ST. TAMMANY PARISH
COASTAL MASTER PLAN
EXECUTIVE SUMMARY AND FINAL REPORT

Appendix B:
Geotechnical Data & Reports

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19 January 2021

Neel-Schaffer, Inc.
Suite G360
10000 Perkins Rowe
Baton Rouge, Louisiana 70810

Attention Mr. Glenn Ledet, Jr., P.E.
Email glenn.ledet@neel-schaffer.com

Ladies and Gentlemen:

Geotechnical Data Gap Analyses
St. Tammany Parish Government
Coastal Flood Protection Project
Task 1
St. Tammany Parish, Louisiana
Eustis Engineering Project No. 24493

Transmitted is an electronic copy of our engineering 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.

STATE OF LOUISIANA
JAMES J. HANCE
License No. 31270
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

N. S. Izzo:cep

GEOTECHNICAL DATA GAP ANALYSES

ST. TAMMANY PARISH GOVERNMENT

COASTAL FLOOD PROTECTION PROJECT

TASK 1

ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING PROJECT NO. 24493

FOR
NEEL-SCHAFFER, INC.
MANDEVILLE, LOUISIANA

By
Eustis Engineering L.L.C.
Baton Rouge, Louisiana

19 JANUARY 2021

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GEOTECHNICAL DATA GAP ANALYSES

ST. TAMMANY PARISH GOVERNMENT

COASTAL FLOOD PROTECTION PROJECT

TASK 1

ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING PROJECT NO. 24493

INTRODUCTION

1. This report contains the results of our geotechnical data gap analysis study to support Neel-Schaffer, Inc. (Neel-Schaffer) with a conceptual design for the St. Tammany Coastal Flood Protection located in St. Tammany Parish, Louisiana. Our report was prepared in accordance with Task 1 of Eustis Engineering L.L.C.'s proposal dated 1 July 2020. Authorization to proceed was provided by Neel-Schaffer with Amendment No. 1 to the Subconsultant Agreement made on 9 November 2020.

SCOPE OF WORK

2. The scope of work as described in Amendment No. 1 to the Subconsultant Agreement involves three tasks. This report only addresses the scope for Task 1. The Task 1 scope included performing an evaluation of the historical geotechnical explorations performed in the vicinity of the three proposed flood protection alignments: the West Slidell Ring levee, the Central Slidell Structural Coastal Flood Risk Reduction ("Slidell Ring levee"), and the Eden Isle Ring Levee. Figure 1 shows preliminary concepts of these three alignments. Each alignment is being considered for 100-year protection. The West Slidell Ring levee and Eden Isle Ring levee are also being considered for 50-year protection levels. Our study included

reviewing the locations and depths of both soil borings and cone penetration tests (CPTs), the types of borings (3-inch diameter vs. 5-inch diameter), and the laboratory testing programs completed for each project. Our review also included organizing the previous explorations with respect to the applicable levee alignment. The scope of work for Task 1 also included a review and discussion of the geology relative to each of the three alignments, and the preparation of preliminary soil design parameters for each of the three alignments. These preliminary soil design parameters will be used to complete Task 2, which is a conceptual design, to assist Neel-Schaffer's preparation of an Order-of-Magnitude Cost Estimate. The conceptual designs will be performed considering the State of Louisiana, Coastal Protection and Restoration Authority's Flood Protection Design Guidelines (LFPDG) (i.e., the State guidelines for 50-year protection) and the U.S. Army Corps of Engineers' Greater New Orleans Hurricane & Storm Damage Risk Reduction System (HSSDRS) Design Guidelines (i.e., the Federal guidelines for 100-year protection). Task 3 of the scope comprises a geotechnical data collection program required to complete a detailed design for each alignment considering State and/or Federal requirements.

FURNISHED INFORMATION

3. We understand that Neel-Schaffer is working with the St. Tammany Parish government and the St. Tammany Levee, Drainage and Conservation District to determine conceptual-level designs and order-of-magnitude cost estimates for design and construction of flood protection along the following flood protection alignments: West Slidell Ring levee, Slidell Ring levee, and Eden Isle Ring levee. The flood protection will comprise various alternatives of earthen levees and cast-in-place concrete floodwalls supported by driven piles (known as T-walls). Approximate locations of each alignment were furnished by Neel-Schaffer and are shown on Figure 1.

REVIEW OF AVAILABLE GEOTECHNICAL INFORMATION

4. Eustis Engineering has prepared numerous geotechnical exploration reports in St. Tammany parish in the vicinity of the proposed flood protection project alignments. We present relevant previous exploration locations with respect to the project features on Figure 2, Sheets 1 through 3. We present information regarding each relevant previous exploration on Figures 3 through 5. The data presented on Figures 3 through 5 includes the previous Eustis Engineering project number, boring or CPT designation, depth, date performed, sampling type, and laboratory testing performed for each exploration location.

5. Geologic Studies. Besides available boring and laboratory test data, the primary source of areal geologic information is a study made by the USACE's Waterways Experiment Station. This study is entitled "Geologic Investigation, Mississippi River Deltaic Plain, Distribution of Deltaic and Marine Deposits," dated 1984. In particular, the Chef Menteur quadrangle delineate area geology in the southern area of Slidell along the shores of Lake Pontchartrain. In addition to the USACE study, we reference a paper, "Pleistocene and Holocene Fluvial Systems of the Lower Pearl River, Mississippi and Louisiana, USA" by Paul V. Heinrich, dated 2006. The Heinrich paper details geologic units throughout the Pearl River delta including Slidell and the surrounding areas.

INTERPRETATION OF EXISTING GEOTECHNICAL DATA

6. General. The available data reviewed for this project consists of explorations performed in the project vicinities over the last 40 years. Due to the complex filling and development history of some of the areas, including Slidell and Eden Isle, the geologic conditions encountered throughout the last 40 years may not be representative of what currently exists in these project vicinities. Our interpretation of the geology of the area is based on

the available data, geologic mapping of the area, and our experience. We present preliminary soil design parameters on Figure 6, Sheets 1 through 3, for each alignment. The soil design parameters are based on representative exploration points. Representative data presented on Figure 6, Sheets 1 through 3, was collected in the vicinity of the alignments, not within the footprint (levee or floodwall) of the alignments; therefore, these data may not represent the current conditions beneath each alignment. Representative boring and CPT logs are provided in Appendices I and II, respectively.

7. Eden Isle Ring Levee Alignment. Review of the geology mapping of the area, as well as our previous exploration data in the vicinity of Eden Isle, indicates a history of past filling within the Eden Isle community. Dredged fill materials including sand and silt, in addition to clay fill materials, were placed in areas of Eden Isle to create the land to build the community that exists today. These fill materials vary in depth depending on the ground surface elevation of each exploration location, but generally exist to approximately 6 to 16 feet below the existing ground surface. Beneath the fill materials, and in areas where no fill had previously been placed (e.g., the marsh area along the western spur of the Eden Isle alignment), marsh soils consisting of organic clay, humus, or peat were encountered. This marsh stratum may exist throughout the Eden Isle area and is approximately 4 to 8 feet thick. The marsh stratum may be thinner in areas of previous filling due to consolidation settlement. Beneath the marsh soils, stiffer Pleistocene-Age clays and/or substratum sands may be expected as they were encountered in the exploration locations to the terminal depths of each location.

8. Slidell Ring Levee Alignment. Near surface fill materials were also encountered within explorations in the vicinity of the Slidell Ring Levee Alignment. These materials include sand and clay fill materials and vary in depth depending on the ground surface elevation at each exploration location. The Slidell Ring Levee Alignment consists of 3 spurs; eastern

and western spurs that run north to south, and a southern spur that runs east to west. The subsoils within the southern portion of the Slidell Ring Levee Alignment that borders the Eden Isle community may have similar characteristics to the Eden Isle geology, and we anticipate fill thicknesses to be greater in the vicinity of Eden Isle. Please refer to the Eden Isle geology for anticipated conditions within the southern spur of the Slidell Ring Levee Alignment. Fill material may exist within the eastern and western spurs of the Slidell Ring Levee Alignment but will likely be less thick (2 feet to 5 feet). Beneath the fill materials in the eastern and western spurs, stiffer Pleistocene-Age clays and/or substratum sands may be expected as were encountered in the exploration locations to the terminal depths of each location.

9. West Slidell Levee Alignment. The West Slidell Levee Alignment is proposed within mainly marsh deposits beyond the extents of previous development. The near surface soils within these coastal deposits encountered in our previous explorations consist of organic clay, humus, silty clay, clay, and sand. Due to the lack of exploration data along the West Slidell Levee Alignment, it is difficult to generalize the subsurface profiles. We anticipate, based on geologic mapping, that the near surface soils in the marsh areas will consist of several feet of organic clay, humus, or peat with potentially interbedded sand and silt strata. Beneath the marsh deposits, we anticipate stiffer Pleistocene clays or substratum sands will be encountered. As the West Slidell Levee Alignment moves westward, we anticipate the geology will transition from the marsh deposits to fill materials overlying Pleistocene-Age deposits, or near surface Pleistocene soils.

RECOMMENDED EXPLORATION PROGRAM

10. Subsurface Exploration. The exploration program recommendations for the proposed alignments will differ whether the levee alignments will be designed for 100-year or 50-

year protection. If the alignments are designed for 100-year protection, the geotechnical exploration should follow the methodology outlined in the USACE's HSSDRS Design Guidelines. If the alignments are designed for 50-year protection, the exploration should follow the recommendations provided in the State's LFPDG. We discuss the recommendations for each design guideline subsequently.

11. 100-Year Protection Levees and T-Walls. For levees and T-walls designed for the 100-year level of protection, the USACE requires exploratory points at 500-ft center-to-center spacings along levee/floodwall structures per the HSSDRS guidelines. A combination of CPTs, 5-in. diameter fixed piston undisturbed sample type borings, and supplemental continuous 3-in. diameter fixed piston borings made at 500-ft center-to-center spacings along the levee alignments may be used. In general, the CPT locations and the undisturbed boring locations alternate. Along levee alignments we anticipate exploration points will be made to 80-ft depths. If T-walls are selected for some alignments, we anticipate the exploration depth will need to extend deeper to approximately 150 feet for pile design.

12. 50-Year Protection Levees and T-Walls. For levees and T-walls designed for the 50-year level of protection, the CPRA require exploratory points at 500-ft center-to-center spacings along levee structures per the LFPDG. A combination of CPTs and continuous 3-inch diameter fixed piston borings made at 500-ft center-to-center spacings along the levee alignments may be used. In general, the CPT locations and the undisturbed boring locations alternate. Along levee alignments we anticipate exploration points will be made to 80-ft depths. If T-walls are selected for some alignments, we anticipate the exploration depth will need to extend deeper to approximately 150 feet for pile design.

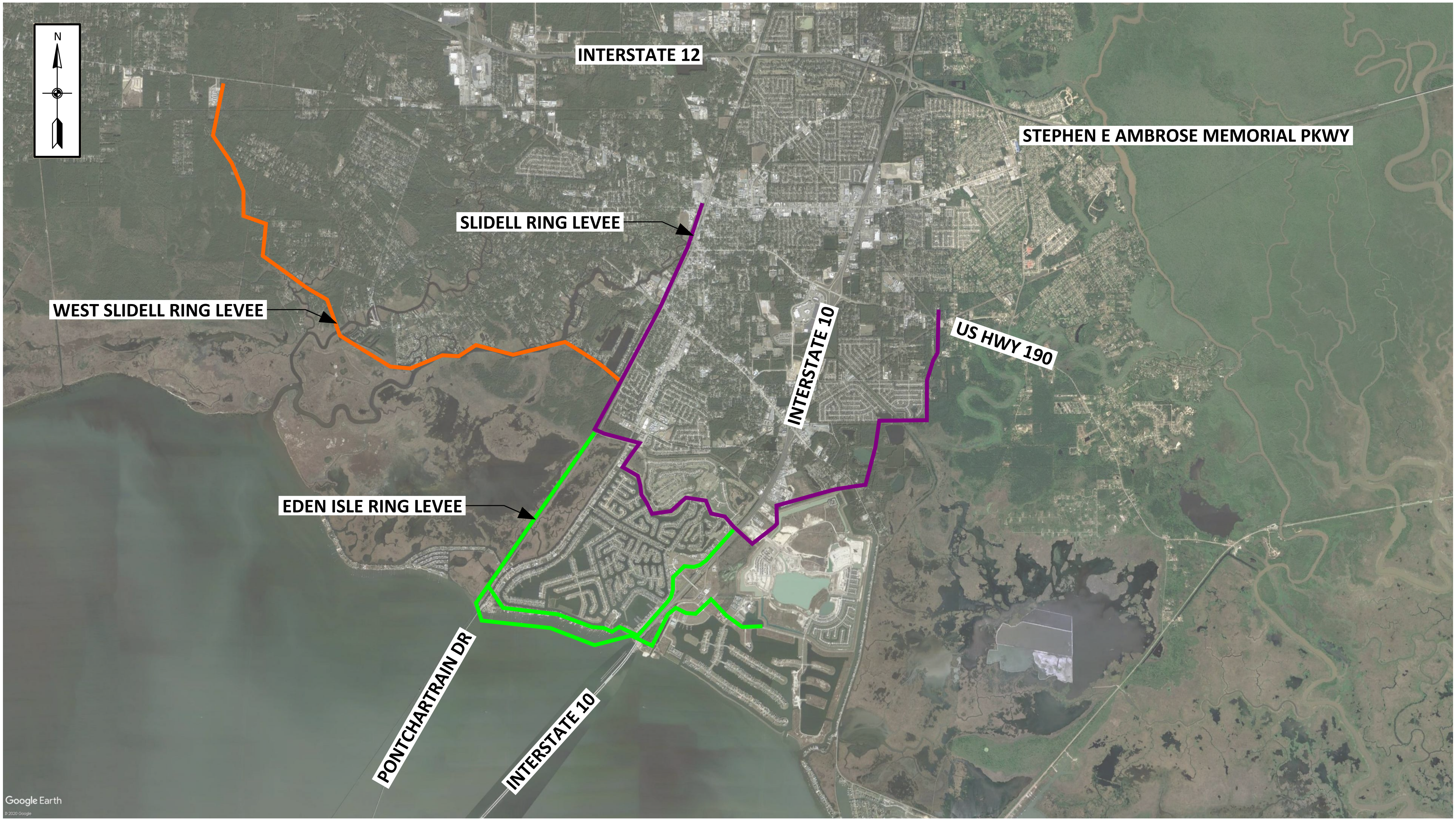
13. <u>Conclusions.</u> The prior explorations reviewed for this phase of the project were not performed to the standards of either the HSSDRSDG or LFPDG. Therefore, we anticipate full exploration plans will be required to finalize the design of each alignment. However, we believe the data and preliminary soil design parameters presented in this report are sufficient to perform analyses for conceptual-level assessments of each alignment.

LIMITATIONS

14. Eustis Engineering has provided engineering services in accordance with generally accepted geotechnical engineering practices in this locality at this time. No warranty or guarantee is expressed or implied.

15. Our report has been prepared in accordance with generally accepted geotechnical engineering practice for the exclusive use of Neel-Schaffer for specific application to the subject sites. This report and the data presented in the figures and appendices are for feasibility study purposes of the previously mentioned flood protection alignments only and should not be used for construction or final design. Substantial, additional geotechnical data are required to complete the final design, and the details of the recommended additional geotechnical data will be provided in a report as part of Eustis Engineering's Task 3 scope. If there are any changes in the nature, design, or location of the proposed alignments, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report are modified and verified through written correspondence. Should these data be used by anyone other than Neel-Schaffer, the user should contact Eustis Engineering for interpretation of data and to secure any other information which may be pertinent to the project.

16. The individual logs of the borings and CPTs completed are considered representative of subsurface conditions at their respective locations on the dates completed. No warranty is given the logs are representative of subsurface conditions at other locations or times. The nature and extent of variations in subsurface conditions, between and away from their locations, may not become evident until construction. A final exploration will be required for each alignment to meet the governing agency requirements and provide sufficient geotechnical data for final analyses.



SATELLITE IMAGERY DATED: 15 NOVEMBER 2019

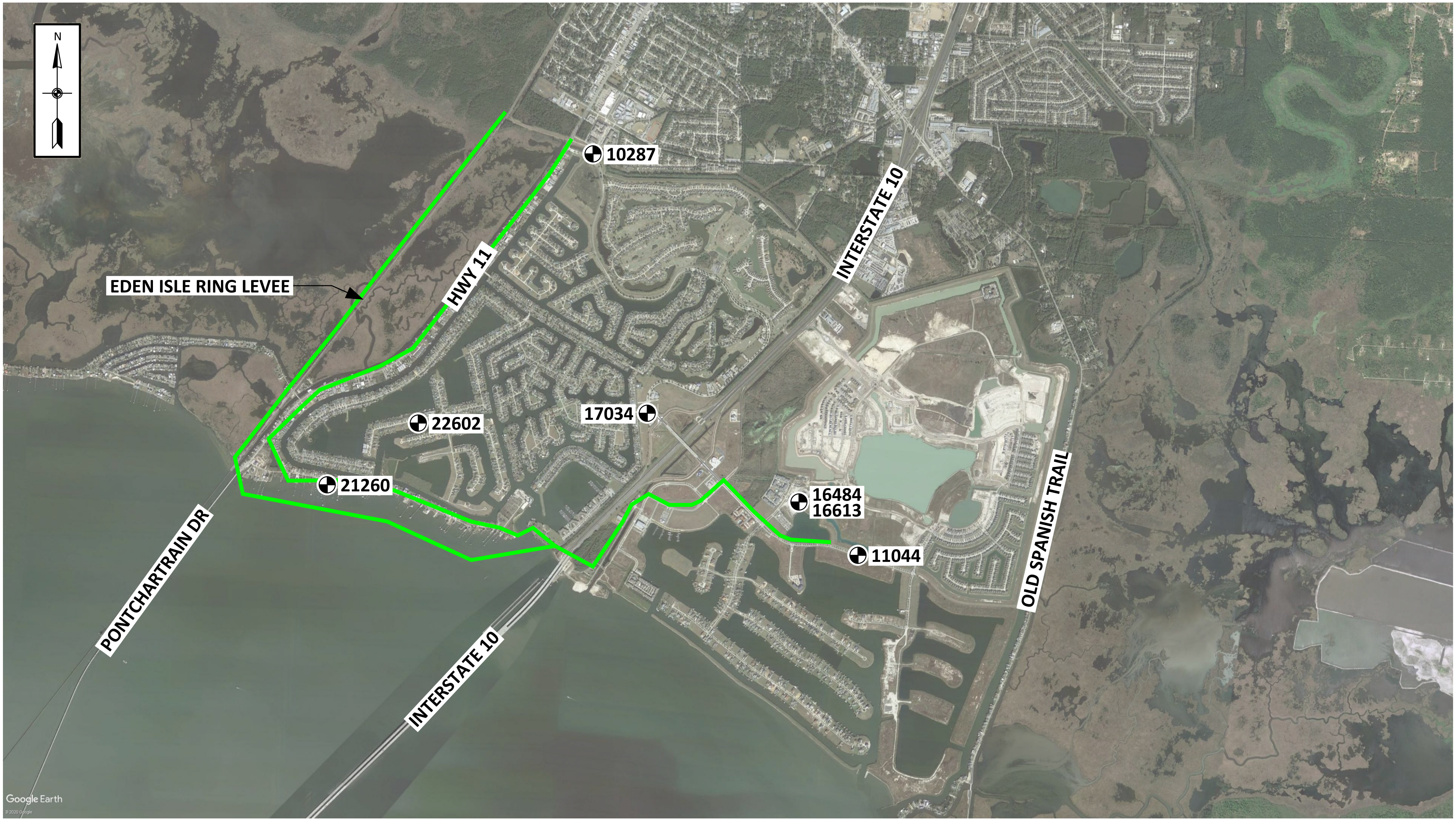
NOT TO SCALE

VICINITY MAP

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H	DATE: 15 JAN 2021
CADD FILE: VICINITY MAP.DGN	FIGURE 1



SATELLITE IMAGERY DATED: 15 NOVEMBER 2019

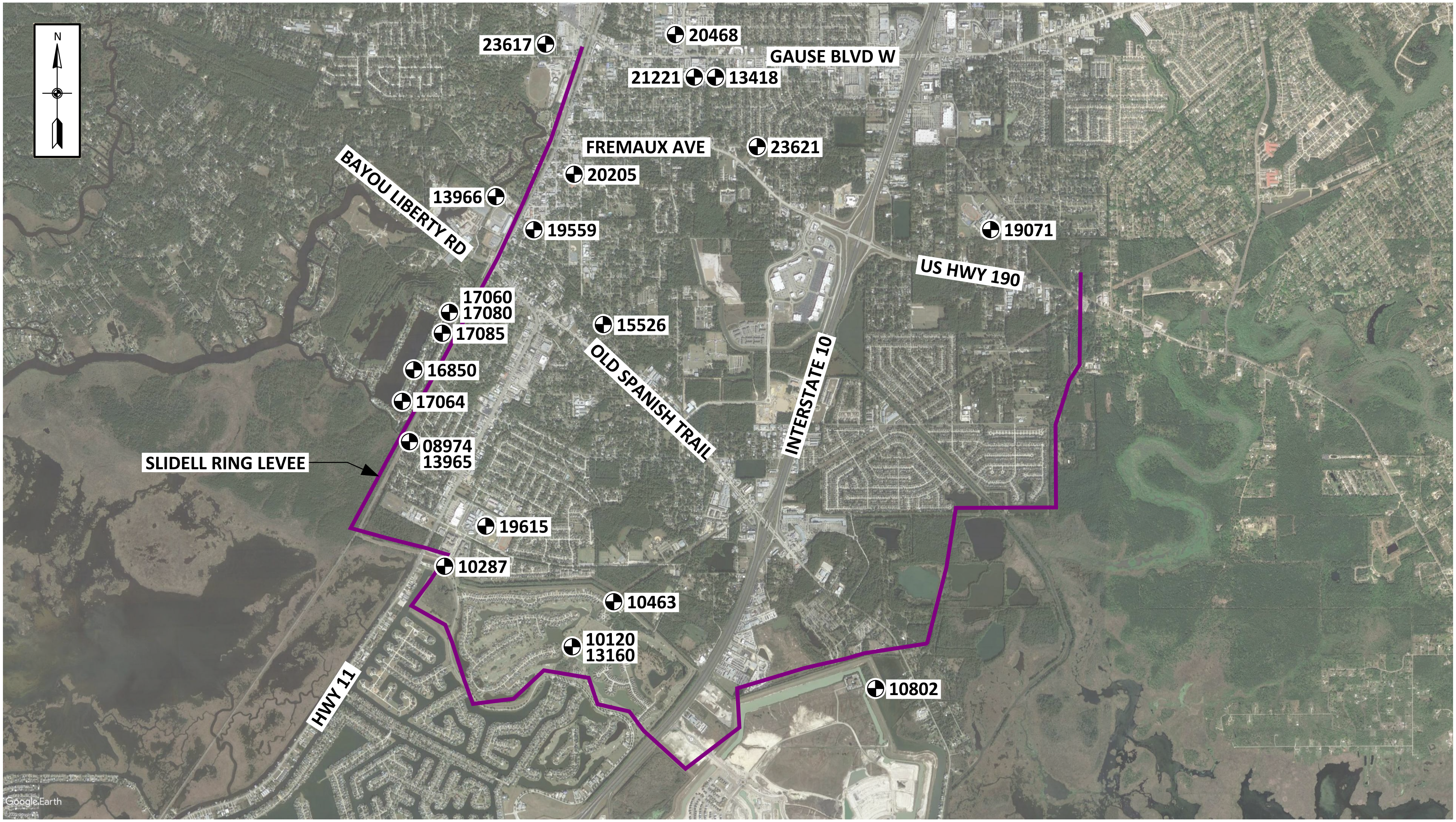
NOT TO SCALE

◐ DENOTES LOCATION OF HISTORICAL EUSTIS ENGINEERING PROJECTS

HISTORICAL PROJECT LOCATION MAP
EDEN ISLE RING LEVEE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946	DRAWN BY: B.G.W.	JOB NO.: 24493
	CHECKED BY: B.A.D	DATE: 15 JAN 2021
	CADD FILE: SITE PLAN 2.DGN	FIGURE 2 SHEET 1 OF 3



SATELLITE IMAGERY DATED: 15 NOVEMBER 2019

NOT TO SCALE

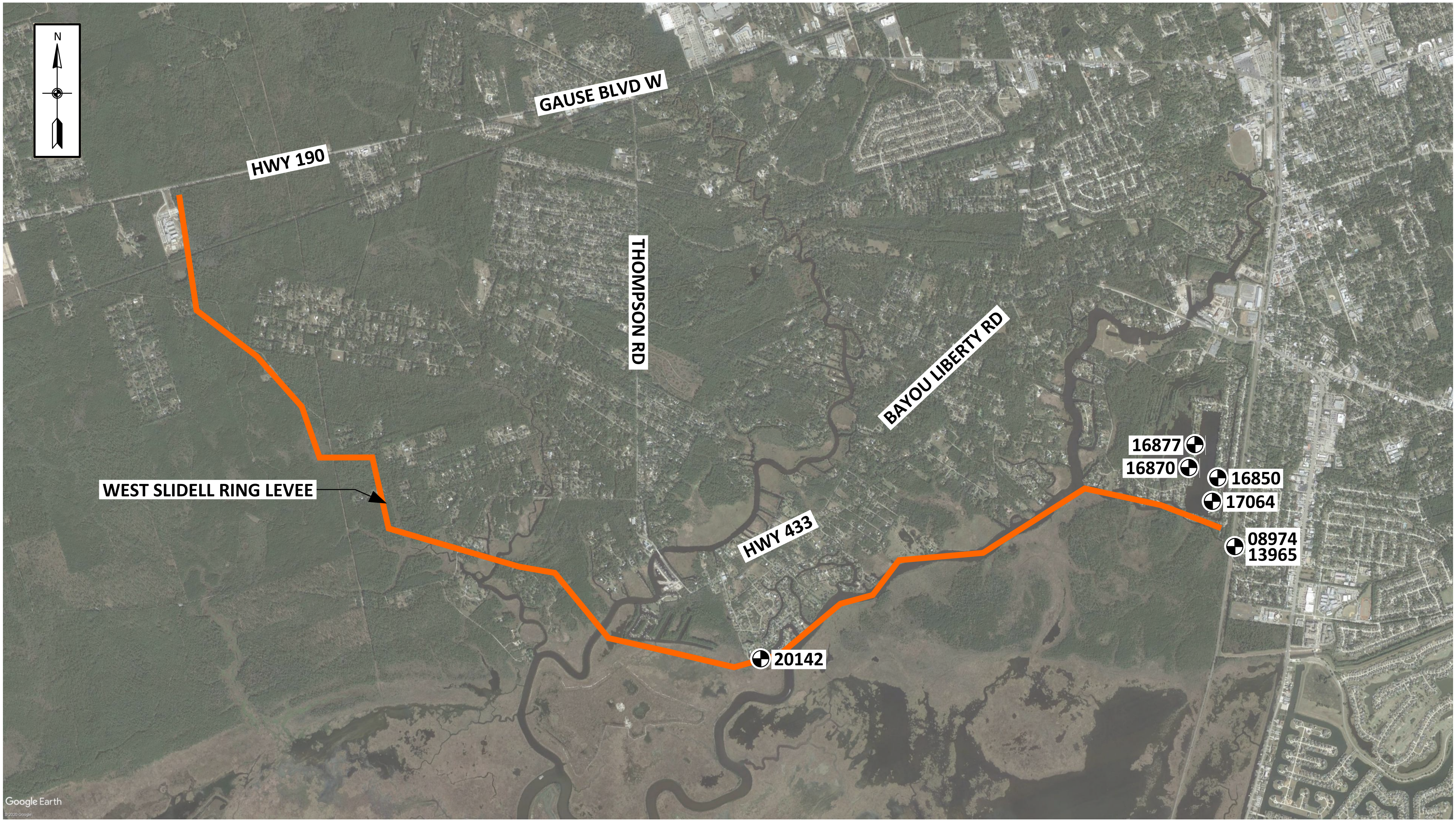
◐ DENOTES LOCATION OF HISTORICAL EUSTIS ENGINEERING PROJECTS

HISTORICAL PROJECT LOCATION MAP
SLIDELL RING LEVEE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

EUSTIS ENGINEERING L.L.C.	DRAWN BY: B.G.W.	JOB NO.: 24493
	CHECKED BY: B.A.D	DATE: 15 JAN 2021
	CADD FILE: SITE PLAN 2.DGN	FIGURE 2 SHEET 2 OF 3



SATELLITE IMAGERY DATED: 15 NOVEMBER 2019

NOT TO SCALE

◐ DENOTES LOCATION OF HISTORICAL EUSTIS ENGINEERING PROJECTS

HISTORICAL PROJECT LOCATION MAP
WEST SLIDELL RING LEVEE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: B.A.D	DATE: 15 JAN 2021
CADD FILE: SITE PLAN 2.DGN	FIGURE 2 SHEET 3 OF 3

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
EUSTIS ENGINEERING PROJECT NO. 24493

EDEN ISLE RING LEVEE HISTORICAL PROJECT DATA

PROJECT NO.	LATITUDE	LONGITUDE	EXPLORATION NO.	EXPLORATION DATE	DEPTH IN FEET	BORING/CPT	SAMPLING TYPE	LABORATORY TESTS
10287	30.2446	-89.7929	B-1	6/28/1988	50	BORING	3-IN SHELBY/SPT	SHEAR
			B-2	6/27/1988	100	BORING	3-IN SHELBY/SPT	SHEAR, ATT, T.V.
			B-3	6/27/1988	50	BORING	3-IN SHELBY/SPT	SHEAR
			B-1	1/5/1993	100	BORING	3-IN SHELBY/SPT	SHEAR, ATT.
			B-2	1/5/1993	40	BORING	3-IN SHELBY/SPT	SHEAR, ATT.
			B-3	1/6/1993	40	BORING	3-IN SHELBY/SPT	SHEAR, PD
			B-4	1/6/1993	40	BORING	3-IN SHELBY/SPT	SHEAR, PD
11044	30.2139	-89.7662	B-1	4/3/1990	40	BORING	3-IN SHELBY/SPT	SHEAR, ATT.
			B-2	4/4/1990	40	BORING	3-IN SHELBY	
			B-3	4/4/1990	45	BORING	3-IN SHELBY	SHEAR, ATT.
			B-4	4/5/1990	40	BORING	3-IN SHELBY	SHEAR
			B-5	4/5/1990	40	BORING	3-IN SHELBY/SPT	SHEAR, ATT.
			B-6	4/6/1990	45	BORING	3-IN SHELBY/SPT	SHEAR, ATT.
			B-7	4/10/1990	40	BORING	3-IN SHELBY/SPT	SHEAR, ATT.
			B-8	4/9/1990	45	BORING	3-IN SHELBY/SPT	SHEAR
			B-9	4/9/1990	40	BORING	3-IN SHELBY/SPT	SHEAR, ATT.
16484	30.2180	-89.7718	B-2	6/15/2000	100	BORING	3-IN SHELBY/SPT	SHEAR
			B-8	6/21/2000	100	BORING	3-IN SHELBY/SPT	SHEAR
			B-9	6/16/2000	150	BORING	3-IN SHELBY/SPT	SHEAR, ATT. CON
			B-10	6/14/2000	100	BORING	3-IN SHELBY/SPT	SHEAR, ATT.
			B-15	6/13/2000	100	BORING	3-IN SHELBY/SPT	SHEAR, ATT., CON
			B-22	6/13/2000	75	BORING	3-IN SHELBY/SPT	ATT.
			CPT-1	6/6/2000	21.98	CPT	NA	NA
			CPT-2	6/5/2000	64.8	CPT	NA	NA
			CPT-3	6/6/2000	21.85	CPT	NA	NA
			CPT-4	6/5/2000	65.12	CPT	NA	NA
			CPT-5	6/5/2000	63.98	CPT	NA	NA
			CPT-6	6/6/2000	21.82	CPT	NA	NA
			CPT-7	6/6/2000	21.98	CPT	NA	NA
			CPT-11	6/5/2000	67.42	CPT	NA	NA
			CPT-12	6/5/2000	64.96	CPT	NA	NA
			CPT-13	6/7/2000	67.75	CPT	NA	NA
			CPT-14	6/6/2000	21.98	CPT	NA	NA
			CPT-16	6/6/2000	21.33	CPT	NA	NA
			CPT-17	6/6/2000	22.15	CPT	NA	NA

NOTES FOR LABORATORY TEST DESIGNATIONS:
SHEAR - UNCONFINED COMPRESSION SHEAR OR UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION SHEAR ON ONE SPECIMEN
ATT. - ATTERBERG LIQUID AND PLASTIC LIMIT DETERMINATIONS   T.V. - TORVANE READINGS   PD - PARTICLE SIZE DISTRIBUTION

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
EUSTIS ENGINEERING PROJECT NO. 24493

EDEN ISLE RING LEVEE HISTORICAL PROJECT DATA

PROJECT NO.	LATITUDE	LONGITUDE	EXPLORATION NO.	EXPLORATION DATE	DEPTH IN FEET	BORING/CPT	SAMPLING TYPE	LABORATORY TESTS
16484 - CONTINUED	30.2180	-89.7718	CPT-18	6/6/2000	21.98	CPT	NA	NA
			CPT-19	6/7/2000	21.98	CPT	NA	NA
			CPT-20	6/7/2000	21.82	CPT	NA	NA
			CPT-21	6/7/2000	21.98	CPT	NA	NA
			CPT-23	6/6/2000	68.57	CPT	NA	NA
			CPT-24	6/7/2000	21.98	CPT	NA	NA
			CPT-25	6/6/2000	21.98	CPT	NA	NA
			CPT-26	6/6/2000	21.65	CPT	NA	NA
16613	30.2180	-89.7718	B-27	8/29/2000	60	BORING	3-IN SHELBY	SHEAR, ATT.
			B-28	8/29/2000	60	BORING	3-IN SHELBY/SPT	SHEAR, ATT.
			B-29	8/28/2000	60	BORING	3-IN SHELBY	SHEAR, ATT.
			B-30	8/28/2000	60	BORING	3-IN SHELBY/SPT	SHEAR, ATT.
17034	30.2242	-89.7867	B-1	7/12/2001	30	BORING	3-IN SHELBY	SHEAR
			B-2	7/10/2001	15	BORING	3-IN SHELBY	None
			B-3	7/12/2001	30	BORING	3-IN SHELBY	SHEAR
			B-4	7/10/2001	15	BORING	3-IN SHELBY	None
			B-5	7/12/2001	30	BORING	3-IN SHELBY	SHEAR
			B-6	7/10/2001	15	BORING	3-IN SHELBY	None
21260	30.2170	-89.8157	B-1	1/3/2011	50	BORING	3-IN SHELBY	SHEAR
22602	30.2223	-89.8075	B-1	8/7/2014	40	BORING	3-IN SHELBY	SHEAR

NOTES FOR LABORATORY TEST DESIGNATIONS:
SHEAR - UNCONFINED COMPRESSION SHEAR OR UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION SHEAR ON ONE SPECIMEN
ATT. - ATTERBERG LIQUID AND PLASTIC LIMIT DETERMINATIONS T.V. - TORVANE READINGS PD - PARTICLE SIZE DISTRIBUTION

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
EUSTIS ENGINEERING PROJECT NO. 24493

SLIDELL RING LEVEE HISTORICAL PROJECT DATA

PROJECT NO.	LATITUDE	LONGITUDE	EXPLORATION NO.	EXPLORATION DATE	DEPTH IN FEET	BORING/CPT	SAMPLING TYPE	LABORATORY TESTS
8974	30.2544	-89.7964	B-1	1/15/1985	5.5	BORING	3-IN SHELBY	SHEAR
			B-2	1/15/1985	5.5	BORING	3-IN SHELBY	SHEAR
			B-3	1/15/1985	7.5	BORING	3-IN SHELBY	SHEAR
			B-4	1/15/1985	10	BORING	3-IN SHELBY	SHEAR
			B-5	1/15/1985	8	BORING	3-IN SHELBY	SHEAR
10120	30.2382	-89.7815	B-1	6/15/1988	50	BORING	3-IN SHELBY	SHEAR, ATT.
			B-2	6/16/1988	20	BORING	3-IN SHELBY	SHEAR, ATT
			B-3	6/16/1988	20	BORING	3-IN SHELBY	SHEAR
			B-4	6/13/1988	20	BORING	3-IN SHELBY/SPT	SHEAR
			B-5	6/15/1988	20	BORING	3-IN SHELBY	SHEAR
			B-6	6/15/1988	20	BORING	3-IN SHELBY/SPT	SHEAR
			B-7	6/15/1988	20	BORING	3-IN SHELBY	SHEAR
			B-8	6/16/1988	50	BORING	3-IN SHELBY	SHEAR, ATT
			B-9	6/16/1988	20	BORING	3-IN SHELBY	SHEAR, ATT
			B-10	6/16/1988	20	BORING	3-IN SHELBY	SHEAR
			B-11	6/16/1988	20	BORING	3-IN SHELBY	SHEAR, T.V.
			B-12	6/15/1988	20	BORING	3-IN SHELBY/SPT	SHEAR
			B-13	6/16/1988	20	BORING	3-IN SHELBY/SPT	SHEAR
			B-14	6/16/1988	20	BORING	3-IN SHELBY	SHEAR,T.V.
			B-15	6/13/1988	50	BORING	3-IN SHELBY	SHEAR, ATT, T.V.
			B-16	6/13/1988	20	BORING	3-IN SHELBY	SHEAR, ATT., T.V.
			B-17	6/13/1988	20	BORING	3-IN SHELBY	SHEAR
			B-18	6/16/1988	20	BORING	3-IN SHELBY	SHEAR, ATT.
			B-19	6/15/1988	20	BORING	3-IN SHELBY	SHEAR
			B-20	6/15/1988	50	BORING	3-IN SHELBY	SHEAR
10287	30.2446	-89.7929	B-1	6/28/1988	50	BORING	3-IN SHELBY	SHEAR
			B-2	6/27/1988	100	BORING	3-IN SHELBY/SPT	SHEAR, ATT, T.V.
			B-3	6/27/1988	50	BORING	3-IN SHELBY/SPT	SHEAR
			B-1	1/5/1993	100	BORING	3-IN SHELBY/SPT	SHEAR, ATT.
			B-2	1/5/1993	40	BORING	3-IN SHELBY/SPT	SHEAR, ATT.
			B-3	1/6/1993	40	BORING	3-IN SHELBY/SPT	SHEAR, PD
			B-4	1/6/1993	40	BORING	3-IN SHELBY/SPT	SHEAR, PD
10463	30.2416	-89.7774	B-1	11/22/1988	50	BORING	3-IN SHELBY/SPT	SHEAR
			B-2	11/21/1988	100	BORING	3-IN SHELBY/SPT	SHEAR, ATT.
			B-3	11/22/1988	50	BORING	3-IN SHELBY/SPT	SHEAR, ATT.

NOTES FOR LABORATORY TEST DESIGNATIONS:
SHEAR - UNCONFINED COMPRESSION SHEAR OR UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION SHEAR ON ONE SPECIMEN
ATT. - ATTERBERG LIQUID AND PLASTIC LIMIT DETERMINATIONS T.V. - TORVANE READINGS PD - PARTICLE SIZE DISTRIBUTION

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
EUSTIS ENGINEERING PROJECT NO. 24493

SLIDELL RING LEVEE HISTORICAL PROJECT DATA

PROJECT NO.	LATITUDE	LONGITUDE	EXPLORATION NO.	EXPLORATION DATE	DEPTH IN FEET	BORING/CPT	SAMPLING TYPE	LABORATORY TESTS
10802	30.2347	-89.7535	B-1	9/14/1989	30	BORING	3-IN SHELBY/SPT	SHEAR
			B-2	9/14/1989	15	BORING	3-IN SHELBY	UW, ATT
			B-3	9/14/1989	15	BORING	3-IN SHELBY	UW, ATT
			B-4	9/14/1989	15	BORING	3-IN SHELBY	UW, ATT
			B-5	9/14/1989	30	BORING	3-IN SHELBY	SHEAR, PD
13418	30.2836	-89.7684	B-1	3/28/1995	40	BORING	3-IN SHELBY/SPT	SHEAR
			B-2	3/28/1995	40	BORING	3-IN SHELBY	SHEAR
			B-3	3/27/1995	40	BORING	3-IN SHELBY/SPT	SHEAR
13965	30.2544	-89.7964	B-1	3/27/1996	80	BORING	3-IN SHELBY	SHEAR, ATT. LL
13966	30.2734	-89.7884	B-1	3/26/1996	80	BORING	3-IN SHELBY/SPT	SHEAR, ATT. LL
16850	30.2602	-89.7956	B-1	2/7/2001	30	BORING	3-IN SHELBY	SHEAR
			B-2	2/7/2001	10	BORING	GRAB	ATT.
17060	30.2646	-89.7927	B-1	7/26/2001	30	BORING	3-IN SHELBY/SPT	SHEAR
			B-2	7/26/2001	10	BORING	3-IN SHELBY/SPT	SHEAR
17064	30.2578	-89.7972	B-1	7/26/2001	30	BORING	3-IN SHELBY/SPT	SHEAR
17080	30.2643	-89.7928	B-1	8/15/2001	30	BORING	3-IN SHELBY/SPT	PD
17085	30.2635	-89.7932	B-1	8/15/2001	30	BORING	3-IN SHELBY	SHEAR, ATT., T.V.
			B-2	8/15/2001	15	BORING	GRAB	MOI
19071	30.2712	-89.7429	B-1	9/22/2005	30	BORING	3-IN SHELBY	SHEAR
			B-2	9/22/2005	30	BORING	3-IN SHELBY	SHEAR
19559	30.2713	-89.7844	B-1	10/19/2006	24	BORING	3-IN SHELBY	SHEAR, ATT.
			B-2	10/18/2006	24	BORING	3-IN SHELBY	SHEAR, ATT.
			B-3	10/18/2006	40	BORING	3-IN SHELBY	SHEAR, ATT.
			B-4	10/26/2006	40	BORING	3-IN SHELBY	SHEAR, ATT.
			B-5	10/26/2006	24	BORING	3-IN SHELBY	SHEAR, ATT.
			B-6	10/26/2006	24	BORING	3-IN SHELBY	SHEAR
			B-7	10/26/2006	40	BORING	3-IN SHELBY	SHEAR, ATT.
19615	30.2477	-89.7892	B-1	1/5/2007	55	BORING	3-IN SHELBY	SHEAR, ATT.
			B-2	1/5/2007	55	BORING	3-IN SHELBY	SHEAR, ATT.
			B-3	1/6/2007	55	BORING	3-IN SHELBY	SHEAR, ATT.
			B-4	1/6/2007	55	BORING	3-IN SHELBY	SHEAR
			B-5	1/4/2007	55	BORING	3-IN SHELBY	SHEAR
			B-6	1/4/2007	55	BORING	3-IN SHELBY	SHEAR
			B-7	1/6/2007	55	BORING	3-IN SHELBY	SHEAR, ATT.
			CPT-1	12/19/2006	6	CPT	CPT	NA

NOTES FOR LABORATORY TEST DESIGNATIONS:
SHEAR - UNCONFINED COMPRESSION SHEAR OR UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION SHEAR ON ONE SPECIMEN
ATT. - ATTERBERG LIQUID AND PLASTIC LIMIT DETERMINATIONS   T.V. - TORVANE READINGS   PD - PARTICLE SIZE DISTRIBUTION

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
EUSTIS ENGINEERING PROJECT NO. 24493

SLIDELL RING LEVEE HISTORICAL PROJECT DATA

PROJECT NO.	LATITUDE	LONGITUDE	EXPLORATION NO.	EXPLORATION DATE	DEPTH IN FEET	BORING/CPT	SAMPLING TYPE	LABORATORY TESTS
19615 - CONTINUED	30.2477	-89.7892	CPT-2	12/19/2006	7	CPT	CPT	NA
			CPT-3	12/19/2006	6	CPT	CPT	NA
			CPT-4	12/19/2006	6	CPT	CPT	NA
			CPT-5	12/19/2006	6	CPT	CPT	NA
			CPT-6	12/20/2006	55	CPT	CPT	NA
			CPT-7	12/20/2006	55	CPT	CPT	NA
			CPT-8	12/20/2006	55	CPT	CPT	NA
			CPT-9	12/20/2006	55	CPT	CPT	NA
			CPT-10	12/20/2006	55	CPT	CPT	NA
			CPT-11	12/20/2006	55	CPT	CPT	NA
			CPT-12	12/28/2006	55	CPT	CPT	NA
			CPT-13	12/27/2006	55	CPT	CPT	NA
			CPT-14	12/27/2006	55	CPT	CPT	NA
			CPT-15	12/27/2006	55	CPT	CPT	NA
			CPT-16	12/27/2006	55	CPT	CPT	NA
			CPT-17	12/27/2006	55	CPT	CPT	NA
			CPT-18	12/27/2006	55	CPT	CPT	NA
			CPT-19	12/27/2006	55	CPT	CPT	NA
			CPT-20	12/27/2006	6	CPT	CPT	NA
			CPT-21	12/28/2006	6	CPT	CPT	NA
			CPT-22	12/28/2006	6	CPT	CPT	NA
			CPT-23	12/28/2006	6	CPT	CPT	NA
			CPT-24	12/28/2006	6	CPT	CPT	NA
			CPT-25	12/28/2006	6	CPT	CPT	NA
20205	30.2755	-89.7811	B-1	4/9/2008	100	BORING	3-IN SHELBY/SPT	SHEAR, PD
			B-2	4/10/2008	100	BORING	3-IN SHELBY/SPT	SHEAR, PD
20468	30.2867	-89.7717	A-1	12/17/2008	30	BORING	3-IN SHELBY/SPT	SHEAR, ATT.
			A-2	12/15/2008	30	BORING	3-IN SHELBY/SPT	SHEAR
			B-1	12/17/2008	30	BORING	3-IN SHELBY/SPT	SHEAR, ATT.
			B-2	12/15/2008	30	BORING	3-IN SHELBY/SPT	SHEAR
			C-1	12/16/2008	30	BORING	3-IN SHELBY/SPT	SHEAR, ATT.
			C-2	12/16/2008	30	BORING	3-IN SHELBY/SPT	SHEAR
			D-1	12/16/2008	30	BORING	3-IN SHELBY/SPT	SHEAR, ATT.
			D-2	12/16/2008	30	BORING	3-IN SHELBY/SPT	SHEAR, ATT.

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SLIDELL RING LEVEE HISTORICAL PROJECT DATA

PROJECT NO.	LATITUDE	LONGITUDE	EXPLORATION NO.	EXPLORATION DATE	DEPTH IN FEET	BORING/CPT	SAMPLING TYPE	LABORATORY TESTS
20611	30.2444	-89.7683	B-1	5/1/2009	40	BORING	3-IN SHELBY	SHEAR
			B-2	4/30/2009	40	BORING	3-IN SHELBY	SHEAR
			B-3	5/1/2009	40	BORING	3-IN SHELBY	SHEAR
21221	30.2836	-89.7696	B-1	11/11/2010	40	BORING	3-IN SHELBY	SHEAR
			B-2	11/11/2010	20	BORING	3-IN SHELBY	SHEAR, ATT.
23617	30.2859	-89.7837	B-1	7/20/2017	30	BORING	3-IN SHELBY	SHEAR, ATT.
			B-2	7/20/2017	30	BORING	3-IN SHELBY	SHEAR
23621	30.2775	-89.7641	B-1	7/20/2017	12	BORING	3-IN SHELBY	SHEAR
			B-2	7/20/2017	12	BORING	3-IN SHELBY	SHEAR

NOTES FOR LABORATORY TEST DESIGNATIONS:
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COASTAL FLOOD PROTECTION PROJECT
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EUSTIS ENGINEERING PROJECT NO. 24493

WEST SLIDELL RING LEVEE HISTORICAL PROJECT DATA

PROJECT NO.	LATITUDE	LONGITUDE	EXPLORATION NO.	EXPLORATION DATE	DEPTH IN FEET	BORING/CPT	SAMPLING TYPE	LABORATORY TESTS
8974	30.2544	-89.7964	B-1	1/15/1985	5.5	BORING	3-IN SHELBY	SHEAR
			B-2	1/15/1985	5.5	BORING	3-IN SHELBY	SHEAR
			B-3	1/15/1985	7.5	BORING	3-IN SHELBY	SHEAR
			B-4	1/15/1985	10	BORING	3-IN SHELBY	SHEAR
			B-5	1/15/1985	8	BORING	3-IN SHELBY	SHEAR
13965	30.2544	-89.7964	B-1	3/27/1996	80	BORING	3-IN SHELBY	SHEAR, ATT. LL
16850	30.2602	-89.7956	B-1	2/7/2001	30	BORING	3-IN SHELBY	SHEAR
			B-1	2/7/2001	10	BORING	GRAB	ATT.
16870	30.2606	-89.7979	B-1	2/23/2001	30	BORING	3-IN SHELBY/SPT	SHEAR, ATT.
			B-2	3/2/2001	10	BORING	GRAB	MOI
16877	30.2618	-89.7972	B-1	3/2/2001	30	BORING	3-IN SHELBY/SPT	SHEAR, ATT.
			B-2	3/2/2001	10	BORING	3-IN SHELBY	SHEAR
17026	30.2621	-89.7970	B-1	7/9/2001	30	BORING	3-IN SHELBY/SPT	SHEAR, ATT.
17064	30.2578	-89.7972	B-1	7/26/2001	30	BORING	3-IN SHELBY/SPT	SHEAR
20142	30.2626	-89.8337	A-1	2/27/2008	6	BORING	Piston?/3-IN SHELBY	SHEAR
			A-2	2/27/2008	12	BORING	3-IN SHELBY	SHEAR
			A-3	2/27/2008	6	BORING	3-IN SHELBY	SHEAR
			B-1	2/27/2008	6	BORING	3-IN SHELBY	MOI
			B-2	2/27/2008	12	BORING	3-IN SHELBY	SHEAR
			B-3	2/27/2008	6	BORING	3-IN SHELBY	SHEAR
			C-1	2/28/2008	6	BORING	3-IN SHELBY	SHEAR
			C-2	2/28/2008	12	BORING	3-IN SHELBY	SHEAR
			C-3	2/28/2008	6	BORING	3-IN SHELBY	SHEAR
			D-1	2/28/2008	6	BORING	3-IN SHELBY	SHEAR
			D-2	2/28/2008	12	BORING	3-IN SHELBY	SHEAR
			D-3	2/28/2008	6	BORING	3-IN SHELBY	SHEAR
			E-1	2/28/2008	6	BORING	3-IN SHELBY	SHEAR
			E-2	2/28/2008	12	BORING	3-IN SHELBY	SHEAR
			E-3	2/28/2008	6	BORING	3-IN SHELBY	SHEAR
			F-1	2/28/2008	6	BORING	3-IN SHELBY	SHEAR
			F-2	2/28/2008	12	BORING	3-IN SHELBY	SHEAR
			F-3	2/28/2008	6	BORING	3-IN SHELBY	SHEAR
			G-1	3/2/2008	6	BORING	3-IN SHELBY	SHEAR
			G-2	3/2/2008	12	BORING	3-IN SHELBY	SHEAR
			G-3	3/2/2008	6	BORING	3-IN SHELBY	SHEAR

NOTES FOR LABORATORY TEST DESIGNATIONS:
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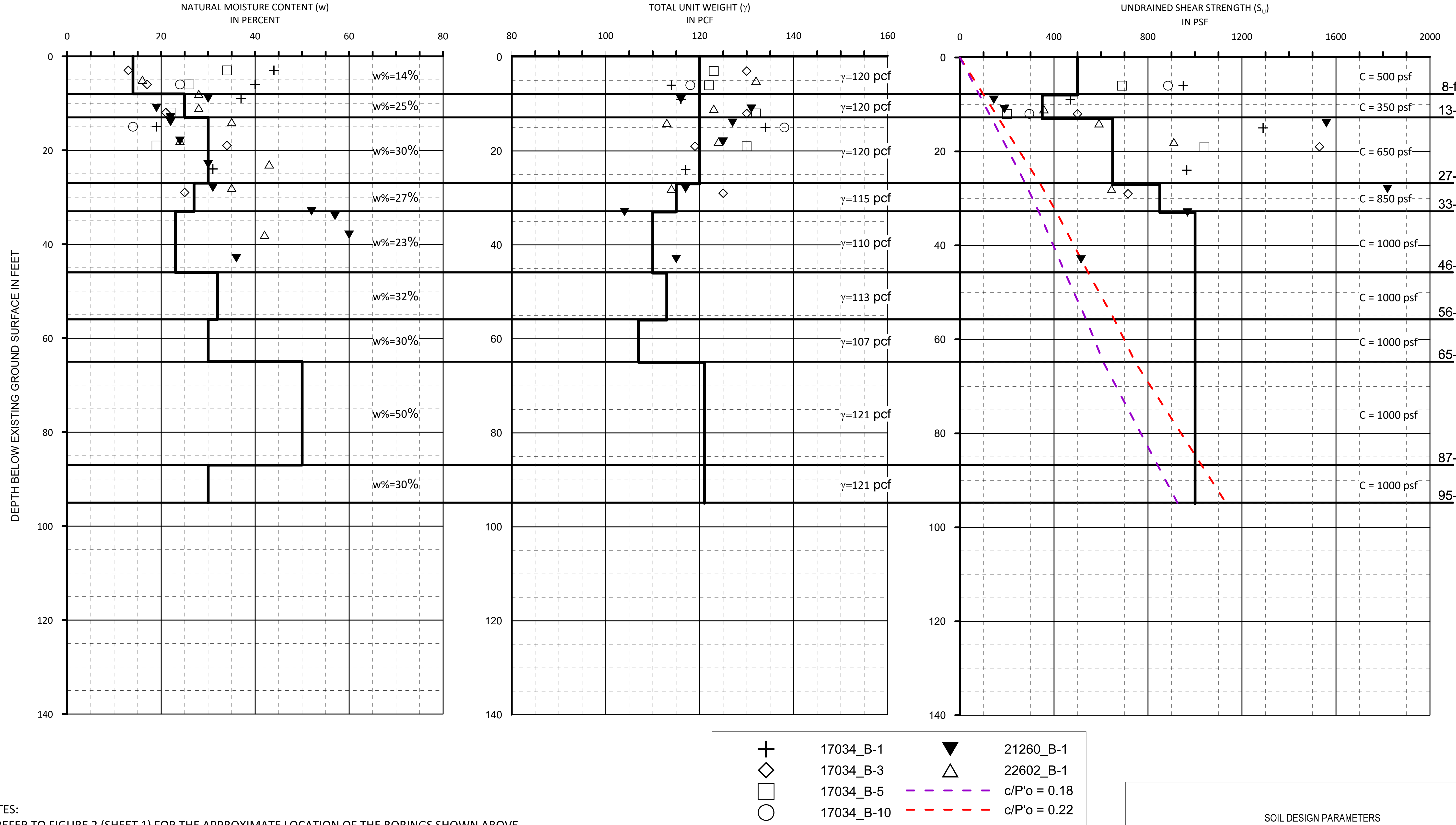
ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
EUSTIS ENGINEERING PROJECT NO. 24493

WEST SLIDELL RING LEVEE HISTORICAL PROJECT DATA

PROJECT NO.	LATITUDE	LONGITUDE	EXPLORATION NO.	EXPLORATION DATE	DEPTH IN FEET	BORING/CPT	SAMPLING TYPE	LABORATORY TESTS
20142 - CONTINUED	30.2626	-89.8337	H-1	3/3/2008	6	BORING	3-IN SHELBY	SHEAR
			H-2	3/3/2008	12	BORING	3-IN SHELBY	SHEAR
			H-3	3/3/2008	6	BORING	3-IN SHELBY	SHEAR

NOTES FOR LABORATORY TEST DESIGNATIONS:
SHEAR - UNCONFINED COMPRESSION SHEAR OR UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION SHEAR ON ONE SPECIMEN
ATT. - ATTERBERG LIQUID AND PLASTIC LIMIT DETERMINATIONS T.V. - TORVANE READINGS PD - PARTICLE SIZE DISTRIBUTION



NOTES:

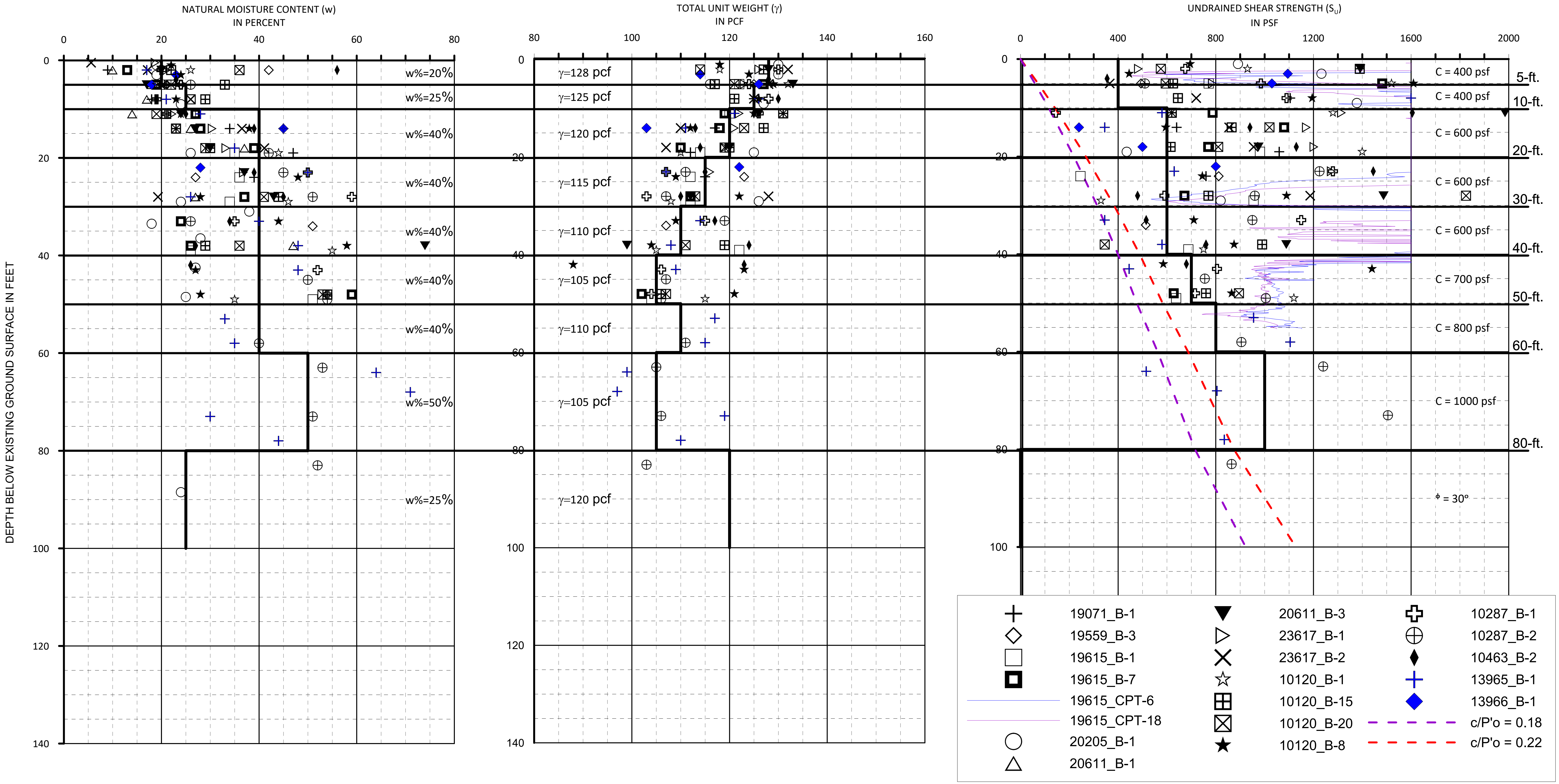
1. REFER TO FIGURE 2 (SHEET 1) FOR THE APPROXIMATE LOCATION OF THE BORINGS SHOWN ABOVE.
2. LOGS OF THE SOIL BORINGS ARE PROVIDED IN APPENDIX I.
3. DESIGN PROFILES SHOWN CANNOT FULLY ANTICIPATE ALL PARAMETERS WHICH MAY INFLUENCE SELECTION OF DESIGN VALUES FOR A SPECIFIC ANALYSIS. FOR THIS REASON, THE USER SHOULD CONTACT EUSTIS ENGINEERING, L.L.C. PRIOR TO USE OF DESIGN PROFILES IN ANY ANALYSES.
4. UNIT WEIGHTS SHOWN ARE TOTAL UNIT WEIGHTS AND MUST BE APPROPRIATELY REDUCED TO ESTIMATE EFFECTIVE STRESS STATES.
5. THE ESTIMATED GROUND SURFACE ELEVATION FOR THE PARAMETERS PRESENTED ON THIS FIGURE IS ASSUMED TO BE EL 6 (NAVD 88). G.S.E. MAY VARY ALONG THE ALIGNMENT.
6. C/P RATIOS ARE THE RATIO OF UNDRAINED SHEAR STRENGTH TO EFFECTIVE STRESS WITHIN THE SUBSOIL PROFILE. A C/P OF 0.22 MAY BE REPRESENTATIVE OF NORMALLY CONSOLIDATED CLAY BEHAVIOR.

SOIL DESIGN PARAMETERS
EDEN ISLE RING LEVEE

ST. TAMMANY PARISH GOVERMENT
COASTAL FLOOD PROTECTION PROJECT
LACOMBE RING LEVEE
WEST SLIDELL RING LEVEE AND EDEN ISLE RING LEVEE
ST TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: BGW	JOB NO: 24493
CHECKED BY: NSI	DATE: 1/5/21
FILE NAME: 24493 Parameters.GRF	FIGURE6 SHEET 1



NOTES:

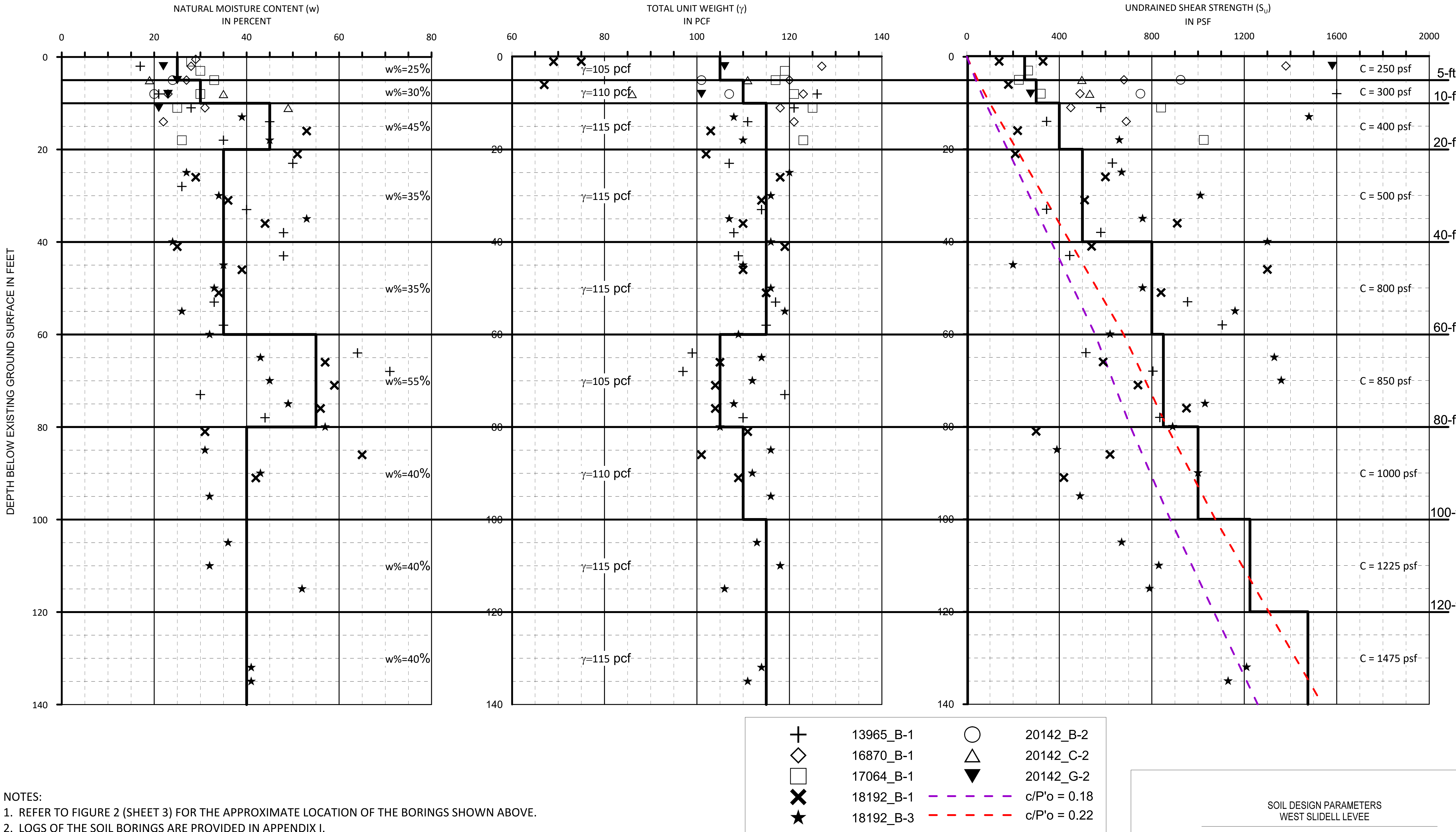
1. REFER TO FIGURE 2 (SHEET 2) FOR THE APPROXIMATE LOCATION OF THE BORINGS SHOWN ABOVE.
2. LOGS OF THE SOIL BORINGS ARE PROVIDED IN APPENDIX I AND LOGS OF THE CPTS ARE PROVIDED IN APPENDIX II.
3. DESIGN PROFILES SHOWN CANNOT FULLY ANTICIPATE ALL PARAMETERS WHICH MAY INFLUENCE SELECTION OF DESIGN VALUES FOR A SPECIFIC ANALYSIS. FOR THIS REASON, THE USER SHOULD CONTACT EUSTIS ENGINEERING, L.L.C. PRIOR TO USE OF DESIGN PROFILES IN ANY ANALYSES.
4. UNIT WEIGHTS SHOWN ARE TOTAL UNIT WEIGHTS AND MUST BE APPROPRIATELY REDUCED TO ESTIMATE EFFECTIVE STRESS STATES.
5. THE ESTIMATED GROUND SURFACE ELEVATION FOR THE PARAMETERS PRESENTED ON THIS FIGURE IS ASSUMED TO BE EL 6 (NAVD 88). G.S.E. MAY VARY ALONG THE ALIGNMENT.
6. C/P RATIOS ARE THE RATIO OF UNDRAINED SHEAR STRENGTH TO EFFECTIVE STRESS WITHIN THE SUBSOIL PROFILE. A C/P OF 0.22 MAY BE REPRESENTATIVE OF NORMALLY CONSOLIDATED CLAY BEHAVIOR.

SOIL DESIGN PARAMETERS
SLIDELL RING LEVEE

ST. TAMMANY PARISH GOVERMENT
COASTAL FLOOD PROTECTION PROJECT
LACOMBE RING LEVEE
WEST SLIDELL RING LEVEE AND EDEN ISLE RING LEVEE
ST TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: TD	JOB NO: 24493
CHECKED BY: SGW	DATE: 1/5/21
FILE NAME: 24493 Parameters.GRF	FIGURE 6 SHEET 2



NOTES:

1. REFER TO FIGURE 2 (SHEET 3) FOR THE APPROXIMATE LOCATION OF THE BORINGS SHOWN ABOVE.
2. LOGS OF THE SOIL BORINGS ARE PROVIDED IN APPENDIX I.
3. DESIGN PROFILES SHOWN CANNOT FULLY ANTICIPATE ALL PARAMETERS WHICH MAY INFLUENCE SELECTION OF DESIGN VALUES FOR A SPECIFIC ANALYSIS. FOR THIS REASON, THE USER SHOULD CONTACT EUSTIS ENGINEERING, L.L.C. PRIOR TO USE OF DESIGN PROFILES IN ANY ANALYSES.
4. UNIT WEIGHTS SHOWN ARE TOTAL UNIT WEIGHTS AND MUST BE APPROPRIATELY REDUCED TO ESTIMATE EFFECTIVE STRESS STATES.
5. THE ESTIMATED GROUND SURFACE ELEVATION FOR THE PARAMETERS PRESENTED ON THIS FIGURE IS ASSUMED TO BE EL 0 (NAVD 88). G.S.E. MAY VARY ALONG THE ALIGNMENT.
6. C/P RATIOS ARE THE RATIO OF UNDRAINED SHEAR STRENGTH TO EFFECTIVE STRESS WITHIN THE SUBSOIL PROFILE. A C/P OF 0.22 MAY BE REPRESENTATIVE OF NORMALLY CONSOLIDATED CLAY BEHAVIOR.

SOIL DESIGN PARAMETERS
WEST SLIDELL LEVEE

ST. TAMMANY PARISH GOVERMENT
COASTAL FLOOD PROTECTION PROJECT
LACOMBE RING LEVEE
WEST SLIDELL RING LEVEE AND EDEN ISLE RING LEVEE
ST TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: BW	JOB NO: 24493
CHECKED BY: NSI	DATE: 1/19/21
FILE NAME: 24493 Parameters.GRF	FIGURE 6 SHEET 3

APPENDIX I

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, Geoprobe, 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
- 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.

EDEN ISLE RING LEVEE HISTORICAL BORING DATA

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

FLOOD CONTROL IMPROVEMENTS - SCHNEIDER CANAL PUMPING STATION, SLIDELL, ST. TAMMANY PARISH, LOUISIANA
STATE PROJECT NO. 576-52-04, SLIDELL JOB NO. 100-3

Ground Elev.: 4.0 (Est.) Datum: MSL Gr. Water Depth: See Text Job No: 10287 Date Drilled: 6/28/88 Boring: 1 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
				Loose gray & brown sandy clay w/gravel, concrete & wood (fill)	CL	1	0-1											
		20		Medium dense light gray & tan sand w/gravel	SP	2	2-3											
5		6		Loose gray & brown clayey sand w/organic clay layers	SC	3	4-5	19										
				Loose to medium dense gray clayey sand w/sandy clay layers & decayed wood	SC	4	7-8	22	107	130	OB	—	365					
10		50=11"		Very dense gray sand w/trace of clay	SP	5	9-10											
15		40		Dense gray sand	SP	6	14-15											
20		23		Medium dense gray sand	SP	7	19-20											
25		37		Dense gray sand	SP	8	24-25											
30		42				9	29-30											
35		7		Stiff greenish-gray clay w/sandy clay layers & pockets	CH	10	34-35	34										
	2.10			w/sand pockets, lenses & layers		11	36-37	24	101	126	UC	—	1315					
		20		Medium dense gray sand	SP	12	38-39											
40		4		Alternating layers of loose gray silty sand & soft gray clay	SP/CH	13	40-41											
45	0.40					14	43-44	37	84	115	OB	—	940					
				Medium stiff gray clay w/silty sand lenses & few shell fragments	CH													
50	1.00					15	48-49	49	72	108	UC	—	760					

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

FLOOD CONTROL IMPROVEMENTS - SCHNEIDER CANAL PUMPING STATION, SLIDELL, ST. TAMMANY PARISH, LOUISIANA
STATE PROJECT NO. 576-52-04, SLIDELL JOB NO. 100-3 (Sheet 1 of 2)

Ground Elev.: 7.5 (Est.) Datum: MSL Gr. Water Depth: See Text Job No: 10287 Date Drilled: 6/27/88 Boring: 2 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	T.V. TSF	Other Tests
			Loose gray & tan sand w/clay layers & pockets, concrete & brick (fill)	SP	1	2-3											
5	0.55		Medium stiff dark gray sandy clay w/clayey sand layers & decayed wood & organic matter	CL	2	5-6	26	92	116	OB	—	510					
	0.55		w/clayey sand layers		3	7-8											
10		25	Medium dense gray sand w/trace of clay	SP	4	9-10											
		30			5	12-13											
15		17			6	15-16											
20		4	Medium stiff gray & tan clay w/sand lenses	CH	7	19-20	42										
			Stiff gray & tan clay w/sand lenses & fissures	CH													
25	1.00				8	23-24	45	76	111	UC	—	1225				0.850	
			Medium stiff gray clay w/few silt lenses & sand pockets	CH													
30	0.85				9	28-29	51	71	107	UC	—	960	90	23	67	0.625	
			Medium stiff gray & greenish-gray clay w/silt pockets & clayey sand layers & shell fragments	CH													
35	1.25				10	33-34	26	95	119	OB	—	950				0.925	
						37-38											
40		37	Dense gray sand	SP	11	39-40											
		6	Medium stiff to stiff gray clay w/silt & sand pockets & lenses & shell fragments	CH	12	42-43											
45	0.90				13	45-46	50	71	107	UC	—	755				0.550	
50	0.70				14	49-50	54	69	106	UC	—	1005	78	21	57		

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

FLOOD CONTROL IMPROVEMENTS - SCHNEIDER CANAL PUMPING STATION, SLIDELL, ST. TAMMANY PARISH, LOUISIANA
STATE PROJECT NO. 576-52-04, SLIDELL JOB NO. 100-3

Ground Elev.: 7.5 (Est.) Datum: MSL Gr. Water Depth: See Text Job No: 10287 Date Drilled: 6/27/88 Boring: 2 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	T.V. TSF	Other Tests
					Medium stiff gray clay w/shell fragments & trace of sand	CH													
55	0.75						15	53-54											
60	0.70				w/shell fragments & sand lenses		16	58-59	40	79	111	UC	—	905				0.450	
					Medium stiff to stiff gray clay w/trace of decayed wood & sand pockets	CH													
65	1.05						17	63-64	53	68	105	UC	—	1240				0.675	
70	1.20				& sand lenses		18	68-69											
75	1.10				w/sand pockets & organic matter		19	73-74	51	70	106	UC	—	1505				0.725	
80	1.00						20	78-79											
85	1.20						21	83-84	52	67	103	UC	—	865				0.675	
								87-88											
90		50=10"			Very dense gray sand	SP	22	89-90											
95		35			Dense gray sand	SP	23	94-95											
100		15			Stiff to very stiff gray sandy clay	CL	24	99-100											

EUSTIS ENGINEERING **LOG OF BORING AND TEST RESULTS**

FLOOD CONTROL IMPROVEMENTS - SCHNEIDER CANAL PUMPING STATION, SLIDELL, ST. TAMMANY PARISH, LOUISIANA
STATE PROJECT NO. 576-52-04, SLIDELL JOB NO. 100-3

Ground Elev.: 2.5 (Est.) Datum: MSL Gr. Water Depth: See Text Job No: 10287 Date Drilled: 6/27/88 Boring: 3 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits			T.V. TSF	Other Tests
								Dry	Wet	Type	ø	C	LL	PL	PI		
	4.50+		Very stiff gray & tan sandy clay w/organic sand layers	CL	1	2-3	12	125	139	OB	—	2115					
5			Loose brown clayey sand w/organic matter & decayed wood	SC	2	5-6	24	96	119	OB	—	310					
10		50	Very dense gray sand	SP	3	8-9											
		23	Medium dense gray sand	SP	4	11-12											
15		10	Loose gray sand w/trace of organic matter & decayed wood	SP	5	14-15											
20	2.30		Stiff gray & tan clay w/silt lenses & fissures	CH	6	18-19											
25	2.50				7	23-24	46	75	110	UC	—	1400				1.60	
30	0.25		Medium stiff gray clay w/sand layers & shell fragments	CH	8	28-29	58	66	104	UC	—	655					
35	1.10		Stiff greenish-gray clay w/sandy clay layers	CH	9	33-34	27	95	121	UC	—	1215				1.30	
		20	Medium dense gray silty sand w/clay layers	SM	10	37-38											
40		4	Medium stiff gray clay w/sand lenses & shell fragments	CH	11	40-41											
45	0.70				12	43-44	44	76	110	UC	—	655					
50	0.85				13	48-49											

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

SCHNEIDER CANAL PUMPING STATION, STATEWIDE FLOOD CONTROL PROGRAM
SLIDELL, LOUISIANA

Ground Elev.: 2.5 **Datum: NGVD** **Gr. Water Depth: See Text** **Job No.: 10287** **Date Drilled: 1/05/93** **Boring: 1** **Refer To "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Ø	C	Atterberg Limits LL	PL	PI		Other Tests
					2" Limestone		1	0-2"											
	0.50				Medium stiff tan & gray sandy clay w/roots	CL	2	2-3	20	108	130	UC	--	675	31	17	14		
5	1.50						3	5-6	24	100	124	UC	--	985					
10	1.50				Dense gray clayey sand w/clay layers & lenses	SC	4	8-9	19	107	128	OB	--	1090	27	19	8		
	0.75				Very loose tan & gray silty sand w/clay layers, roots & wood	SM	5	11-12	21	104	126	OB	--	145					
15		25			Medium dense tan sand	SP	6	14-15											
		23					7	16-17											
		23					8	18-19											
20		4			Loose tan sand w/clay layers	SP	9	20-21											
25	1.25				Stiff gray clay w/silt lenses & fissures	CH	10	23-24	50	71	107	UC	--	1280					
30	0.75				Medium stiff gray clay w/silt lenses, sand pockets & fissures	CH	11	28-29	59	64	103	UC	--	590	89	23	66		
35	3.25				Stiff gray flocculated clay w/sand pockets & lenses & roots	CH	12	33-34	35	85	115	UC	--	1150					
40					Medium compact gray sandy silt	ML	13	38-39											
45	0.75				Medium stiff gray clay w/sandy silt lenses & trace of wood & shell fragments	CH	14	43-44	52	70	106	UC	--	805					
50	1.00						15	48-49	54	68	104	UC	--	715					

STATION 107+00

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

SCHNEIDER CANAL PUMPING STATION, STATEWIDE FLOOD CONTROL PROGRAM
SLIDELL, LOUISIANA

Ground Elev.: 2.5 **Datum: NGVD** **Gr. Water Depth: See Text** **Job No.: 10287** **Date Drilled: 1/05/93** **Boring: 1** **Refer To "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Ø	C	Atterberg Limits LL	PL	PI		Other Tests
					Medium stiff gray clay w/sandy silt lenses, trace of wood & shell fragments	CH													
55	0.75				Stiff dark gray clay w/sand lenses & pockets & trace of organic matter	CH	16	53–54	40	80	112	UC	--	1025	77	21	56		
60	1.00						17	58–59	50	70	106	UC	--	1100					
65	1.00						18	63–64											
					Medium stiff dark gray clay w/organic matter	CH													
70	1.25						19	68–69	56	66	102	UC	--	825					
75	1.25						20	73–74											
80	0.50				w/sand lenses		21	78–79	32	89	117	OB	--	875					
85	0.75				Dense gray silty sand w/clay lenses & organic matter	SM	22	83–84	27	94	119	OB	--	1365					
					Dense gray sand	SP	23	87–88											
90		34					24	89–90											
95		50=6"			Very dense gray sand	SP	25	94–95											
100		50=7"					26	99–100											

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

SCHNEIDER CANAL PUMPING STATION, STATEWIDE FLOOD CONTROL PROGRAM (SHEET 1 Of 1)

SLIDELL, LOUISIANA

Ground Elev.: 2.5 **Datum: NGVD** **Gr. Water Depth: See Text** **Job No.: 10287** **Date Drilled: 1/05/93** **Boring: 2** **Refer To "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests Ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
					2" Limestone		1	0–2"											
	1.25				Dense tan & gray clayey sand	SC	2	2–3	15	116	133	OB	--	1570					
5	0.75				w/roots		3	5–6	15	115	133	OB	--	1375					
10	1.50				Stiff gray & tan sandy clay	CL	4	8–9	20	108	130	UC	--	1255					
					Loose gray clayey sand w/sand layers	SC	5	11–12											
		3			Loose tan sand	SP	6	13–14											
15		46			Dense tan sand	SP	7	15–16											
		35					8	18–19											
20		28			Medium dense tan sand	SP	9	20–21											
25		25			Medium dense tan & gray sand		10	24–25											
30		4			Soft gray sandy clay w/clay layers	CL	11	29–30											
35	2.50				Stiff gray flocculated clay w/sand layers & pockets	CH	12	33–34	25	98	123	UC	--	1230					
40	0.75				Medium stiff gray clay w/sandy silt layers	CH	13	38–39	44	75	109	OB	--	770	72	21	51		
45																			
50																			

STATION 105+00

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

SCHNEIDER CANAL PUMPING STATION, STATEWIDE FLOOD CONTROL PROGRAM (SHEET 1 Of 1)
SLIDELL, LOUISIANA

Ground Elev.: 3.5 **Datum: NGVD** **Gr. Water Depth: See Text** **Job No.: 10287** **Date Drilled: 1/06/93** **Boring: 3** **Refer To "Legends & Notes"**

Scale In Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests Ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
			2" Limestone		1	0–2"											
			Compact tan sandy silt w/silty sand layers	ML	2	2–3											
5		11			3	4–5											
		21	Medium dense tan silty sand	SM	4	6–7											
10		22			5	9–10											PD
		26			6	11–12											
15		18	Medium dense tan sand w/gravel	SP	7	14–15											PD
20		9	Loose tan sand w/clay layers	SP	8	19–20											
25	1.50		Medium stiff gray & tan clay w/trace of sand lenses & fissures	CH	9	23–24	45	75	109	UC	--	520					
30	2.00		Very dense gray & tan clayey sand w/sandy clay layers	SC	10	28–29	22	102	125	OB	--	2350					
35	0.75		Soft to medium stiff gray clay w/sandy silt layers	CH	11	33–34	43	77	110	UC	--	415					
40	0.75		w/silt lenses, trace of wood & fissures		12	38–39	55	67	104	UC	--	695					
45																	
50																	

STATION 103+00

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

SCHNEIDER CANAL PUMPING STATION, STATEWIDE FLOOD CONTROL PROGRAM (SHEET 1 Of 1)

