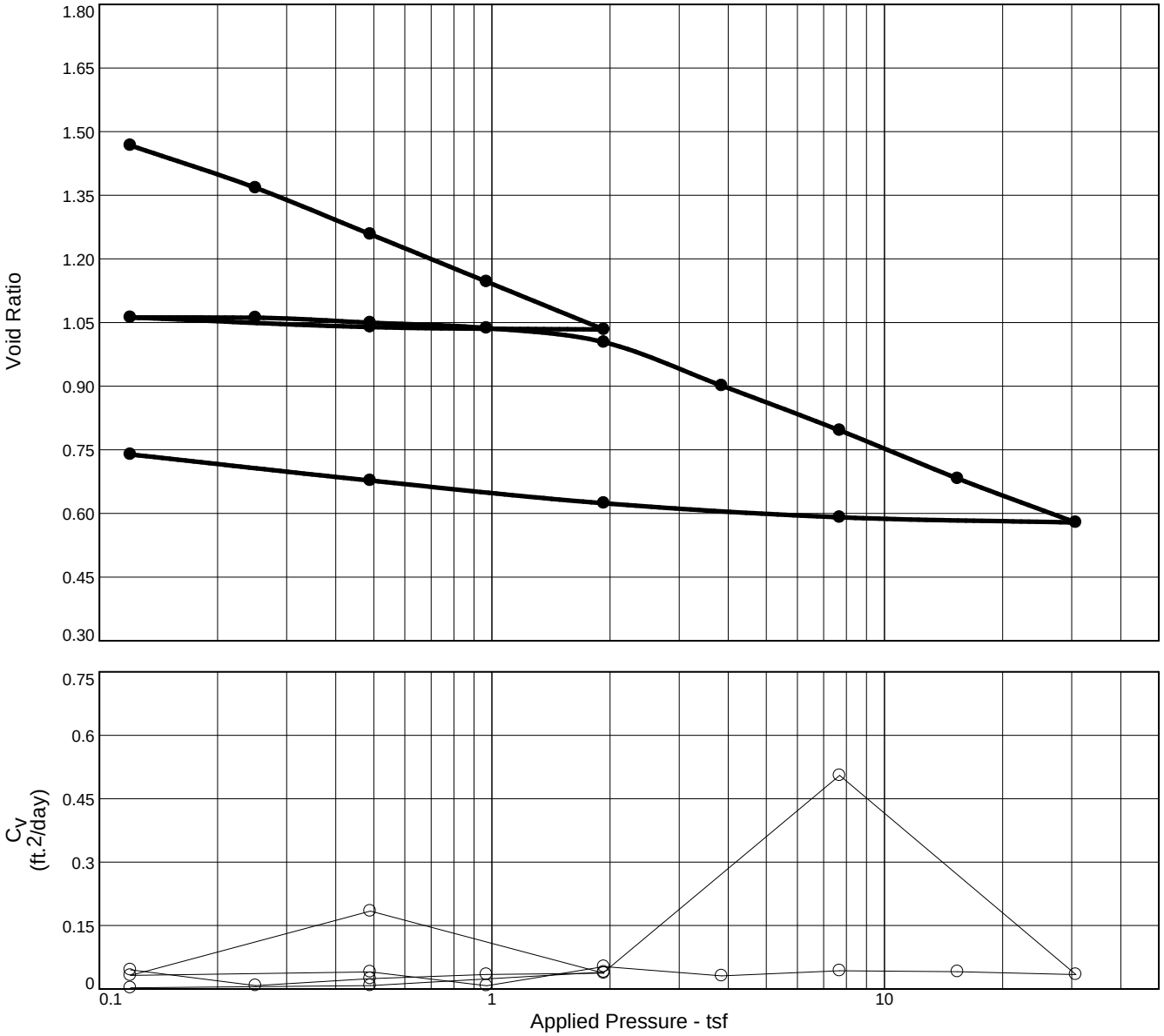
Remarks:

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH **Checked By:** RR

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	P_c (tsf)	C_c	Initial Void Ratio
Saturation	Moisture							
99.9 %	57.9 %	65.6	64	37	2.69	1.1	0.38	1.559

MATERIAL DESCRIPTION	USCS	AASHTO
VSO G CL W/ TR-SI POC & LEN, TR-SH FRAG	CH	

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

Source of Sample: B-2 **Depth:** 12.04 **Sample Number:** 5A

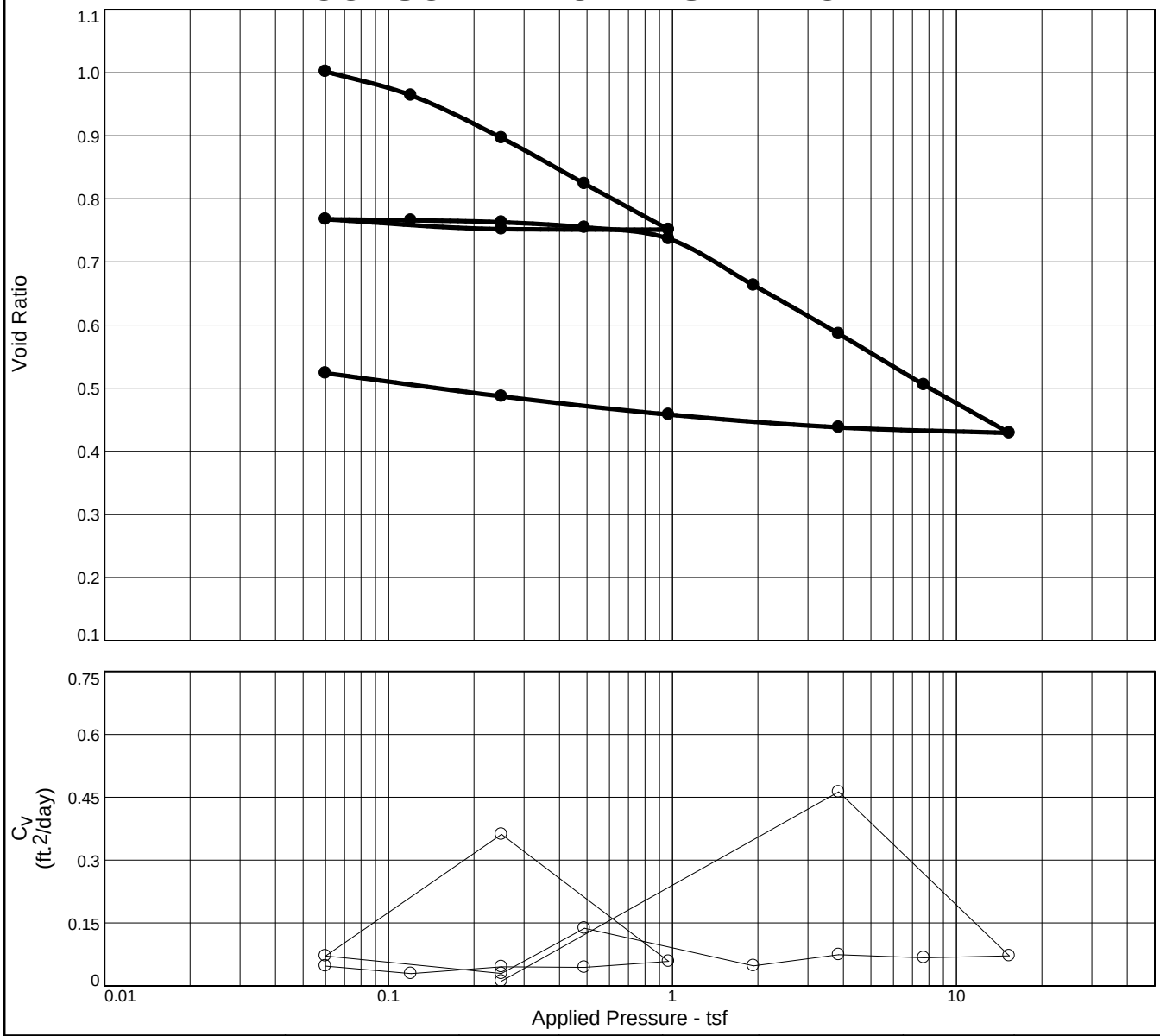
EUSTIS ENGINEERING SINCE 1946

Remarks:

Figure

Tested By: BH **Checked By:** RR

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	P_c (tsf)	C_c	Initial Void Ratio
Saturation	Moisture							
98.3 %	39.6 %	80.4	37	16	2.68	0.2	0.26	1.081

MATERIAL DESCRIPTION	USCS	AASHTO
VSO G SICL W/ TR-RTS, OM & RTS	CL	

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

Source of Sample: B-3 **Depth:** 7 **Sample Number:** 2B

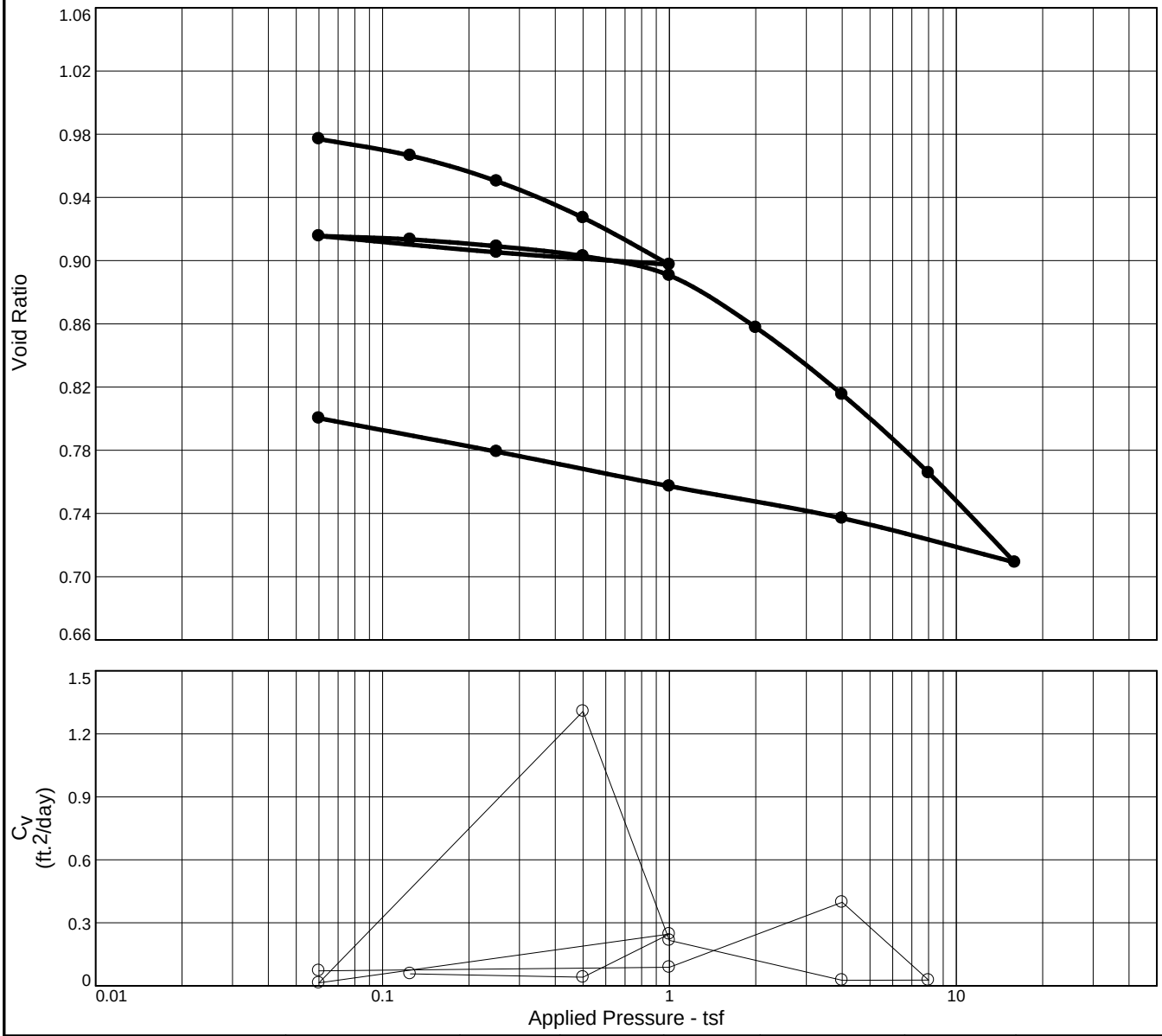
EUSTIS ENGINEERING SINCE 1946

Remarks:

Figure

Tested By: BH **Checked By:** RR

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	P_c (tsf)	C_c	Initial Void Ratio
Saturation	Moisture							
98.1 %	35.7 %	84.8	36	17	2.69	0.6	0.13	0.980

MATERIAL DESCRIPTION	USCS	AASHTO
XSO G SICL W/ TR-OM	CL	

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

Source of Sample: B-4 **Depth:** 12.33 **Sample Number:** 5B

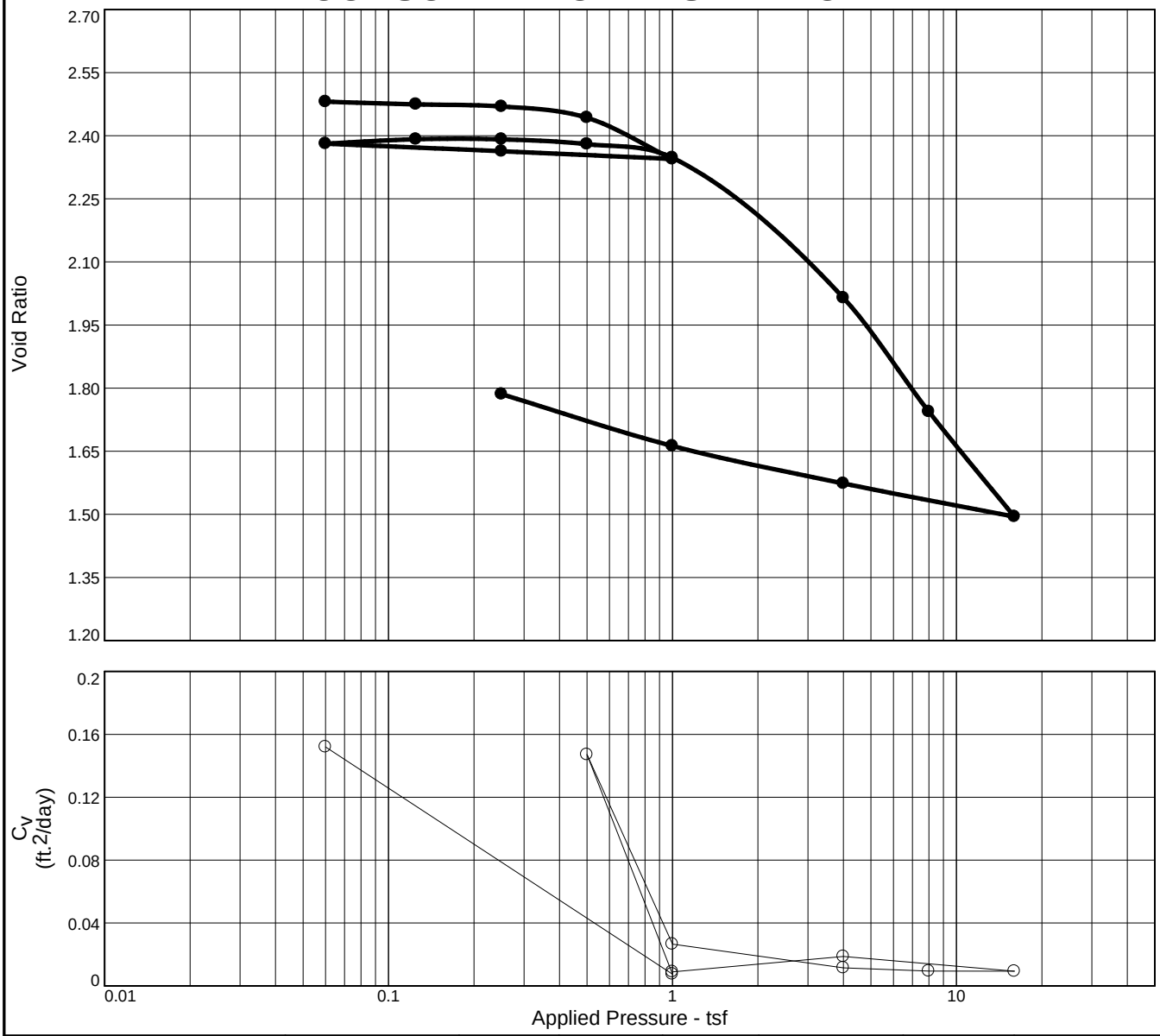
EUSTIS ENGINEERING SINCE 1946

Remarks:

Figure

Tested By: BH **Checked By:** RR

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	P_c (tsf)	C_c	Initial Void Ratio
Saturation	Moisture							
98.7 %	90.0 %	48.7	95	77	2.71	2.6	0.93	2.472