SLIDELL, LOUISIANA

Ground Elev.: 4.5 Datum: NGVD Gr. Water Depth: See Text Job No.: 10287 Date Drilled: 1/06/93 Boring: 4 Refer To ``Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Ø	C	Atterberg Limits LL	PL	PI		Other Tests
					2" Limestone		1	0–2"											
					Compact tan sandy silt w/wood & roots	ML	2	2–3											
5					Medium dense tan silty sand w/sandy clay layers & wood	SM	3	4–5											PD
		9			Loose tan silty sand	SM	4	6–7											
		20			Medium dense tan dand	SP	5	8–9											
10		20					6	10–11											
		20					7	12–13											
15		20					8	14–15											
20		4			Stiff gray & tan clay	CH	9	19–20											
25	2.50				w/fissures		10	23–24	45	76	109	OB	--	1815					
30	0.50				Soft gray clay w/sandy silt lenses & layers & sandy clay layers	CH	11	28–29	57	67	105	UC	--	350					
35	1.25				Medium stiff gray clay w/sandy silt & silty sand lenses & layers & shell fragments	CH	12	33–34	36	82	112	UC	--	605					
40	1.00				w/sandy silt lenses & shell fragments		13	38–39	50	71	106	UC	--	980					
45																			
50																			

STATION 100+75

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Perimeter Levee System, Oak Harbor, East Side of Interstate 10, Vicinity of Slidell, Louisiana

Ground Elev.: -1.50 **Datum:** NGVD **Gr. Water Depth:** See Text **Job No:** 11044 **Date Drilled:** 4/03/90 **Boring:** 1 **Refer To "Legends & Notes"**

PP	SPT	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	ø	C	Atterberg Limits LL	PL	PI	Other Tests
0.50		Medium stiff gray & tan silty clay w/clay & clayey silt pockets, organic matter & roots (fill)	CL	1	2-3	41									
0.75		Medium stiff gray & tan clay w/silty sand lenses & organic clay layers (fill)	CH	2	5-6	42	80	113	UC	—	670				
0.60		Medium stiff gray & light gray sandy clay w/silty sand pockets & lenses	CL	3	8-9	19	112	133	UC	—	1020				
0.20		Very soft gray clay w/sand & organic clay pockets & decayed roots	CH	4	11-12	60	65	103	UC	—	250				
0.15				5	14-15	83	53	97	UC	—	155	92	26	66	
2.50		Very stiff gray & light gray sandy clay	CL	6	18-19	20	107	128	UC	—	4570				
2.35		Stiff gray & greenish-gray silty clay	CL	7	23-24	25	98	122	UC	—	1160				
				8	27-28										
	29	Medium dense gray fine sand w/clayey sand pockets	SP	9	29-30										
	6	Loose gray fine sand	SP	10	32-33										
	6	w/clay layers		11	35-36										
0.20		Medium stiff gray clay w/sand pockets & lenses	CH	12	38-39	46	76	111	OB	—	590				

Coordinates: 10760 N; 11830 E

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Perimeter Levee System, Oak Harbor, East Side of Interstate 10, Vicinity of Slidell, Louisiana

Ground Elev.: 1.0 Datum: NGVD Gr. Water Depth: See Text Job No: 11044 Date Drilled: 4/04/90 Boring: 2 Refer To "Legends & Notes"

Scale in Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
	1.20		Medium stiff gray & tan silty clay w/clayey silt & clayey sand layers & roots	CL	1	2-3	21	104	125	OB	—	840					
5	0.75				2	5-6	23	103	127	UC	—	690					
	1.50		Stiff tan & gray clay w/sand & silt pockets & lenses	CH	3	8-9	22	104	127	UC	—	1425					
10	1.90				4	11-12	27	96	122	UC	—	1135					
15	1.50				5	14-15											
	1.50				6	18-19	37	84	115	UC	—	940					
20	1.70		w/fissures		7	23-24											
25			Loose gray clayey sand w/clay layers, pockets & shell fragments	SC													
	0.75				8	28-29	32	91	120	OB	—	455					
30			Stiff gray clay w/clayey sand & silty sand pockets	CH													
	1.75				9	33-34	28	95	121	UC	—	960					
35			Medium stiff gray clay w/clayey silt lenses & shell fragments	CH													
40	0.50				10	38-39	58	66	104	UC	—	480	79	24	55		

Coordinates: 17900 N; 17340 E

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Perimeter Levee System, Oak Harbor, East Side of Interstate 10, Vicinity of Slidell, Louisiana

Ground Elev.: 6.78 Datum: NGVD Gr. Water Depth: See Text Job No: 11044 Date Drilled: 4/04/90 Boring: 3 Refer To "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
	1.50				Stiff tan & gray clay w/sand pockets & clayey sand layers (fill)	CH	1	2-3	24	102	125	UC	—	1375	56	20	36		
5	0.60				Medium stiff tan & gray clay w/clayey silt & clayey sand pockets (fill)	CH	2	5-6	22	104	127	UC	—	685					
10	0.10				Soft tan & gray silty clay w/concretions & clayey silt layers	CL	3	8-9	22	103	126	OB	—	250					
	1.75				Very stiff gray & tan sandy clay w/sand & clayey sand pockets & roots	CL	4	11-12	17	113	132	UC	—	2170					
15	2.25				Very stiff tan & gray clay w/sandy clay layers	CH	5	14-15											
20	3.50						6	18-19	25	101	126	UC	—	3560					
25	2.30				Stiff tan & gray clay w/silt pockets	CH	7	23-24											
30	2.20				w/fissures		8	28-29	40	80	113	UC	—	1540					
35	0.70				Loose gray & tan clayey sand	SC	9	33-34											
40	1.75				Stiff gray & tan clay w/silt pockets & lenses	CH	10	38-39	34	87	116	UC	—	1090					
45	0.60				Medium stiff gray clay w/shell fragments	CH	11	43-44	58	66	104	UC	—	650					

Coordinates: 18681 N; 20362 E

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Perimeter Levee System, Oak Harbor, East Side of Interstate 10, Vicinity of Slidell, Louisiana

Ground Elev.: 0.5 Datum: NGVD Gr. Water Depth: See Text Job No: 11044 Date Drilled: 4/05/90 Boring: 4 Refer To "Legends & Notes"

Scale in Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	PL	PI	Other Tests
	0.10		Soft gray & tan sandy clay w/roots & concretions	CL	1	2-3	23	105	129	OB	—	255				
5	0.60				2	5-6	24	104	128	OB	—	445				
	1.30		Medium stiff gray & tan clay w/sand pockets & lenses	CH	3	8-9	28	96	123	UC	—	940				
10	2.60		Stiff tan & gray silty clay w/clayey sand pockets	CL	4	11-12	29	93	121	UC	—	1200				
15	2.60		Stiff tan & gray clay w/clayey silt lenses & fissures	CH	5	14-15										
	2.10				6	18-19	45	77	111	UC	—	1120				
20	1.16		Stiff tan & gray clay w/fissures & clayey sand layers & concretions	CH	7	23-24	44	78	112	UC	—	1650				
25	1.70		Medium stiff gray & tan clay w/clayey silt pockets & shell fragments	CH	8	28-29	29	91	118	UC	—	785				
30	0.60		Medium stiff gray clay w/clayey silt & silty sand lenses, layers & shell fragments	CH	9	33-34	45	78	112	UC	—	560				
35	0.50				10	38-39	57	68	106	UC	—	520				
40																

Coordinates: 18571 N; 20399 E

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Perimeter Levee System, Oak Harbor, East Side of Interstate 10, Vicinity of Slidell, Louisiana

Ground Elev.: -1.50 Datum: NGVD Gr. Water Depth: See Text Job No: 11044 Date Drilled: 4/05/90 Boring: 5 Refer To "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
	0.10				Very soft black humus	Pt	1	2-3	517	11	67	UC	—	60	448	131	317		
5	0.20				Loose gray silty fine sand w/clayey sand layers	SM	2	5-6	26	98	124	OB	—	375					
10	1.70				Stiff gray sandy clay w/clayey sand pockets, layers & lenses	CL	3	8-9	19	111	132	UC	—	1695					
	3.75				Stiff gray & greenish-gray sandy clay w/sand pockets	CL	4	11-12	17	111	130	UC	—	1350					
15	4.20				Stiff light gray sandy clay w/clayey sand pockets & layers	CL	5	14-15	17	115	134	OB	—	1470					
	2.75				Medium dense to dense light gray silty fine sand	SM	6	17-18											
20		42			Dense gray fine sand w/trace of wood	SP	7	19-20											
		46					8	22-23											
25		27			Medium dense gray fine sand	SP	9	25-26											
30		47			Dense gray fine sand	SP	10	29-30											
35		37					11	34-35											
40		50=10"			Very dense gray fine sand	SP	12	39-40											

Coordinates: 18469 N; 22752 E

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Perimeter Levee System, Oak Harbor, East Side of Interstate 10, Vicinity of Slidell, Louisiana

Ground Elev.: 5.55 **Datum:** NGVD **Gr. Water Depth:** See Text **Job No:** 11044 **Date Drilled:** 4/06/90 **Boring:** 6 **Refer To "Legends & Notes"**

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
	0.75				Medium stiff tan & gray clay w/roots & clayey sand pockets (fill)	CH	1	2-3	30	90	117	UC	—	700					
5	1.60				Medium stiff to stiff tan & gray clay w/silty clay & sandy clay pockets & layers	CH	2	5-6	31	93	121	UC	—	1070					
	1.20						3	8-9	24	102	127	UC	—	900					
10	0.90				Soft tan & gray clay w/silty clay layers	CH	4	11-12	35	88	119	UC	—	430					
15	0.00				Loose gray clayey sand w/clay pockets	SC	5	14-15	21										
	2.75				Stiff gray sandy clay w/clayey sand layers	CL	6	18-19	14	121	138	OB	—	1890	25	19	6		
20	1.30				Stiff gray & tan clay w/sandy silt pockets & fissures	CH	7	23-24	41	79	112	UC	—	1515					
25	1.75				Medium stiff tan & gray clay w/silt pockets & decayed wood	CH	8	28-29	39	83	115	UC	—	965					
30	0.40				Soft gray sandy clay w/clayey sand pockets & shell fragments	CL	9	33-34	34	89	119	UC	—	370	35	20	15		
35	1.30				Stiff gray clay w/silt pockets & lenses & shell fragments	CH	10	38-39	40	81	113	UC	—	1025					
40	3.10				Very stiff greenish-gray clay w/silty clay layers & pockets	CH	11	43-44	25	99	124	UC	—	2625					
45																			

Coordinates: 14373 N; 24368 E

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Perimeter Levee System, Oak Harbor, East Side of Interstate 10, Vicinity of Slidell, Louisiana

Ground Elev.: -1.50 Datum: NGVD Gr. Water Depth: See Text Job No: 11044 Date Drilled: 4/10/90 Boring: 7 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
	0.30		Medium stiff dark brown organic clay w/humus layers	OH	1	2-3	234	22	72	UC	—	590					
5	0.10		Very soft dark brown & gray organic clay w/humus & sand pockets	OH	2	5-6	166	30	80	UC	—	130	169	41	128		
	0.90		Medium stiff light gray sandy clay w/clayey sand layers	CL	3	8-9	21	106	128	OB	—	735					
10	1.20		Medium dense gray clayey sand w/sandy clay pockets	SC	4	11-12	14	121	139	OB	—	1380					
15		37	Dense gray & tan silty fine sand	SM	5	13-14											
		8	Medium stiff gray & greenish-gray clay	CH	6	16-17											
20	1.40		Stiff tan & gray clay	CH	7	18-19	45	75	109	UC	—	1050					
25	0.50		Loose gray clayey sand w/clay pockets & organic matter	SC	8	23-24											
30	1.50		Stiff gray clay w/clayey sand pockets & organic matter	CH	9	28-29	30	93	120	UC	—	1020					
35	0.50		Medium stiff gray clay w/shell fragments & organic matter	CH	10	33-34	60	63	102	UC	—	640	82	24	58		
40	2.20		Stiff greenish-gray clay w/silt pockets & layers	CH	11	38-39	30	92	120	OB	—	1045					

Coordinates: 14382 N; 24295 E

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Perimeter Levee System, Oak Harbor, East Side of Interstate 10, Vicinity of Slidell, Louisiana

Ground Elev.: 7.17 Datum: NGVD Gr. Water Depth: See Text Job No: 11044 Date Drilled: 4/09/90 Boring: 8 Refer To "Legends & Notes"

Scale in Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
	0.75		Medium dense tan & gray clayey sand w/trace of clay	SC	1	2-3	13	117	133	OB	—	730					
5	0.80		Dense light gray & tan fine sand w/clay pockets	SP	2	5-6	16	114	132	OB	—	2070					
	0.40		Loose gray clayey sand w/organic matter	SC	3	8-9	15	118	136	OB	—	465					
10	1.50		Medium dense tan & gray clayey sand	SC	4	11-12	16	116	135	OB	—	845					
15	1.60																
		50=11"	Very dense tan & gray fine sand w/clay pockets	SP	5	16-17											
20		8	Loose tan & gray fine sand w/clay layers	SP	6	19-20											
		5	Medium stiff gray & tan clay w/silt lenses, sand pockets & fissures	CH	7	22-23											
25	1.70				8	24-25	40	80	111	UC	—	585					
30	1.60		Stiff tan & gray clay w/silt & sand pockets	CH	9	28-29	46	76	111	UC	—	1405					
35	1.90		Stiff gray & tan clay w/fissures	CH	10	33-34	46	76	110	UC	—	1040					
			Loose gray clayey sand w/clay layers & organic matter	SC	11	38-39											
40			Very stiff greenish-gray clay w/silty sand pockets & shell fragments	CH	12	43-44	34	87	117	UC	—	1085					
45																	

Coordinates: 10021 N; 23715 E

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Perimeter Levee System, Oak Harbor, East Side of Interstate 10, Vicinity of Slidell, Louisiana

Ground Elev.: 1.25 **Datum:** NGVD **Gr. Water Depth:** See Text **Job No:** 11044 **Date Drilled:** 4/09/90 **Boring:** 9 **Refer To "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
	0.75				Medium dense gray & tan clayey sand w/humus layers, roots & organic matter	SC	1	2–3	16	116	135	OB	—	515					
5	0.75						2	5–6	16	116	135	OB	—	745	15	12	3		
	0.70				Loose gray & tan fine sand w/clay pockets	SP	3	8–9	18	110	130	OB	—	380					
10		13			Medium dense gray fine sand	SP	4	10–11											
		4			Soft gray & tan clay w/silt pockets	CH	5	13–14	35										
15	1.70				Medium stiff gray & tan clay w/silty sand pockets	CH	6	14–15	30	93	121	UC	—	835					
20	3.10				Stiff tan & gray clay w/silty clay & sand pockets	CH	7	18–19	34	87	117	UC	—	1060					
25	2.10						8	23–24											
30	1.60				Stiff gray & tan clay w/fissures	CH	9	28–29	46	75	110	UC	—	1200					
35	1.60				Stiff greenish-gray sandy clay w/clayey sand & clay layers	CL	10	34–35											
40	0.50				Medium stiff gray sandy clay w/shell fragments	CL	11	39–40	35	87	117	UC	—	655					

Coordinates: 10032 N; 23643 E

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

EAST ST. TAMMANY EVENTS CENTER
ST. TAMMANY PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 16484 **Date Drilled:** 6/15/00 **Boring:** 2 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ϕ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Other Tests
0		7	Loose gray clayey silt w/roots	ML	1	0-0.5										
			Loose gray clayey sand	SC												
			Medium stiff tan & gray sandy clay	CL	3	3-4	17	108	126	OB	--	630				
			Loose gray fine sand	SP	4	5.5-6.5										
		13	Medium dense gray & tan fine sand w/clayey sand layers	SP	5	7-8										
10		13	Medium dense gray fine sand	SP	6	10-11										
		12			7	13-14										
		8	Soft greenish-gray & tan clay w/clayey silt lenses	CH	8	16-17										
	2.30		Stiff greenish-gray & tan silty clay w/clay layers	CL	9	18-19										
20																
	2.00		Stiff greenish-gray & tan clay w/fine sand lenses	CH	10	23-24										
	1.10		Medium stiff greenish-gray clay w/trace of fine sand & organic matter	CH	11	28-29										
30																
	0.50		Soft greenish-gray sandy clay w/clayey sand layers	CL	12	33-34	25	97	122	UC	--	420				
					13	38-39	33	88	117	UC	--	385				
40																
			Stiff brown & gray clay w/organic matter, silt pockets, & wood	CH												
		7			14	46-47										
	0.50				15	48-49	51	69	104	UC	--	1350				
50																

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

EAST ST. TAMMANY EVENTS CENTER
ST. TAMMANY PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 16484 **Date Drilled:** 6/15/00 **Boring:** 2 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Stiff brown & gray clay w/organic matter, silt pockets, & wood	CH													
	0.50				Soft gray clay w/trace of clayey silt & organic matter	CH	16	53-54											
					Loose gray clayey sand	SC	17	58-59											
60					Medium dense gray fine sand w/clayey sand lenses	SP	18	61-62											
		32			Dense gray fine sand	SP	19	63-64											
		50=6"			Very dense gray fine sand w/shell fragments	SP	20	66-67											
70		50=6"			Very dense gray fine sand		21	69-70											
		50=4"					22	74-75											
80		50=5"					23	79-80											
		45			Dense gray fine sand	SP	24	84-85											
90		50=4"			Very dense gray fine sand	SP	25	89-90											
		25			Medium dense gray fine sand	SP	26	94-95											
100		50=9"			Very dense gray fine sand	SP	27	99-100											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

EAST ST. TAMMANY EVENTS CENTER
ST. TAMMANY PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 16484 **Date Drilled:** 6/21/00 **Boring:** 8 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0		14	Loose gray & brown sandy silt w/grass roots	ML	1	0-0.5											
			Medium dense gray & brown clayey sand	SC	2	1-2											
			Medium dense gray, tan, & brown sandy clay w/organic matter	CL	3	3-4	19	107	127	OB	--	535					
			Medium dense gray & tan sandy clay w/roots	CL	4	5-6	20	109	131	OB	--	765					
			Loose gray fine sand	SP	5	8-9											
10					6	10-11											
		8			7	12-13											
		48	Dense gray fine sand	SP	8	15-16											
		50=11"	Very dense gray fine sand	SP	9	18-19											
20		36	Dense gray fine sand	SP	10	21-22											
		7	Medium stiff greenish-gray & tan clay	CH	11	24-25											
	1.75		Stiff greenish-gray & tan clay w/clayey silt lenses	CH	12	28-29	51	71	107	UC	--	1185					
30																	
	0.20		Medium stiff greenish-gray clay w/fine sand pockets & shell fragments	CH	13	33-34	67	60	100	UC	--	550					
	0.50		Soft to medium stiff gray clay w/silt lenses & shell fragments	CH	14	38-39	43	76	109	UC	--	425					
40																	
	0.25				15	43-44	53	69	106	UC	--	760					
	0.50		Stiff gray clay w/organic matter	CH	16	48-49	38	83	115	UC	--	955					
50																	

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

EAST ST. TAMMANY EVENTS CENTER
ST. TAMMANY PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 16484 **Date Drilled:** 6/21/00 **Boring:** 8 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	φ	C	LL	PL	PI		
50					Stiff gray clay w/organic matter	CH													
	0.30				Medium stiff gray silty clay w/organic matter	CL	17	53-54	26	99	124	UC	--	930					
					Dense gray clayey sand	SC	18	58-59	24	99	123	OB	--	1025					
60		12			Medium dense gray fine sand	SP	19	61-62											
		31			Dense gray fine sand	SP	20	64-65											
		47					21	67-68											
70		50=9"			Very dense gray fine sand	SP	22	70-71											
		50=5"			Very dense gray medium sand	SP	23	74-75											
80		50=6"					24	79-80											
		50=4"					25	84-85											
90		50=5"					26	89-90											
		50=4"					27	94-95											
100		50=5"					28	99-100											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

EAST ST. TAMMANY EVENTS CENTER
ST. TAMMANY PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 16484 **Date Drilled:** 6/16/00 **Boring:** 9 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0		4			Loose brown & gray organic sandy silt	ML	1	0-0.5											
					Loose gray & brown clayey sand	SC	2	1-2											
					Soft gray sandy clay w/organic matter & roots	CL	3	3-4	22	104	127	OB	--	435					
					Soft greenish-gray & tan sandy clay	CL	4	5-6											
	1.75				Medium stiff greenish-gray & tan sandy clay w/clayey sand layers	CL	5	8-9											
10	1.25				Stiff gray clay w/silt lenses	CH	6	11-12	28	96	122	UC	--	1175	60	16	44		
	1.30						7	14-15											
	1.50				Medium stiff gray & tan clay w/silt lenses	CH	8	18-19	33	86	115	UC	--	880	58	18	40		CON
20	0.80						9	23-24											
	0.20				Medium stiff gray clay w/shell fragments	CH	10	28-29	59	65	103	UC	--	680	94	20	74		
30	0.20				Medium stiff gray sandy clay w/shell fragments	CL	11	33-34	25	99	124	UC	--	565					
	0.75				Soft to medium stiff gray clay w/organic matter & shell fragments	CH	12	38-39	32	87	115	UC	--	380	55	16	39		
40	0.30						13	43-44	58	66	104	UC	--	635	73	21	52		CON
	0.50				Stiff brown & gray clay w/om & roots	CH	14	48-49	50	70	105	UC	--	1320					
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

EAST ST. TAMMANY EVENTS CENTER
ST. TAMMANY PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 16484 **Date Drilled:** 6/16/00 **Boring:** 9 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50	0.30				Stiff brown & gray clay w/organic matter & roots	CH	15	53-54	43	76	109	UC	--	1170	60	20	40		
					Loose gray clayey sand	SC	16	58-59											
60	0.75				Medium stiff gray sandy clay w/silt layers	CL	17	63-64	27	95	121	UC	--	650					
					Loose gray fine sand w/organic matter	SP	18	68-69											
70		18			Medium dense gray fine sand	SP	19	71-72											
		50=8"			Very dense gray fine sand	SP	20	74-75											
		50=5"					21	77-78											
80		50=8"			w/trace of coarse sand		22	80-81											
		50=9"			Very dense gray fine sand		23	84-85											
90		50=11"			Very dense gray medium sand w/clay lenses	SP	24	89-90											
		46			Dense gray fine sand	SP	25	94-95											
100		14			Medium stiff greenish-gray sandy clay	CL	26	99-100											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

EAST ST. TAMMANY EVENTS CENTER
ST. TAMMANY PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 16484 **Date Drilled:** 6/16/00 **Boring:** 9 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
100					Medium stiff greenish-gray sandy clay	CL													
	1.25				Stiff greenish-gray sandy clay	CL	27	102-103											
		22			Medium dense gray fine sand w/wood	SP	28	104-105											
110		50=6"			Very dense gray fine sand	SP	29	109-110											
		50=11"					30	114-115											
120		50=5"					31	119-120											
		50=7"					32	124-125											
130		50=6"					33	129-130											
		50=5"					34	134-135											
140		50=6"					35	139-140											
		50=8"					36	144-145											
150		50=6"					37	149-150											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

EAST ST. TAMMANY EVENTS CENTER
ST. TAMMANY PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 16484 **Date Drilled:** 6/14/00 **Boring:** 10 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0		8			Loose gray organic clayey silt w/roots	ML	1	0-0.5	15										
					Medium stiff gray & brown sandy clay	CL	2	1-2											
							3	3-4											
	1.25				Medium stiff gray clay w/sand pockets	CH	4	5-6	21	104	125	UC	--	600					
	1.50				Stiff gray clay w/sand pockets	CH	5	8-9	25	100	124	UC	--	1670	66	18	48		
10	1.50						6	11-12	28	91	117	UC	--	1180					
	2.00				Stiff gray & tan clay w/silt lenses	CH	7	14-15	38	83	114								
	1.50						8	18-19	33	88	116	UC	--	1145	69	22	47		
20	1.60						9	23-24	46	76	111	UC	--	1360					
	1.10						10	28-29	43	78	112	UC	--	1195					
30	0.30				Medium stiff gray silty clay w/organic matter, wood, & shell fragments	CL	11	33-34	24	103	127	UC	--	785					
	0.40				Medium stiff gray clay w/silt pockets & shell fragments	CH	12	38-39	46	75	110	UC	--	780					
40	0.25						13	43-44	59	66	104	UC	--	635	83	23	60		
	0.30				Stiff gray & brown clay w/organic matter	CH	14	48-49	54	67	103	UC	--	1040					
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

EAST ST. TAMMANY EVENTS CENTER
ST. TAMMANY PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 16484 **Date Drilled:** 6/14/00 **Boring:** 10 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Stiff gray & brown clay w/organic matter	CH													
					Loose gray fine sand	SP	15	53-54											
							16	58-59											
60		39			Dense gray fine sand	SP	17	61-62											
		50=11"			Very dense gray fine sand	SP	18	64-65											
		50=7"					19	67-68											
70		50=5"			Very dense gray medium sand	SP	20	70-71											
		50=4"					21	74-75											
80		50=5"			Very dense gray coarse sand w/gravel	SP	22	79-80											
		50=4"			Very dense gray fine sand	SP	23	84-85											
90		50=6"					24	89-90											
		50=7"					25	94-95											
100		50=5"					26	99-100											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

EAST ST. TAMMANY EVENTS CENTER
ST. TAMMANY PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 16484 **Date Drilled:** 6/13/00 **Boring:** 15 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0		7			Loose brown dry humus	Pt	1	0-0.5											
					Soft brown clay w/organic matter & roots	CH	2	1-2	26						50	25	25		
	0.40				Medium stiff brown silty clay	CL	3	3-4	19	107	126	UC	--	595					
	2.50				Stiff greenish-gray & tan sandy clay	CL	4	5-6											
	3.60						5	8-9											
10																			
	0.90				Stiff gray clay w/sand pockets	CH	6	11-12	28	95	122	UC	--	1425					
	1.25				Stiff gray & tan clay	CH	7	14-15	29	93	120	UC	--	1130	73	18	55		CON
	2.10				Medium stiff to stiff greenish-gray clay w/silt lenses	CH	8	18-19											
20																			
	1.75						9	23-24	41	79	111	UC	--	1035	100	26	74		CON
	1.30						10	28-29											
30					Medium stiff gray clay w/silt & sand pockets	CH													
							11	33-34	65	62	101	UC	--	585					
	0.60						12	38-39											
40																			
	0.30						13	43-44	58	66	105	UC	--	565					
50	0.25						14	48-49											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

EAST ST. TAMMANY EVENTS CENTER
ST. TAMMANY PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 16484 **Date Drilled:** 6/13/00 **Boring:** 15 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium stiff gray clay w/silt & sand pockets	CH													
	0.60				Stiff brown & gray clay w/organic matter & roots	CH	15	53-54	69	58	97	UC	--	1365	104	37	67		CON
	0.80						16	58-59											
60					Loose greenish-gray & gray clayey sand w/fine sand layers	SC	17	61-62											
		16			Medium dense gray medium sand	SP	18	63-64											
		12					19	66-67											
70		50=5"			Very dense gray fine sand w/clayey silt layers	SP	20	69-70											
		50=6"					21	72-73											
		50=6"			Very dense gray medium sand	SP	22	75-76											
80		50=7"					23	79-80											
		50=11"					24	84-85											
90		42			Dense gray fine sand	SP	25	89-90											
		41					26	94-95											
100		50=7"			V dense gray med. sand w/org. matter	SP	27	99-100											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

EAST ST. TAMMANY EVENTS CENTER
ST. TAMMANY PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 16484 **Date Drilled:** 6/12-13/00 **Boring:** 22 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	φ	C	LL	PL	PI		
0					Loose brown & gray humus	Pt	1	0-1											
	0.50				Soft gray & brown sandy clay	CL	2	2-3											
	0.75				Medium stiff gray & light gray sandy clay	CL	3	5-6	19						24	10	14		
					Loose gray clayey sand	SC	4	8-9											
10					Loose gray fine sand	SP	5	11-12											
		7					6	13-14											
		22			Medium dense gray fine sand	SP	7	16-17											
20		9			Medium stiff greenish-gray & tan clay	CH	8	19-20											
	1.25				Stiff greenish-gray & tan clay w/silt pockets	CH	9	23-24	50						99	28	71		
	0.75				Soft to medium stiff gray clay w/clayey sand lenses & shell fragments	CH	10	28-29	50										
30	0.40						11	33-34	29										
	0.40						12	38-39	39						66	20	46		
40	0.40						13	43-44	68										
50					Loose gray fine sand w/organic matter	SP	14	48-49											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

EAST ST. TAMMANY EVENTS CENTER
ST. TAMMANY PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 16484 **Date Drilled:** 6/12-13/00 **Boring:** 22 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ϕ	C	LL	PL	PI		
50		12			Medium dense gray fine sand	SP	15	51-52											
		17			Medium dense gray clayey sand w/sandy clay layers	SC	16	54-55											
		29			Medium dense gray clayey sand		17	57-58											
60		50=9"			Very dense gray fine sand	SP	18	60-61											
		50=7"					19	64-65											
70		50=9"					20	69-70											
		50=5"					21	74-75											
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

EAST ST. TAMMANY EVENTS CENTER
PROPOSED BORROW PONDS
VICINITY OF OAK HARBOR BOULEVARD AND INTERSTATE 10
ST. TAMMANY PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 16613 **Date Drilled:** 8/29/00 **Boring:** 27 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Loose dark gray clayey silt w/organic matter	ML	1	0-0.5	36										
					Loose brown & gray clayey sand	SC	2	2-3	15										
					Loose gray & tan clayey sand w/organic matter	SC	3	5-6	19	109	129	OB	--	560					
					Soft gray & tan sandy clay w/organic matter	CL	4	8-9	22						25	14	11		
10					Very soft light gray sandy clay	CL	5	11-12	21	107	130	UC	--	150					
					Very soft gray & tan sandy clay	CL	6	14-15	32						26	17	9		
	0.50				Medium stiff greenish-gray clay w/silt lenses	CH	7	18-19	36	84	114	UC	--	665					
20	1.80				Medium stiff greenish-gray clay		8	23-24	47	75	111	UC	--	805					
	2.00				Stiff greenish-gray & tan clay w/clayey sand lenses	CH	9	28-29	47										
30	1.00				Soft gray sandy clay w/shell fragments & roots	CL	10	33-34	27	96	122	UC	--	415					
	0.25				Medium stiff gray clay w/sand pockets & organic matter	CH	11	38-39	42	78	111	UC	--	605					
40					Loose gray shells w/clayey sand	GP	12	43-44	24										
50	0.50				Medium stiff gray clay w/silt pockets, organic matter, & large roots	CH	13	48-49	36	84	115	UC	--	785					

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

EAST ST. TAMMANY EVENTS CENTER
PROPOSED BORROW PONDS
VICINITY OF OAK HARBOR BOULEVARD AND INTERSTATE 10
ST. TAMMANY PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 16613 **Date Drilled:** 8/29/00 **Boring:** 27 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	φ	C	LL	PL	PI		
50					Medium stiff gray clay w/trace of sand & organic matter	CH													
	0.25						14	53-54											
	0.30				w/trace of sand		15	58-59	26										
60					Loose gray fine sand	SP	16	59.5-60											
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

EAST ST. TAMMANY EVENTS CENTER
PROPOSED BORROW PONDS
VICINITY OF OAK HARBOR BOULEVARD AND INTERSTATE 10
ST. TAMMANY PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 16613 **Date Drilled:** 8/29/00 **Boring:** 28 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	φ	C	LL	PL	PI		
0					Medium stiff dark gray silty clay w/organic matter & roots	CL	1	0-0.5											
							2	2-3	25										
	1.75				Stiff gray & tan sandy clay w/organic matter	CL	3	5-6	19	110	131	UC	--	1680	35	12	23		
	1.50				Medium stiff light gray clay w/sand pockets & layers	CH	4	8-9	28	95	121	UC	--	755					
10	1.50				Medium stiff gray clay w/sand lenses & pockets	CH	5	11-12	30	93	120	UC	--	745	69	17	52		
	1.25				Medium stiff gray & tan clay w/clayey sand pockets	CH	6	14-15	32										
20	2.25				Stiff gray & tan clay w/sand lenses & pockets	CH	7	18-19											
	1.75				Medium stiff light gray & tan clay w/organic matter	CH	8	23-24	46	76	111	UC	--	980					
30	1.50						9	28-29											
					Soft gray clay w/trace of shell fragments	CH	10	33-34	62	63	102	UC	--	410					
40	0.25				Medium stiff gray clay w/clayey sand lenses & layers	CH	11	38-39	29	93	120	UC	--	595					
	0.25				Soft gray clay w/shell fragments	CH	12	43-44	59	65	103	UC	--	430					
50	0.75				Medium stiff gray clay w/sand pockets & organic matter	CH	13	48-49											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

EAST ST. TAMMANY EVENTS CENTER
PROPOSED BORROW PONDS
VICINITY OF OAK HARBOR BOULEVARD AND INTERSTATE 10
ST. TAMMANY PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 16613 **Date Drilled:** 8/29/00 **Boring:** 28 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Stiff gray clay w/trace of organic matter	CH													
	1.00						14	53-54	30	93	121	UC	--	1295					
							15	57-58											
		48			Dense gray fine sand w/clayey sand layers	SP	16	59-60											
60																			
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

EAST ST. TAMMANY EVENTS CENTER
PROPOSED BORROW PONDS
VICINITY OF OAK HARBOR BOULEVARD AND INTERSTATE 10
ST. TAMMANY PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 16613 **Date Drilled:** 8/28/00 **Boring:** 29 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	φ	C	LL	PL	PI		
0					Loose dark gray clayey silt w/organic matter & roots	ML	1	0-0.5	35						71	19	52		
					Soft gray sandy clay w/organic matter	CL	2	2-3	17	109	127	UC	--	430	24	12	12		
	2.50				Medium stiff to stiff greenish-gray sandy clay w/trace of organic matter	CL	3	5-6	20	105	126	UC	--	710	50	15	35		
	2.25				Medium stiff to stiff greenish-gray sandy clay		4	8-9	22	103	126	UC	--	1350	55	15	40		
10	1.00				Medium stiff light gray clay w/sand lenses & pockets	CH	5	11-12	29	94	121	UC	--	820					
	0.75				Medium stiff gray & tan clay w/sand lenses & concretions	CH	6	14-15	34	93	125	UC	--	435					
	2.25				Stiff gray & tan clay w/sand pockets	CH	7	18-19											
20	1.25				Medium stiff gray & tan clay w/concretions & trace of organic matter	CH	8	23-24	45	75	109	UC	--	755					
	1.75				Stiff greenish-gray & tan clay	CH	9	28-29											
30					Soft gray clay w/sand lenses & shell fragments	CH	10	33-34	59	65	103	UC	--	450					
40					w/silt lenses & pockets, shell fragments, & trace of organic matter		11	38-39	48	73	108	UC	--	465					
	0.25				Medium stiff gray clay w/silt pockets & shell fragments	CH	12	43-44	57	67	105	UC	--	555					
50					Medium stiff brown sandy clay w/roots, wood, & organic matter	CL	13	48-49	36	84	114	UC	--	855					

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

EAST ST. TAMMANY EVENTS CENTER
PROPOSED BORROW PONDS
VICINITY OF OAK HARBOR BOULEVARD AND INTERSTATE 10
ST. TAMMANY PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 16613 **Date Drilled:** 8/28/00 **Boring:** 29 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	φ	C	LL	PL	PI		
50					Medium stiff gray sandy clay w/organic matter	CL													
							14	53-54	28	96	122	UC	--	575					
					Loose gray clayey sand	SC	15	58-59											
60																			
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

EAST ST. TAMMANY EVENTS CENTER
PROPOSED BORROW PONDS
VICINITY OF OAK HARBOR BOULEVARD AND INTERSTATE 10
ST. TAMMANY PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 16613 **Date Drilled:** 8/28/00 **Boring:** 30 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	φ	C	LL	PL	PI		
0					Medium stiff dark gray silty clay w/organic matter & roots	CL	1	0-0.5	62										
					Medium stiff light brown sandy clay	CL	2	2-3	19	109	129	UC	--	555	24	14	10		
	1.75				Medium stiff gray sandy clay w/organic matter	CL	3	5-6	22	102	125	UC	--	625	39	14	25		
	2.20				Medium stiff light gray clay w/large sand pockets	CH	4	8-9	20	103	124	UC	--	160	63	16	47		
10	1.50				Stiff gray & tan clay w/sand pockets	CH	5	11-12	30	92	120	UC	--	1155	67	16	51		
	2.25						6	14-15											
20	1.50				Medium stiff gray & tan clay w/clayey silt pockets	CH	7	18-19	36	85	115	UC	--	705					
	2.30				Stiff gray & tan clay w/sand pockets	CH	8	23-24											
30	2.25				w/silt lenses		9	28-29											
					Soft gray clay w/sand pockets & shell fragments	CH	10	33-34	63	62	101	UC	--	455					
40	0.60				w/clayey silt pockets & trace of organic matter		11	38-39	36	85	115	UC	--	360					
	0.25				Soft dark gray clay w/silt lenses & pockets, & trace of shell fragments	CH	12	43-44	56	67	105	UC	--	480					
50					Loose gray clayey sand w/shell fragments	SC	13	48-49											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

EAST ST. TAMMANY EVENTS CENTER
PROPOSED BORROW PONDS
VICINITY OF OAK HARBOR BOULEVARD AND INTERSTATE 10
ST. TAMMANY PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 16613 **Date Drilled:** 8/28/00 **Boring:** 30 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	φ	C	LL	PL	PI		
50		32			Dense gray & brown fine sand w/organic matter	SP	14	50-51	26										
		22			Medium dense gray fine sand	SP	15	53-54											
		11			Medium stiff gray silty clay	CL	16	56-57	27										
	0.40				Soft gray clay w/organic matter	CH	17	58-59											
60																			
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

CHEVRON/WAFFLE HOUSE
OAK HARBOR BOULEVARD
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17034 **Date Drilled:** 7/12/01 **Boring:** 1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Medium stiff red & tan silty clay w/roots	CL	1	0-1											
	0.75				Medium stiff tan & light gray clay w/silt lenses & roots	CH	2	2-3	44										
	1.75				Medium stiff gray & tan clay w/silt pockets & roots	CH	3	5-6	40	81	114	UC	–	950					
	0.75				Soft dark gray clay w/few silt pockets	CH	4	8-9	37	85	116	UC	–	470					
10	0.50				w/clayey sand layers		5	11-12											
	1.25				Stiff tan & gray silty clay w/concretions	CL	6	14-15	19	112	134	UC	–	1290					
	1.50						7	18-19											
20																			
	1.50				Medium stiff gray & tan clay w/silt pockets & lenses	CH	8	23-24	31	90	117	UC	–	965					
	1.75						9	28-29											
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

CHEVRON/WAFFLE HOUSE
OAK HARBOR BOULEVARD
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17034 **Date Drilled:** 7/10/01 **Boring:** 2 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Compact tan clayey silt w/roots	ML	1	0-1											
	2.00				Stiff light gray clay w/clayey silt pockets & lenses	CH	2	2-3											
	1.75				w/sand pockets		3	5-6											
	0.25				Soft gray sandy clay	CL	4	8-9											
10	0.25						5	11-12											
	0.25				Soft gray sandy clay w/sand layers	CL	6	14-15											
20																			
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

CHEVRON/WAFFLE HOUSE
OAK HARBOR BOULEVARD
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Test **Job No.:** 17034 **Date Drilled:** 7/12/01 **Boring:** 3 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff tan silty clay w/roots	CL	1	0-1											
	2.00				Very stiff gray & tan sandy clay w/roots	CL	2	2-3	13	115	130	UC	--	2170					
	1.25				Stiff tan & light gray sandy clay	CL	3	5-6	17										
	0.50				Medium stiff dark gray clay w/organic matter layers	CH	4	8-9											
10	0.25				Soft to medium stiff gray silty clay w/organic matter layers	CL	5	11-12	21	107	130	UC	--	500					
	0.50				Medium stiff light gray sandy clay w/sand lenses	CL	6	14-15											
	1.00				Stiff greenish-gray & tan clay w/sand pockets	CH	7	18-19	34	89	119	UC	--	1530					
20	1.75						8	23-24											
	2.00				Medium stiff tan & gray sandy clay w/clayey sand layers	CL	9	28-29	25	100	125	UC	--	715					
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

CHEVRON/WAFFLE HOUSE
OAK HARBOR BOULEVARD
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17034 **Date Drilled:** 7/10/01 **Boring:** 4 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff tan silty clay	CL													
	1.25				Stiff tan & light gray clay w/clayey silt pockets	CH	1 2	1-2 2-3											
	1.50				w/organic matter layers		3	5-6											
	0.75				Medium stiff gray silty clay w/organic matter layers	CI	4	8-9											
10	0.50						5	11-12											
					Soft black humus w/sand pockets	Pt	6	14-15											
20																			
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

CHEVRON/WAFFLE HOUSE
OAK HARBOR BOULEVARD
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17034 **Date Drilled:** 7/12/01 **Boring:** 5 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff tan & gray silty clay w/roots	CL	1	0-1											
	1.50				Very stiff tan & gray clay w/silt pockets & lenses & roots	CH	2	2-3	34	99	123	UC	--	2055					
	0.75				Medium stiff tan & gray clay w/organic matter, wood, silty sand lenses & concretions	CH	3	5-6	26	97	122	UC	--	690					
	0.50				Medium stiff dark gray clay w/organic matter layers	CH	4	8-9											
10	0.25				Very soft light gray & tan sandy clay w/roots	CL	5	11-12	22	108	132	UC	--	200					
	0.50				Medium stiff light gray sandy clay	CL	6	14-15											
	1.00				Stiff light gray sandy clay	CL	7	18-19	19	109	130	UC	--	1040					
20		11			Medium dense light gray sand	SP	8	20-21											
		4			Soft light gray clay w/clayey sand layers	CH	9	23-24											
	2.00				Very stiff light gray clay w/silty sand lenses	CH	10	28-29											
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

CHEVRON/WAFFLE HOUSE
OAK HARBOR BOULEVARD
SLIDELL, LOUISIANA

(Sheet 1 of 1)

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17034 **Date Drilled:** 7/10/01 **Boring:** 6 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Stiff brown silty clay w/roots	CL	1	0-1											
	2.50				Very stiff tan & brown clay w/organic matter	CH	2	2-3											
	1.50				Stiff tan & gray clay w/clayey sand pockets & lenses	CH	3	5-6											
	0.50				Medium stiff gray clay w/organic matter layers	CH	4	8-9											
10					Soft gray silty clay w/organic matter layers	CL	5	11-12											
	0.25						6	14-15											
20																			
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

RESIDENCE FOR SCOTT OWENS
159 LAKEVIEW DRIVE (LOT 46)
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 21260 **Date Drilled:** 1/03/11 **Boring:** 1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0		32			Dense tan medium coarse sand	SP	1	0-1.5											
		7			Loose tan medium dense sand	SP	2	3-4.5											
		2			Very soft dark gray humus w/clay layers & wood	PT	3	6-7.5	176										
10	0.25				Very soft to soft light gray & tan sandy clay w/trace of organic matter & roots	CL	4	9-10	30	89	116	UC	--	144					
							5	11-12	19	110	131	UC	--	189					
	1.00						6	13-14	22										
	2.00				Stiff light gray & tan sandy clay w/roots	CL	7	14-15	22	104	127	UC	--	1559					
	2.75				Very stiff light gray & tan clay w/trace of silty sand pockets & lenses	CH	8	18-19	24	101	125	UC	--	2170					
20																			
	1.75						9	23-24	30										
					Stiff brown & gray clay with sandy silt lenses	CH	10	28-29	31	89	117	UC	--	1819					
30																			
	3.25				Medium stiff greenish-gray & brown clay	CH	11	33-34	52	69	104	UC	--	968					
					Stiff gray clay w/silty sand lenses & shell fragments	CH	12	34-35	57										
	1.25				Medium stiff gray sandy clay w/trace of clay	CL	13	38-39	60										
40																			
	1.25				w/shell fragments & decayed wood		14	43-44	36	85	115	UC	--	515					
		11			Loose gray fine sand	SP	15	45.5-47											
50		7			Medium stiff gray clay w/trace of sand	CH	16	48.5-50											

Comments: Latitude: 30° 13.021' N
Longitude: 89° 48.938' W

EUSTIS ENGINEERING

Proposed Residence
Clipper Estates Subdidvision
Lots 4C-1 and 4E-1
Slidell, Louisiana
Project No: 22602

Date: 08/7/2014

LOG OF BORING AND TEST RESULTS

B-1

Latitude: 30.22240
Longitude: -89.80746

Water Depth: See Text
Total Depth: 40.0 ft

PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	ϕ	C	Atterberg Limits LL	PL	PI		Other Tests
5.00				Stiff to very stiff tan & gray silty clay	CL	PB-1	0											
				w/roots & shell fragments		2	2											
5.00																		
				w/trace of organic matter		3	5	16	114	132	UC	--	2662					
4.00																		
						4	8	28										
1.50																		
				Soft greenish-gray silty clay w/few fine sand pockets & some organic matter	CL	5	11	28	96	123	UC	--	357					
0.25																		
0.25						6	14	35	84	113	UC	--	592					
				Very soft dark gray clay w/organic matter, roots, & wood	CH													
1.00				Medium stiff greenish-gray silty clay w/trace of organic matter	CL	7	18	24	100	124	UC	--	910					
3.50				Very stiff gray & tan clay w/trace of silt lenses	CH	8	23	43										
2.50				Medium stiff tan & gray silty clay	CL	9	28	35	84	114	UC	--	646					
				Very stiff tan & gray clay w/silt lenses	CH													
2.00						10	33											
2.50						11	38	42										

Scale in Feet: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50

NOTES:

SLIDELL RING LEVEE HISTORICAL BORING DATA

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

LOG OF BORING

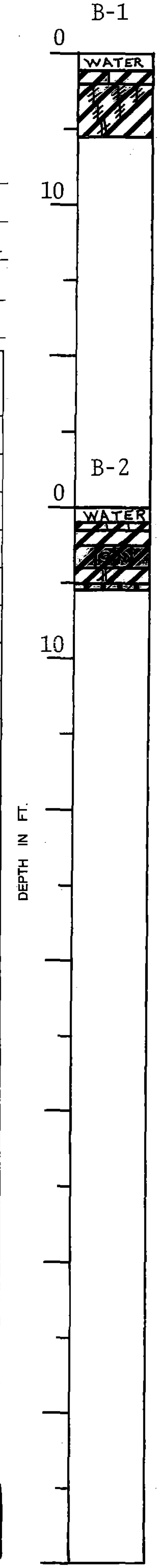
Name of Project: City of Slidell
Dellwood Drainage Improvements, St. Tammany Parish, Louisiana

For: City of Slidell, Department of Engineering, St. Tammany Parish, Louisiana

Boring No. ________ Soil Technician A. Croal, Jr. Date 15 January 1985

Ground Elev. ________ Datum ________ Gr. Water Depth ________

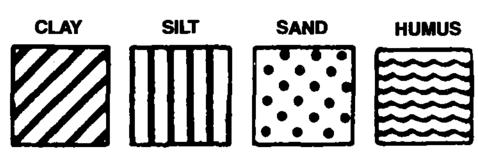
Sample No.	SAMPLE Depth — Feet		DEPTH STRATUM Feet		VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
	From	To	From	To			
					BORING 1		
			0.0	1.0	Water		
1	1.0	1.5	1.0		Very soft tan & gray clay w/silt lenses		
2	1.5	2.0		2.0	Soft tan & gray clay		
3	2.0	2.5	2.0		Medium stiff gray & tan clay		
4	3.0	3.5			Medium stiff gray & tan clay w/silty		
					clay layers & pockets		
5	5.0	5.5		5.5	Medium stiff gray & tan clay w/clayey		
					silt lenses		
					BORING 2		
			0.0	1.0	Water		
1	1.0	1.5	1.0	1.5	Very soft gray & tan clay w/silt		
					pockets, shell fragments & few roots		
2	1.5	2.0	1.5	2.5	Soft gray & tan clay		
3	3.0	3.5	2.5	4.0	Stiff gray & tan silty clay w/trace of		
					organic matter		
4	4.0	4.5	4.0	5.0	Stiff gray & tan clay w/clayey silt		
					lenses		
5	5.0	5.5	5.0	5.5	Loose gray & tan clayey silt		



*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: ________



Predominant type shown heavy. Modifying type shown light.

Fig. 2

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

LOG OF BORING

Name of Project: City of Slidell
Dellwood Drainage Improvements, St. Tammany Parish, Louisiana
For: City of Slidell, Department of Engineering, St. Tammany Parish, Louisiana

Boring No. ______ Soil Technician A. Croal, Jr. Date 15 January 1985

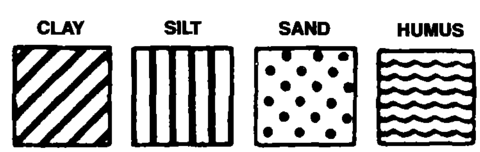
Ground Elev. ______ Datum ______ Gr. Water Depth ______

Sample No.	SAMPLE Depth — Feet From	SAMPLE Depth — Feet To	DEPTH STRATUM Feet From	DEPTH STRATUM Feet To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
					BORING 3		
1	0.0	0.5	0.0	0.5	Extremely soft gray silty clay		
2	0.5	1.0	0.5	1.0	Stiff tan & gray clay		
3	1.0	1.5	1.0		Very stiff gray & tan silty clay		
4	2.0	2.5		3.0	Stiff gray & tan silty clay		
5	3.5	4.0	3.0		Stiff gray & tan clay w/clayey silt		
					pockets		
6	5.0	5.5		6.0	Ditto		
7	7.0	7.5	6.0	7.5	Stiff gray & tan clay w/clayey silt		
					pockets & layers		
					BORING 4		
			0.0	0.2	Extremely soft gray silty clay w/roots		
1	0.5	1.0	0.2	1.0	Medium stiff tan & gray clay w/clayey		
					silt pockets		
2	1.0	1.5	1.0	2.0	Stiff gray & tan silty clay		
3	2.0	2.5	2.0		Ditto		
4	3.5	4.0			Stiff gray & tan clay w/silt lenses &		
					pockets		
5	5.5	6.0		7.0	Stiff gray & tan clay		
6	7.5	8.0	7.0	8.5	Very stiff gray & tan clay w/clayey		
					silt lenses		
7	9.5	10.0	8.5	10.0	Stiff gray & tan clay		

*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: ______



Predominant type shown heavy. Modifying type shown light.

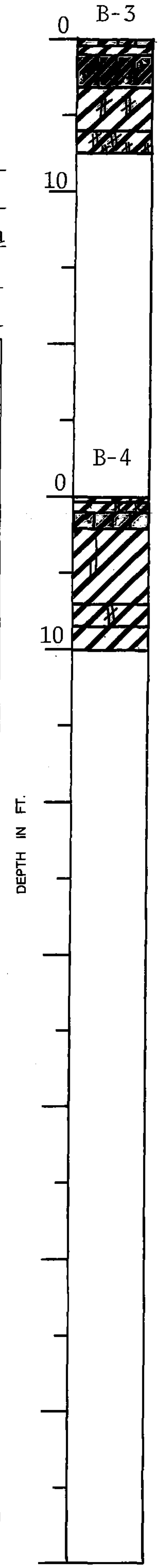


Fig. 3

B-5

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

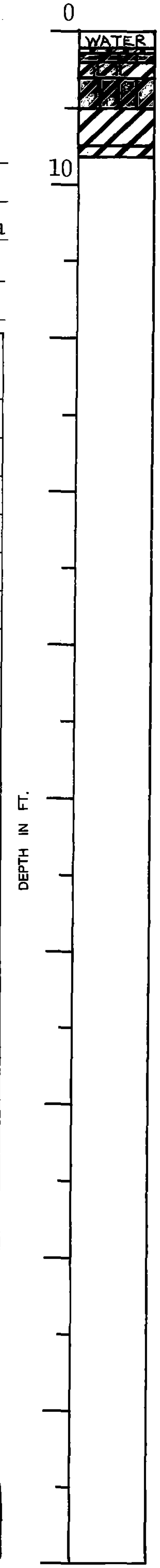
LOG OF BORING

Name of Project: City of Slidell
Dellwood Drainage Improvements, St. Tammany Parish, Louisiana
For: City of Slidell, Department of Engineering, St. Tammany Parish, Louisiana

Boring No. ____ Soil Technician A. Croal, Jr. Date 15 January 1985

Ground Elev. ____ Datum ____ Gr. Water Depth ____

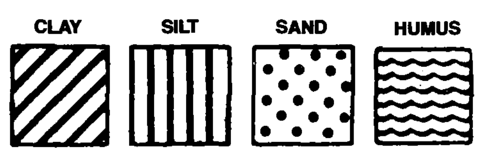
Sample No.	SAMPLE Depth — Feet From	SAMPLE Depth — Feet To	DEPTH STRATUM Feet From	DEPTH STRATUM Feet To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
					BORING 5		
			0.0	1.0	Water		
1	1.0	1.2	1.0	1.2	Extremely loose gray clayey silt		
2	1.2	1.7	1.2	2.0	Medium stiff gray & tan silty clay		
3	2.0	2.5	2.0	3.0	Very stiff gray & tan clay w/clayey		
					silt pockets		
4	3.5	4.0	3.0	5.0	Stiff gray & tan silty clay		
5	5.5	6.0	5.0	7.5	Stiff gray & tan clay		
6	7.5	8.0	7.5	8.0	Very stiff gray & tan clay		



*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: ____



Predominant type shown heavy. Modifying type shown light.

Fig. 4

Geotechnical Investigation
City of Slidell
Dellwood Drainage Improvements
St. Tammany Parish, Louisiana

For: City of Slidell, Department of Engineering, St. Tammany Parish, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

BORING 1

Sample No.	Depth In Feet	Classification	Water Content Percent	Density PCF Dry	Density PCF Wet	Unconfined Compressive Strength PSF
1	1.0	Very soft tan & gray clay w/silt lenses & pockets	35.0	88.3	119.1	345
4	3.0	Medium stiff gray & tan clay w/silty clay layers & pockets	31.4	93.6	122.9	1125

BORING 2

Sample No.	Depth In Feet	Classification	Water Content Percent	Density PCF Dry	Density PCF Wet	Unconfined Compressive Strength PSF
1	1.0	Very soft gray & tan clay w/silt pockets, shell fragments & few roots	29.9	----	-----	----
3	3.0	Stiff gray & tan silty clay w/trace of organic matter	24.1	102.6	127.4	2610

BORING 3

Sample No.	Depth In Feet	Classification	Water Content Percent	Density PCF Dry	Density PCF Wet	Unconfined Compressive Strength PSF
3	1.0	Very stiff gray & tan silty clay	21.5	108.5	131.8	4380

BORING 4

Sample No.	Depth In Feet	Classification	Water Content Percent	Density PCF Dry	Density PCF Wet	Unconfined Compressive Strength PSF
2	1.0	Stiff gray & tan silty clay	22.2	106.8	130.5	2410
4	3.5	Stiff gray & tan clay w/silt lenses & pockets	24.7	102.6	128.0	3025

BORING 5

Sample No.	Depth In Feet	Classification	Water Content Percent	Density PCF Dry	Density PCF Wet	Unconfined Compressive Strength PSF
2	1.2	Medium stiff gray & tan silty clay	22.3	105.3	128.8	1965
4	3.5	Stiff gray & tan silty clay	23.1	105.5	129.8	2980

Fig. 5

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Eden Isles Expansion, Proposed Levee System, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: See Text Job No: 10120 Date Drilled: 6/15/88 Boring: 1 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Other Tests
					Medium stiff tan & gray silty clay w/organic matter & roots	CL												
	1.00						1	2-3	26	94	118	UC	—	930				
					Stiff gray silty clay w/decayed wood	CL												
5																		
	1.50						2	5-6	19	111	132	UC	—	1520				
					Stiff gray & tan clay w/silt lenses & pockets	CH												
	1.25						3	8-9										
10																		
	1.80						4	11-12	24	100	125	UC	—	1280				
15	1.75						5	14-15										
					Stiff tan & gray clay w/silt lenses	CH												
20	2.10						6	19-20	44	77	110	UC	—	1400				
25	2.50						7	24-25										
					Soft gray clay w/sand layers	CH												
30	0.75						8	29-30	46	74	108	UC	—	330	63	21	42	
35	0.60						9	34-35										
					Medium stiff gray fissured clay w/shell layers	CH												
40	0.90						10	39-40	55	66	105	UC	—	750				
					Stiff greenish-gray fissured clay w/silt lenses	CH												
45	2.50						11	44-45										
50	2.75						12	49-50	35	85	115	UC	—	1120				

Boring offset 40 feet west of staked location.

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Eden Isles Expansion, Proposed Levee System, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: See Text Job No: 10120 Date Drilled: 6/16/88 Boring: 2 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
	0.45				Medium compact gray clayey silt	ML	1	2-3	22	105	127	OB	—	765	25	19	6		
5	0.35				Medium stiff light gray silty clay	CL	2	5-6	22	104	127	UC	—	740					
	1.25				Medium stiff greenish-gray silty clay	CL	3	8-9	23	102	125	UC	—	920					
10	1.65				Medium stiff greenish-gray & tan clay w/silt pockets	CH	4	11-12	36	85	116	UC	—	855					
15	1.75				Stiff gray & tan clay w/silt lenses	CH	5	14-15											
20	1.75				Stiff tan & gray clay	CH	6	18-19	47	75	109	UC	—	1100					

Boring drilled at staked location

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Eden Isles Expansion, Proposed Levee System, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: See Text Job No: 10120 Date Drilled: 6/16/88 Boring: 3 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests Ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
					Loose black organic clay w/roots & humus	OH	1	0-1	148										
	1.10				Medium stiff dark gray silty clay w/roots	CL	2	2-3	24	101	124	UC	—	725					
5	0.50				Medium stiff greenish-gray silty clay	CL	3	5-6	25	99	124	UC	—	860					
	1.80				Stiff gray & tan clay w/silty sand pockets	CH	4	8-9	24	101	125	UC	—	1220					
10	1.95						5	11-12											
15	2.45				Medium stiff gray & tan clay w/silt lenses	CH	6	14-15	37	84	115	UC	—	690					
20	1.50				Stiff gray & tan clay	CH	7	18-19											

Boring drilled at staked location

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Eden Isles Expansion, Proposed Levee System, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: 6.2' Job No: 10120 Date Drilled: 6/13/88 Boring: 4 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
				Loose tan fine sand	SP	1	1-2	4										
5	0.40			Very loose tan & gray clayey sand	SC	2	4-5	17	116	136	UC	—	135					
	0.80			Medium dense tan sand w/some clay	SP	3	6-7	13	119	134								
10		28		Medium dense tan & gray fine sand	SP	4	8-9											
		29				5	10-11											
		55		Very dense tan & gray fine sand	SP	6	12-13											
15		31		Dense tan & gray fine sand	SP	7	14-15											
				Medium dense gray fine sand	SP													
20		18				8	19-20											

Boring drilled at staked location

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Eden Isles Expansion, Proposed Levee System, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: See Text Job No: 10120 Date Drilled: 6/15/88 Boring: 5 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
			Loose tan & gray sand w/roots & some silt	SP	1	2-3	16	98	114	OB	—	440					
5	0.30		Very soft gray & tan sandy clay	CL	2	5-6	23	103	126	UC	—	210					
	1.55		Stiff tan & gray clay w/few silt pockets	CH	3	8-9	30	92	120	UC	—	1805					
10	1.90		Stiff tan & gray silty clay	CL	4	11-12	28	94	121	UC	—	1045					
15	1.50				5	14-15											
20	1.50		Stiff tan & gray fissured clay	CH	6	19-20	43	77	110	UC	—	1090					

Boring drilled at staked location

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Eden Isles Expansion, Proposed Levee System, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: 6.3' Job No: 10120 Date Drilled: 6/15/88 Boring: 6 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
			Medium dense tan sand w/roots & trace of clay	SP	1	2-3	16	94	109	OB	—	985					
5			Medium stiff gray & tan sandy clay	CL	2	5-6	22	105	127	OB	—	805					
			Stiff tan & gray sandy clay	CL	3	8-9	17	112	131	UC	—	1040					
10	1.20		Medium dense tan & gray clayey sand	SC	4	11-12	22	104	127								
		17	Medium dense tan sand	SP	5	13-14											
15		24			6	16-17											
20		32	Dense tan sand	SP	7	19-20											

Boring drilled at staked location

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Eden Isles Expansion, Proposed Levee System, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: See Text Job No: 10120 Date Drilled: 6/15/88 Boring: 7 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg LL	Atterberg PL	Atterberg PI		Other Tests
			Medium compact gray & tan clayey silt	ML	1	2-3	22	103	125	OB	—	885					
5	0.90		Medium stiff gray & tan silty clay	CL	2	5-6	23	103	127	UC	—	590					
	0.75		Medium stiff greenish-gray & tan silty clay	CL	3	8-9	34	88	118	UC	—	755					
10	0.75		Soft light gray silty clay w/clayey silt layers	CL	4	11-12	26	97	122	OB	—	355					
15	1.50		Medium stiff tan & gray fissured clay w/silt lenses	CH	5	14-15											
20	1.75				6	19-20	49	73	108	UC	—	690					

Boring drilled at staked location

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Eden Isles Expansion, Proposed Levee System, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: See Text Job No: 10120 Date Drilled: 6/15-16/88 Boring: 8 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
					Medium compact gray & tan clayey silty w/some sand	ML	1	1-2	22	97	118	OB	—	695					
					Soft dark gray silty clay w/roots	CL	2	3-4	24	100	124	UC	—	445					
5	1.50				Stiff tan & gray silty clay	CL	3	5-6	20	108	129	UC	—	1610					
10	1.10						4	8-9	23	102	126	UC	—	1195					
	1.60						5	11-12											
15	2.20				Medium stiff gray & tan fissured clay w/silt lenses	CH	6	14-15	38	81	112	UC	—	595					
20	2.00						7	19-20											
25	0.75				Medium stiff gray clay w/trace of silt & shell fragments	CH	8	24-25	48	74	109	UC	—	745	66	21	45		
30	2.50				Stiff greenish-gray clay w/silty sand lenses & pockets	CH	9	28-29	28	96	122	UC	—	1090					
35	0.40				Medium stiff gray clay w/silty sand lenses & shell fragments	CH	10	33-34	44	76	109	UC	—	710					
40	0.75				Medium stiff gray clay w/shell fragments	CH	11	38-39	58	66	104	UC	—	875	79	22	57		
	0.30				Medium stiff gray & brown clay w/decayed wood, organic clay layers and roots	CH	12	42-43	101	44	88	UC	—	585					
45	1.85				Stiff dark gray silty clay	CL	13	43-44	27	97	123	UC	—	1440					
50	2.30				Medium stiff gray clay w/silty sand pockets	CH	14	48-49	28	95	121	UC	—	865				1.20	

Boring drilled at staked location

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Eden Isles Expansion, Proposed Levee System, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: See Text Job No: 10120 Date Drilled: 6/16/88 Boring: 9 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
	0.25				Very soft gray & tan silty clay	CL	1	2-3	36	82	112	UC	—	215					
5	0.75				Soft tan & gray silty clay	CL	2	5-6	28	96	122	UC	—	490	40	20	20		
10	2.25				Stiff tan & gray clay w/silt pockets	CH	3	8-9	22	103	126	UC	—	1385					
	1.75				Medium stiff gray & tan clay	CH	4	11-12											
15	1.25				w/silt lenses		5	14-15	34	86	115	UC	—	800					
20	1.15				Stiff tan & gray clay	CH	6	18-19											

Boring drilled at staked location

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Eden Isles Expansion, Proposed Levee System, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: See Text Job No: 10120 Date Drilled: 6/16/88 Boring: 10 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
	0.95				Medium stiff tan & gray clay w/many silt lenses & pockets	CH	1	2-3	23	102	125	UC	—	765					
5	1.50				Medium stiff gray & tan clay w/clayey silt lenses & pockets	CH	2	5-6	23	103	126	UC	—	950					
10	2.25				Stiff gray & tan clay	CH	3	8-9											
	1.75				Medium stiff gray & tan clay w/silt lenses	CH	4	11-12	35	86	116	UC	—	850					
15	1.95				Stiff tan & gray clay	CH	5	14-15											
20	1.75						6	18-19	44	77	111	UC	—	1075					

Boring drilled at staked location

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Eden Isles Expansion, Proposed Levee System, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: See Text Job No: 10120 Date Drilled: 6/16/88 Boring: 11 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	T.V. TSF	Other Tests
	1.40				Stiff gray & tan sandy clay w/clay pockets & roots	CL	1	2-3	17	112	131	UC	—	1520					
5					Medium dense dark gray silty sand w/roots	SM	2	5-6	22	92	112	OB	—	685					
	0.90				Medium stiff gray & tan sandy clay	CL	3	8-9	21	106	128	UC	—	885					
10	1.50				Very stiff tan & gray sandy clay w/clay layers	CL	4	11-12	19	108	129	UC	—	2130					
15	2.50				Very stiff gray & tan clay w/sand pockets	CH	5	14-15											
20	1.70				Stiff tan & gray clay w/clayey silt layers	CH	6	18-19	34	86	115	OB	—	1055				1.18	

Boring drilled at staked location

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Eden Isles Expansion, Proposed Levee System, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: 5.0' Job No: 10120 Date Drilled: 6/15/88 Boring: 12 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests Ø	Shear Tests C	Atterberg LL	Atterberg PL	Atterberg PI		Other Tests
		26	Medium dense tan & gray sand w/clay pockets & trace of shell fragments	SP	1	1-2	15										
5		21	Medium dense gray sand	SP	2	4-5	27										
			Very loose gray clayey sand w/small roots & organic matter	SC	3	6-7	21										
10			Very soft gray & tan sandy clay w/roots	CL	4	8-9	23										
	2.25		Stiff gray & tan sandy clay	CL	5	11-12	17	111	130	UC	—	1370					
15	1.95		Very stiff gray & tan clay w/sand pockets	CH	6	14-15	18	110	130	UC	—	3105					
20	1.90		Stiff gray & tan clay w/sandy clay layers	CH	7	18-19	18	105	124	OB	—	1510					

Boring drilled at staked location

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Eden Isles Expansion, Proposed Levee System, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: See Text Job No: 10120 Date Drilled: 6/15/88 Boring: 13 Refer To "Legends & Notes"

Scale in Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
		28	Medium dense tan & gray sand w/trace of clay & shells	SP	1	1-2	7										
5		18	Medium dense tan & gray sand w/shells	SP	2	4-5	11										
		3	Very loose gray shells w/sand	SI	3	7-8											
10		2	Very loose brown & gray organic clayey sand w/small roots	SC	4	9-10	32										
			Very loose gray clayey sand w/small roots	SC	5	11-12	20										
15	2.25		Medium dense tan & gray clayey sand	SC	6	14-15	20	107	128	OB	—	770					
20	2.20		Stiff gray & tan clay w/sand pockets	CH	7	18-19	21	105	127	UC	—	1745					

Boring drilled at staked location

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Eden Isles Expansion, Proposed Levee System, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: See Text Job No: 10120 Date Drilled: 6/16/88 Boring: 14 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	T.V. TSF	Other Tests
					Medium dense gray & tan clayey sand w/small roots	SC	1	2-3	17	110	129	OB	—	620					
5	0.85				Medium stiff tan & gray sandy clay	CL	2	5-6	23	103	126	UC	—	630				0.875	
10	1.25				Medium stiff gray & tan fissured clay w/sand pockets & lenses	CH	3	8-9	35	85	115	UC	—	540				0.975	
	0.70				Medium stiff gray & tan clay w/sandy silt lenses & pockets	CH	4	11-12	37	84	115							0.375	
15	1.20				Medium stiff gray & tan clay w/clayey silt layers	CH	5	14-15	41	80	112	OB	—	735					
20	1.60				Stiff gray & tan clay	CH	6	18-19											

Boring drilled at staked location

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Eden Isles Expansion, Proposed Levee System, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: 7.7' Job No: 10120 Date Drilled: 6/13/88 Boring: 15 Refer To "Legends & Notes"

PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	ø	C	Atterberg Limits LL	PL	PI	T.V. TSF	Other Tests
1.00		Stiff tan & gray clay w/sandy silt lenses & pockets	CH	1	2-3	22	104	127	UC	—	1390					
0.70		Medium stiff gray & tan clay w/sandy silt pockets & shell fragments	CH	2	5-6	33	88	117	UC	—	625	55	21	34	0.475	
0.75		Medium stiff gray & tan silty clay w/sand pockets & decayed roots	CL	3	8-9	29	94	121	UC	—	645					
0.60		Medium stiff dark gray & tan sandy clay w/decayed roots	CL	4	11-12	21	108	131	UC	—	620					
0.80		Medium stiff tan & gray sandy clay w/decayed roots	CL	5	14-15	23	103	127	UC	—	865					
1.10		Medium compact gray & tan clayey silt w/clay lenses	ML	6	18-19	30	93	120	OB	—	615					
1.30		Stiff tan & gray clay w/silt pockets & lenses	CH	7	23-24											
2.20		Medium stiff tan & gray fissured clay	CH	8	28-29	44	78	112	UC	—	770				1.25	
2.00				9	33-34											
1.60		Medium stiff gray clay w/sand pockets & shell fragments	CH	10	38-39	29	92	119	UC	—	990				0.900	
1.15		Medium stiff gray fissured clay w/sand pockets & shell fragments	CH	11	43-44											
1.25				12	48-49	54	69	106	UC	—	760				0.600	

Boring drilled at staked location

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Eden Isles Expansion, Proposed Levee System, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: See Text Job No: 10120 Date Drilled: 6/13/88 Boring: 16 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	T.V. TSF	Other Tests
	1.00				Medium stiff greenish-gray & tan clay w/silty clay layers & organic matter	CH	1	2-3	38	86	119	UC	—	640					
5	0.70				Medium stiff tan & gray sandy clay w/clay lenses & organic matter	CL	2	5-6	24	99	122	UC	—	950					
	0.65				Soft greenish-gray & tan silty clay w/trace of organic matter	CL	3	8-9	38	83	115								
10	0.70				Medium stiff gray & tan silty clay w/roots & trace of sand	CL	4	11-12	25	102	127	UC	—	560	43	20	23		
15	1.20				Stiff greenish-gray & tan clay w/sand pockets	CH	5	14-15	27	99	125	UC	—	1110				1.63	
20	1.35						6	18-19											

Boring drilled at staked location

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Eden Isles Expansion, Proposed Levee System, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: See Text Job No: 10120 Date Drilled: 6/13/88 Boring: 17 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
	1.10				Soft tan & gray clay w/clayey silt pockets	CH	1	2-3	37	84	115	UC	—	435					
5	0.85				Soft greenish-gray & tan clay w/sandy clay layers	CH	2	5-6	32	89	118	UC	—	360					
10	0.40				Loose gray clayey sand w/humus & roots	SC	3	8-9	28	94	120	OB	—	425					
	0.75				Soft gray & tan sandy clay w/decayed roots	CL	4	11-12	23	103	127	UC	—	365					
15	2.20				Stiff greenish-gray & tan clay w/sand pockets	CH	5	14-15	23	102	127	UC	—	1585					
20	1.50				Stiff tan & gray clay w/silt lenses & pockets	CH	6	18-19											

Boring drilled at staked location

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Eden Isles Expansion, Proposed Levee System, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: See Text Job No: 10120 Date Drilled: 6/16/88 Boring: 18 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
					Medium stiff gray & tan silty clay	CL													
	1.25						1	2-3	22	102	125	UC	—	890					
5					Medium stiff dark gray silty clay w/roots	CL													
	0.35						2	5-6	20	107	128	UC	—	695					
					Soft gray & tan silty clay w/roots & trace of sand	CL													
	0.35						3	8-9	26	97	122	UC	—	410	47	21	26		
10					Stiff light gray clay w/silt lenses & pockets	CH													
	2.25						4	11-12	21	106	128	UC	—	1755					
15	2.50						5	14-15											
					Medium stiff gray & tan clay w/silt pockets	CH													
	1.50						6	18-19	34	86	114	UC	—	905					
20																			

Boring drilled at staked location

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Eden Isles Expansion, Proposed Levee System, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: See Text Job No: 10120 Date Drilled: 6/15/88 Boring: 19 Refer To "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
	0.50				Medium stiff tan & gray silty clay w/trace of sand	CL	1	2-3	25	98	122	UC	—	860					
5	0.05				Medium stiff gray & tan clay w/clayey silt lenses	CH	2	5-6	23	101	124	UC	—	560					
10	0.50				Medium compact gray clayey silt w/many roots	ML	3	8-9	22	103	126	OB	—	830					
	0.85				Soft gray & tan sandy clay	CL	4	11-12	24	101	126	OB	—	325					
15	2.20				Stiff gray & tan sandy clay w/silt pockets	CL	5	14-15	20	106	128	UC	—	1185					
20	2.85				Very stiff gray & tan clay w/sand pockets	CH	6	18-19	25	99	123	UC	—	2055					

Boring drilled at staked location

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Eden Isles Expansion, Proposed Levee System, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: See Text Job No: 10120 Date Drilled: 6/15/88 Boring: 20 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
	0.75				Medium stiff tan & gray clay w/silt pockets & trace of organic matter (fill)	CH	1	2-3	36	84	114	UC	—	575					
5	1.20				Medium stiff greenish-gray & tan clay w/sand pockets & lenses (fill)	CH	2	5-6	22	99	121	UC	—	595					
					Very soft gray sandy clay w/organic matter & some roots	CL	3	8-9	26										
10	0.85				Medium stiff gray & tan sandy clay w/few small roots	CL	4	11-12	19	110	131	UC	—	620					
15	1.25				Stiff gray & tan sandy clay	CL	5	14-15	23	100	123	UC	—	1020					
20	1.30				Medium stiff gray & tan clay w/silty sand lenses & layers	CH	6	18-19	29	93	119	UC	—	810					
25	2.55				Very stiff gray & tan clay w/silt lenses & pockets	CH	7	23-24											
30	3.05				Stiff greenish-gray clay	CH	8	28-29	41	80	113	UC	—	1825					
35	0.60				Medium stiff gray clay w/trace of shell fragments & clayey sand layers	CH	9	33-34											
40	0.95				Soft gray clay w/sand lenses & layers	CH	10	38-39	36	82	111	UC	—	345					
45	0.65				Medium stiff gray clay w/shell fragments	CH	11	43-44											
50	0.70						12	48-49	53	70	107	UC	—	895					

Boring drilled at staked location

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

FLOOD CONTROL IMPROVEMENTS - SCHNEIDER CANAL PUMPING STATION, SLIDELL, ST. TAMMANY PARISH, LOUISIANA
STATE PROJECT NO. 576-52-04, SLIDELL JOB NO. 100-3

Ground Elev.: 4.0 (Est.) Datum: MSL Gr. Water Depth: See Text Job No: 10287 Date Drilled: 6/28/88 Boring: 1 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
			Loose gray & brown sandy clay w/gravel, concrete & wood (fill)	CL	1	0-1											
		20	Medium dense light gray & tan sand w/gravel	SP	2	2-3											
5		6	Loose gray & brown clayey sand w/organic clay layers	SC	3	4-5	19										
			Loose to medium dense gray clayey sand w/sandy clay layers & decayed wood	SC	4	7-8	22	107	130	OB	—	365					
10		50=11"	Very dense gray sand w/trace of clay	SP	5	9-10											
15		40	Dense gray sand	SP	6	14-15											
20		23	Medium dense gray sand	SP	7	19-20											
25		37	Dense gray sand	SP	8	24-25											
30		42			9	29-30											
35		7	Stiff greenish-gray clay w/sandy clay layers & pockets	CH	10	34-35	34										
	2.10		w/sand pockets, lenses & layers		11	36-37	24	101	126	UC	—	1315					
		20	Medium dense gray sand	SP	12	38-39											
40		4	Alternating layers of loose gray silty sand & soft gray clay	SP/CH	13	40-41											
45	0.40				14	43-44	37	84	115	OB	—	940					
			Medium stiff gray clay w/silty sand lenses & few shell fragments	CH													
50	1.00				15	48-49	49	72	108	UC	—	760					

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

FLOOD CONTROL IMPROVEMENTS - SCHNEIDER CANAL PUMPING STATION, SLIDELL, ST. TAMMANY PARISH, LOUISIANA
STATE PROJECT NO. 576-52-04, SLIDELL JOB NO. 100-3 (Sheet 1 of 2)

Ground Elev.: 7.5 (Est.) Datum: MSL Gr. Water Depth: See Text Job No: 10287 Date Drilled: 6/27/88 Boring: 2 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	T.V. TSF	Other Tests
			Loose gray & tan sand w/clay layers & pockets, concrete & brick (fill)	SP	1	2-3											
5	0.55		Medium stiff dark gray sandy clay w/clayey sand layers & decayed wood & organic matter	CL	2	5-6	26	92	116	OB	—	510					
	0.55		w/clayey sand layers		3	7-8											
10		25	Medium dense gray sand w/trace of clay	SP	4	9-10											
		30			5	12-13											
15		17			6	15-16											
20		4	Medium stiff gray & tan clay w/sand lenses	CH	7	19-20	42										
			Stiff gray & tan clay w/sand lenses & fissures	CH													
25	1.00				8	23-24	45	76	111	UC	—	1225				0.850	
			Medium stiff gray clay w/few silt lenses & sand pockets	CH													
30	0.85				9	28-29	51	71	107	UC	—	960	90	23	67	0.625	
35	1.25		Medium stiff gray & greenish-gray clay w/silt pockets & clayey sand layers & shell fragments	CH	10	33-34	26	95	119	OB	—	950				0.925	
						37-38											
40		37	Dense gray sand	SP	11	39-40											
		6	Medium stiff to stiff gray clay w/silt & sand pockets & lenses & shell fragments	CH	12	42-43											
45	0.90				13	45-46	50	71	107	UC	—	755				0.550	
50	0.70				14	49-50	54	69	106	UC	—	1005	78	21	57		

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

FLOOD CONTROL IMPROVEMENTS - SCHNEIDER CANAL PUMPING STATION, SLIDELL, ST. TAMMANY PARISH, LOUISIANA
STATE PROJECT NO. 576-52-04, SLIDELL JOB NO. 100-3

Ground Elev.: 7.5 (Est.) Datum: MSL Gr. Water Depth: See Text Job No: 10287 Date Drilled: 6/27/88 Boring: 2 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	T.V. TSF	Other Tests
			Medium stiff gray clay w/shell fragments & trace of sand	CH													
55	0.75				15	53-54											
60	0.70		w/shell fragments & sand lenses		16	58-59	40	79	111	UC	—	905				0.450	
			Medium stiff to stiff gray clay w/trace of decayed wood & sand pockets	CH													
65	1.05				17	63-64	53	68	105	UC	—	1240				0.675	
70	1.20		& sand lenses		18	68-69											
75	1.10		w/sand pockets & organic matter		19	73-74	51	70	106	UC	—	1505				0.725	
80	1.00				20	78-79											
85	1.20				21	83-84	52	67	103	UC	—	865				0.675	
						87-88											
90		50=10"	Very dense gray sand	SP	22	89-90											
95		35	Dense gray sand	SP	23	94-95											
100		15	Stiff to very stiff gray sandy clay	CL	24	99-100											

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

FLOOD CONTROL IMPROVEMENTS - SCHNEIDER CANAL PUMPING STATION, SLIDELL, ST. TAMMANY PARISH, LOUISIANA
STATE PROJECT NO. 576-52-04, SLIDELL JOB NO. 100-3

Ground Elev.: 2.5 (Est.) Datum: MSL Gr. Water Depth: See Text Job No: 10287 Date Drilled: 6/27/88 Boring: 3 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	T.V. TSF	Other Tests
	4.50+		Very stiff gray & tan sandy clay w/organic sand layers	CL	1	2-3	12	125	139	OB	—	2115					
5			Loose brown clayey sand w/organic matter & decayed wood	SC	2	5-6	24	96	119	OB	—	310					
10		50	Very dense gray sand	SP	3	8-9											
		23	Medium dense gray sand	SP	4	11-12											
15		10	Loose gray sand w/trace of organic matter & decayed wood	SP	5	14-15											
20	2.30		Stiff gray & tan clay w/silt lenses & fissures	CH	6	18-19											
25	2.50				7	23-24	46	75	110	UC	—	1400				1.60	
30	0.25		Medium stiff gray clay w/sand layers & shell fragments	CH	8	28-29	58	66	104	UC	—	655					
35	1.10		Stiff greenish-gray clay w/sandy clay layers	CH	9	33-34	27	95	121	UC	—	1215				1.30	
		20	Medium dense gray silty sand w/clay layers	SM	10	37-38											
40		4	Medium stiff gray clay w/sand lenses & shell fragments	CH	11	40-41											
45	0.70				12	43-44	44	76	110	UC	—	655					
50	0.85				13	48-49											

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

SCHNEIDER CANAL PUMPING STATION, STATEWIDE FLOOD CONTROL PROGRAM
SLIDELL, LOUISIANA

Ground Elev.: 2.5 **Datum: NGVD** **Gr. Water Depth: See Text** **Job No.: 10287** **Date Drilled: 1/05/93** **Boring: 1** **Refer To ``Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Ø	C	Atterberg Limits LL	PL	PI		Other Tests
					2" Limestone		1	0–2"											
	0.50				Medium stiff tan & gray sandy clay w/roots	CL	2	2–3	20	108	130	UC	--	675	31	17	14		
5	1.50						3	5–6	24	100	124	UC	--	985					
10	1.50				Dense gray clayey sand w/clay layers & lenses	SC	4	8–9	19	107	128	OB	--	1090	27	19	8		
	0.75				Very loose tan & gray silty sand w/clay layers, roots & wood	SM	5	11–12	21	104	126	OB	--	145					
15		25			Medium dense tan sand	SP	6	14–15											
		23					7	16–17											
		23					8	18–19											
20		4			Loose tan sand w/clay layers	SP	9	20–21											
25	1.25				Stiff gray clay w/silt lenses & fissures	CH	10	23–24	50	71	107	UC	--	1280					
30	0.75				Medium stiff gray clay w/silt lenses, sand pockets & fissures	CH	11	28–29	59	64	103	UC	--	590	89	23	66		
35	3.25				Stiff gray flocculated clay w/sand pockets & lenses & roots	CH	12	33–34	35	85	115	UC	--	1150					
40					Medium compact gray sandy silt	ML	13	38–39											
45	0.75				Medium stiff gray clay w/sandy silt lenses & trace of wood & shell fragments	CH	14	43–44	52	70	106	UC	--	805					
50	1.00						15	48–49	54	68	104	UC	--	715					