MATERIAL DESCRIPTION	USCS	AASHTO
XSO G CL W/ TR-SI POC & SH FRAG	CH	

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

Source of Sample: B-5 **Depth:** 14 **Sample Number:** 6B

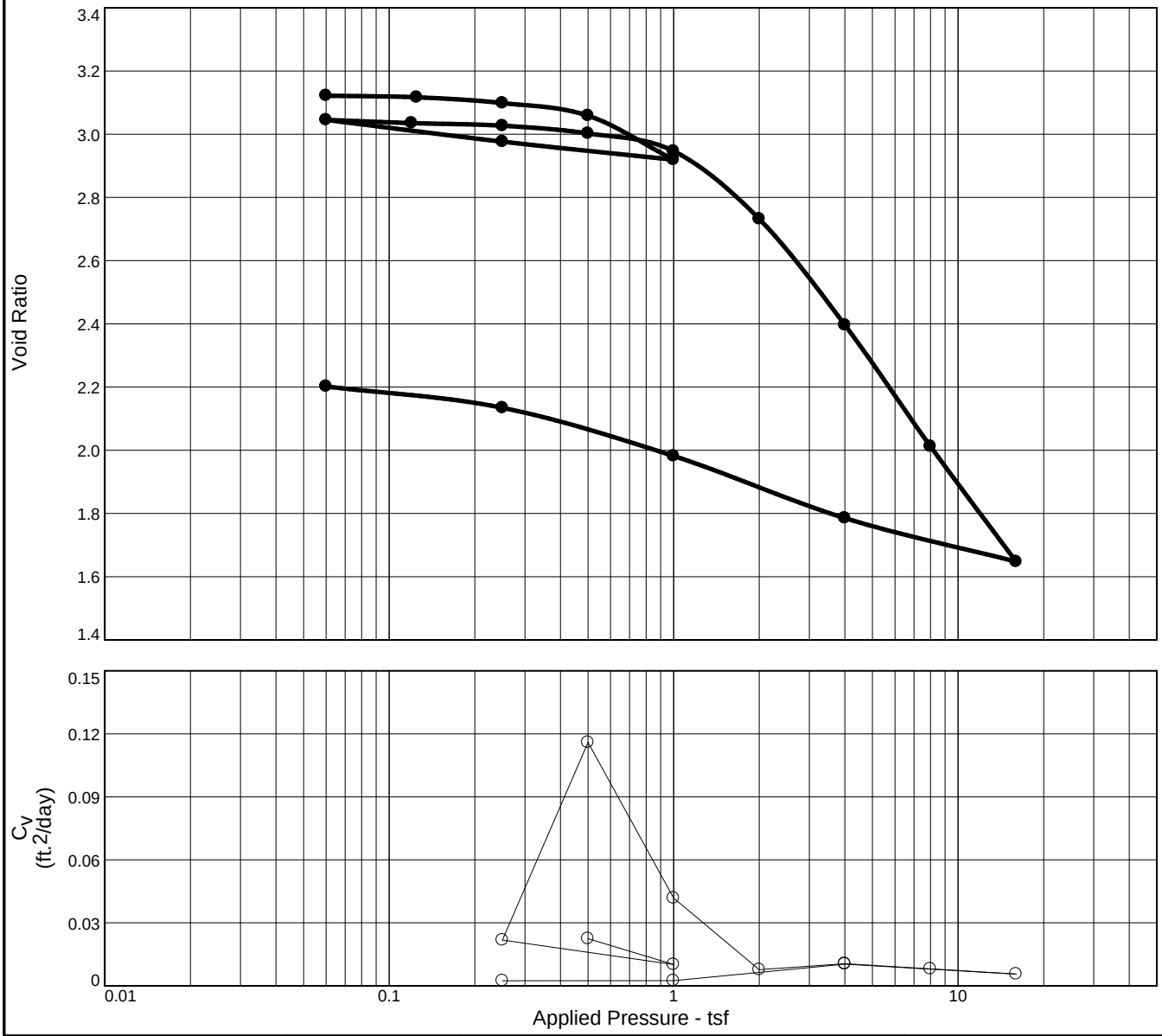
EUSTIS ENGINEERING SINCE 1946

Remarks:

Figure

Tested By: BH **Checked By:** RR

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	P_c (tsf)	C_c	Initial Void Ratio
Saturation	Moisture							
98.8 %	118.4 %	39.4	137	93	2.59	1.7	1.29	3.104

MATERIAL DESCRIPTION	USCS	AASHTO
XSO G & BR ORG CL W/ DEC WD	CH	

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

Source of Sample: B-6 **Depth:** 19.42 **Sample Number:** 8A

EUSTIS ENGINEERING SINCE 1946

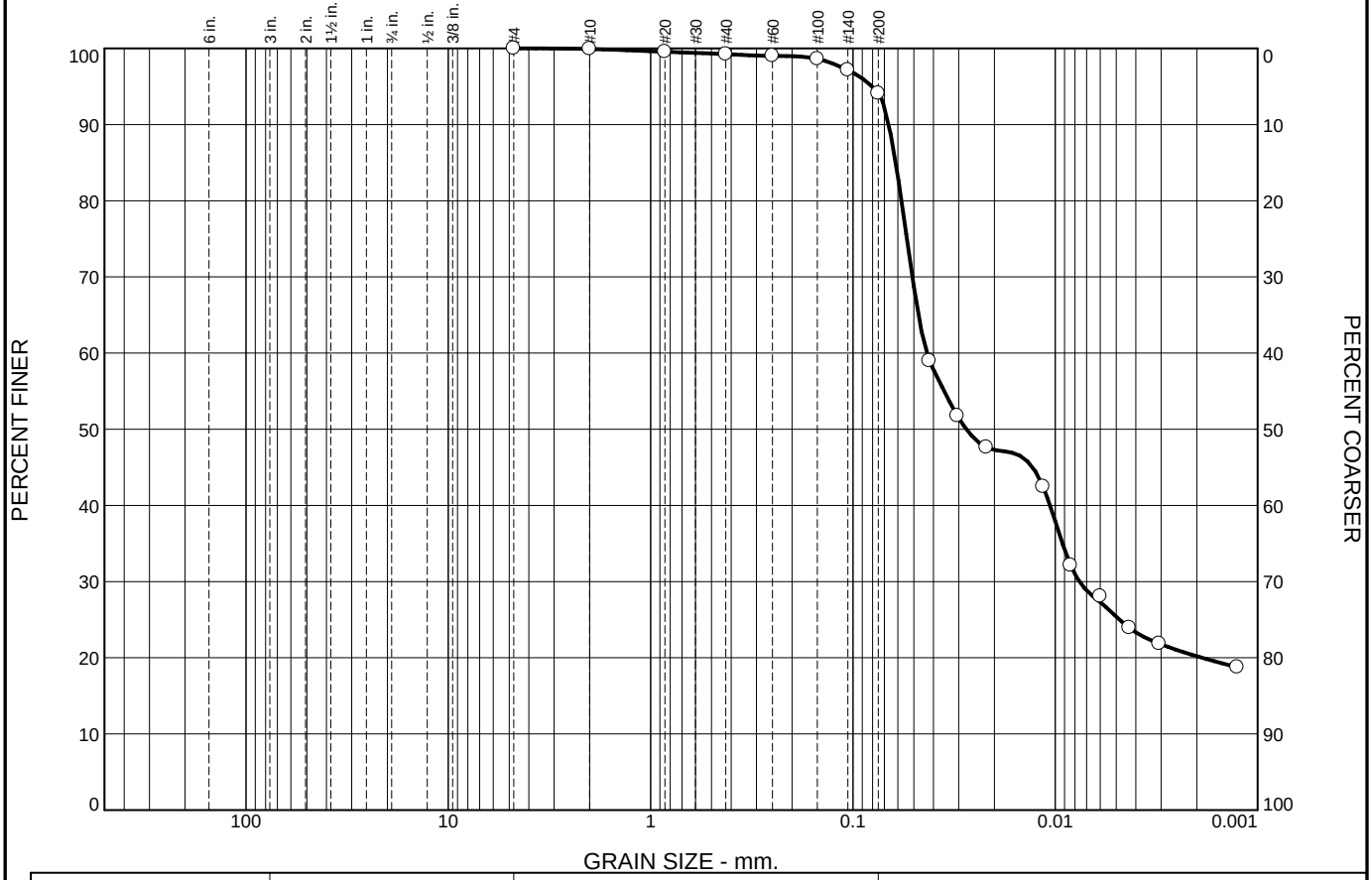
Remarks:

Figure

Tested By: BH **Checked By:** RR

APPENDIX VI
GRAIN SIZE TEST RESULTS

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.1	0.7	5.1	68.7	25.4

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	62	20	0.0615	0.0433	0.0275	0.0076				

Material Description	USCS	AASHTO
○ Extremely Soft Gray Clay W/ Few Sand Pockets and Organic Matter, Trace of Shell Fragments	CH	A-7-6(44)

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Source of Sample:** BA-1 **Depth:** 7 **Sample Number:** 2A

Remarks:

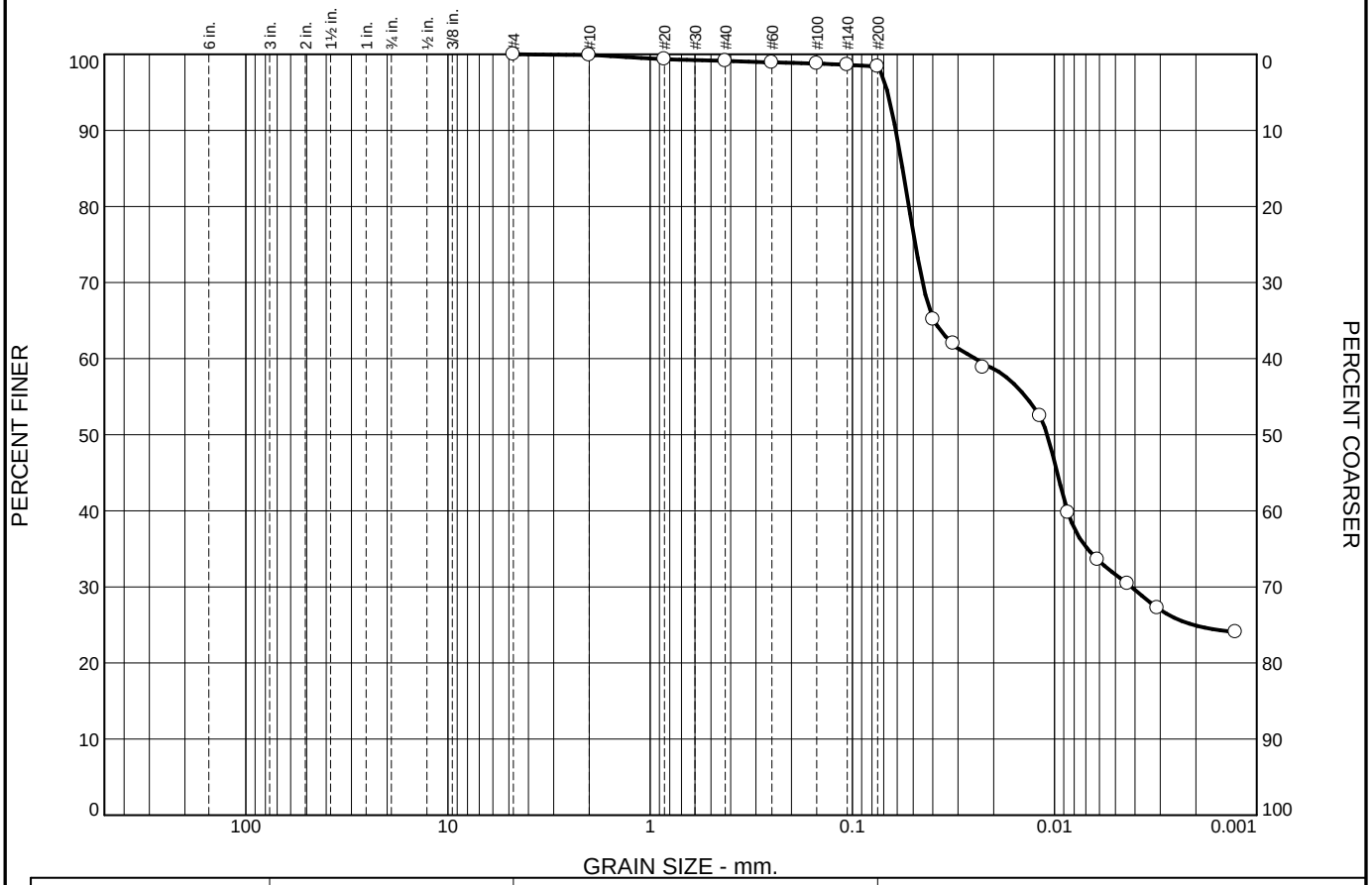
○Specific Gravity was Estimated ASTM D7928-17 was Performed

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH & MJS **Checked By:** CD

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.1	0.8	0.7	66.8	31.6

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	89	25	0.0565	0.0246	0.0109	0.0042				

Material Description	USCS	AASHTO
○ Extremely Soft Gray Clay W/ Silt Pockets, Wood and Organic Matter, Trace of Fine Sand	CH	A-7-6(73)

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Source of Sample:** BA-1 **Depth:** 19 **Sample Number:** 8A

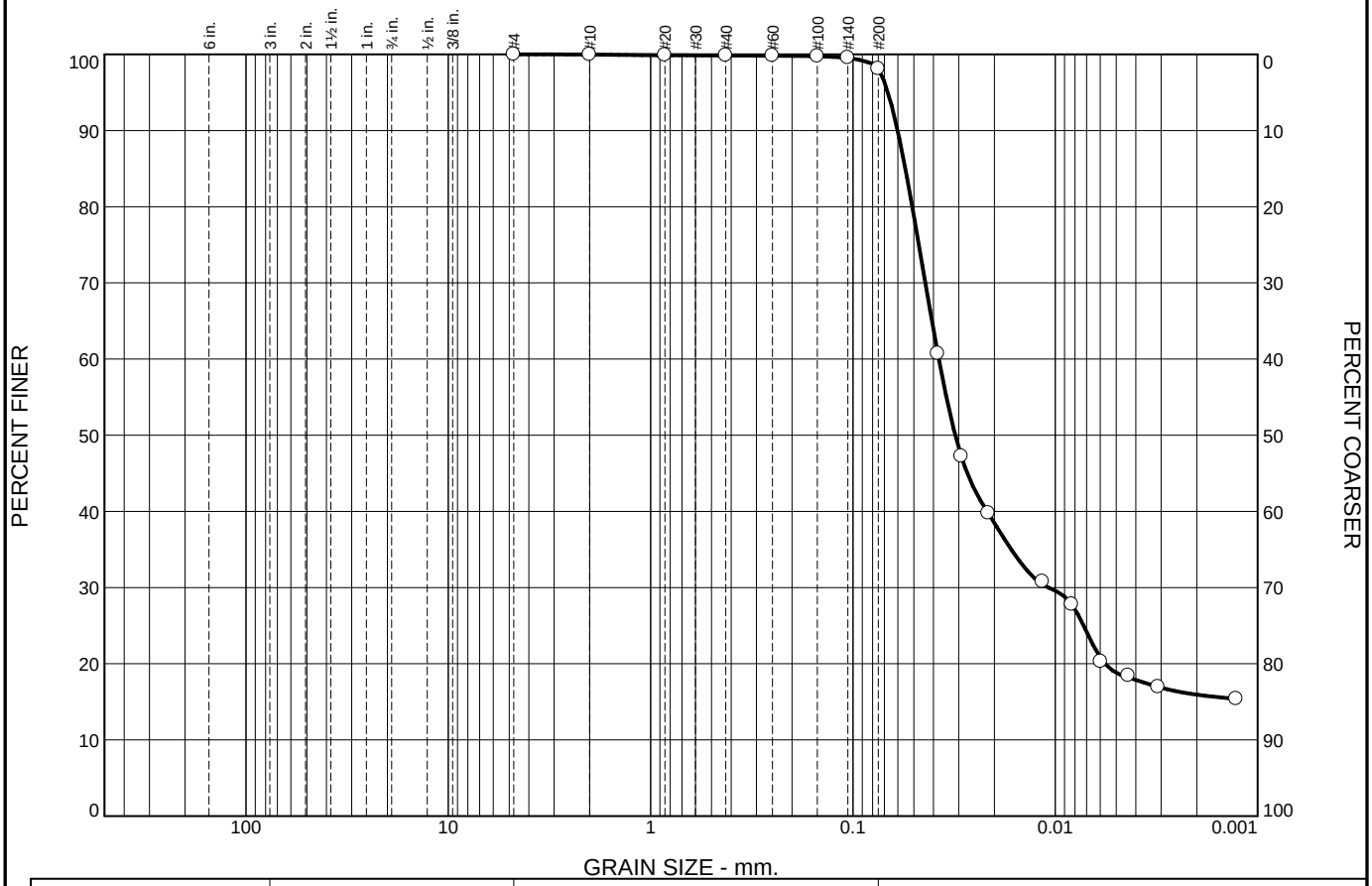
Remarks:
○Specific Gravity was Estimated ASTM D7928-17 was Performed

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH & MJS **Checked By:** CD

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.2	1.7	79.3	18.8

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	47	19	0.0551	0.0377	0.0312	0.0108				

Material Description	USCS	AASHTO
○ Extremely Soft Gray Silty Clay W/ Few Organic Matter and Shell Fragments	CL	A-7-6(30)

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Source of Sample:** BA-2 **Depth:** 6 **Sample Number:** 2A

Remarks:

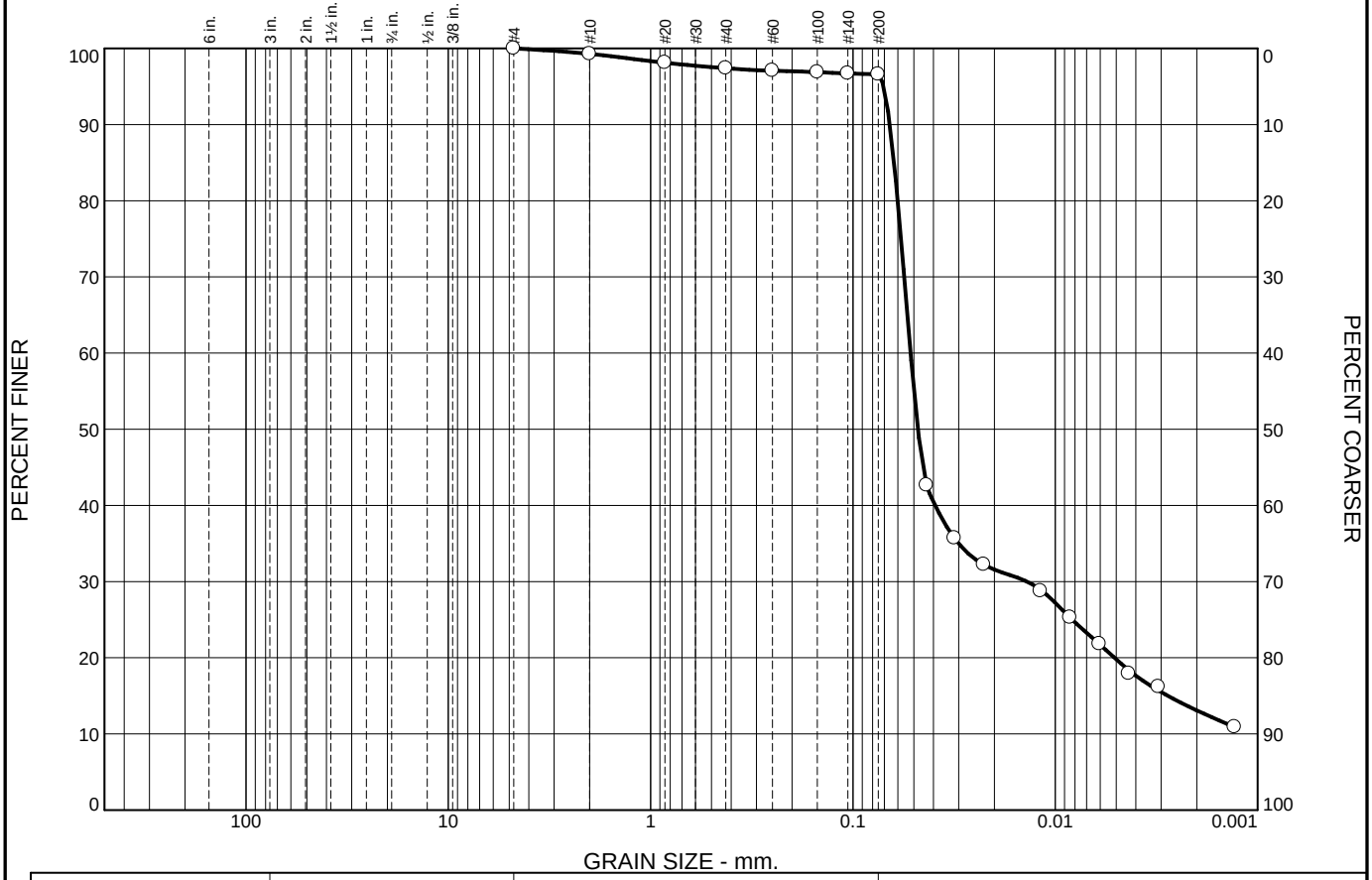
○Specific Gravity was Estimated ASTM D7928-17 was Performed

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH & MJS **Checked By:** CD

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.7	1.9	0.8	76.8	19.8

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	134	29	0.0626	0.0519	0.0478	0.0138	0.0028			

Material Description	USCS	AASHTO
○ Extremely Soft Gray Clay W/ Wood, Roots, Trace of Shell Fragments	CH	A-7-6(119)

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Source of Sample:** BA-2 **Depth:** 14 **Sample Number:** 6A

Remarks:

○Specific Gravity was Estimated ASTM D7928-17 was Performed

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH & MJS **Checked By:** CD

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.1	0.2	64.9	34.8

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	111	27	0.0519	0.0302	0.0138	0.0034				

Material Description	USCS	AASHTO
○ Extremely Soft Gray and Brown Organic Clay W/ Shell Fragments, Trace of Roots and Organic Matter	OH	A-7-6(99)

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Source of Sample:** BA-3 **Depth:** 4.17 **Sample Number:** 1A

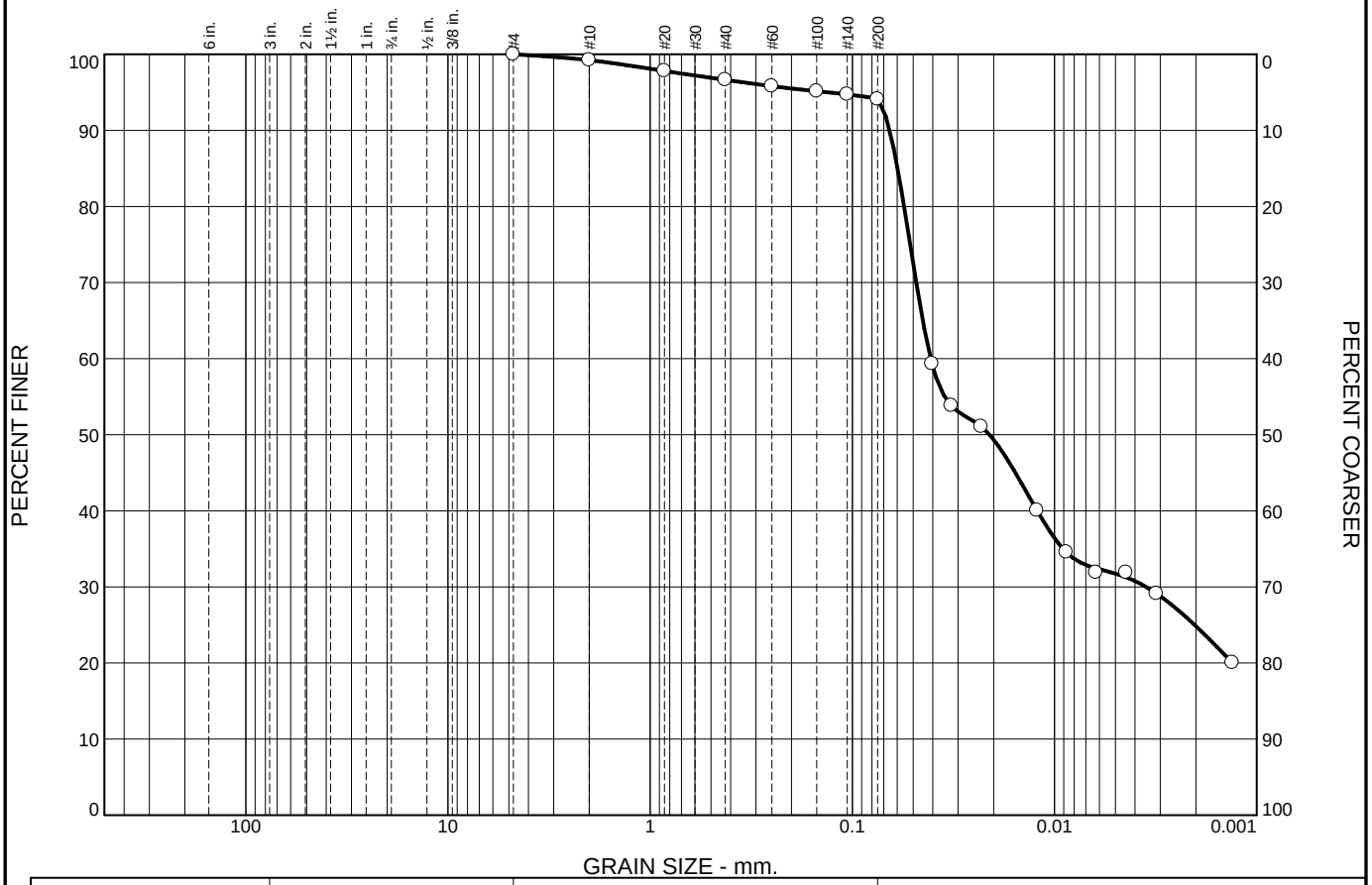
Remarks:
○Specific Gravity was Estimated
ASTM D7928-17 was Performed

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH & MJS **Checked By:** CD

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.8	2.6	2.5	62.4	31.7

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	191	86	0.0598	0.0410	0.0210	0.0035				

Material Description	USCS	AASHTO
○ Extremely Soft Gray Organic Clay W/ Organic MAtter, Roots, Trace of Shell Fragments	MH	A-7-5(131)

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Source of Sample:** BA-3 **Depth:** 12.17 **Sample Number:** 5A

Remarks:

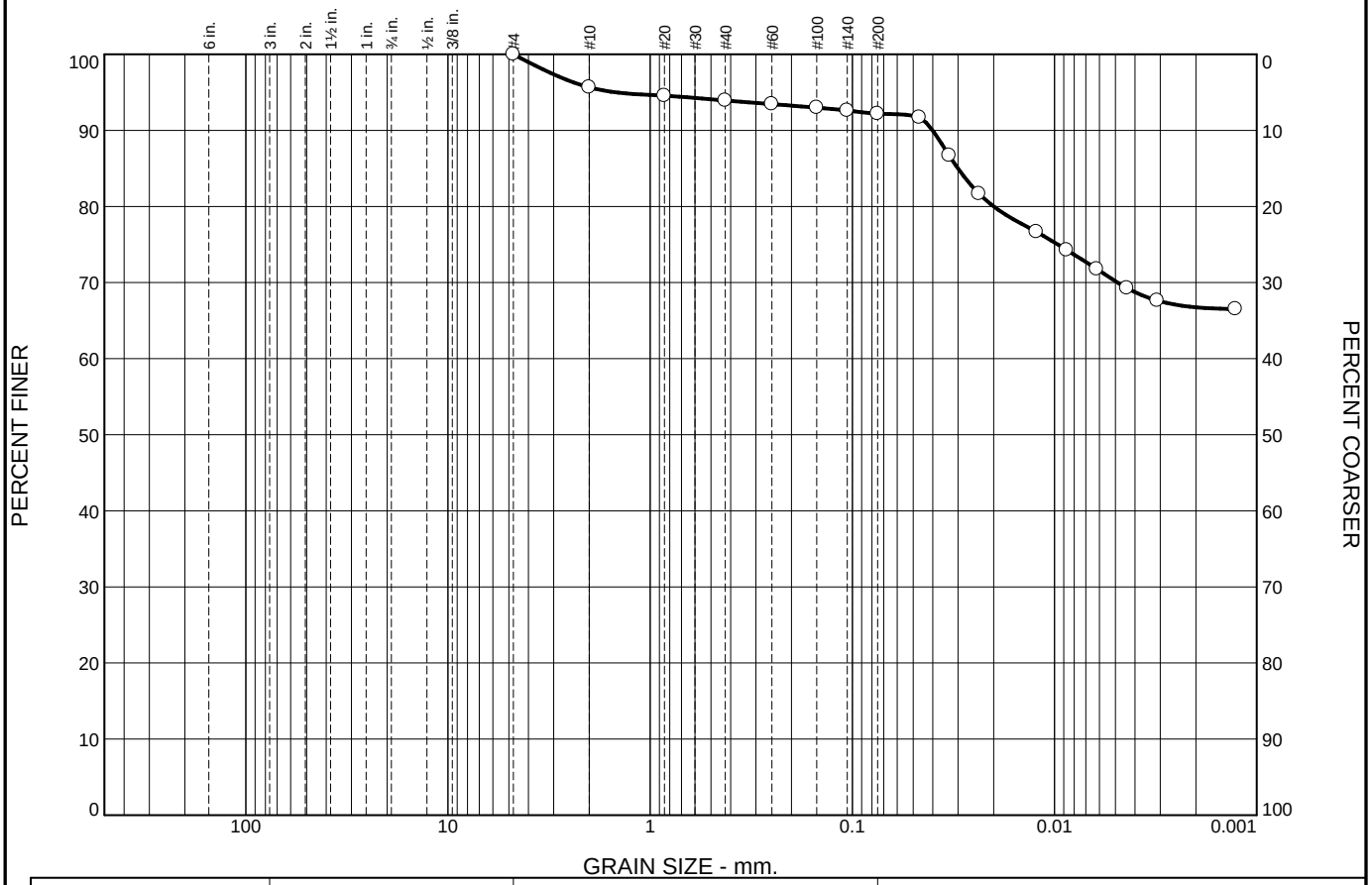
○Specific Gravity was Estimated ASTM D7928-17 was Performed

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH & MJS **Checked By:** CD

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	4.3	1.8	1.7	22.0	70.2

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	118	28	0.0301							

Material Description	USCS	AASHTO
○ Extremely Soft Gray and Dark Gray Organic Clay W/ Traces of Decayed Wood and Shell Fragments	OH	A-7-6(95)

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Source of Sample:** BA-4 **Depth:** 16.17 **Sample Number:** 7A

Remarks:

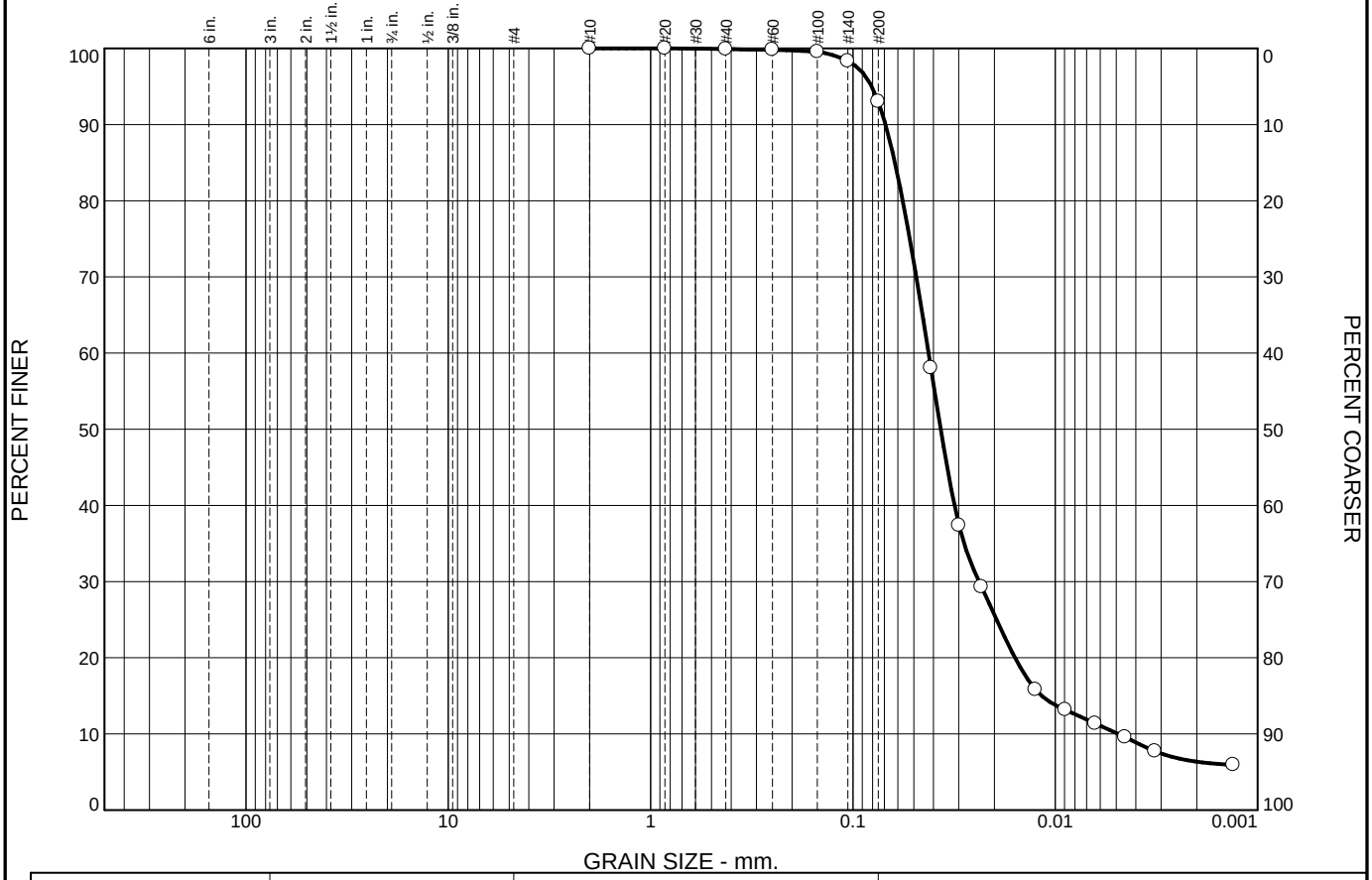
○Specific Gravity was Estimated ASTM D7928-17 was Performed