STATION 107+00

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

SCHNEIDER CANAL PUMPING STATION, STATEWIDE FLOOD CONTROL PROGRAM (SHEET 2 Of 2)
SLIDELL, LOUISIANA

Ground Elev.: 2.5 **Datum: NGVD** **Gr. Water Depth: See Text** **Job No.: 10287** **Date Drilled: 1/05/93** **Boring: 1** **Refer To "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests Ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
					Medium stiff gray clay w/sandy silt lenses, trace of wood & shell fragments	CH													
55	0.75				Stiff dark gray clay w/sand lenses & pockets & trace of organic matter	CH	16	53-54	40	80	112	UC	--	1025	77	21	56		
60	1.00						17	58-59	50	70	106	UC	--	1100					
65	1.00						18	63-64											
					Medium stiff dark gray clay w/organic matter	CH													
70	1.25						19	68-69	56	66	102	UC	--	825					
75	1.25						20	73-74											
80	0.50				w/sand lenses		21	78-79	32	89	117	OB	--	875					
85	0.75				Dense gray silty sand w/clay lenses & organic matter	SM	22	83-84	27	94	119	OB	--	1365					
					Dense gray sand	SP	23	87-88											
90		34					24	89-90											
95		50=6"			Very dense gray sand	SP	25	94-95											
100		50=7"					26	99-100											

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

SCHNEIDER CANAL PUMPING STATION, STATEWIDE FLOOD CONTROL PROGRAM (SHEET 1 Of 1)
SLIDELL, LOUISIANA

Ground Elev.: 2.5 **Datum: NGVD** **Gr. Water Depth: See Text** **Job No.: 10287** **Date Drilled: 1/05/93** **Boring: 2** **Refer To "Legends & Notes"**

PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Ø	C	Atterberg Limits LL	PL	PI		Other Tests
		2" Limestone		1	0–2"											
1.25		Dense tan & gray clayey sand	SC	2	2–3	15	116	133	OB	--	1570					
0.75		w/roots		3	5–6	15	115	133	OB	--	1375					
1.50		Stiff gray & tan sandy clay	CL	4	8–9	20	108	130	UC	--	1255					
		Loose gray clayey sand w/sand layers	SC	5	11–12											
	3	Loose tan sand	SP	6	13–14											
	46	Dense tan sand	SP	7	15–16											
	35			8	18–19											
	28	Medium dense tan sand	SP	9	20–21											
	25	Medium dense tan & gray sand		10	24–25											
	4	Soft gray sandy clay w/clay layers	CL	11	29–30											
2.50		Stiff gray flocculated clay w/sand layers & pockets	CH	12	33–34	25	98	123	UC	--	1230					
0.75		Medium stiff gray clay w/sandy silt layers	CH	13	38–39	44	75	109	OB	--	770	72	21	51		

STATION 105+00

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

SCHNEIDER CANAL PUMPING STATION, STATEWIDE FLOOD CONTROL PROGRAM (SHEET 1 Of 1)
SLIDELL, LOUISIANA

Ground Elev.: 3.5 **Datum: NGVD** **Gr. Water Depth: See Text** **Job No.: 10287** **Date Drilled: 1/06/93** **Boring: 3** **Refer To "Legends & Notes"**

Scale In Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Ø	C	Atterberg Limits LL	PL	PI		Other Tests
			2" Limestone		1	0–2"											
			Compact tan sandy silt w/silty sand layers	ML	2	2–3											
5		11			3	4–5											
		21	Medium dense tan silty sand	SM	4	6–7											
10		22			5	9–10											PD
		26			6	11–12											
15		18	Medium dense tan sand w/gravel	SP	7	14–15											PD
20		9	Loose tan sand w/clay layers	SP	8	19–20											
25	1.50		Medium stiff gray & tan clay w/trace of sand lenses & fissures	CH	9	23–24	45	75	109	UC	--	520					
30	2.00		Very dense gray & tan clayey sand w/sandy clay layers	SC	10	28–29	22	102	125	OB	--	2350					
35	0.75		Soft to medium stiff gray clay w/sandy silt layers	CH	11	33–34	43	77	110	UC	--	415					
40	0.75		w/silt lenses, trace of wood & fissures		12	38–39	55	67	104	UC	--	695					
45																	
50																	

STATION 103+00

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

SCHNEIDER CANAL PUMPING STATION, STATEWIDE FLOOD CONTROL PROGRAM (SHEET 1 Of 1)
SLIDELL, LOUISIANA

Ground Elev.: 4.5 **Datum: NGVD** **Gr. Water Depth: See Text** **Job No.: 10287** **Date Drilled: 1/06/93** **Boring: 4** **Refer To ``Legends & Notes"**

PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests Ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
		2" Limestone		1	0–2"											
		Compact tan sandy silt w/wood & roots	ML	2	2–3											
		Medium dense tan silty sand w/sandy clay layers & wood	SM	3	4–5											PD
	9	Loose tan silty sand	SM	4	6–7											
	20	Medium dense tan dand	SP	5	8–9											
	20			6	10–11											
	20			7	12–13											
	20			8	14–15											
	4	Stiff gray & tan clay	CH	9	19–20											
2.50		w/fissures		10	23–24	45	76	109	OB	--	1815					
0.50		Soft gray clay w/sandy silt lenses & layers & sandy clay layers	CH	11	28–29	57	67	105	UC	--	350					
1.25		Medium stiff gray clay w/sandy silt & silty sand lenses & layers & shell fragments	CH	12	33–34	36	82	112	UC	--	605					
1.00		w/sandy silt lenses & shell fragments		13	38–39	50	71	106	UC	--	980					

STATION 100+75

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Oak Harbor Pump Station, St. Tammany Drainage District No. 2, St. Tammany Parish, Louisiana

Ground Elev.: 1.60 Datum: MSL Gr. Water Depth: See Text Job No: 10463 Date Drilled: 11/22/88 Boring: 1 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
	0.25		Very soft gray & tan sandy clay w/roots & gravel (fill)	CL	1	2-3	25	97	121	UC	—	175					
5			Very soft tan & gray silty clay w/organic matter, glass, tin, etc. (fill)	CL	2	5-6	30										
	0.90		Medium stiff gray & tan clay w/sand lenses & pockets	CH	3	8-9	23	101	125	UC	—	1000					
10	1.90		Medium stiff to stiff gray & tan clay w/silty clay layers	CH	4	11-12	27	96	121	UC	—	1145					
15	2.30		w/silt lenses & pockets		5	14-15	40	81	113	UC	—	710					
	1.50		Soft gray & tan clay	CH	6	18-19	42	79	113	UC	—	460					
20																	
	2.50		Stiff greenish-gray & tan clay w/silt pockets	CH	7	23-24	36	84	115	UC	—	1225					
25																	
			Soft gray sandy clay w/clayey sand pockets	CL	8	28-29	35										
30																	
	0.25		Medium stiff gray clay w/sandy clay pockets & layers	CH	9	33-34	39	82	114	UC	—	665					
35																	
		25	Medium dense gray fine sand	SP	10	37-38											
40		7	Loose gray clayey sand w/clay layers	SC	11	40-41	28										
45		50=7"	Very dense gray fine sand	SP	12	44-45											
50		50=9"			13	49-50											

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Oak Harbor Pump Station, St. Tammany Drainage District No. 2, St. Tammany Parish, Louisiana

Ground Elev.: 2.15 Datum: MSL Gr. Water Depth: See Text Job No: 10463 Date Drilled: 11/21/88 Boring: 2 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
			Medium compact shells, sand & clay pockets														
			Compact tan & gray sandy silt w/organic matter & shell fragments	ML	1	2-3	56										
5	0.25		Soft light gray & tan silty clay w/silt pockets	CL	2	4-5	23	104	128	UC	—	355					
			Stiff gray & tan silty clay w/clayey silt	CL													
	1.30				3	8-9	19	109	130	UC	—	2115					
10			Stiff light gray & tan clay w/silty sand pockets	CH													
	2.00				4	11-12	25	100	125	UC	—	1605					
			Medium stiff to stiff gray & tan clay w/silt pockets	CH													
15	2.25				5	14-15	39	81	113	UC	—	940	70	24	46		
	1.90				6	18-19	40	81	114	UC	—	1130					
20			Stiff gray & greenish-gray clay w/silt pockets	CH													
	2.00				7	23-24	39	82	115	UC	—	1445					
25			Medium stiff gray clay w/clayey sand pockets	CH													
	0.30				8	28-29	45	76	110	UC	—	480	61	21	40		
30			Medium stiff gray sandy clay	CL													
	0.25				9	33-34	34	87	117	OB	—	515					
35			Loose gray fine sand w/clay pockets	SP													
					10	38-39	27	97	124	OB	—	760					
40			Loose gray clayey sand w/clay pockets	SC													
	0.30				11	42-43	26	98	123	OB	—	680					
45		50=10"	Very dense gray fine sand	SP	12	44-45											
		50=7"			13	47-48											
50																	

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Oak Harbor Pump Station, St. Tammany Drainage District No. 2, St. Tammany Parish, Louisiana

Ground Elev.: 2.15 Datum: MSL Gr. Water Depth: See Text Job No: 10463 Date Drilled: 11/21/88 Boring: 2 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
		50=7"			Very dense gray fine sand	SP	14	50-51											
55		50=8"					15	54-55											
60		50=7"					16	59-60											
65		50=6"					17	64-65											
					Dense gray medium coarse sand w/gravel & clay layers	SP													
70		34					18	69-70											
					Very dense gray fine sand	SP													
75		50=7"					19	74-75											
80		50=10"					20	79-80											
85		50=10"					21	84-85											
90		50=7"			w/silt		22	89-90											
95		50=7"					23	94-95											
100		50=4"					24	99-100											

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Oak Harbor Pump Station, St. Tammany Drainage District No. 2, St. Tammany Parish, Louisiana

Ground Elev.: 5.00 Datum: MSL Gr. Water Depth: See Text Job No: 10463 Date Drilled: 11/22/88 Boring: 3 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
			Loose gray & tan fine sand w/clay pockets (fill)	SP	1	2-3											
5			Very stiff tan & gray sandy clay w/roots	CL	2	5-6	15	112	129	UC	—	2413					
	0.90		Medium stiff light gray & tan & red sandy clay	CL	3	8-9	22	103	125	UC	—	720					
10	4.25		Very stiff gray sandy clay w/silty sand pockets	CL	4	11-12	17	111	130	UC	—	2037					
15			Medium stiff gray silty clay w/vertical silty sand lenses	CL	5	14-15	21										
20		15	Medium dense gray fine sand	SP	6	18-19											
		48	Dense gray fine sand	SP	7	21-22											
25		22	Medium dense gray fine sand	SP	8	25-26											
30		4	Soft gray sandy clay w/silty clay pockets	CL	9	29-30	32										
35	0.40		Medium stiff gray silty clay w/sand lenses & pockets	CL	10	33-34	38	83	115	OB	—	890					
40	0.50		Medium stiff gray sandy clay w/clay lenses	CL	11	38-39	39	82	114	OB	—	651	36	21	15		
45	0.40				12	43-44	39	82	114	OB	—	915					
			Loose gray clayey sand	SC	13	47-48											
50		33	Dense gray fine sand	SP	14	49-50											

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Existing Levee Seepage Area, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: See Text Job No: 10802 Date Drilled: 9/14/89 Boring: 1 Refer To "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
					Medium stiff to very stiff tan & gray silty clay (very dry)	CL	1	1-2	17	105	122	OB	--	3260					
							2	3-4	20	87	105								
5	0.40				Soft black silty clay w/humus & clay layers	CL	3	5-6	37	85	116								
	0.35				Soft black humus w/some wood & clay	Pt	4	7-8	430	13	68	UC	—	200					
10	0.35						5	9-10											
	0.40				Soft black organic clay w/humus & trace of wood	OH	6	11-12	171	29	79								
	0.55				Soft gray clay w/few small roots	CH	7	13-14	44	77	111	UC	--	320					
15	0.65				Soft to medium stiff gray clay w/some wood	CH	8	15-16											
	0.75						9	18-19	38	83	115								
20																			
	0.85						10	23-24											
25																			
	0.65				Medium stiff gray silty clay w/organic matter & wood	CH	11	27-28	72	56	96								
30		18			Medium dense gray fine sand w/organic matter	SP	12	29-30											

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Existing Levee Seepage Area, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: See Text Job No: 10802 Date Drilled: 9/14/89 Boring: 2 Refer To "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits			k	Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
					Very stiff tan & gray silty clay (very dry)	CL	1	1-2	13										
	1.65				Medium stiff gray clay w/silt pockets & organic matter	CH	2	3-4											
5	1.10						3	5-6	39	81	113								
	0.40				Very soft black humus w/clay	Pt	4	7-8	395	13	66				468	139	329	1.5×10^{-6}	(H)
10	0.35				Soft black humus w/some wood	Pt	5	9-10											
	0.35						6	11-12	329	17	72								
	0.40				Soft gray clay w/some organic matter	CH	7	13-14	40	82	115								
15																			

(H) Horizontal
(V) Vertical

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Existing Levee Seepage Area, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: See Text Job No: 10802 Date Drilled: 9/14/89 Boring: 3 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	k	Other Tests
					Stiff tan & gray silty clay w/organic matter, burnt wood & burnt clay	CL	1	1-2											
							2	3-4	65										
5	0.40				Soft black humus w/organic clay pockets	Pt	3	5-6	422	13	69								
	0.35						4	7-8											
10	0.35				Very soft black humus w/trace of wood	Pt	5	9-10	394	13	65				528	265	263	6.3×10^{-7}	(V)
	0.35						6	11-12											
15	0.65				Medium stiff gray sandy clay w/silt pockets & some organic matter	CL	7	13-14	23	105	129								

(H) Horizontal
(V) Vertical

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Existing Levee Seepage Area, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: See Text Job No: 10802 Date Drilled: 9/14/89 Boring: 4 Refer To "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	k	Other Tests
					Stiff tan & gray silty clay w/organic matter	CL	1	1-2	34	77	103								
							2	3-4											
5	0.75				Medium stiff gray clay w/organic matter, humus & some wood	CH	3	5-6	43	78	111								
	0.40				Soft black organic clay w/humus & wood	OH	4	7-8	107	41	85				116	33	83	2.3.x 10^{-8}	(V)
10	0.35						5	9-10											
	0.70				Medium stiff greenish-gray sandy clay w/some organic matter	CL	6	11-12	21	108	131								
	1.10				Stiff greenish-gray sandy clay w/trace of organic matter	CL	7	13-14	18	110	130								
15																			

(H) Horizontal
(V) Vertical

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Existing Levee Seepage Area, Vicinity of Slidell, Louisiana

Ground Elev.: Datum: Gr. Water Depth: See Text Job No: 10802 Date Drilled: 9/14/89 Boring: 5 Refer To "Legends & Notes"

Scale in Feet	PP	SPT	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
				Stiff tan & gray clay w/silt pockets (dry)	CH	1	1-2											
5	0.90			Medium stiff gray & tan clay w/trace of organic matter	CH	2	3-4	32	91	120	UC	--	1060					
				Soft black organic clay w/humus	OH	3	5-6	370	15	69								
	0.45			Medium stiff black humus w/some wood	Pt	4	7-8	319	17	69	UC	--	870					
10	0.40			Soft black organic clay w/humus	OH	5	9-10	115	41	87								
	0.75			Medium stiff greenish-gray sandy clay w/trace of organic matter	CL	6	11-12	22	106	130	UC	--	605					
15	1.30			Stiff greenish-gray & tan sandy clay w/sand pockets	CL	7	13-14	17	116	136								
		23		Medium dense greenish-gray & tan fine sand	SP	8	15-16											PD
		18				9	17-18											
20		16		Medium dense greenish-gray fine sand	SP	10	19-20											PD
				Medium dense gray fine sand	SP													
25		28				11	24-25											
30		20				12	29-30											PD

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

SLIDELL MEMORIAL HOSPITAL, BANK STABILIZATION STUDY
W-14 DRAINAGE CANAL, SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth: See Text** **Job No.: 13418** **Date Drilled: 3/28/95** **Boring: 1** **Refer To "Legends & Notes"**

Scale In Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	Ø	C	LL	PL	PI		
					8" Asphalt Pavement														
		8			Loose tan fine sand	SP	1	1-2											
					Loose gray clayey silt	ML													
					Loose brown & gray sandy silt w/few roots	CL	2	3-4	14	114	130								
5	0.40				Soft tan & light gray sandy clay w/clayey sand pockets	CL	3	5-6	19	102	122	OB	--	410					
	2.70				Stiff tan & gray sandy clay w/clayey sand pockets		4	8-9	23	100	123	OB	--	1195					
10																			
	3.00				Dense light gray clayey sand	SC	5	11-12	19	108	128	OB	--	1910					
15					Loose light gray clayey sand	SC	6	14-15	21	103	125	OB	--	440					
					Loose light gray fine sand	SP	7	18-19											
20																			
		16			Medium dense light gray fine sand	SP	8	21-22											
25		13					9	24-25											
30		10			Loose light gray fine sand	SP	10	29-30											
35		23			Medium dense gray fine sand	SP	11	34-35											
40		19					12	39-40											
45																			
50																			

Boring located at Station 0+45, 3 feet east of baseline and 6 feet west of failure.

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

SLIDELL MEMORIAL HOSPITAL, BANK STABILIZATION STUDY
W-14 DRAINAGE CANAL, SLIDELL, LOUISIANA

(SHEET 1 Of 1)

Ground Elev.: **Datum:** **Gr. Water Depth: See Text** **Job No.: 13418** **Date Drilled: 3/28/95** **Boring: 2** **Refer To "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	Ø	C	LL	PL	PI		
					3.5" Loose white shells		1	0-0.3											
	0.10				Very loose light gray clayey sand w/trace of organic matter & clayey silt layers	SC	2	2-3	24	98	122	OB	--	75					
5	0.60				Stiff tan & gray sandy clay w/few concretions	CL	3	5-6	21	101	123	UC	--	1055					
10	2.50				Stiff tan & light gray clay w/sand pockets & lenses	CH	4	8-9	19	104	123	UC	--	1375					
	2.60				Medium stiff light gray clay w/vertical clayey sand lenses	CH	5	11-12	27	95	120	UC	--	980					
15	2.70				w/few clayey sand pockets		6	14-15											
20	1.70				Medium stiff light gray & tan clay w/fissures & silt lenses & pockets	CH	7	18-19	36	84	115	OB	--	630					
25	1.50				Stiff brown & gray clay	CH	8	23-24											
30					Medium dense greenish-gray clayey sand	SC	9	28-29	25	98	123	OB	--	1635					
35	1.25				Stiff gray clay w/clayey silt & clayey sand lenses & trace of organic matter	CH	10	33-34											
40	0.40				Loose gray clayey sand w/clay lenses & pockets	SC	11	38-39	29	93	120	OB	--	480					
45																			
50																			

Boring located at Station 2+34, 12 feet west of baseline and 8 feet west of failure.

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

SLIDELL MEMORIAL HOSPITAL, BANK STABILIZATION STUDY
W-14 DRAINAGE CANAL, SLIDELL, LOUISIANA

(SHEET 1 Of 1)

Ground Elev.: **Datum:** **Gr. Water Depth: See Text** **Job No.: 13418** **Date Drilled: 3/27/95** **Boring: 3** **Refer To "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests Ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
					4" Asphalt pavement														
		6			8" Medium dense white shells	ML	1	1-2	16										
	0.20				Loose gray clayey silt w/shell fragments	ML	2	3-4	22	103	125	OB	--	230					
5					Very loose dark gray clayey silt														
	1.10				Medium stiff light gray & tan clay w/clayey sand pockets	CH	3	5-6	25	99	123	UC	--	605					
	1.50				Stiff light gray & tan clay w/sand pockets	CH	4	8-9	28	95	121	UC	--	1335					
10					Very stiff light gray & tan clay	CH													
	2.50						5	11-12											
15	3.00				w/sand pockets		6	14-15	25	98	123	UC	--	2190					
	2.20				w/few silt lenses		7	18-19											
20																			
	1.60				Medium stiff gray & tan clay w/sand pockets	CH	8	23-24	33	86	114	UC	--	875					
25																			
	0.75				Medium stiff gray & dark gray clay w/silty sand layers	CH	9	28-29											
30																			
	1.30				Soft gray & reddish-brown clay w/silty sand pockets & lenses & trace of organic matter	CH	10	33-34	49	72	108	OB	--	430					
35																			
	0.40				Soft gray sandy clay w/clayey sand pockets	CL	11	38-39											
40																			
45																			
50																			

Boring located at Station 3+92, 3 feet west of failure.

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

DELWOOD PUMPING STATION
FRONT STREET
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 13965 **Date Drilled:** 3/27/96 **Boring:** 1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	φ	C	LL	PL	PI		
0					Loose dark gray & tan clayey silt w/silty clay layers, shells & roots	ML	1	0-0.5											
	2.80				Very stiff tan & gray silty clay w/clay layers, shells & roots	CL	2	2-3	17									DIST.	
					Loose tan fine sand w/clayey sand pockets	SP	3	5-6											
10	2.10				Stiff gray & tan silty clay w/clayey silt layers	CL	4	8-9	21	105	126	UC	--	1600	43				
					Medium stiff gray & tan silty clay w/clayey silt layers	CL	5	11-12	28	94	121	OB	--	580					
	1.60				Stiff tan & gray clay w/clayey silt lenses	CH	6	14-15	45	76	111	OB	--	345					
20	1.60						7	18-19	35						74				
	1.50				Medium stiff gray & tan clay w/shell fragments & fissures	CH	8	23-24	50	72	107	OB	--	630					
30					Loose gray clayey sand w/shell fragments	SC	9	28-29	26										
	0.40				Soft gray clay w/silty sand layers, pockets & concretions	CH	10	33-34	40	82	114	O8	--	345					
40	0.60				Medium stiff gray clay w/clayey silt lenses & shell fragments	CH	11	38-39	48	73	108	UC	--	580					
	0.60				w/shell fragments		12	43-44	48	74	109	UC	--	445					
50					Medium compact gray clayey silt w/shell	ML	13	48-49											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

DELWOOD PUMPING STATION
FRONT STREET
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 13965 **Date Drilled:** 3/27/96 **Boring:** 1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium compact gray clayey silt w/shell fragments	ML													
	1.80				Stiff greenish-gray clay w/clayey silt pockets & shell fragments	CH	14	53-54	33	88	117	OB	--	955					
	1.60				w/fissures & shell fragments		15	58-59	35	85	115	OB	--	1105					
60																			
					Loose gray clayey sand	SC	16	62-63											
	0.60				Medium stiff brown & gray clay w/organic matter & fissures	CH	17	64-65	64	60	99	OB	--	515					
	0.90						18	68-69	71	57	97	OB	--	805					
70																			
	1.80				Stiff greenish-gray clay w/silt pockets	CH	19	73-74	30	92	119	OB	--	2225					
	2.70				Stiff greenish-gray & tan clay w/fissures	CH	20	78-79	44	76	110	OB	--	835					
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

CITY BARN PUMPING STATION
BAYOU BONFOUCA
SLIDELL, LOUISIANA

Ground Elev.: +8.5' **Datum:** **Gr. Water Depth:** See Text **Job No.:** 13966 **Date Drilled:** 3/26/96 **Boring:** 1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	φ	C	LL	PL	PI		
0					1.5" Asphalt														
	1.25				Stiff gray & tan sandy clay w/clay layers & miscellaneous fill	CL	1	3-4	23	93	114	O8	--	1095					
	1.00				Medium dense blackish-gray clayey sand w/clay layers	SC	2	5-6	18	107	126	O8	--	1030	25				
					Wood layer	WD	3	8-9											
10																			
	0.40				Soft brown organic clay w/wood, roots & clayey sand layers	OH	4	11-12	100						92				
	0.50				Soft brown & gray sandy clay w/sand layers, wood & roots	CL	5	14-15	45	71	103	OB	--	240					
	0.40				Soft brown humus w/wood & roots	PT	6	18-19	262	19	70	O8	--	500	362				
20																			
					Medium dense light gray sandy silt w/silty sand & sandy clay layers & roots	ML	7	22-23	28	95	122	O8	--	800					
		29			Medium dense light gray fine silty sand	SM	8	24-25											
		25					9	27-28											
		21					10	29-30											
30																			
		15			w/thin clay layers		11	34-35											
		40			Dense tan fine sand	SP	12	39-40											
40																			
		28			Medium dense tan fine sand	SP	13	44-45											
50		12			Medium dense light gray fine sand w/sandy clay layers	SP	14	49-50											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

CITY BARN PUMPING STATION
BAYOU BONFOUCA
SLIDELL, LOUISIANA

Ground Elev.: +8.5' **Datum:** **Gr. Water Depth:** See Text **Job No.:** 13966 **Date Drilled:** 3/26/96 **Boring:** 1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	φ	C	LL	PL	PI		
50					Medium dense light gray fine sand w/sandy clay layers	SP													
		48	☒		Dense light gray fine sand	SP	15	54-55											
60		50=7"	☒		Very dense gray fine sand	SP	16	59-60											
		41	☒		Dense gray fine sand	SP	17	64-65											
70		20	☒		Medium dense gray fine sand	SP	18	69-70											
		47	☒		Dense gray fine sand	SP	19	74-75											
80		8	☒		Medium stiff gray sandy clay w/clayey sand layers & shells	CL	20	79-80											
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

FEMA PROJECT
RESIDENCE
3045 SOUTH PALM DRIVE
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 16850 **Date Drilled:** 2/07/01 **Boring:** 1 Refer to "Legends & Notes"

PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	φ	C	LL	PL	PI		Other Tests
0.50		Soft gray silty clay w/sand layers	CL	1	0-0.5											
0.50		Medium stiff light gray clay w/silty sand lenses	CH	2	2-3	24	97	120	UC	--	900					
0.50		Soft light gray & tan clay w/silty sand lenses	CH	3	5-6	30	89	116	UC	--	335					
0.50		Medium stiff light gray & tan clay w/silty sand pockets & lenses	CH	4	8-9	30	92	119	UC	--	870					
1.00		Stiff gray clay w/sand pockets & lenses	CH	5	11-12											
0.50		Medium stiff light gray clay w/silty sand lenses & pockets	CH	6	14-15	26	98	123	UC	--	1370					
1.50		Stiff light gray & tan clay w/silty sand lenses & pockets	CH	7	18-19	26	97	123	UC	--	1710					
2.00		Very stiff gray clay w/sand lenses & pockets	CH	8	23-24											
0.50		Soft gray sandy clay w/sand lenses	CL	9	28-29	34	88	118	UC	--	475					

Scale In Feet: 0, 10, 20, 30, 40, 50

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

FEMA PROJECT
RESIDENCE
3045 SOUTH PALM DRIVE
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 16850 **Date Drilled:** 2/07/01 **Boring:** 2 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	φ	C	LL	PL	PI		
0					Soft brown sandy clay w/roots & organic matter	CL	1	0-0.5											
					Stiff tan sandy clay w/silt	CL	2	2-3	23						27	13	14		
					Stiff tan clay w/silt layers	CH	3	5-6											
10					Very stiff tan & gray sandy clay w/silty clay layers	CL	4	9-10											
20																			
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RESIDENCE OF DONNA ROBERTS
2998 PALM DRIVE
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17060 **Date Drilled:** 7/26/01 **Boring:** 1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Percent Saturation	Other Tests
0					Medium stiff brown sandy clay w/roots, vegetation, & organic matter	CL	1	0-0.5	29										
	2.00				Medium dense gray & tan clayey sand w/roots, gravel, & traces of organic matter	SC	2	2-3	14	116	132	OB	--	520				85	
	0.75				Loose gray sand	SP	3	5-6	18	114	135	UC	--	1115				100	
					Stiff gray & tan sandy clay w/roots	CL	4	6-7											
		27			Medium dense tan sand	SP	5	8-9											
10		29			Medium dense light gray sand	SP	6	11-12											
		13			Medium dense light gray & tan sand w/clay layers	SP	7	14-15											
		8			Loose light gray clayey sand w/alternating silt layers	SC	8	17-18	29										
20		5			Medium stiff tan & greenish-gray clay	CH	9	20-21	44										
	2.75				Medium stiff tan & gray clay w/fissures	CH	10	23-24	41	81	114	UC	--	770				100	
	2.25				Stiff tan & greenish-gray clay w/fissures	CH	11	28-29	41	81	114	UC	--	1575				100	
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RESIDENCE OF DONNA ROBERTS
2998 PALM DRIVE
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17060 **Date Drilled:** 7/26/01 **Boring:** 2 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits			Percent Saturation	Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Very soft brown sandy clay w/roots, vegetation, & organic matter	CL	1	0-0.5	38										
	0.65				Loose tan & gray clayey sand w/roots & sand layers	SC	2	1-2	16	112	130	OB	--	370				88	
		25			Medium dense tan sand	SP	3	3-4											
		27					4	6-7											
10		23			Medium dense gray clayey sand w/organic matter	SC	5	9-10											
20																			
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RESIDENCE OF DUDLEY SMITH
3071 SOUTH PALM DRIVE
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17064 **Date Drilled:** 7/25-26/01 **Boring:** 1 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0		5			2" Concrete														
					Medium stiff gray & tan silty clay w/sand layers	CL	1	1-2	28										
	0.25					CH	2	3-4	30	91	119	UC	--	265					
					Soft gray clay w/concretions & silt pockets & lenses	CL	3	5-6	33	88	117	UC	--	225					
					Very soft tan & gray silty clay w/sand pockets, concretions & clay layers	CL	4	8-9	30	93	121	UC	--	320					
10					Soft greenish-gray silty clay w/sand lenses & clay layers	CL													
	0.65				Medium stiff light gray silty clay w/sand lenses & clayey silt layers		5	11-12	25	100	125	UC	--	840					
	1.15						6	14-15											
					Stiff light gray silty clay w/concretions & clayey silt layers	CL													
	1.50						7	18-19	26	98	123	UC	--	1025					
20																			
	1.50				w/sand pockets & lenses		8	23-24											
					Loose gray clayey sand w/alternating clay layers & lenses	SC	9	28-29											
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RESIDENCE OF CECIL AND BETTY KEITH
3000 SOUTH PALM DRIVE
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17080 **Date Drilled:** 8/15/01 **Boring:** 1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0		6			Medium stiff dark brown silty clay w/roots, & sand	CL	1	0-0.5	28										
					Loose tan clayey sand w/roots & gravel w/sand layers	SC	2	1-2	17										PD
		8					3	4-5	24										
	1.50				Dense tan & gray clayey sand	SC													
	0.50						4	8-9	19										
10		30			Dense light gray fine sand w/clayey sand layers	SP-SC	5	10-11	23										PD
		26			Medium dense light gray fine sand w/silt	SP-SM	6	13-14	24										PD
		27			Medium dense light gray medium sand w/silt	SP-SM	7	16-17	29										
		30			Dense light gray medium to fine sand	SP	8	19-20	33										
20		15			Stiff brown & gray clay w/silt lenses	CH	9	21-22	38										
		13			Stiff brown & gray silty clay	CL	10	25-26	34										
		9			Stiff brown & gray sandy clay w/silty sand layers	CL	11	29-30	34										
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RESIDENCE OF REX & LINDA ESTORFFE
3008 SOUTH PALM DRIVE
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17085 **Date Drilled:** 8/15/01 **Boring:** 1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits			Torvane	Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Soft dark brown silty clay w/roots	CL	1	0-0.5											
	0.25				Soft light gray clay w/sand layers & lenses & roots (disturbed)	CH	2	2-3	31						65	16	49	0.100	
	0.25				Soft gray sandy clay w/sand layers & lenses	CL	3	5-6	29	95	122	UC	--	245				0.150	
	1.75				Stiff greenish-gray & tan silty clay w/sandy silt lenses	CL	4	8-9	25	102	128	UC	--	1065				1.050	
10	2.50				Very stiff light gray & tan clay w/silty sand lenses	CH	5	11-12	24	101	125	UC	--	2355				1.100	
	2.50				Stiff tan & gray silty clay w/silt lenses & concretions	CL	6	14-15	28	94	120	UC	--	1175				0.950	
	2.00				Stiff gray & tan clay w/silt lenses, concretions, & fissures	CH	7	18-19	30	93	121	UC	--	1540				1.000	
20	2.75				Stiff greenish-gray clay w/silt lenses, concretions, & fissures	CH	8	23-24	39	83	115	UC	--	1205				1.000	
	1.00				w/sand pockets		9	28-29	24	100	124	OB	--	710				0.530	
30					Medium dense tan & gray clayey sand w/silt & clay lenses	SC													
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RESIDENCE OF REX & LINDA ESTORFFE
3008 SOUTH PALM DRIVE
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17085 **Date Drilled:** 8/15/01 **Boring:** 2 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits			Torvane	Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Loose dark brown clayey sand w/roots	SC	1	0-0.5											
					Soft tan sandy clay w/roots	CL	2	1-2											
					Very soft gray & tan sandy clay	CL	3	3-4	31										
					w/roots		4	5-6	28										
					Stiff tan & dark gray sandy clay w/silt	CL	5	7-8	28										
10					Very stiff tan & gray sandy clay	CL	6	9-10	28										
							7	11-12											
							8	14-15	27										
20																			
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
NORTHSHORE HIGH SCHOOL
CLASSROOM ADDITION AND AGRISCIENCE BUILDING
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19071 **Date Drilled:** 9/22/05 **Boring:** 1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	ø	C	Atterberg Limits LL	PL	PI		Other Tests
0					Very loose tan & gray silty sand	SM	1	0-0.5											
	0.10				Loose gray & tan silty sand w/clay & gravel	SM	2	2-3	9										
							3	5-6											
	4.00				Stiff gray & tan silty clay w/concretions	CL	4	8-9	18	106	125	UC	--	1105					
10	1.25				Stiff gray & tan clay w/sand pockets	CH	5	11-12											
	1.50				w/sandy silt		6	14-15	34	87	117	UC	--	640					
					Stiff tan & gray clay w/fissures	CH													
20	2.50						7	19-20	47	76	112	UC	--	1060					
					Medium stiff gray & tan clay w/silty sand lenses	CH													
	3.00						8	24-25	39	83	115	UC	--	760					
30	2.50						9	29-30											
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
NORTHSHORE HIGH SCHOOL
CLASSROOM ADDITION AND AGRISCIENCE BUILDING
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19071 **Date Drilled:** 9/22/05 **Boring:** 2 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Loose gray silty sand w/gravel & shell fragments	SM	1	0-0.5											
	0.15				Stiff dark gray sandy clay w/gravel & roots	CL	2	2-3	13	109	123	UC	--	1040					
					Stiff dark gray silty clay	CL	3	5-6	27	90	115	UC	--	1115					
	4.00				Stiff gray & light tan silty clay	CL	4	8-9	21										
10	2.25				Very stiff gray clay w/silt pockets (fissures)	CH	5	11-12	22	103	127	UC	--	2455					
	4.00				Hard gray & tan clay w/silt pockets & concretions	CH	6	14-15	22										
20	4.00				Stiff tan & light gray clay w/silty sand pockets	CH	7	19-20	26	96	121	UC	--	1480					
	3.00						8	24-25	42										
30	4.00				Stiff tan & gray clay w/fine sand lenses & pockets	CH	9	29-30	33	89	117	UC	--	1017					
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
BROCK ELEMENTARY SCHOOL RENOVATIONS AND ADDITIONS
BRAKEFIELD STREET AT CAREY STREET
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19559 **Date Drilled:** 10/19/06 **Boring:** 1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Loose gray sand w/gravel	SP	1	0-0.5											
	2.00				Stiff gray clay w/silt & sand pockets	CH	2	2-3	19	108	129	UC	--	1844					
					Very stiff gray clay w/silt & sand pockets	CH													
	2.00						3	5-6	18	110	130	UC	--	2085	55	18	37		
	2.00				Stiff tan & gray clay w/silt pockets	CH	4	8-9	23	100	123	UC	--	1494					
10	2.00						5	11-12	24										
	2.00						6	14-15	31	92	120	UC	--	1626					
20	2.00						7	19-20	32										
	2.00						8	23-24											
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
BROCK ELEMENTARY SCHOOL RENOVATIONS AND ADDITIONS
BRAKEFIELD STREET AT CAREY STREET
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19559 **Date Drilled:** 10/18/06 **Boring:** 2 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Loose gray silty sand	SM	1	0-0.5											
	1.75				Stiff gray clay w/silt pockets (plastic clay)	CH	2	2-3	17	112	131	UC	--	1422					
					Stiff tan & light gray clay	CH													
	1.25						3	5-6	25	100	125	UC	--	1021	52	15	37		
	1.50						4	7-8	24	102	126	UC	--	1387					
10	2.00						5	11-12	29	93	120	UC	--	1315					
	2.00				w/shell pockets		6	14-15											
	1.50				w/silt pockets		7	19-20	37										
20					Stiff tan & light gray clay w/silt pockets	CH													
	1.00						8	23-24											
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
BROCK ELEMENTARY SCHOOL RENOVATIONS AND ADDITIONS
BRAKEFIELD STREET AT CAREY STREET
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19559 **Date Drilled:** 10/18/06 **Boring:** 3 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Loose gray sand w/gravel	SP	1	0-0.5											
	1.00				Stiff gray clay w/silt & sand pockets	CH	2	2-3	42										
	1.00				Soft gray clay w/silt pockets (plastic clay)	CH	3	5-6	24	101	125	UC	--	494					
	2.00						4	8-9							60	16	44		
10	2.00						5	11-12											
	2.00				Medium stiff tan & gray clay w/silt pockets	CH	6												
20	2.00				Medium stiff tan & light gray clay w/silt	CH	7	19-20											
	2.00				Medium stiff tan & light gray silty clay w/sand pockets	CL	8	24-25	27	97	123	OB	0	812					
30	1.50						9	29-30											
					Medium stiff gray clay w/silt pockets (plastic clay)	CH													
	1.00						10	34-35	51	71	107	OB	0	513					
40							11	39-40											
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
BROCK ELEMENTARY SCHOOL RENOVATIONS AND ADDITIONS
BRAKEFIELD STREET AT CAREY STREET
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19559 **Date Drilled:** 10/26/06 **Boring:** 4 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Loose dark gray silty sand	SM	1	0-0.5											
	1.00				Stiff tan & gray clay w/silt pockets	CH	2	2-3							44	14	30		
	1.00				Very stiff tan & gray clay w/silt pockets	CH	3	5-6	21	105	128	UC	--	2041					
	1.25				Very soft gray & tan clay w/silt pockets	CH	4	8-9	31	90	118	UC	--	149	55	16	39		
10	1.75						5	11-12											
	1.00				Soft gray & tan clay w/silt pockets (plastic clay)	CH	6	14-15	51										
20	1.75						7	19-20											
	1.00				Medium stiff gray & tan clay w/silt & sand pockets (plastic clay)	CH	8	24-25	36	84	114	UC	--	846					
30	1.50						9	29-30											
	1.00				Soft gray silty clay	CL	10	34-35	31	88	115	UC	--	270					
40	1.25						11	39-40											
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
BROCK ELEMENTARY SCHOOL RENOVATIONS AND ADDITIONS
BRAKEFIELD STREET AT CAREY STREET
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19559 **Date Drilled:** 10/26/06 **Boring:** 5 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Loose dark gray silty sand	SM	1	0-0.5											
	2.00				Very stiff tan & gray silty clay	CL	2	2-3	16	108	125	UC	--	2167					
	1.00						3	5-6	37						42	16	26		
					Soft gray & tan silty clay w/roots & organic matter	CL													
	1.25				Soft dark gray clay w/roots & sand pockets	CH	4	8-9	39	76	106	UC	--	427	50	23	27		
10	1.50				Very soft gray sandy clay	CL	5	11-12	30	91	119	OB	0	177					
	1.50				Soft gray silty clay w/sand pockets	CL	6	14-15	24	101	125	OB	0	340					
					Soft gray clay w/silt layers	CH													
20	1.00						7	19-20	44	75	108	UC	--	228					
	1.25						8	23-24											
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
BROCK ELEMENTARY SCHOOL RENOVATIONS AND ADDITIONS
BRAKEFIELD STREET AT CAREY STREET
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19559 **Date Drilled:** 10/26/06 **Boring:** 6 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Medium stiff gray & brown clay w/silt layers (plastic clay)	CH	1	2-2.5	32										
	1.00				Loose dark gray silty sand w/roots & organic matter	SM	2	5-6	14										
	1.00				Soft gray & dark gray clay w/silty sand pockets (plastic clay)	CH	3	8-9.5	42	77	109	UC	--	137					
10	1.00				Medium stiff gray silty clay w/silt pockets	CL	4	11-12	37	83	114	UC	--	622					
	1.00				Medium stiff greenish-gray clay w/silt pockets	CH	5	14-15	31	91	118	UC	--	517					
20	1.00						6	19-20	35	85	114	UC	--	653					
	1.00				Stiff greenish-gray clay w/silt pockets	CH	7	23-24											
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
BROCK ELEMENTARY SCHOOL RENOVATIONS AND ADDITIONS
BRAKEFIELD STREET AT CAREY STREET
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19559 **Date Drilled:** 10/26/06 **Boring:** 7 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	ø	C	Atterberg Limits LL	PL	PI		Other Tests
0					Stiff dark gray & tan silty clay w/sand pockets	CL													
	1.00						1	2-3											
	1.00						2	5-6	21	101	122	UC	--	1648					
	1.00				Very soft tan & gray silty clay	CL	3	8-9	25	98	122	UC	--	231	50	14	36		
10	1.25				Stiff gray & tan silty clay w/silt pockets	CL	4	11-12	24	100	124	UC	--	1968					
	1.50						5	14-15											
					Medium stiff gray & tan clay w/silt pockets	CH													
20	1.25						6	19-20	33	88	116	UC	--	799					
	1.00						7	24-25											
					Stiff gray silty clay w/sand pockets	CL													
30	1.00				Stiff gray clay w/sand pockets	CH	8	29-30											
	1.25						9	34-35											
40	1.75						10	39-40											
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SALMEN HIGH SCHOOL
NEW SCHOOL FACILITY
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19615 **Date Drilled:** 1/05/07 **Boring:** 1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Very loose brown silty sand w/roots	SM	1	0-0.5											
	0.50				Soft gray silty clay w/roots & gravel	CL	2	2-3	36										
	2.00				Medium stiff gray & brown silty clay	CL	3	5-6	21	100	122	UC	--	771					
	0.50				Soft to medium stiff tan & gray silty clay	CL	4	8-9											
10	3.00				Very stiff tan & gray clay w/silt pockets	CH	5	11-12	26	95	120	UC	--	2126	60	15	45		
	4.00						6	14-15											
20	3.00				Stiff to very stiff light gray clay w/silt pockets	CH	7	19-20	35	84	114	UC	--	981					
	2.00				Stiff light gray & tan clay w/silt pockets & lenses	CH	8	24-25	36	82	112	UC	--	246					
30	1.75				Medium stiff to stiff gray & tan clay w/silt pockets & lenses	CH	9	29-30	34	84	112	UC	--	955					
	1.00				Medium stiff gray sandy clay	CL	10	34-35											
40	1.50				Loose to medium dense gray silty sand	SC	11	39-40	26	97	122	OB	--	688					
	0.75				Medium stiff gray clay	CH	12	44-45											
50	1.00				w/silt pockets & shell frag		13	49-50	51	69	104	UC	--	638					

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SALMEN HIGH SCHOOL
NEW SCHOOL FACILITY
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19615 **Date Drilled:** 1/05/07 **Boring:** 1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
50					Medium stiff gray clay	CH													
	1.00						14	54-55											
60																			
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SALMEN HIGH SCHOOL
NEW SCHOOL FACILITY
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19615 **Date Drilled:** 1/05/07 **Boring:** 2 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	ø	C	Atterberg Limits LL	PL	PI		Other Tests
0					Medium compact gray & tan clayey silt w/shell fragments & roots	ML	1	0-0.5	16										
	1.50				Loose brown silty sand w/shell fargments	SM	2	2-3											
	1.50				Stiff tan & gray silty clay	CL	3	4-5											
					Soft gray & tan silty clay	CL													
	1.00						4	8-9	29	92	119	UC	--	490					
10					Very stiff light gray clay	CH													
	3.00						5	11-12											
					Stiff gray & tan silty clay	CL													
	1.50						6	14-15	26	94	118	UC	--	1889	62	18	44		
					Stiff gray silty clay	CL													
	2.00						7	18-19											
20					Stiff to very stiff gray & tan clay	CH													
	2.50						8	23-24	38	76	105	UC	--	1233					
					Very stiff gray & tan clay	CH													
	2.50						9	28-29											
30					Stiff to very stiff gray & tan clay	CH													
	4.50						10	33-34	39	78	108	UC	--	1088					
					Loose gray silty sand	SM													
							11	38-39											
40					Medium stiff gray clay w/shell fragments	CH													
	1.25						12	43-44	54	66	101	UC	-	538	83	25	58		
	1.25						13	48-49											
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SALMEN HIGH SCHOOL
NEW SCHOOL FACILITY
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19615 **Date Drilled:** 1/05/07 **Boring:** 2 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
50	1.00				Medium stiff gray clay w/shell fragments & silt pockets	CH	14	53-54	57	66	103	OB	0	614					
60																			
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SALMEN HIGH SCHOOL
NEW SCHOOL FACILITY
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19615 **Date Drilled:** 1/06/07 **Boring:** 3 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	ø	C	Atterberg Limits LL	PL	PI		Other Tests
0					Very loose brown sand w/roots & gravel	SP	1	0-0.04											
					Loose to medium dense brown clayey sand w/shell fragments	SC	2	2-3	11										
					w/wood & gravel		3	5-6											
	3.50				Stiff tan & light gray clay w/silt pockets & roots	CH	4	8-9	29	93	120	UC	--	1892	63	18	45		
10					Loose to medium dense tan & gray silty sand	SM	5	11-12											
	2.75				Stiff light gray & tan clay w/silt pockets	CH	6	14-15	28	95	121	OB	0	1384					
	3.00				Very stiff gray & brown silty clay	CL	7	18-19											
20	2.00				Medium stiff to stiff tan & gray clay w/silt pockets & lenses	CH	8	23-24	42	78	111	UC	--	645					
	1.50				Stiff gray clay w/silt lenses	CH	9	28-29											
30	1.50				w/shell fragments		10	33-34	46	74	108	UC	--	1187					
	1.25				Medium stiff gray clay w/silty sand pockets	CH	11	38-39	52										
40	0.75				Medium stiff gray clay	CH	12	43-44											
	0.75				Medium stiff gray silty clay	CL	13	48-49											
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SALMEN HIGH SCHOOL
NEW SCHOOL FACILITY
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19615 **Date Drilled:** 1/06/07 **Boring:** 3 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
50	0.50				Soft gray clay w/silt pockets & shell fragments	CL	14	53-54	47	74	108	UC	--	428					
60																			
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SALMEN HIGH SCHOOL
NEW SCHOOL FACILITY
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19615 **Date Drilled:** 1/06/07 **Boring:** 4 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	ø	C	Atterberg Limits LL	PL	PI		Other Tests
0					Very loose brown sand w/roots & gravel	SP	1	0-0.5											
	0.25				Loose brown sand w/shell fragments	SP	2	2-3											
	1.25				Medium stiff gray & tan clay w/silty sand pockets	CH	3	5-6	24	98	121	UC	--	828					
	1.25				Stiff gray silty clay w/gravel	CL	4	8-9											
10	1.25				Stiff tan & brown silty clay	CL	5	11-12	27	96	122	UC	--	463					
	2.00				Medium stiff to stiff tan & gray silty clay	CL	6	14-15	28	92	118	UC	--	634					
20	2.50				Stiff tan & gray clay w/silt pockets & lenses	CH	7	19-20	33	85	113	UC	--	1192					
	2.75				Very stiff gray & brown silty clay	CL	8	24-25											
30	0.50				Medium stiff gray clay w/shell fragments	CH	9	29-30	54	67	103	UC	--	627					
	2.50				Very stiff gray clay w/silt lenses	CH	10	34-35											
40	1.00				Soft gray clay w/silty sand lenses & layers	CH	11	39-40	48	72	106	UC	--	394					
	1.00				Stiff gray sandy clay	CL	12	44-45											
50	1.25				Medium stiff gray clay w/silt pockets & lenses	CH	13	49-50	48	73	107	UC	--	911					

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SALMEN HIGH SCHOOL
NEW SCHOOL FACILITY
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19615 **Date Drilled:** 1/06/07 **Boring:** 4 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
50					Medium stiff gray clay	CH													
	0.50						14	53-54											
60																			
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SALMEN HIGH SCHOOL
NEW SCHOOL FACILITY
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19615 **Date Drilled:** 1/04/07 **Boring:** 5 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	ø	C	Atterberg Limits LL	PL	PI		Other Tests
0					Very loose gray sandy silt w/roots	ML	1	0-0.5											
	1.00				Stiff brown & tan sandy clay w/shell fragments & roots	CL	2	2-3	20										
	2.00				Medium stiff gray & reddish-brown silty clay w/concretions	CL	3	5-6	24	99	123	UC	--	723					
	4.50				Stiff light gray silty clay	CL	4	8-9	22	102	124	UC	--	1072					
10	0.75				Soft light brown & tan silty clay	CL	5	11-12	27	97	123	UC	--	305					
	1.00				Medium stiff light gray silty clay	CL	6	14-15											
	1.50				Stiff gray & tan silty clay	CL	7	18-19	30	91	119	UC	--	1382					
20	2.00				Stiff tan sandy clay	CL	8	23-24											
					Stiff gray & tan silty clay	CL	9	29-30	27	94	120	UC	--	1346					
30	1.00				Loose to medium dense stiff gray clayey sand	SC	10	34-35											
	0.75				Soft gray clay	CH	11	39-40	54	67	104	UC	--	462					
40	2.00						12	44-45											
50	1.00				w/shell fragments & silty sand lenses		13	47.5-48.5	46	74	108	UC	--	305					

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SALMEN HIGH SCHOOL
NEW SCHOOL FACILITY
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19615 **Date Drilled:** 1/04/07 **Boring:** 5 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
50					Medium stiff gray clay w/silt lenses	CH													
	0.75						14	54-55											
60																			
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SALMEN HIGH SCHOOL
NEW SCHOOL FACILITY
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19615 **Date Drilled:** 1/04/07 **Boring:** 6 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Very loose brown sand w/shell fragments	SP	1	0-0.5											
	2.00				Soft gray silty clay w/concretions	CL	2	2-3	24										
					Loose gray silty sand	SM	3	5-6											
	3.50				Soft gray & tan silty clay	CL	4	8-9	25	96	119	UC	--	239					
10	2.00				Stiff gray & tan silty clay	CL	5	11-12											
	1.50						6	14-15	32	88	117	UC	--	1161					
20	2.50				Very stiff gray sandy clay	CL	7	19-20											
	1.75				Medium stiff to stiff gray & tan clay w/silt pockets	CH	8	24-25	47	73	107	UC	--	728					
30	1.50				Stiff gray clay	CH	9	29-30											
	3.50				Medium stiff to stiff greenish-gray silty clay	CL	10	34-35	29	92	119	UC	--	678					
40	1.75				Loose to medium dense gray clayey sand	SC	11	39-40											
	1.50				Medium stiff gray clay w/shell fragments	CH	12	44-45	63	61	100	UC	--	570					
50	1.00						13	49-50											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SALMEN HIGH SCHOOL
NEW SCHOOL FACILITY
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19615 **Date Drilled:** 1/04/07 **Boring:** 6 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
50					Medium stiff gray clay w/sand pockets & shell fragments	CH													
	1.00						14	54-55	54	68	104	UC	--	607					
60																			
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SALMEN HIGH SCHOOL
NEW SCHOOL FACILITY
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19615 **Date Drilled:** 1/05-06/07 **Boring:** 7 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Very loose brown sand w/roots	SP	1	0-0.5											
	0.75				Medium dense tan & light brown clayey sand	SC	2	2-3	13										
	4.00				Stiff to very stiff silty clay	CL	3	5-6	19	107	127	UC	--	1482	27	14	13		
	1.75				Stiff gray silty clay	CL	4	8-9											
10	2.00				Medium stiff to stiff gray & light brown silty clay	CL	5	11-12	27	94	119	UC	--	787					
	3.00				Stiff tan & light gray silty clay	CL	6	14-15	28	92	118	UC	--	1080					
	2.50				Medium stiff to stiff gray & tan clay w/silt pockets	CH	7	18-19	39	79	110	UC	--	769					
20	3.00				Stiff gray clay	CH	8	23-24											
	2.25				Medium stiff to stiff gray & tan clay w/silt pockets & lenses	CH	9	28-29	37	82	112	UC	--	672					
30	1.00				Medium stiff greenish-gray sandy clay w/shell fragments	CL	10	33-34	24										
	1.00						11	38-39	26										
40	1.25				Medium stiff gray clay	CH	12	43-44											
	1.50				w/shell fragments		13	48-49	59	64	102	UC	--	628					
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SALMEN HIGH SCHOOL
NEW SCHOOL FACILITY
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 19615 **Date Drilled:** 1/05-06/07 **Boring:** 7 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
50	1.00				Medium stiff gray silty clay	CL	14	53-54											
60																			
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

CITY OF SLIDELL
AUDITORIUM FLOODWALL
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 20205 **Date Drilled:** 4/09/08 **Boring:** 1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Other Tests
0			12" Asphalt													
	1.00		Medium stiff gray & tan silty clay w/wood, & fine sand pockets (flocculated)	CL	1	1-2	19	110	130	UC	--	891				
	2.50		Stiff gray & tan sandy clay	CL	2	3-4	19	110	130	UC	--	1233				
	2.50				3	6-7										
10	2.50		Stiff light gray silty clay (flocculated)	CL	4	9-10	24	102	127	UC	--	1378				
	2.00				5	12-13										
			Soft to medium stiff gray & tan sandy clay (flocculated)	CL												
20	1.50				6	19-20	26	100	125	UC	--	435				
			Medium stiff gray clay w/silt pockets	CH												
	1.00				7	24-25										
			Medium stiff gray & tan sandy clay	CL												
30	1.00				8	29-30	24	102	126	UC	--	820				
	0.50		Medium dense gray clayey sand	SC	9	31-32	38									
		13	Medium dense gray fine sand	SP	10	33.5-35	18									
		23	Very stiff gray sandy clay	CL	11	36.5-38	28									
40		30	Medium dense gray clayey sand	SC	12	39.5-41										PD
		35	Dense gray fine sand	SP	13	42.5-44	27									
		50=4"	Very dense gray fine sand	SP	14	45.5-47										
50		50=6"			15	48.5-50	25									

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

CITY OF SLIDELL
AUDITORIUM FLOODWALL
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 20205 **Date Drilled:** 4/09/08 **Boring:** 1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
50					Very dense gray fine sand	SP													
		50=6"	☒				16	53.5-55											
		50=10"	☒		Very dense gray medium to fine sand w/silt	SP-SM	17	58.5-60											PD
60																			
		50=8"	☒				18	63.5-65											
		50=6"	☒				19	68.5-70											
70																			
		50=4"	☒				20	73.5-75											PD
		50=4"	☒		w/limestone		21	78.5-80											
80																			
		50=4"	☒		Gravel w/coarse to fine sand	GP	22	83.5-85											PD
		49	☒		Dense gray fine sand	SP	23	88.5-90	24										
90																			
		47	☒				24	93.5-95											
		50=10"	☒		Very dense gray fine sand	SP	25	98.5-100											PD
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

CITY OF SLIDELL
AUDITORIUM FLOOD WALL
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 20205 **Date Drilled:** 4/10/08 **Boring:** 2 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	ø	C	Atterberg Limits LL	PL	PI		Other Tests
0					6" Asphalt														
					Gravel w/silty clay & shell fragments	GP	1	0.5-2	11										
	0.25				Soft gray & tan sandy clay w/trace of organic matter	CL	2	2-6	20	108	131	UC	--	368					
					Loose to medium dense gray & tan silty sand w/roots & clay pockets	SM	3	6-9	25	100	125	OB	0	1880					
10		12			Medium dense gray & tan fine sand w/clay pockets	SP	4	9-10.5	26										
	0.50				Medium stiff gray & tan clay w/silty sand pockets & concretions (flocculated)	CH	5	12-15	32	90	118	UC	--	719					
					Loose to medium dense gray silty sand w/clay pockets	SM													
20	0.50						6	19-20	25	100	125	OB	0	1275					
	0.50				w/decayed wood		7	22-23.5	24	101	125	OB	0	1036					
		16			Medium dense gray silty sand	SM	8	23.5-25	26										
		27			Medium dense gray clayey sand w/clay pockets	SC	9	26.5-28											PD
30		34			Dense gray & tan fine sand w/gravel	SP	10	29.5-31	22										
		39					11	32.5-34											
40		50=11"			Very dense gray medium to fine sand w/silt	SP-SM	12	38.5-40											
		50=8"					13	43.5-45											PD
50		50=6"					14	48.5-50											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

CITY OF SLIDELL
AUDITORIUM FLOODWALL
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 20205 **Date Drilled:** 4/10/08 **Boring:** 2 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Very dense gray medium to fine sand w/silt	SP-SM													
		50=6"					15	53.5-55											PD
60		50=8"					16	58.5-60											
		50=7"			Very dense tan fine sand	SP	17	63.5-65	25										
70		50=6"			Very dense light gray sand w/clay	SP-SC	18	68.5-70											PD
		50=5"					19	73.5-75											
80		50=4"			Very dense light gray medium to fine sand w/silt	SP-SM	20	78.5-80											PD
		35			Hard gray sandy clay	CL	21	83.5-85	36										
90		48			Very dense light gray fine sand	SP	22	88.5-90											
		50=6"			Very dense gray fine sand		23	93.5-95	27										
100		50=10"					24	98.5-100											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SLIDELL HIGH SCHOOL
BASEBALL FIELD LIGHTING
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Water Depth:** **Job No.:** 20468 **Date Drilled:** 12/17/08 **Boring:** A-1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0		7			Loose tan clayey sand	SC	1	0.5-2	18										
					Soft tan & gray silty clay w/roots	CL	2	3-4	19	106	127	OB	0	328					
					Soft tan & gray sandy clay w/concretions	CL	3	5-6	19	106	126	OB	0	427	27	14	13		
					Loose to medium dense light gray fine sand w/ clay pockets	SP	4	7-8	17	113	132	OB	0	1313					
		14			Stiff light gray clay	CH	5	8.5-10	23										
10					Stiff tan & gray sandy clay	CL	6	14-15	30	93	120	UC	--	1202					
					Medium stiff to stiff tan & gray clay (fissured)	CH	7	19-20	42	79	112	UC	--	673					
20					Medium stiff gray & tan sandy clay w/concretions	CL	8	24-25	32	89	117	UC	--	399					
		47			Dense gray fine sand	SP	9	28.5-30											
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SLIDELL HIGH SCHOOL
BASEBALL FIELD LIGHTING
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Water Depth:** **Job No.:** 20468 **Date Drilled:** 12/15/08 **Boring:** A-2 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0		8			Loose gray & tan clayey sand	SC	1	0.5-2	16										
		21			Medium dense tan & brown clayey sand	SC	2	2.5-4											
		45			Hard reddish-brown silty clay w/concretions	CL	3	4.5-6	16										
		17			Very stiff light gray & tan clay w/silt pockets & roots	CH	4	6.5-8	22										
		19			Very stiff light gray & tan silty clay	CL	5	8.5-10	29										
10					Medium stiff to stiff gray & tan sandy clay	CL	6	14-15											
					Medium stiff greenish-gray silty clay	CL	7	19-20	39	82	113	UC	--	634					
20							8	24-25	27	94	119	UC	--	682					
					Medium stiff gray sandy clay w/clayey sand layers	CL	9	29-30	40	81	114	UC	--	409					
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SLIDELL HIGH SCHOOL
BASEBALL FIELD LIGHTING
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Water Depth:** **Job No.:** 20468 **Date Drilled:** 12/17/08 **Boring:** B-1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0		7			Loose tan & brown silty sand w/roots	SM	1	0.5-2											
					Medium stiff gray & reddish-brown sandy clay	CL	2	3-4	23	102	126	UC	--	596					
					Loose light gray & tan clayey sand	SC	3	5-6	20	107	129	OB	0	583					
					Loose tan & brown clayey sand	SC	4	7-8	18	111	130	OB	0	900					
		13			Stiff light gray clay w/silt pockets	CH	5	8.5-10	26										
10					Stiff brown & gray clay w/silty sand lenses	CH	6	14-15	37	81	112	UC	--	1137	87	31	56		
					Stiff gray & tan clay	CH	7	19-20	41	78	110	UC	--	1321					
20					Stiff gray sandy clay	CL	8	24-25	34	82	111	OB	0	298					
		48			Dense gray fine sand	SP	9	28.5-30											
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SLIDELL HIGH SCHOOL
BASEBALL FIELD LIGHTING
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Water Depth:** **Job No.:** 20468 **Date Drilled:** 12/15/08 **Boring:** B-2 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0		3			Soft gray & tan sandy clay	CL	1	0.5-2	21										
							2	3-4	29	95	122	UC	--	289					
					Stiff gray & tan silty clay	CL	3	5-6	20	109	130	UC	--	1037					
					Medium stiff to stiff light gray & tan silty clay	CL	4	7-8	19	107	126	UC	--	990					
					Stiff light gray silty clay	CL	5	8.5-10	28	95	122	UC	--	1681					
10					Stiff gray & tan silty clay	CL	6	14-15	34	83	111	UC	--	1078					
					Stiff gray & tan clay w/silt pockets	CH	7	19-20	40	81	114	UC	--	1217					
20					Stiff greenish-gray & tan silty clay	CL	8	24-25	28	94	120	UC	--	371					
		22			Medium dense gray fine sand	SP	9	28.5-30											
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SLIDELL HIGH SCHOOL
BASEBALL FIELD LIGHTING
SLIDELL, LOUISIANA

(Sheet 1 of 1)

Ground Elev.: **Datum:** **Water Depth:** 2.0" **Job No.:** 20468 **Date Drilled:** 12/16/08 **Boring:** C-1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0		12			Medium compact brown & gray clayey silt	ML	1	0.5-2	14										
					Loose to medium dense tan & light gray clayey sand	SC	2	3-4	16	113	132	UC	--	399					
					Stiff reddish-brown & gray sandy clay	CL	3	5-6	17	112	131	UC	--	1139					
					Loose gray & tan fine sand w/gravel	SP	4	7-8	17	111	129	OB	0	589					
					Loose light gray & tan clayey sand	SC	5	9-10	24	100	125	OB	0	684					
10					Very stiff light gray & tan clay w/silty sand pockets	CH	6	14-15	23	102	125	UC	--	2164					
					Medium stiff to stiff tan & light gray clay w/silty sand pockets	CH	7	19-20	37	83	113	OB	0	917					
20					Medium stiff to stiff gray & tan sandy clay w/clayey sand layers	CL	8	24-25	27	90	114	OB	0	222	34	14	20		
		32			Dense gray fine sand	SP	9	28.5-30											
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SLIDELL HIGH SCHOOL
BASEBALL FIELD LIGHTING
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Water Depth:** **Job No.:** 20468 **Date Drilled:** 12/16/08 **Boring:** C-2 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0		6			Medium stiff gray & tan silty clay w/sand pockets	CL	1	0.5-2	22										
					Compact gray sandy silt w/clay pockets	ML	2	3-4	18	110	130	OB	0	1412					
					Stiff tan & gray silty clay	CL	3	5-6	16	114	132	UC	--	1472					
					Very stiff gray & light gray silty clay	CL	4	7-8	18	111	121	UC	--	2140					
							5	9-10	22	104	127	UC	--	2553					
10					Medium stiff to stiff light gray clay w/silt lenses & layers (fissured)	CH	6	14-15	30	93	120	UC	--	862					
					Stiff gray & tan clay w/silty sand pockets (fissured)	CH	7	19-20	35	85	115	UC	--	1441					
20					Loose greenish-gray silty sand	SM	8	24-25	25										
					Loose gray silty sand w/clay lenses	SM	9	29-30	36	85	115	OB	0	867					
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SLIDELL HIGH SCHOOL
BASEBALL FIELD LIGHTING
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Water Depth:** 1.4' **Job No.:** 20468 **Date Drilled:** 12/16/08 **Boring:** D-1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0		7			Medium stiff dark gray sandy clay w/roots	CL	1	0.5-2											
					Stiff gray & tan sandy clay	CL	2	3-4	18	110	130	OB	0	1349	23	12	11		
					Loose to medium dense light gray & tan clayey sand	SC	3	5-6	14	119	135	OB	0	1137					
					Stiff light gray sandy clay	CL	4	7-8	22	104	127	UC	--	1350					
					Very stiff light gray silty clay	CL	5	9-10	19	108	129	UC	--	2287					
10					Very stiff tan & gray clay w/sandy silt lenses & pockets	CH	6	14-15	32	86	114	OB	0	2480					
					Stiff to very stiff tan & gray clay w/fine sand pockets	CH	7	19-20	32	89	117	UC	--	1220					
20					Loose greenish-gray silty sand	SM	8	24-25	25										
		28			Medium dense gray fine sand	SP	9	28.5-30											
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

ST. TAMMANY PARISH SCHOOL BOARD
SLIDELL HIGH SCHOOL
BASEBALL FIELD LIGHTING
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Water Depth:** 0.7' **Job No.:** 20468 **Date Drilled:** 12/16/08 **Boring:** D-2 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0		10			Loose dark gray & tan clayey silt	CL	1	0.5-2											
					Soft to medium stiff gray & tan sandy clay	CL	2	3-4	26	99	124	UC	--	411					
					Loose to medium dense tan & gray clayey sand	SC	3	5-6	19	109	130	OB	0	884					
							4	7-8	17	114	133	OB	0	533					
		23					5	8.5-10	23										
10					Stiff tan & gray silty clay	CL	6	14-15	28	93	119	UC	--	1236					
					Medium stiff to stiff tan & gray clay w/fine sand pockets	CH	7	19-20	37	83	113	UC	--	883					
20					Loose gray & greenish-gray silty sand w/clay pockets	SM	8	24-25	28										
					Medium dense gray silty sand	SM													
		20					9	28.5-30											
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

CITY OF SLIDELL
FRITCHIE PARK
SOFTBALL AND DUGOUT RENOVATIONS, LIGHT POLE FOUNDATIONS
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Water Depth:** **Job No.:** 20611 **Date Drilled:** 5/01/09 **Boring:** 1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Loose gray silty sand w/roots	SM	1	0-0.5											
	4.50						2	2-3	10	100	110	OB	0	1407					
					Medium stiff gray & tan silty clay w/silty sand lenses	CL													
	1:00						3	5-6	18	107	126	UC	--	916					
					Hard tan & gray sandy clay	CL													
	4.50						4	8-9	17										
10					Loose gray & tan sand w/clay pockets	SP													
	1.50						5	11-12	14	114	130	OB	0	513					
					Stiff gray & tan clay w/silt pockets & layers	CH													
	2.50						6	14-15	26										
	3.50						7	18-19	37	84	115	UC	--	1298					
20																			
	3.50						8	23-24											
					Medium stiff greenish-gray sandy clay	CL													
	2.50						9	28-29	27	96	122	UC	--	525					
30					Stiff gray clay w/silt pockets & lenses, & shell fragments	CH													
	2.00						10	33-34											
	1.00						11	38-39	47	75	110	UC	--	1039					
40																			
50																			

Comments: Latitude: 30° 14.776' N
Longitude: 89° 46.494' W

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

CITY OF SLIDELL
FRITCHIE PARK
SOFTBALL AND DUGOUT RENOVATIONS, LIGHT POLE FOUNDATIONS
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Water Depth:** **Job No.:** 20611 **Date Drilled:** 4/30/09 **Boring:** 2 **Refer to "Legends & Notes"**

PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	PL	PI		Other Tests
		Loose gray & tan silty sand	SM	1	0-0.5	9										
4.50		Very stiff tan & gray sandy clay	CL	2	2-3											
4.50				3	5-6											
4.50				4	8-9	19	108	130	UC	--	3217					
4.50				5	11-12	22										
4.50		Stiff gray & tan clay w/silt pockets & lenses	CH	6	14-15	21	104	126	UC	--	1862					
1.50				7	18-19	31										
4.50				8	23-24	34	85	115	UC	--	1878					
4.50				9	28-29											
2.00		Loose gray clayey sand w/shell fragments	SC	10	33-34	31	92	121	OB	0	399					
1.50		Stiff gray clay	CH	11	38-39											

Scale In Feet: 0, 10, 20, 30, 40, 50

Comments: Latitude: 30° 14.751' N
Longitude: 89° 46.426' W

EUSTIS ENGINEERING SERVICES, L.L.C.

LOG OF BORING AND TEST RESULTS

CITY OF SLIDELL
FRITCHIE PARK
SOFTBALL AND DUGOUT RENOVATIONS, LIGHT POLE FOUNDATIONS
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Water Depth:** **Job No.:** 20611 **Date Drilled:** 5/01/09 **Boring:** 3 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Stiff tan & gray silty clay	CL	1	0-0.5											
	2.00						2	2-3	20	107	128	UC	--	1392					
					Very stiff tan & gray silty clay w/silty sand pockets	CL													
	4.50						3	5-6	17	114	133	UC	--	2351					
					Stiff tan & gray clay w/silt pockets	CH													
	2.50						4	8-9											
10	2.00						5	11-12	24	101	126	UC	--	1985					
	1.50						6	14-15	27										
					Loose tan & gray silty sand w/clay pockets	SM													
	1.50						7	18-19	30	92	120	OB	0	975					
20					Very stiff tan & gray clay w/silt pockets & lenses	CH													
	2.50						8	23-24	37										
					Stiff gray clay w/silt pockets	CH													
	3.00						9	28-29	43	79	112	UC	--	1487					
30																			
	2.50						10	33-34											
	2.00						11	38-39	74	57	99	UC	--	1089					
40																			
50																			

Comments: Latitude: 30° 14.698' N
Longitude: 89° 46.442' W

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

SLIDELL MEMORIAL HOSPITAL
MRI ADDITION
1001 GAUSE BOULEVARD
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 21221 **Date Drilled:** 11/11/10 **Boring:** 1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Stiff light gray clay w/silt pockets	CH	1	0-0.5	20										
	1.25				Stiff gray & tan sandy clay w/shell fragments & gravel	CL	2	2-3	10	116	128	UC	--	1679					
					Very stiff gray & tan silty clay	CL	3	5-6	22										
	2.25				Stiff light gray silty clay	CL	4	8-9	21	105	128	UC	--	1327					
10	2.00						5	11-12											
	2.25				Stiff light gray clay w/silt pockets	CH	6	14-15	26	98	123	UC	--	1945					
	2.00				Loose brown silty sand w/clay pockets, roots, & gravel	SM	7	18-19	28										
20	2.50				Stiff tan & gray clay w/silt pockets	CH	8	23-24	40	83	115	UC	--	1293					
	1.75				Medium stiff gray sandy clay	CL	9	28-29											
30	1.50						10	33-34	25	99	124	UC	--	895					
	0.75						11	38-39											
40																			
50																			

Comments: Latitude: 30° 17.014' N
Longitude: 89° 46.178' W

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

SLIDELL MEMORIAL HOSPITAL
MRI ADDITION
1001 GAUSE BOULEVARD
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 21221 **Date Drilled:** 11/11/10 **Boring:** 2 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Loose gray clayey sand w/silt pockets	SC	1	0-0.5	15										
	2.25				Very stiff tan silty clay w/gravel	CL	2	2-3											
					Stiff gray & tan clay	CH	3	5-6	22										
	1.50				Stiff light gray & tan silty clay	CL	4	8-9	23	103	127	UC	--	1119	43	13	30		
10	1.75				Very stiff brown clay w/silt pockets & vertical silt lenses	CH	5	11-12	23	102	125	UC	--	1741					
	2.00				Loose brown clayey sand w/shell fragments, roots, & gravel	SC	6	14-15	28										
	2.00				Stiff gray & tan clay w/silt pockets	CH	7	18-19	18	104	122	UC	--	1729					
20																			
30																			
40																			
50																			

Comments: Latitude: 30° 17.016' N
Longitude: 89° 46.183' W

LOG OF BORING AND TEST RESULTS

EUSTIS ENGINEERING SINCE 1946

City of Slidell
Drainage and Roadway Project
Box Culverts, South Magnolia Street
and North Carnation Street
Slidell, Louisiana

Boring: B-1

Project No: 23617
Date: 07/20/2017
Latitude: 30.28588°
Longitude: -89.78373°
Water Depth: See Text
Total Depth: 30.0 ft

Scale in Feet	PP	SPT	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			6" Asphalt		NS	0	19										
			Very soft gray & tan silty clay w/few roots	CL	PB-1	0.5											
			Medium stiff tan & light gray silty clay w/trace of decayed wood	CL	2	2	21	104	126	UC	--	483	29	13	16		
			Medium stiff light gray & tan silty clay w/trace of roots	CL													
5	1.25				3	5	21	101	123	UC	--	786					
			Stiff light gray & tan silty clay w/trace of concretions	CL													
	1.25				4	8											
10	0.75				5	11	22	100	122	UC	--	1315					
15	1.00		w/silt pockets & trace of clay lenses		6	14	30	93	121	UC	--	1171					
			Stiff light gray & tan clay w/silty sand pockets (flocculated)	CH													
20	3.00				7	18	33	89	119	UC	--	1202					
			Stiff tan & gray clay w/few concretions (fissured, flocculated)	CH													
25	1.75				8	23	37	85	116	UC	--	1273					
			Very stiff tan & gray clay	CH													
30	2.50				9	28											
35																	
40																	
45																	
50																	

NOTES: South Magnolia Street Site

EUSTIS GINT LIBRARY012017.GLB EE STANDARD BORING LOG 23617.GPJ 8/18/17

LOG OF BORING AND TEST RESULTS

EUSTIS ENGINEERING SINCE 1946

City of Slidell
Drainage and Roadway Project
Box Culverts, South Magnolia Street and North Carnation Street
Slidell, Louisiana

Boring: B-2

Project No: 23617
Date: 07/20/2016
Latitude: 30.29650°
Longitude: -89.78263°

Water Depth: See Text
Total Depth: 30.0 ft

PP	SPT	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
		6" Asphalt		NS	0	6										
		Soft to medium stiff gray silty clay w/gravel & recycled asphalt (fill)	CL	PB-1	0.5											
3.50				2	2	17	113	132	UC	--	2049					
		Very stiff gray silty clay w/trace of organic matter	CL													
0.75		Soft light gray silty clay w/trace of organic matter	CL	3	5	20	106	128	UC	--	366					
		Medium stiff to stiff gray & tan silty clay w/few concretions (brittle)	CL													
3.00				4	8	26	99	125	UC	--	721					
2.00				5	11											
		Medium stiff light gray & tan clay w/few silt pockets (flocculated)	CH													
1.00				6	14	37	81	110	UC	--	855					
		Medium stiff gray & tan clay w/few silt pockets (fissured, flocculated)	CH													
0.75				7	18	41	76	107	UC	--	955					
		Very stiff gray & tan clay w/silt layers (flocculated)	CH													
2.00				8	23											
		Stiff light gray silty clay (brittle)	CL													
0.50				9	28	19	107	128	UC	--	1187					

Scale in Feet: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50

EUSTIS GINT LIBRARY012017.GLB EE STANDARD BORING LOG 23617.GPJ 8/18/17

NOTES: North Carnation Street Site

LOG OF BORING AND TEST RESULTS

EUSTIS ENGINEERING SINCE 1946

City of Slidell
Drainage and Roadway Project
Ridgecrest Drive and Fremaux Avenue
Slidell, Louisiana

Boring: B-1

Project No: 23621
Date: 07/20/2017
Latitude: 30.27827°
Longitude: -89.76492°

Water Depth: See Text
Total Depth: 12.0 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
0					4" Concrete		NS	0											
					Medium stiff light brown & gray silty clay w/trace of concretions	CL	NS	0.33											
							1	1.33	19	110	131	UC	--	956					
	1.00																		
					Stiff light gray & tan silty clay w/wood & trace of silt pockets	CL													
5	1.50						2	4.33	20	106	127	UC	--	1383					
					Stiff tan & gray silty clay w/few silt pockets (brittle)	CL													
	2.50						3	7.33	23	104	128	UC	--	1826					
10	4.00						4	10.33											
15																			
20																			
25																			

NOTES: Ridgecrest Drive

EUSTIS GINT LIBRARY012017.GLB EE STANDARD BORING LOG 23621.GPJ 8/22/17

LOG OF BORING AND TEST RESULTS

EUSTIS ENGINEERING SINCE 1946

City of Slidell
Drainage and Roadway Project
Ridgecrest Drive and Fremaux Avenue
Slidell, Louisiana

Boring: B-2

Project No: 23621
Date: 07/20/2017
Latitude: 30.27773°
Longitude: -89.76492°

Water Depth: See Text
Total Depth: 12.0 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	ϕ	C psf	Atterberg Limits LL	PL	PI		Other Tests
0					4.5" Concrete		NS	0											
	1.50				Stiff tan & light gray silty clay w/trace of concretions	CL	1	0.375	19	107	127	UC	--	1940					
	2.50				Very stiff reddish-tan & gray silty clay w/trace of silt pockets & concretions	CL	2	2.375	19	111	132	UC	--	2601					
5							3	4.375											
	2.75				Very stiff tan & light gray silty clay w/clay pockets	CL													
	2.50						4	7.375	24	102	127	UC	--	2172					
10	2.50						5	10.375											
15																			
20																			
25																			

NOTES: Ridgecrest Drive

EUSTIS GINT LIBRARY012017.GLB EE STANDARD BORING LOG 23621.GPJ 8/22/17

EUSTIS ENGINEERING SINCE 1946

City of Slidell
Drainage and Roadway Project
Ridgecrest Drive and Fremaux Avenue
Slidell, Louisiana

LOG OF BORING AND TEST RESULTS

Boring: B-3

Project No: 23621
Date: 07/20/2017
Latitude: 30.27757°
Longitude: -89.76320°

Water Depth: See Text
Total Depth: 12.0 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
0					5.5" Asphalt w/1" of sand/gravel subbase		NS	0											
					Medium compact dark gray clayey silt w/fine sand & trace organic matter	ML	NS	0.54											
	4.50						1	1.54	20										-#200 = 72.6%
					Stiff light gray & tan silty clay w/silt pockets (brittle)	CL													
5	2.00						2	4.54	19	109	130	UC	--	1486					
					Very stiff light gray silty clay	CL													
	2.50						3	7.54	19	107	128	UC	--	2092					
10																			
	3.50						4	10.54											
15																			
20																			
25																			

EUSTIS GINT LIBRARY012017.GLB EE STANDARD BORING LOG 23621.GPJ 8/22/17

NOTES: Fremaux Avenue

WEST SLIDELL RING LEVEE HISTORICAL BORING DATA

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

LOG OF BORING

Name of Project: City of Slidell
Dellwood Drainage Improvements, St. Tammany Parish, Louisiana

For: City of Slidell, Department of Engineering, St. Tammany Parish, Louisiana

Boring No. ______ Soil Technician A. Croal, Jr. Date 15 January 1985

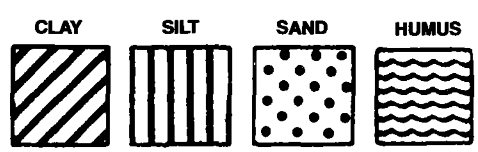
Ground Elev. ______ Datum ______ Gr. Water Depth ______

Sample No.	SAMPLE Depth — Feet From	SAMPLE Depth — Feet To	DEPTH STRATUM Feet From	DEPTH STRATUM Feet To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
					BORING 1		
			0.0	1.0	Water		
1	1.0	1.5	1.0		Very soft tan & gray clay w/silt lenses		
2	1.5	2.0		2.0	Soft tan & gray clay		
3	2.0	2.5	2.0		Medium stiff gray & tan clay		
4	3.0	3.5			Medium stiff gray & tan clay w/silty clay layers & pockets		
5	5.0	5.5		5.5	Medium stiff gray & tan clay w/clayey silt lenses		
					BORING 2		
			0.0	1.0	Water		
1	1.0	1.5	1.0	1.5	Very soft gray & tan clay w/silt pockets, shell fragments & few roots		
2	1.5	2.0	1.5	2.5	Soft gray & tan clay		
3	3.0	3.5	2.5	4.0	Stiff gray & tan silty clay w/trace of organic matter		
4	4.0	4.5	4.0	5.0	Stiff gray & tan clay w/clayey silt lenses		
5	5.0	5.5	5.0	5.5	Loose gray & tan clayey silt		

*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: ______



Predominant type shown heavy. Modifying type shown light.

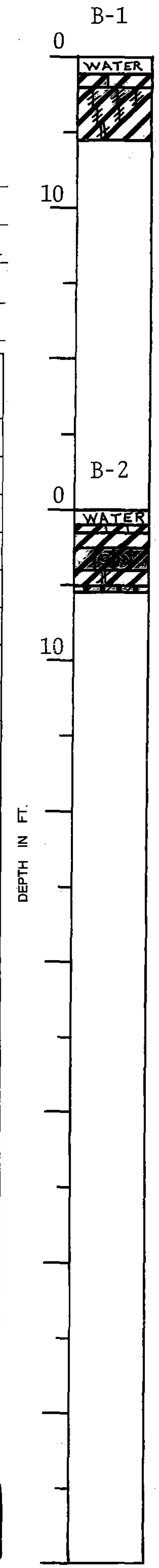


Fig. 2

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

LOG OF BORING

Name of Project: City of Slidell
Dellwood Drainage Improvements, St. Tammany Parish, Louisiana
For: City of Slidell, Department of Engineering, St. Tammany Parish, Louisiana

Boring No.______ Soil Technician A. Croal, Jr. Date 15 January 1985

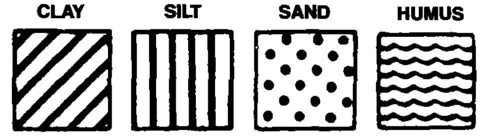
Ground Elev.______ Datum ______ Gr. Water Depth______

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
					BORING 3		
1	0.0	0.5	0.0	0.5	Extremely soft gray silty clay		
2	0.5	1.0	0.5	1.0	Stiff tan & gray clay		
3	1.0	1.5	1.0		Very stiff gray & tan silty clay		
4	2.0	2.5		3.0	Stiff gray & tan silty clay		
5	3.5	4.0	3.0		Stiff gray & tan clay w/clayey silt		
					pockets		
6	5.0	5.5		6.0	Ditto		
7	7.0	7.5	6.0	7.5	Stiff gray & tan clay w/clayey silt		
					pockets & layers		
					BORING 4		
			0.0	0.2	Extremely soft gray silty clay w/roots		
1	0.5	1.0	0.2	1.0	Medium stiff tan & gray clay w/clayey		
					silt pockets		
2	1.0	1.5	1.0	2.0	Stiff gray & tan silty clay		
3	2.0	2.5	2.0		Ditto		
4	3.5	4.0			Stiff gray & tan clay w/silt lenses &		
					pockets		
5	5.5	6.0		7.0	Stiff gray & tan clay		
6	7.5	8.0	7.0	8.5	Very stiff gray & tan clay w/clayey		
					silt lenses		
7	9.5	10.0	8.5	10.0	Stiff gray & tan clay		

*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: ______



Predominant type shown heavy. Modifying type shown light.