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH & MJS **Checked By:** CD

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.1	6.9	82.9	10.1

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	57	21	0.0621	0.0423	0.0368	0.0238	0.0117	0.0049	2.75	8.65

Material Description	USCS	AASHTO
○ Soft Gray Clay W/ Clayey Silt Layer, Fine Sand Len	CH	A-7-6(37)

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Source of Sample:** BA-4 **Depth:** 19.17 **Sample Number:** 8B

Remarks:

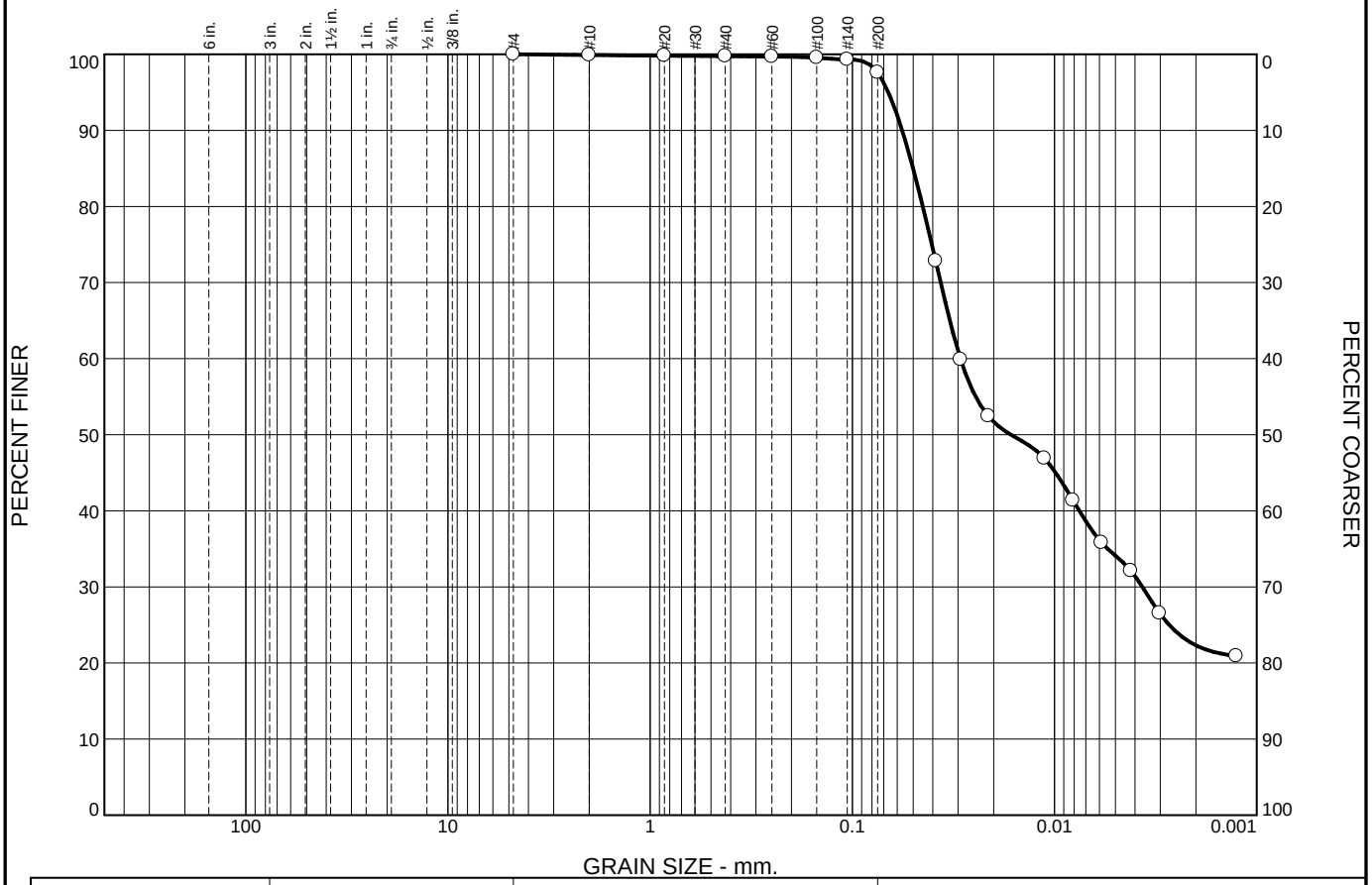
○Specific Gravity was Estimated ASTM D7928-17 was Performed

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH & MJS **Checked By:** CD

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.1	0.1	2.2	63.5	34.1

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	51	18	0.0501	0.0292	0.0164	0.0037				

Material Description	USCS	AASHTO
○ Extremely Soft Gray Clay W/ Shell Fragments	CH	A-7-6(35)

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Source of Sample:** BA-5 **Depth:** 7 **Sample Number:** 2A

Remarks:

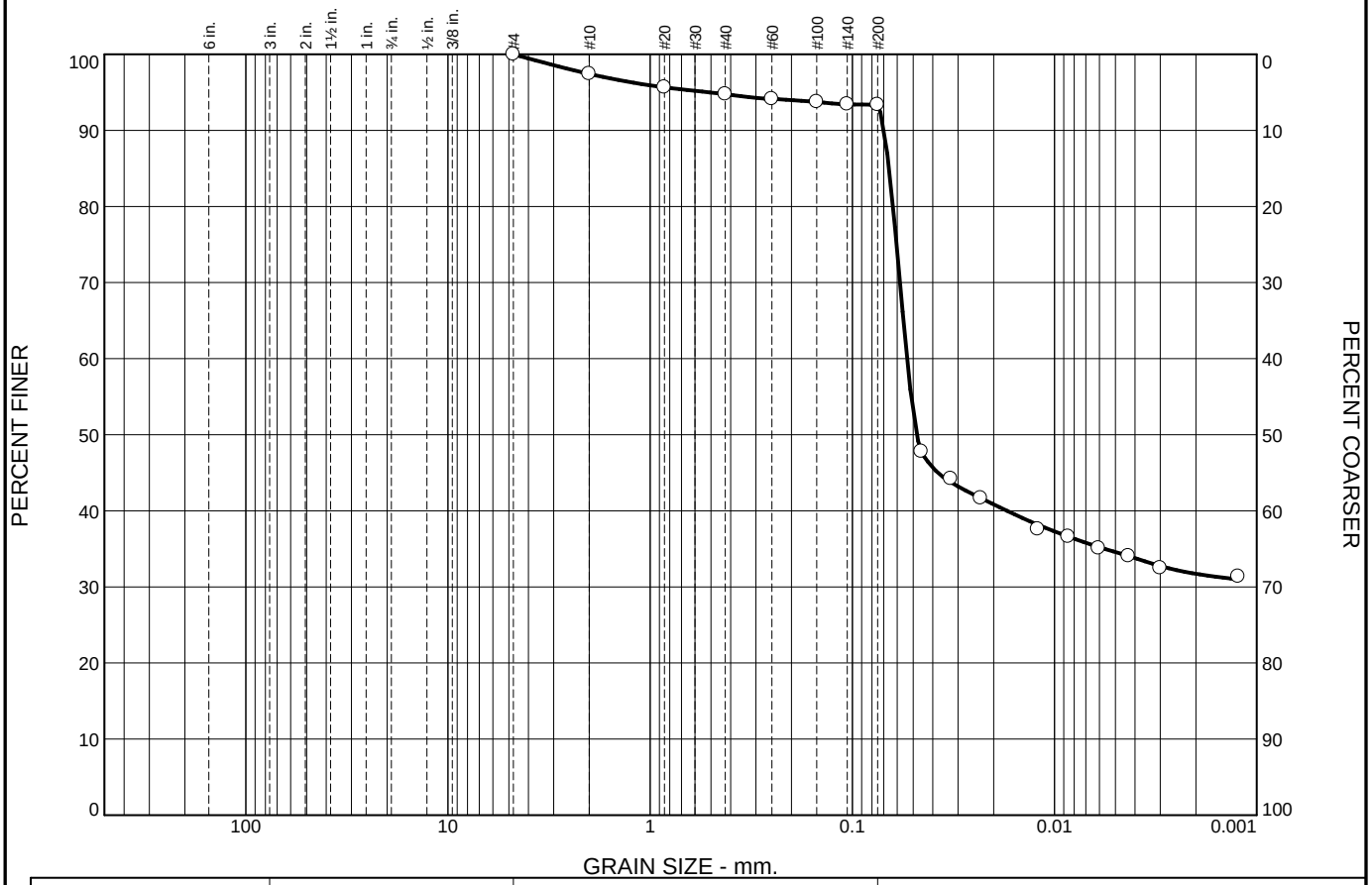
○Specific Gravity was Estimated ASTM D7928-17 was Performed

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH & MJS **Checked By:** CD

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	2.6	2.6	1.4	58.8	34.6

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	155	48	0.0658	0.0536	0.0480					

Material Description	USCS	AASHTO
○ Extremely Soft Gray Clay W/ Organic Matter, Roots, Silty Sand Pockets	CH	A-7-5(121)

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Source of Sample:** BA-5 **Depth:** 15 **Sample Number:** 6A

Remarks:

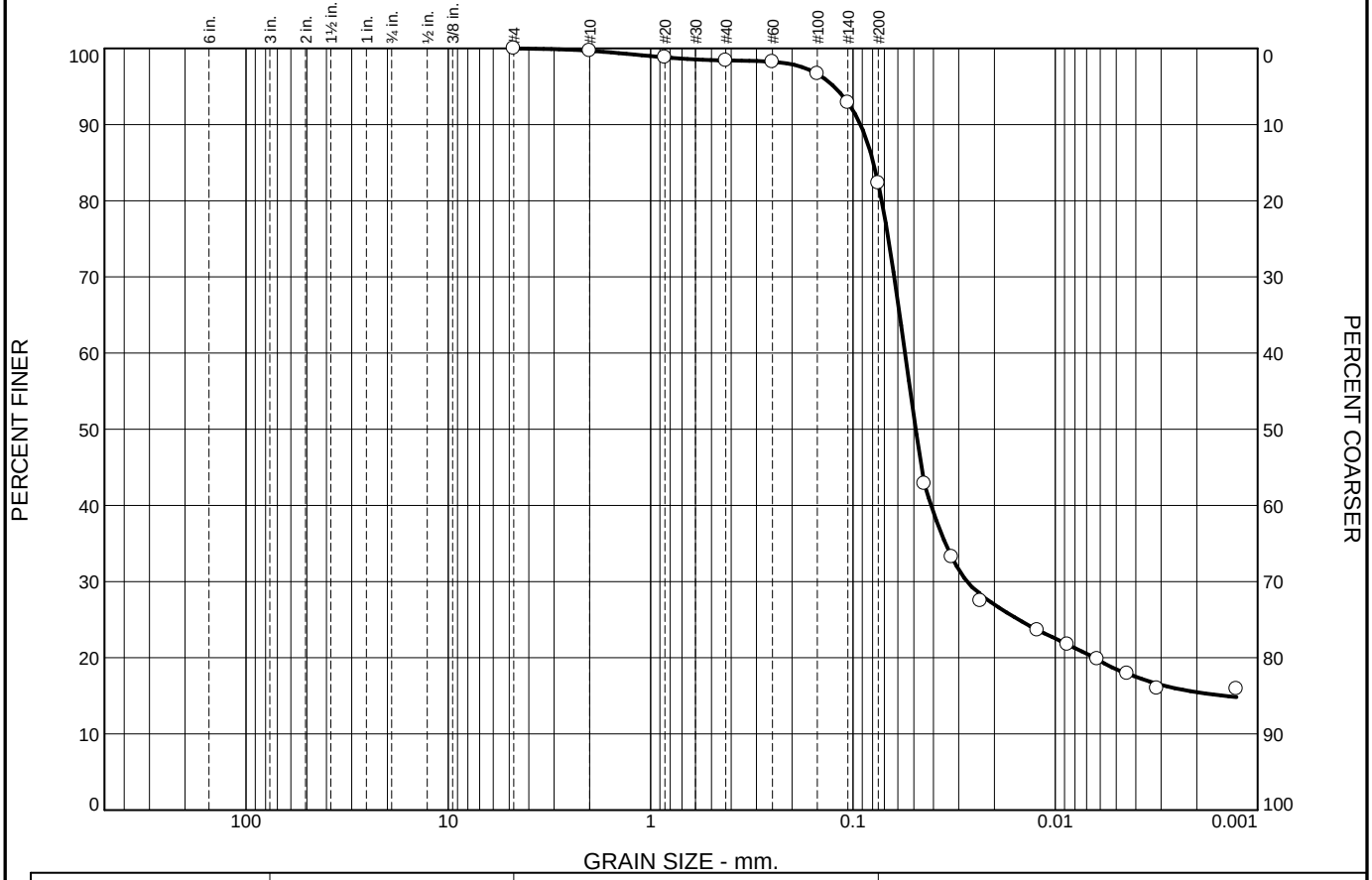
○Specific Gravity was Estimated ASTM D7928-17 was Performed

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH & MJS **Checked By:** CD

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.3	1.3	16.1	63.8	18.5

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	56	27	0.0792	0.0553	0.0489	0.0273	0.0015			

Material Description	USCS	AASHTO
○ Extremely Soft Gray Clay W/ Organic Matter, Silt, Wood, Shell Fragments	CH	A-7-6(26)

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Source of Sample:** BA-6 **Depth:** 13 **Sample Number:** 5A

Remarks:

○Specific Gravity was Estimated ASTM D7928-17 was Performed

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH & MJS **Checked By:** CD

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.2	0.1	77.4	22.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.1879	0.1465	0.1314	0.0958				

Material Description	USCS	AASHTO
○ Loose Gray Silty Sand W/ Few Clay Pockets and Shell Fragments	SM	

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Source of Sample:** BA-6 **Depth:** 17 **Sample Number:** 7A

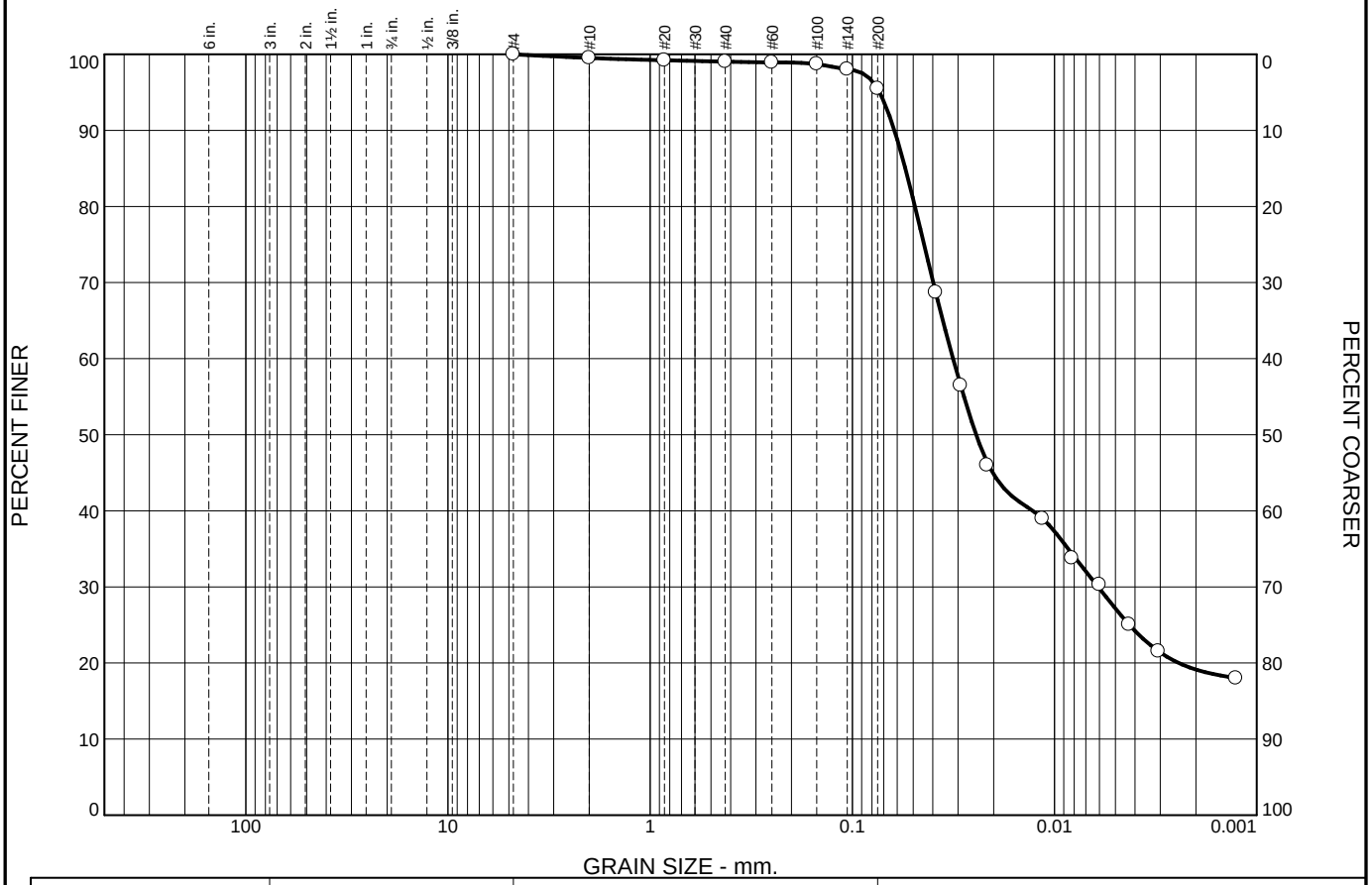
Remarks:

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: MJS **Checked By:** _____

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.5	0.5	3.5	68.3	27.2

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	53	23	0.0547	0.0318	0.0244	0.0061				

Material Description	USCS	AASHTO
○ Extremely Soft Gray Clay W/ Shells and Shell Fragments	CH	A-7-6(32)

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Source of Sample:** BA-7 **Depth:** 9.75 **Sample Number:** 3A

Remarks:

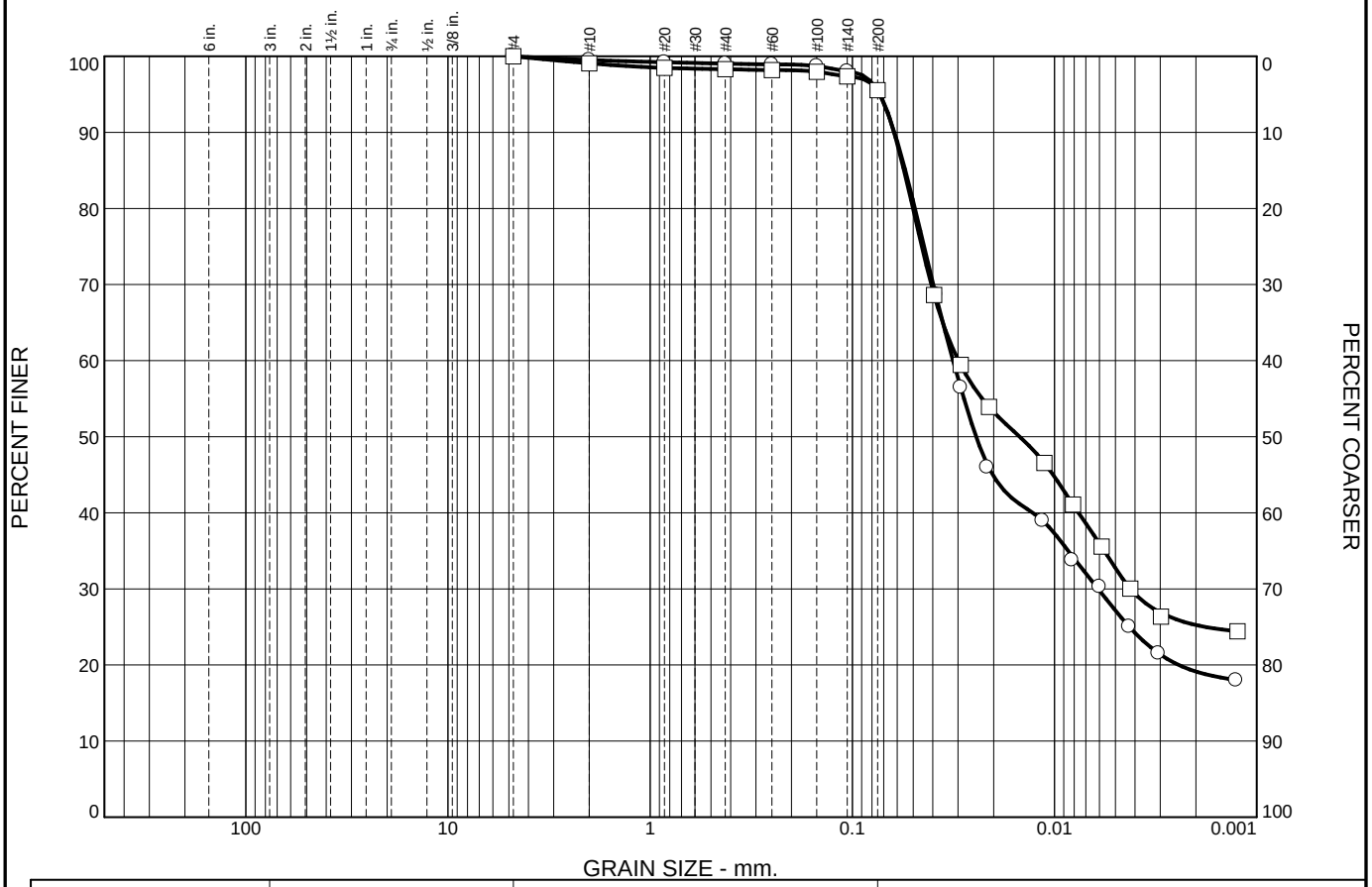
○Specific Gravity was Estimated ASTM D7928-17 was Performed

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH & MJS **Checked By:** CD

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.5	0.5	3.5	68.3	27.2
□	0.0	0.0	0.0	0.9	0.8	2.8	62.8	32.7

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	53	23	0.0547	0.0318	0.0244	0.0061				
□	69	25	0.0555	0.0298	0.0149	0.0042				

Material Description	USCS	AASHTO
○ Extremely Soft Gray Clay W/ Shells and Shell Fragments	CH	A-7-6(32)
□ Extremely Soft Gray Clay W/ Few Fine Sand, Roots and Shell Fragments	CH	A-7-6(49)

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Source of Sample:** BA-7 **Depth:** 9.75 **Sample Number:** 3A

□ **Source of Sample:** BA-7 **Depth:** 11.75 **Sample Number:** 4A

Remarks:

○Specific Gravity was Estimated ASTM D7928-17 was Performed

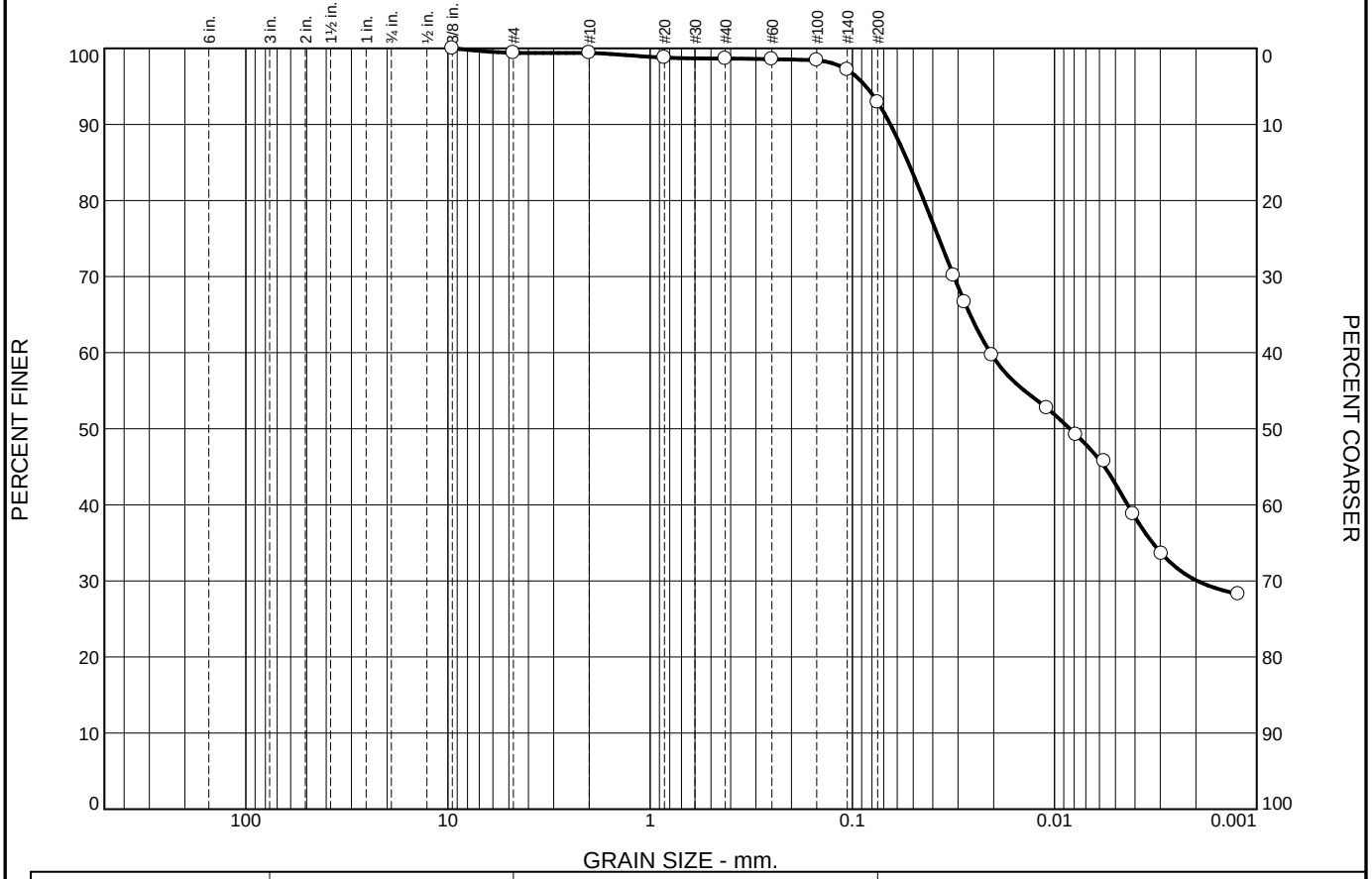
□Specific Gravity was Estimated ASTM D7928-17 was Estimated

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH & MJS **Checked By:** CD

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.6	0.0	0.7	5.8	50.1	42.8

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.0529	0.0208	0.0084	0.0020				

Material Description	USCS	AASHTO
○ Extremely Soft Gray Silty Clay W/ Organic Matter, Few Fine Sand, Trace of Shell Fragments	CL	

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Source of Sample:** BA-8 **Depth:** 12.5 **Sample Number:** 3B

Remarks:

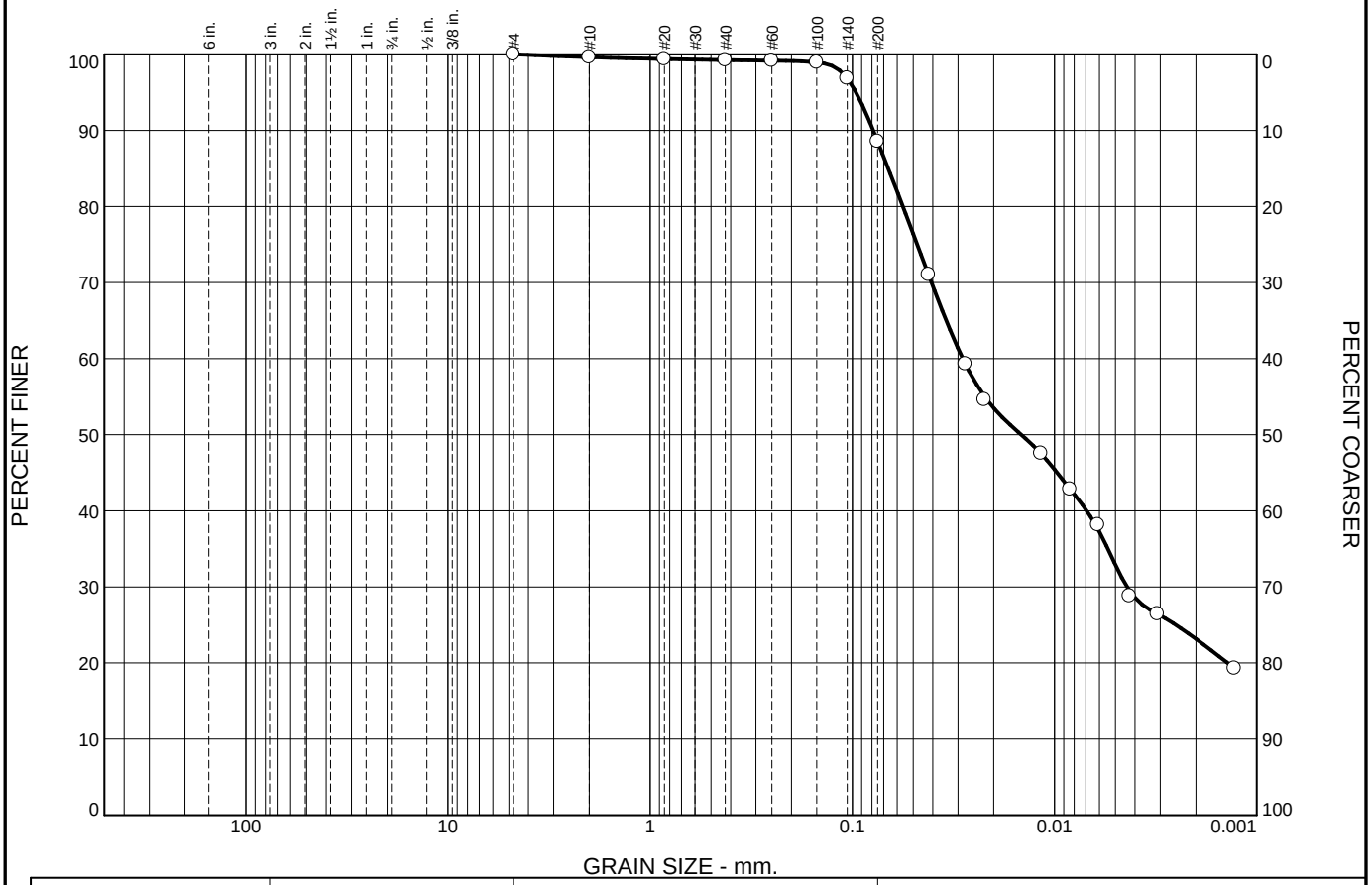
○Specific Gravity was Estimated ASTM D7928-17 was Performed

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH **Checked By:** CD

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.4	0.4	10.6	55.7	32.9

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	60	18	0.0665	0.0285	0.0146	0.0044				

Material Description	USCS	AASHTO
○ Extremely Soft Gray Clay W/ Fine Sand, Traces of Shell Fragments and Organic Matter	CH	A-7-6(40)

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Source of Sample:** BA-8 **Depth:** 15.5 **Sample Number:** 5A

Remarks:

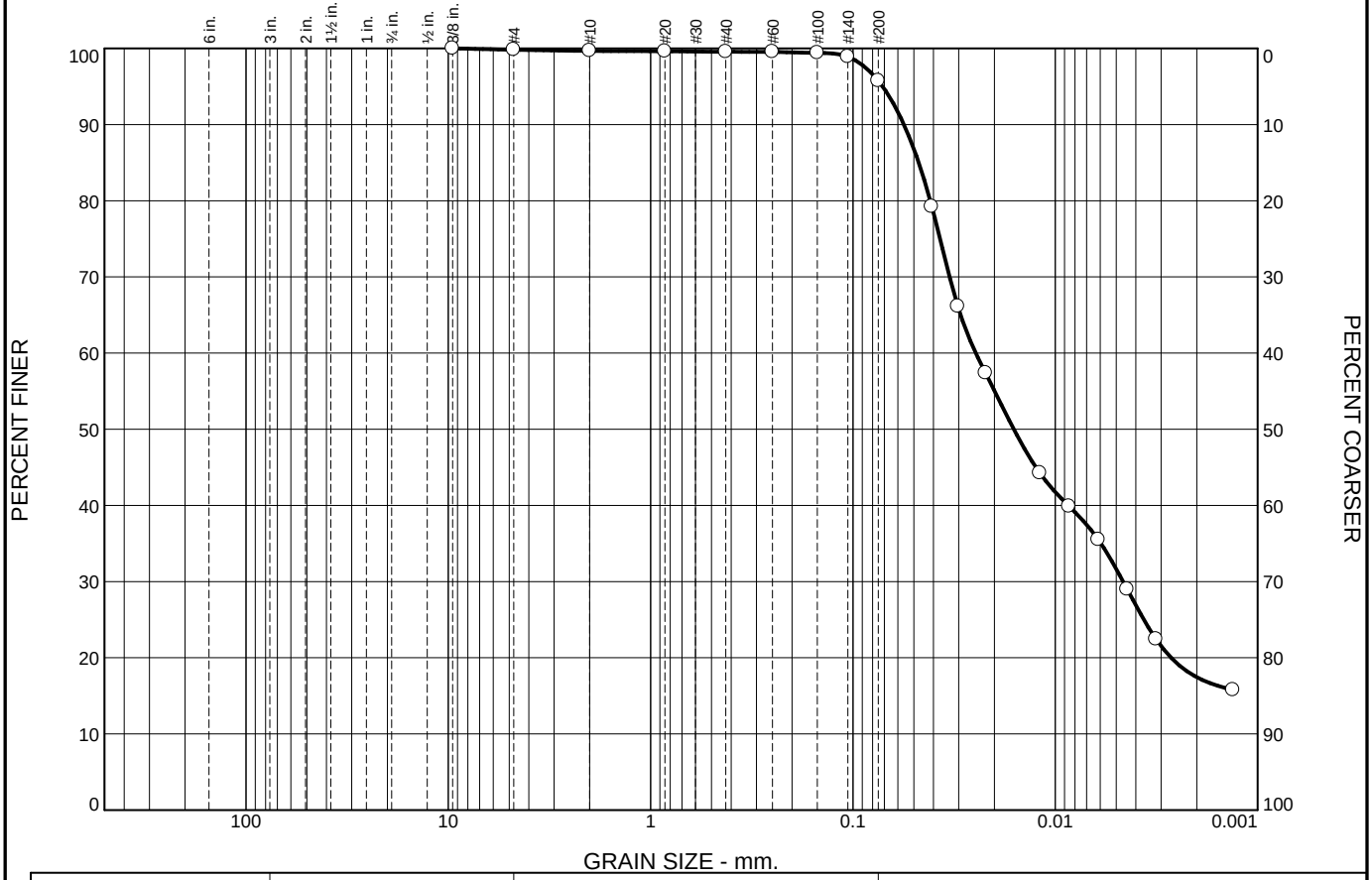
○Specific Gravity was Estimated ASTM D7928-17 was Performed