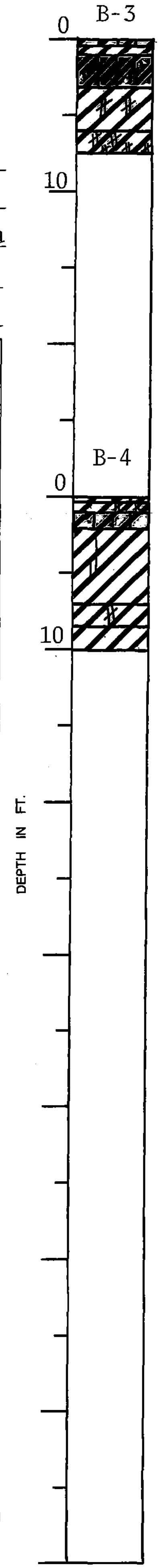


Fig. 3

B-5

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

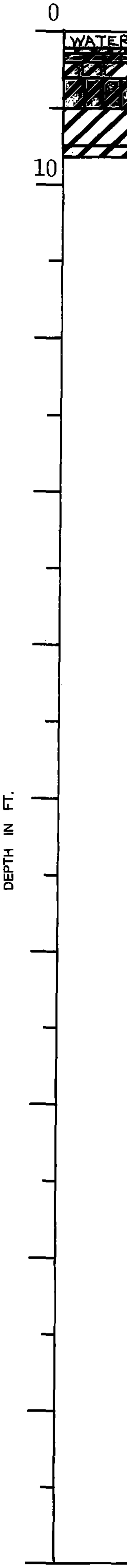
LOG OF BORING

Name of Project: City of Slidell
Dellwood Drainage Improvements, St. Tammany Parish, Louisiana
For: City of Slidell, Department of Engineering, St. Tammany Parish, Louisiana

Boring No. ________ Soil Technician A. Croal, Jr. Date 15 January 1985

Ground Elev. ________ Datum ________ Gr. Water Depth ________

Sample No.	SAMPLE Depth — Feet		DEPTH STRATUM Feet		VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
	From	To	From	To			
					BORING 5		
			0.0	1.0	Water		
1	1.0	1.2	1.0	1.2	Extremely loose gray clayey silt		
2	1.2	1.7	1.2	2.0	Medium stiff gray & tan silty clay		
3	2.0	2.5	2.0	3.0	Very stiff gray & tan clay w/clayey		
					silt pockets		
4	3.5	4.0	3.0	5.0	Stiff gray & tan silty clay		
5	5.5	6.0	5.0	7.5	Stiff gray & tan clay		
6	7.5	8.0	7.5	8.0	Very stiff gray & tan clay		



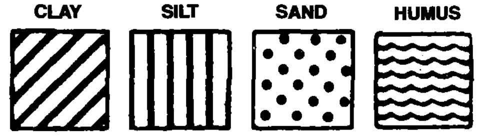
DEPTH IN FT.

*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: ________

CLAY SILT SAND HUMUS



Predominant type shown heavy. Modifying type shown light.

Fig. 4

Geotechnical Investigation
City of Slidell
Dellwood Drainage Improvements
St. Tammany Parish, Louisiana

For: City of Slidell, Department of Engineering, St. Tammany Parish, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

Sample No.	Depth In Feet	Classification	Water Content Percent	Density PCF Dry	Density PCF Wet	Unconfined Compressive Strength PSF
BORING 1						
1	1.0	Very soft tan & gray clay w/silt lenses & pockets	35.0	88.3	119.1	345
4	3.0	Medium stiff gray & tan clay w/silty clay layers & pockets	31.4	93.6	122.9	1125
BORING 2						
1	1.0	Very soft gray & tan clay w/silt pockets, shell fragments & few roots	29.9	----	-----	----
3	3.0	Stiff gray & tan silty clay w/trace of organic matter	24.1	102.6	127.4	2610
BORING 3						
3	1.0	Very stiff gray & tan silty clay	21.5	108.5	131.8	4380
BORING 4						
2	1.0	Stiff gray & tan silty clay	22.2	106.8	130.5	2410
4	3.5	Stiff gray & tan clay w/silt lenses & pockets	24.7	102.6	128.0	3025
BORING 5						
2	1.2	Medium stiff gray & tan silty clay	22.3	105.3	128.8	1965
4	3.5	Stiff gray & tan silty clay	23.1	105.5	129.8	2980

Fig. 5

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

DELWOOD PUMPING STATION
FRONT STREET
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 13965 **Date Drilled:** 3/27/96 **Boring:** 1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	φ	C	LL	PL	PI		
0					Loose dark gray & tan clayey silt w/silty clay layers, shells & roots	ML	1	0-0.5											
	2.80				Very stiff tan & gray silty clay w/clay layers, shells & roots	CL	2	2-3	17									DIST.	
					Loose tan fine sand w/clayey sand pockets	SP	3	5-6											
10	2.10				Stiff gray & tan silty clay w/clayey silt layers	CL	4	8-9	21	105	126	UC	--	1600	43				
					Medium stiff gray & tan silty clay w/clayey silt layers	CL	5	11-12	28	94	121	OB	--	580					
	1.60				Stiff tan & gray clay w/clayey silt lenses	CH	6	14-15	45	76	111	OB	--	345					
20	1.60						7	18-19	35						74				
	1.50				Medium stiff gray & tan clay w/shell fragments & fissures	CH	8	23-24	50	72	107	OB	--	630					
30					Loose gray clayey sand w/shell fragments	SC	9	28-29	26										
	0.40				Soft gray clay w/silty sand layers, pockets & concretions	CH	10	33-34	40	82	114	O8	--	345					
40	0.60				Medium stiff gray clay w/clayey silt lenses & shell fragments	CH	11	38-39	48	73	108	UC	--	580					
	0.60				w/shell fragments		12	43-44	48	74	109	UC	--	445					
50					Medium compact gray clayey silt w/shell	ML	13	48-49											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

DELWOOD PUMPING STATION
FRONT STREET
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 13965 **Date Drilled:** 3/27/96 **Boring:** 1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium compact gray clayey silt w/shell fragments	ML													
	1.80				Stiff greenish-gray clay w/clayey silt pockets & shell fragments	CH	14	53-54	33	88	117	OB	--	955					
	1.60				w/fissures & shell fragments		15	58-59	35	85	115	OB	--	1105					
60																			
					Loose gray clayey sand	SC	16	62-63											
	0.60				Medium stiff brown & gray clay w/organic matter & fissures	CH	17	64-65	64	60	99	OB	--	515					
	0.90						18	68-69	71	57	97	OB	--	805					
70																			
	1.80				Stiff greenish-gray clay w/silt pockets	CH	19	73-74	30	92	119	OB	--	2225					
	2.70				Stiff greenish-gray & tan clay w/fissures	CH	20	78-79	44	76	110	OB	--	835					
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

FEMA PROJECT
RESIDENCE
3045 SOUTH PALM DRIVE
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 16850 **Date Drilled:** 2/07/01 **Boring:** 1 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0	0.50				Soft gray silty clay w/sand layers	CL	1	0-0.5											
	0.50				Medium stiff light gray clay w/silty sand lenses	CH	2	2-3	24	97	120	UC	--	900					
	0.50				Soft light gray & tan clay w/silty sand lenses	CH	3	5-6	30	89	116	UC	--	335					
	0.50				Medium stiff light gray & tan clay w/silty sand pockets & lenses	CH	4	8-9	30	92	119	UC	--	870					
10	1.00				Stiff gray clay w/sand pockets & lenses	CH	5	11-12											
	0.50				Medium stiff light gray clay w/silty sand lenses & pockets	CH	6	14-15	26	98	123	UC	--	1370					
	1.50				Stiff light gray & tan clay w/silty sand lenses & pockets	CH	7	18-19	26	97	123	UC	--	1710					
20	2.00				Very stiff gray clay w/sand lenses & pockets	CH	8	23-24											
	0.50				Soft gray sandy clay w/sand lenses	CL	9	28-29	34	88	118	UC	--	475					
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

FEMA PROJECT
RESIDENCE
3045 SOUTH PALM DRIVE
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 16850 **Date Drilled:** 2/07/01 **Boring:** 2 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Soft brown sandy clay w/roots & organic matter	CL	1	0-0.5											
					Stiff tan sandy clay w/silt	CL	2	2-3	23						27	13	14		
					Stiff tan clay w/silt layers	CH	3	5-6											
					Very stiff tan & gray sandy clay w/silty clay layers	CL	4	9-10											
10																			
20																			
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

SCHUTTEN RESIDENCE
3042 NORTH PALM DRIVE
SLIDELL, LOUISIANA

(Sheet 1 of 1)

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 16870 **Date Drilled:** 2/23/01 **Boring:** 1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	φ	C	LL	PL	PI		
0					Soft brown silty clay w/sand lenses & roots	CL	1	0-0.5	29										
	4.00				Stiff tan, gray, & orange clay w/sandy clay layers & silt pockets	CH	2	2-3	28	99	127	UC	--	1380	67	17	50		
	1.50				Medium stiff greenish-gray clay w/sand pockets	CH	3	5-6	27	95	120	UC	--	680					
	1.50				Soft gray & tan clay w/sand pockets & lenses	CH	4	8-9	23	100	123	UC	--	490					
10	1.25				Medium stiff greenish-gray & orange clay w/silt lenses & pockets	CH	5	11-12	31	90	118	UC	--	450					
	2.00				Medium stiff greenish-gray sandy clay	CL	6	14-15	22	99	121	UC	--	690					
		24			Medium dense gray sand	SP	7	18-19											
20		21			Medium dense gray & brown sand		8	22-23											
		50=9"			Very dense gray & brown sand	SP	9	25-26											
		50=7"					10	29-30											
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

SCHUTTEN RESIDENCE
3042 NORTH PALM DRIVE
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 16870 **Date Drilled:** 3/02/01 **Boring:** 2 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	φ	C	LL	PL	PI		
0					Loose brown clayey sand	SC	1	0-1	15										
					Medium stiff gray & tan silty clay w/shell fragments	CL	2	2-3	21										
							3	4-5	21										
					Stiff gray & brown silty clay w/shell fragments	CL	4	7-8	29										
10							5	9-10											
20																			
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

LATUSO RESIDENCE
3032 NORTH PALM DRIVE
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 16877 **Date Drilled:** 3/02/01 **Boring:** 1 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	φ	C	LL	PL	PI		
0					Very soft brown silty clay w/roots	CL	1	0-0.5											
	2.25				Stiff gray & tan silty clay w/roots & sand pockets	CL	2	2-3	22	103	125	UC	--	1125	49	13	36		
	2.00				Medium stiff gray, tan, & red silty clay w/gravel	CL	3	5-6	27	95	120	UC	--	895					
	0.75				Soft gray, tan, & orange silty clay w/sand pockets	CL	4	8-9	31	89	117	UC	--	230					
10	2.50				Medium stiff gray & tan clay w/silt lenses	CH	5	11-12	30	92	120	UC	--	865					
					Stiff gray sandy clay	CL	6	14-15	22	103	125	OB	--	1085					
					Medium dense gray sand	SP	7	18-19											
20		38			Dense gray sand	SP	8	20-21											
		42					9	23-24											
		48					10	26-27											
30		50=10"			Very dense gray & tan sand	SP	11	29-30											
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

LATUSO RESIDENCE
3032 NORTH PALM DRIVE
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 16877 **Date Drilled:** 3/02/01 **Boring:** 2 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	φ	C	LL	PL	PI		
0					Soft brown silty clay w/sand lenses	CL	1	0-1	21										
					Loose gray & tan clayey silt w/sand lenses & roots	ML	2	2-3	20	98	118	O8	--	350					
					Medium stiff tan & gray sandy clay w/trace of organic matter	CL	3	4-5	23	99	122	UC	--	880					
							4	7-8	25	97	121	O8	--	620					
10							5	9-10											
20																			
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RESIDENCE OF VINCENT CARUSO
3030 NORTH PALM DRIVE
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17026 **Date Drilled:** 7/09/01 **Boring:** 1 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits			Percent Saturation	Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Loose brown sandy silt w/roots	ML	1	0-0.5											
	3.25				Extremely stiff tan & gray clay w/silt pockets & roots	CH	2	2-3	17	113	133	UC	--	4970	59	14	45	94	SP
					Medium stiff tan & gray silty clay w/sand layers	CL	3	4-5	30	94	122	UC	--	730				100	
	1.75	8			Medium dense gray sand	SP	4	6-7											
		7					5	9-10											
10					Medium stiff gray clay w/silt lenses	CH													
	1.25						6	11-12	31	92	120	UC	--	975				97	
	2.00				Stiff light gray clay w/silty sand pockets & lenses	CH	7	14-15	28	97	124	UC	--	1170				100	
					Medium dense tan & gray fine sand w/clayey sand layers	SP	8	17-18											
20																			
		11					9	21-22	28										
		21					10	24-25											
		29					11	26-27	26										
		35			Dense light gray fine sand	SP	12	29-30	26										
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RESIDENCE OF DUDLEY SMITH
3071 SOUTH PALM DRIVE
SLIDELL, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17064 **Date Drilled:** 7/25-26/01 **Boring:** 1 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0		5			2" Concrete														
					Medium stiff gray & tan silty clay w/sand layers	CL	1	1-2	28										
	0.25					CH	2	3-4	30	91	119	UC	--	265					
					Soft gray clay w/concretions & silt pockets & lenses	CL	3	5-6	33	88	117	UC	--	225					
					Very soft tan & gray silty clay w/sand pockets, concretions & clay layers	CL	4	8-9	30	93	121	UC	--	320					
10					Soft greenish-gray silty clay w/sand lenses & clay layers	CL													
	0.65				Medium stiff light gray silty clay w/sand lenses & clayey silt layers		5	11-12	25	100	125	UC	--	840					
	1.15						6	14-15											
	1.50				Stiff light gray silty clay w/concretions & clayey silt layers	CL	7	18-19	26	98	123	UC	--	1025					
20																			
	1.50				w/sand pockets & lenses		8	23-24											
					Loose gray clayey sand w/alternating clay layers & lenses	SC	9	28-29											
30																			
40																			
50																			

Comments:

APPENDIX II

EUSTIS
ENGINEERING
SINCE 1946

CONE PENETRATION
SOIL BEHAVIOR TYPE LEGEND

1 - SENSITIVE FINE GRAINED

2 - ORGANIC MATERIAL

3 - CLAY

4 - SILTY CLAY TO CLAY

5 - CLAYEY SILT TO SILTY CLAY

6 - SANDY SILT TO CLAYEY SILT

7 - SILTY SAND TO SANDY SILT

8 - SAND TO SILTY SAND

9 - SAND

10 - GRAVELLY SAND TO SAND

11 - VERY STIFF FINE GRAINED (*)

12 - SAND TO CLAYEY SAND (*)

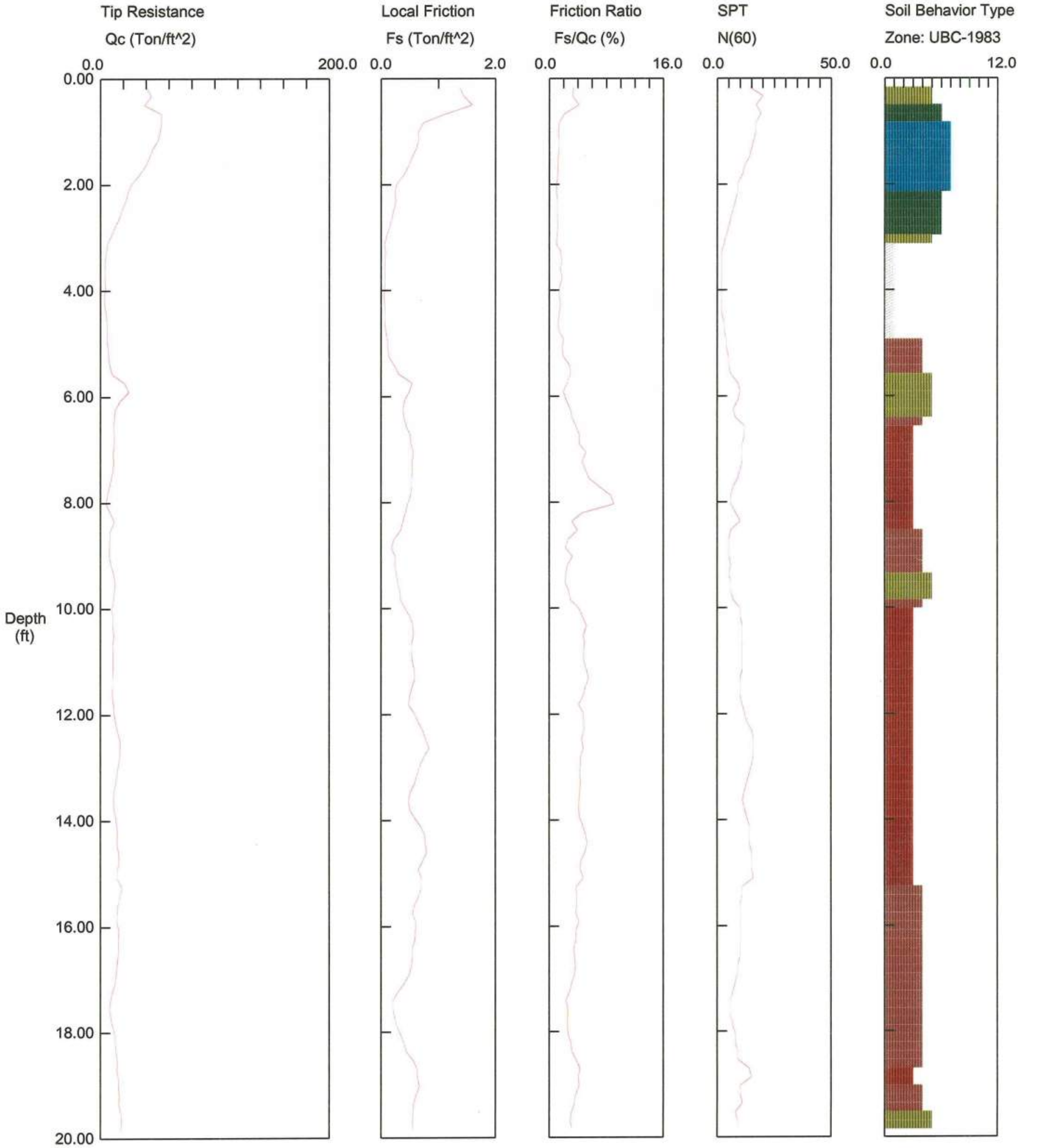
*OVERCONSOLIDATED OR CEMENTED

EDEN ISLE RING LEVEE CPT LOGS

Eustis Engineering Company

Operator: TRR & DV
Sounding: CPT1
Cone Used: 702TC

CPT Date/Time: 06-06-00 09:42
Location: EAST ST. TAMMY EVENTS CENTER
Job Number: 16484



Maximum Depth = 21.98 feet

Depth Increment = 0.16 feet

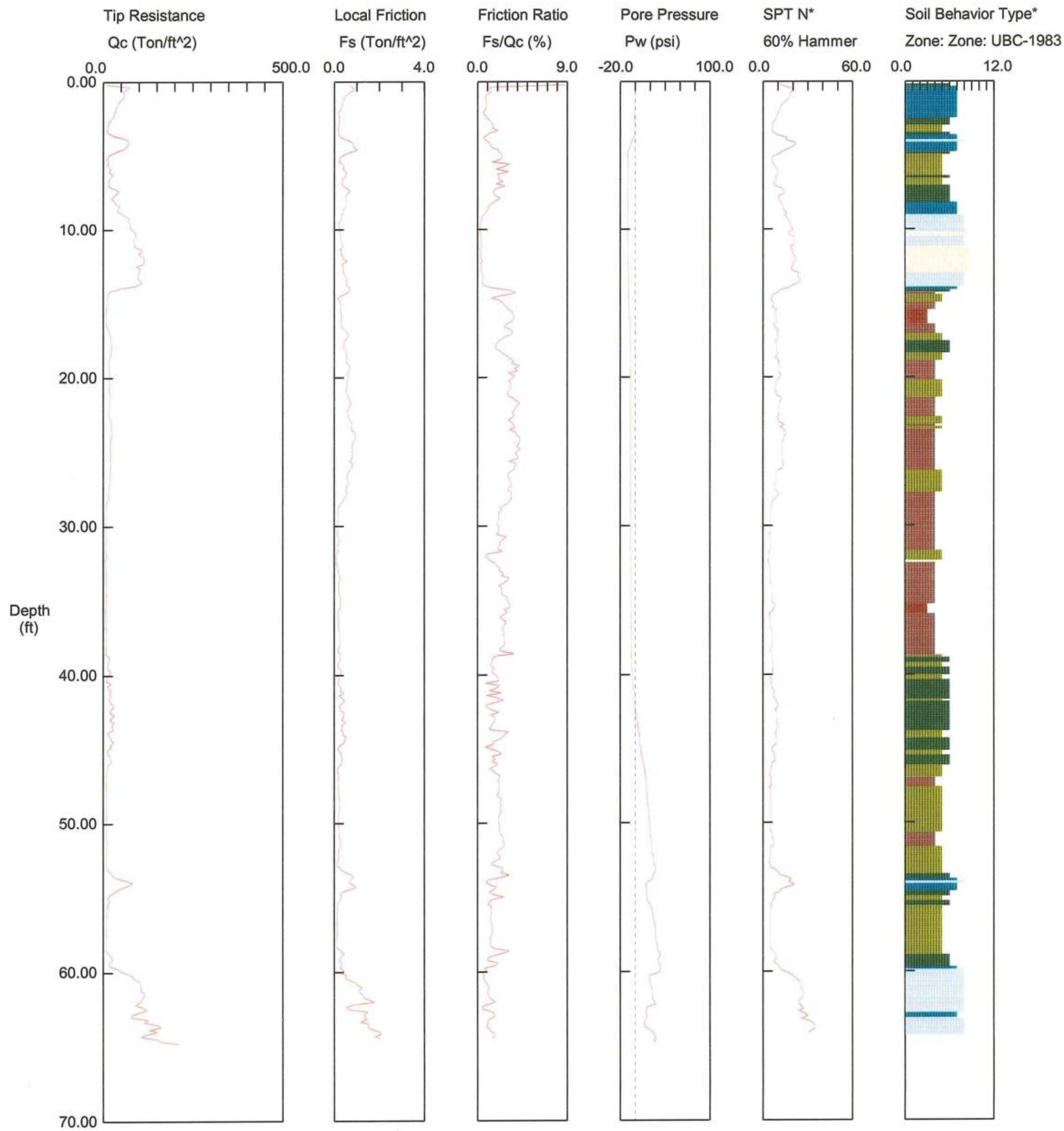
1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*Soil behavior type and SPT based on data from Zone: UBC-1983

Eustis Engineering Company

Operator: TRR & DV
Sounding: CPT2
Cone Used: 702TC

CPT Date/Time: 06-05-00 09:40
Location: EAST ST. TAMMY EVENTS CENTER
Job Number: 16484



Maximum Depth = 64.80 feet

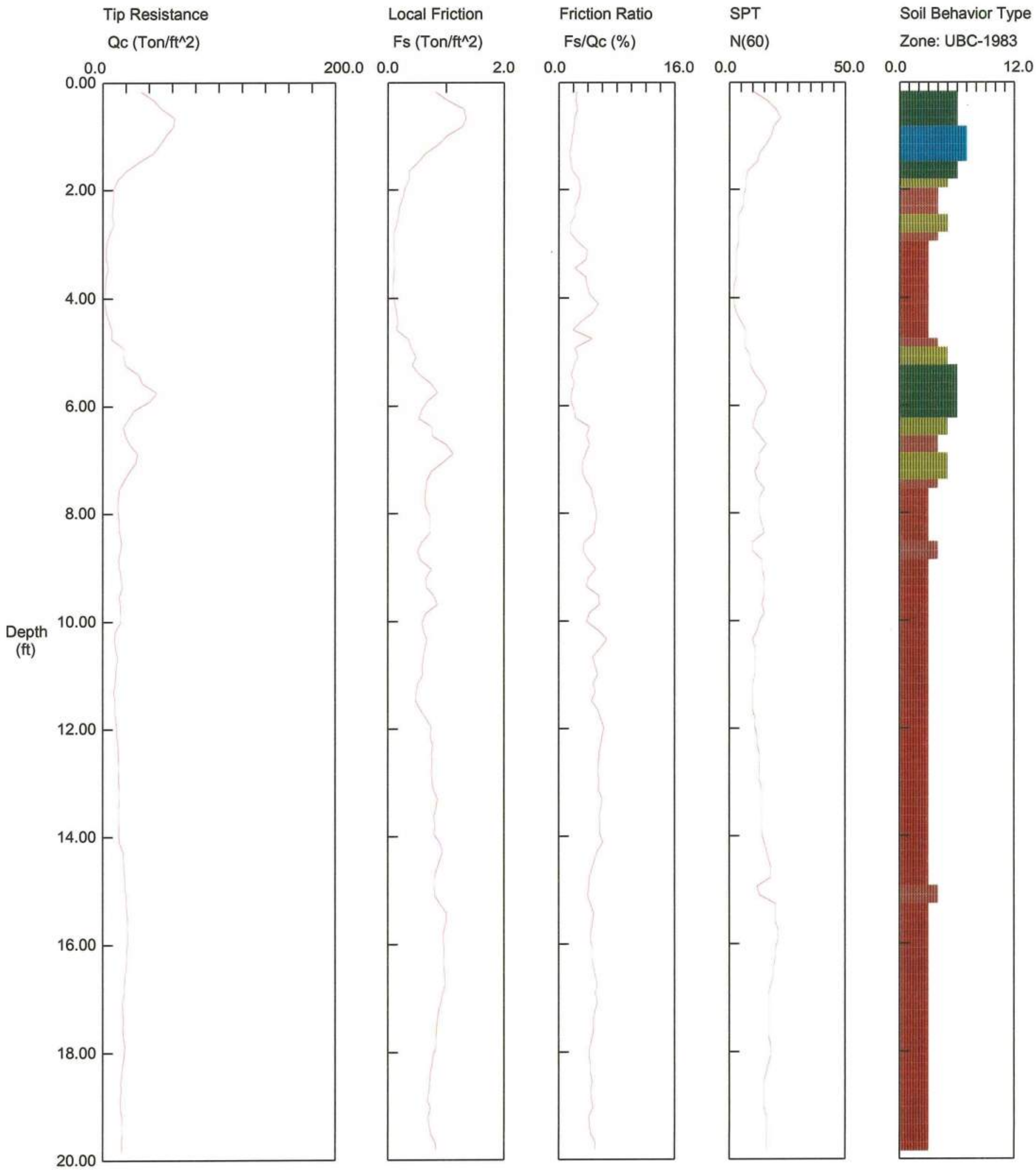
Depth Increment = 0.16 feet

1	sensitive fine grained
2	organic material
3	clay
4	silty clay to clay
5	clayey silt to silty clay
6	sandy silt to clayey silt
7	silty sand to sandy silt
8	sand to silty sand
9	sand
10	gravelly sand to sand
11	very stiff fine grained (*)
12	sand to clayey sand (*)

Eustis Engineering Company

Operator: TRR & DH
Sounding: CPT3
Cone Used: 702TC

CPT Date/Time: 06-06-00 11:18
Location: EAST ST. TAMMY EVENTS CENTER
Job Number: 16484



Maximum Depth = 21.65 feet

Depth Increment = 0.16 feet

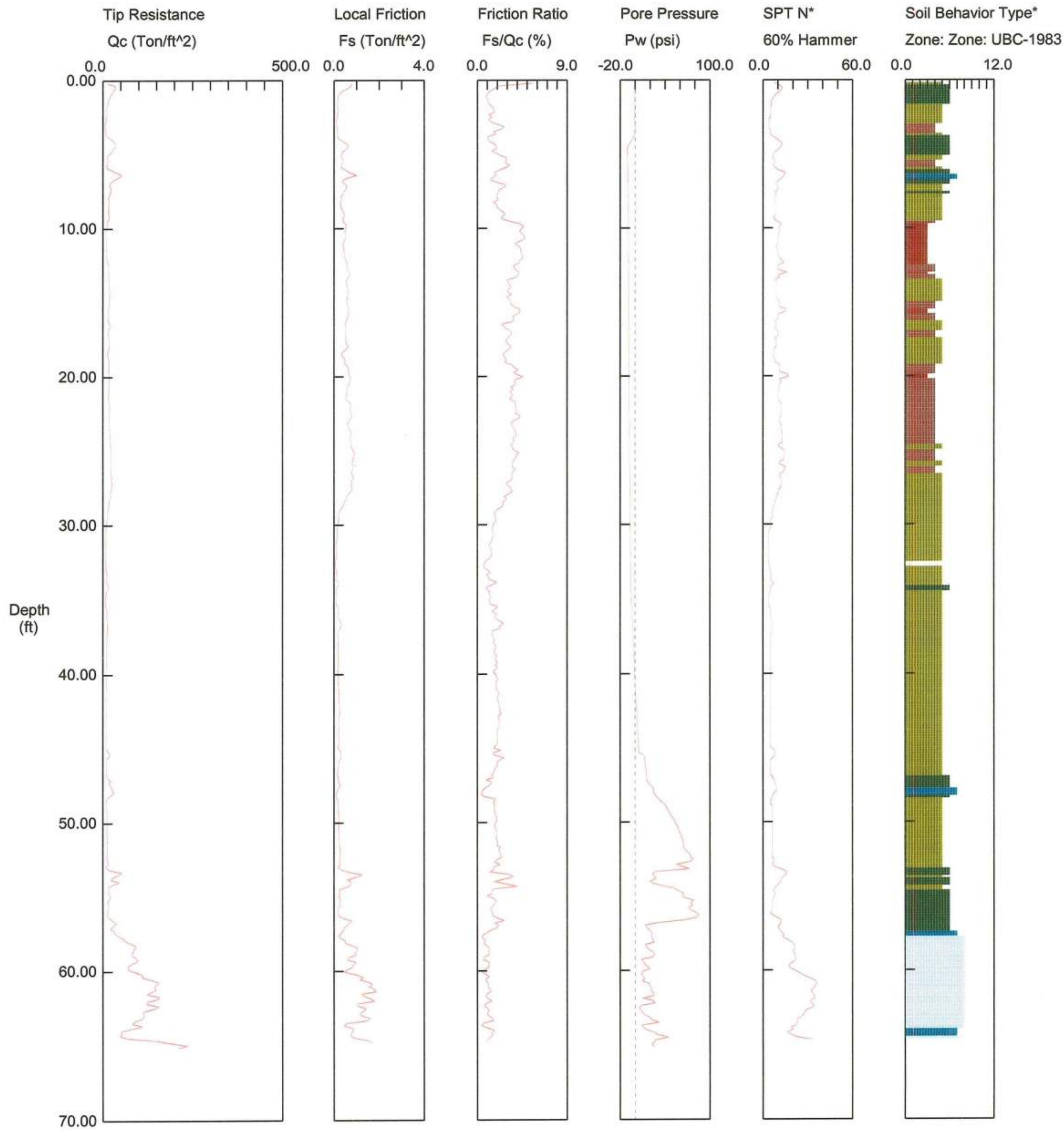
1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*Soil behavior type and SPT based on data from Zone: UBC-1983

Eustis Engineering Company

Operator: TRR & DV
Sounding: CPT4
Cone Used: 702TC

CPT Date/Time: 06-05-00 14:08
Location: EAST ST. TAMMY EVENTS CENTER
Job Number: 16484



Maximum Depth = 65.12 feet

Depth Increment = 0.16 feet

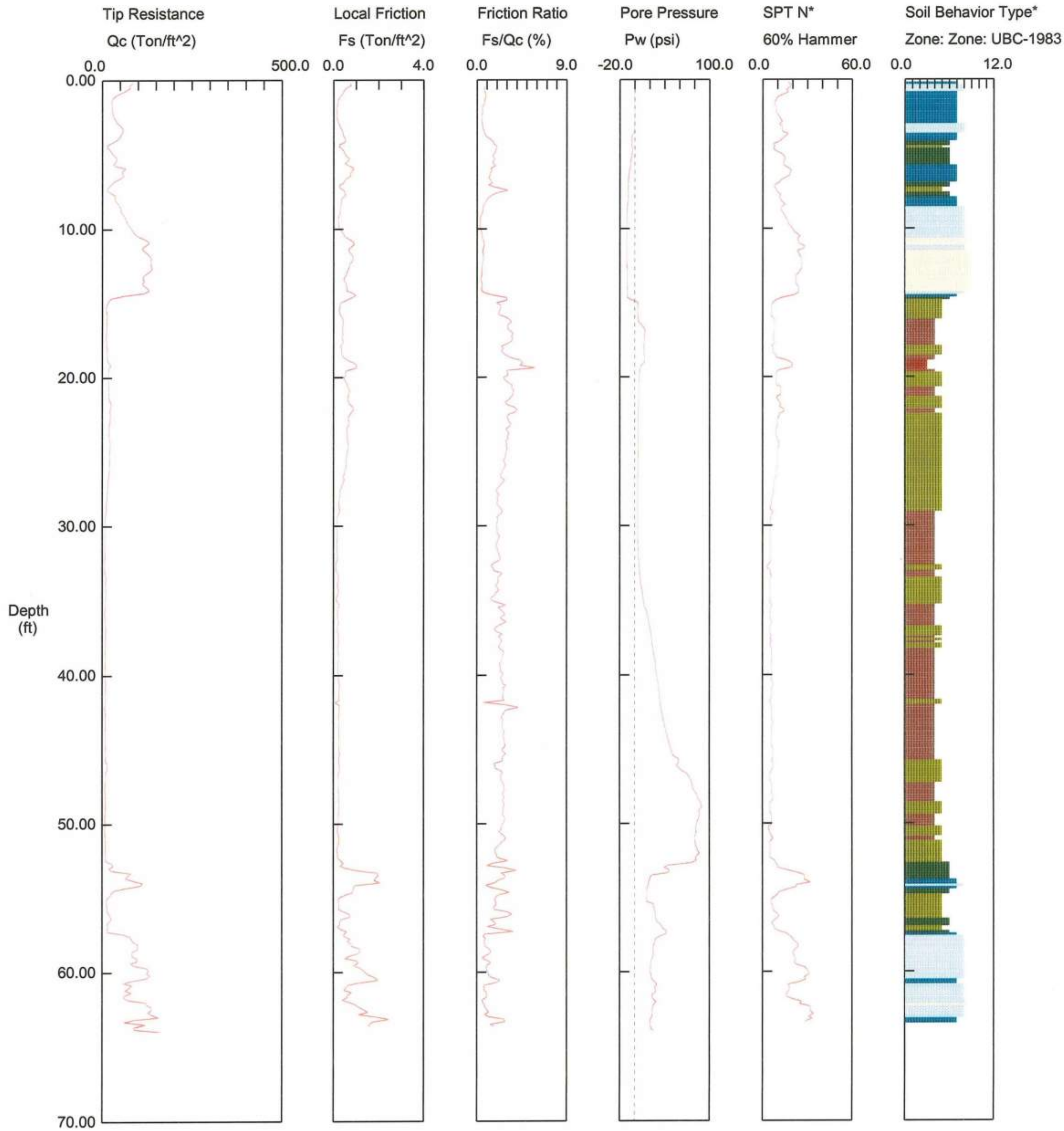
1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*Soil behavior type and SPT based on data from Zone: UBC-1983

Eustis Engineering Company

Operator: TRR & DV
Sounding: CPT5
Cone Used: 702TC

CPT Date/Time: 06-05-00 11:02
Location: EAST ST. TAMMY EVENTS CENTER
Job Number: 16484



Maximum Depth = 63.98 feet

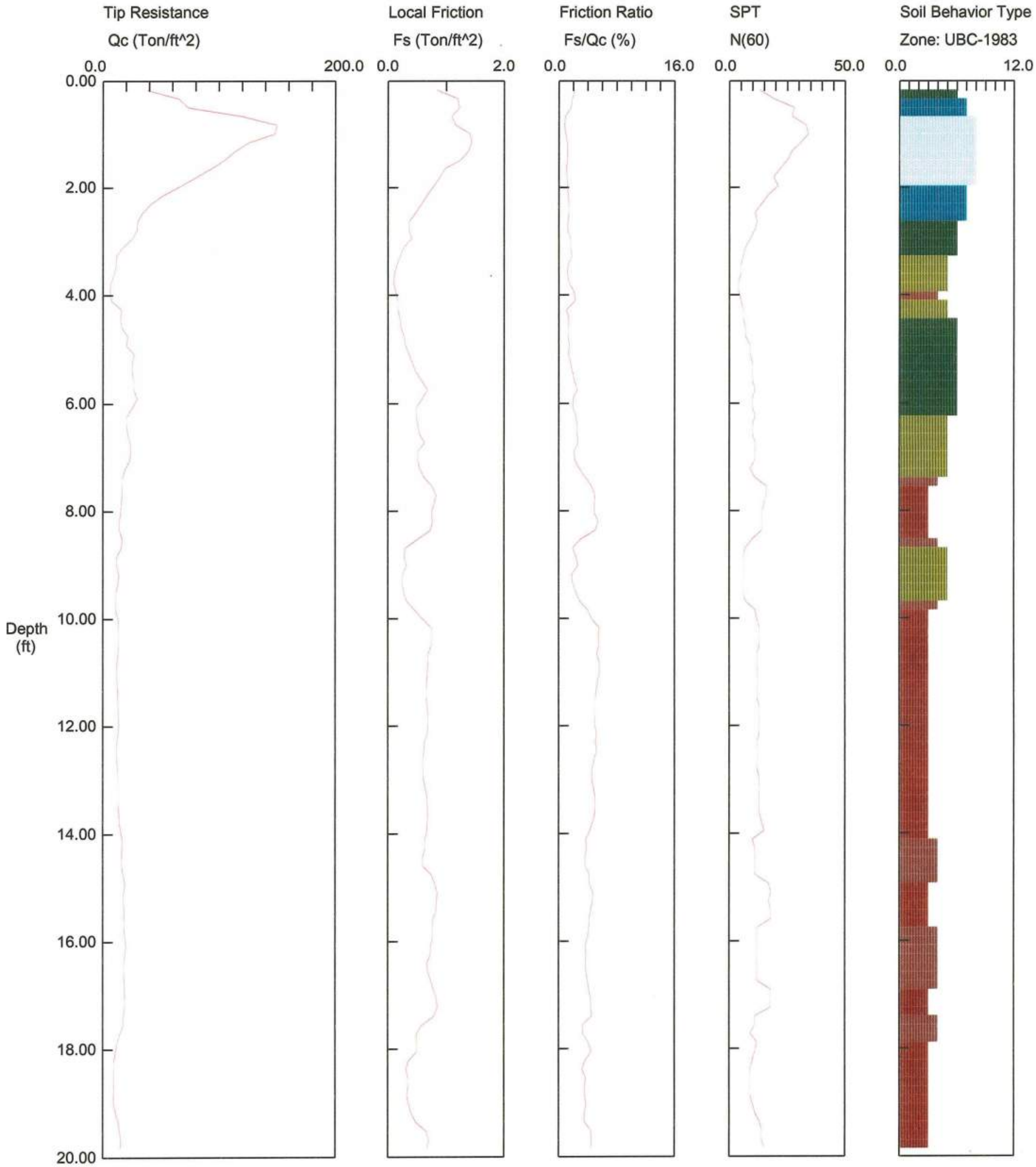
Depth Increment = 0.16 feet

1 sensitive fine grained	4 silty clay to clay	7 silty sand to sandy silt	10 gravelly sand to sand
2 organic material	5 clayey silt to silty clay	8 sand to silty sand	11 very stiff fine grained (*)
3 clay	6 sandy silt to clayey silt	9 sand	12 sand to clayey sand (*)

Eustis Engineering Company

Operator: TRR & DV
Sounding: CPT6
Cone Used: 702TC

CPT Date/Time: 06-06-00 09:05
Location: EAST ST. TAMMY EVENTS CENTER
Job Number: 16484



Maximum Depth = 21.82 feet

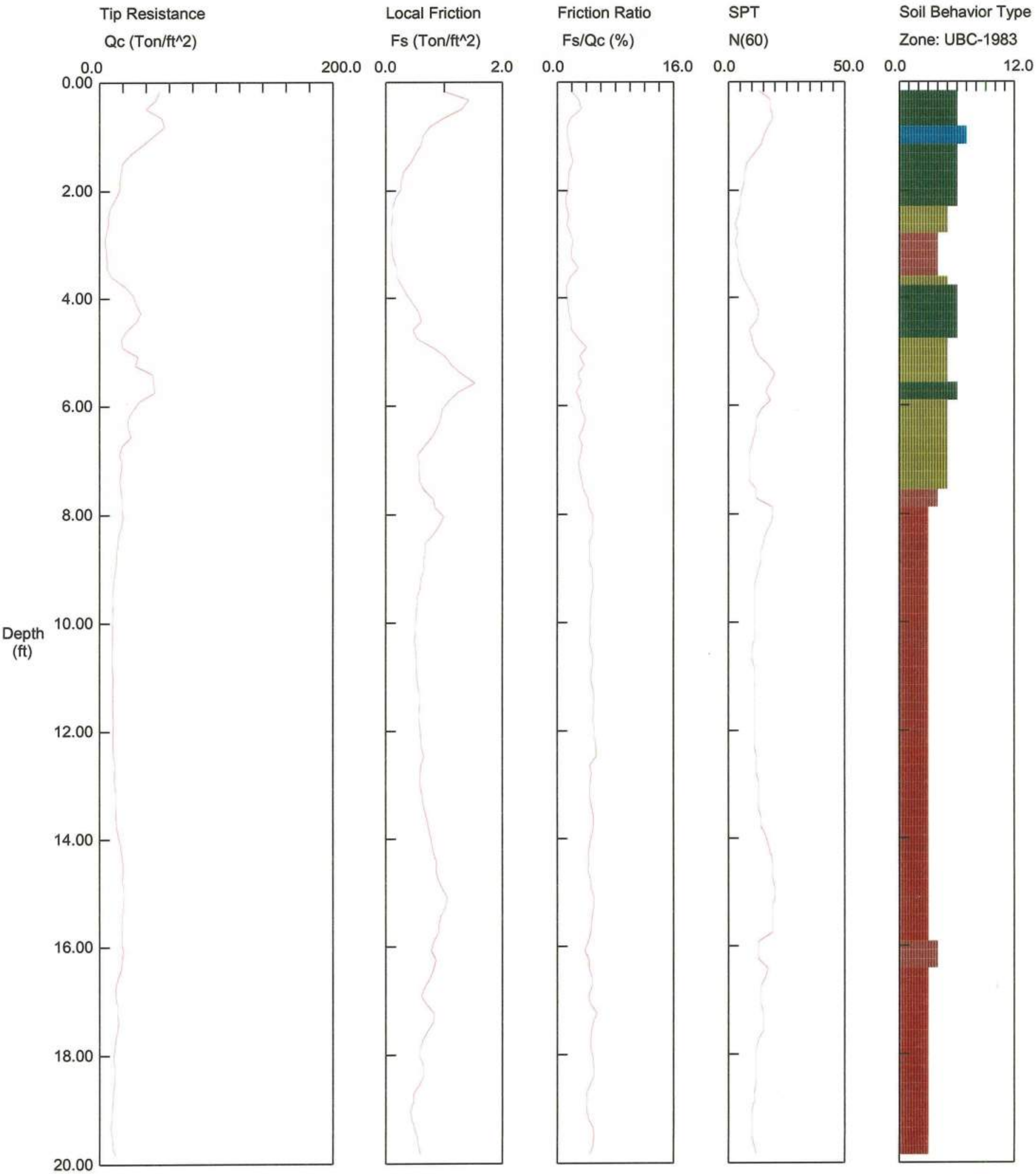
Depth Increment = 0.16 feet

1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

Eustis Engineering Company

Operator: TRR & DH
Sounding: CPT7
Cone Used: 702TC

CPT Date/Time: 06-06-00 10:15
Location: EAST ST. TAMMY EVENTS CENTER
Job Number: 16484



Maximum Depth = 21.98 feet

Depth Increment = 0.16 feet

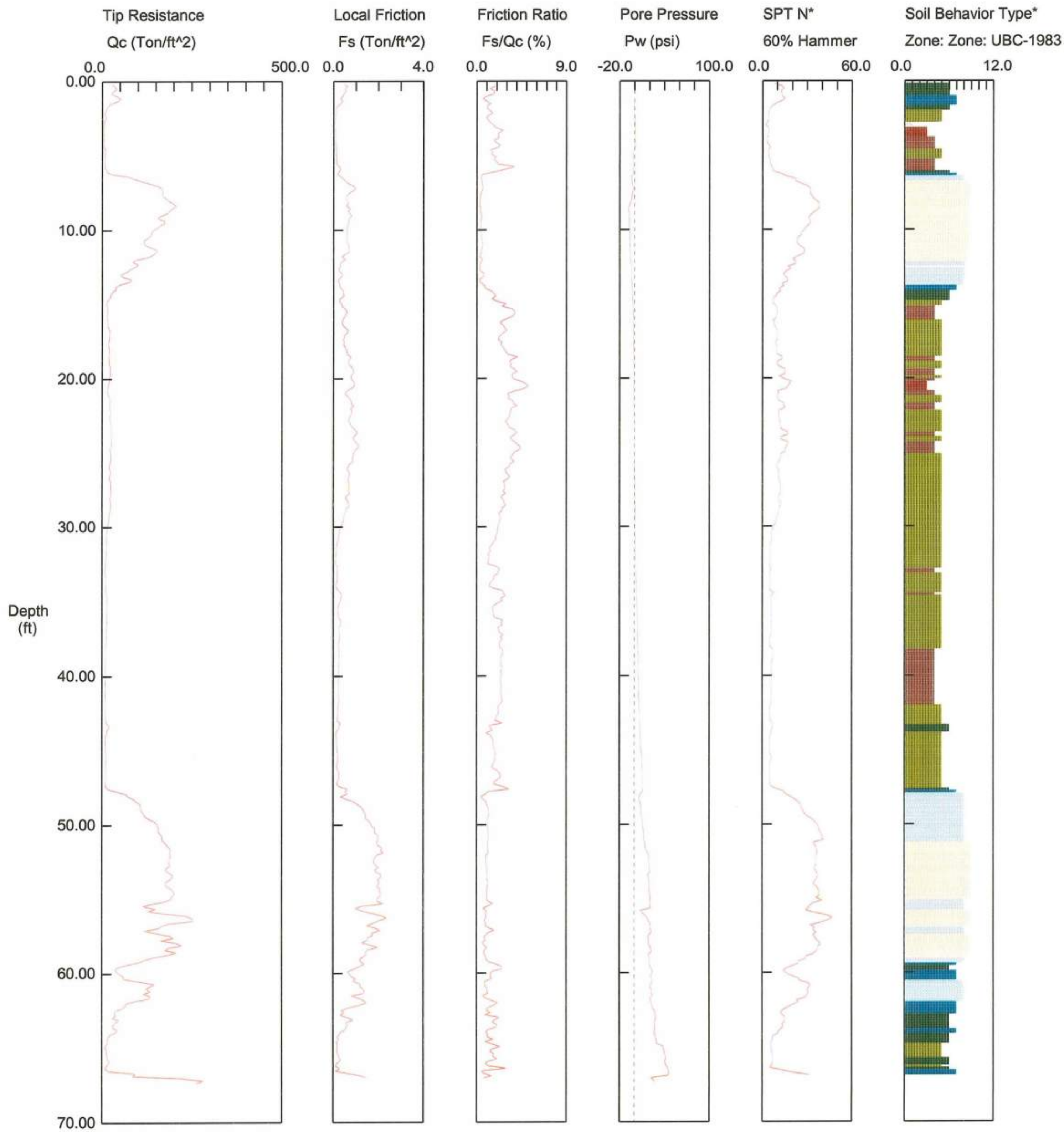
1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*Soil behavior type and SPT based on data from Zone: UBC-1983

Eustis Engineering Company

Operator: TRR & DV
Sounding: CPT11
Cone Used: 702TC

CPT Date/Time: 06-05-00 14:55
Location: EAST ST. TAMMY EVENTS CENTER
Job Number: 16484



Maximum Depth = 67.42 feet

Depth Increment = 0.16 feet

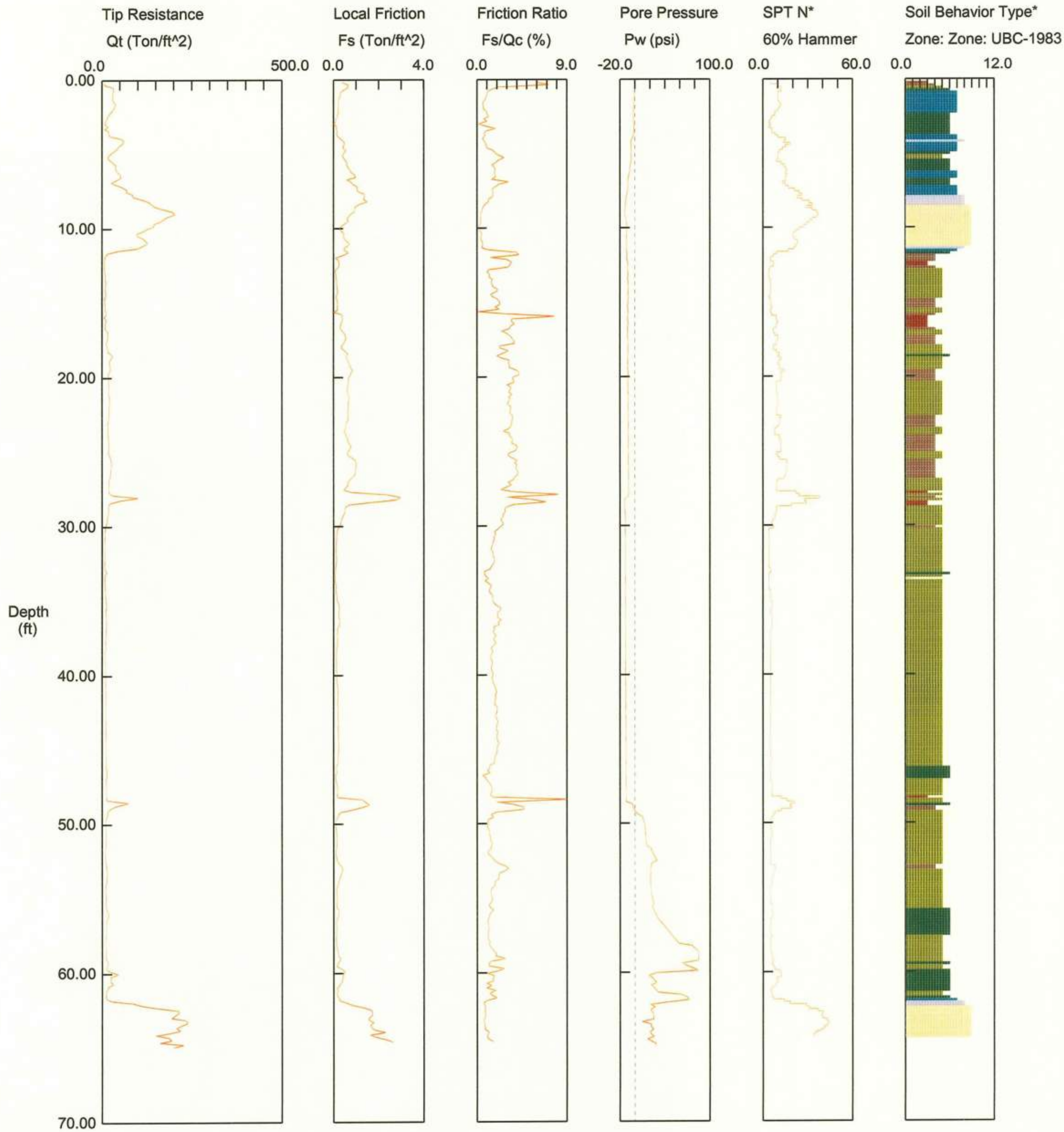
1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*Soil behavior type and SPT based on data from Zone: UBC-1983

Eustis Engineering Company

Operator: TRR & DV
Sounding: C12
Cone Used: 702TC

CPT Date/Time: 06-05-00 12:55
Location: Slidell
Job Number: 16484



Maximum Depth = 64.96 feet

Depth Increment = 0.16 feet

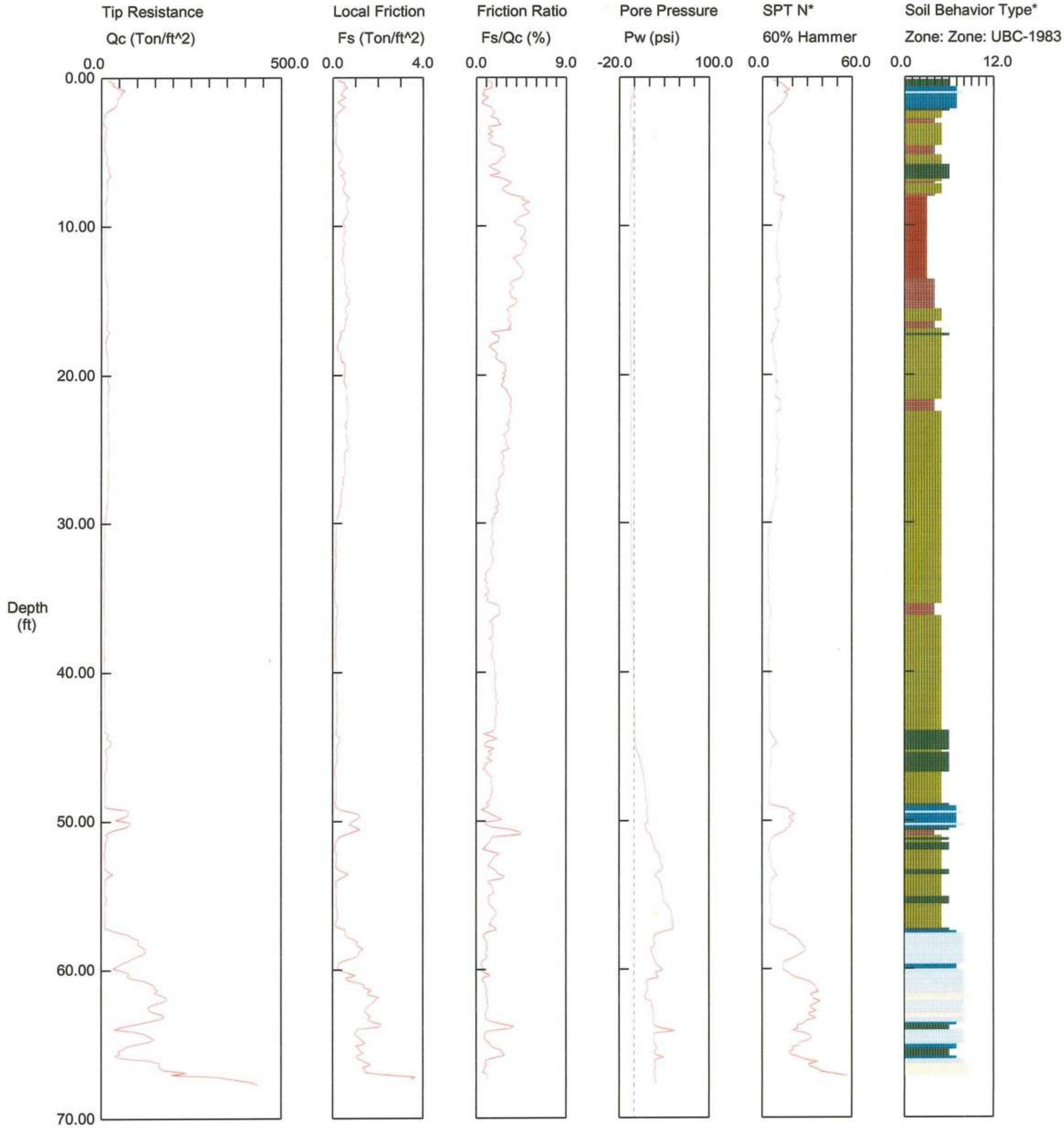
1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*Soil behavior type and SPT based on data from Zone: UBC-1983

Eustis Engineering Company

Operator: TRR & DH
Sounding: CPT13
Cone Used: 702TC

CPT Date/Time: 06-07-00 10:47
Location: EAST ST. TAMMY EVENTS CENTER
Job Number: 16484



Maximum Depth = 67.75 feet

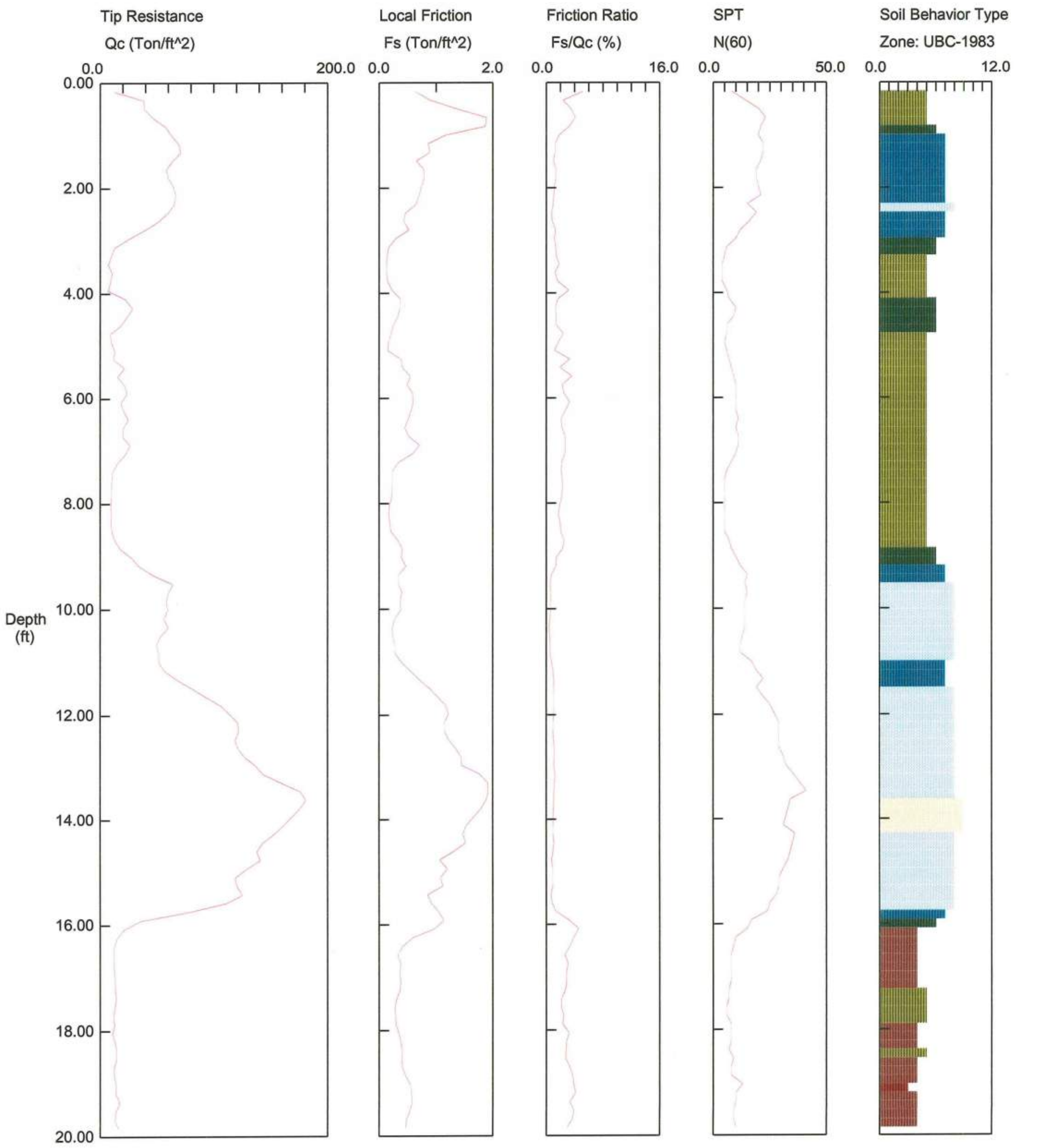
Depth Increment = 0.16 feet

1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

Eustis Engineering Company

Operator: TRR & DH
Sounding: CPT14
Cone Used: 702TC

CPT Date/Time: 06-06-00 10:43
Location: EAST ST. TAMMY EVENTS CENTER
Job Number: 16484



Maximum Depth = 21.98 feet

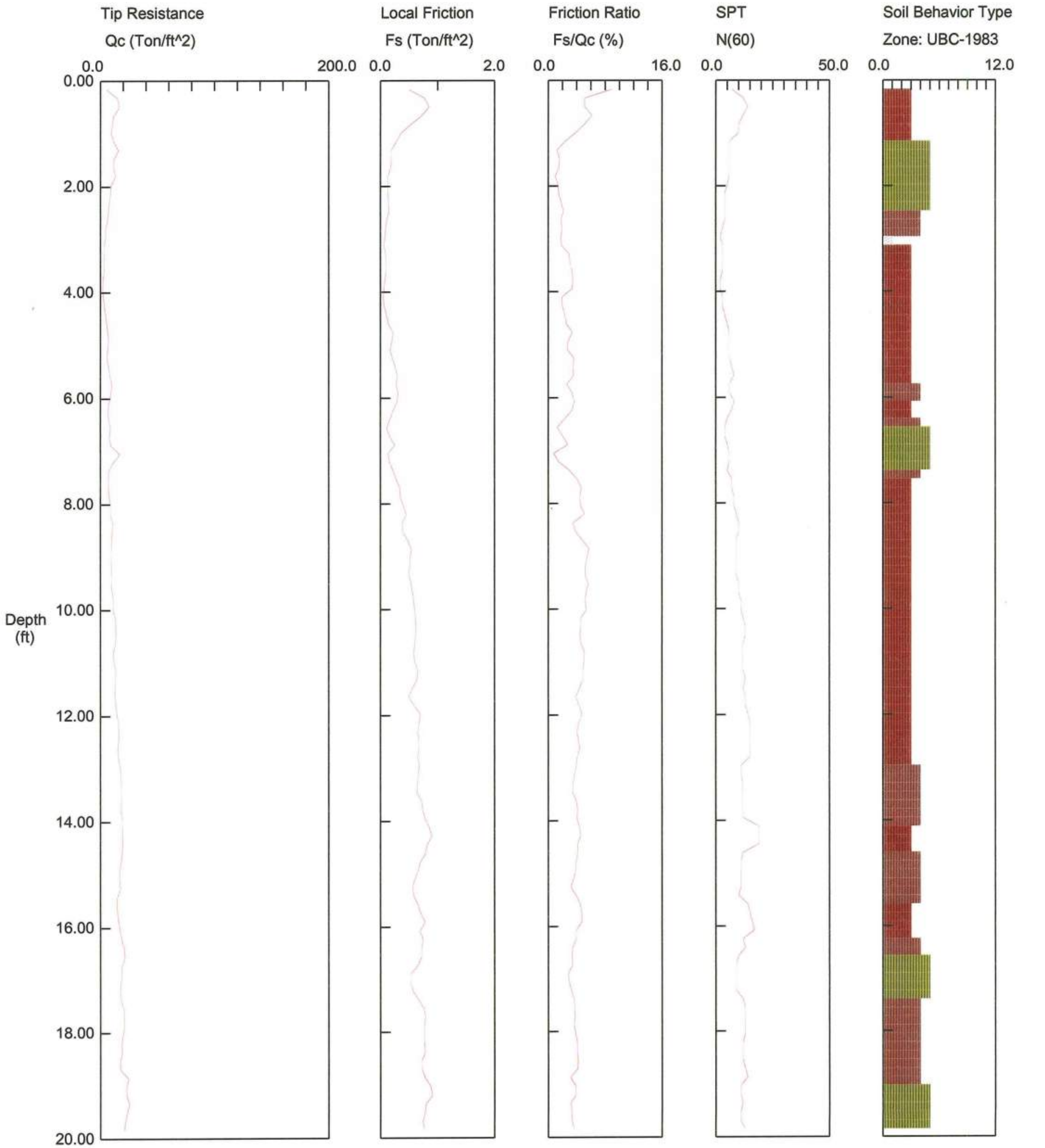
Depth Increment = 0.16 feet

1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

Eustis Engineering Company

Operator: TRR & DH
Sounding: CPT16
Cone Used: 702TC

CPT Date/Time: 06-06-00 11:48
Location: EAST ST. TAMMY EVENTS CENTER
Job Number: 16484



Maximum Depth = 21.33 feet

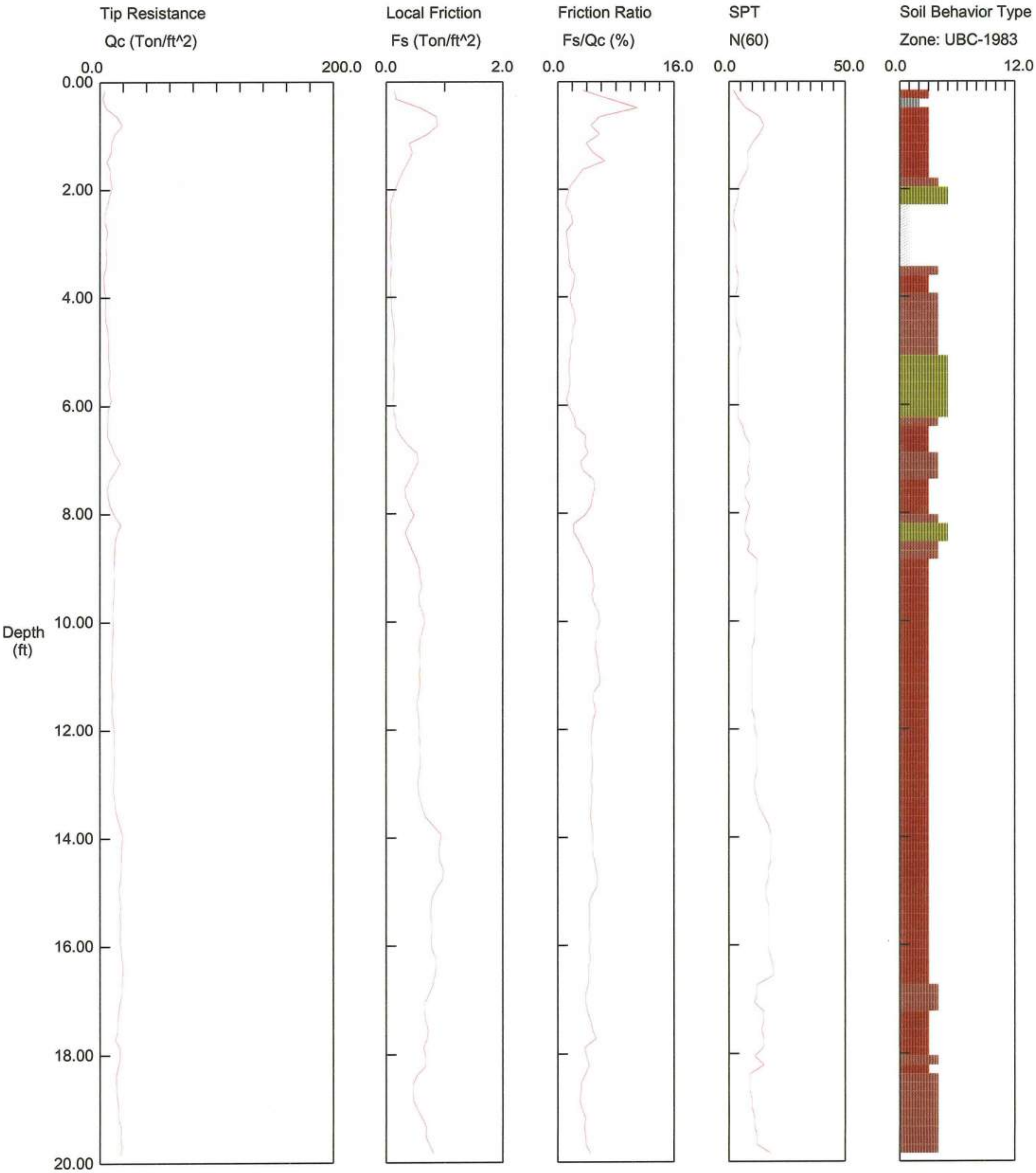
Depth Increment = 0.16 feet

1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

Eustis Engineering Company

Operator: TRR & DH
Sounding: CPT17
Cone Used: 702TC

CPT Date/Time: 06-06-00 14:21
Location: EAST ST. TAMMY EVENTS CENTER
Job Number: 16484



Maximum Depth = 22.15 feet

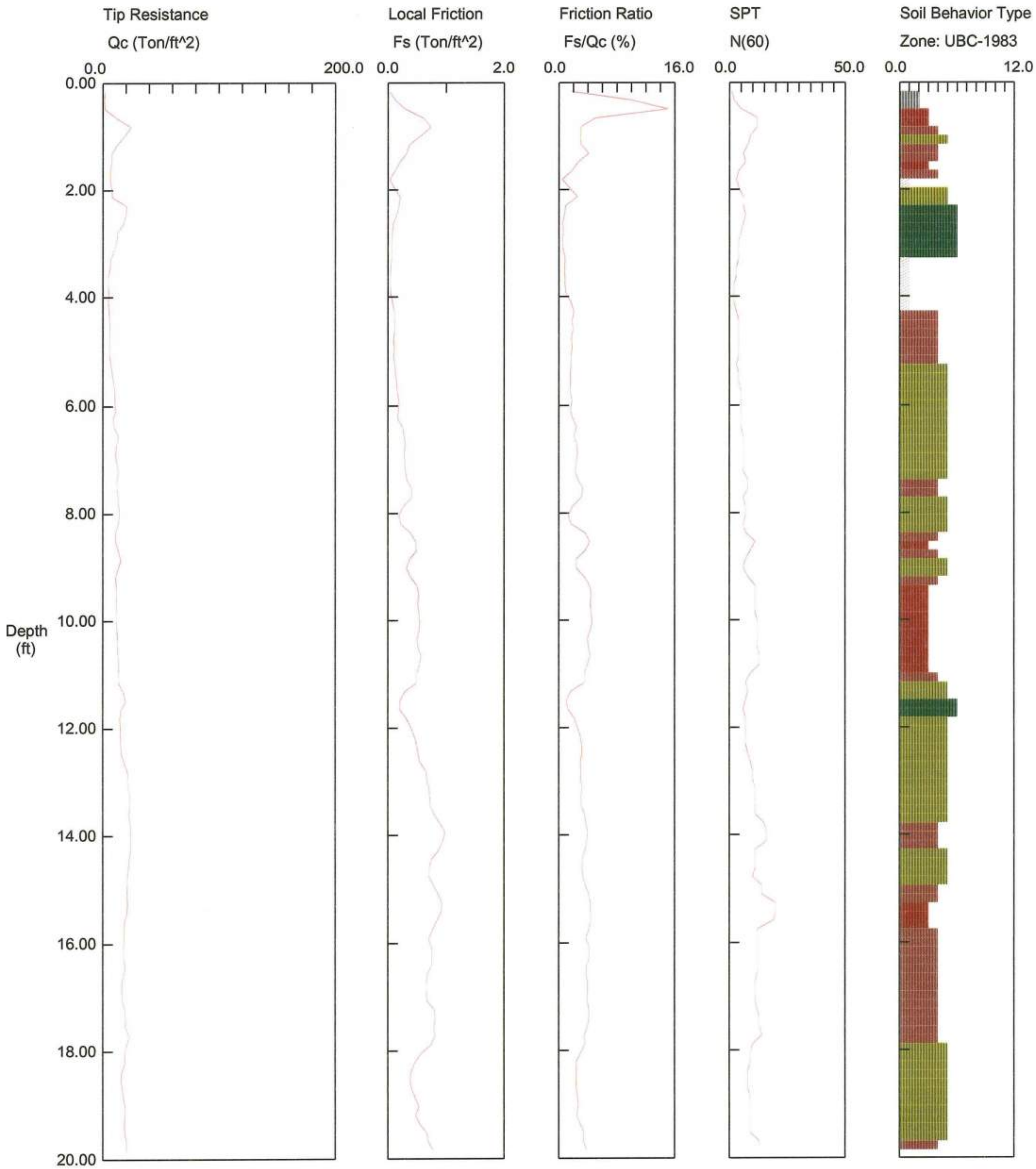
Depth Increment = 0.16 feet

1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

Eustis Engineering Company

Operator: TRR & DH
Sounding: CPT18
Cone Used: 702TC

CPT Date/Time: 06-06-00 14:53
Location: EAST ST. TAMMY EVENTS CENTER
Job Number: 16484



Maximum Depth = 21.98 feet

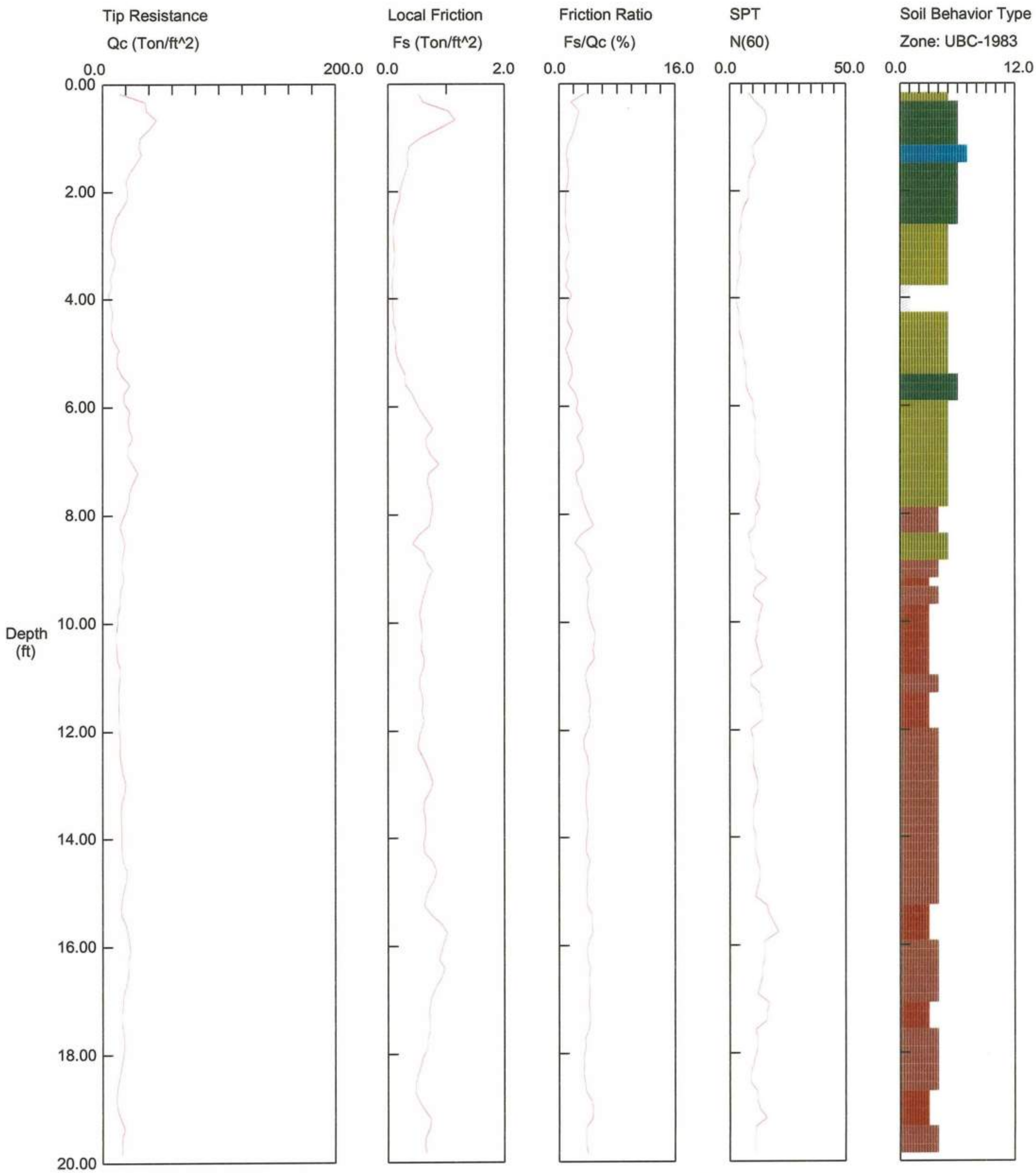
Depth Increment = 0.16 feet

1 sensitive fine grained	4 silty clay to clay	7 silty sand to sandy silt	10 gravelly sand to sand
2 organic material	5 clayey silt to silty clay	8 sand to silty sand	11 very stiff fine grained (*)
3 clay	6 sandy silt to clayey silt	9 sand	12 sand to clayey sand (*)

Eustis Engineering Company

Operator: TRR & DH
Sounding: CPT19
Cone Used: 702TC

CPT Date/Time: 06-07-00 09:03
Location: EAST ST. TAMMY EVENTS CENTER
Job Number: 16484



Maximum Depth = 21.98 feet

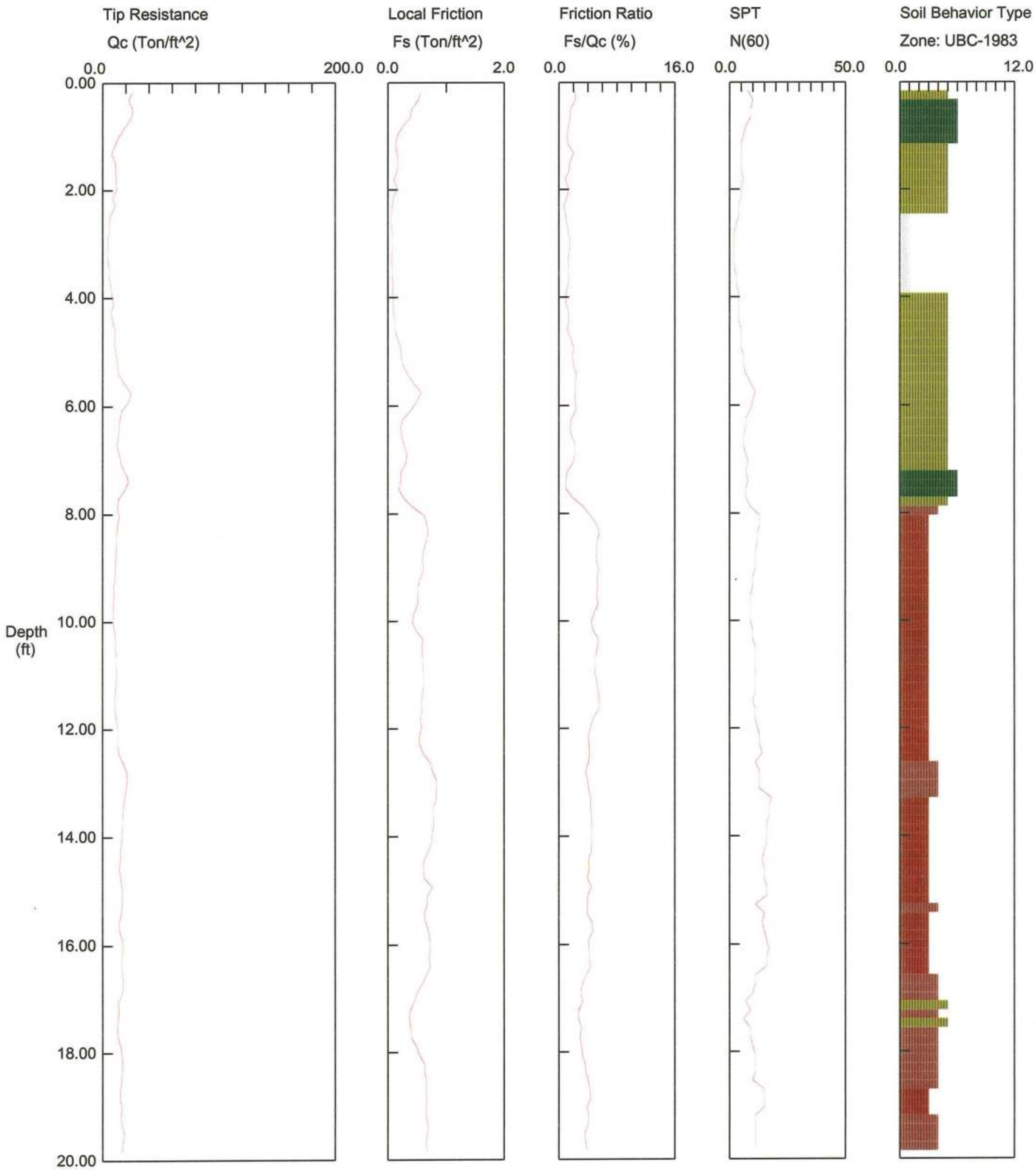
Depth Increment = 0.16 feet

1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

Eustis Engineering Company

Operator: TRR & DH
Sounding: CPT20
Cone Used: 702TC

CPT Date/Time: 06-07-00 09:25
Location: EAST ST. TAMMY EVENTS CENTER
Job Number: 16484



Maximum Depth = 21.82 feet

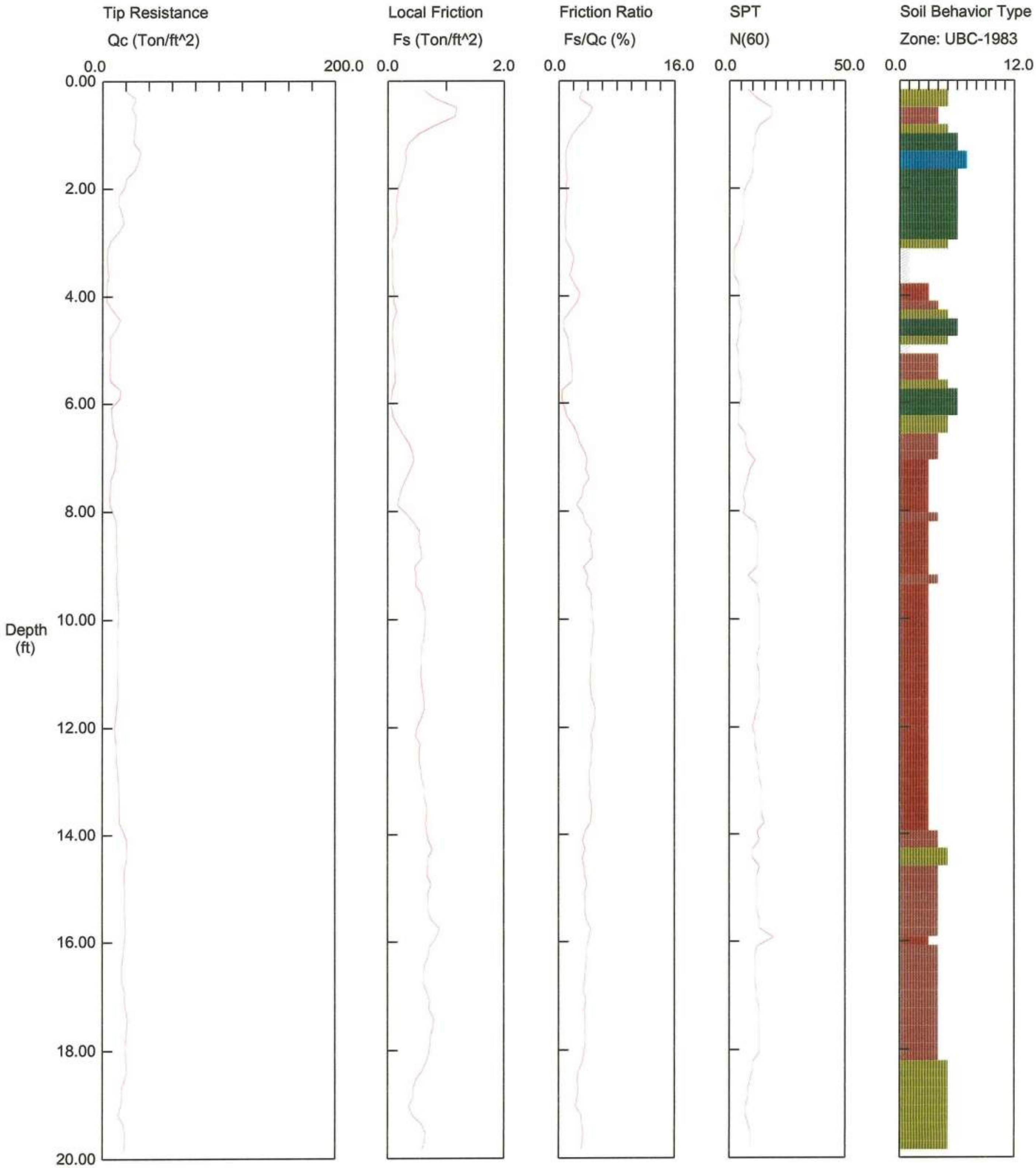
Depth Increment = 0.16 feet

1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

Eustis Engineering Company

Operator: TRR & DH
Sounding: CPT21
Cone Used: 702TC

CPT Date/Time: 06-07-00 08:43
Location: EAST ST. TAMMY EVENTS CENTER
Job Number: 16484



Maximum Depth = 21.98 feet

Depth Increment = 0.16 feet

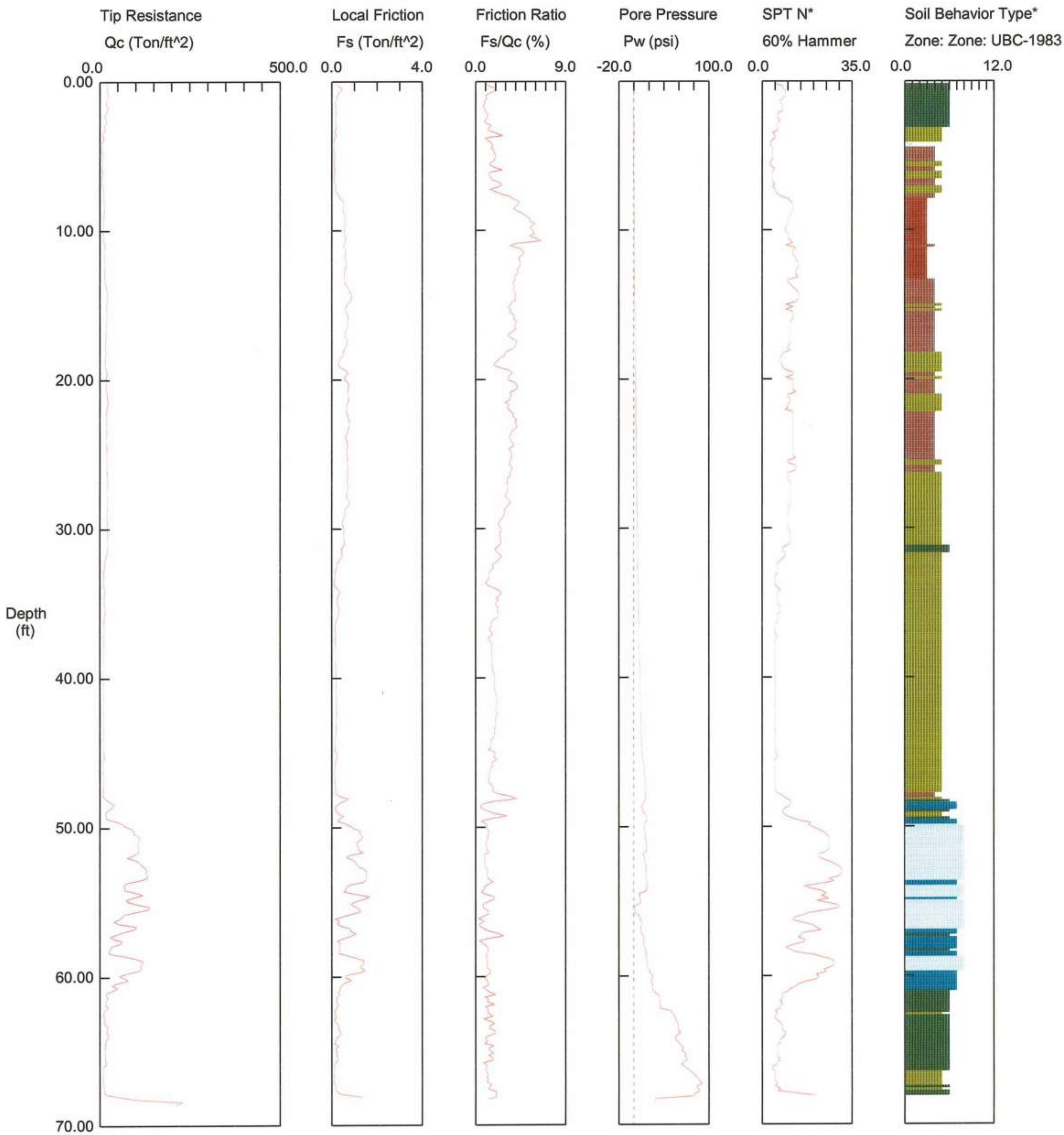
1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*Soil behavior type and SPT based on data from Zone: UBC-1983

Eustis Engineering Company

Operator: TRR & DH
Sounding: CPT23
Cone Used: 702TC

CPT Date/Time: 06-06-00 12:59
Location: EAST ST. TAMMY EVENTS CENTER
Job Number: 16484



Maximum Depth = 68.57 feet

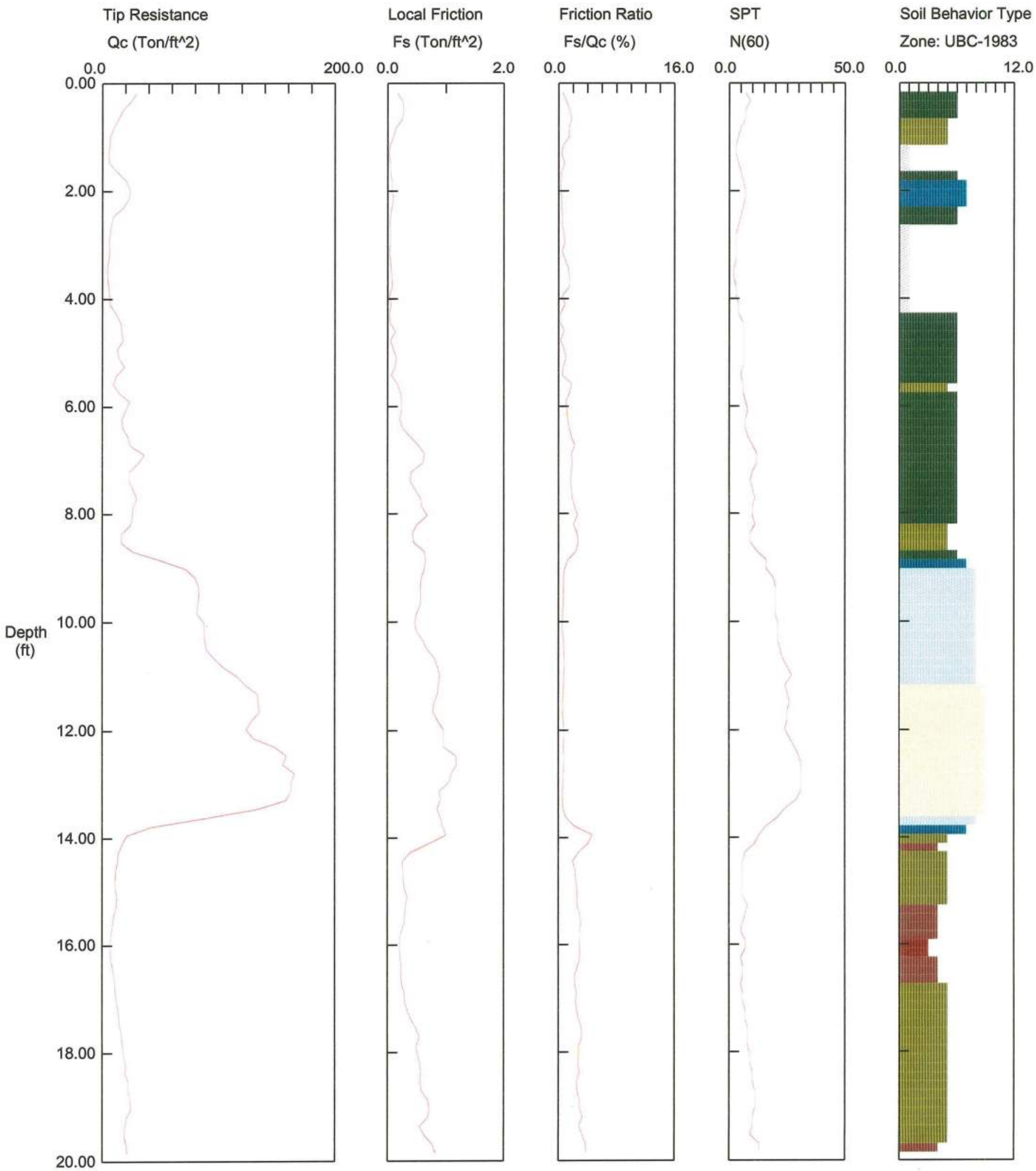
Depth Increment = 0.16 feet

1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

Eustis Engineering Company

Operator: TRR & DH
Sounding: CPT24
Cone Used: 702TC

CPT Date/Time: 06-07-00 08:24
Location: EAST ST. TAMMY EVENTS CENTER
Job Number: 16484



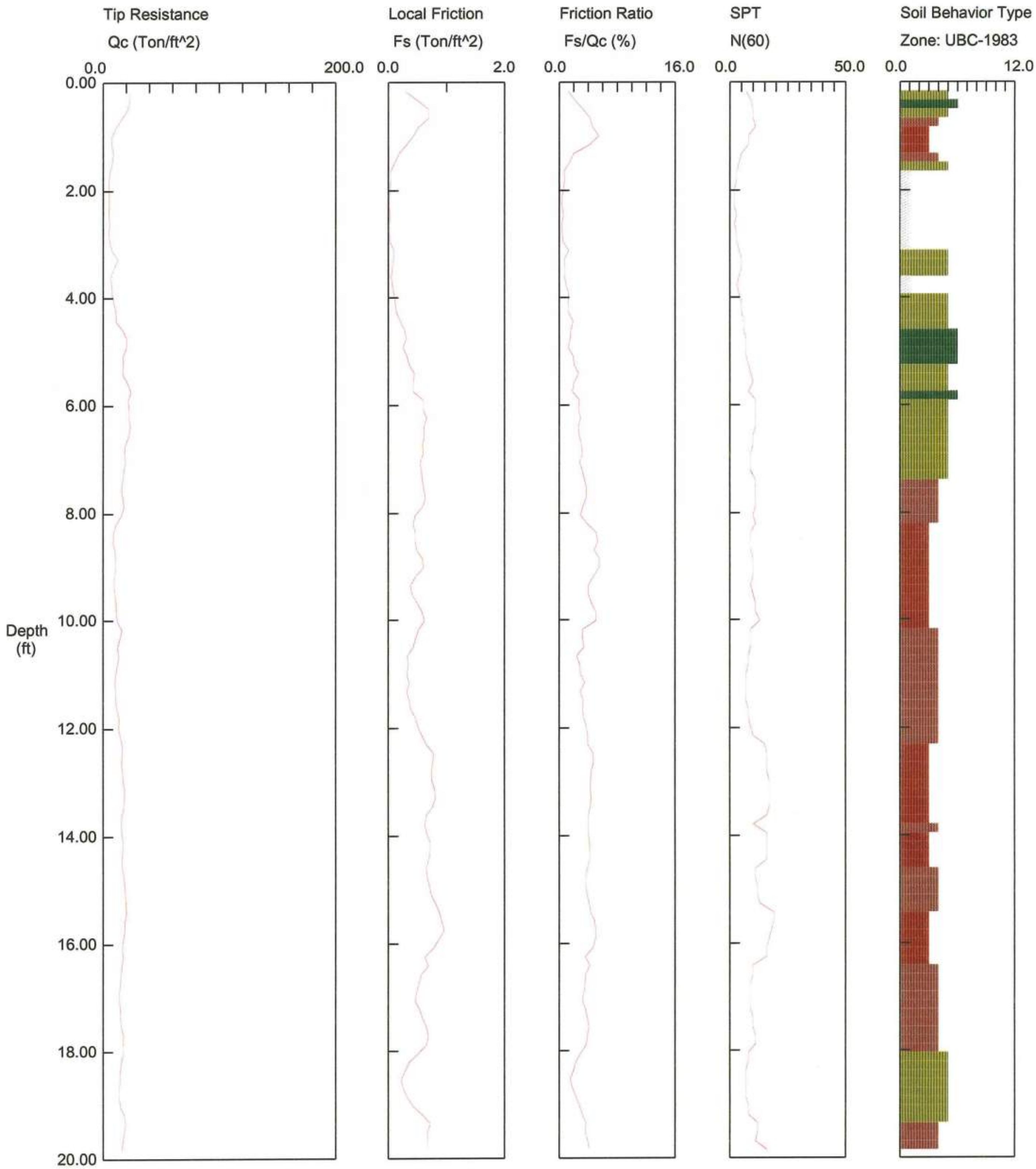
Maximum Depth = 21.98 feet

Depth Increment = 0.16 feet

Eustis Engineering Company

Operator: TRR & DH
Sounding: CPT25
Cone Used: 702TC

CPT Date/Time: 06-06-00 15:16
Location: EAST ST. TAMMY EVENTS CENTER
Job Number: 16484

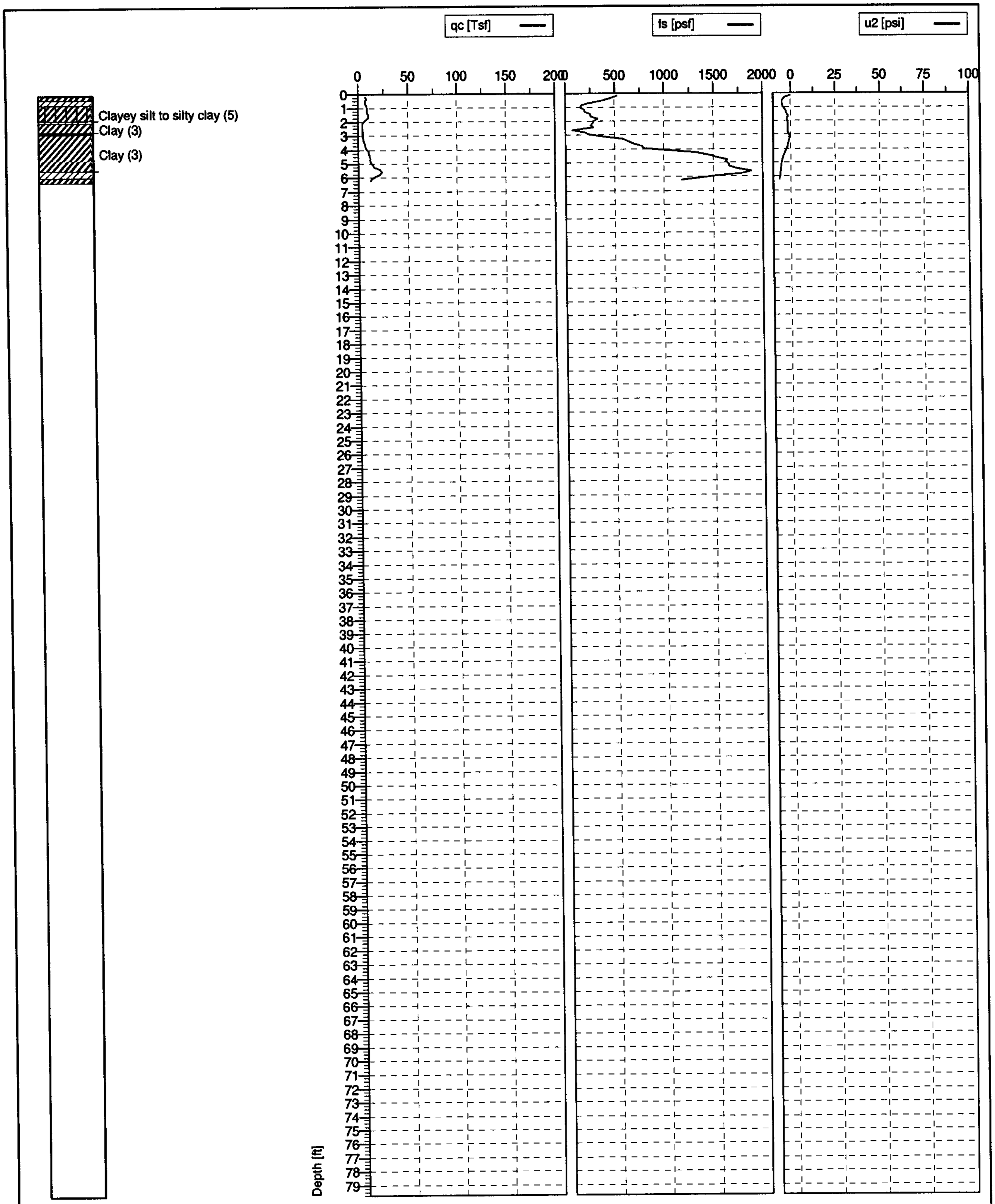


Maximum Depth = 21.98 feet

Depth Increment = 0.16 feet

1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

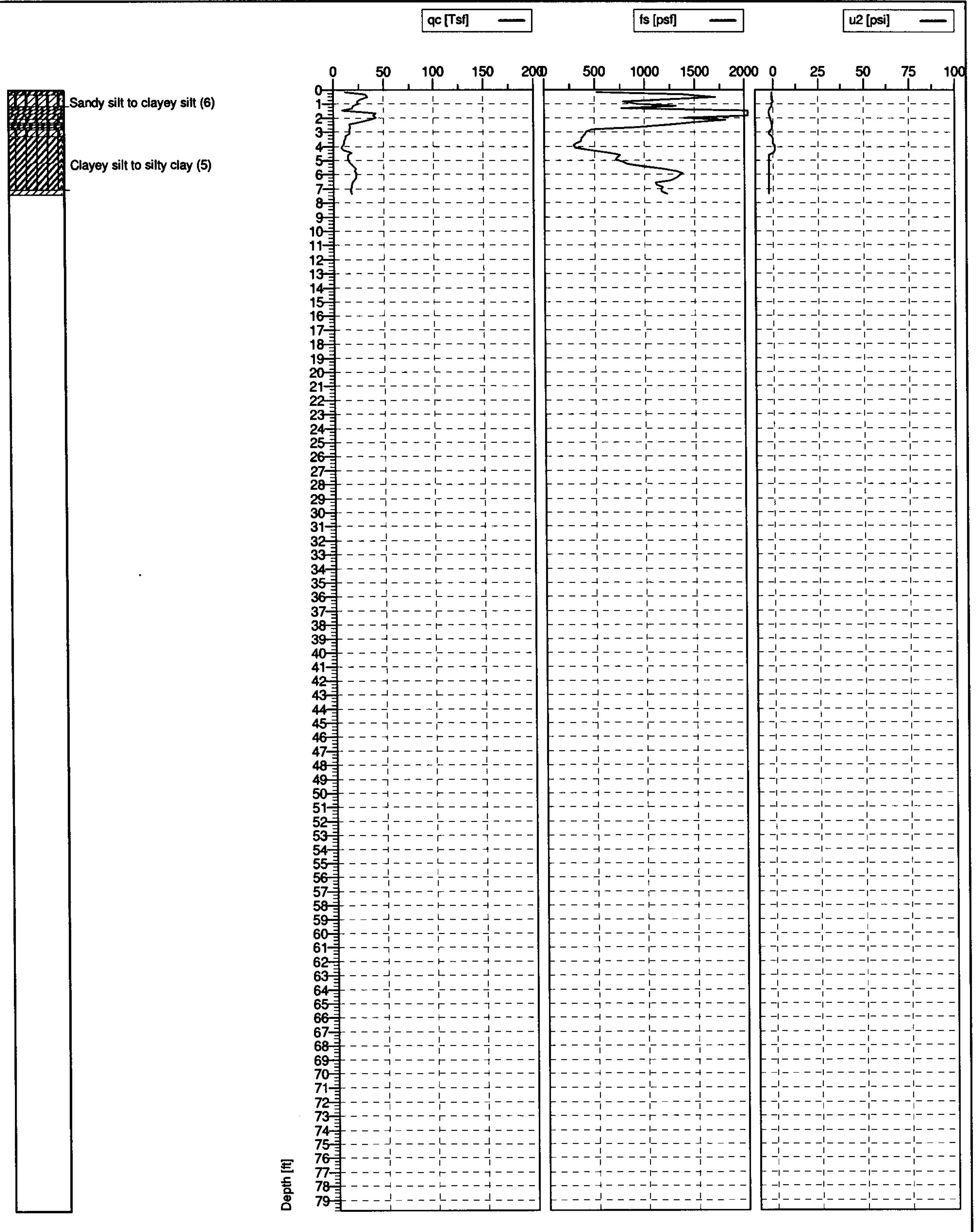
SLIDELL RING LEVEE CPT LOGS



U2

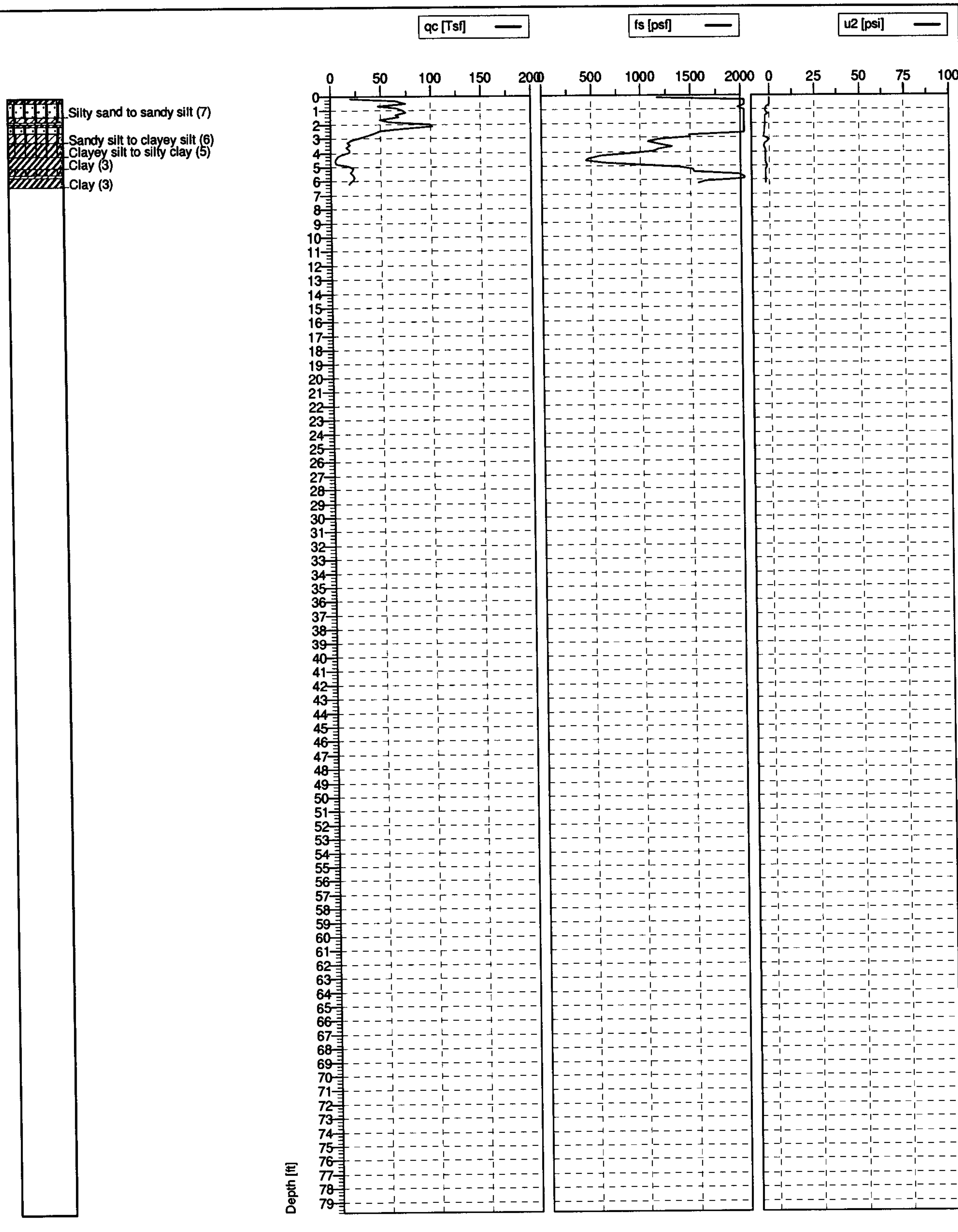
Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: CPT1	Position: ,	Ground level:	
Client:	ST. TAMMANY PARISH SCHOOL BOARD	Date: 12/19/2006	Scale: 1 : 120
Project:	SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY	Page: 1/1	Fig:
	SLIDELL, LOUISIANA	File: h1.cpd	



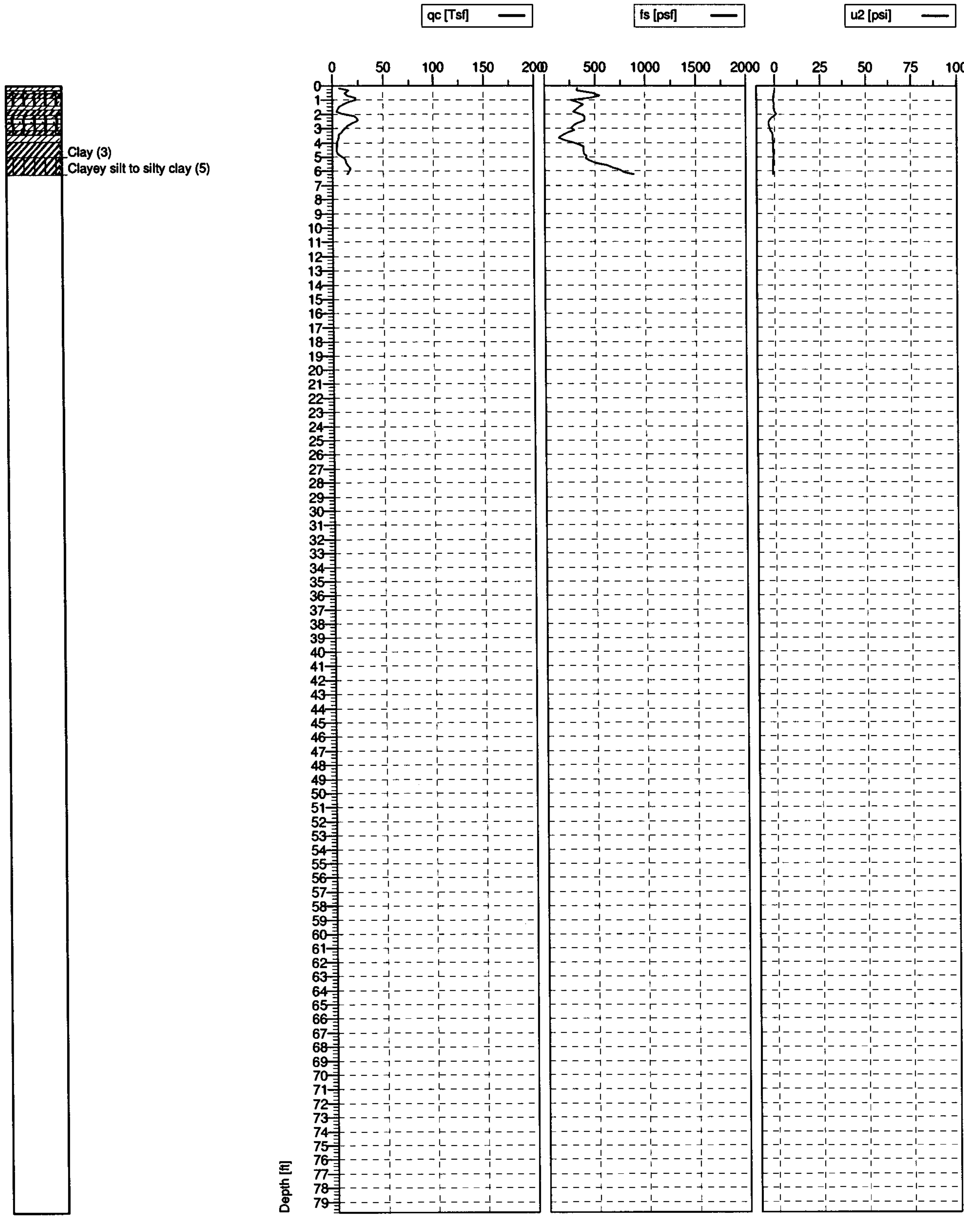
Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: CPT2	Position: ,	Ground level:	
Client:	ST. TAMMANY PARISH SCHOOL BOARD	Date: 12/19/2006	Scale: 1 : 120
Project:	SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY	Page: 1/1	Fig:
	SLIDELL, LOUISIANA	File: h2.cpd	



Cone No: DTA1025
Tip eree [cm2]: 10
Sleeve area [cm2]: 150

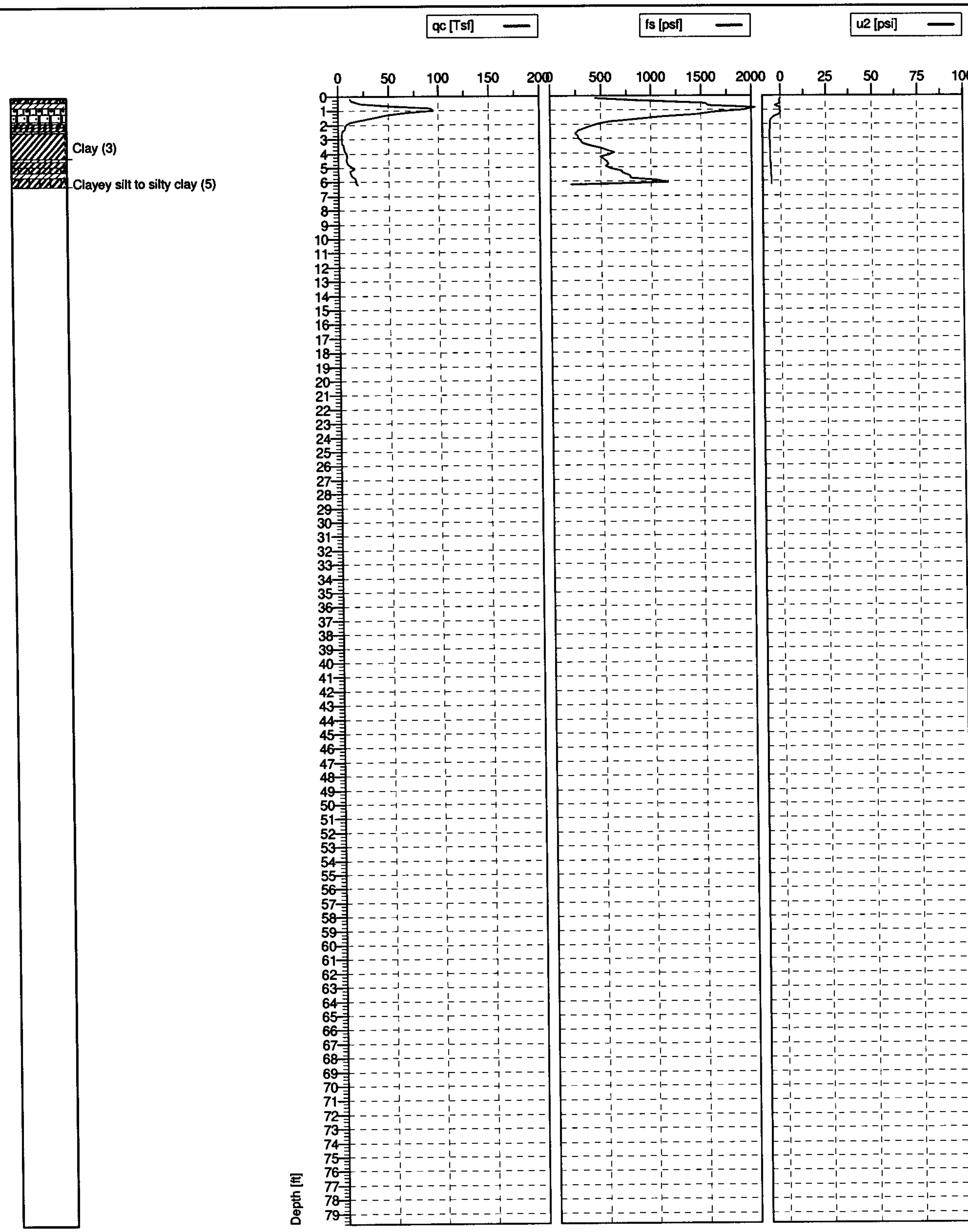
Test no: CPT3	Position: ,	Ground level:	
Client:	ST. TAMMANY PARISH SCHOOL BOARD	Date: 12/19/2006	Scale: 1 : 120
Project:	SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY	Page: 1/1	Fig:
	SLIDELL, LOUISIANA	File: h3.cpd	



U2

Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

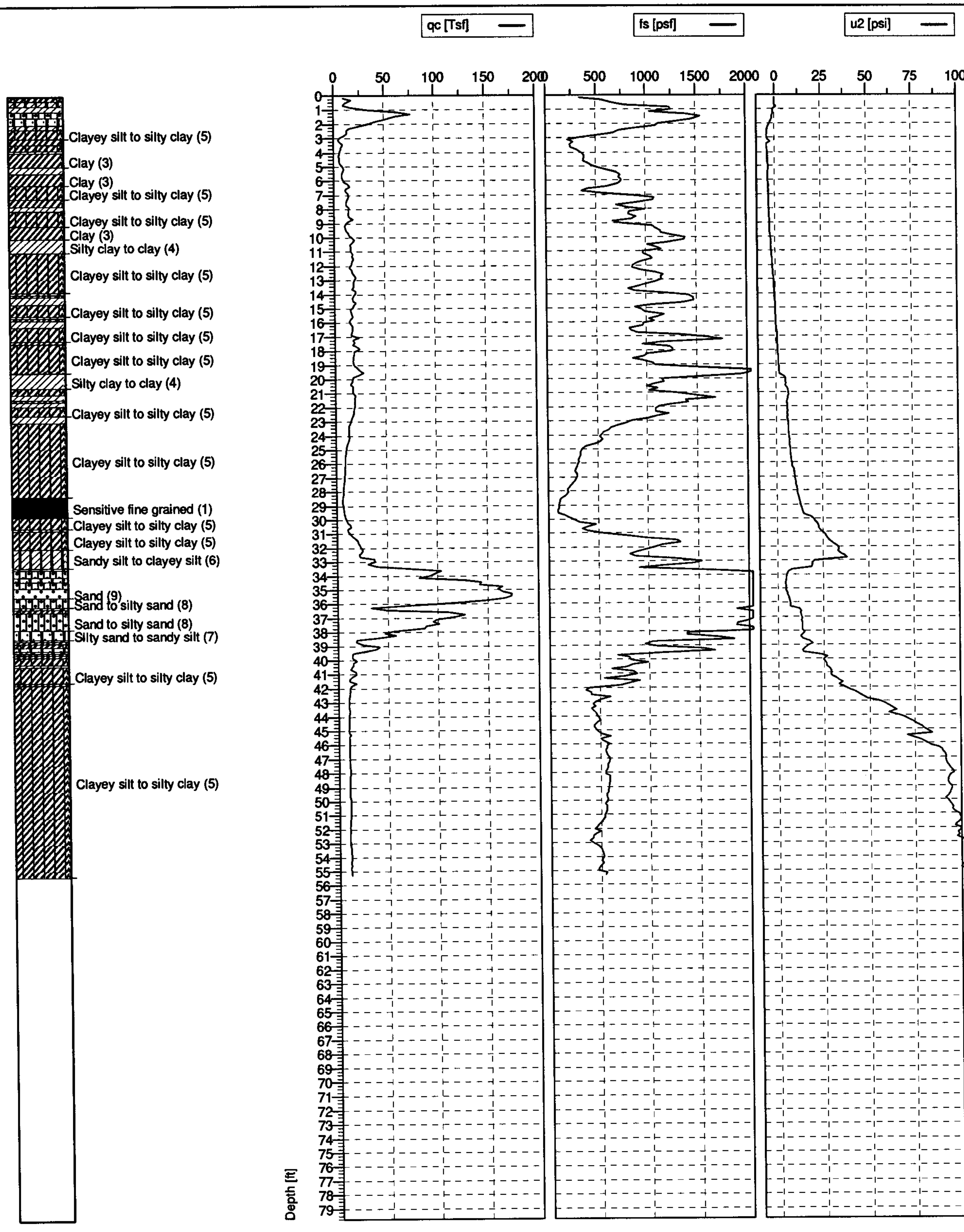
Test no: CPT4	Position: ,	Ground level:	
Client:	ST. TAMMANY PARISH SCHOOL BOARD	Date: 12/19/2006	Scale: 1 : 120
Project:	SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY	Page: 1/1	Fig:
	SLIDELL, LOUISIANA	File: h4.cpd	



U2

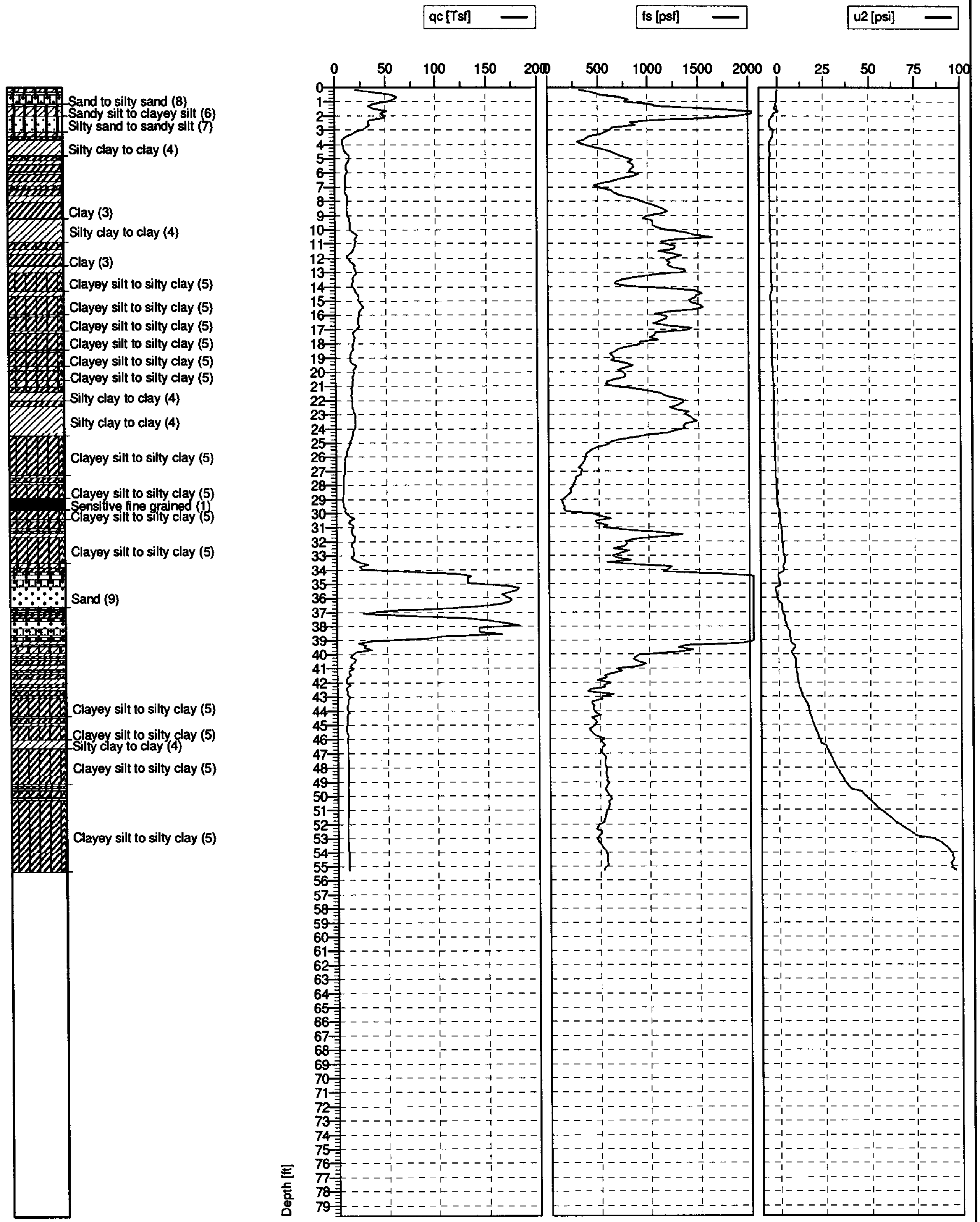
Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: CPT5	Position: , Y-Coord: m	Ground level:	
Client:	ST. TAMMANY PARISH SCHOOL BOARD	Date: 12/19/2006	Scale: 1 : 120
Project:	SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY	Page: 1/1	Fig:
	SLIDELL, LOUISIANA	File: h5.cpd	



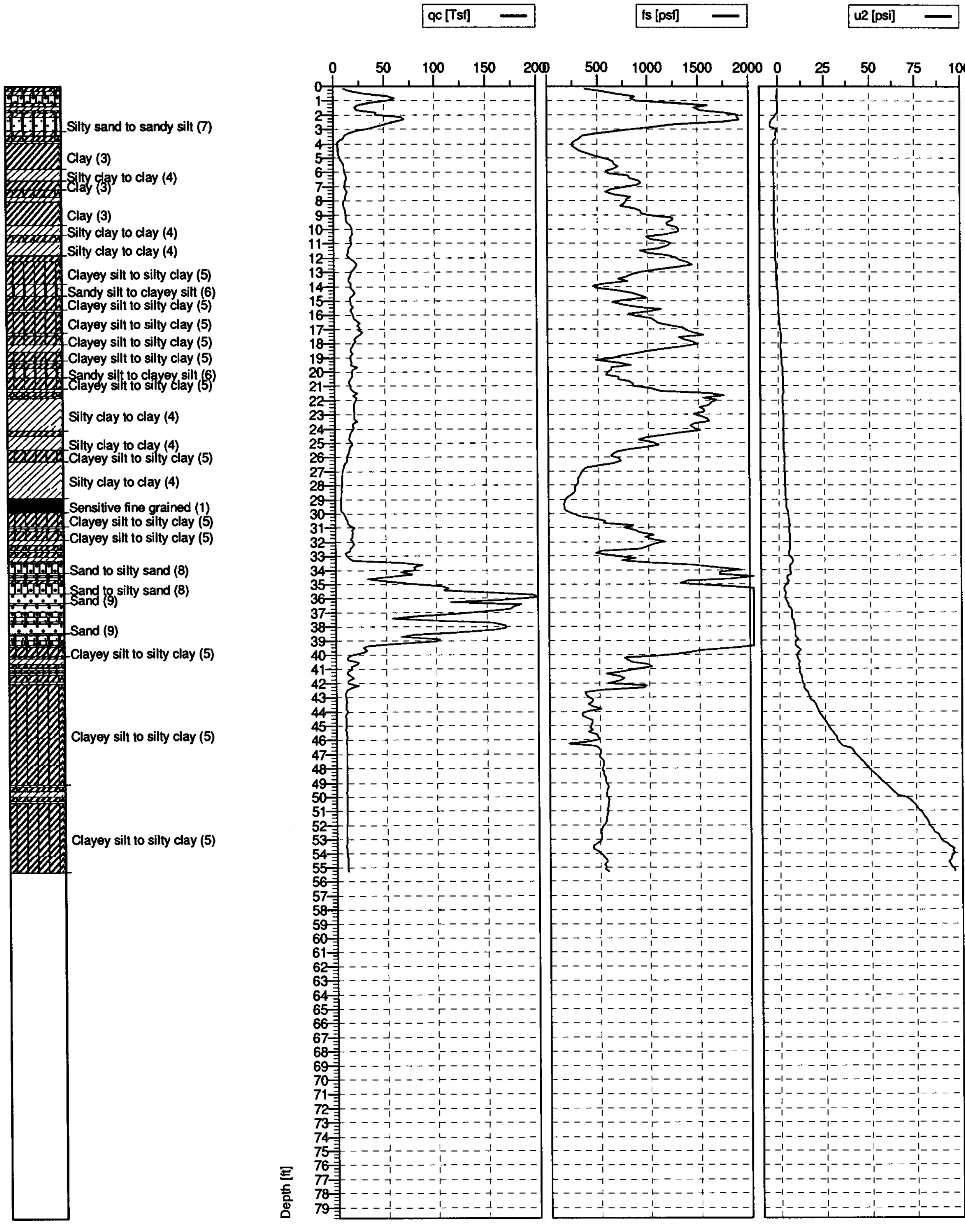
Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

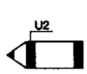
Test no: CPT6	Position: ,	Ground level:	
Client:	ST. TAMMANY PARISH SCHOOL BOARD	Date: 12/20/2006	Scale: 1 : 120
Project:	SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY	Page: 1/1	Fig:
	SLIDELL, LOUISIANA	File: h6.cpd	



Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

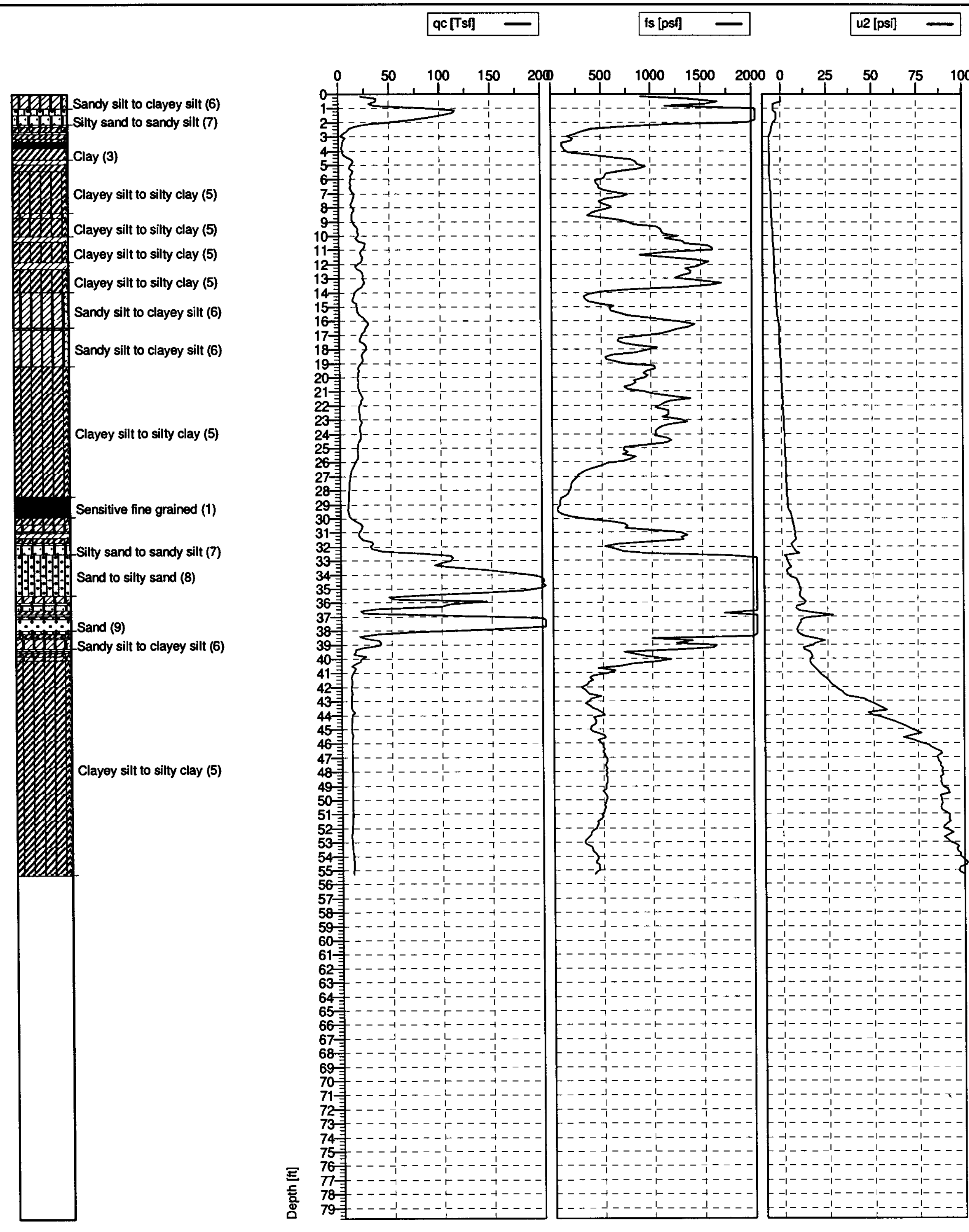
Test no: CPT7	Position: ,	Ground level:	
Client:	ST. TAMMANY PARISH SCHOOL BOARD	Date: 12/20/2006	Scale: 1 : 120
Project:	SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY	Page: 1/1	Fig:
	SLIDELL, LOUISIANA	File: h7.cpd	





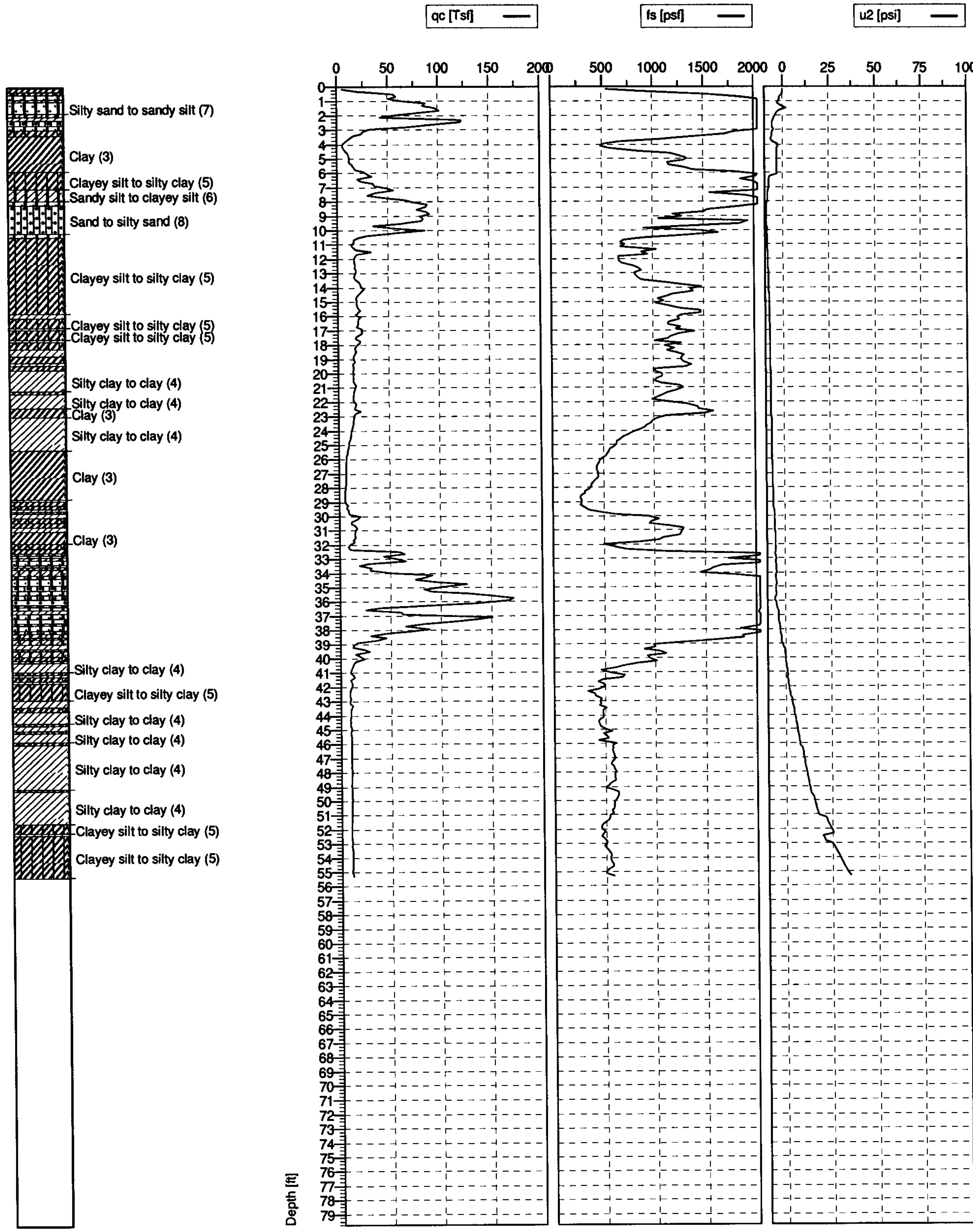
Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: CPT8	Position: ,	Ground level:	
Client:	ST. TAMMANY PARISH SCHOOL BOARD	Date: 12/20/2006	Scale: 1 : 120
Project:	SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY	Page: 1/1	Fig:
	SLIDELL, LOUISIANA	File: h8.cpd	



Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

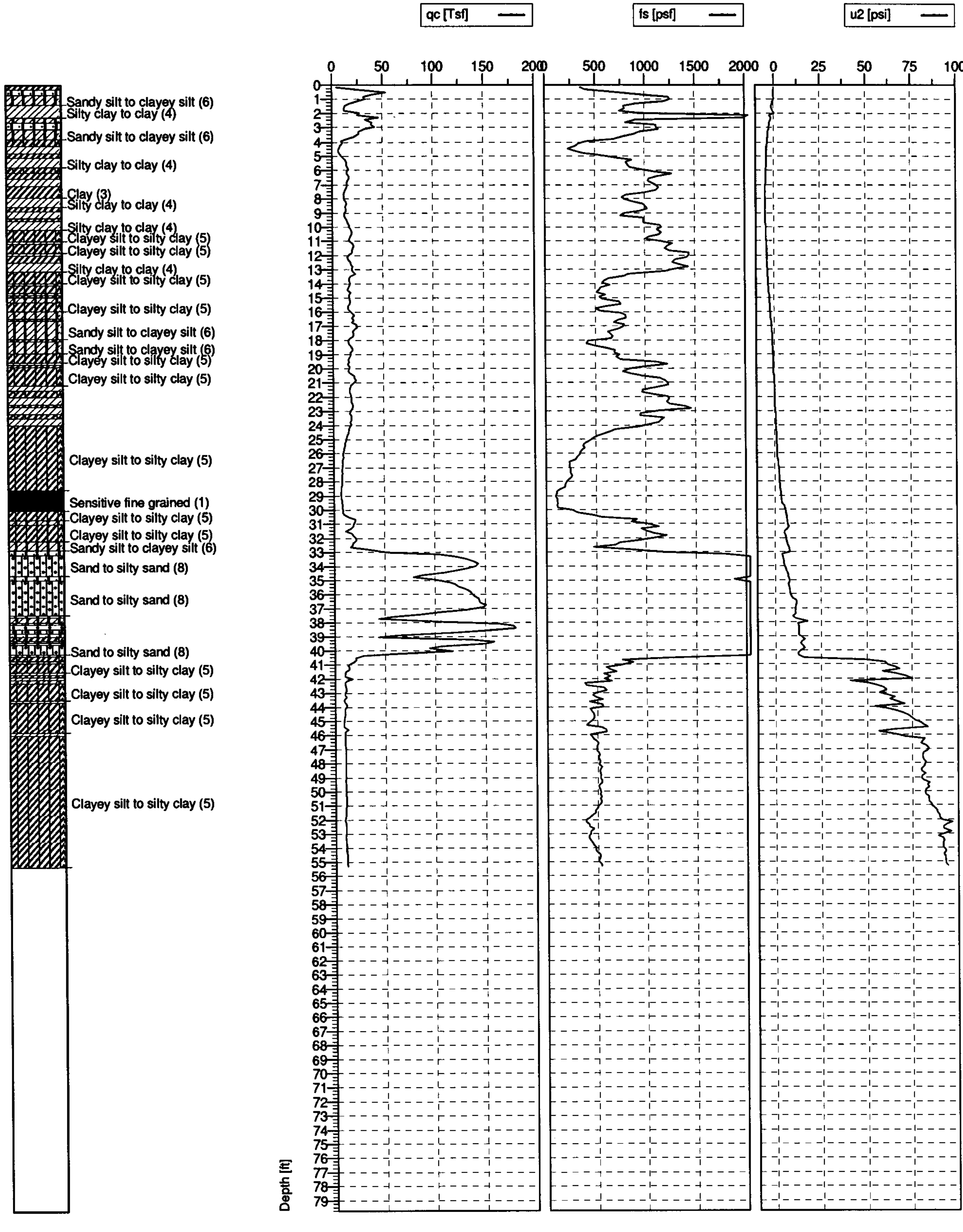
Test no: CPT9	Position: ,	Ground level:	
Client:	ST. TAMMANY PARISH SCHOOL BOARD	Date: 12/20/2006	Scale: 1 : 120
Project:	SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY	Page: 1/1	Fig:
	SLIDELL, LOUISIANA	File: h9.cpd	

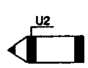


U2

Cone No: DTA1025
Tip area [cm2]: 10
Sleeva area [cm2]: 150

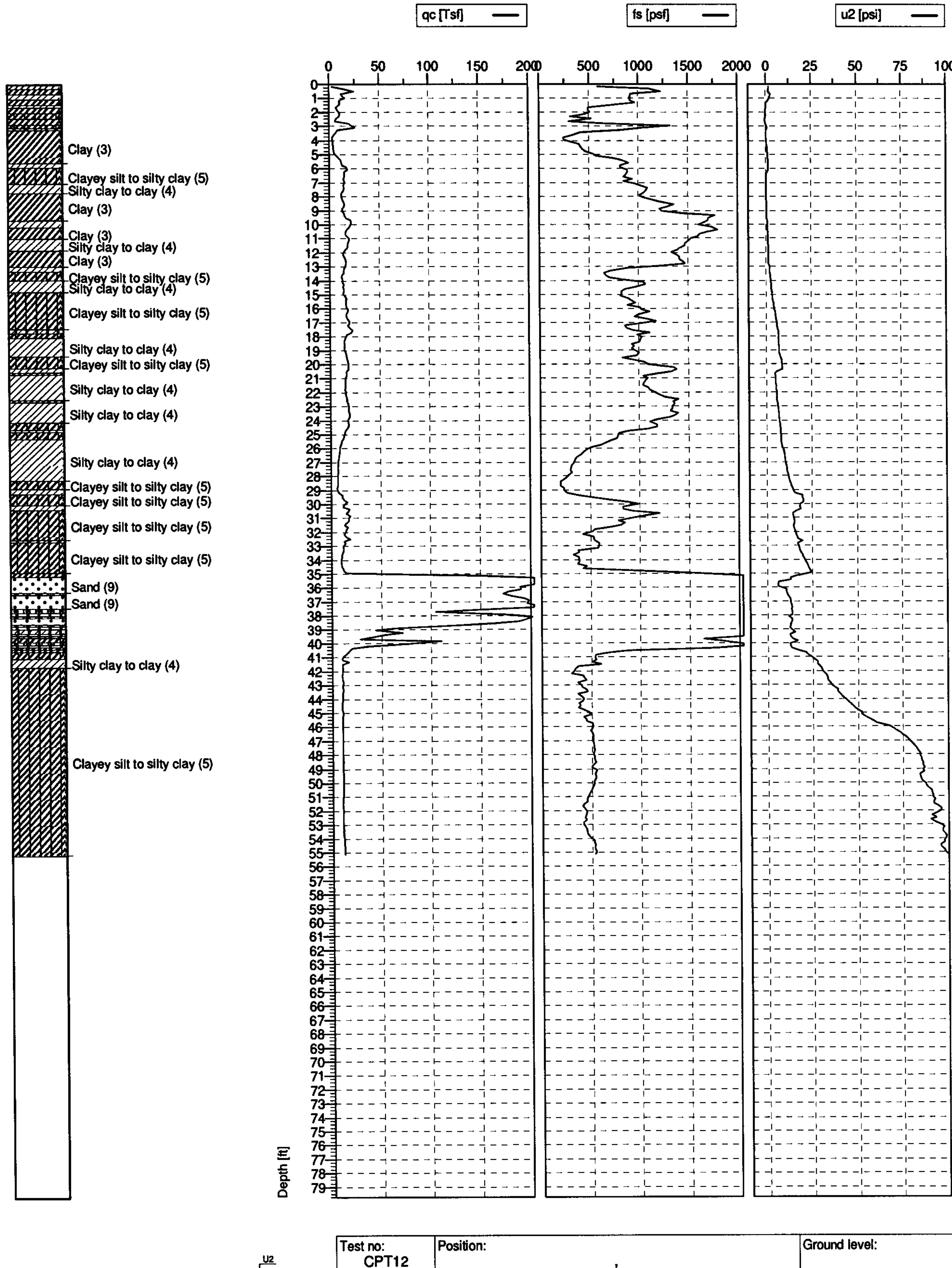
Test no: CPT10	Position: ,	Ground level:	
Client:	ST. TAMMANY PARISH SCHOOL BOARD	Date: 12/20/2006	Scale: 1 : 120
Project:	SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY	Page: 1/1	Fig:
	SLIDELL, LOUISIANA	File: h10.cpd	





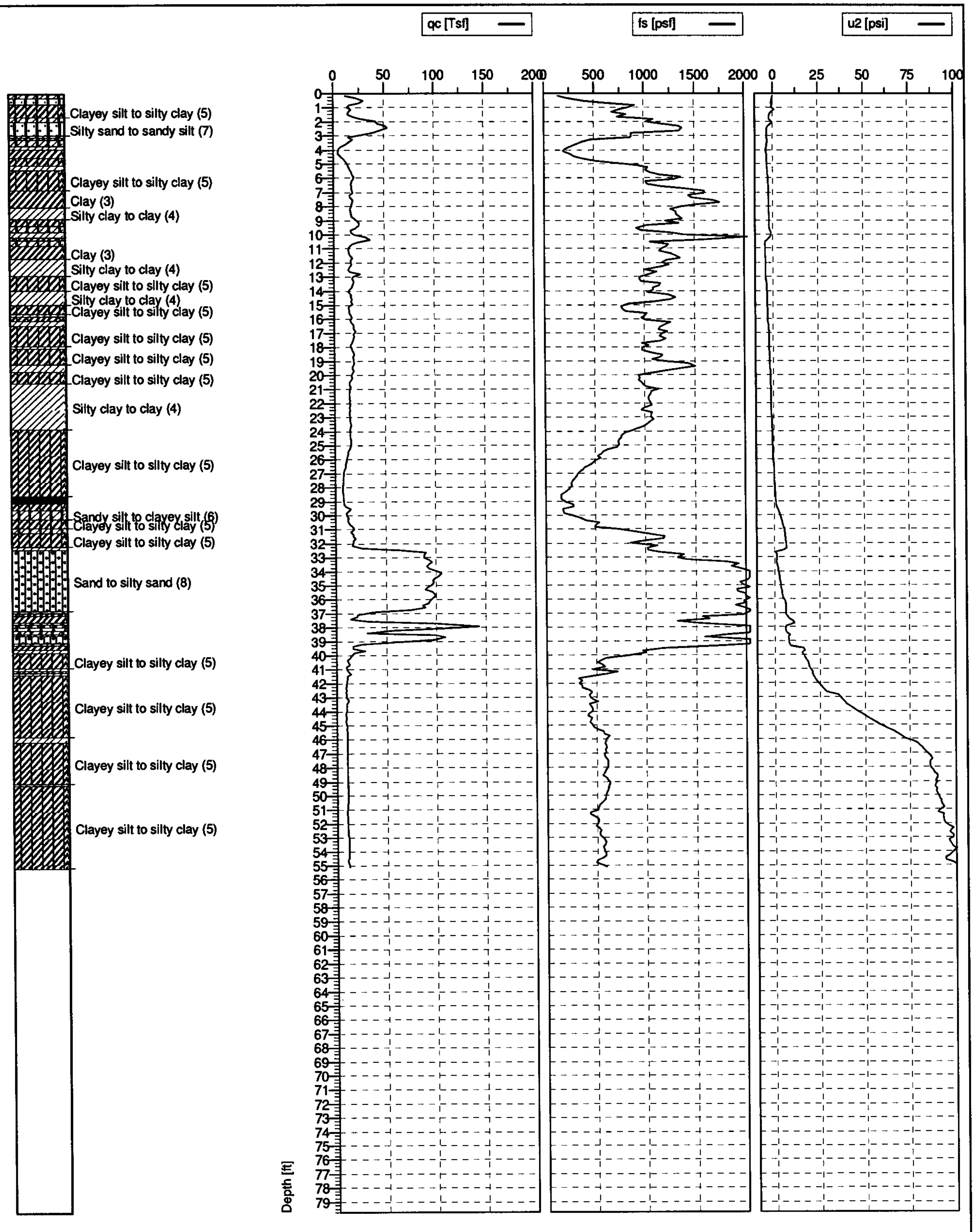
Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: CPT11	Position: ,	Ground level:	
Client:	ST. TAMMANY PARISH SCHOOL BOARD	Date: 12/20/2006	Scale: 1 : 120
Project:	SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY	Page: 1/1	Fig:
	SLIDELL, LOUISIANA	File: h11.cpd	



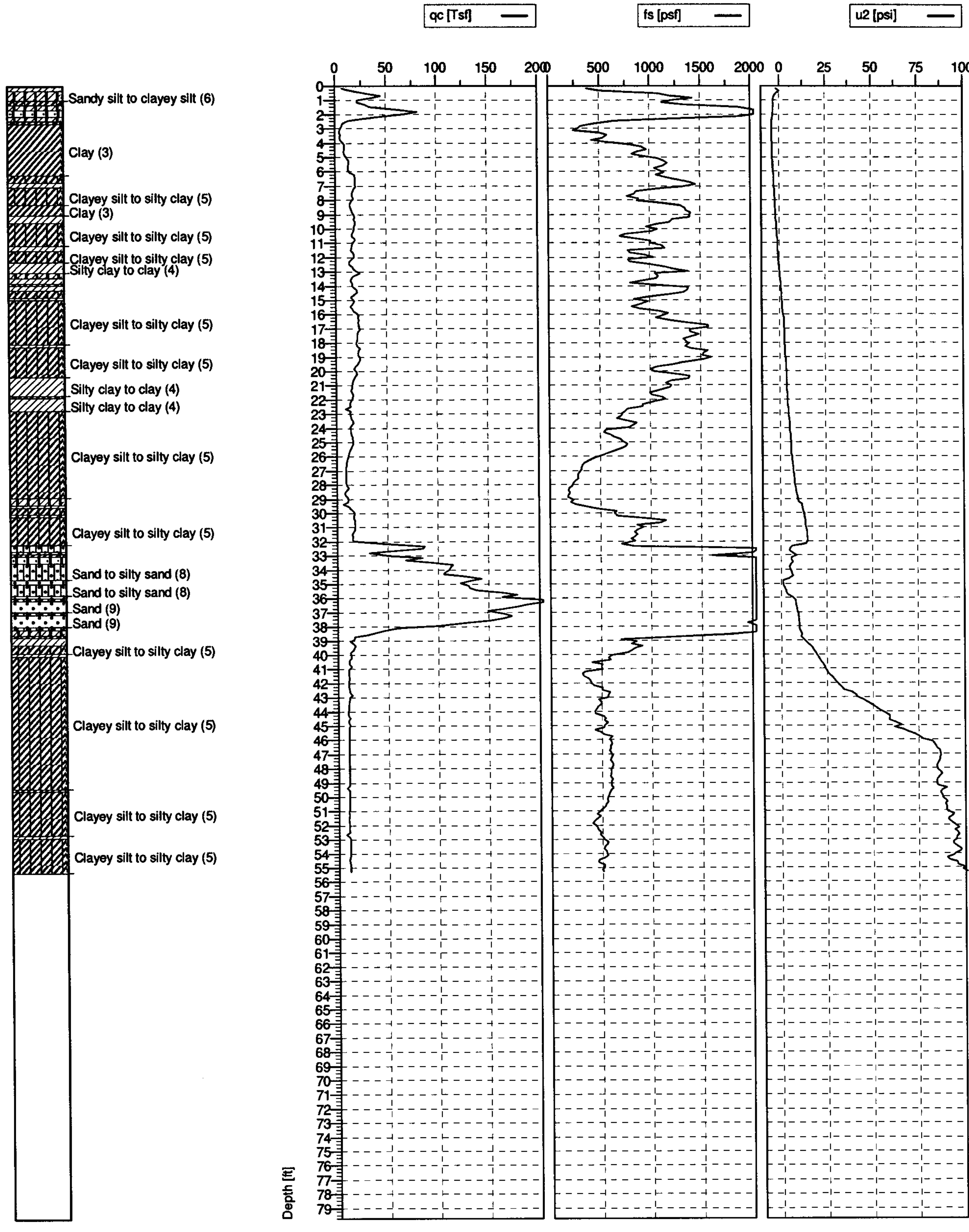
Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

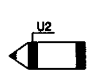
Test no: CPT12	Position: ,	Ground level:	
Client:	ST. TAMMANY PARISH SCHOOL BOARD	Date: 12/28/2006	Scale: 1 : 120
Project:	SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY	Page: 1/1	Fig:
	SLIDELL, LOUISIANA	File: h12y.cpd	



Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

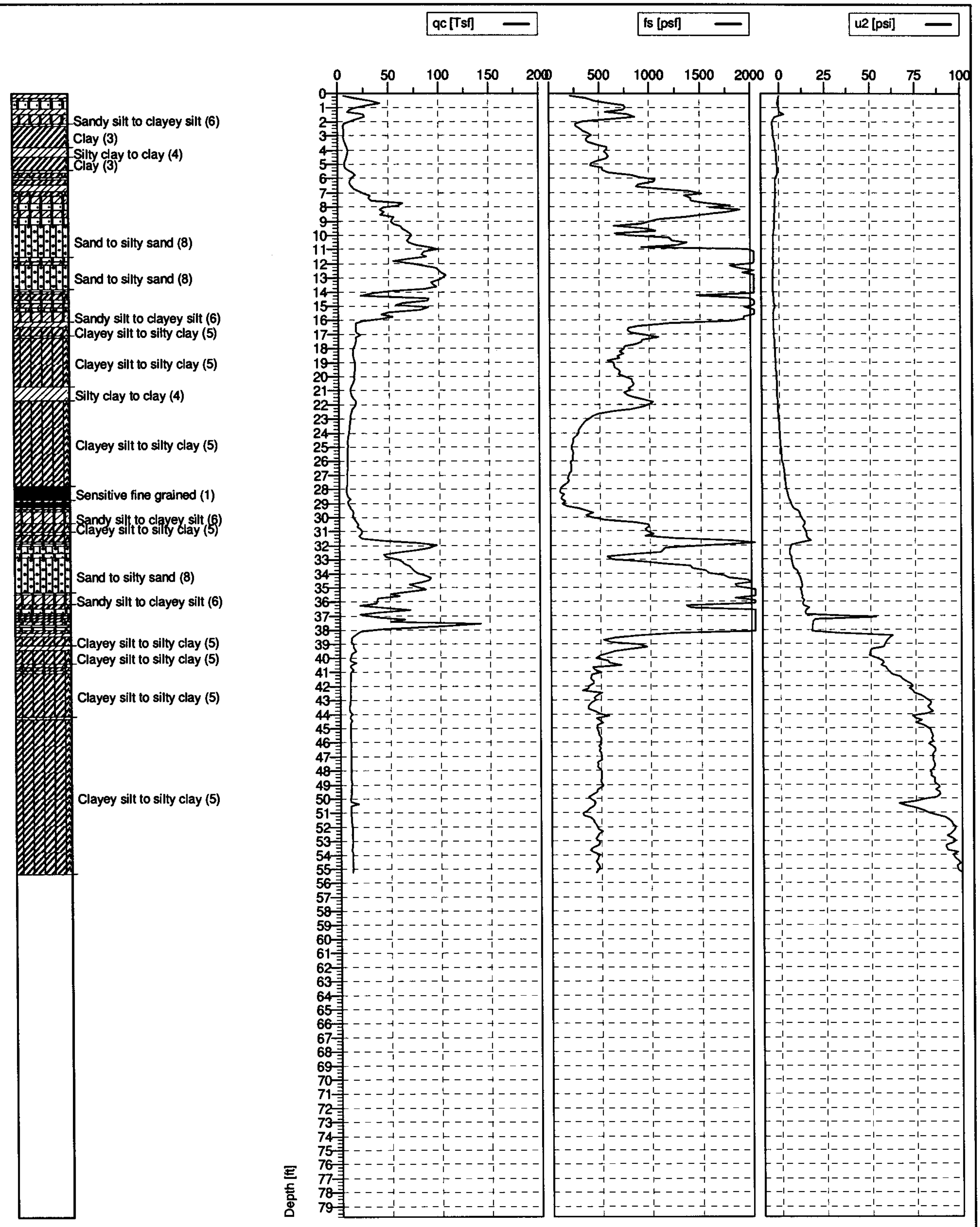
Test no: CPT13	Position: ,	Ground level:	
Client:	ST. TAMMANY PARISH SCHOOL BOARD	Date: 12/27/2006	Scale: 1 : 120
Project:	SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY	Page: 1/1	Fig:
	SLIDELL, LOUISIANA	File: h13.cpd	





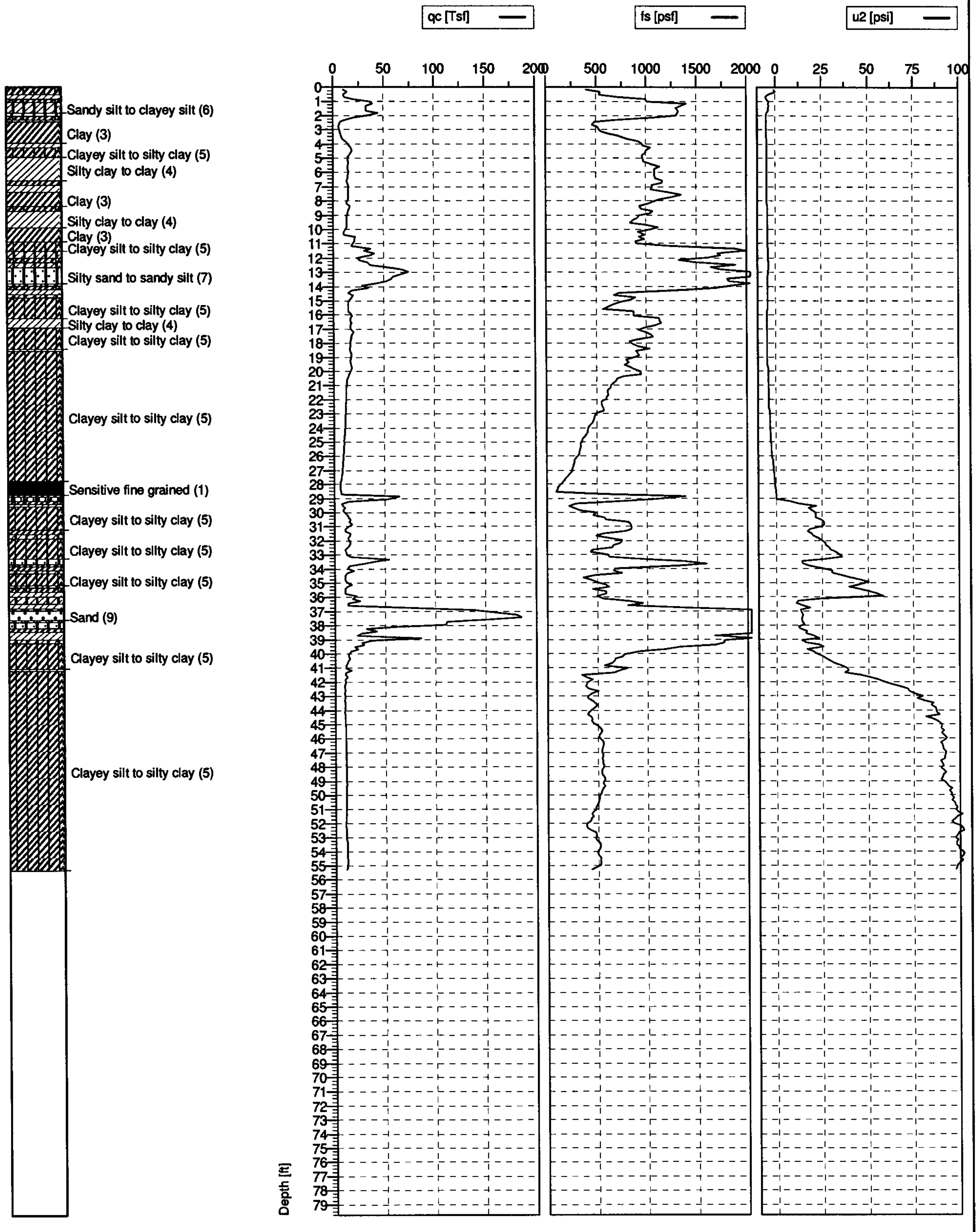
Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: CPT14	Position: ,	Ground level:	
Client:	ST. TAMMANY PARISH SCHOOL BOARD	Date: 12/27/2006	Scale: 1 : 120
Project:	SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY	Page: 1/1	Fig:
	SLIDELL, LOUISIANA	File: h14.cpd	



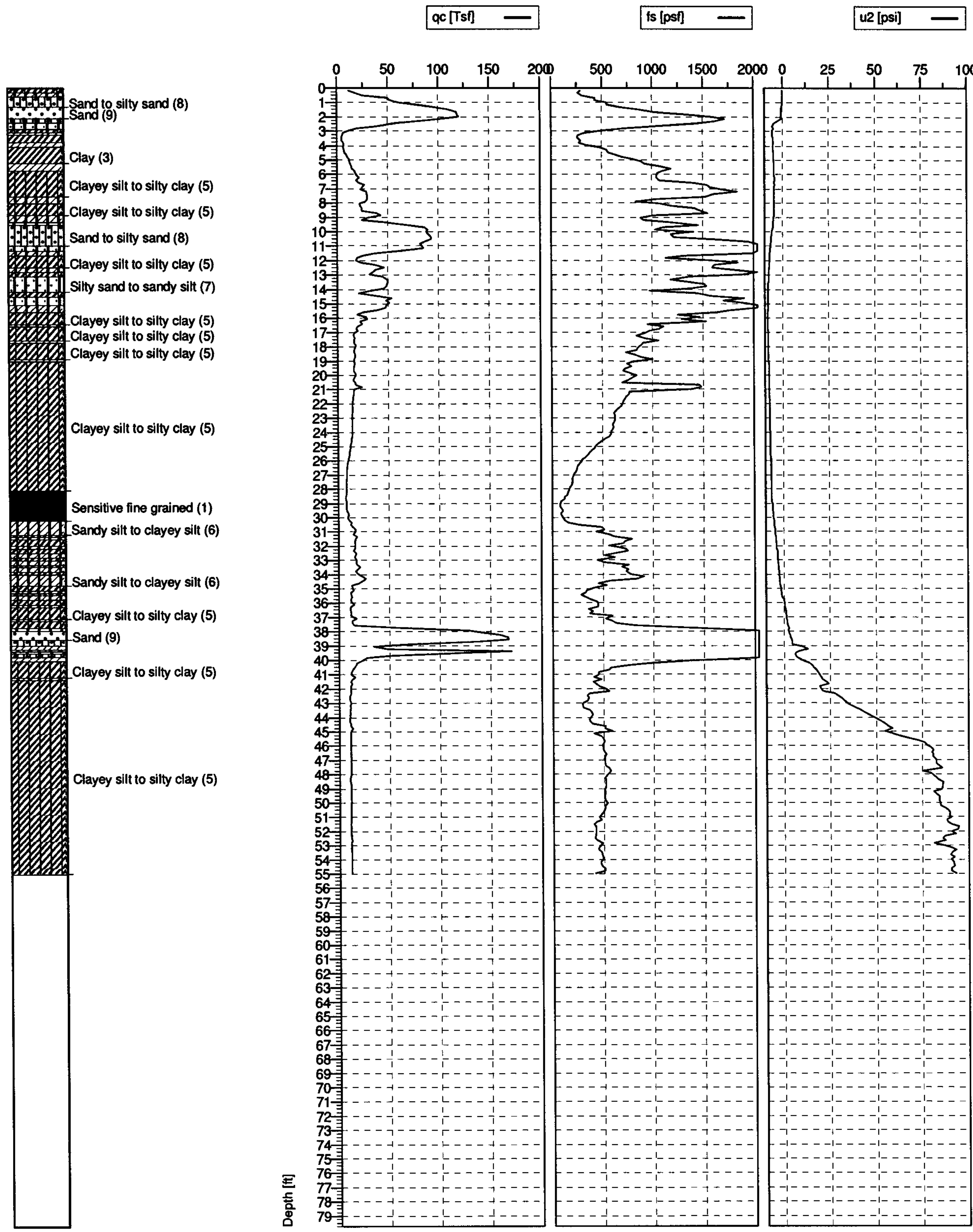
Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: CPT15	Position: ,	Ground level:	
Client:	ST. TAMMANY PARISH SCHOOL BOARD	Date: 12/27/2006	Scale: 1 : 120
Project:	SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY	Page: 1/1	Fig:
	SLIDELL, LOUISIANA	File: h15.cpd	