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH **Checked By:** CD

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.2	0.1	0.1	3.9	64.0	31.7

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	52	19	0.0473	0.0247	0.0160	0.0046				

Material Description	USCS	AASHTO
○ Extremely Soft Dark Gray and Gray Organic Clay W/ Shell Fragments	CH	A-7-6(34)

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Source of Sample:** BA-9 **Depth:** 6.67 **Sample Number:** 2A

Remarks:

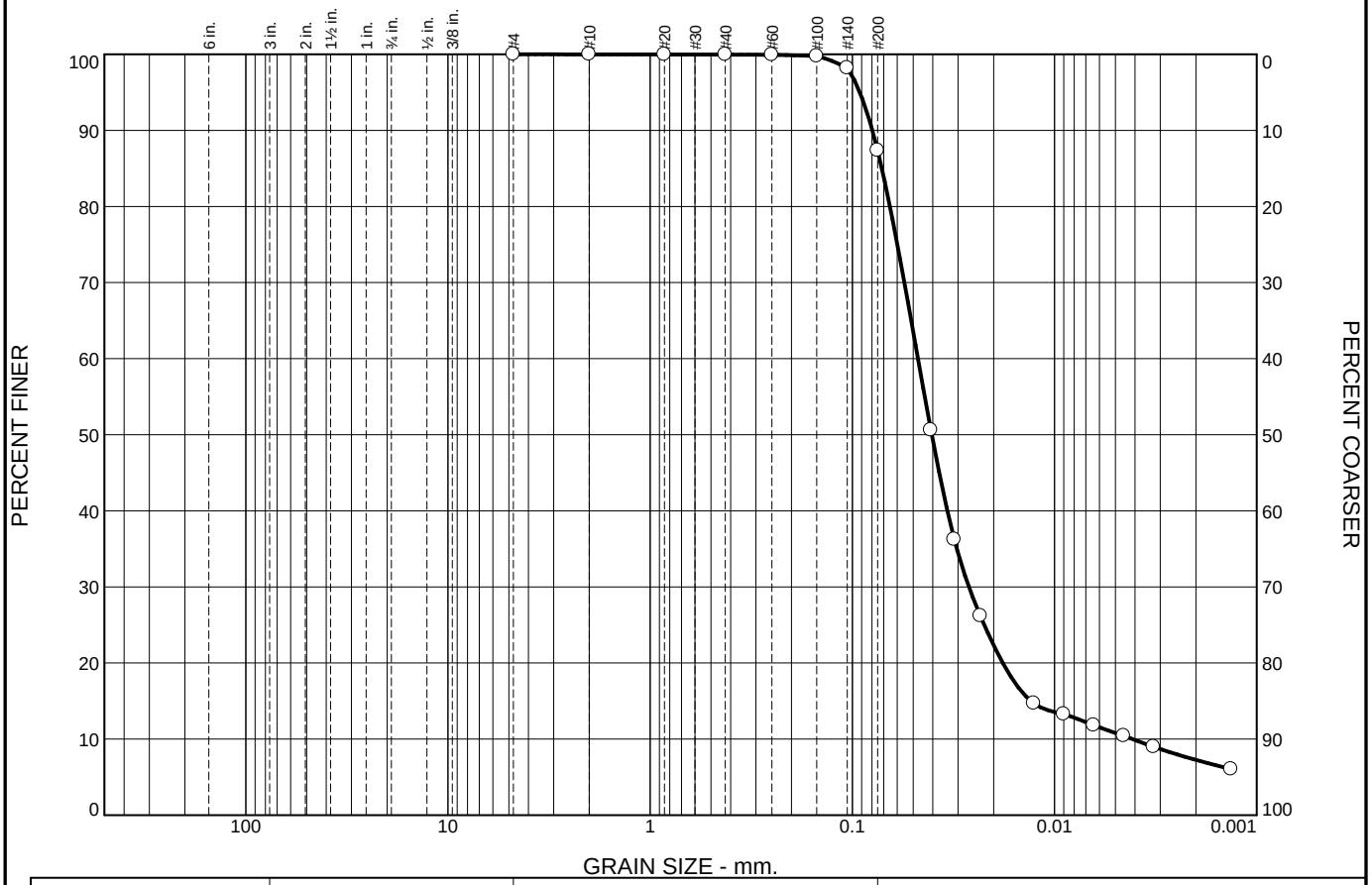
○Specific Gravity was Estimated ASTM D7928-17 was Performed

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH **Checked By:** CD

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.0	12.6	76.6	10.8

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.0715	0.0474	0.0405	0.0265	0.0131	0.0041	3.60	11.51

Material Description	USCS	AASHTO
○ Very Loose Gray Silt W/ Fine Sand, Clay Lenses	ML	

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Source of Sample:** BA-9 **Depth:** 19.67 **Sample Number:** 8B

Remarks:

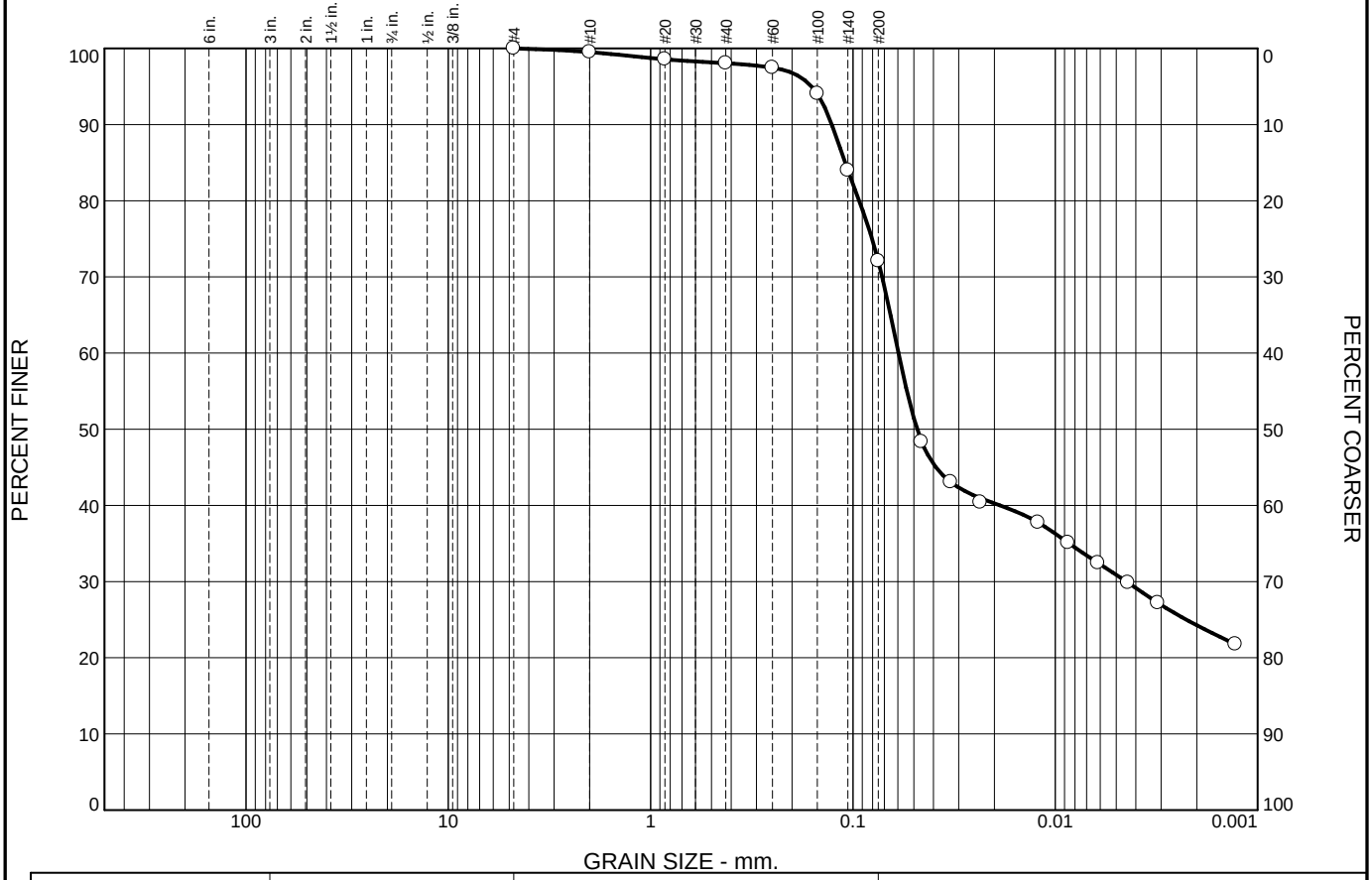
○Specific Gravity was Estimated ASTM D7928-17 was Performed

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH **Checked By:** CD

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.5	1.4	26.0	41.2	30.9

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	80	17	0.1093	0.0595	0.0482	0.0045				

Material Description	USCS	AASHTO
○ Extremely Soft Gray Clay W/ Silty Sand Pockets, Shell Fragment, Organic Matter	CH	A-7-6(45)

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Source of Sample:** BA-10 **Depth:** 11.92 **Sample Number:** 4A

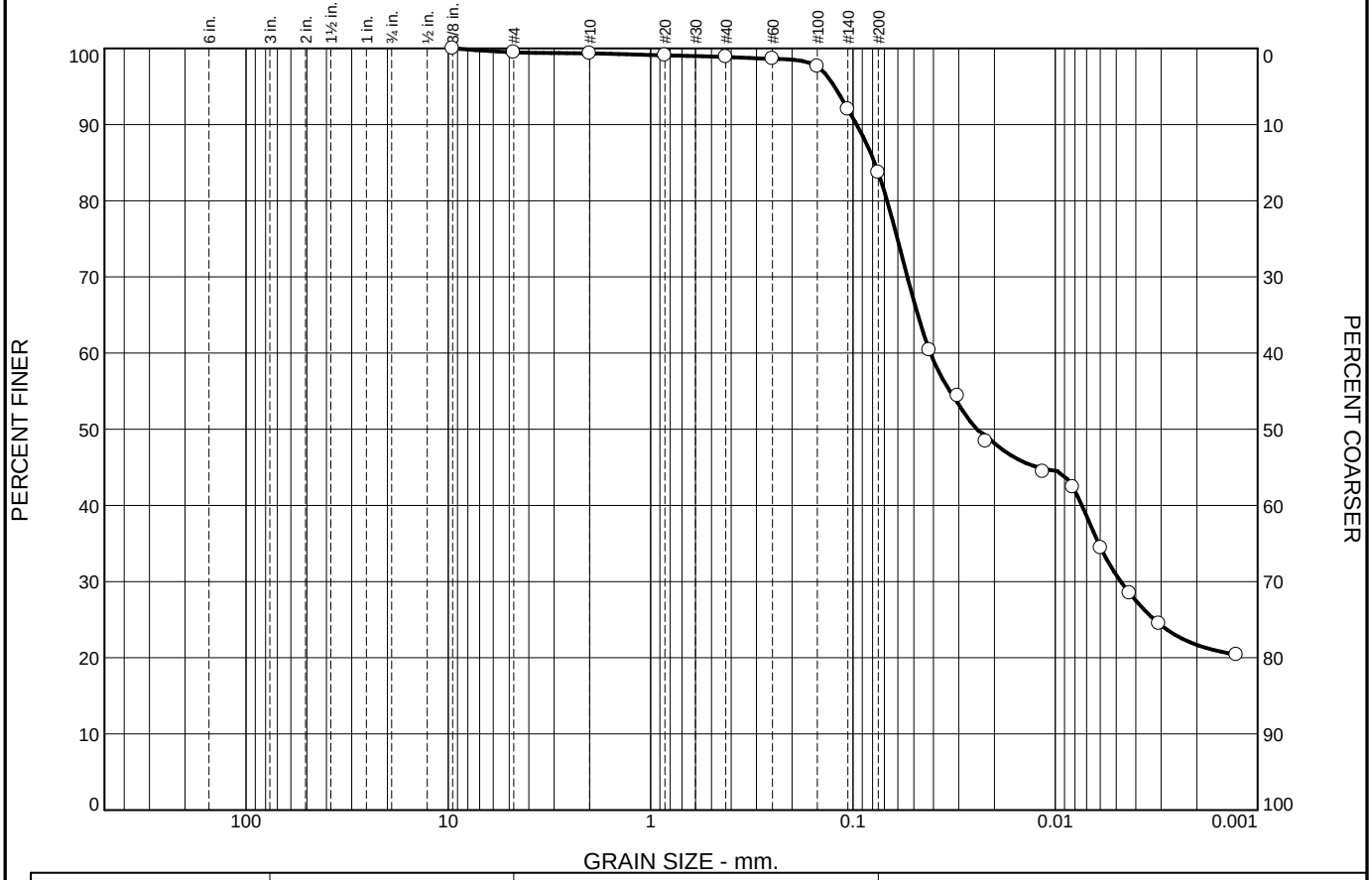
Remarks:
○Specific Gravty was Estimated ASTM D7928-17 was Performed

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH **Checked By:** CD

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.5	0.2	0.4	15.2	52.8	30.9

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	57	19	0.0781	0.0414	0.0245	0.0047				

Material Description	USCS	AASHTO
○ Extremely Soft Gray Clay W/ Silt Pockets, Shell Fragments, Trace of Wood	CH	A-7-6(33)

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Source of Sample:** BA-11 **Depth:** 11.33 **Sample Number:** 5A

Remarks:

○Specific Gravity was Estimated

ASTM D7928-17 was Performed

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH **Checked By:** CD

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.2	0.1	1.9	59.9	37.9

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	54	18	0.0385	0.0102	0.0078	0.0038				

Material Description	USCS	AASHTO
○ Extremely Soft Gray Clay W/ Silty Sand Pockets, Shell Fragments	CH	A-7-6(39)

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Source of Sample:** BA-12 **Depth:** 9 **Sample Number:** 3A

Remarks:

○Specific Gravity was Estimated ASTM D7928-17 was Performed

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH **Checked By:** CD

APPENDIX VII
SETTLING COLUMN TEST RESULTS

Pace Analytical Services, LLC
1000 Riverbend Blvd - Suite F
St. Rose, LA 70087
(504)469-0333

ANALYTICAL RESULTS

Project: East Delacroix
Pace Project No.: 20178218

Sample: Water sample/ 24431 **Lab ID: 20178218001** Collected: 11/03/20 00:00 Received: 11/03/20 15:38 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Salinity by Conductivity	Analytical Method: SM 2520B Modified Pace Analytical Services - New Orleans							
Salinity	**6100**	mg/L	1.0	1		11/04/20 11:44		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1000 Riverbend Blvd - Suite F
St. Rose, LA 70087
(504)469-0333

QUALITY CONTROL DATA

Project: East Delacroix
Pace Project No.: 20178218

QC Batch: 205941
QC Batch Method: SM 2520B Modified
Analysis Method: SM 2520B Modified
Analysis Description: 2520B Salinity by Conductivity
Laboratory: Pace Analytical Services - New Orleans
Associated Lab Samples: 20178218001

METHOD BLANK: 963235 Matrix: Water
Associated Lab Samples: 20178218001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Salinity	mg/L	ND	1.0	11/04/20 11:41	

LABORATORY CONTROL SAMPLE: 963236

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Salinity	mg/L	25000	24500	98	90-110	

SAMPLE DUPLICATE: 963237

Parameter	Units	20178218001 Result	Dup Result	RPD	Max RPD	Qualifiers
Salinity	mg/L	6100	6100	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