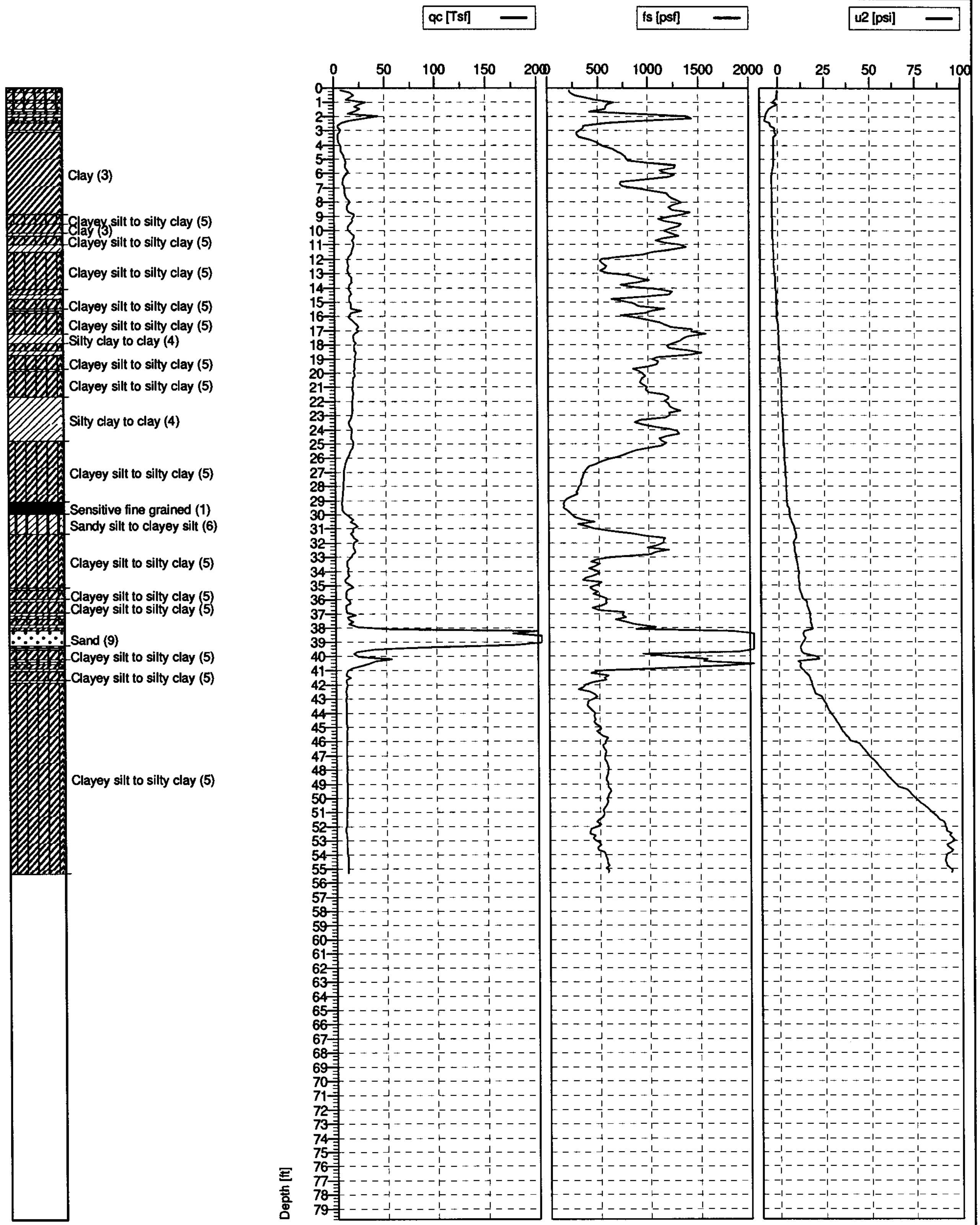
Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: CPT16	Position: ,	Ground level:	
Client:	ST. TAMMANY PARISH SCHOOL BOARD	Date: 12/27/2006	Scale: 1 : 120
Project:	SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY	Page: 1/1	Fig:
	SLIDELL, LOUISIANA	File: h16.cpd	



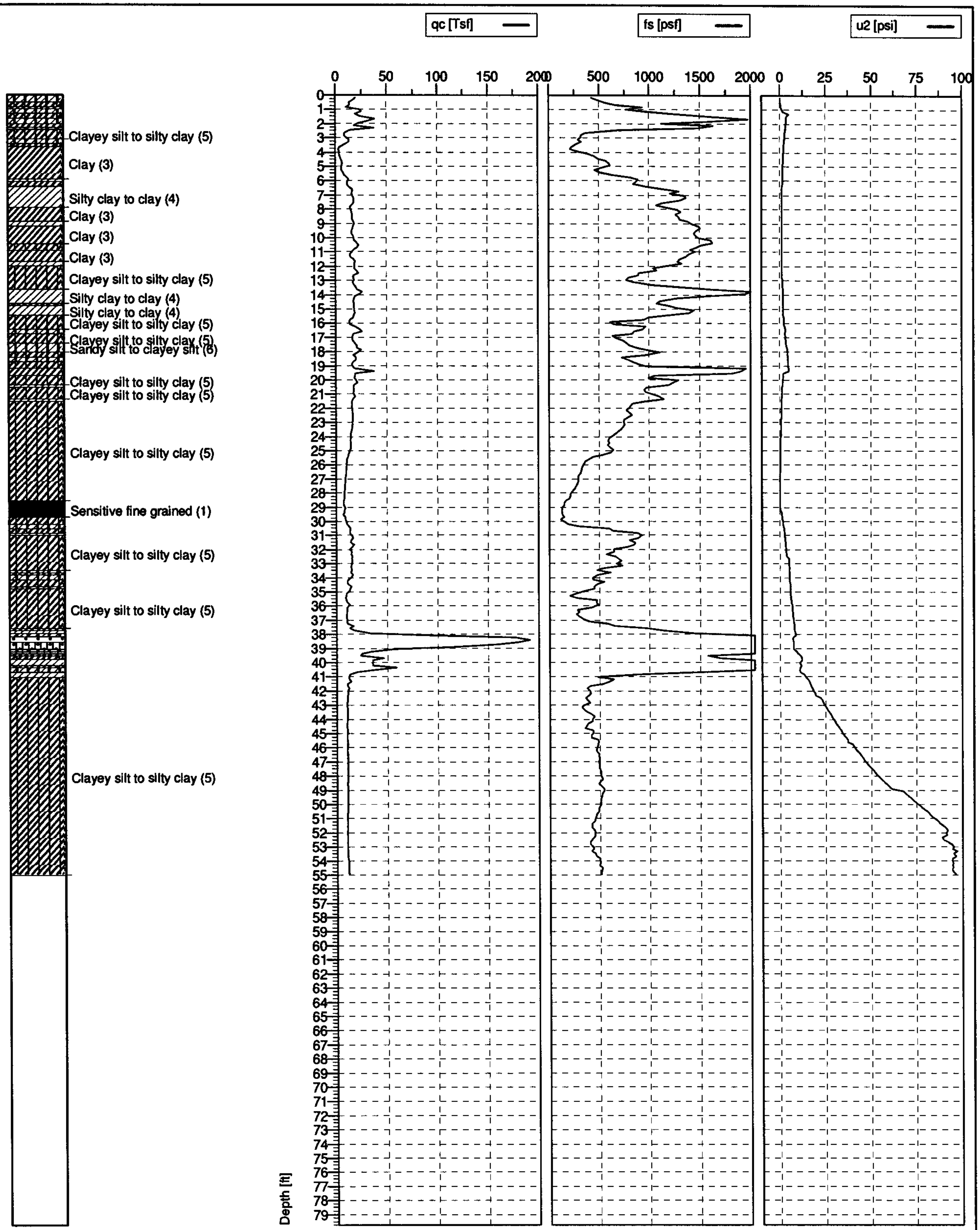
Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: CPT17	Position: ,	Ground level:	
Client: ST. TAMMANY PARISH SCHOOL BOARD		Date: 12/27/2006	Scale: 1 : 120
Project: SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY		Page: 1/1	Fig:
SLIDELL, LOUISIANA		File: h17.cpd	



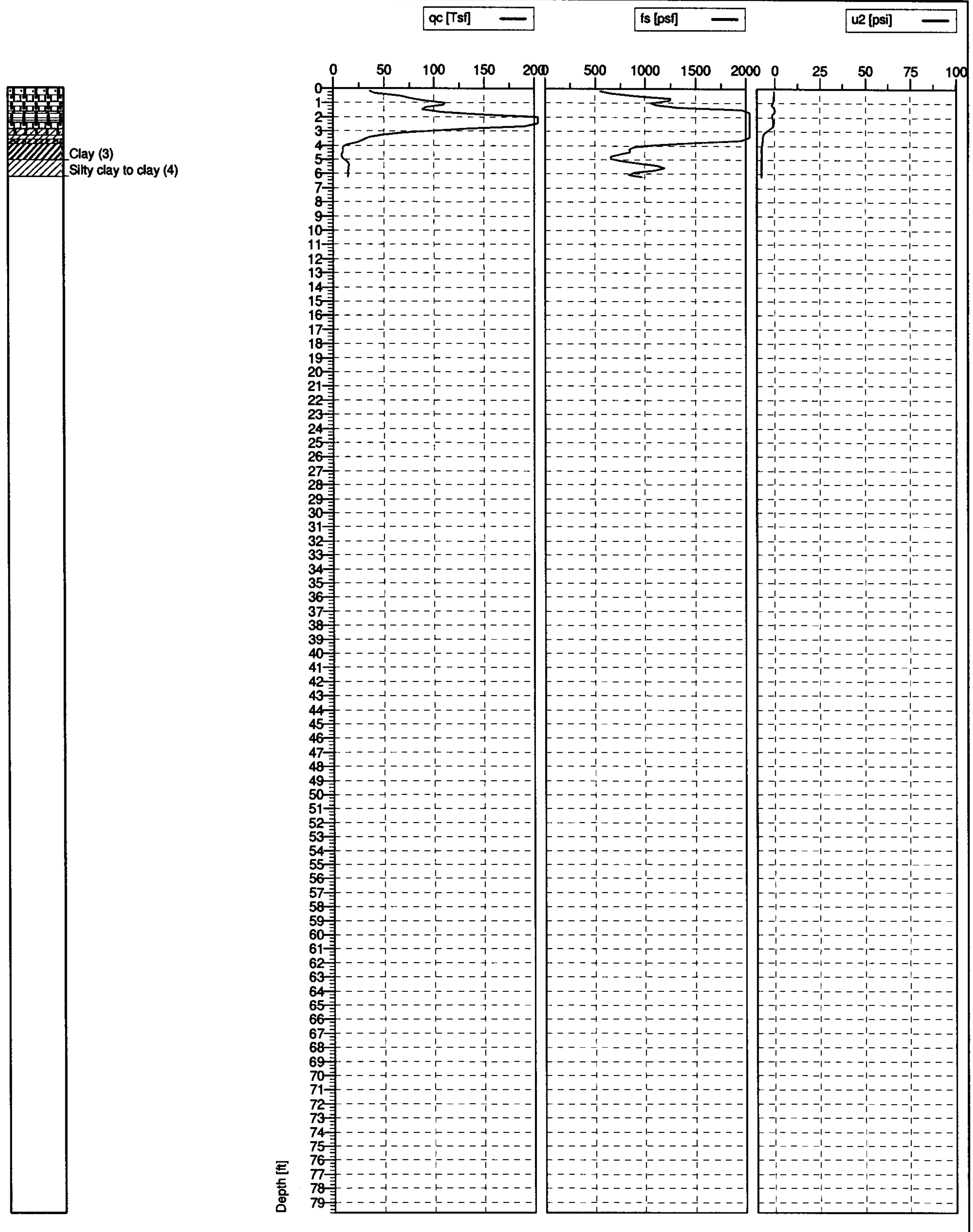
Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: CPT18	Position: ,	Ground level:	
Client:	ST. TAMMANY PARISH SCHOOL BOARD	Date: 12/27/2006	Scale: 1 : 120
Project:	SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY	Page: 1/1	Fig:
	SLIDELL, LOUISIANA	File: h18.cpd	



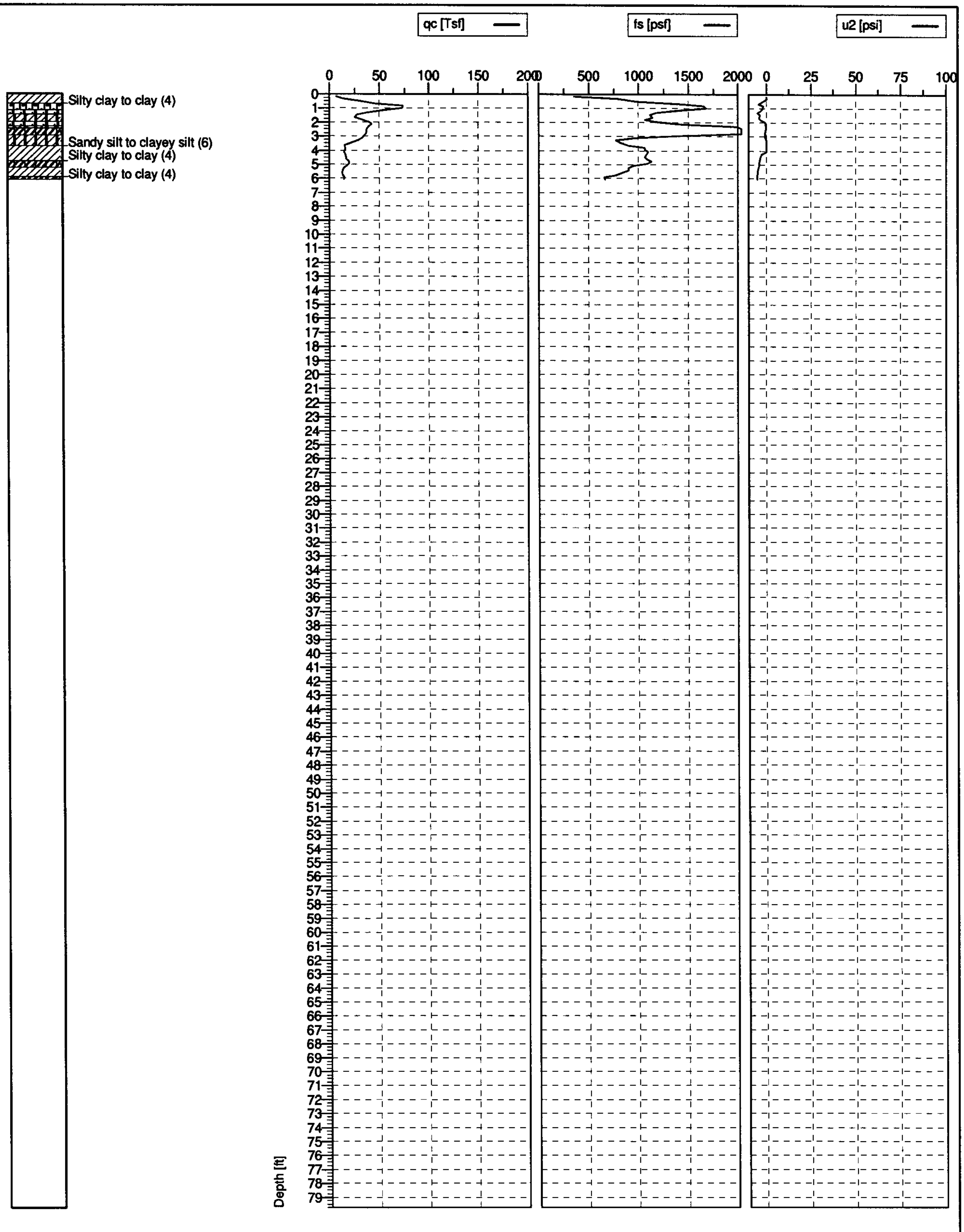
Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: CPT19	Position: ,	Ground level:	
Client: ST. TAMMANY PARISH SCHOOL BOARD		Date: 12/27/2006	Scale: 1 : 120
Project: SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY		Page: 1/1	Fig:
SLIDELL, LOUISIANA		File: h19.cpd	



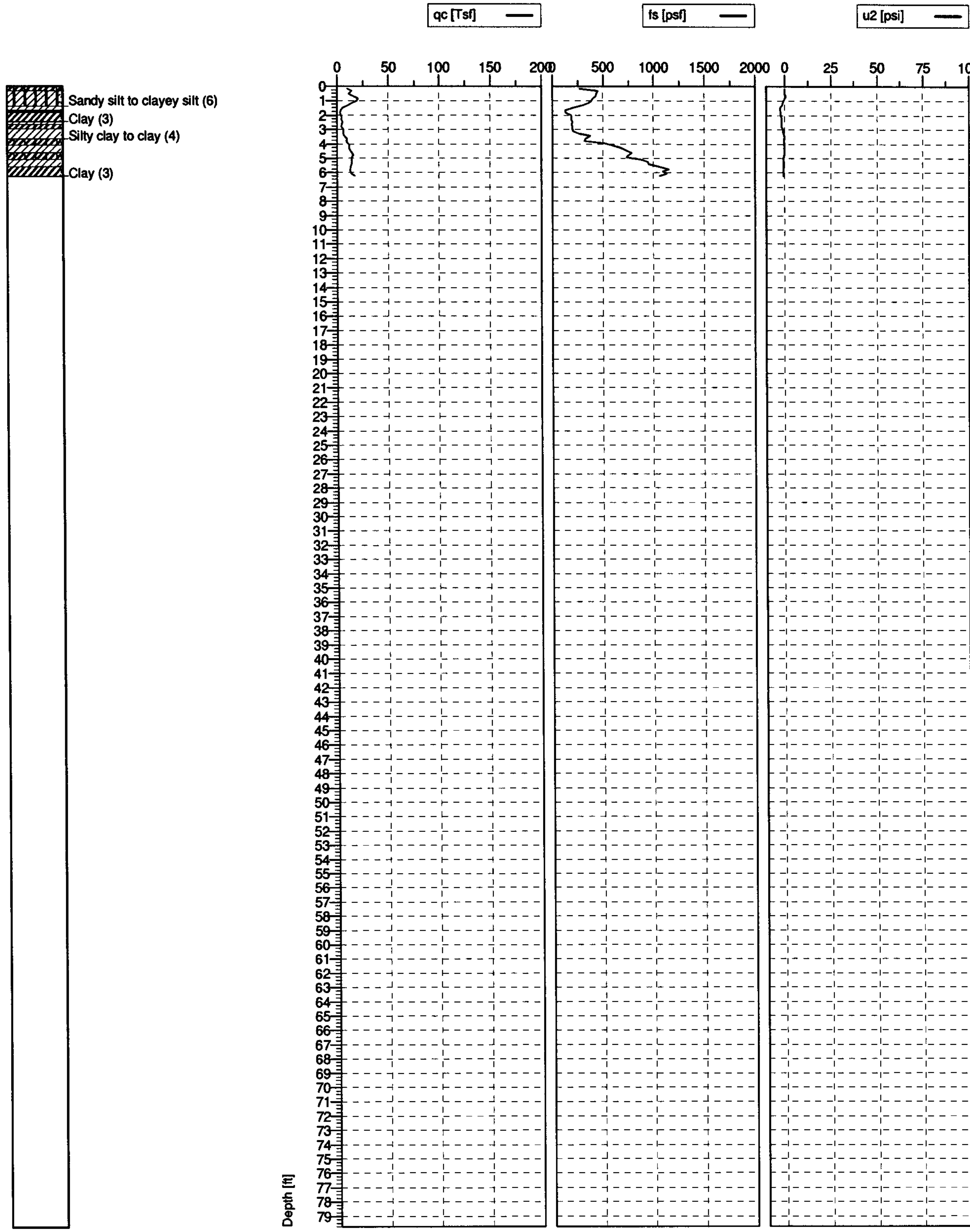
Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: CPT20	Position: ,	Ground level:	
Client: ST. TAMMANY PARISH SCHOOL BOARD		Date: 12/27/2006	Scale: 1 : 120
Project: SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY		Page: 1/1	Fig:
SLIDELL, LOUISIANA		File: h20.cpd	



Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

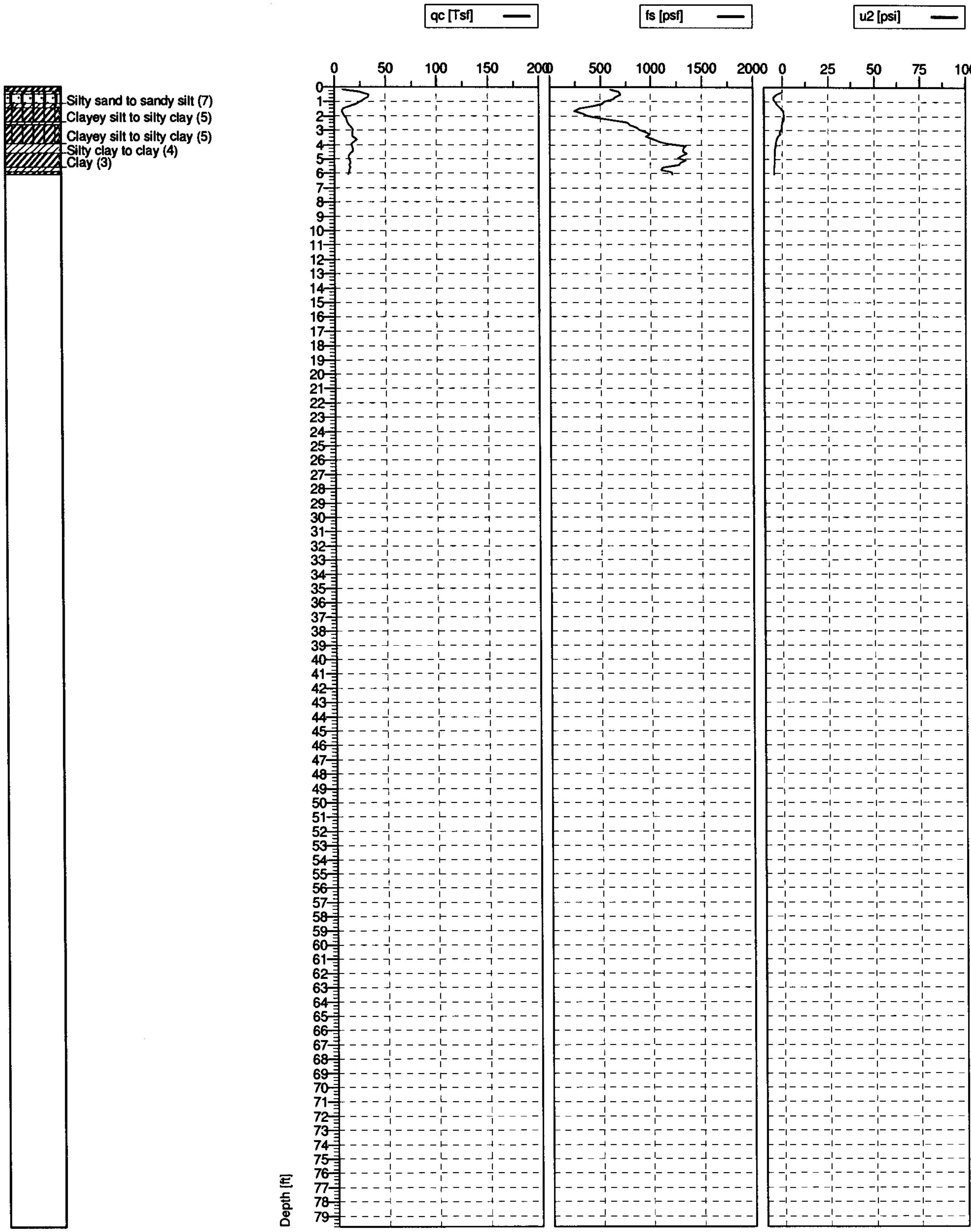
Test no: CPT21	Position: ,	Ground level:	
Client:	ST. TAMMANY PARISH SCHOOL BOARD	Date: 12/28/2006	Scale: 1 : 120
Project:	SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY	Page: 1/1	Fig:
	SLIDELL, LOUISIANA	File: h21.cpd	



U2

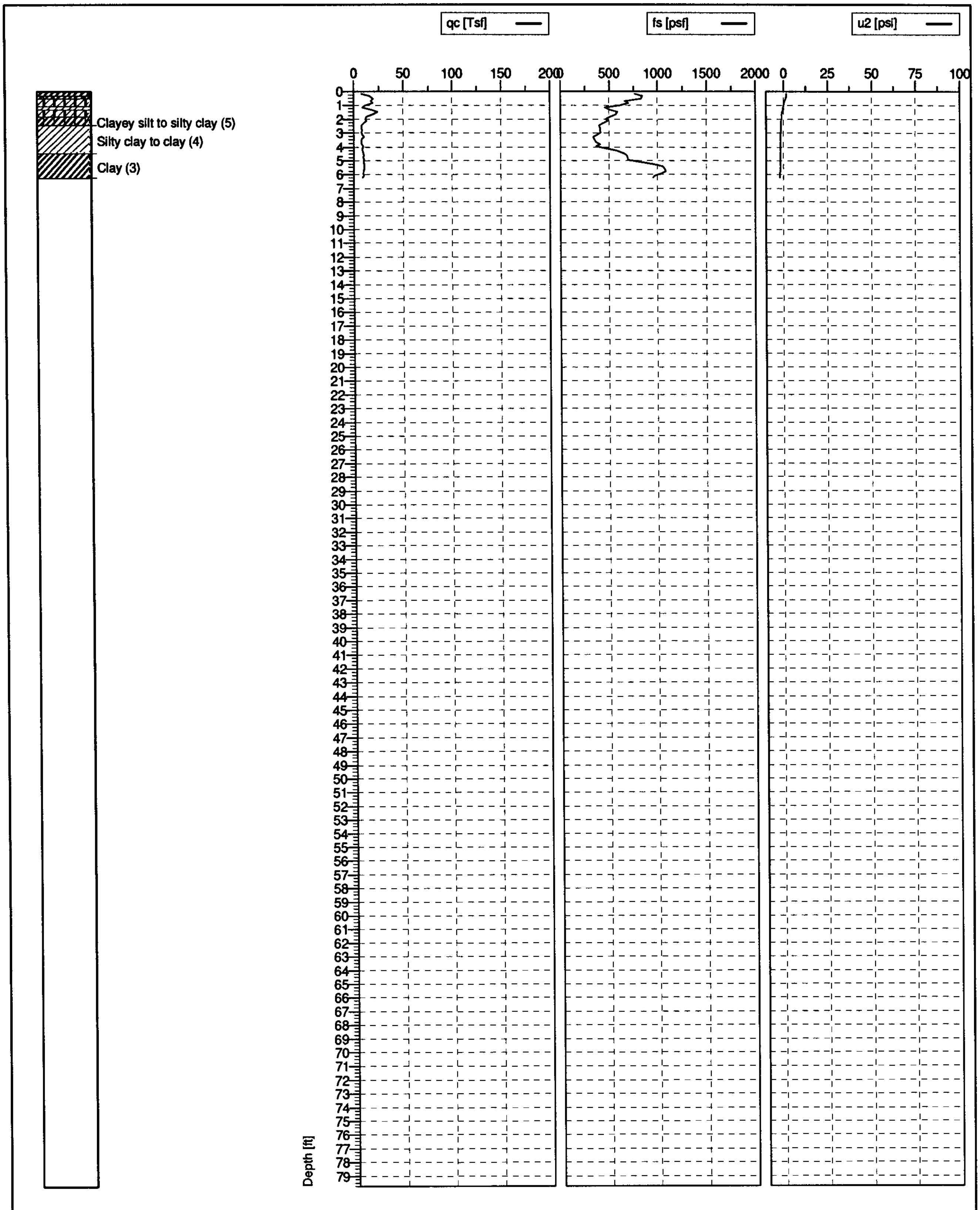
Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: CPT22	Position: ,	Ground level:	
Client:	ST. TAMMANY PARISH SCHOOL BOARD	Date: 12/28/2006	Scale: 1 : 120
Project:	SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY	Page: 1/1	Fig:
	SLIDELL, LOUISIANA	File: h22.cpd	



Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

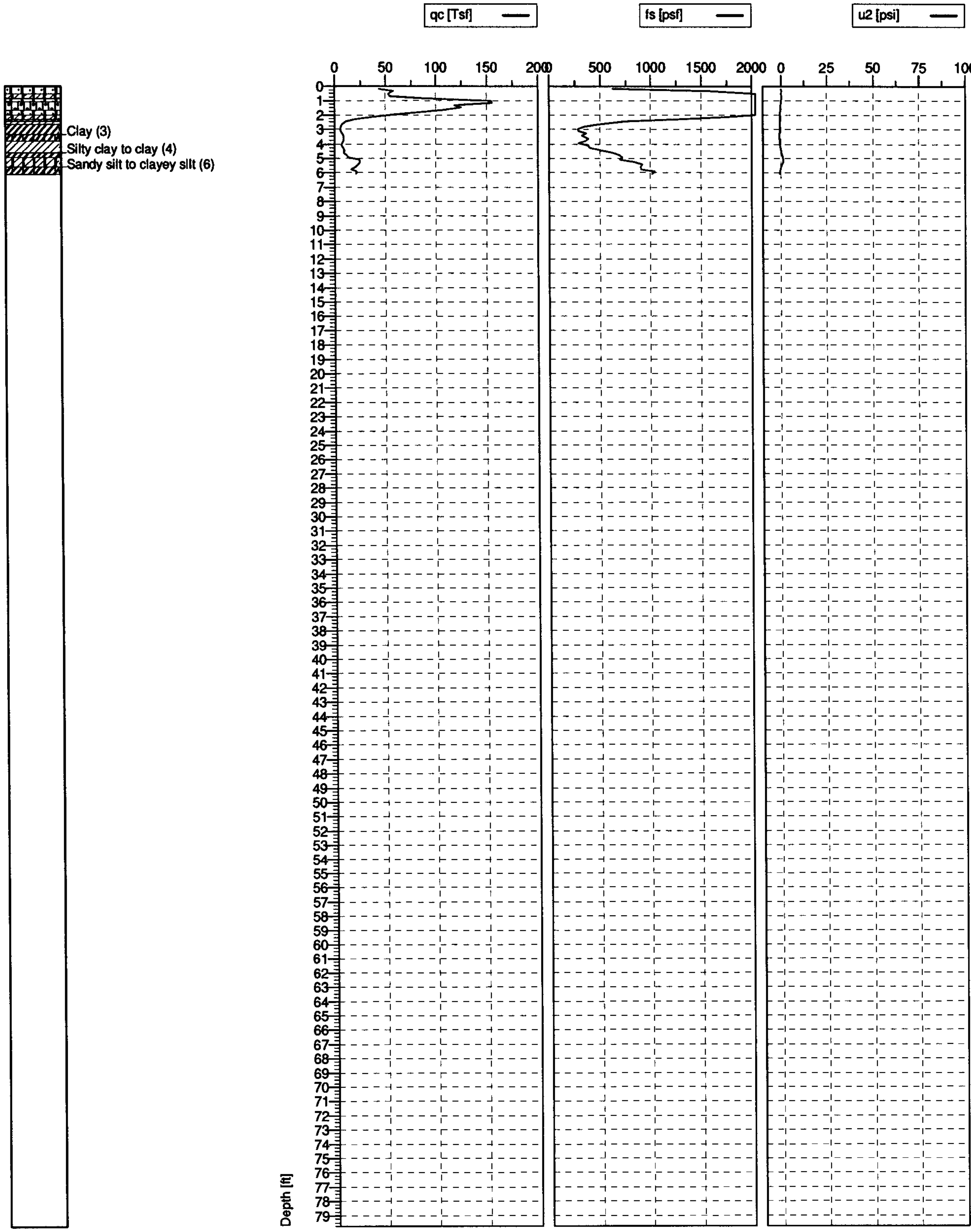
Test no: CPT23	Position: ,	Ground level:	
Client:	ST. TAMMANY PARISH SCHOOL BOARD	Date: 12/28/2006	Scale: 1 : 120
Project:	SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY	Page: 1/1	Fig:
	SLIDELL, LOUISIANA	File: h23.cpd	



U2

Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: CPT24	Position: ,	Ground level:	
Client: ST. TAMMANY PARISH SCHOOL BOARD		Date: 12/28/2006	Scale: 1 : 120
Project: SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY		Page: 1/1	Fig:
SLIDELL, LOUISIANA		File: h24.cpd	



U2

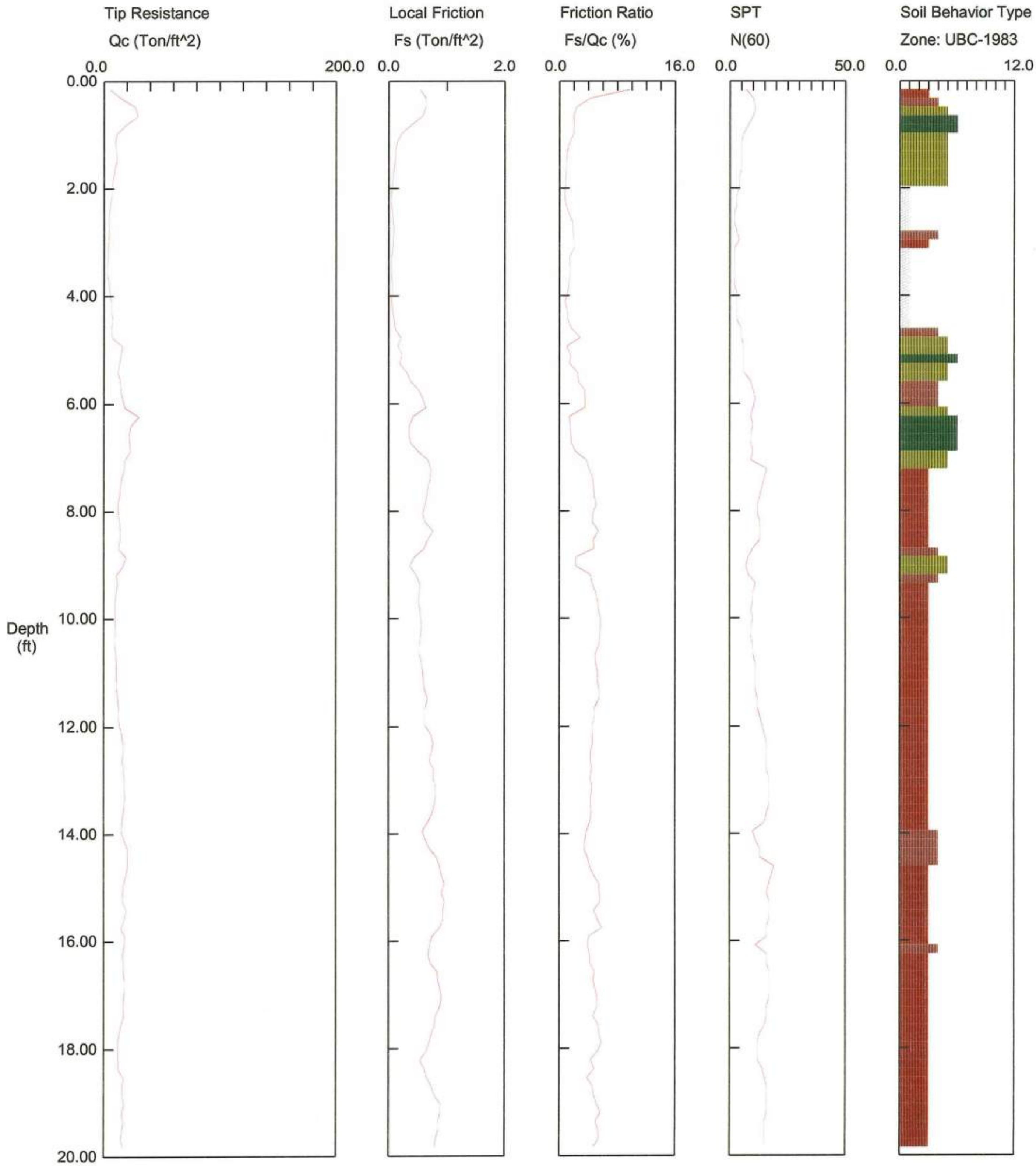
Cone No: DTA1025
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: CPT25	Position: ,	Ground level:	
Client:	ST. TAMMANY PARISH SCHOOL BOARD	Date: 12/28/2006	Scale: 1 : 120
Project:	SALMEN HIGH SCHOOL - NEW SCHOOL FACILITY	Page: 1/1	Fig:
	SLIDELL, LOUISIANA	File: h25.cpd	

Eustis Engineering Company

Operator: TRR & DH
Sounding: CPT26
Cone Used: 702TC

CPT Date/Time: 06-06-00 13:45
Location: EAST ST. TAMMY EVENTS CENTER
Job Number: 16484



Maximum Depth = 21.65 feet

Depth Increment = 0.16 feet

1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

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 ≤ N_c ≤ YYY	
S_u (6)	$S_u = q_c/N_c$	where XXX ≤ N_c ≤ YYY	

Effective Cohesion

$c' = 0.02 * \sigma_p'$ 38

Drained Friction Angle

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

Unit Weight

$\rho = \gamma/\gamma_w$

$\rho = 0.8\mathrm{Log}(V_s)$ 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)	$D_R = 1/2.91 * \ln((q_c/(61 * \sigma'_{vo}{}^{0.71}))*100$	20
D_R (5)	$D_R = 100*(0.268*\ln((q_t/p_a)/(\sigma'_{vo}/p_a)$^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 $I_{cfs} = [(1.95-\mathrm{Log}Q_t)^2+(\log F_r+1.78)^2]^{0.5}$

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

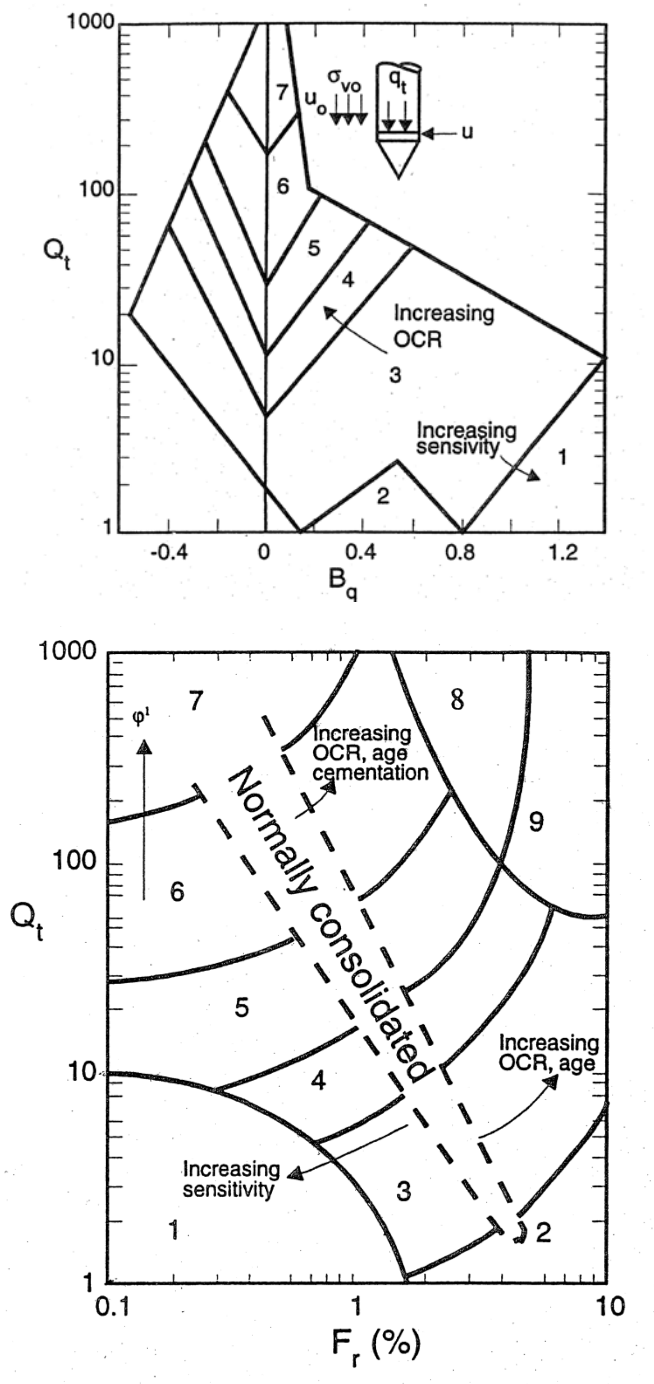
$V_s(4) = 118.8 \cdot \log f_s + 18.5$ (all soils) – m/s and kPa 32

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

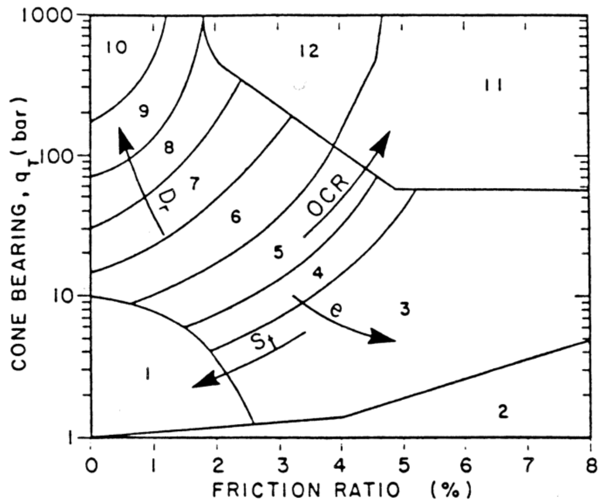
Hydraulic Conductivity

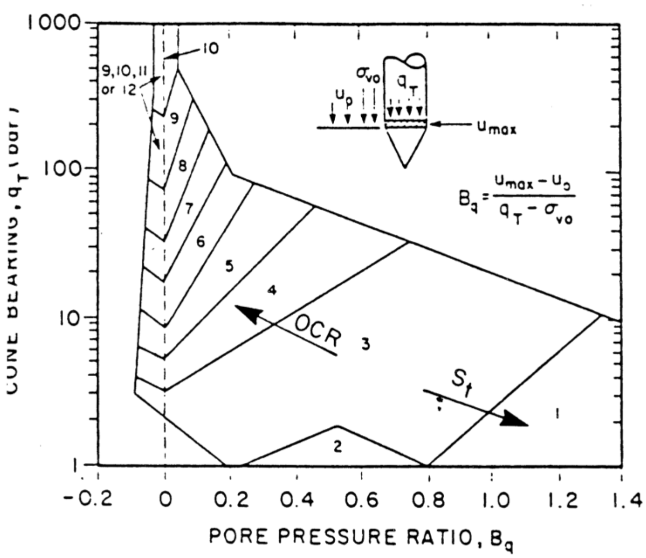
Lookup based on SBT and SBTn (1986 and 1990) 40

Normalized Soil Behavior Types - Robertson & Campanella (1990)



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





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27 August 2021

Neel-Schaffer, Inc.
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Baton Rouge, Louisiana 70810

Attention Mr. Glenn Ledet, Jr., P.E.
Email glenn.ledet@neel-schaffer.com

Ladies and Gentlemen:

Conceptual Design Report
St. Tammany Parish Government
Coastal Flood Protection Project
Task 2
St. Tammany Parish, Louisiana
Eustis Engineering Project No. 24493

Transmitted is an electronic copy of our engineering report covering a geotechnical conceptual design study 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. B.

G. Weinberg/brp/smc

STATE OF LOUISIANA
JAMES J. HANCE
License No. 31270
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

CONCEPTUAL DESIGN REPORT

ST. TAMMANY PARISH GOVERNMENT

COASTAL FLOOD PROTECTION PROJECT

TASK 2

ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING PROJECT NO. 24493

FOR
NEEL-SCHAFFER, INC.
MANDEVILLE, LOUISIANA

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

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27 August 2021

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EUSTIS ENGINEERING PROJECT NO. 24493

INTRODUCTION

1. This report contains the results of our desktop information study to support Neel-Schaffer, Inc. (Neel-Schaffer), with a conceptual design to develop an order-of-magnitude cost estimate for the St. Tammany Coastal Flood Protection located in St. Tammany Parish, Louisiana. Our report was prepared in accordance with Task 2 of Eustis Engineering L.L.C.'s (Eustis Engineering) proposal dated 1 July 2020. Authorization to proceed was provided by Neel-Schaffer with Amendment No. 1 to the Subconsultant Agreement made on 9 November 2020.

SCOPE OF SERVICE

2. The scope of service as described in Amendment No. 1 to the Subconsultant Agreement involves three tasks. This report addresses the scope for Task 2. The Task 2 scope includes performing conceptual-level geotechnical design analyses relative to each of the three proposed flood protection alignments: the West Slidell Ring Levee, the Central Slidell Structural Coastal Flood Risk Reduction ("Slidell Ring Levee"), and the Eden Isle Ring Levee. Changes to the scope of work were made via email correspondence with Mr. Don Lancaster, P.E., representing Neel-Schaffer, as additional information was obtained, and design alternatives were developed for the three alignments. For the Eden Isle Ring Levee, additional analyses were requested to include three alternative alignments (West, South,

and East Alternatives) along with an intermediate flood protection level on 9 December 2020. For the West Slidell Ring Levee, additional analyses were requested to include three alternative alignments (Alternatives 1, 2, and 3) on 11 February 2021. The Slidell Ring Levee was removed from the scope on 26 May 2021 in a notice to proceed to finalize this Task 2 report. Each alignment is being considered for 100-year protection levels. Our scope is a study that includes conceptual-level geotechnical design recommendations for earthen levees without geotextile reinforcement and pile-supported concrete floodwalls ("T-Walls"). This geotechnical report includes levee foundation settlement estimates due to new loading, seepage potential evaluation for cutoff below the T-walls, deep-seated global stability analyses for levees and T-walls, and allowable axial pile load capacity estimates for support of the T-walls.

COMPUTER PROGRAMS

3. The following computer programs were used to evaluate the proposed project features.

   a) Microsoft Excel, Version for Microsoft Office 365
      a. Settlement of new earthen levees
      b. Allowable axial pile load capacity estimates for support of T-walls and surge barrier
      c. Estimate of Horizontal Subgrade modulus of subgrade reaction for support of vertical and batter piles

   b) Stability Analysis, Spencer's Method with optimization search routine using SLOPE/W, Version 2019 R2, by Geo-Slope International, Ltd.
      a. New earthen levee stability
      b. T-wall and surge barrier stability

<u>GEOTECHNICAL AND HYDRAULIC DESIGN CRITERIA</u>

4. The project design criteria used in the geotechnical analyses are described in detail in the U.S. Army Corps of Engineers' (USACE) Hurricane and Storm Damage Risk Reduction System Design Guidelines (HSDRRSDG), dated 14 June 2012. Additional design criteria prepared by the USACE and referenced for our analyses include:

- EM 1110-2-2502, Retaining and Flood Walls, dated September 1989;
- EM 1110-2-2504, Design of Sheet Pile Walls, dated March 1994;
- EM 1110-2-2906, Design of Pile Foundations, dated January 1991;
- EM 1110-2-1902, Slope Stability, dated October 2003;
- EM 1110-2-1913, Design & Construction of Levees, dated April 2000;
- EM 1110-2-1901, Seepage Analysis and Control for Dams, dated April 1993;
- EM 1110-1-1904, Settlement Analysis, dated September 1990;
- EM 1110-1-1804, Geotechnical Investigations, dated January 2001;
- ER 1110-1-1807, Drilling in Earth Embankment Dams and Levees, dated December 2014;
- DIVR 1110-1-400, Soil Mechanic Data, dated December 1998;
- ETL 1110-2-569, Design Guidance for Levee Underseepage, dated May 2005;
- Engineering Manual (EM) 1110-1-1904; Settlement Analysis, dated September 1990;
- EM 1110-1-1905, Bearing Capacity of Soils, dated October 1992;
- Geotechnical Design Memorandums for WSLP
- Engineering Technical Letter (ETL) 1110-2-569, Design Guidance for Levee Underseepage, dated May 2005;
- Division Regulation (DIVR) 1110-1-400, Soil Mechanic Data, Section 8, Groundwater and Seepage, dated December 1998; and
- LPILE Method for Evaluating Bending Moments in Batter Piles Due to Ground Settlement for Pile-Supported Floodwalls in New Orleans and Vicinity, Final Contract Report, dated September 2012.

- Settlement Induced Bending Moment, Fixed vs. Pinned (R02), dated 31 January 2020.

5. The HSDRRS design guidelines shall supersede all applicable EM and ETL criteria. Table 1 summarizes the geotechnical criteria and required factors of safety.

TABLE 1: GEOTECHNICAL DESIGN CRITERIA

ITEM	LOADING CONDITIONS		FACTOR OF SAFETY	CONDITION
	WATER LEVEL (1)	SHEAR STRENGTH PARAMETER (2)		
Pile Capacity (Axial)	N/A	Q	2.0	With Load Test
	N/A	Q	3.0	Without Load Test
	N/A	Q	2.5	With Dynamic Pile Test
	N/A	S	1.5	With or Without Load Test
Deep-Seated Stability of Pile Supported Structures Using Spencer's Method (and Optimization Search Routine)	SWL	Q	1.5	If target factor of safety is not achieved, determine required unbalanced force to achieve this target factor of safety
	EWL/TOW	Q	1.4	
	LWL	Q	1.4	
	LWL	S	1.4	
Deep-Seated Stability of Pile Supported Structures Using Janbu's Method(3)(4)	SWL	Q	1.3	
	EWL	Q	1.2	
	LWL	Q	1.3	
Deep-Seated Global Stability of Levee Using Spencer's Method	LWL	Q	1.4	-
	LWL	S	1.4	-
	SWL	Q	1.5	-
	PGL	Q	1.4	-
	CGL	Q	1.2	-

ITEM	LOADING CONDITIONS		FACTOR OF SAFETY	CONDITION
	WATER LEVEL (1)	SHEAR STRENGTH PARAMETER (2)		
Deep-Seated Global Stability of Levee Using Janbu's Method(5)	LWL	Q	1.3	-
	LWL	S	1.3	-
	SWL	Q	1.3	-
	PGL	Q	1.2	-
	CGL	Q	NA	-

(1) SWL = Still Water Level; EWL = Extreme Water Level/TOW = Top of Wall; LWL = Low Water Level; PGL = Project Grade Level (Net Grade); CGL = Construction Grade Level (PGL + overbuild)

(2) Q = Unconsolidated Undrained Shear Strengths (Quick, short-term); S = Consolidated Drained Shear Strengths (Slow, long-term)

(3) Janbu's Method is used as a design check only for T-walls and should not be used for design. Spencer's Method is the design tool. Janbu's method should be used in lieu of the USACE's Method of Planes as a check of the factor of safety using force equilibrium. We neglected analyses by Janbu's method considering the conceptual level of these analyses.

(4) Low water level S-Case analyses were also evaluated for the structures, but insufficient driving forces were computed to determine a factor of safety.

(5) Janbu's method should be used in lieu of the USACE's Method of Planes as a check of the factor of safety using force equilibrium. We neglected analyses by Janbu's method considering the conceptual level of these analyses.

6. Hydraulic design criteria were provided as presented in Table 2. The application of factors of safety is discussed in detail in this report.

TABLE 2: HYDRAULIC DESIGN CRITERIA

DESIGN FEATURE	ELEVATION, FEET (NAVD 88)	
	Top of Wall (EWL) or Levee Crown Elevation (PGL)	Intermediate Top of Wall (EWL) or Levee Crown Elevation (PGL)
Eden Isle Levees	18.0	11.0
Eden Isle T-Wall	18.0	11.0
Eden Isle Lake Surge Barrier	18.0	11.0
West Slidell Levees	14.5	11.0

7. The low water design elevation (LWL) for non-hurricane conditions had an assumed elevation at the existing ground surface of each levee design alternative. Considering the

preliminary nature of our analyses, we conservatively assumed a still water level for design flood events (SWL) at the levee crown elevation (PGL). For these preliminary analyses, a unit weight of water of 62.4 pcf was used on the flood side and protected side of the proposed flood protection. For final design and analyses using site-specific geotechnical data, HSDRRS criteria will respectively require a water unit weight of 64 pcf and 62.4 pcf for the flood side and protected side of the flood protection.

GEOTECHNICAL DATA AND SOIL DESIGN PARAMETERS

8. Our Task 1 scope included performing an evaluation of historical geotechnical explorations performed in the vicinity of the three proposed flood protection alignments and preparation of preliminary soil design parameters for each. In our Task 1 report, dated 19 January 2021, we present conceptual level soil design parameters on Figure 5, Sheets 1 through 3, for each alignment. For the purposes of this report, preliminary soil parameters for the Eden Isle Ring Levee and West Slidell Ring Levee, respectively, are presented on Figure 5, Sheet 1 and 3.

FOUNDATION ANALYSES

9. Furnished Information. The project comprises consideration of new earthen levees with and without geosynthetic reinforcement and floodwalls. Depending on the heights and structural design requirements of these floodwalls, the various floodwall designs considered by the Coastal Protection and Restoration Authority (CPRA) and the U. S. Army Corps of Engineers (USACE) are (in order of increasing levels of height and strength): I-walls, L-walls, and T-walls. Based on conceptual layouts provided by Neel-Schaffer, new earthen levees are being considered for three alternative alignments for both the Eden Isle Ring Levee and West Slidell Ring Levee. Based on correspondence, dated 20 December 2020, T-wall structures are also being considered at four locations along the Eden Isle Ring Levee as described in Table 3.

TABLE 3: T-WALL STRUCTURES CONSIDERED FOR THE EDEN ISLE RING LEVEE ALTERNATIVE ALIGNMENTS

EDEN ISLE RING LEVEE ALTERNATIVE	LOCATION OF T-WALL STRUCTURES
East Alternative 2	I-10 Median Wall
South Alternative 1	Lake Surge Barrier
South Alternative 2	Floodwall Along Lakeview Drive
West Alternative 3	Highway 11 Floodwall

10. Appendices I and II shows concepts of the Eden Isle Ring Levee and West Slidell Ring Levee, respectively, and associated alternatives that were considered in the development of this report.

Iterative Design and Analyses of Eden Isle Ring and West Slidell Ring Levees

11. Iterative Design Approach. Our design approach included selection of design overbuild heights based on settlement estimates for our typical levee section analyses. Strength gain estimates beneath the levee centerline was not estimated for our analyses because of the conceptual nature of this initial, geotechnical engineering study. Adjustments to stability berm geometries were then completed to achieve the required factor of safety for deep-seated global stability. These adjustments were then checked to confirm no substantial change to the total settlement was estimated. We present the results of our selected cross-section based on multiple design iterations.

12. Levee Geometry Assumptions. Our stability analyses consider a typical levee cross-section with a 10-ft crown width with 3 horizontal on 1 vertical (3H:1V) side slopes of the levee section. For levee geometries that did not meet factor of safety requirements, protected and flood side berms were added, and widths adjusted until the factor of safety requirement was met. A summary of the levee geometry assumptions used in our analyses along with figure references are presented in Table 4.

TABLE 4: LEVEE GEOMETRY ASSUMPTION SUMMARY AND FIGURE REFERENCES

LEVEE DESIGN SECTION	GEOMETRY	REVISED FLOOD AND PROTECTED BENCH ELEVATION (NAVD 88)	REVISED FLOOD SIDE BENCH WIDTH IN FEET	PROTECTED SIDE BENCH WIDTH IN FEET	CROWN WIDTH IN FEET	SIDE SLOPE INCLINATIO N	FIGURE
Eden Isle Ring Levee East Levee (1 & 3) & South 3	ORIGINAL[1]	NA	NA	NA	10	3H:1V	FIGURE 1 SHEETS 1-8
Eden Isle Ring Levee West Levee (1, 2A, & 2B) 100 Year Design	ORIGINAL[2]	NA	NA	NA	10	3H:1V	NOT PRESENTED
	FINAL BENCH	7	9	9	10	3H:1V	FIGURE 1 SHEETS 9-12
Eden Isle Ring Levee West Levee (1, 2A, & 2B) Intermediat e	ORIGINAL[1]	NA	NA	NA	10	3H:1V	FIGURE 1 SHEETS 13-16
West Slidell Ring Levee Alternatives 1-3 100 – Year Design	ORIGINAL[2]	NA	NA	NA	10	3H:1V	NOT PRESENTED
	BENCH[3]	5	10	10	10	3H:1V	FIGURE 2 SHEETS 1-5
	FINAL BENCH	5	10	17	10	3H:1V	FIGURE 2 SHEETS 6-10

1. The typical levee design cross section meets factor of safety requirements.
2. The typical levee design cross section does not meet the factor of safety requirements for the project and required us to evaluate a benched levee design cross section in order to develop new sections meeting the safety factor criteria.
3. The originally assessed benched levee design cross section did not meet factor of safety requirements for the project and required evaluation of a widened protected side bench.

13. Levee Consolidation Settlement. To estimate levee overbuilds, analyses were performed to estimate settlement beneath the center of the proposed levees using a Microsoft Excel spreadsheet that calculates and applies Westergaard Theory of Stress Distribution and estimates magnitudes and rates of consolidation settlement based on Terzaghi's one-dimensional consolidation theory. Our analyses consider design parameters for the Eden Isle Ring and West Slidell Ring as respectively presented on Figure 3 Sheet 1 and 3 of our Task 1 report. A summary of settlement and levee overbuild estimates are presented in Table 5.

TABLE 5: SETTLEMENT AND LEVEE OVERBUILD ESTIMATES

LEVEE DESIGN SECTION	FLOOD PROTECTION ELEVATION (NAVD 88)	GROUND SURFACE ELEVATION (NAVD 88)	ESTIMATED SETTLEMENT/ OVERBUILD IN FEET	CROWN ELEVATION WITH OVERBUILD (NAVD 88)
Eden Isle Ring Levee East Levee (1 & 3) & South 3 100–Year Flood Protection	18	6	1.0	19
Eden Isle Ring Levee East Levee (1 & 3) & South 3 Intermediate Flood Protection	11	6	0.5	11.5
Eden Isle Ring Levee West Levee (1, 2A, & 2B) 100–Year Flood Protection	18	1	1 to 2	19
Eden Isle Ring Levee West Levee (1, 2A, & 2B) Intermediate Flood Protection	11	1	0.5	11.5
West Slidell Ring Levee Alternatives 1-3 100–Year Design	14.5	1	1.5	6

14. Our analyses neglect lateral spread of soft surficial deposits that will occur during construction. The extent and magnitude of lateral spread is dependent upon the contractors means and methods. More refined settlement analyses for during and after construction scenarios are generally considered during the preliminary and final design phases of a project and are only warranted when site-specific geotechnical data are the basis of the analyses.

15. Deep-Seated Global Stability. Deep-seated stability analyses of the earthen levees were performed for typical levee sections using Spencer's Method of Slices with the program SLOPE/W, Version 10.1, by GEO-SLOPE International Ltd. These analyses were checked using Q-case and S-case soil parameters as outlined in Table 1. We considered circular

methods with optimization (Spencer's only) and tension crack lines in the active slices. We provide a summary of our deep-seated global stability analyses on Sheets 1 and 2 of Appendix III. We neglected analyses by Janbu's method considering the conceptual level of these analyses. Outputs from our Spencer's analyses are furnished on Figures 1 and 2.

16. Our preliminary analyses do not indicate a need for geosynthetic fabric placed beneath the levee at this time but may be required for construction in the marsh to reduce the amount of lateral spread/settlement during construction.

17. After appropriate geotechnical data is collected for the project, the earthen levees should also be analyzed using Janbu's method for CGL, PGL, SWL, and LWL conditions. Note, that results using Janbu's are not used in design and are just for comparison purposes with Spencer's Method. Analyses following Janbu's method are in place of the USACE's MOP.

Levee Seepage

18. Levee Underseepage. We do not anticipate levee underseepage will be a critical design case for the Eden Isle Ring and West Slidell Ring levees based on the significant width of the levees and the predominance of clay deposits in the subgrade. However, the potential for levee underseepage can significantly increase with the presence of surficial granular deposits or soils with sand lenses. Levee underseepage would be evaluated after obtaining additional geotechnical data along the proposed levee alignments.

Deep-Seated Stability Analyses – T-Walls

19. Design Methods and Assumptions. Deep-seated stability analyses were performed for proposed T-Walls at three alternative locations of the Eden Isle Ring Levee and a T-Wall for the Lake Surge Barrier following Spencer's Method of Slices with the program SLOPE/W, Version 10.1, by GEO-SLOPE International Ltd. Our analyses generally follow

criteria provided in the HSDRRS design guidelines and shown in Tables 1 and 2 of this report. The guidelines require analyses by the Spencer's Method for non-circular failures. We neglected analyses by Janbu's method considering the conceptual level of these analyses. We evaluated Q-case conditions. We completed proposed T-Walls for East Alternative 2 (I-10 Median Wall), South Alternative 1 (Lake Surge Barrier), South Alternative 2 (Floodwall Along Lakeview Drive), and West Alternative 3 (Highway 11 Floodwall). We evaluated storm loading levels at TOW (100-Year protection level) and SWL (also intermediate protection level). For our analyses, we assumed a T-wall slab thickness of 5 feet and respective widths of 15 and 30 feet.

20. For the Spencer's analyses, if the factor of safety of a critical surface is greater than that required in Table 1, the structural design can proceed without the need of applying an unbalanced force in the pile group analysis software. If the factor of safety of the critical failure surface is less than required, the analyses proceeds to Step 2 of the guidelines.

21. Step 2 includes computation of an unbalanced force (FUB) necessary to achieve the required minimum factor of safety. The unbalanced force is estimated through a trial-and-error process where the load is varied until the desired factor of safety is achieved. The critical failure plane is defined as a failure surface that produces the greatest unbalanced load. Where unbalanced loads are present, the axial pile capacity developed above the critical failure plane is disregarded.

22. Step 3 of the design includes computation of allowable axial capacity. In addition, computation of allowable shear loads on individual piles at the critical failure surface is made using the program LPILE. LPILE analyses are provided in this report.

23. Step 4 includes use of CPGA to analyze all load cases and perform a preliminary pile and T-wall design. Step 5 includes analyses using the GROUP pile program to verify the preliminary CPGA design. These analyses were performed by the structural engineer.

24. After appropriate geotechnical data is collected for the project, the T-wall monoliths should also be analyzed using Janbu's method for EWL and SWL conditions. Note, that results using Janbu's are not used in design and are just for comparison purposes with Spencer's Method. Analyses following Janbu's method are in place of the USACE's MOP.

25. Results of Spencer's Method. Ground surface level configurations at el -6, el +6, and el +8 were evaluated for the proposed T-walls for 100-year (TOW) and intermediate (SWL) protection levels. We considered short-term (Q-case) and long-term (S-case) analyses. No Q-case and S-case analyses resulted in the need for unbalanced loads to achieve necessary factors of safety. Results of the stability analyses by the Spencer's Method are summarized in Sheet 3 of Appendix III. Results from our Spencer's analyses are shown on Figure 3.

Piping Analyses for T-Walls

26. Design Methods and Assumptions. Piping potential was evaluated using the Lane's Weighted Creep Ratio (LWCR). Sheetpile tip penetrations were designed to provide a minimum LWCR of 3 (clay). Clay strata are predominant based on review of the geotechnical data. This information was incorporated into the design. The flow path was assumed only to be the penetration of the sheetpile, and horizontal contacts were not assumed. A summary of required sheetpile tip elevation based on LWCR is presented in Table 6.

TABLE 6: REQUIRED MINIMUM SHEETPILE TIP ELEVATIONS FOR T-WALLS

STRUCTURE	EXISTING GROUND SURFACE (NAVD 88)	ASSUMED T-WALL BOTTOM ELEVATION (NAVD 88)	MINIMUM SHEETPILE TIP ELEVATION (NAVD 88)	WATER AT TOP OF WALL ELEVATION (NAVD 88)	WATER ON PROTECTED SIDE ELEVATION (NAVD88	DIFFERENTIAL HEIGHT ANALYZED IN FEET
Eden Isle Ring Levee Wall – East Case 2	+6	+1	-26	+18	+6	12
Eden Isle Ring Levee Wall – South Case 1	-6	-11	-38	+18	0	18
Eden Isle Ring Levee Wall – South Case 2	+6	+1	-26	+18	+6	12
Eden Isle Ring Levee Wall – West Case 3	+8	+3	-24	+18	+8	10

Pile Foundations

27. Design Methods and Assumptions. Computations were made to estimate the allowable single pile load capacity for two sizes of steel H-Piles installed at ground surface configurations at el +6 and el -6. This is part of Step 3 of the USACE T-wall design procedure. Capacity estimates were computed for piles driven for support of the T-walls. We only considered steel H-piles because they are the typical pile used for T-wall foundations. Our pile capacity estimates were computed for Q-case soil parameters which typically govern in southeast Louisiana where the foundation deposits are generally soft to medium stiff clays. The analyses procedure followed the HSDRRSDG. The estimated allowable single pile load capacity (factor of safety ≈ 2.0) for piles installed at el +6 and el -6 are respectively provided on Figures 4 and 5. Application of factors of safety should follow Table 1. Appropriate pile testing will be required. Installation and testing recommendations should be addressed after obtaining additional geotechnical data.

28. Batter Piles. The allowable pile load capacity estimates we present on Figures 4 and 5 are for vertically driven pile installations, but these estimates can also be used to estimate

load capacity for piles driven with a batter (i.e., inclined piles). The vertical pile load capacity estimate is equivalent to the vertical component of a batter pile that has the same tip elevation. From this relationship, you can use the batter (inclination) geometry to estimate axial capacity and the horizontal component of a batter pile as shown on Figure 6. These correlations should also be used when assessing static load test requirements.

29. Pile Group Capacity and Spacing. Piles will derive a majority of their supporting capacity from skin friction. Therefore, it will be necessary to consider the effect of group action. In this regard, the supporting value of the piles driven in groups should be investigated on the basis of group perimeter shear by the formula shown on Figure 7. The minimum spacing between piles will be determined using the formula shown on Figure 7.

30. Lateral Loads. The modulus of horizontal subgrade reaction (Kh) necessary for evaluating lateral support of vertical and batter piles should be estimated using the table of values we present on Figure 8.

31. Estimated Pile Settlement – Sustained Structural Loads. Long-term settlements of individual pile foundations, due to sustained structural loads, have not been estimated at this time. At this time, settlement due to structural loading is expected to be minimal as pile-founded structures will likely receive support from piles bearing in the Pleistocene soils along the project alignments. These estimates assume piles will be driven in rows supporting the T-walls and do not include the elastic deformation of the piles. Elastic deformation will be estimated as 67% to 75% of the static column strain.

32. Estimated Pile Settlement – Downdrag due to Fill Placement. Placement of fill to construct the adjacent levees will result in settlement of the foundation deposits. The piles supporting the T-walls that connect with levee alignments will also be affected by

placement of fill on the site. As fill settles from consolidation of the underlying deposits, negative skin friction (drag loads) is induced on the piles as the soil settles along the pile. These drag loads will result in additional pile settlement and may also result in additional bending of batter piles. However, these estimates depend on the thickness of fill to be placed and the utilization of ground improvement using a surcharge program. We anticipate drag loads following completion of a construction surcharge program will be negligible. Additional analyses should be completed once additional geotechnical data is obtained along the project alignment and preliminary grading and civil/structural plans have been developed.

33. Settlement-Induced Bending Moment. Settlement-induced bending moments (SIBM) are a design consideration that should be considered when designing floodwall connections to levee alignments. SIBM is generated when settlements are caused by fill placement (e.g., levee embankments), and inclined (batter) piles that are positioned within a settling foundation deposit will tend to deflect and have an associated bending moment induced. This becomes a structural design check on the pile, and this is handled in final design.

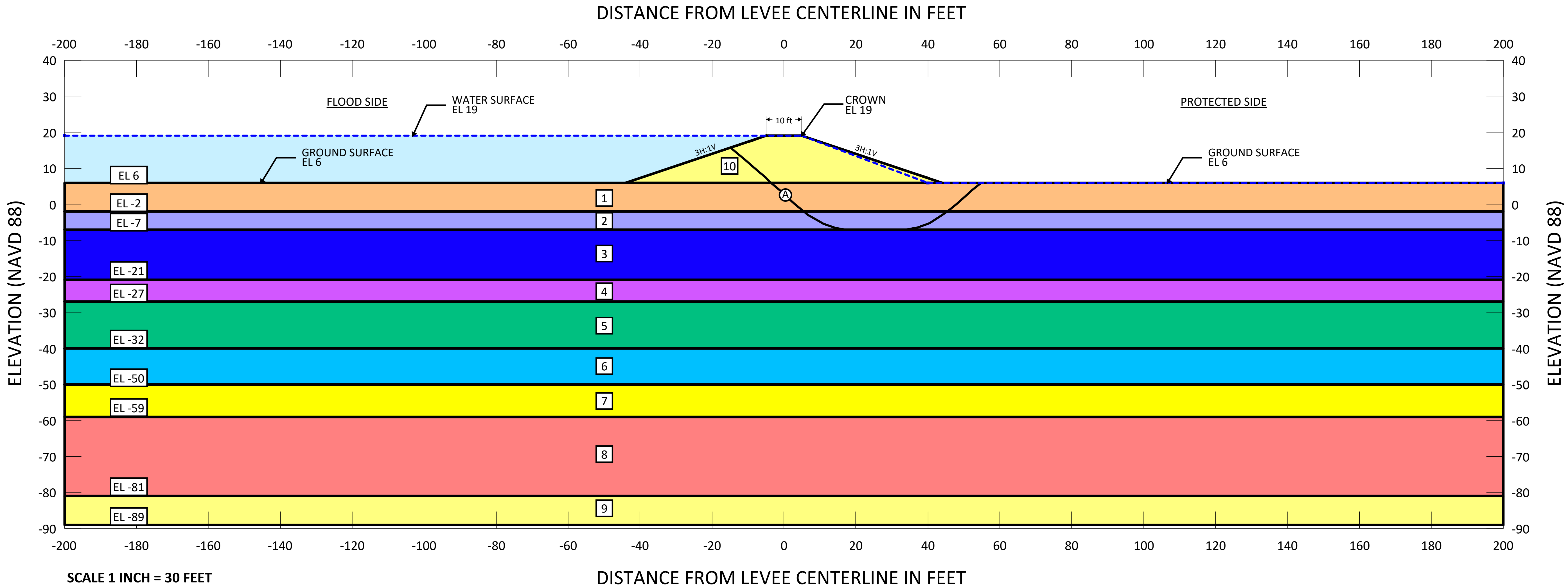
34. Differential Settlement. Your design should recognize the potential for differential settlement between pile-supported features and grade-supported features. Differential settlements should be considered in the geotechnical and structural designs during the preliminary design phase of this project.

LIMITATIONS

35. Eustis Engineering has provided engineering services in accordance with generally accepted geotechnical engineering practices in this locality at this time. No warranty or guarantee is expressed or implied.

36. Our report has been prepared in accordance with generally accepted geotechnical engineering practice for the exclusive use of Neel-Schaffer for specific application to the

subject sites. This report and the data we present in the figures and appendices are for feasibility study/conceptual-level design purposes and should not be used for final design. Substantial, additional geotechnical data are required to complete the final design and to meet the governing agency requirements, and the details of the recommended additional geotechnical data will be provided in a report as part of Eustis Engineering's Task 3 scope. If there are any changes in the nature, design, or location of the proposed alignments, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed, and the conclusions of this report are modified and verified through written correspondence. Should these data be used by anyone other than Neel-Schaffer, the user should contact Eustis Engineering for interpretation of data and to secure any other information which may be pertinent to the project.



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	120	500	500
2	CLAY	0	120	350	350
3	CLAY	0	120	650	650
4	CLAY	0	115	850	850
5	CLAY	0	110	1000	1000
6	CLAY	0	113	1000	1000
7	CLAY	0	107	1000	1000
8	CLAY	0	121	1000	1000
9	CLAY	0	121	1000	1000
10	LEVEE FILL	0	115	600	600

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	1.75	100 YEAR - CGL (Q-CASE_CGL CIRCULAR)	1.30

APPLICABLE PROJECT SECTIONS:

1. EAST LEVEE ALTERNATIVE 1 - EAST OF I-10
2. EAST LEVEE ALTERNATIVE 3 - WEST OF I-10
3. SOUTH LEVEE ALTERNATIVE 3 - LEVEE ALONG LAKEVIEW DRIVE

NOTES:

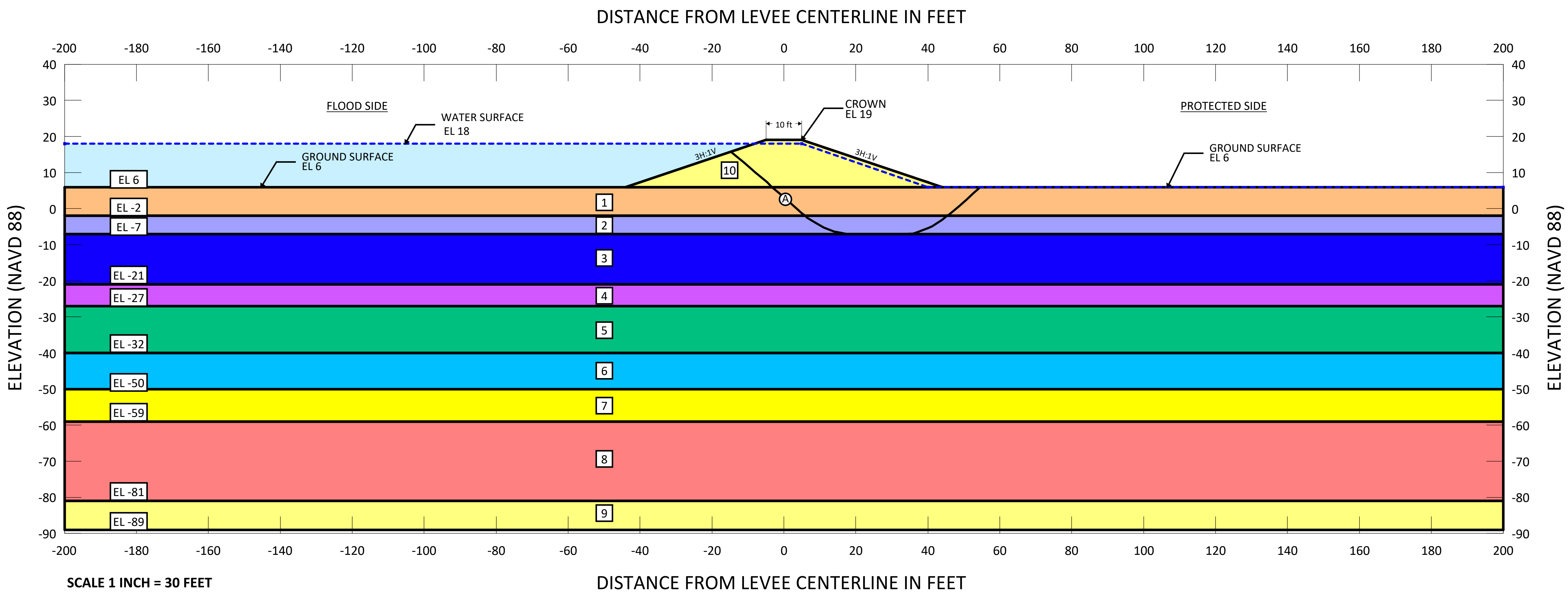
1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - EAST LEVEE (1 & 3) & SOUTH 3 - 100 YEAR
TYPICAL SECTION - CONSTRUCTION GRADE (CGL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 1 SHEET 1 OF 16



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	120	500	500
2	CLAY	0	120	350	350
3	CLAY	0	120	650	650
4	CLAY	0	115	850	850
5	CLAY	0	110	1000	1000
6	CLAY	0	113	1000	1000
7	CLAY	0	107	1000	1000
8	CLAY	0	121	1000	1000
9	CLAY	0	121	1000	1000
10	LEVEE FILL	0	115	600	600

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	1.77	100 YEAR - SWL (Q-CASE_SWL CIRCULAR)	1.50
A	CIRCULAR	1.77	100 YEAR - PGL (Q-CASE_PGL CIRCULAR)	1.40

NOTES:

1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPEPTUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.
5. THE PROJECT GRADE LEVEL (PGL) AND STILL WATER LEVEL (SWL) WERE ASSUMED TO BE EQUAL FOR THIS CONCEPTUAL LEVEL DESIGN ANALYSES.