GRAIN SIZE DISTRIBUTION TEST DATA

12/7/2020

Client: STATE OF LOUISIANA, OFFICE OF COASTAL PROTECTION AND RESTORATION AUTHORITY, BATON ROUGE, LOUISIANA

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA), EAST DELACROIX MARSH CREATION PROJECT, ST. BERNARD PARISH, LOUISIANA CONTRACT NO. 4400015385. PROJECT NO. BS-0037. TASK NO. 4

Project Number: 24431

Location: Settlement Composite

Material Description: Gray Clay w/ Traces of Fine Sand, Organic Matter and Shell Fragments

Liquid Limit: 59 **Plastic Limit:** 21

USCS Classification: CH

Testing Remarks: Organic Content = 3.52%

Tested by: BH **Checked by:** RR

Material specification: 24438

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 2.60
Tare Wt. = 0.00
Minus #200 from wash = 94.9%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained	Lower Spec. Limit, %	Upper Spec. Limit, %	Deviation From Spec., %
50.75	0.00	0.00	#10	0.00	100.0	0.0			
			#20	0.06	99.9	0.1			
			#40	0.15	99.7	0.3			
			#60	0.20	99.6	0.4			
			#100	0.30	99.4	0.6			
			#140	0.71	98.6	1.4			
			#200	2.23	95.6	4.4			

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 100.0
Weight of hydrometer sample =50.75
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -6.06
Meniscus correction only = 0.9
Specific gravity of solids = 2.69
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 **-** 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
0.50	21.8	46.0	40.3	0.0132	46.9	8.6	0.0547	78.7	21.3
1.00	21.8	43.0	37.3	0.0132	43.9	9.1	0.0398	72.8	27.2
2.00	21.8	39.0	33.3	0.0132	39.9	9.8	0.0291	65.0	35.0
5.00	21.8	35.0	29.3	0.0132	35.9	10.4	0.0190	57.2	42.8
15.00	21.8	30.0	24.3	0.0132	30.9	11.2	0.0114	47.5	52.5
30.00	21.8	28.0	22.3	0.0132	28.9	11.6	0.0082	43.5	56.5
60.00	21.9	25.0	19.3	0.0132	25.9	12.0	0.0059	37.7	62.3
120.00	21.9	23.0	17.3	0.0132	23.9	12.4	0.0042	33.8	66.2
250.00	22.0	21.0	15.3	0.0132	21.9	12.7	0.0030	30.0	70.0

Hydrometer Test Data (continued)

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1440.00	22.8	16.0	10.6	0.0130	16.9	13.5	0.0013	20.6	79.4

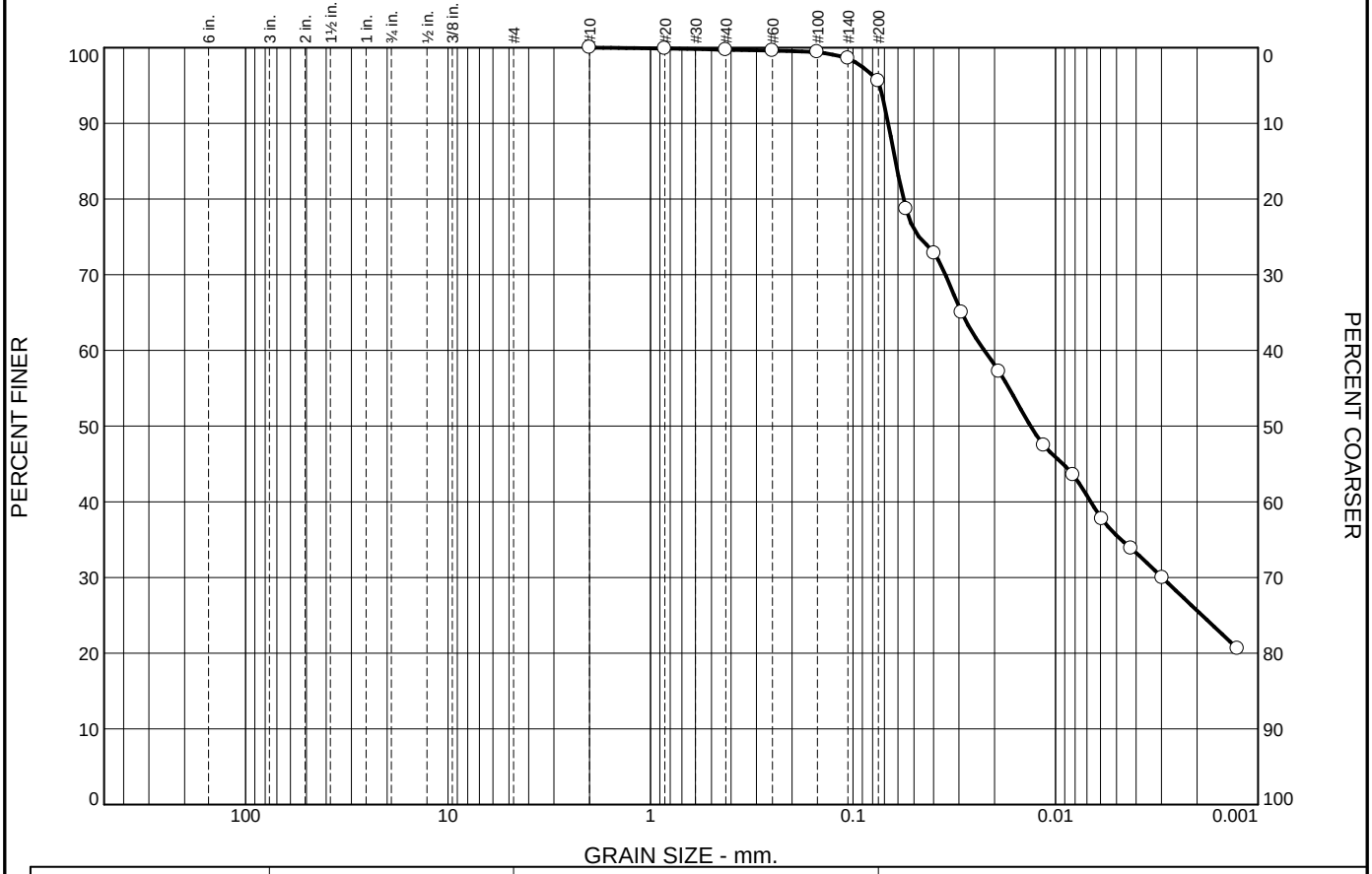
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.3	4.1	4.4	60.0	35.6	95.6

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0030	0.0067	0.0133	0.0225	0.0563	0.0617	0.0671	0.0739

Fineness Modulus
0.01

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.3	4.1	60.0	35.6

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○	59	21	0.0617	0.0225	0.0133	0.0030				

Material Description	USCS	AASHTO
○ Gray Clay w/ Traces of Fine Sand, Organic Matter and Shell Fragments	CH	

Project No. 24431 **Client:** STATE OF LOUISIANA, OFFICE OF COASTAL

Project: LOUISIANA, STATE OF - COASTAL PROTECTION AND RESTORATION AUTHORITY (CPRA),

○ **Location:** Settlement Composite

Remarks:

○Organic Content = 3.52%

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: BH **Checked By:** RR

SETTLING COLUMN DATA SHEET

Project ID: LCA Budmat, Barataria Bay Waterway, Jefferson Parish, Louisiana
Eustis Engineering Project No. 24097

Date: 4/28/20 to 5/13/20

Analyst: Ryan Rodrigue, and BH

Salinity: 6100 mg/l
6.1 ppt

Initial Conc: 151.2 g/L

Target Conc: 150.0 g/L

Specifc Gravity: 2.59

Date	Time	Elapsed Time (min)	Surface Water Height in feet	Solids Interface Height in feet	Coarse Material Height in inches	Ports Sampled
11/9/2020	8:00	0	6.41	6.41	NA	1, 2, 3, 4, 5, 6 for concentration check
11/9/2020	8:05	5	6.39	6.39		
11/9/2020	8:20	20	6.39	6.37		
11/9/2020	8:25	25	6.39	6.36		
11/9/2020	8:35	35	6.39	6.35		
11/9/2020	8:40	40	6.39	6.34		
11/9/2020	8:45	45	6.39	6.33		
11/9/2020	8:50	50	6.39	6.32		
11/9/2020	8:55	55	6.39	6.31		
11/9/2020	9:05	65	6.39	6.3		
11/9/2020	9:15	75	6.39	6.29		
11/9/2020	9:30	90	6.39	6.27		
11/9/2020	9:45	105	6.39	6.25		
11/9/2020	10:00	120	6.39	6.23		
11/9/2020	10:15	135	6.39	6.21		
11/9/2020	10:30	150	6.39	6.18		
11/9/2020	10:45	165	6.39	6.15		
11/9/2020	11:00	180	6.39	6.13		
11/9/2020	11:15	195	6.39	6.11		
11/9/2020	11:30	210	6.39	6.08		
11/9/2020	11:45	225	6.39	6.05		
11/9/2020	12:00	240	6.39	6.03		
11/9/2020	12:15	255	6.39	6		
11/9/2020	12:30	270	6.39	5.98		
11/9/2020	12:45	285	6.39	5.95		
11/9/2020	13:00	300	6.39	5.93		
11/9/2020	13:15	315	6.39	5.91		
11/9/2020	13:30	330	6.39	5.88		
11/9/2020	14:00	360	6.39	5.86		
11/9/2020	14:15	375	6.39	5.83		
11/9/2020	14:30	390	6.39	5.81		
11/9/2020	14:45	405	6.39	5.79		
11/9/2020	15:00	420	6.39	5.75		
11/9/2020	15:15	435	6.39	5.74		
11/9/2020	15:30	450	6.39	5.72		
11/9/2020	15:45	465	6.39	5.69		
11/9/2020	16:00	480	6.39	5.67		
11/9/2020	16:15	495	6.39	5.64		

SETTLING COLUMN DATA SHEET

Project ID: LCA Budmat, Barataria Bay Waterway, Jefferson Parish, Louisiana
Eustis Engineering Project No. 24097

Date: 4/28/20 to 5/13/20

Analyst: Ryan Rodrigue, and BH

Salinity: 6100 mg/l
6.1 ppt

Initial Conc: 151.2 g/L

Target Conc: 150.0 g/L

Specifc Gravity: 2.59

Date	Time	Elapsed Time (min)	Surface Water Height in feet	Solids Interface Height in feet	Coarse Material Height in inches	Ports Sampled
11/9/2020	16:30	510	6.39	5.62		
11/9/2020	18:00	600	6.39	5.44		
11/9/2020	20:10	730	6.39	5.23		
11/10/2020	6:23	1343	6.39	4.5		
11/10/2020	7:20	1400	6.39	3.91		
11/10/2020	8:20	1460	6.39	3.76		
11/10/2020	8:50	1490	6.39	3.68		
11/10/2020	9:30	1530	6.39	3.56		
11/10/2020	10:00	1560	6.39	3.49		
11/10/2020	10:30	1590	6.39	3.46		
11/10/2020	11:00	1620	6.39	3.45		
11/10/2020	11:30	1650	6.39	3.44		
11/10/2020	12:00	1680	6.39	3.43		
11/10/2020	13:00	1740	6.39	3.42		
11/10/2020	13:30	1770	6.39	3.41		
11/10/2020	14:00	1800	6.39	3.4		
11/10/2020	14:30	1830	6.39	3.4		
11/10/2020	15:00	1860	6.39	3.39		
11/10/2020	15:30	1890	6.39	3.38		
11/10/2020	16:00	1920	6.39	3.38		
11/11/2020	6:20	2780	6.39	3.22		
11/11/2020	7:20	2840	6.39	3.21		
11/11/2020	8:20	2900	6.39	3.2		
11/11/2020	9:20	2960	6.39	3.19		
11/11/2020	10:20	3020	6.39	3.18		
11/11/2020	11:20	3080	6.39	3.17		
11/11/2020	13:20	3200	6.39	3.16		
11/11/2020	14:20	3260	6.39	3.15		
11/11/2020	15:20	3320	6.39	3.15		
11/12/2020	6:20	4220	6.39	3.05		
11/12/2020	10:20	4460	6.39	3.04		
11/12/2020	11:20	4520	6.39	3.04		
11/12/2020	13:20	4640	6.39	3.03		
11/12/2020	15:20	4760	6.39	3.02		
11/13/2020	5:40	5620	6.39	2.96		
11/13/2020	7:40	5740	6.39	2.95		
11/13/2020	10:40	5920	6.39	2.94		
11/13/2020	12:40	6040	6.39	2.93		
11/14/2020	10:30	7350	6.39	2.86		
11/15/2020	10:30	8790	6.39	2.8		
11/16/2020	11:00	10260	6.39	2.74		

SETTLING COLUMN DATA SHEET

Project ID: LCA Budmat, Barataria Bay Waterway, Jefferson Parish, Louisiana
Eustis Engineering Project No. 24097

Date: 4/28/20 to 5/13/20

Analyst: Ryan Rodrigue, and BH

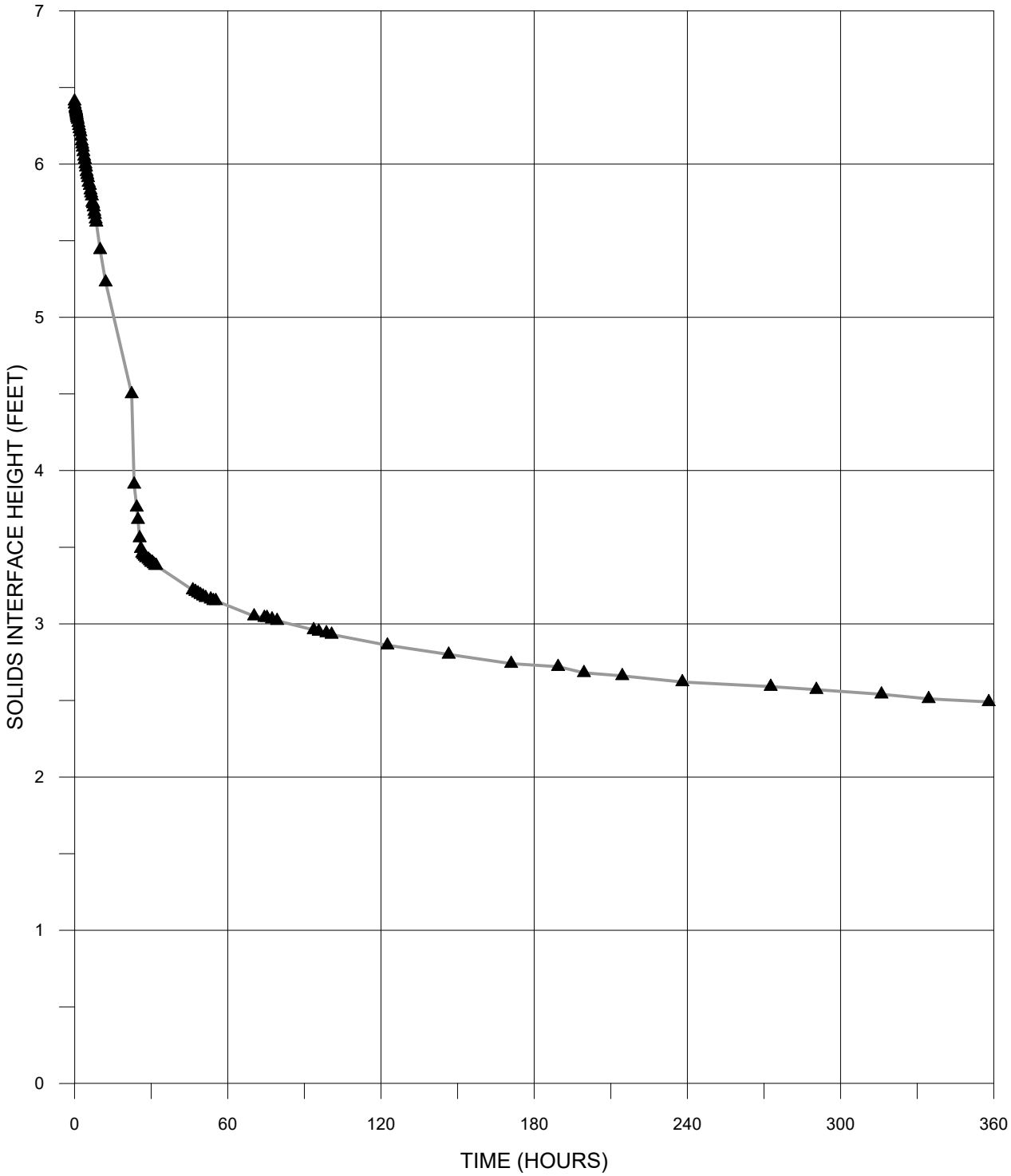
Salinity: 6100 mg/l
6.1 ppt

Initial Conc: 151.2 g/L

Target Conc: 150.0 g/L

Specifc Gravity: 2.59

Date	Time	Elapsed Time (min)	Surface Water Height in feet	Solids Interface Height in feet	Coarse Material Height in inches	Ports Sampled
11/17/2020	5:20	11360	6.39	2.72		
11/17/2020	15:30	11970	6.39	2.68		
11/18/2020	6:30	12870	6.39	2.66		
11/19/2020	6:00	14280	6.39	2.62		
11/20/2020	16:40	16360	6.39	2.59		
11/21/2020	10:30	17430	6.38	2.57		
11/22/2020	12:00	18960	6.38	2.54		
11/23/2020	6:30	20070	6.38	2.51		
11/24/2020	6:00	21480	6.38	2.49		
11/25/2020	5:00	22860	6.38	2.47		
11/30/2020	12:55	30535	6.38	2.38		
12/1/2020	5:00	31500	6.38	2.36		
12/7/2020	10:50	40490	6.38	2.29		



NOTE:

1) THE SETTLING TEST WAS PERFORMED ON COMPOSITE SAMPLES OBTAINED FROM THE BA BORINGS: BA-5, BA-6, BA-7, BA-8, BA-10, BA-12.

2) SAMPLES USED TO FORM THE COMPOSITE CORRESPOND TO AN APPROXIMATE DREDGE CUT DEPTH OF 10 FEET. SAMPLES THAT WERE CLASSIFIED AS HAVING ORGANICS WERE NOT USED IN THE COMPOSITE. THESE SELECTIONS ARE BASED ON CORRESPONDENCE WITH CPRA ON 10-15-2020

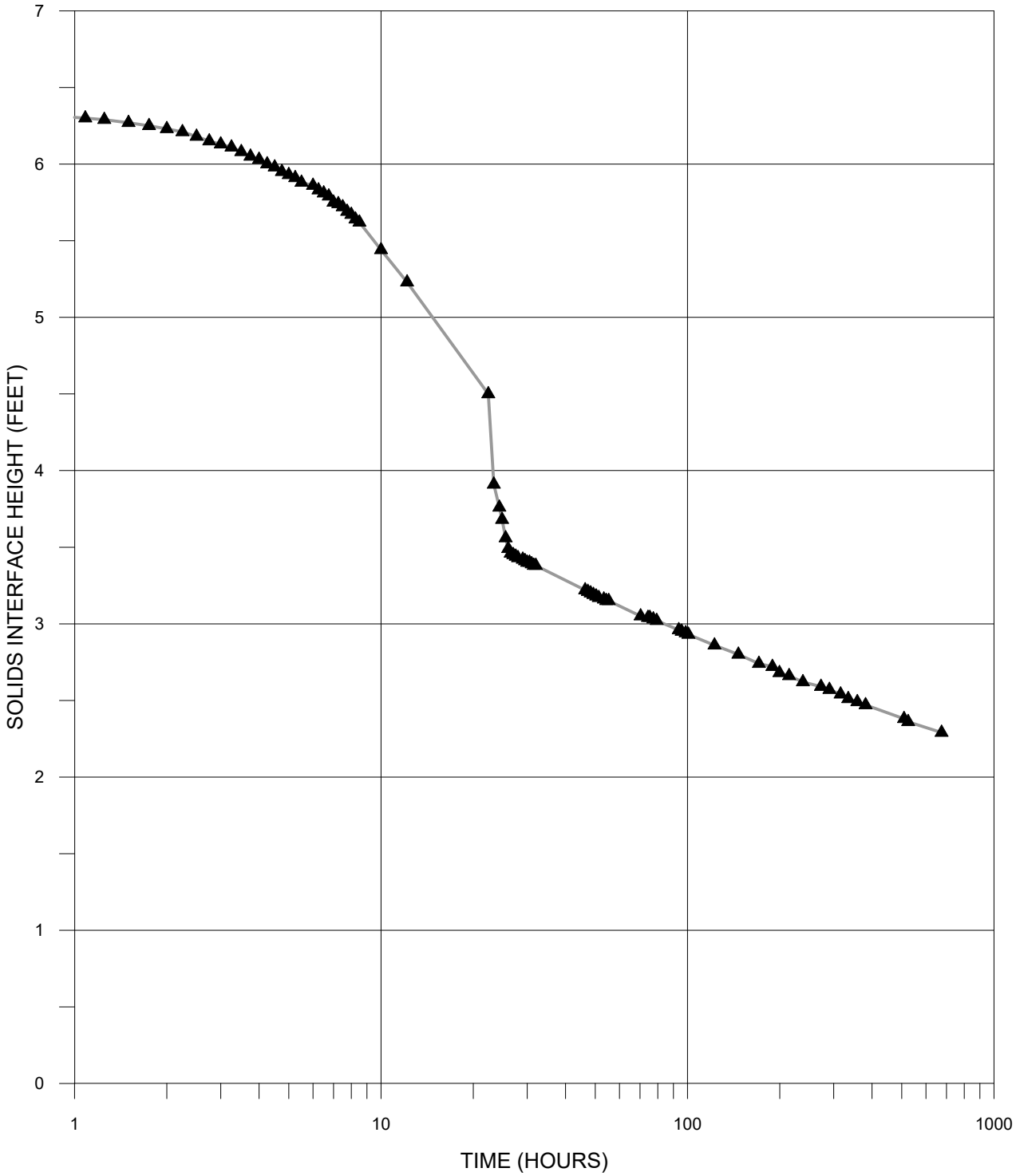
3) AN INITIAL CONCENTRATION OF 151.2 GRAMS PER LITER WAS USED BASED ON TARGET CONCENTRATION OF 150 GRAMS PER LITER.

SETTLING COLUMN TEST RESULTS

STATE OF LOUISIANA
COASTAL PROTECTION AND RESTORATION AUTHORITY
EAST DELACROIX MARSH CREATION PROJECT
PHASE I
ST. BERNARD PARISH, LOUISIANA
CPRA PROJECT NO. BS-0037

EUSTIS ENGINEERING SINCE 1946

DRAWN BY: J.M.W.	JOB NO.: 24431
CHECKED BY: J.J.H.	DATE: 7 DEC. 2020
FILE NAME: 24431 Column Settling Curve.grf	



NOTE:

1) THE SETTLING TEST WAS PERFORMED ON COMPOSITE SAMPLES OBTAINED FROM THE BA BORINGS: BA-5, BA-6, BA-7, BA-8, BA-10, BA-12.

2) SAMPLES USED TO FORM THE COMPOSITE CORRESPOND TO AN APPROXIMATE DREDGE CUT DEPTH OF 10 FEET. SAMPLES THAT WERE CLASSIFIED AS HAVING ORGANICS WERE NOT USED IN THE COMPOSITE. THESE SELECTIONS ARE BASED ON CORRESPONDENCE WITH CPRA ON 10-15-2020

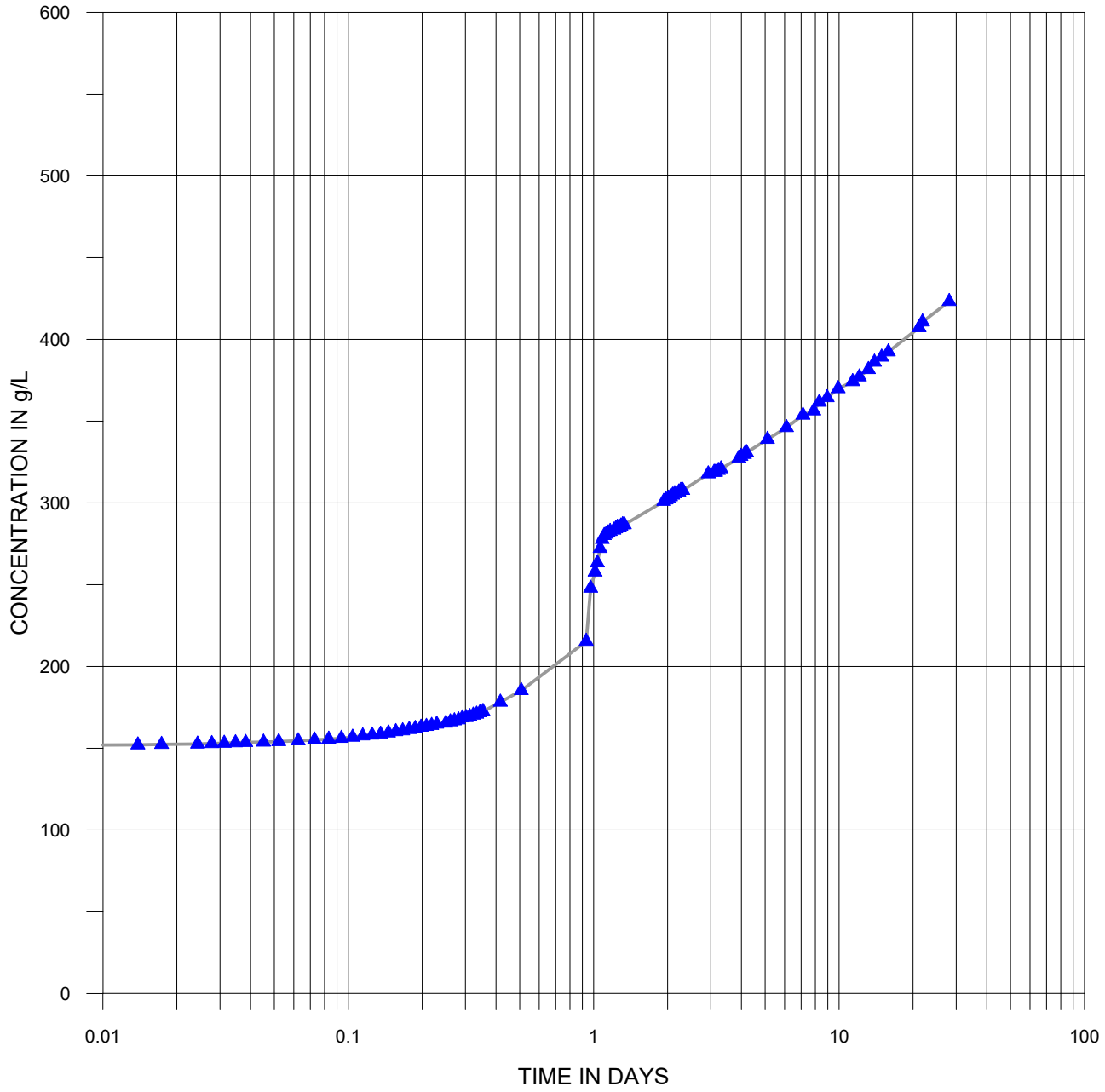
3) AN INITIAL CONCENTRATION OF 151.2 GRAMS PER LITER WAS USED BASED ON TARGET CONCENTRATION OF 150 GRAMS PER LITER.

SETTLING COLUMN TEST RESULTS

STATE OF LOUISIANA
COASTAL PROTECTION AND RESTORATION AUTHORITY
EAST DELACROIX MARSH CREATION PROJECT
PHASE I
ST. BERNARD PARISH, LOUISIANA
CPRA PROJECT NO. BS-0037

EUSTIS ENGINEERING SINCE 1946

DRAWN BY: J.M.W.	JOB NO.: 24431
CHECKED BY: J.J.H.	DATE: 7 DEC. 2020
FILE NAME: 24431 Column Settling Curve.grf	



NOTES:

1) THE SETTLING TEST WAS PERFORMED ON COMPOSITE SAMPLES OBTAINED FROM THE BA BORINGS: BA-5, BA-6, BA-7, BA-8, BA-10, BA-12.

2) AN INITIAL CONCENTRATION OF 151.2 GRAMS PER LITER WAS USED BASED ON TARGET CONCENTRATION OF 150 GRAMS PER LITER.

3) IN ACCORDANCE WITH CHAPTER 3 OF THE USACE ENGINEERING MANUAL EM 1110-2-5207, THE CONCENTRATIONS FOR VARIOUS INTERFACE HEIGHTS WERE CALCULATED USING EQUATION 3-11, $C_t = (C_O H_i)/H_t$, WHERE C_t IS THE SLURRY CONCENTRATION AT TIME t, C_O IS THE INITIAL SLURRY CONCENTRATION, H_i IS THE INITIAL SLURRY HEIGHT, AND H_t IS THE HEIGHT OF THE INTERFACE AT TIME t.

SETTLING COLUMN TEST RESULTS
INCREASE IN TOTAL SUSPENDED SOLIDS CONCENTRATION OVER TIME

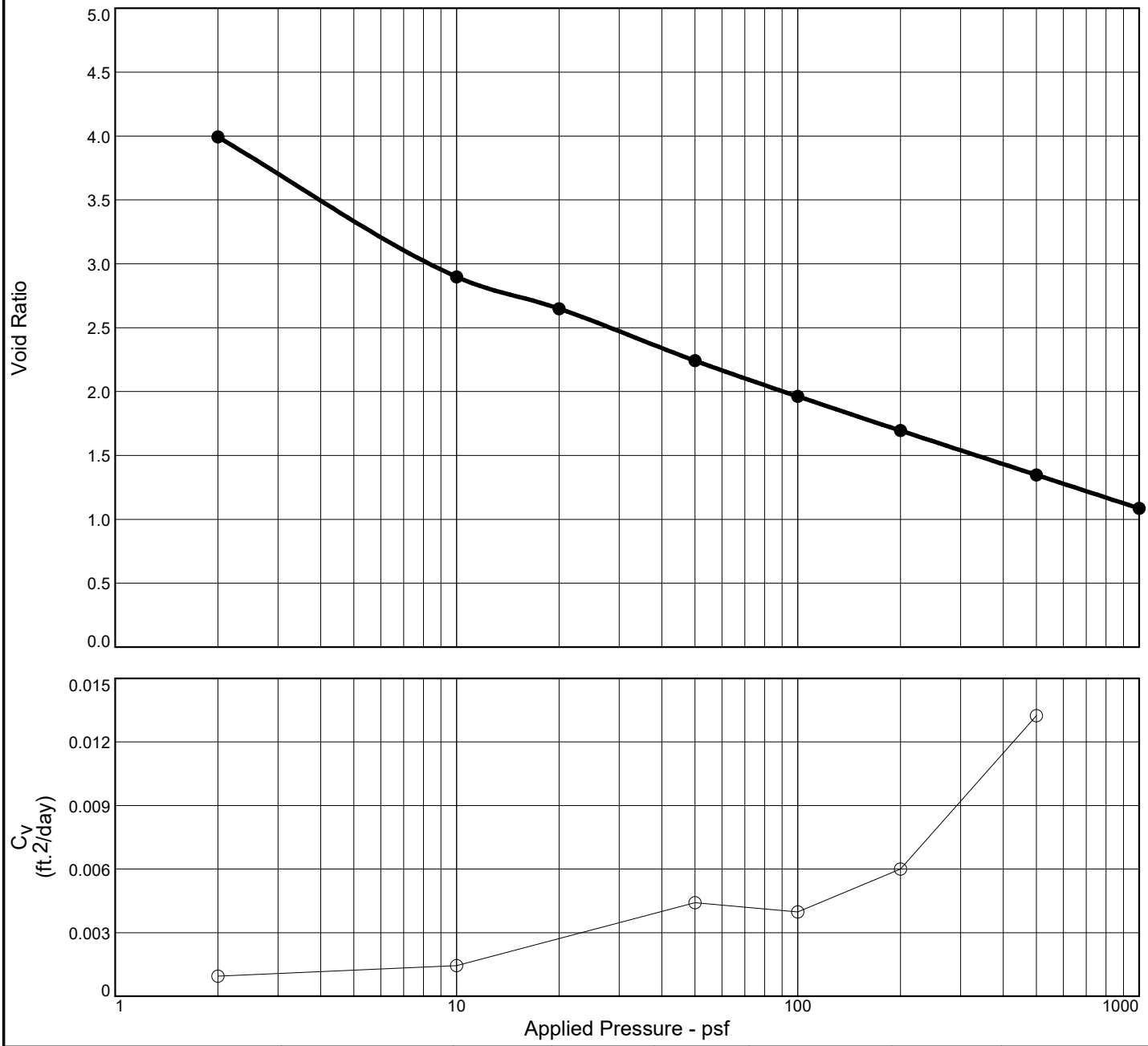
STATE OF LOUISIANA
COASTAL PROTECTION AND RESTORATION AUTHORITY
EAST DELACROIX MARSH CREATION PROJECT
PHASE I
ST. BERNARD PARISH, LOUISIANA
CPRA PROJECT NO. BS-0037

EUSTIS ENGINEERING SINCE 1946

DRAWN BY: J.M.W.	JOB NO.: 24431
CHECKED BY: J.J.H.	DATE: 7 DEC 2020
FILE NAME: 24431 full-scale_ concentration vs log time curve.grf	

APPENDIX VIII
LOW PRESSURE CONSOLIDATION TEST RESULTS

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	P_c (psf)	C_c	Initial Void Ratio
Saturation	Moisture							
104.4 %	197.2 %	27.6	59	38	2.69	0	0.92	5.081

MATERIAL DESCRIPTION	USCS	AASHTO
24431 East Delacroix Borrow Composite	CH	

Project No. 24431 **Client:** STATE OF LOUISIANA, COASTAL PROTECTION

Project: EAST DELACROIX MARSH CREATION PROJECT

EUSTIS ENGINEERING SINCE 1946

Remarks:

Low Pressure High Strain Test. Load Step 1 used machined cap with laser to record deflection. Initial concentration approximately 420 g/L

Figure

Tested By: JMW **Checked By:** RR