APPLICABLE PROJECT SECTIONS:

1. EAST LEVEE ALTERNATIVE 1 - EAST OF I-10
2. EAST LEVEE ALTERNATIVE 3 - WEST OF I-10
3. SOUTH LEVEE ALTERNATIVE 3 - LEVEE ALONG LAKEVIEW DRIVE

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - EAST LEVEE (1 & 3) & SOUTH 3 - 100 YEAR
TYPICAL SECTION - STILL WATER LEVEL (SWL/PGL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

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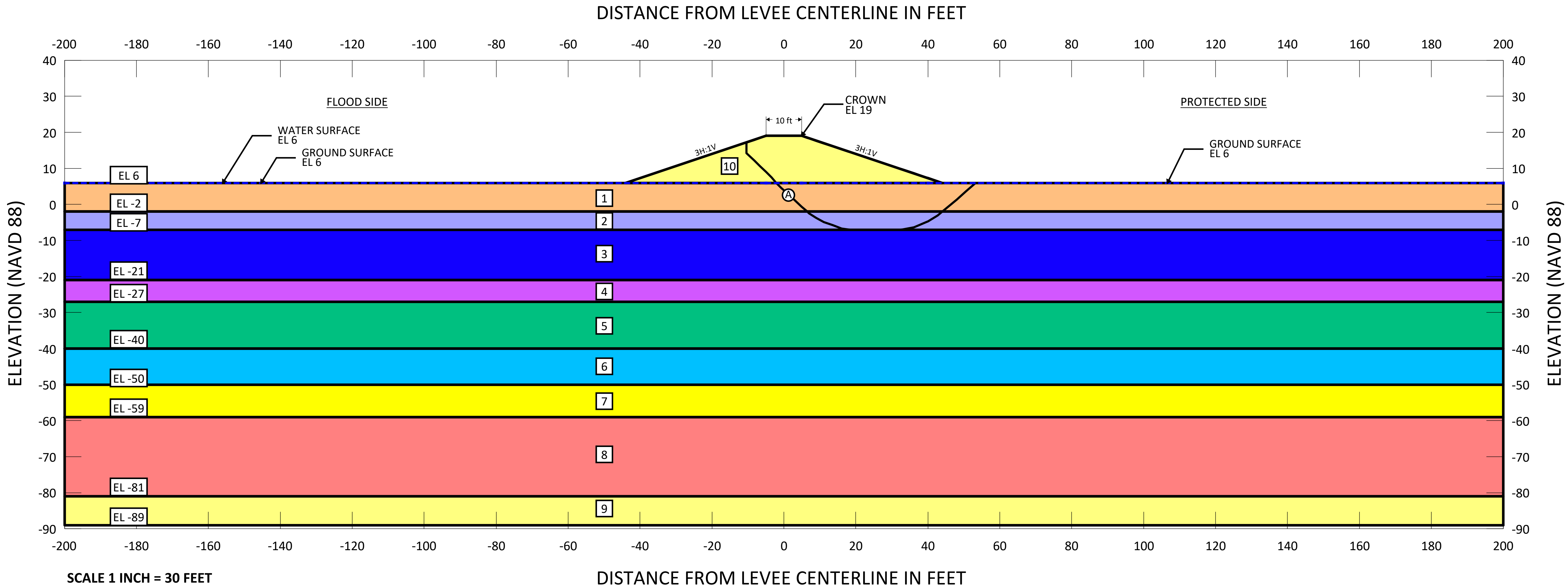
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 1 SHEET 2 OF 16



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	120	500	500
2	CLAY	0	120	350	350
3	CLAY	0	120	650	650
4	CLAY	0	115	850	850
5	CLAY	0	110	1000	1000
6	CLAY	0	113	1000	1000
7	CLAY	0	107	1000	1000
8	CLAY	0	121	1000	1000
9	CLAY	0	121	1000	1000
10	LEVEE FILL	0	115	600	600

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	1.73	100 YEAR - LWL (Q-CASE_LWL CIRCULAR)	1.40

APPLICABLE PROJECT SECTIONS:

1. EAST LEVEE ALTERNATIVE 1 - EAST OF I-10
2. EAST LEVEE ALTERNATIVE 3 - WEST OF I-10
3. SOUTH LEVEE ALTERNATIVE 3 - LEVEE ALONG LAKEVIEW DRIVE

NOTES:

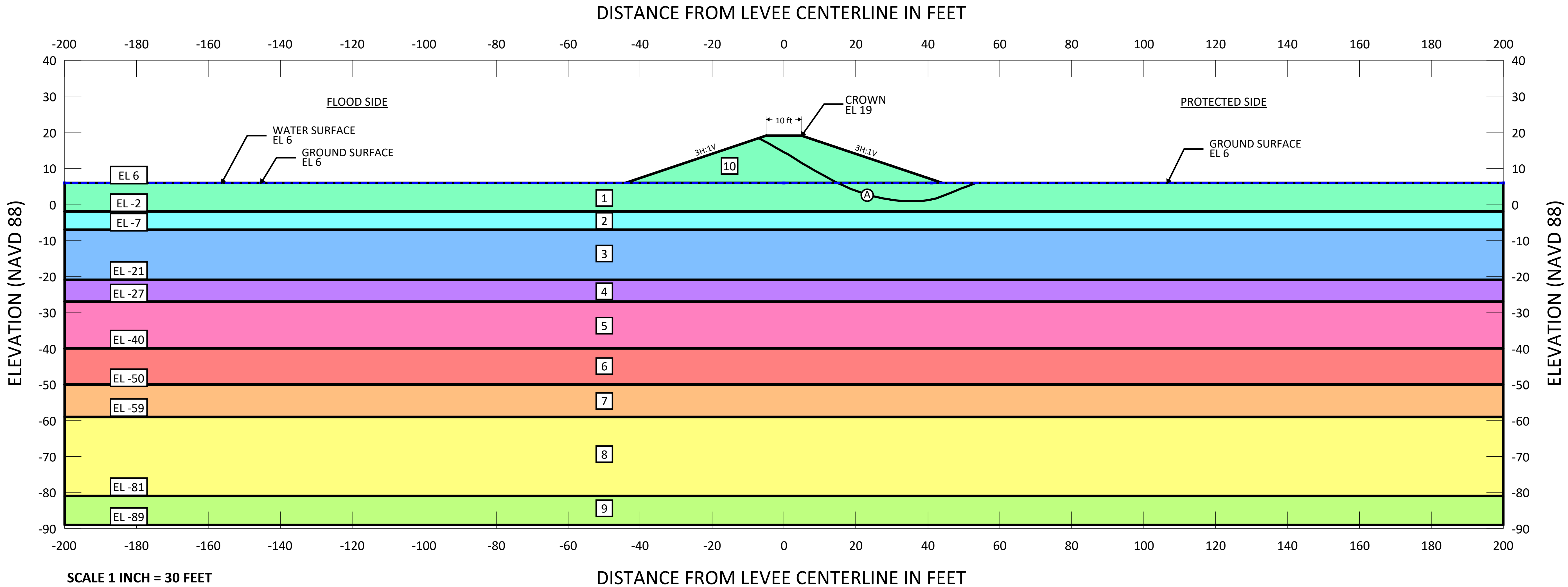
1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - EAST LEVEE (1 & 3) & SOUTH 3 - 100 YEAR
TYPICAL SECTION - LOW WATER LEVEL (LWL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 1 SHEET 3 OF 16



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	23	120	0	0
2	CLAY	23	120	0	0
3	CLAY	23	120	0	0
4	CLAY	23	115	0	0
5	CLAY	23	110	0	0
6	CLAY	23	113	0	0
7	CLAY	23	107	0	0
8	CLAY	23	121	0	0
9	CLAY	23	121	0	0
10	LEVEE FILL	23	115	0	0

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	1.47	100 YEAR - LWL (S-CASE_LWL CIRCULAR)	1.40

APPLICABLE PROJECT SECTIONS:

1. EAST LEVEE ALTERNATIVE 1 - EAST OF I-10
2. EAST LEVEE ALTERNATIVE 3 - WEST OF I-10
3. SOUTH LEVEE ALTERNATIVE 3 - LEVEE ALONG LAKEVIEW DRIVE

NOTES:

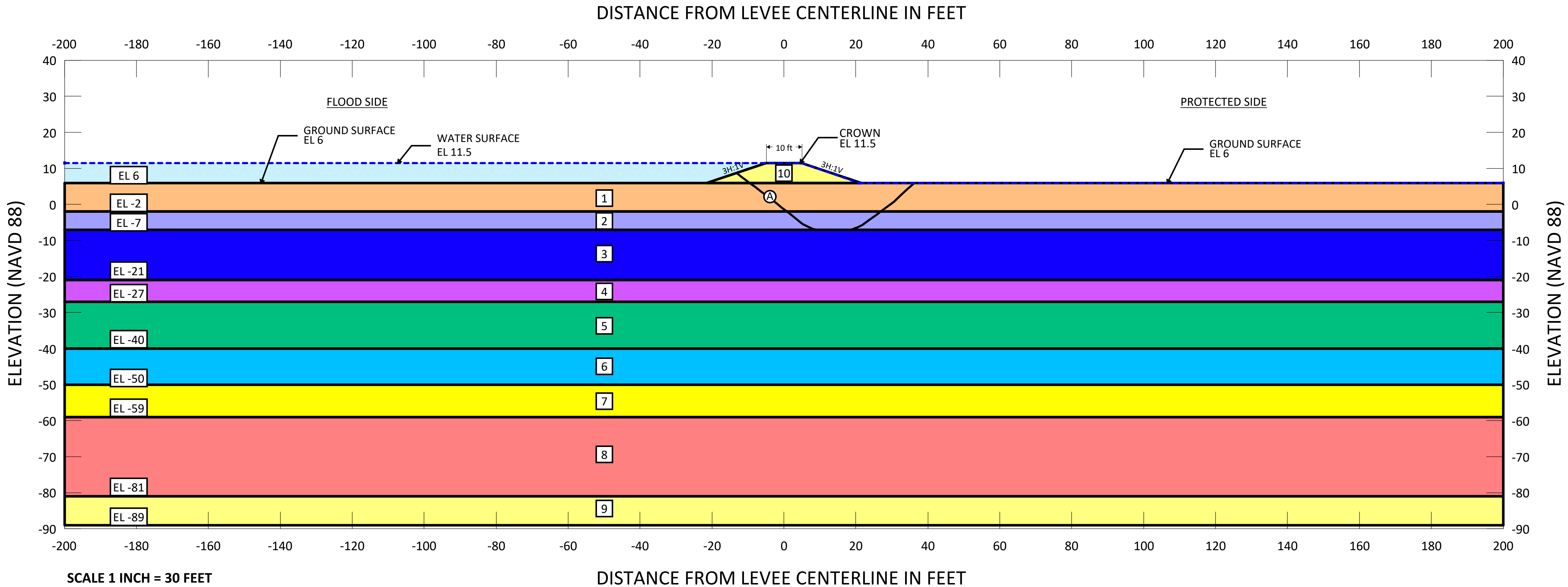
1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - EAST LEVEE (1 & 3) & SOUTH 3 - 100 YEAR
TYPICAL SECTION - LOW WATER LEVEL (LWL) - S-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 1 SHEET 4 OF 16



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	120	500	500
2	CLAY	0	120	350	350
3	CLAY	0	120	650	650
4	CLAY	0	115	850	850
5	CLAY	0	110	1000	1000
6	CLAY	0	113	1000	1000
7	CLAY	0	107	1000	1000
8	CLAY	0	121	1000	1000
9	CLAY	0	121	1000	1000
10	LEVEE FILL	0	115	600	600

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	3.58	INTERMEDIATE - EL 11 - CGL (Q-CASE_CGL CIRCULAR)	1.30

APPLICABLE PROJECT SECTIONS:

1. EAST LEVEE ALTERNATIVE 1 - EAST OF I-10
2. EAST LEVEE ALTERNATIVE 3 - WEST OF I-10
3. SOUTH LEVEE ALTERNATIVE 3 - LEVEE ALONG LAKEVIEW DRIVE

NOTES:

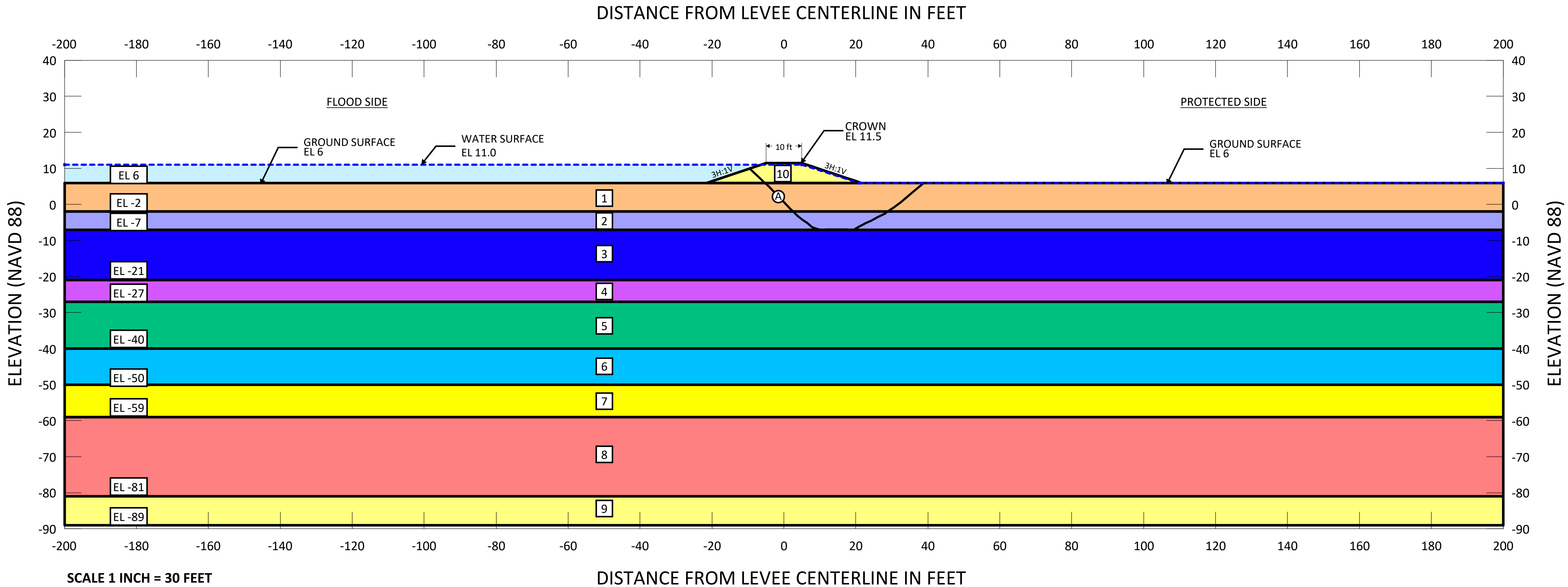
1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPEPTUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - EAST LEVEE (1 & 3) & SOUTH 3 - EL 11
TYPICAL SECTION - CONSTRUCTION GRADE (CGL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 1 SHEET 5 OF 16



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	120	500	500
2	CLAY	0	120	350	350
3	CLAY	0	120	650	650
4	CLAY	0	115	850	850
5	CLAY	0	110	1000	1000
6	CLAY	0	113	1000	1000
7	CLAY	0	107	1000	1000
8	CLAY	0	121	1000	1000
9	CLAY	0	121	1000	1000
10	LEVEE FILL	0	115	600	600

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	3.62	INTERMEDIATE - EL 11 - SWL (Q-CASE_SWL CIRCULAR)	1.50
A	CIRCULAR	3.62	INTERMEDIATE - EL 11 - PGL (Q-CASE_PGL CIRCULAR)	1.40

NOTES:

1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPEUTAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.
5. THE PROJECT GRADE LEVEL (PGL) AND STILL WATER LEVEL (SWL) WERE ASSUMED TO BE EQUAL FOR THIS CONCEPTUAL LEVEL DESIGN ANALYSES.

APPLICABLE PROJECT SECTIONS:

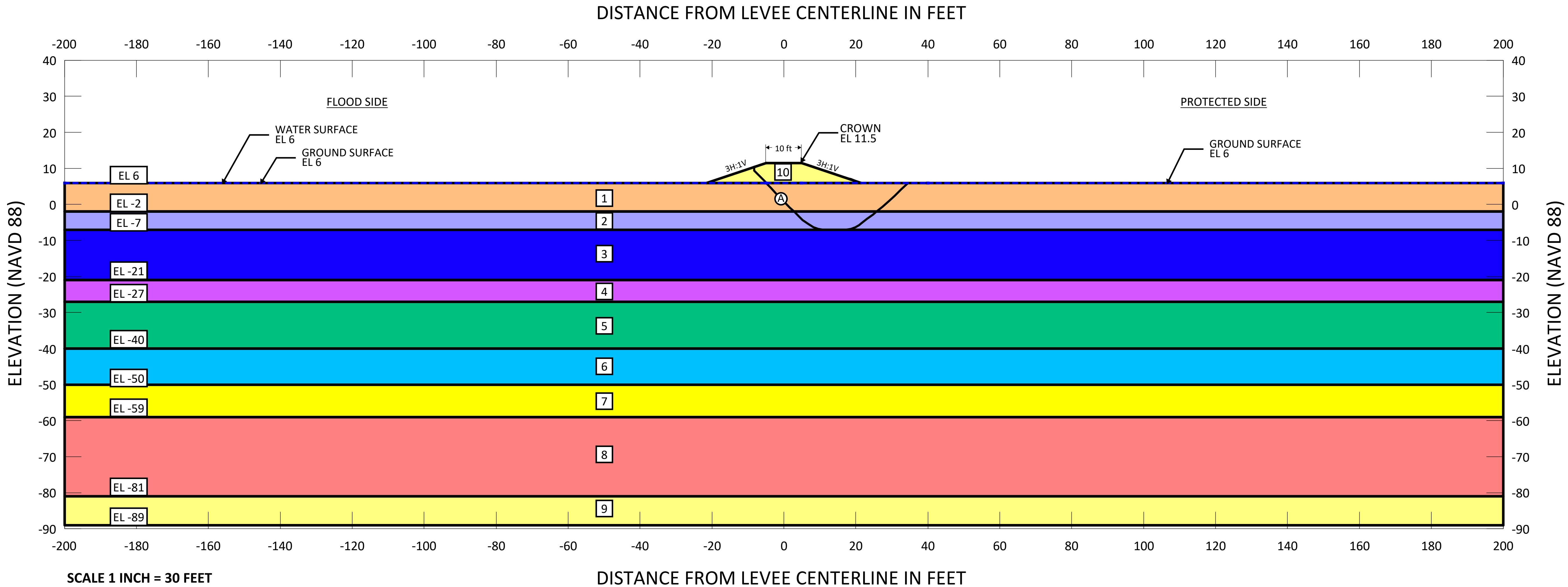
1. EAST LEVEE ALTERNATIVE 1 - EAST OF I-10
2. EAST LEVEE ALTERNATIVE 3 - WEST OF I-10
3. SOUTH LEVEE ALTERNATIVE 3 - LEVEE ALONG LAKEVIEW DRIVE

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - EAST LEVEE (1 & 3) & SOUTH 3 - EL 11
TYPICAL SECTION - STILL WATER LEVEL (SWL/PGL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 1 SHEET 6 OF 16



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	120	500	500
2	CLAY	0	120	350	350
3	CLAY	0	120	650	650
4	CLAY	0	115	850	850
5	CLAY	0	110	1000	1000
6	CLAY	0	113	1000	1000
7	CLAY	0	107	1000	1000
8	CLAY	0	121	1000	1000
9	CLAY	0	121	1000	1000
10	LEVEE FILL	0	115	600	600

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	3.51	INTERMEDIATE - EL 11 - LWL (Q-CASE_LWL CIRCULAR)	1.40

APPLICABLE PROJECT SECTIONS:

1. EAST LEVEE ALTERNATIVE 1 - EAST OF I-10
2. EAST LEVEE ALTERNATIVE 3 - WEST OF I-10
3. SOUTH LEVEE ALTERNATIVE 3 - LEVEE ALONG LAKEVIEW DRIVE

NOTES:

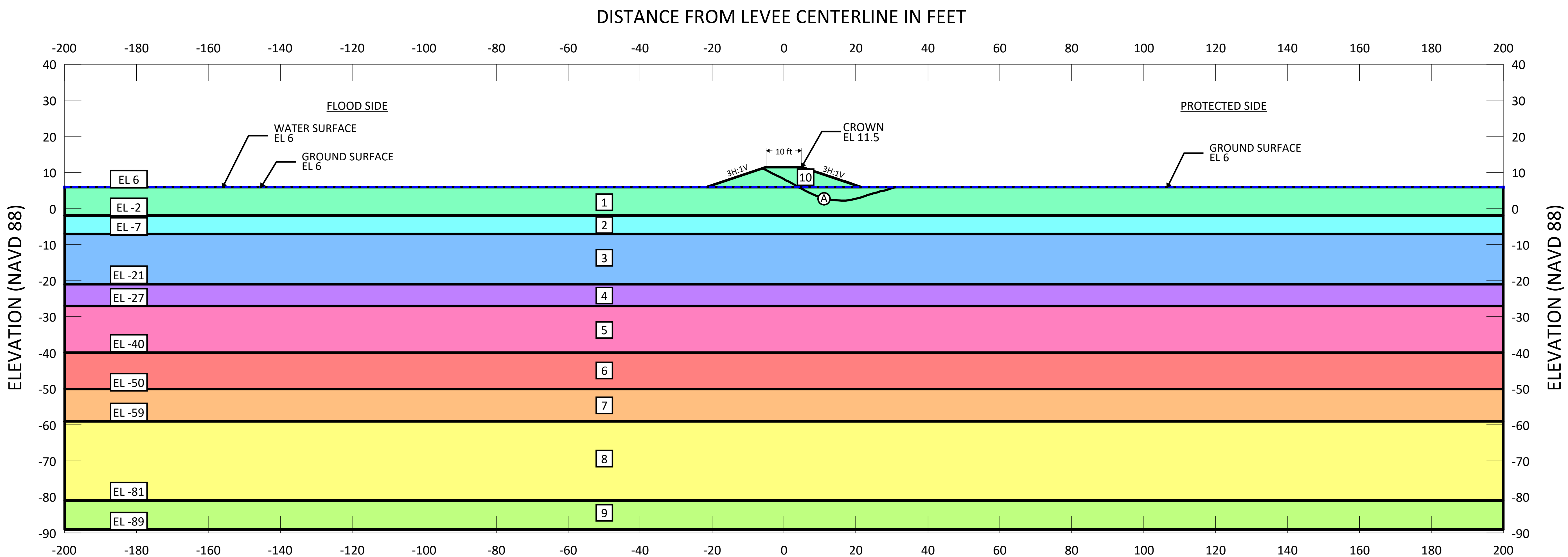
1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - EAST LEVEE (1 & 3) & SOUTH 3 - EL 11
TYPICAL SECTION - LOW WATER LEVEL (LWL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 1 SHEET 7 OF 16



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	23	120	0	0
2	CLAY	23	120	0	0
3	CLAY	23	120	0	0
4	CLAY	23	115	0	0
5	CLAY	23	110	0	0
6	CLAY	23	113	0	0
7	CLAY	23	107	0	0
8	CLAY	23	121	0	0
9	CLAY	23	121	0	0
10	LEVEE FILL	23	115	0	0

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	1.74	INTERMEDIATE - EL 11 - LWL (S-CASE_LWL CIRCULAR)	1.40

APPLICABLE PROJECT SECTIONS:

1. EAST LEVEE ALTERNATIVE 1 - EAST OF I-10
2. EAST LEVEE ALTERNATIVE 3 - WEST OF I-10
3. SOUTH LEVEE ALTERNATIVE 3 - LEVEE ALONG LAKEVIEW DRIVE

NOTES:

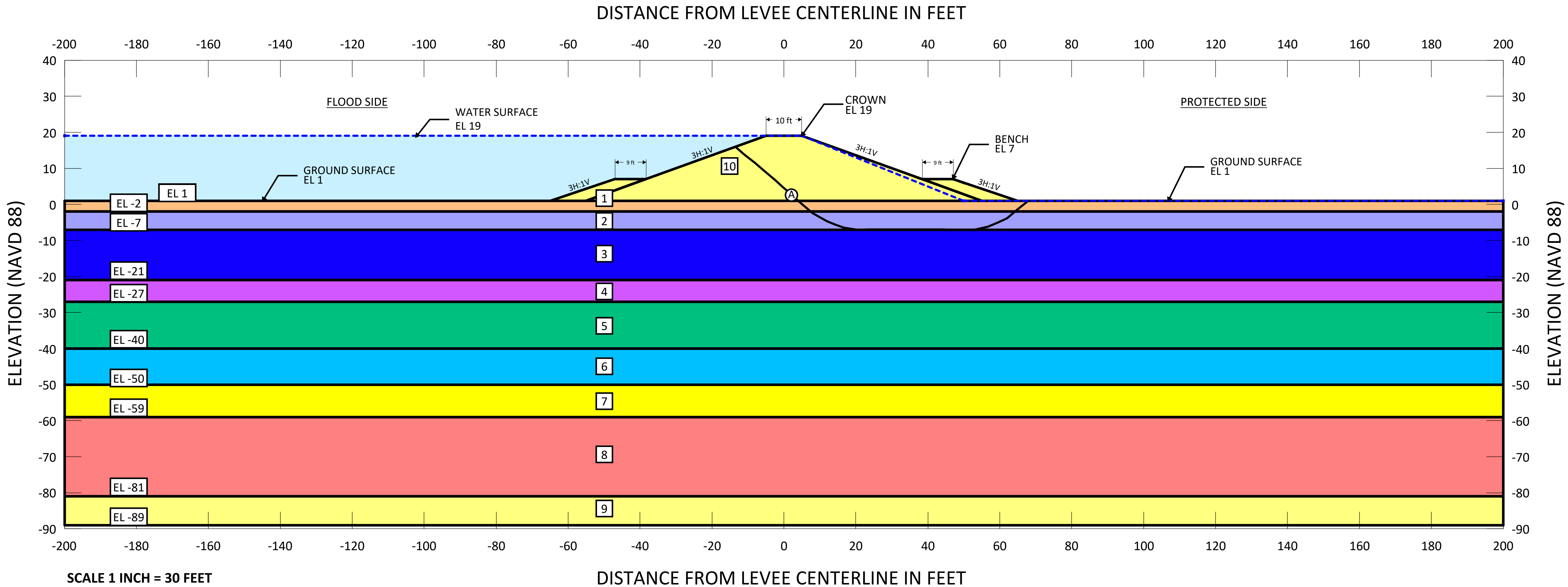
1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - EAST LEVEE (1 & 3) & SOUTH 3 - EL 11
TYPICAL SECTION - LOW WATER LEVEL (LWL) - S-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 1 SHEET 8 OF 16



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	120	500	500
2	CLAY	0	120	350	350
3	CLAY	0	120	650	650
4	CLAY	0	115	850	850
5	CLAY	0	110	1000	1000
6	CLAY	0	113	1000	1000
7	CLAY	0	107	1000	1000
8	CLAY	0	121	1000	1000
9	CLAY	0	121	1000	1000
10	LEVEE FILL	0	115	600	600

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	1.53	100 YEAR - CONSTRUCTION (Q-CASE_CGL CIRCULAR)	1.30

APPLICABLE PROJECT SECTIONS:

1. WEST LEVEE ALTERNATIVE 1 - WEST OF RAILROAD TRACKS
2. WEST LEVEE ALTERNATIVE 2A - WEST OF RAILROAD TRACKS TO CARR DR
3. WEST LEVEE ALTERNATIVE 2B - EAST OF RAILROAD TRACKS TO CARR DR

NOTES:

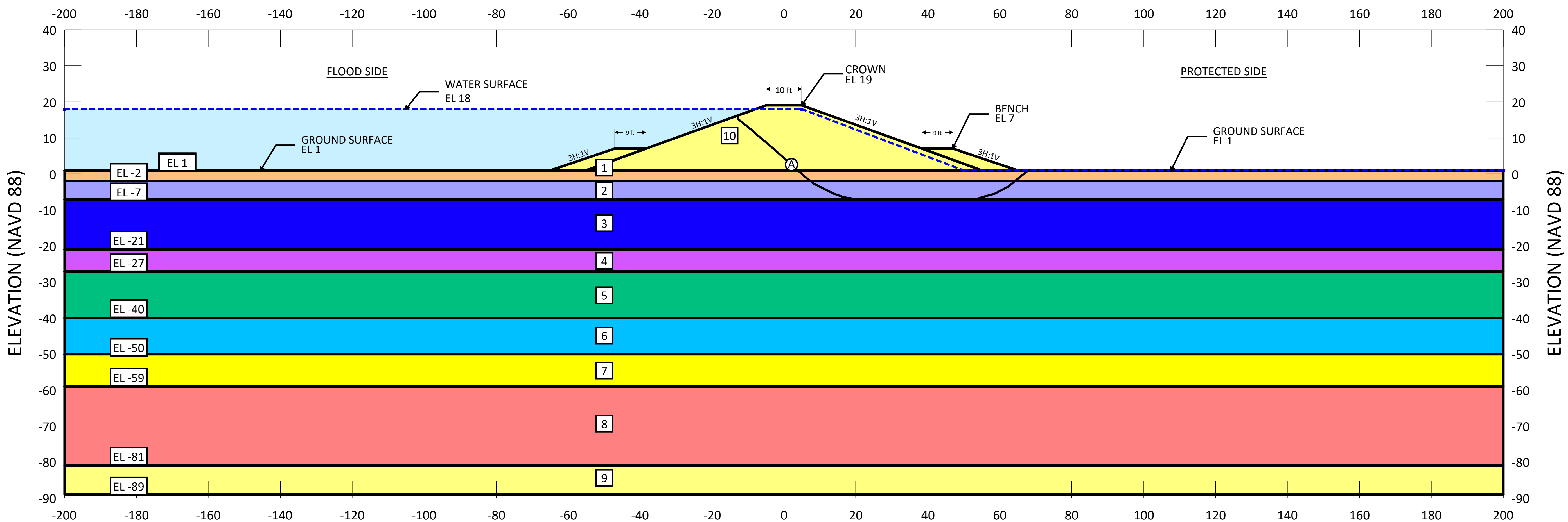
1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.
5. BENCHED SECTION WAS ANALYZED DUE TO TYPICAL LEVEE CROSS SECTION NOT MEETING THE MINIMUM REQUIRED FACTOR OF SAFETY.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - WEST LEVEE (1, 2A, & 2B) - 100 YEAR
BENCHED SECTION - CONSTRUCTION GRADE (CGL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 1 SHEET 9 OF 16



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	120	500	500
2	CLAY	0	120	350	350
3	CLAY	0	120	650	650
4	CLAY	0	115	850	850
5	CLAY	0	110	1000	1000
6	CLAY	0	113	1000	1000
7	CLAY	0	107	1000	1000
8	CLAY	0	121	1000	1000
9	CLAY	0	121	1000	1000
10	LEVEE FILL	0	115	600	600

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	1.53	100 YEAR - SWL (Q-CASE_SWL CIRCULAR)	1.50
A	CIRCULAR	1.53	100 YEAR - PGL (Q-CASE_PGL CIRCULAR)	1.40

NOTES:

1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.
5. THE PROJECT GRADE LEVEL (PGL) AND STILL WATER LEVEL (SWL) WERE ASSUMED TO BE EQUAL FOR THIS CONCEPTUAL LEVEL DESIGN ANALYSES.
6. BENCHED SECTION WAS ANALYZED DUE TO TYPICAL LEVEE CROSS SECTION NOT MEETING THE MINIMUM REQUIRED FACTOR OF SAFETY.

APPLICABLE PROJECT SECTIONS:

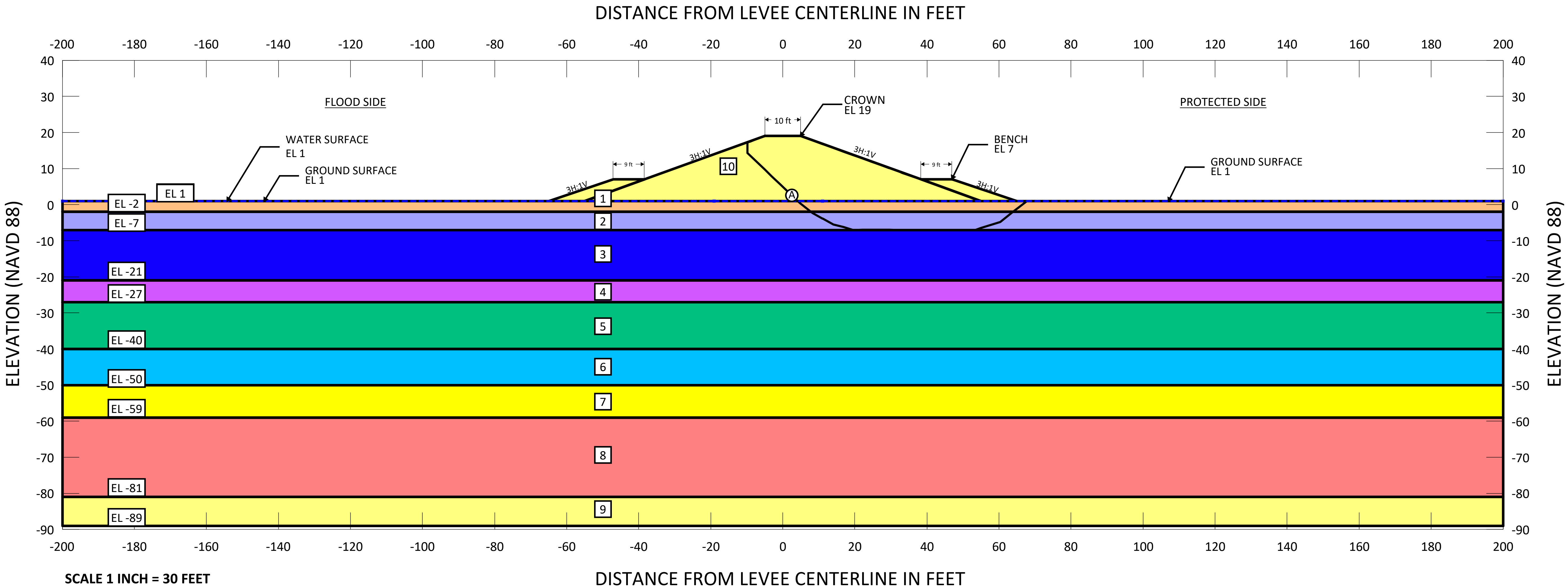
1. WEST LEVEE ALTERNATIVE 1 - WEST OF RAILROAD TRACKS
2. WEST LEVEE ALTERNATIVE 2A - WEST OF RAILROAD TRACKS TO CARR DR
3. WEST LEVEE ALTERNATIVE 2B - EAST OF RAILROAD TRACKS TO CARR DR

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - WEST LEVEE (1, 2A, & 2B) - 100 YEAR
BENCHED SECTION - STILL WATER LEVEL (SWL/PGL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 1 SHEET 10 OF 16



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	120	500	500
2	CLAY	0	120	350	350
3	CLAY	0	120	650	650
4	CLAY	0	115	850	850
5	CLAY	0	110	1000	1000
6	CLAY	0	113	1000	1000
7	CLAY	0	107	1000	1000
8	CLAY	0	121	1000	1000
9	CLAY	0	121	1000	1000
10	LEVEE FILL	0	115	600	600

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	1.50	100 YEAR - LWL (Q-CASE_LWL CIRCULAR)	1.40

APPLICABLE PROJECT SECTIONS:

1. WEST LEVEE ALTERNATIVE 1 - WEST OF RAILROAD TRACKS
2. WEST LEVEE ALTERNATIVE 2A - WEST OF RAILROAD TRACKS TO CARR DR
3. WEST LEVEE ALTERNATIVE 2B - EAST OF RAILROAD TRACKS TO CARR DR

NOTES:

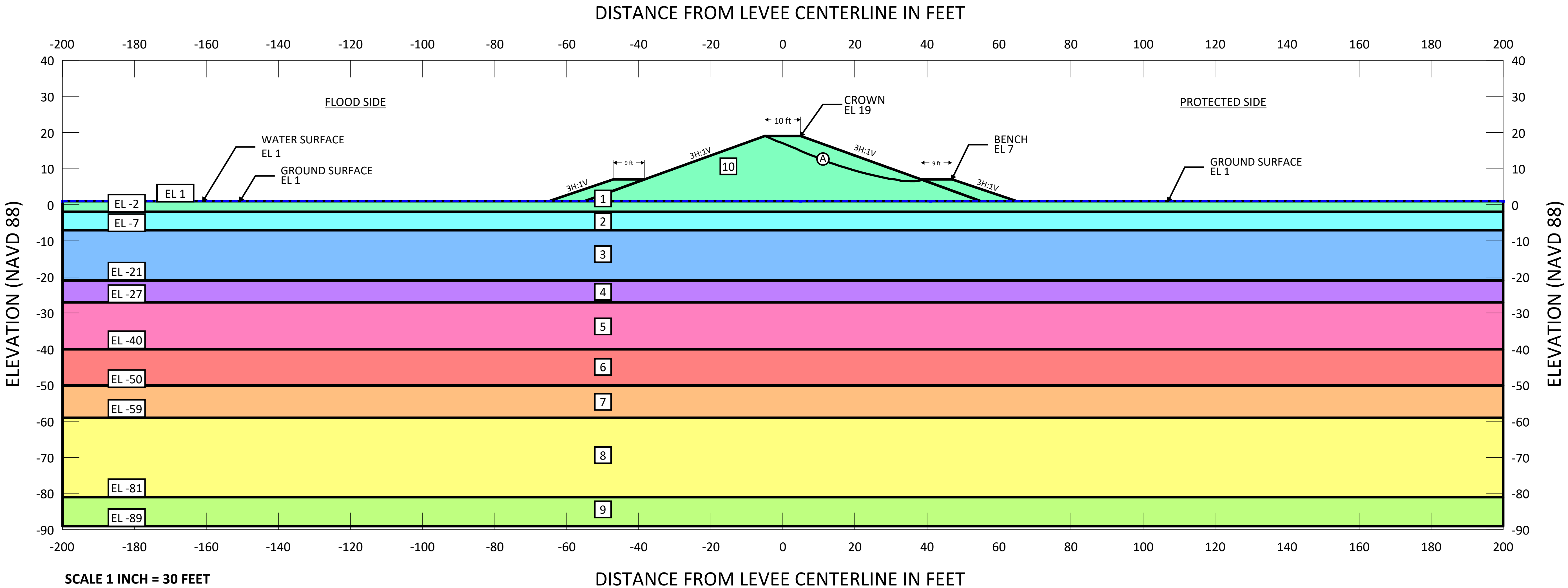
1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.
5. BENCHED SECTION WAS ANALYZED DUE TO TYPICAL LEVEE CROSS SECTION NOT MEETING THE MINIMUM REQUIRED FACTOR OF SAFETY.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - WEST LEVEE (1, 2A, & 2B) - 100 YEAR
BENCHED SECTION - LOW WATER LEVEL (LWL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 1 SHEET 11 OF 16



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	23	120	0	0
2	CLAY	23	120	0	0
3	CLAY	23	120	0	0
4	CLAY	23	115	0	0
5	CLAY	23	110	0	0
6	CLAY	23	113	0	0
7	CLAY	23	107	0	0
8	CLAY	23	121	0	0
9	CLAY	23	121	0	0
10	LEVEE FILL	23	115	0	0

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	1.42	100 YEAR - LWL (S-CASE_LWL CIRCULAR)	1.40

APPLICABLE PROJECT SECTIONS:

1. WEST LEVEE ALTERNATIVE 1 - WEST OF RAILROAD TRACKS
2. WEST LEVEE ALTERNATIVE 2A - WEST OF RAILROAD TRACKS TO CARR DR
3. WEST LEVEE ALTERNATIVE 2B - EAST OF RAILROAD TRACKS TO CARR DR

NOTES:

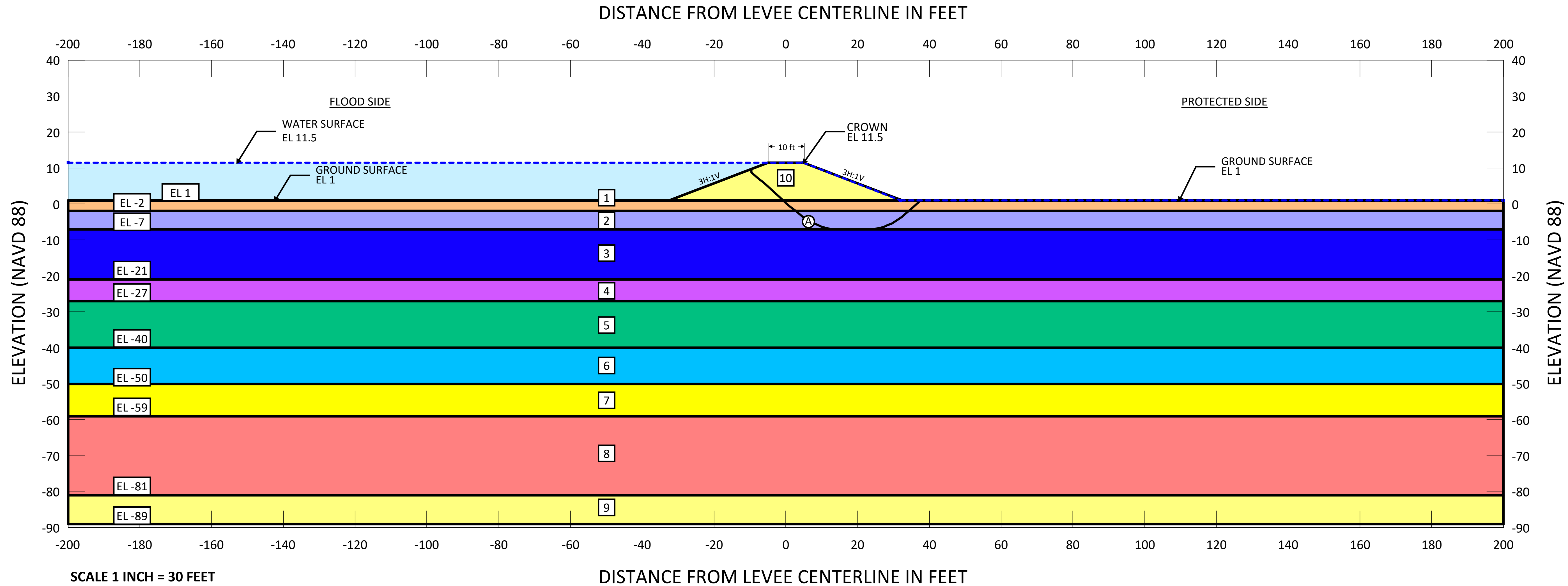
1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.
5. BENCHED SECTION WAS ANALYZED DUE TO TYPICAL LEVEE CROSS SECTION NOT MEETING THE MINIMUM REQUIRED FACTOR OF SAFETY.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - WEST LEVEE (1, 2A, & 2B) - 100 YEAR
BENCHED SECTION - LOW WATER LEVEL (LWL) - S-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 1 SHEET 12 OF 16



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	120	500	500
2	CLAY	0	120	350	350
3	CLAY	0	120	650	650
4	CLAY	0	115	850	850
5	CLAY	0	110	1000	1000
6	CLAY	0	113	1000	1000
7	CLAY	0	107	1000	1000
8	CLAY	0	121	1000	1000
9	CLAY	0	121	1000	1000
10	LEVEE FILL	0	115	600	600

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	2.08	INTERMEDIATE - EL 11 - CGL (Q-CASE_PG CIRCULAR)	1.30

APPLICABLE PROJECT SECTIONS:

1. WEST LEVEE ALTERNATIVE 1 - WEST OF RAILROAD TRACKS
2. WEST LEVEE ALTERNATIVE 2A - WEST OF RAILROAD TRACKS TO CARR DR
3. WEST LEVEE ALTERNATIVE 2B - EAST OF RAILROAD TRACKS TO CARR DR

NOTES:

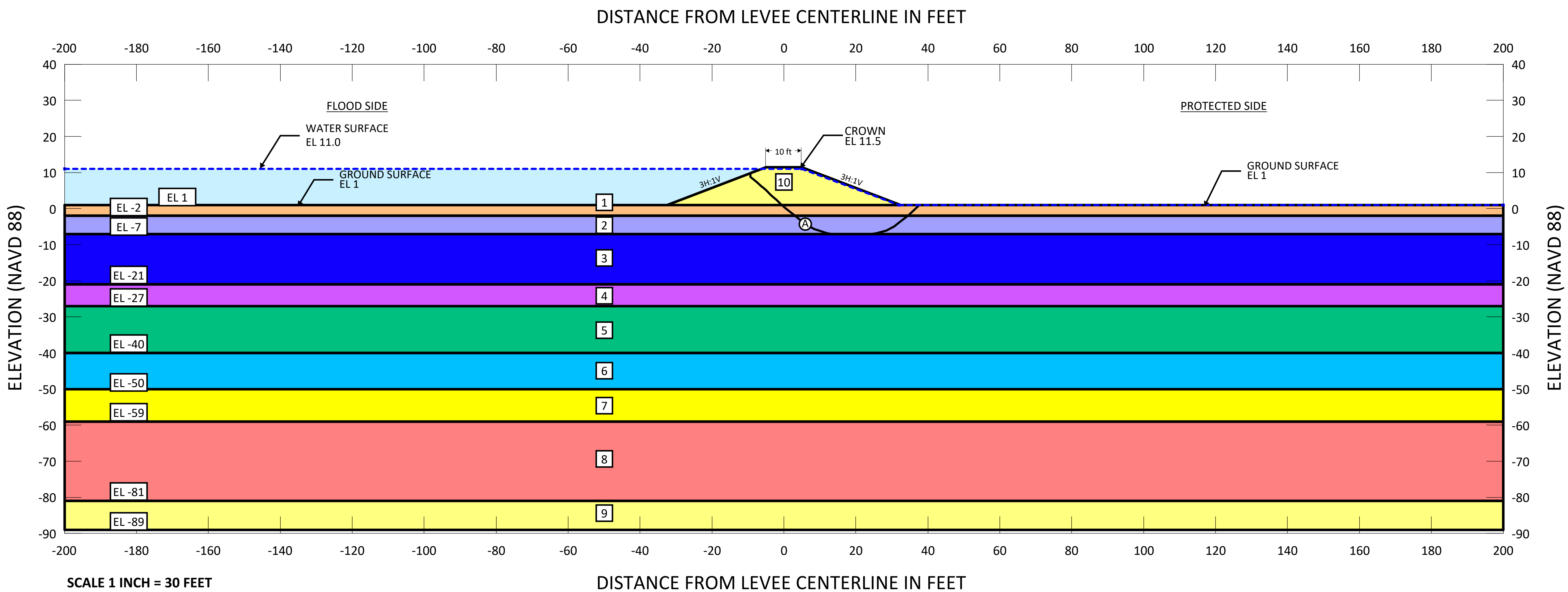
1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - WEST LEVEE (1, 2A, & 2B) - EL 11
TYPICAL SECTION - CONSTRUCTION GRADE (CGL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 1 SHEET 13 OF 16



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	120	500	500
2	CLAY	0	120	350	350
3	CLAY	0	120	650	650
4	CLAY	0	115	850	850
5	CLAY	0	110	1000	1000
6	CLAY	0	113	1000	1000
7	CLAY	0	107	1000	1000
8	CLAY	0	121	1000	1000
9	CLAY	0	121	1000	1000
10	LEVEE FILL	0	115	600	600

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	2.09	INTERMEDIATE - EL 11 - SWL (Q-CASE_SWL CIRCULAR)	1.50
A	CIRCULAR	2.09	INTERMEDIATE - EL 11 - PGL (Q-CASE_PGL CIRCULAR)	1.40

NOTES:

1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.
5. THE PROJECT GRADE LEVEL (PGL) AND STILL WATER LEVEL (SWL) WERE ASSUMED TO BE EQUAL FOR THIS CONCEPTUAL LEVEL DESIGN ANALYSES.

APPLICABLE PROJECT SECTIONS:

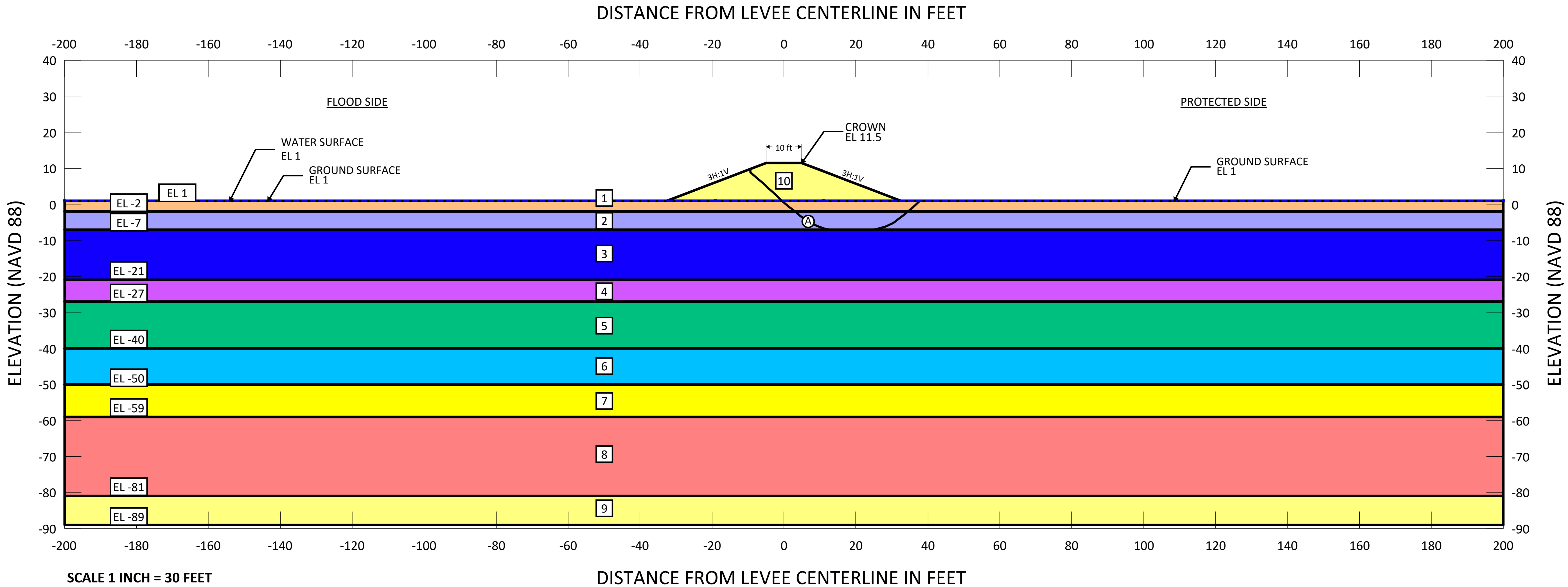
1. WEST LEVEE ALTERNATIVE 1 - WEST OF RAILROAD TRACKS
2. WEST LEVEE ALTERNATIVE 2A - WEST OF RAILROAD TRACKS TO CARR DR
3. WEST LEVEE ALTERNATIVE 2B - EAST OF RAILROAD TRACKS TO CARR DR

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - WEST LEVEE (1, 2A, & 2B) - EL 11
TYPICAL SECTION - STILL WATER LEVEL (SWL/PGL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 1 SHEET 14 OF 16



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	120	500	500
2	CLAY	0	120	350	350
3	CLAY	0	120	650	650
4	CLAY	0	115	850	850
5	CLAY	0	110	1000	1000
6	CLAY	0	113	1000	1000
7	CLAY	0	107	1000	1000
8	CLAY	0	121	1000	1000
9	CLAY	0	121	1000	1000
10	LEVEE FILL	0	115	600	600

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	2.10	INTERMEDIATE - LWL (Q-CASE_LWL CIRCULAR)	1.40

APPLICABLE PROJECT SECTIONS:

1. WEST LEVEE ALTERNATIVE 1 - WEST OF RAILROAD TRACKS
2. WEST LEVEE ALTERNATIVE 2A - WEST OF RAILROAD TRACKS TO CARR DR
3. WEST LEVEE ALTERNATIVE 2B - EAST OF RAILROAD TRACKS TO CARR DR

NOTES:

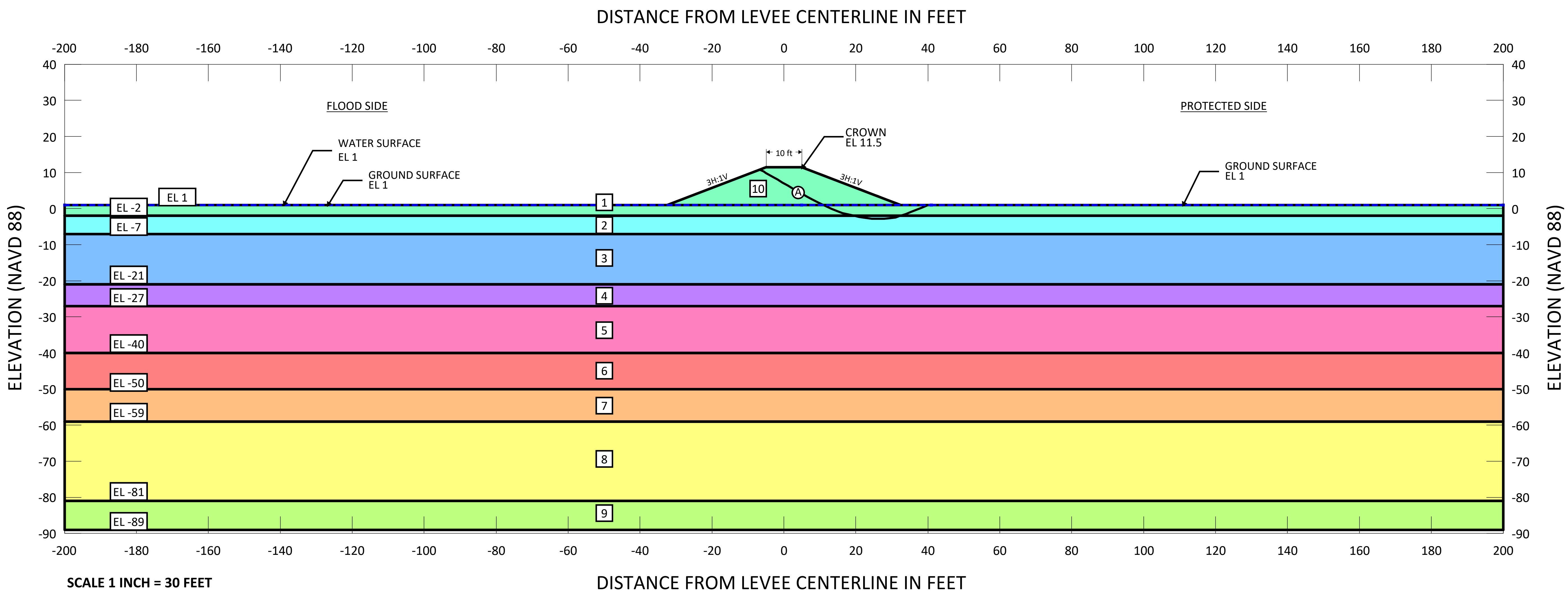
1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - WEST LEVEE (1, 2A, & 2B) - EL 11
TYPICAL SECTION - LOW WATER LEVEL (LWL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 1 SHEET 15 OF 16



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	23	120	0	0
2	CLAY	23	120	0	0
3	CLAY	23	120	0	0
4	CLAY	23	115	0	0
5	CLAY	23	110	0	0
6	CLAY	23	113	0	0
7	CLAY	23	107	0	0
8	CLAY	23	121	0	0
9	CLAY	23	121	0	0
10	LEVEE FILL	23	115	0	0

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	1.40	INTERMEDIATE - LWL (S-CASE_LWL CIRCULAR)	1.40

APPLICABLE PROJECT SECTIONS:

1. WEST LEVEE ALTERNATIVE 1 - WEST OF RAILROAD TRACKS
2. WEST LEVEE ALTERNATIVE 2A - WEST OF RAILROAD TRACKS TO CARR DR
3. WEST LEVEE ALTERNATIVE 2B - EAST OF RAILROAD TRACKS TO CARR DR

NOTES:

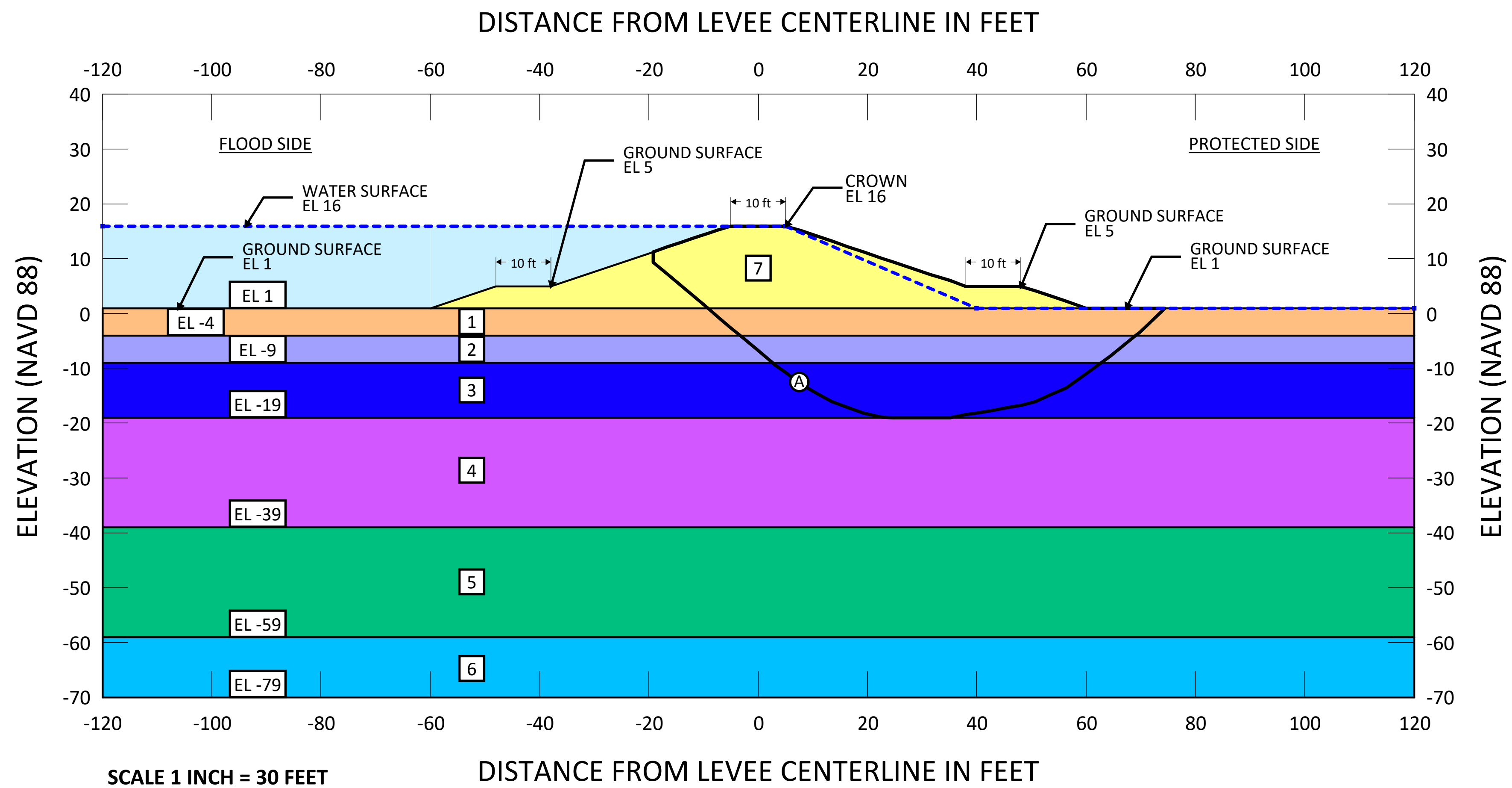
1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - WEST LEVEE (1, 2A, & 2B) - EL 11
TYPICAL SECTION - LOW WATER LEVEL (LWL) - S-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 1 SHEET 16 OF 16



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	105	250	250
2	CLAY	0	110	300	300
3	CLAY	0	115	400	400
4	CLAY	0	115	500	500
5	CLAY	0	115	800	800
6	CLAY	0	105	850	850
7	LEVEE FILL	0	115	600	600

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	1.38	100 YEAR - CGL (Q-CASE_CGL CIRCULAR)	1.30

NOTES:

1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
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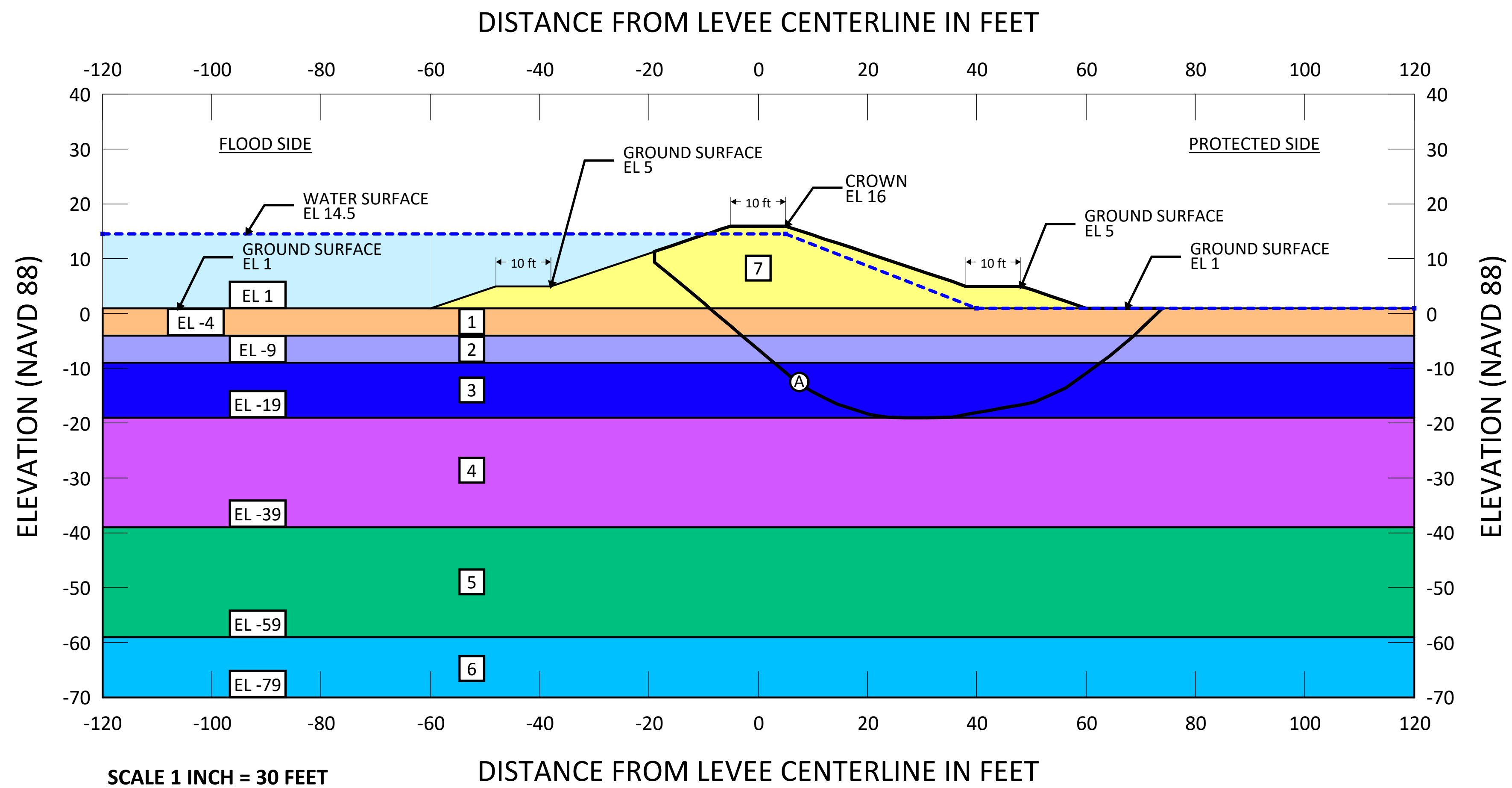
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR WEST SLIDELL RING LEVEE SHOWN ON FIGURE 6 SHEET 3 IN OUR TASK 1 REPORT.
5. SYMMETRICAL BENCHED SECTION WAS ANALYZED DUE TO TYPICAL LEVEE CROSS SECTION NOT MEETING THE MINIMUM REQUIRED FACTOR OF SAFETY
6. FIGURE 2 SHEETS 6-10 SHOW ANALYSES FOR THE FINAL GEOMETRY WITH A WIDENED PROTECTED SIDE BENCH WHICH WAS REQUIRED FOR SWL CONDITIONS.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
WEST SLIDELL RING LEVEE - ALTERNATIVES 1-3 - 100 YEAR
BENCHED SECTION[5] - CONSTRUCTION GRADE (CGL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: WEST SLIDELL ANALYSIS.GSZ	FIGURE 2 SHEET 1 OF 10



SCALE 1 INCH = 30 FEET

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	1.41	100 YEAR - SWL (Q-CASE_SWL CIRCULAR)	1.50
A	CIRCULAR	1.41	100 YEAR - PGL (Q-CASE_PGL CIRCULAR)	1.40

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	105	250	250
2	CLAY	0	110	300	300
3	CLAY	0	115	400	400
4	CLAY	0	115	500	500
5	CLAY	0	115	800	800
6	CLAY	0	105	850	850
7	LEVEE FILL	0	115	600	600

NOTES:

1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
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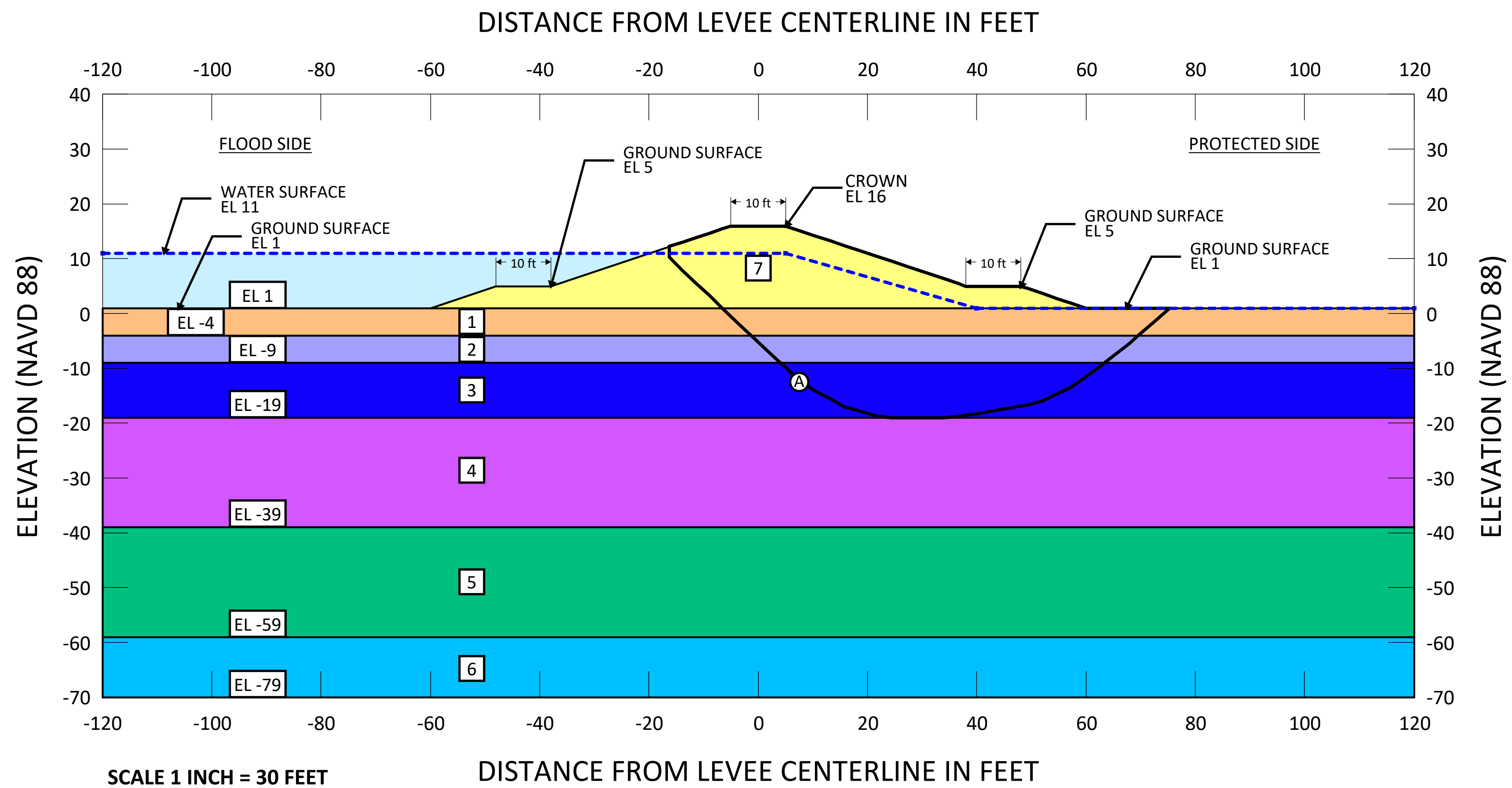
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR WEST SLIDELL RING LEVEE SHOWN ON FIGURE 6 SHEET 3 IN OUR TASK 1 REPORT.
5. SYMMETRICAL BENCHED SECTION WAS ANALYZED DUE TO TYPICAL LEVEE CROSS SECTION NOT MEETING THE MINIMUM REQUIRED FACTOR OF SAFETY
6. FIGURE 2 SHEETS 6-10 SHOW ANALYSES FOR THE FINAL GEOMETRY WITH A WIDENED PROTECTED SIDE BENCH WHICH WAS REQUIRED FOR SWL CONDITIONS.
7. THE PROJECT GRADE LEVEL (PGL) AND STILL WATER LEVEL (SWL) WERE ASSUMED TO BE EQUAL FOR THIS CONCEPTUAL LEVEL DESIGN ANALYSES.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
WEST SLIDELL RING LEVEE - ALTERNATIVES 1-3 - 100 YEAR
BENCHED SECTION[5] - STILL WATER LEVEL (SWL/PGL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: WEST SLIDELL ANALYSIS.GSZ	FIGURE 2 SHEET 2 OF 10



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	105	250	250
2	CLAY	0	110	300	300
3	CLAY	0	115	400	400
4	CLAY	0	115	500	500
5	CLAY	0	115	800	800
6	CLAY	0	105	850	850
7	LEVEE FILL	0	115	600	600

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	1.42	INTERMEDIATE - EL 11 - SWL (Q-CASE_SWL CIRCULAR)	1.50

NOTES:

1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
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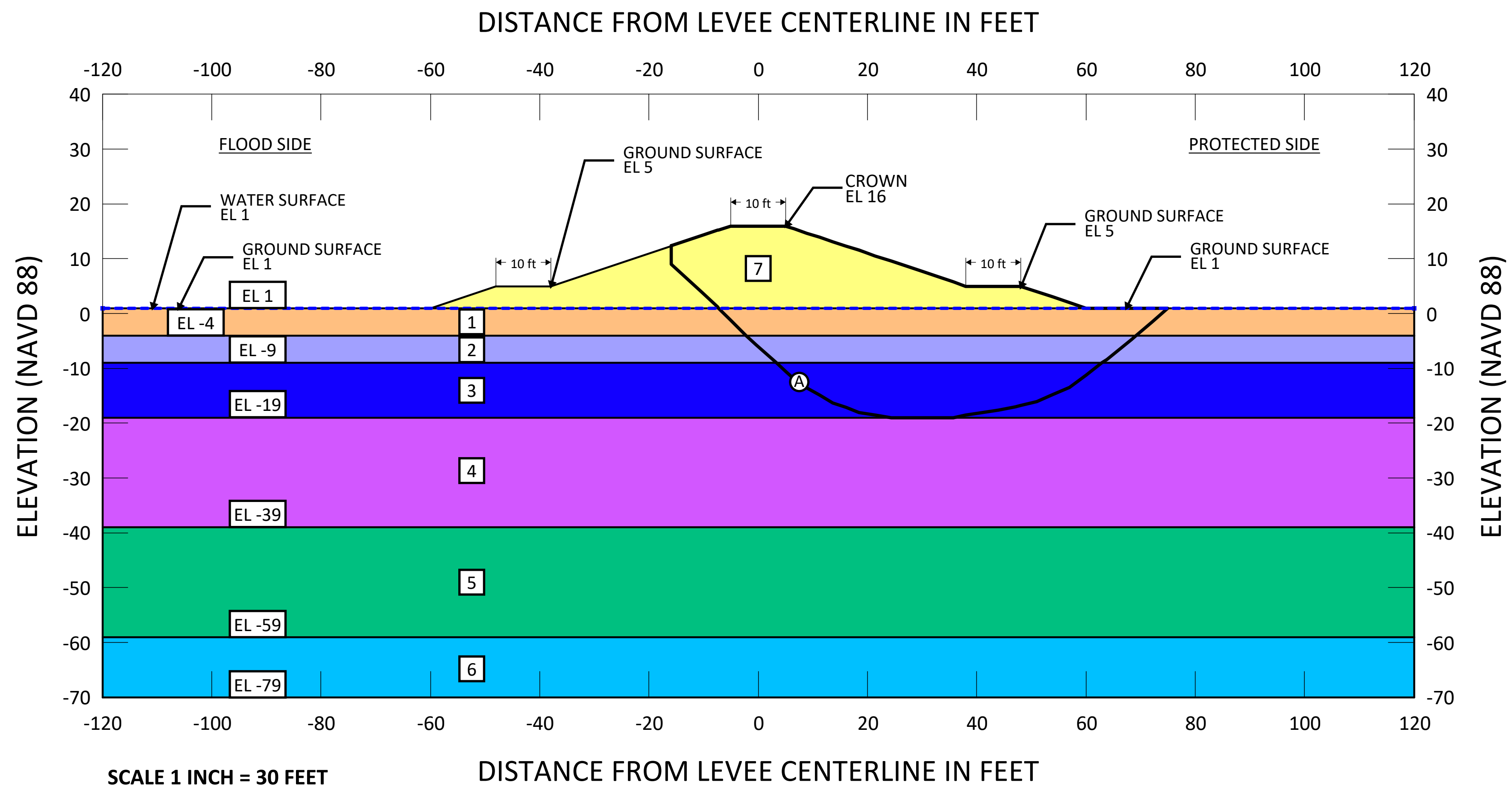
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR WEST SLIDELL RING LEVEE SHOWN ON FIGURE 6 SHEET 3 IN OUR TASK 1 REPORT.
5. SYMMETRICAL BENCHED SECTION WAS ANALYZED DUE TO TYPICAL LEVEE CROSS SECTION NOT MEETING THE MINIMUM REQUIRED FACTOR OF SAFETY
6. FIGURE 2 SHEETS 6-10 SHOW ANALYSES FOR THE FINAL GEOMETRY WITH A WIDENED PROTECTED SIDE BENCH WHICH WAS REQUIRED FOR SWL CONDITIONS.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
WEST SLIDELL RING LEVEE - ALTERNATIVES 1-3 - EL 14.5
BENCHED SECTION[5] - INTERMEDIATE EL 11 (SWL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: WEST SLIDELL ANALYSIS.GSZ	FIGURE 2 SHEET 3 OF 10



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	105	250	250
2	CLAY	0	110	300	300
3	CLAY	0	115	400	400
4	CLAY	0	115	500	500
5	CLAY	0	115	800	800
6	CLAY	0	105	850	850
7	LEVEE FILL	0	115	600	600

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	1.41	100 YEAR - LWL (Q-CASE_LWL CIRCULAR)	1.40

NOTES:

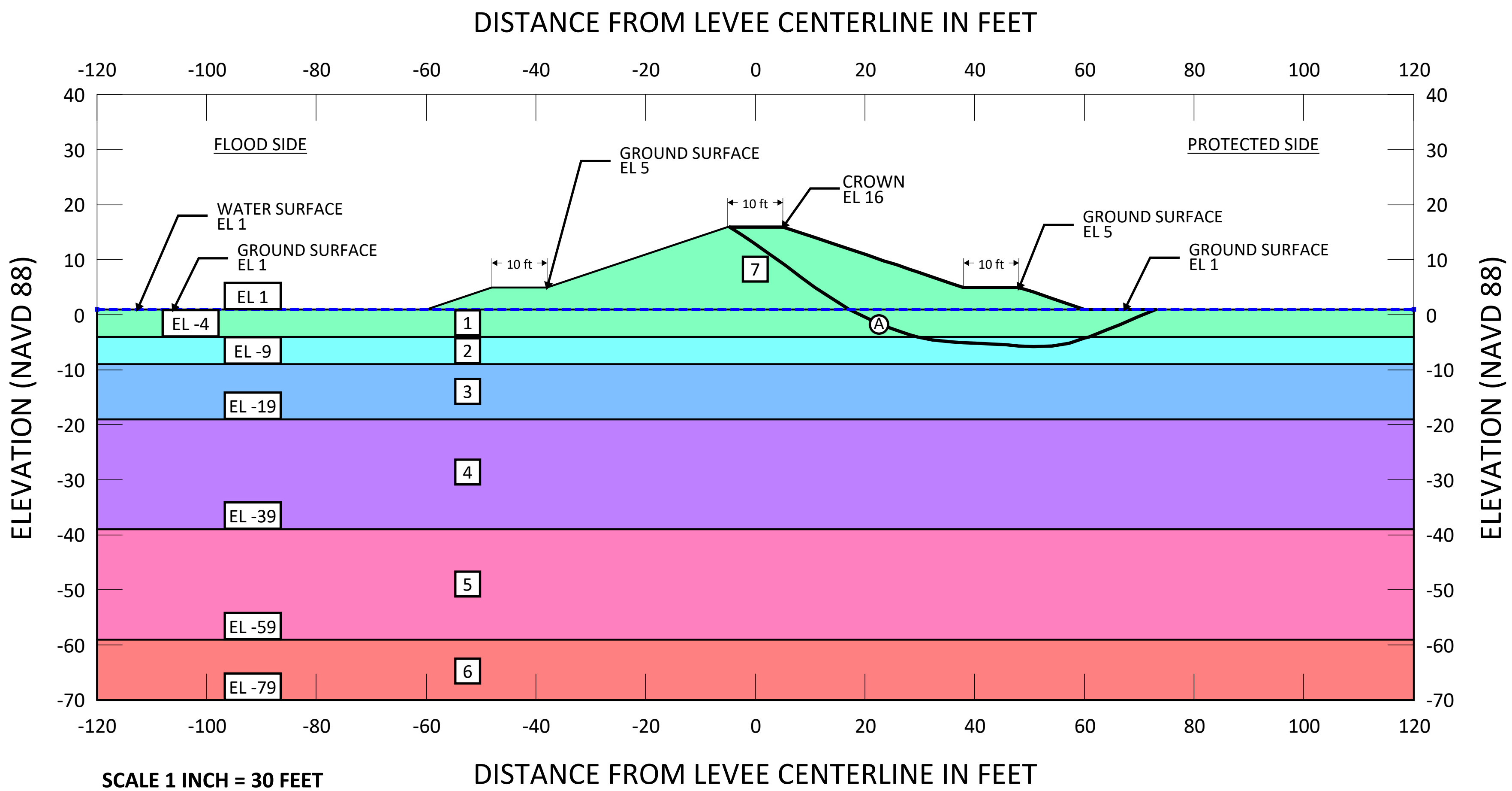
1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR WEST SLIDELL RING LEVEE SHOWN ON FIGURE 6 SHEET 3 IN OUR TASK 1 REPORT.
5. SYMMETRICAL BENCHED SECTION WAS ANALYZED DUE TO TYPICAL LEVEE CROSS SECTION NOT MEETING THE MINIMUM REQUIRED FACTOR OF SAFETY
6. FIGURE 2 SHEETS 6-10 SHOW ANALYSES FOR THE FINAL GEOMETRY WITH A WIDENED PROTECTED SIDE BENCH WHICH WAS REQUIRED FOR SWL CONDITIONS.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
WEST SLIDELL RING LEVEE - ALTERNATIVES 1-3 - 100 YEAR
BENCHED SECTION[5] - LOW WATER LEVEL (LWL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: WEST SLIDELL ANALYSIS.GSZ	FIGURE 2 SHEET 4 OF 10



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	23	105	0	0
2	CLAY	23	110	0	0
3	CLAY	23	115	0	0
4	CLAY	23	115	0	0
5	CLAY	23	115	0	0
6	CLAY	23	105	0	0
7	LEVEE FILL	23	115	0	0

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	1.53	100 YEAR - LWL (S-CASE_LWL CIRCULAR)	1.40

NOTES:

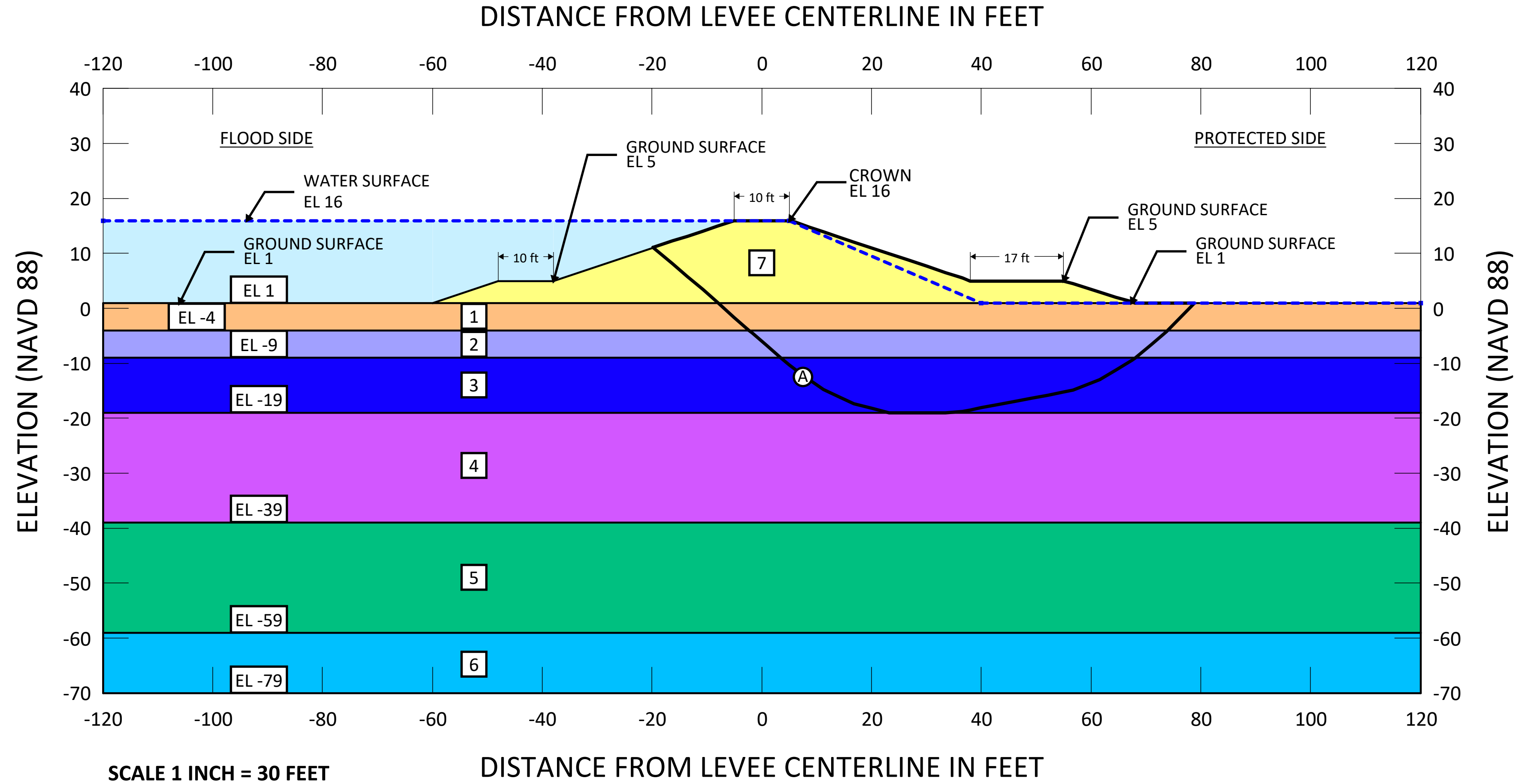
1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR WEST SLIDELL RING LEVEE SHOWN ON FIGURE 6 SHEET 3 IN OUR TASK 1 REPORT.
5. SYMMETRICAL BENCHED SECTION WAS ANALYZED DUE TO TYPICAL LEVEE CROSS SECTION NOT MEETING THE MINIMUM REQUIRED FACTOR OF SAFETY
6. FIGURE 2 SHEETS 6-10 SHOW ANALYSES FOR THE FINAL GEOMETRY WITH A WIDENED PROTECTED SIDE BENCH WHICH WAS REQUIRED FOR SWL CONDITIONS.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
WEST SLIDELL RING LEVEE - ALTERNATIVES 1-3 - 100 YEAR
BENCHED SECTION[5] - LOW WATER LEVEL (LWL) - S-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: WEST SLIDELL ANALYSIS.GSZ	FIGURE 2 SHEET 5 OF 10



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	105	250	250
2	CLAY	0	110	300	300
3	CLAY	0	115	400	400
4	CLAY	0	115	500	500
5	CLAY	0	115	800	800
6	CLAY	0	105	850	850
7	LEVEE FILL	0	115	600	600

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	1.47	FINAL - 100 YEAR - CGL (Q-CASE_CGL CIRCULAR)	1.30

NOTES:

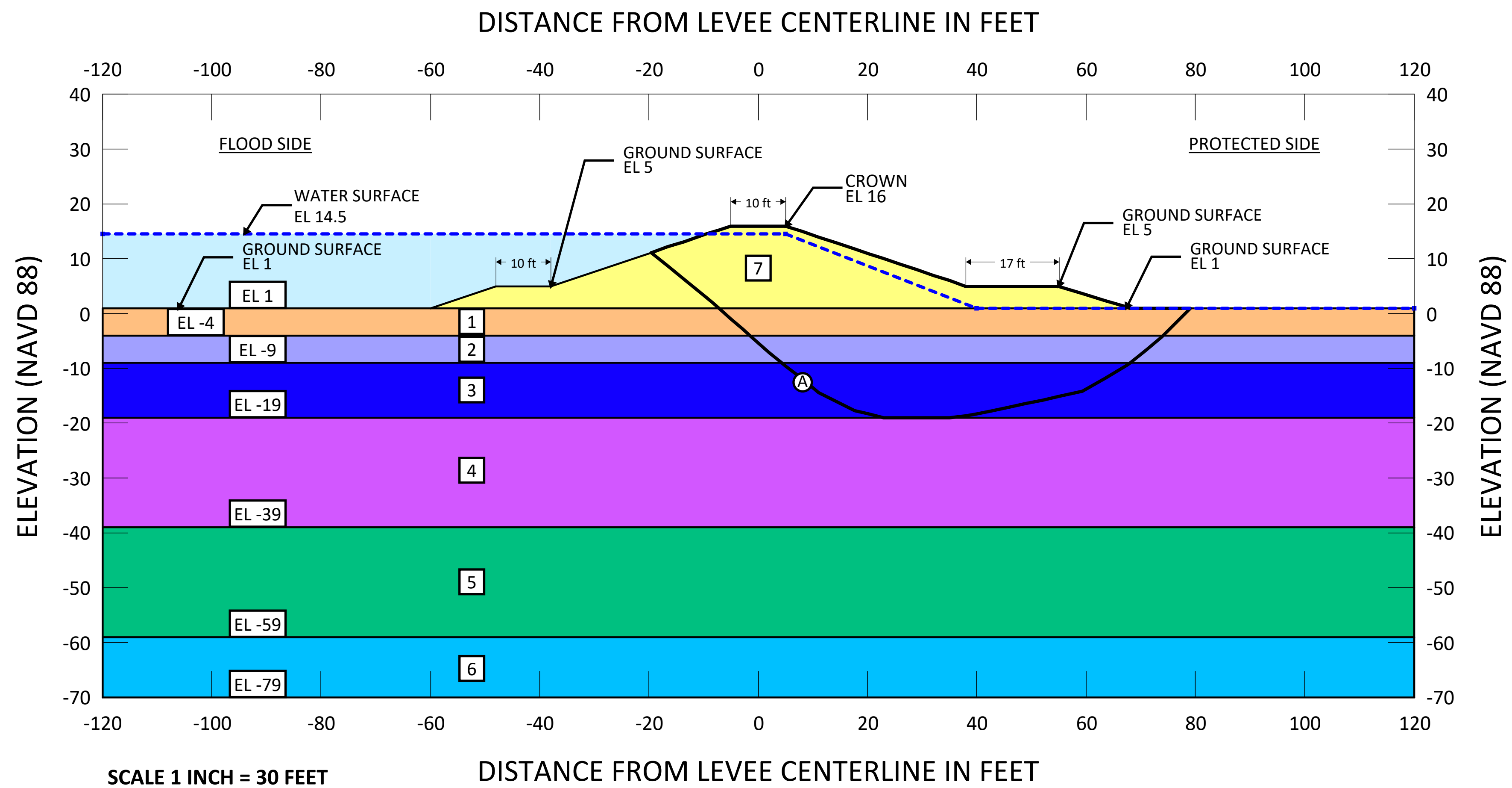
1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR WEST SLIDELL RING LEVEE SHOWN ON FIGURE 6 SHEET 3 IN OUR TASK 1 REPORT.
5. FIGURE 2 SHEETS 6-10 SHOWS ANALYSES FOR FINAL BENCHED SECTION WITH WIDENED PROTECTED SIDE BENCH WHICH IS REQUIRED DUE THE SYMMETRICAL BENCHED SECTION NOT MEETING THE MINIMUM REQUIRED FACTOR OF SAFETY FOR SWL CONDITIONS.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
WEST SLIDELL RING LEVEE - ALTERNATIVES 1-3 - 100 YEAR
FINAL SECTION[5] - CONSTRUCTION GRADE (CGL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: WEST SLIDELL ANALYSIS.GSZ	FIGURE 2 SHEET 6 OF 10



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	105	250	250
2	CLAY	0	110	300	300
3	CLAY	0	115	400	400
4	CLAY	0	115	500	500
5	CLAY	0	115	800	800
6	CLAY	0	105	850	850
7	LEVEE FILL	0	115	600	600

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	1.50	FINAL - 100 YEAR - SWL (Q-CASE_SWL CIRCULAR)	1.50
A	CIRCULAR	1.50	FINAL - 100 YEAR - PGL (Q-CASE_PGL CIRCULAR)	1.40

NOTES:

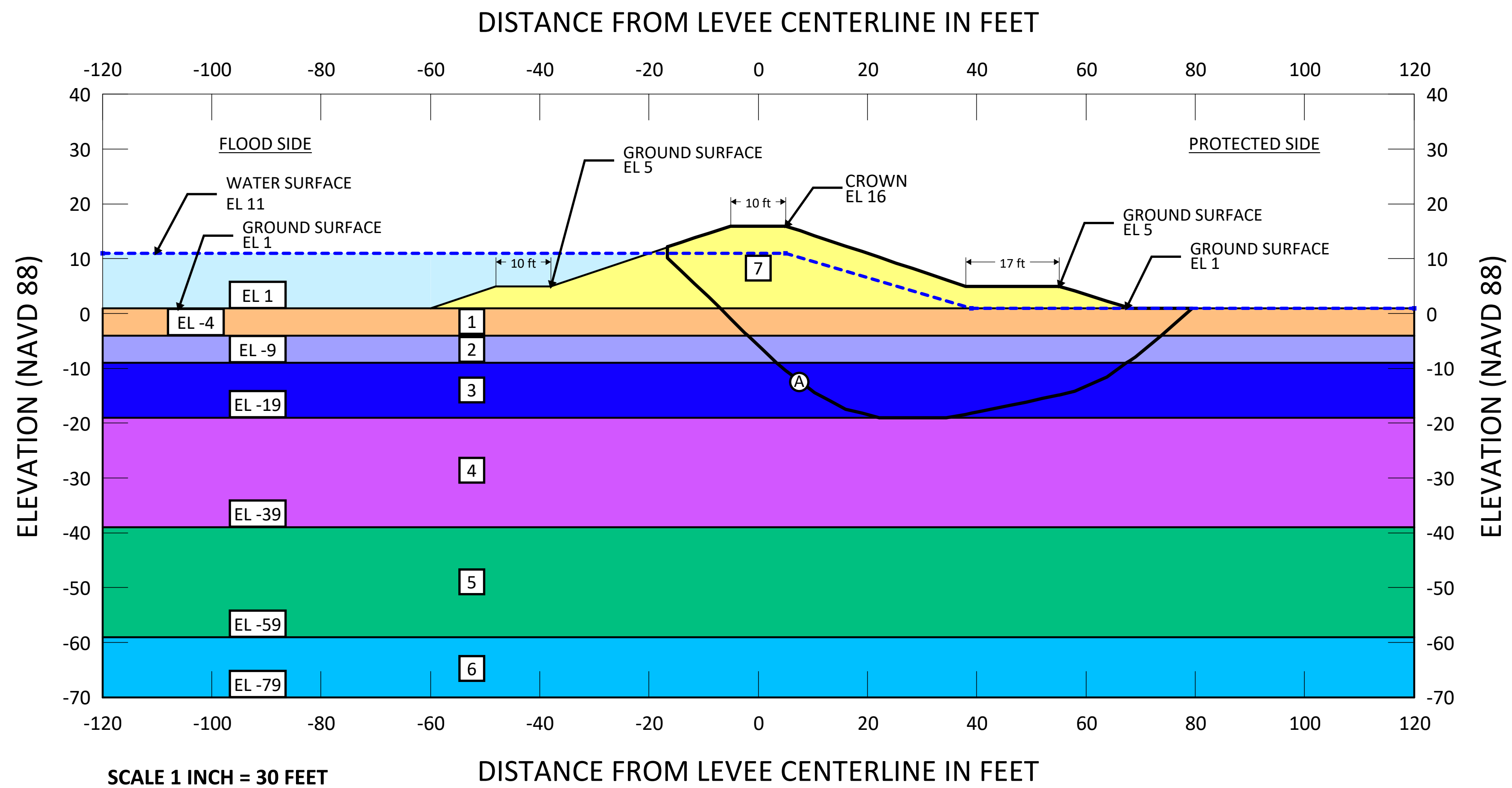
1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR WEST SLIDELL RING LEVEE SHOWN ON FIGURE 6 SHEET 3 IN OUR TASK 1 REPORT.
5. FIGURE 2 SHEETS 6-10 SHOWS ANALYSES FOR FINAL BENCHED SECTION WITH WIDENED PROTECTED SIDE BENCH WHICH IS REQUIRED DUE THE SYMMETRICAL BENCHED SECTION NOT MEETING THE MINIMUM REQUIRED FACTOR OF SAFETY FOR SWL CONDITIONS.
6. THE PROJECT GRADE LEVEL (PGL) AND STILL WATER LEVEL (SWL) WERE ASSUMED TO BE EQUAL FOR THIS CONCEPTUAL LEVEL DESIGN ANALYSES.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
WEST SLIDELL RING LEVEE - ALTERNATIVES 1-3 - 100 YEAR
FINAL SECTION[5] - STILL WATER LEVEL (SWL/PGL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: WEST SLIDELL ANALYSIS.GSZ	FIGURE 2 SHEET 7 OF 10



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	105	250	250
2	CLAY	0	110	300	300
3	CLAY	0	115	400	400
4	CLAY	0	115	500	500
5	CLAY	0	115	800	800
6	CLAY	0	105	850	850
7	LEVEE FILL	0	115	600	600

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	1.50	FINAL - INTERMEDIATE - EL 11 - SWL (Q-CASE_SWL CIRCULAR)	1.50

NOTES:

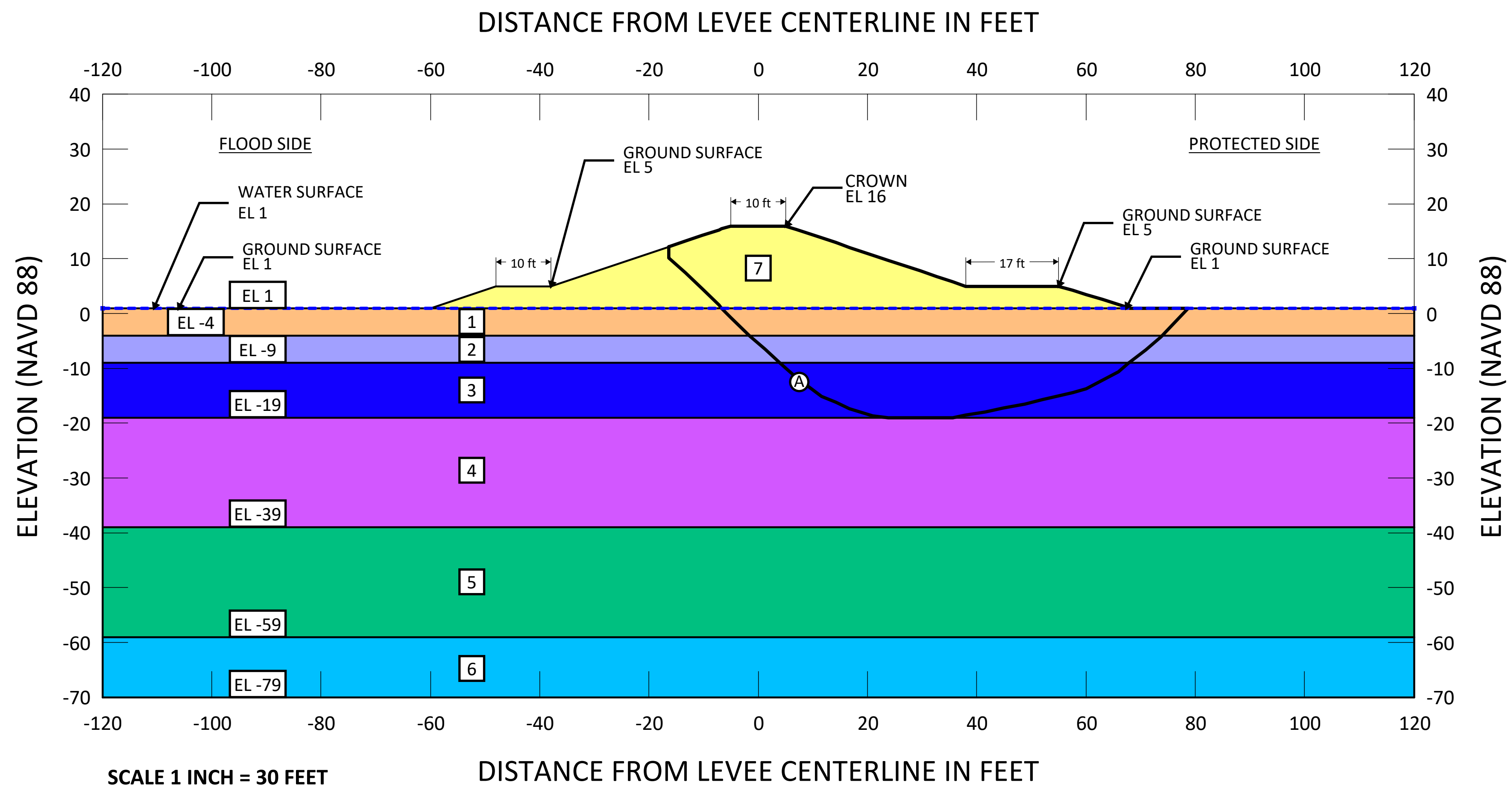
1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR WEST SLIDELL RING LEVEE SHOWN ON FIGURE 6 SHEET 3 IN OUR TASK 1 REPORT.
5. FIGURE 2 SHEETS 6-10 SHOWS ANALYSES FOR FINAL BENCHED SECTION WITH WIDENED PROTECTED SIDE BENCH WHICH IS REQUIRED DUE THE SYMMETRICAL BENCHED SECTION NOT MEETING THE MINIMUM REQUIRED FACTOR OF SAFETY FOR SWL CONDITIONS.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
WEST SLIDELL RING LEVEE - ALTERNATIVES 1-3 - EL 14.5
FINAL SECTION[5] - INTERMEDIATE EL 11 (SWL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: WEST SLIDELL ANALYSIS.GSZ	FIGURE 2 SHEET 8 OF 10



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	105	250	250
2	CLAY	0	110	300	300
3	CLAY	0	115	400	400
4	CLAY	0	115	500	500
5	CLAY	0	115	800	800
6	CLAY	0	105	850	850
7	LEVEE FILL	0	115	600	600

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	1.50	FINAL - 100 YEAR - LWL (Q-CASE_LWL CIRCULAR)	1.40

NOTES:

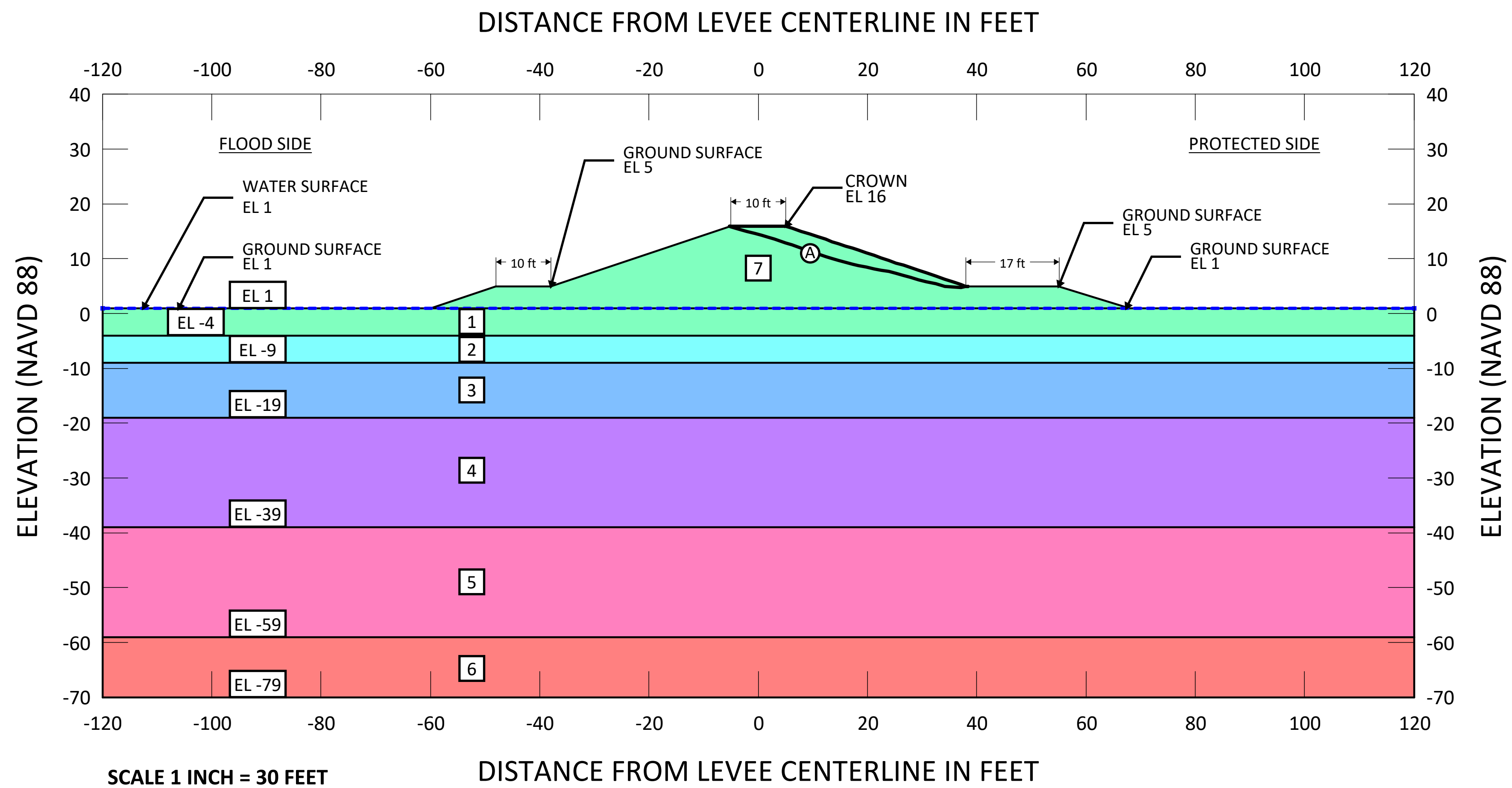
1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR WEST SLIDELL RING LEVEE SHOWN ON FIGURE 6 SHEET 3 IN OUR TASK 1 REPORT.
5. FIGURE 2 SHEETS 6-10 SHOWS ANALYSES FOR FINAL BENCHED SECTION WITH WIDENED PROTECTED SIDE BENCH WHICH IS REQUIRED DUE THE SYMMETRICAL BENCHED SECTION NOT MEETING THE MINIMUM REQUIRED FACTOR OF SAFETY FOR SWL CONDITIONS.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
WEST SLIDELL RING LEVEE - ALTERNATIVES 1-3 - 100 YEAR
FINAL SECTION[5] - LOW WATER LEVEL (LWL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: WEST SLIDELL ANALYSIS.GSZ	FIGURE 2 SHEET 9 OF 10



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	23	105	0	0
2	CLAY	23	110	0	0
3	CLAY	23	115	0	0
4	CLAY	23	115	0	0
5	CLAY	23	115	0	0
6	CLAY	23	105	0	0
7	LEVEE FILL	23	115	0	0

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	CIRCULAR	1.56	FINAL - 100 YEAR - LWL (S-CASE_LWL CIRCULAR)	1.40

NOTES:

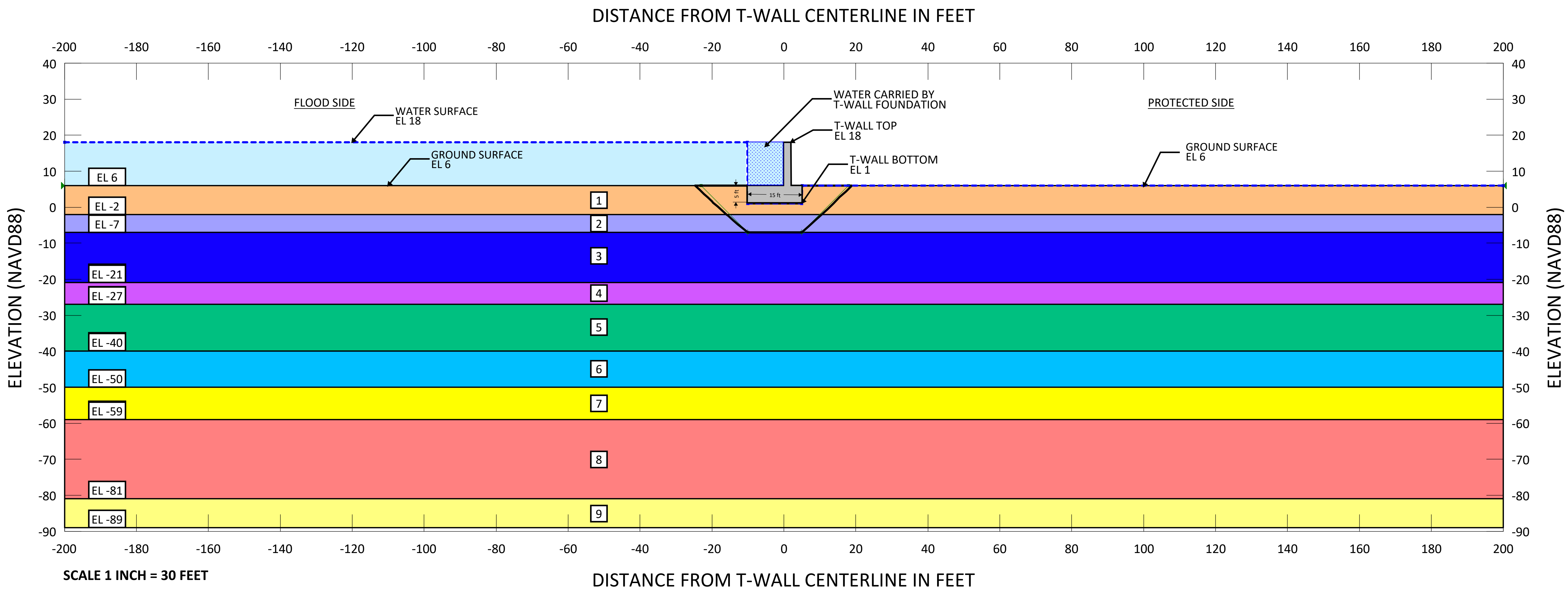
1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. A TENSION CRACK WAS INCORPORATED INTO THE ANALYSES TO ELIMINATE NEGATIVE BASE NORMAL FORCES, NEGATIVE NORMAL FORCES, AND NEGATIVE INTERSLICE FORCES WHEN FOUND WITHIN THE ACTIVE ZONE SLICES.
3. THE LEVEE AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCPETUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
4. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR WEST SLIDELL RING LEVEE SHOWN ON FIGURE 6 SHEET 3 IN OUR TASK 1 REPORT.
5. FIGURE 2 SHEETS 6-10 SHOWS ANALYSES FOR FINAL BENCHED SECTION WITH WIDENED PROTECTED SIDE BENCH WHICH IS REQUIRED DUE THE SYMMETRICAL BENCHED SECTION NOT MEETING THE MINIMUM REQUIRED FACTOR OF SAFETY FOR SWL CONDITIONS.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
WEST SLIDELL RING LEVEE - ALTERNATIVES 1-3 - 100 YEAR
FINAL SECTION[5] - LOW WATER LEVEL (LWL) - S-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: WEST SLIDELL ANALYSIS.GSZ	FIGURE 2 SHEET 10 OF 10



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	120	500	500
2	CLAY	0	120	350	350
3	CLAY	0	120	650	650
4	CLAY	0	115	850	850
5	CLAY	0	110	1000	1000
6	CLAY	0	113	1000	1000
7	CLAY	0	107	1000	1000
8	CLAY	0	121	1000	1000
9	CLAY	0	121	1000	1000

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	FULLY SPECIFIED	3.10	T-WALL - 100 YEAR (Q-CASE_TOP OF WALL)	1.40

NOTES:

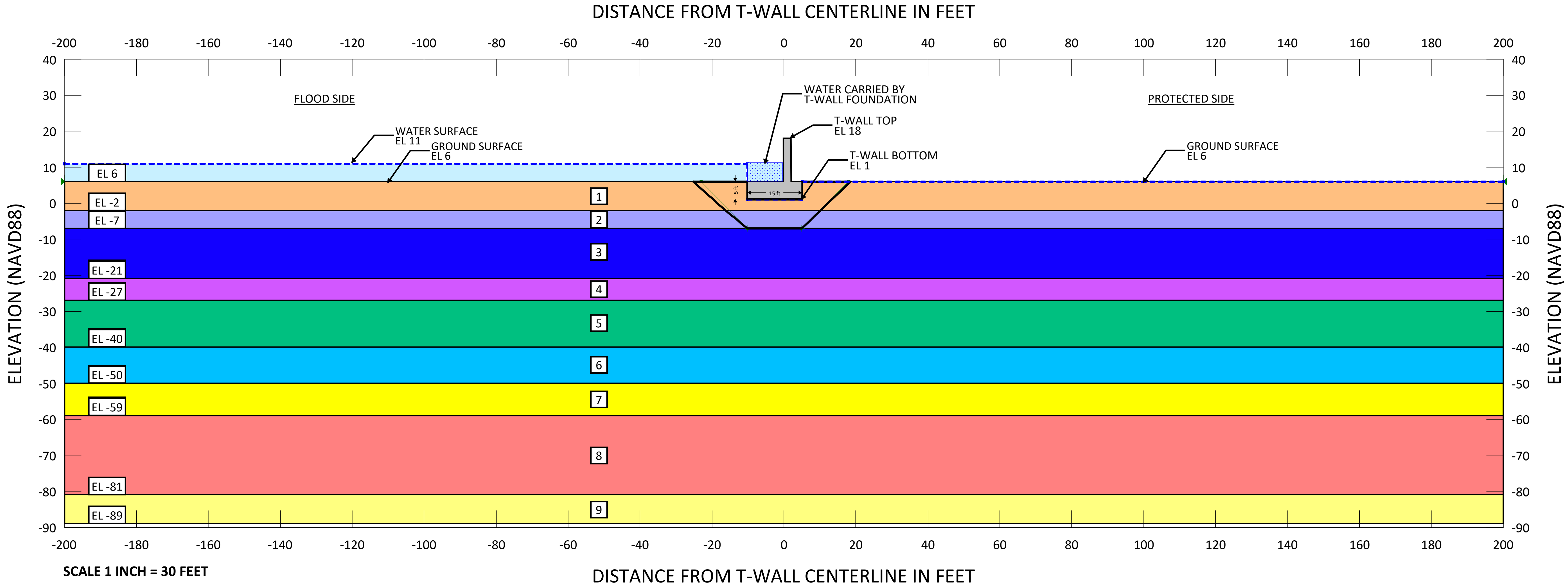
1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. THE T-WALL AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCEPTUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
3. THE STABILITY ANALYSIS WAS COMPLETED IN ACCORDANCE WITH THE T-WALL METHOD DEFINED IN THE USACE'S HURRICANE AND STORM DAMAGE RISK REDUCTION SYSTEM DESIGN GUIDELINES DATED JUNE 2012. CALCULATION OF UNBALANCED LOADS WAS NOT NECESSARY FOR THIS ANALYSIS.
4. THE PRESENCE OF A SEEPAGE CUTOFF WALL WAS CONSERVATIVELY NEGLECTED IN THESE GLOBAL STABILITY ANALYSES.
5. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - EAST ALT 2 - I-10 MEDIAN WALL
T-WALL - 100 YEAR (EL 18) - TOP OF WALL (TOW) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 3 SHEET 1 OF 6



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	120	500	500
2	CLAY	0	120	350	350
3	CLAY	0	120	650	650
4	CLAY	0	115	850	850
5	CLAY	0	110	1000	1000
6	CLAY	0	113	1000	1000
7	CLAY	0	107	1000	1000
8	CLAY	0	121	1000	1000
9	CLAY	0	121	1000	1000

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	FULLY SPECIFIED	7.45	T-WALL - 100 YEAR (Q-CASE_SWL)	1.50

NOTES:

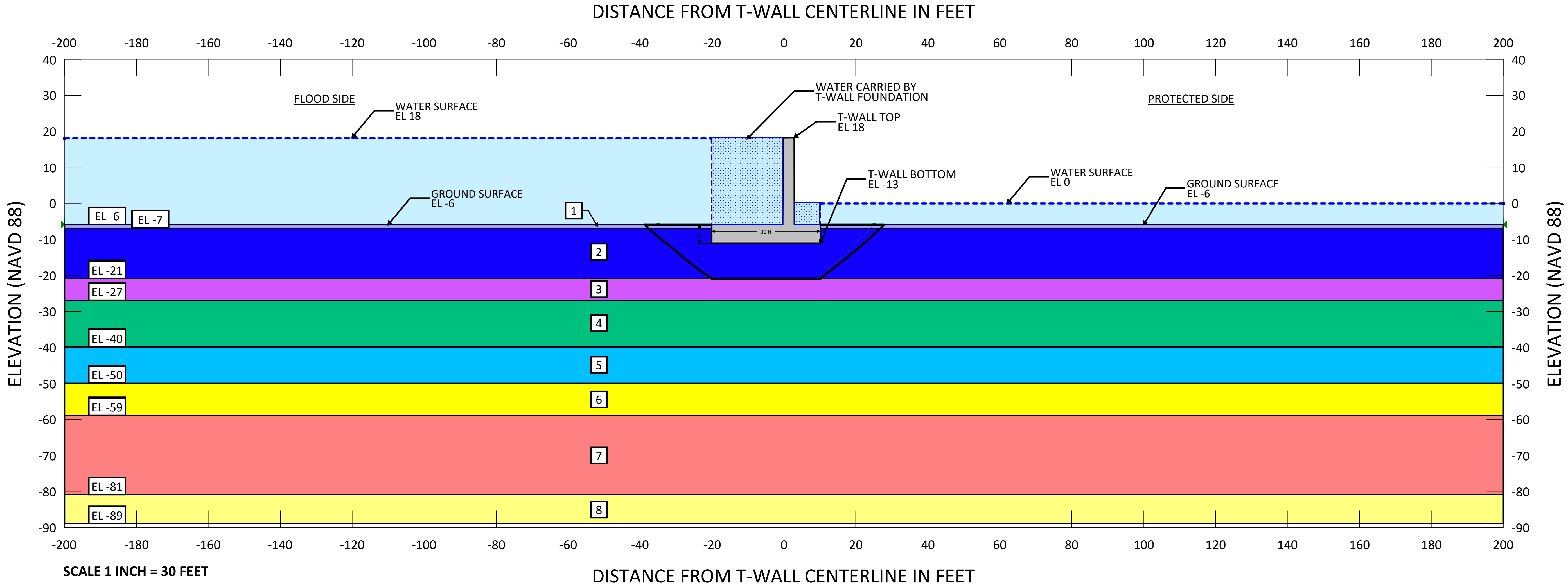
1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
2. THE T-WALL AND RIVERBANK SLOPE CROSS SECTION WAS BASED ON FLOOD PROTECTION LEVELS AND CONCEPTUAL DESIGN INFORMATION PROVIDED BY NEEL-SCHAFFER, INC.
3. THE STABILITY ANALYSIS WAS COMPLETED IN ACCORDANCE WITH THE T-WALL METHOD DEFINED IN THE USACE'S HURRICANE AND STORM DAMAGE RISK REDUCTION SYSTEM DESIGN GUIDELINES DATED JUNE 2012. CALCULATION OF UNBALANCED LOADS WAS NOT NECESSARY FOR THIS ANALYSIS.
4. THE PRESENCE OF A SEEPAGE CUTOFF WALL WAS CONSERVATIVELY NEGLECTED IN THESE GLOBAL STABILITY ANALYSES.
5. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - EAST ALT 2 - I-10 MEDIAN WALL
T-WALL - 100 YEAR (EL 18) - STILL WATER LEVEL (SWL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 3 SHEET 2 OF 6



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	120	350	350
2	CLAY	0	120	650	650
3	CLAY	0	115	850	850
4	CLAY	0	110	1000	1000
5	CLAY	0	113	1000	1000
6	CLAY	0	107	1000	1000
7	CLAY	0	121	1000	1000
8	CLAY	0	121	1000	1000

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	FULLY SPECIFIED	3.80	T-WALL - 100 YEAR (Q-CASE_TOP OF WALL)	1.40

NOTES:

1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
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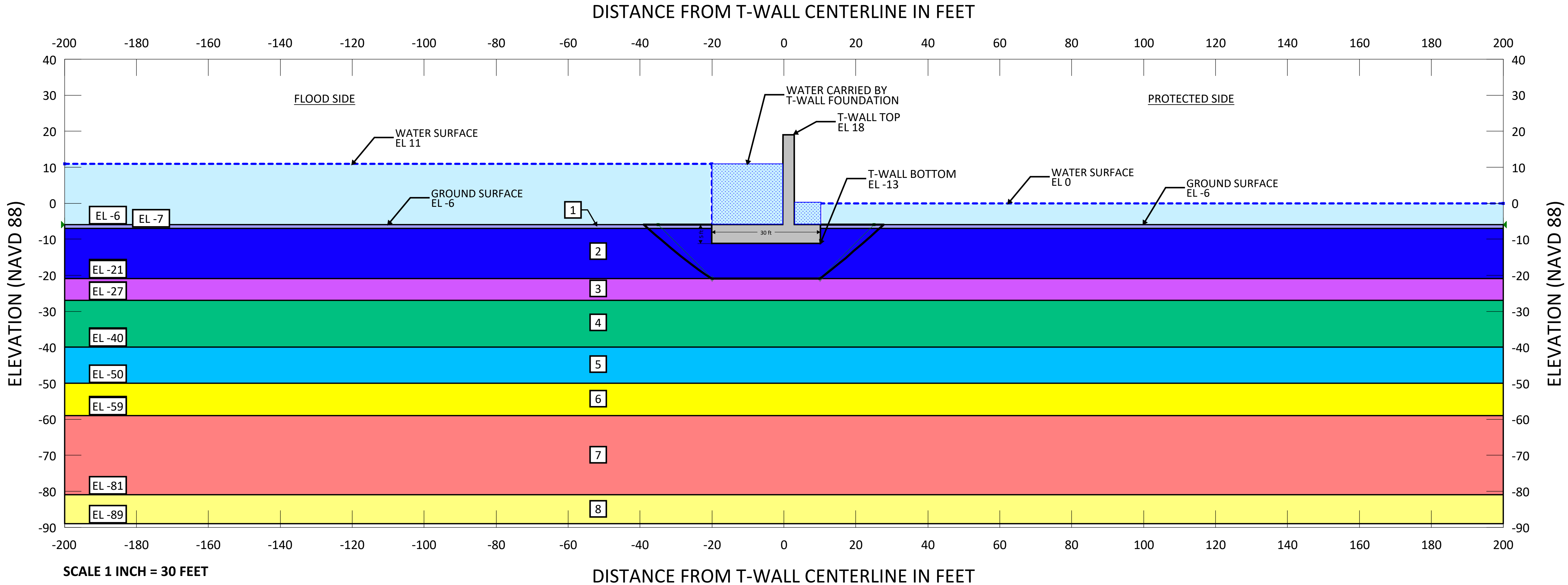
3. THE STABILITY ANALYSIS WAS COMPLETED IN ACCORDANCE WITH THE T-WALL METHOD DEFINED IN THE USACE'S HURRICANE AND STORM DAMAGE RISK REDUCTION SYSTEM DESIGN GUIDELINES DATED JUNE 2012. CALCULATION OF UNBALANCED LOADS WAS NOT NECESSARY FOR THIS ANALYSIS.
4. THE PRESENCE OF A SEEPAGE CUTOFF WALL WAS CONSERVATIVELY NEGLECTED IN THESE GLOBAL STABILITY ANALYSES.
5. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - SOUTH ALT 1 - LAKE SURGE BARRIER
T-WALL - 100 YEAR (EL 18) - TOP OF WALL (TOW) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 3 SHEET 3 OF 6



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	120	350	350
2	CLAY	0	120	650	650
3	CLAY	0	115	850	850
4	CLAY	0	110	1000	1000
5	CLAY	0	113	1000	1000
6	CLAY	0	107	1000	1000
7	CLAY	0	121	1000	1000
8	CLAY	0	121	1000	1000

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	FULLY SPECIFIED	6.24	T-WALL - 100 YEAR (Q-CASE_SWL)	1.50

NOTES:

1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
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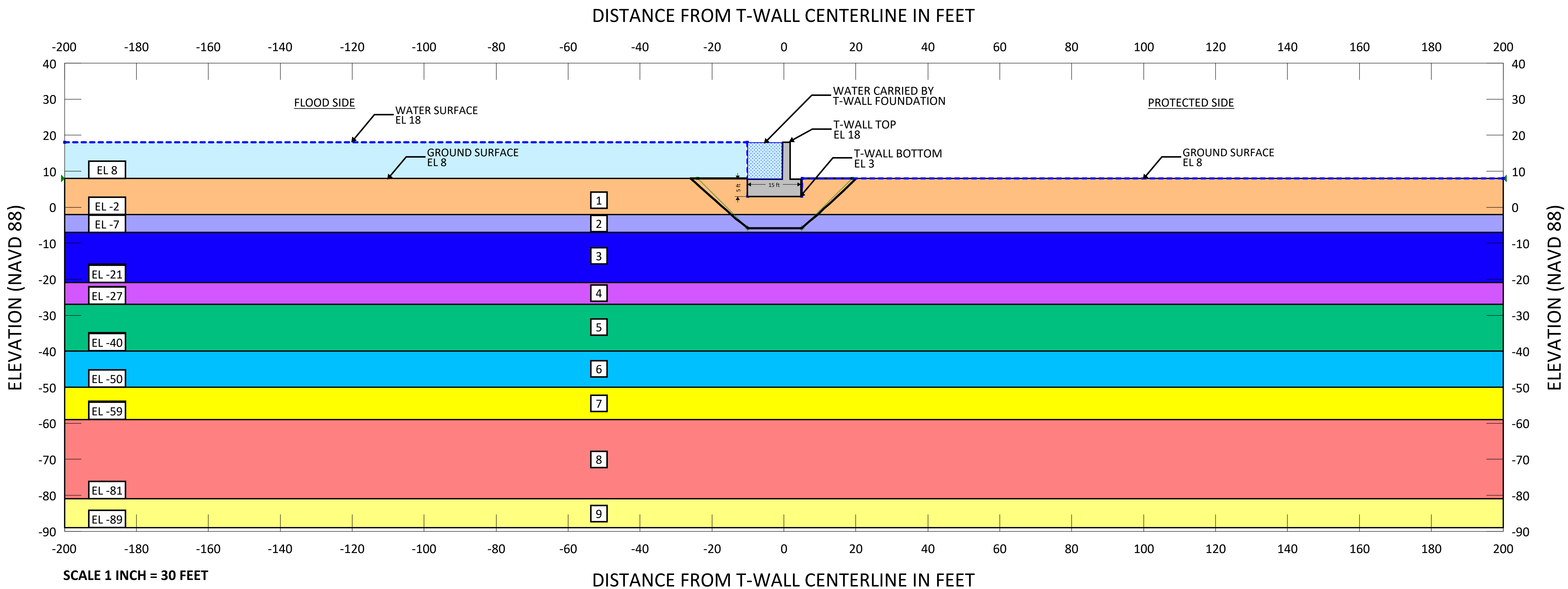
5. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - SOUTH ALT 1 - LAKE SURGE BARRIER
T-WALL - 100 YEAR (EL 18) - STILL WATER LEVEL (SWL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 3 SHEET 4 OF 6



SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	120	500	500
2	CLAY	0	120	350	350
3	CLAY	0	120	650	650
4	CLAY	0	115	850	850
5	CLAY	0	110	1000	1000
6	CLAY	0	113	1000	1000
7	CLAY	0	107	1000	1000
8	CLAY	0	121	1000	1000
9	CLAY	0	121	1000	1000

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	FULLY SPECIFIED	3.80	T-WALL - 100 YEAR (Q-CASE_TOP OF WALL)	1.40

NOTES:

1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
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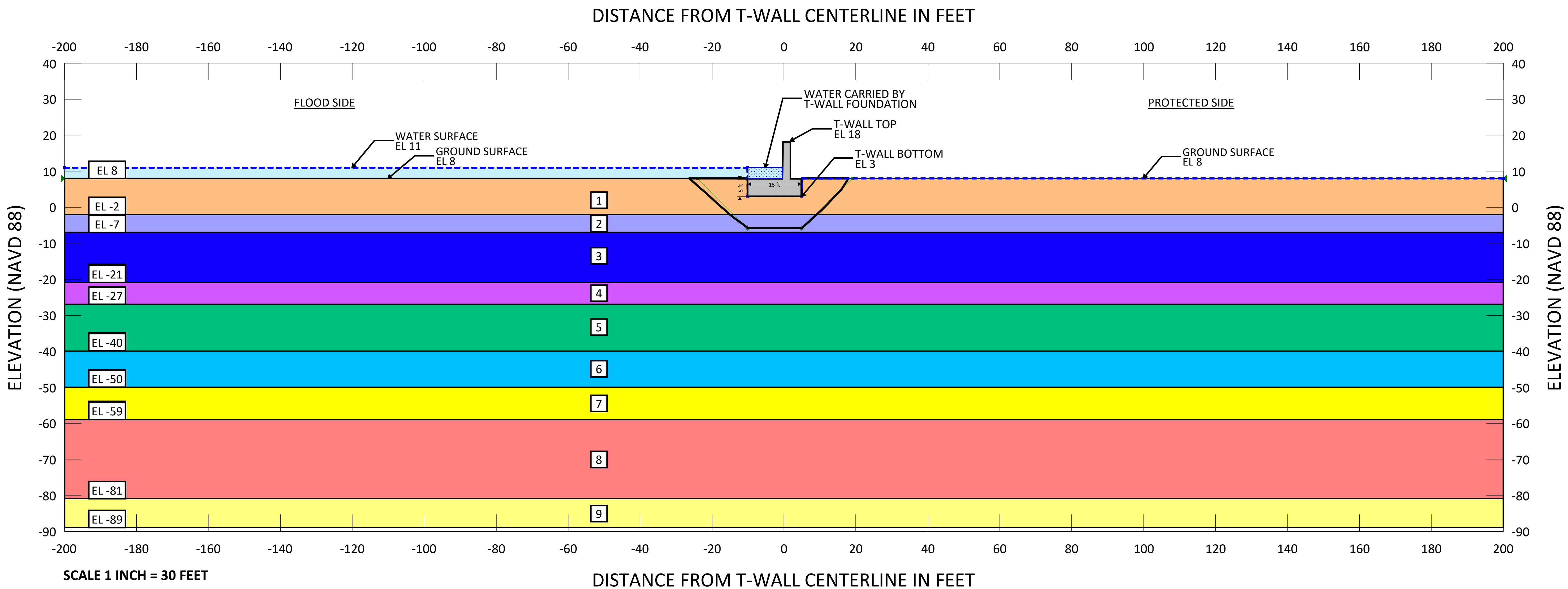
5. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - WEST ALT 3 - HWY 11 FLOODWALL
T-WALL - 100 YEAR (EL 18) - TOP OF WALL (TOW) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 3 SHEET 5 OF 6



SCALE 1 INCH = 30 FEET

SOIL NO.	DESCRIPTION	FRICTION ANGLE IN DEGREES	UNIT WEIGHT IN PCF	COHESION IN PSF	
				AVG.	BASE
1	CLAY	0	120	500	500
2	CLAY	0	120	350	350
3	CLAY	0	120	650	650
4	CLAY	0	115	850	850
5	CLAY	0	110	1000	1000
6	CLAY	0	113	1000	1000
7	CLAY	0	107	1000	1000
8	CLAY	0	121	1000	1000
9	CLAY	0	121	1000	1000

SLIP SURFACE DESIGNATION	TYPE OF SEARCH	COMPUTED FACTOR OF SAFETY	FILE NAME (SUBFILE NAME)	MINIMUM REQUIRED FACTOR OF SAFETY
A	FULLY SPECIFIED	12.67	T-WALL - 100 YEAR (Q-CASE_SWL)	1.50

NOTES:

1. SLOPE STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES (WHICH SATISFIES BOTH FORCE AND MOMENT EQUILIBRIUM) AND THE OPTIMIZATION SEARCH ROUTINE USING SLOPE/W SOFTWARE, VERSION 11.14.1.1.
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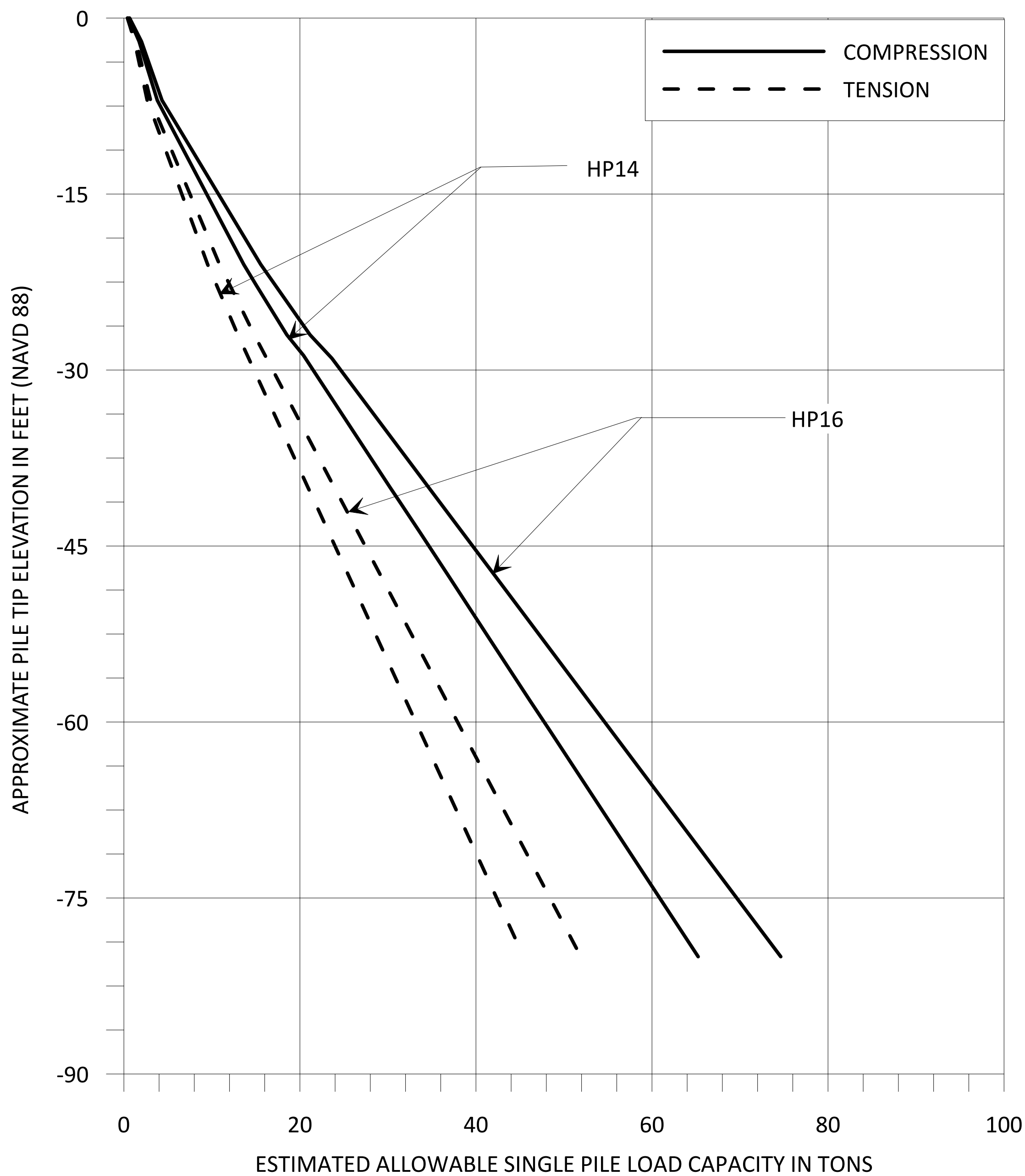
4. THE PRESENCE OF A SEEPAGE CUTOFF WALL WAS CONSERVATIVELY NEGLECTED IN THESE GLOBAL STABILITY ANALYSES.
5. SOIL DESIGN PARAMETERS ARE BASED ON PARAMETERS DEVELOPED FOR EDEN ISLE LEVEE RING SHOWN ON FIGURE 6 SHEET 1 IN OUR TASK 1 REPORT.

SLOPE STABILITY ANALYSES BY SPENCER'S METHOD OF SLICES
EDEN ISLE RING LEVEE - WEST ALT 3 - HWY 11 FLOODWALL
T-WALL - 100 YEAR (EL 18) - STILL WATER LEVEL (SWL) - Q-CASE

ST. TAMMANY PARISH GOVERNMENT
COSTAL FLOOD PROTECTION PROJECT
WEST SLIDELL RING LEVEE, SLIDELL RING LEVEE
& EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: B.G.W.	JOB NO.: 24493
CHECKED BY: J.J.H.	DATE: 15 JAN 2021
CADD FILE: EDEN ISLE LEVEE ANALYSIS.GSZ	FIGURE 3 SHEET 6 OF 6



Q-CASE PARAMETERS

FACTOR OF SAFETY = 2

NOTES:

1. PILE LOAD CAPACITY ESTIMATES PRESENTED ON THIS FIGURE ASSUME A GROUND SURFACE AT EL 1 (NAVD 88) AND **ARE APPLICABLE TO THE T-WALL SECTIONS AT EAST 2/SOUTH 2/WEST 3 WITH A GSE EL 6 (NAVD 88).**

2. PILE LOAD CAPACITIES PRESENTED ON THIS FIGURE DO NOT INCLUDE THEWEIGHT OF THE PILES.

3. PILES ASSUMED TO BE INSTALLED BY IMPACT DRIVING EQUIPMENT WITHOUT ASSISTANCE FROM VIBRATORY EQUIPMENT OR JETTING.

TABLE 3.7: (HSDRRS) RECOMMENDED MINIMUM FACTOR OF SAFETY AXIAL PILE CAPACITY

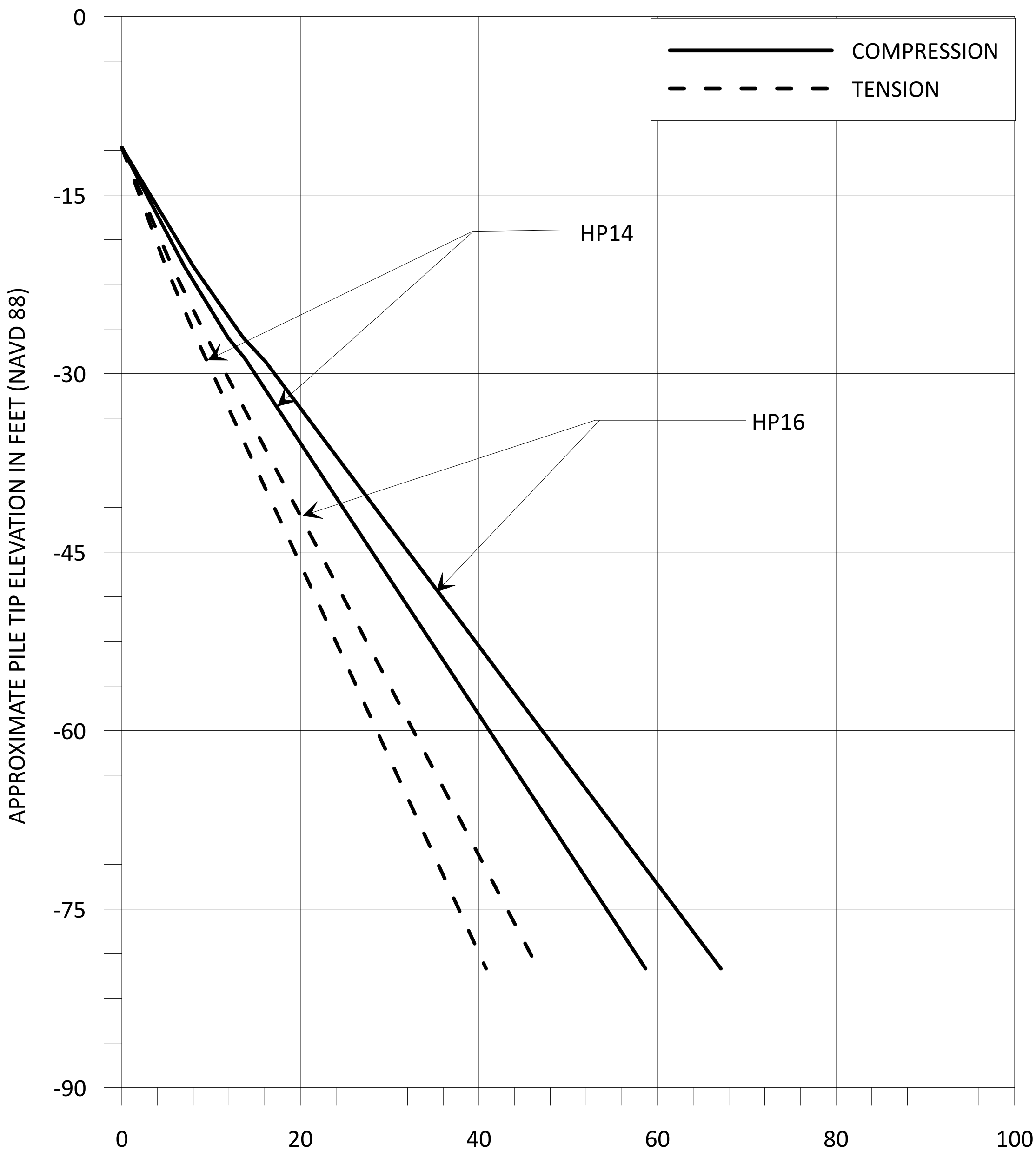
METHOD OF DETERMINING CAPACITY	LOADING CONDITION	MINIMUM FACTOR OF SAFETY	
		COMPRESSION	TENSION
THEORETICAL PREDICTION VERIFIED BY STATIC LOAD TEST	Q-CASE	2.0	2.0
	S-CASE	1.5	1.5
THEORETICAL PREDICTION VERIFIED BY PILE DRIVING ANALYZER	Q-CASE	2.5	3.0
	S-CASE	1.5	1.5
THEORETICAL PREDICTION NOT VERIFIED BY LOAD TEST	Q-CASE	3.0	3.0
	S-CASE	1.5	1.5

ESTIMATED ALLOWABLE SINGLE PILE LOAD CAPACITIES
STEEL H-PILES - Q CASE PARAMETERS
T-WALL FOUNDATIONS (EAST 2/SOUTH 2/WEST 3)

ST. TAMMANY PARISH GOVERMENT
COASTAL FLOOD PROTECTION PROJECT
EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING SINCE 1946

DRAWN BY: P.T.D.	JOB NO.: 24493
CHECKED BY: N.S.I.	DATE:11 JAN 2021
FILE NAME: SH.GRF	FIGURE 4



ESTIMATED ALLOWABLE SINGLE PILE LOAD CAPACITY IN TONS

Q-CASE PARAMETERS

FACTOR OF SAFETY = 2

NOTES:

1. PILE LOAD CAPACITY ESTIMATES PRESENTED ON THIS FIGURE ASSUME A GROUND SURFACE AT EL -11 (NAVD 88) AND **ARE APPLICABLE TO THE T-WALL SECTIONS AT SOUTH 1 WITH A GSE EL -6 (NAVD 88).**

2. PILE LOAD CAPACITIES PRESENTED ON THIS FIGURE DO NOT INCLUDE THEWEIGHT OF THE PILES.

3. PILES ASSUMED TO BE INSTALLED BY IMPACT DRIVING EQUIPMENT WITHOUT ASSISTANCE FROM VIBRATORY EQUIPMENT OR JETTING.

TABLE 3.7: (HSDRRS) RECOMMENDED MINIMUM FACTOR OF SAFETY AXIAL PILE CAPACITY

METHOD OF DETERMINING CAPACITY	LOADING CONDITION	MINIMUM FACTOR OF SAFETY COMPRESSION	TENSION
THEORETICAL PREDICTION VERIFIED BY STATIC LOAD TEST	Q-CASE	2.0	2.0
	S-CASE	1.5	1.5
THEORETICAL PREDICTION VERIFIED BY PILE DRIVING ANALYZER	Q-CASE	2.5	3.0
	S-CASE	1.5	1.5
THEORETICAL PREDICTION NOT VERIFIED BY LOAD TEST	Q-CASE	3.0	3.0
	S-CASE	1.5	1.5

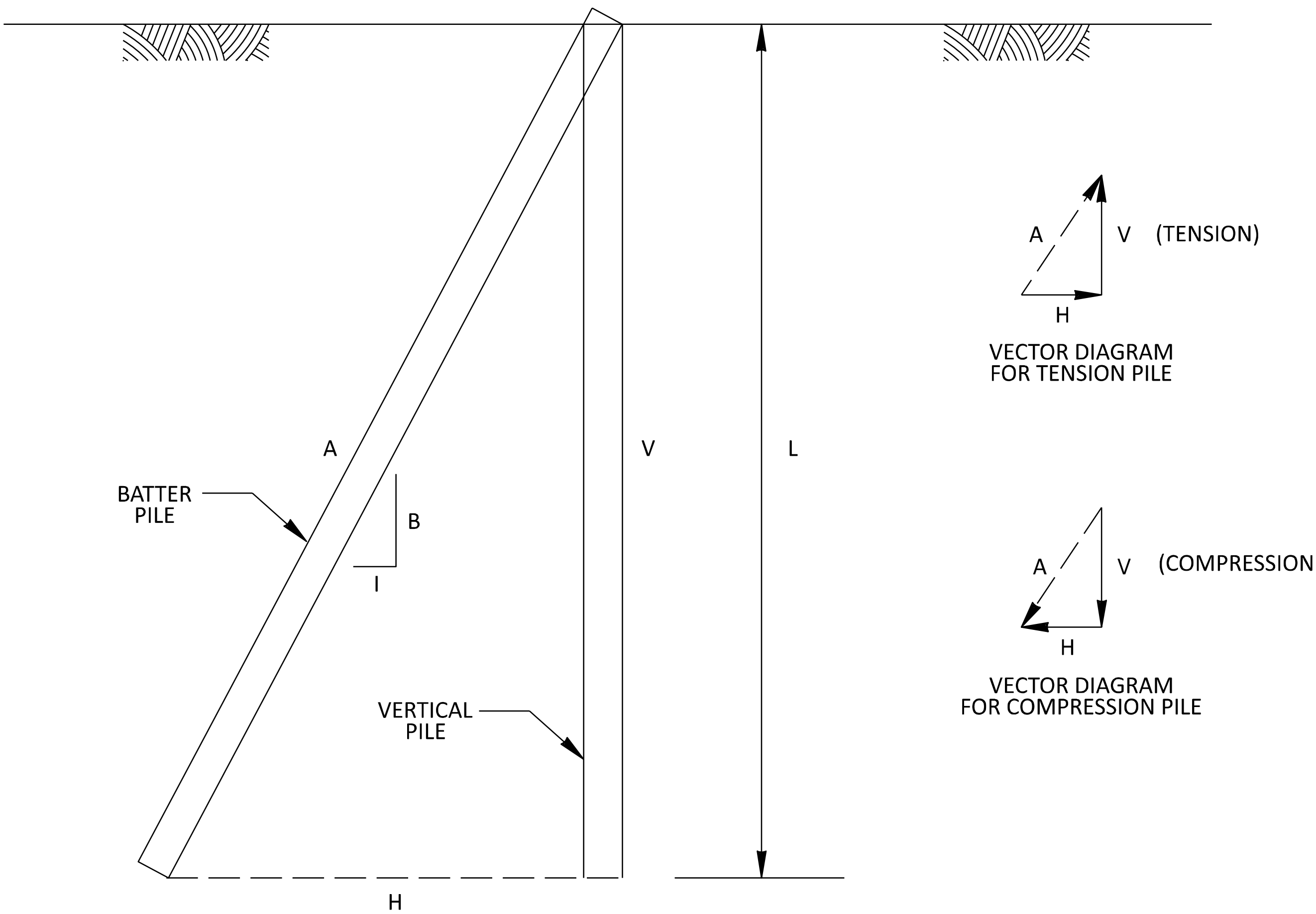
ESTIMATED ALLOWABLE SINGLE PILE LOAD CAPACITIES
STEEL H-PILES - Q CASE PARAMETERS
T-WALL FOUNDATIONS (SOUTH 1)

ST. TAMMANY PARISH GOVERMENT
COASTAL FLOOD PROTECTION PROJECT
EDEN ISLE RING LEVEE
ST. TAMMANY PARISH, LOUISIANA

EUSTIS ENGINEERING SINCE 1946

DRAWN BY: P.T.D.	JOB NO.: 24493
CHECKED BY: N.S.I.	DATE:11 JAN 2021
FILE NAME: SH.GRF	FIGURE 5

AXIAL AND HORIZONTAL RESISTANCE OF BATTER PILES
ESTIMATED FROM ALLOWABLE VERTICAL LOAD CAPACITIES



L = VERTICAL COMPONENT OF BATTER PILE EMBEDMENT LENGTH.

V = ESTIMATED ALLOWABLE SINGLE LOAD CAPACITY OF A PILE DRIVEN VERTICALLY WITH EMBEDMENT LENGTH, L.

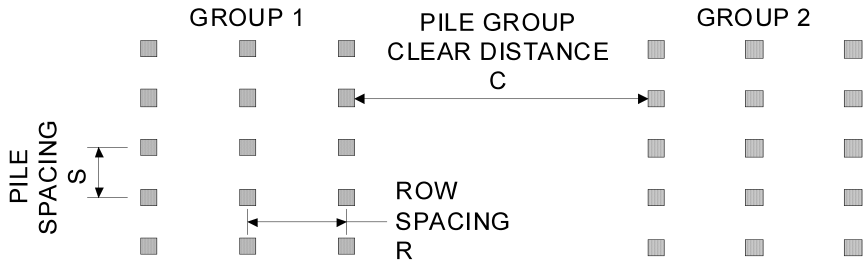
B = BATTER OF PILE EXPRESSED AS A RATIO OF VERTICAL DISTANCE TO ONE FOOT HORIZONTAL DISTANCE.

H = HORIZONTAL RESISTANCE OF BATTER PILE ESTIMATED AS FOLLOWS: $H = \frac{V}{B}$

A = ALLOWABLE AXIAL PILE LOAD CAPACITY OF A SINGLE BATTER PILE ESTIMATED AS FOLLOWS: $A = \sqrt{V^2\left(1+\frac{1}{B^2}\right)}$

NOTE: THE AXIAL LOAD RESISTANCE OF A VERTICAL PILE, V, IS DEPENDENT ON THE TYPE OF LOADING - TENSION OR COMPRESSION. CAUTION SHOULD BE EXERCISED TO ENSURE THE CORRECT VERTICAL CAPACITY IS USED.

Spacing of Pile Groups and Spacing of Piles Within Rows or Groups



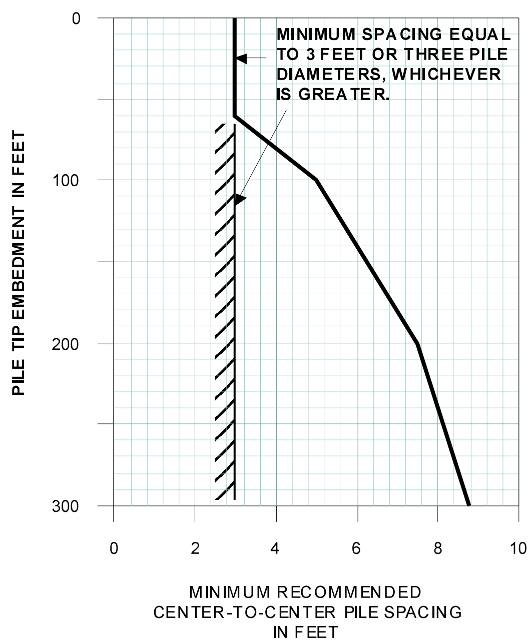
Piles should be arranged to provide a minimum center-to-center spacing, S, within rows or groups. This minimum recommended spacing may be taken as the largest value from the following criteria:

$$S = 0.05 (L_1) + 0.025 (L_2) + 0.0125 (L_3)$$

In Which:

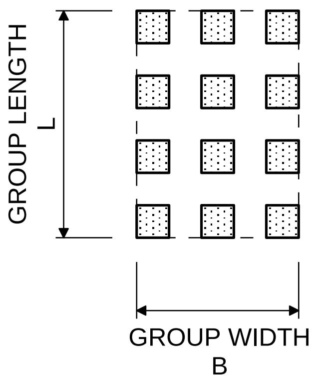
Where	S	=	Center-to-center pile spacing, as illustrated above.
	L_1	=	Pile embedment up to 100 feet.
	L_2	=	Pile embedment between 100 and 200 feet.
	L_3	=	Pile embedment between 200 and 300 feet.
	B	=	Pile outside diameter or side dimension.

These criteria can be presented graphically as follows:

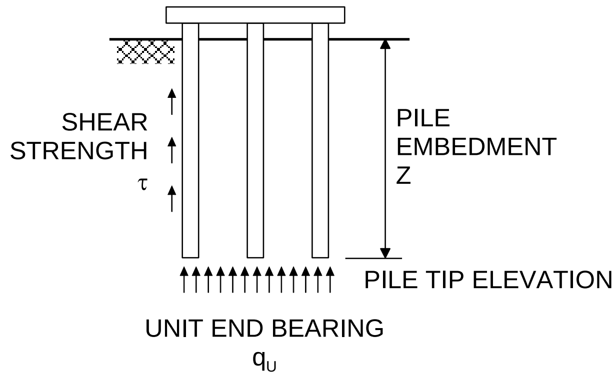


In addition, rows of single piles should provide a minimum center-to-center spacing, R, that is at least as large as the center-to-center pile spacing, S. Finally, individual pile groups should be arranged to provide a clear group spacing, C, equal to twice the largest dimension of the larger pile group. It should be noted, pile spacings greater than the minimum values presented above may be required to minimize the influence of individual piles on each other with respect to lateral load resistance and settlement, or to ensure pile group capacity is adequate when investigated for group perimeter shear.

Load Capacity of Rows or Groups of Driven Piles



PLAN VIEW



ELEVATION VIEW

The capacity of a row or group of piles may be equal to or less than the sum of the individual load capacities of piles within the group. The pile row or group may be considered a single equivalent pier, in which case the row or group capacity may be investigated using the following formula.

$$P_{GROUP} = \frac{(2L+2B)(\tau)(z)}{FS_{SIDE}} + \frac{(B)(L)(q_U)}{FS_{BASE}}$$

Where:	B	=	The width of the pile group in plan dimension.
	L	=	The length of the pile group in plan dimension.
	Z	=	The embedded pile length.
	τ	=	The average unit shear strength acting on the embedded pile length.
	q_U	=	The ultimate unit end-bearing pressure appropriate for the pile group.
	FS_{SIDE}	=	A factor of safety against mobilization of the ultimate skin friction, typically 2.
	FS_{BASE}	=	A factor of safety against mobilization of the ultimate end bearing, usually at least 3.

Notes:

(1) The average unit shear strength acting on the embedded pile length may be taken as the weighted average value of undrained shear strength (or undrained cohesion) acting over that length for assessments of the short term load capacity of the group.

(2) For assessments of the short term load capacity of the group, the ultimate end bearing is commonly estimated by multiplying an undrained shear strength (or undrained cohesion) by a bearing capacity factor, which typically varies between 5 and 6. The appropriate undrained shear strength and bearing capacity factor should consider the width and length of the pile group and the presence of any weak strata beneath the pile tips. In general, the unit end bearing pressure applicable to the pile group is not the same as the unit end bearing pressure used to estimate the load capacity of a single pile.

(3) The factor of safety against base failure should consider that large deformations may be required to mobilize the ultimate end bearing soil pressure estimated for the pile group.

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
TASK 2
ST. TAMMANY PARISH, LOUISIANA
EUSTIS ENGINEERING PROJECT NO. 24493

METHOD FOR COMPUTING MODULUS OF HORIZONTAL SUBGRADE REACTION (E_S)[(1)]
FOR CONCEPTUAL GEOTECHNICAL ENGINEERING REPORT

STRATUM ELEVATION (NAVD 88)	COEFFICIENT OF HORIZONTAL SUBGRADE REACTION(K_h) in lbs/in.^{3}
Grade to -2	222
-2 to -7	155
-7 to -21	289
-21 to -27	377
-27 to -40	444
-40 to -50	444
-50 to –59	444
-59 to -81	444
-81 to -89	444

[(1)]See Sheet 2 of 2 for computation of E_S

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
TASK 2
ST. TAMMANY PARISH, LOUISIANA
EUSTIS ENGINEERING PROJECT NO. 24493

MODULUS OF HORIZONTAL SUBGRADE REACTION (E_s)

E_s (lbs/in.^{2}) = $K_h \times B \times C \times D$

Where: K_h = Coefficient of horizontal subgrade reaction (lbs/in.^{3}) for a one foot diameter /width pile

B = Diameter/side dimension of pile (in.)

C = Reduction factor for cyclic loading

C = 0.33 for cyclic loading
C = 1.0 for initial load

D = Reduction factor for effect of group action

D	PILE SPACING IN DIRECTION OF LOADING
1.00	8B
0.71	7B
0.56	6B
0.45	5B
0.38	4B
0.33	3B

APPENDIX I

PRELIMINARY

THESE DOCUMENTS ARE FOR DESIGN REVIEW AND NOT INTENDED FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES.

ST. TAMMANY COASTAL PROTECTION PROJECT

ST. TAMMANY PARISH, LOUISIANA

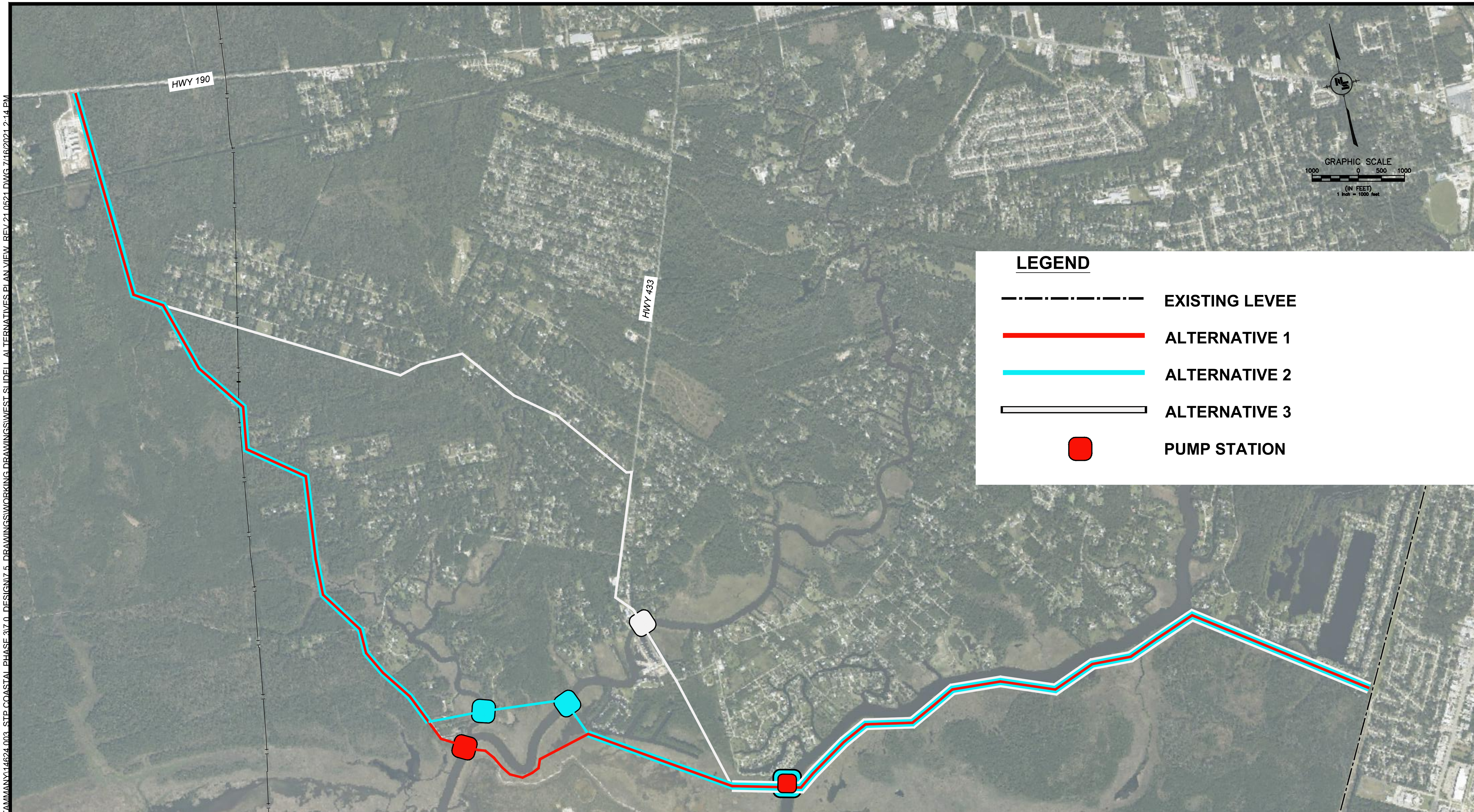
EDEN ISLES
100YR ALTERNATIVES

NEEL-SCHAFFER

CONTRACT NUMBER	FIGURE NUMBER
NS.14624.003	100YR

\\10.1.83.3\DATA\PROJECTS\LA\ST. TAMMANY\14624.003_STP COASTAL PHASE 3\7.0_DESIGN\7.5_DRAWINGS\WORKING DRAWINGS\100YR ALTERNATIVES PLAN VIEW.DWG 4/21/2021 4:29 PM

APPENDIX II



PRELIMINARY

THESE DOCUMENTS ARE FOR DESIGN REVIEW AND NOT INTENDED FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES.

ST. TAMMANY COASTAL PROTECTION PROJECT

ST. TAMMANY PARISH,
LOUISIANA

WEST SLIDELL
ALIGNMENT ALTERNATIVES

CONTRACT NUMBER	FIGURE NUMBER
NS.14624.003	100YR

NEEL-SCHAFFER

\\10.1.83.3\DATA\PROJECTS\ST_TAMMANY\14624.003_STP COASTAL PHASE 3\7.0_DESIGN\7.5_DRAWINGS\WORKING DRAWINGS\WEST SLIDELL ALTERNATIVES PLAN VIEW_REV 210521.DWG 7/16/2021 2:14 PM

APPENDIX III

Levee Analyses												
Eden Isle Ring Protection												
Case Name	Figure - Sheet No.	Water Condition	Soil Shear Strength	Direction of Analyses	Ground Surface Elevation (NAVD 88)	Flood Side Water Elevation (NAVD 88)	Protected Side Water Elevation (NAVD 88)	Estimated Overbuild in Feet	Crown Elevation with Overbuild (NAVD 88)	Required Factor of Safety	Minimum Optimized Factor Of Safety	Comments
East (1 and 3)	3 - 1 of 16	CGL (100 YR)	Q-Case	Protected Side	6	19	6	1	19	1.3	1.75	
East (1 and 3)	3 - 2 of 16	SWL (100 YR)	Q-Case	Protected Side	6	18	6	1	19	1.5	1.77	
East (1 and 3)	3 - 3 of 16	LWL (100 YR)	Q-Case	Protected Side	6	6	6	1	19	1.4	1.73	No Flood side LWL condition Needed due to symmetry
East (1 and 3)	3 - 4 of 16	LWL (100 YR)	S-Case	Protected Side	6	6	6	1	19	1.4	1.47	No Flood side LWL condition Needed due to symmetry
East (1 and 3)	3 - 5 of 16	CGL (Intermediate)	Q-Case	Protected Side	6	11.5	6	0.5	11.5	1.3	3.58	
East (1 and 3)	3 - 6 of 16	SWL (Intermediate)	Q-Case	Protected Side	6	11	6	0.5	11.5	1.5	3.62	
East (1 and 3)	3 - 7 of 16	LWL (Intermediate)	Q-Case	Protected Side	6	6	6	0.5	11.5	1.4	3.51	No Flood side LWL condition Needed due to symmetry
East (1 and 3)	3 - 8 of 16	LWL (Intermediate)	S-Case	Protected Side	6	6	6	0.5	11.5	1.4	1.74	No Flood side LWL condition Needed due to symmetry
South 3	3 - 1 of 16	CGL (100YR)	Q-Case	Protected Side	6	19	6	1	19	1.3		These analyses are the same as East 1 and 3.
South 3	3 - 2 of 16	SWL (100YR)	Q-Case	Protected Side	6	18	6	1	19	1.5		
South 3	3 - 3 of 16	LWL (100 YR)	Q-Case	Protected Side	6	6	6	1	19	1.4		
South 3	3 - 4 of 16	LWL (100 YR)	S-Case	Protected Side	6	6	6	1	19	1.4		
South 3	3 - 5 of 16	CGL (Intermediate)	Q-Case	Protected Side	6	11.5	6	0.5	11.5	1.3		
South 3	3 - 6 of 16	SWL (Intermediate)	Q-Case	Protected Side	6	11	6	0.5	11.5	1.5		
South 3	3 - 7 of 16	LWL (Intermediate)	Q-Case	Protected Side	6	6	6	0.5	11.5	1.4		
South 3	3 - 8 of 16	LWL (Intermediate)	S-Case	Protected Side	6	6	6	0.5	11.5	1.4		
West 1/2A/2B	3 - 9 of 16	CGL (100YR)	Q-Case	Protected Side	1	19	1	1 to 2	19 to 20	1.3	1.53	
West 1/2A/2B	3 - 10 of 16	SWL (100 YR)	Q-Case	Protected Side	1	18	1	1 to 2	19 to 20	1.5	1.53	
West 1/2A/2B	3 - 11 of 16	LWL (100 YR)	Q-Case	Protected Side	1	1	1	1 to 2	19 to 20	1.4	1.50	Protected side and flood side berms needed for stability. No Flood side LWL condition Needed due to symmetry
West 1/2A/2B	3 - 12 of 16	LWL (100 YR)	S-Case	Protected Side	1	1	1	1 to 2	19 to 20	1.4	1.42	
West 1/2A/2B	3 - 13 of 16	CGL (Intermediate)	Q-Case	Protected Side	1	11.5	0	0.5	11.5	1.3	2.08	
West 1/2A/2B	3 - 14 of 16	SWL (Intermediate)	Q-Case	Protected Side	1	11	0	0.5	11.5	1.5	2.09	
West 1/2A/2B	3 - 15 of 16	LWL (Intermediate)	Q-Case	Protected Side	1	1	1	0.5	11.5	1.4	2.10	
West 1/2A/2B	3 - 16 of 16	LWL (Intermediate)	S-Case	Protected Side	1	1	1	0.5	11.5	1.4	1.40	No Flood side LWL condition Needed due to symmetry

Levee Analyses												
West Slidell Ring Protection												
Case Name	Figure - Sheet No.	Water Condition	Soil Shear Strength	Direction of Analyses	Ground Surface Elevation (NAVD 88)	Flood Side Water Elevation (NAVD 88)	Protected Side Water Elevation (NAVD 88)	Estimated Overbuild in Feet	Crown Elevation with Overbuild (NAVD 88)	Required Factor of Safety	Minimum Optimized Factor Of Safety	Comments
Alternatives 1-3	5 - 1 of 10	CGL (100 YR)	Q-Case	Protected Side	1	16	1	1.5	16	1.3	1.38	Symmetrical Benched Levee with Berm Widths = 10.0 feet
Alternatives 1-3	5 - 2 of 10	SWL (100 YR)	Q-Case	Protected Side	1	14.5	1	1.5	16	1.5	1.41	Protected Berm Width = 10.0 feet; Not Adequate Factor of safety. Berm protected side berm needs to be extedended
Alternatives 1-3	5 - 3 of 10	SWL (Intermediate)	Q-Case	Protected Side	1	11	1	1.5	16	1.5	1.42	
Alternatives 1-3	5 - 4 of 10	LWL (100 YR)	Q-Case	Protected Side	1	1	1	1.5	16	1.4	1.41	Symmetrical Benched Levee with Berm Widths = 10.0 feet
Alternatives 1-3	5 - 5 of 10	LWL (100 YR)	S-Case	Protected Side	1	1	1	1.5	16	1.4	1.53	Symmetrical Benched Levee with Berm Widths = 10.0 feet
Alternatives 1-3	5 - 6 of 10	Final - CGL (100 YR)	Q-Case	Protected Side	1	16	1	1.5	16	1.3	1.47	Flood Berm Width = 10.0 feet Protected Berm Width = 17.0 feet
Alternatives 1-3	5 - 7 of 10	Final SWL (100 YR)	Q-Case	Protected Side	1	14.5	1	1.5	16	1.5	1.50	Flood Berm Width = 10.0 feet Protected Berm Width = 17.0 feet
Alternatives 1-3	5 - 8 of 10	Final - SWL (Intermediate)	Q-Case	Protected Side	1	11	1	1.5	16	1.5	1.50	Flood Berm Width = 10.0 feet Protected Berm Width = 17.0 feet
Alternatives 1-3	5 - 9 of 10	Final - LWL (100 YR)	Q-Case	Protected Side	1	1	1	1.5	16	1.4	1.50	Flood Berm Width = 10.0 feet Protected Berm Width = 17.0 feet
Alternatives 1-3	5 - 10 of 10	Final - LWL (100 YR)	S-Case	Protected Side	1	1	1	1.5	16	1.4	1.56	Flood Berm Width = 10.0 feet Protected Berm Width = 17.0 feet

T-Wall Analyses
Eden Isle Ring Protection

Case Name	Figure - Sheet No.	Water Condition	Soil Shear Strength	Direction of Analyses	Ground Surface Elevation (NAVD 88)	Flood Side Water Elevation (NAVD 88)	Protected Side Water Elevation (NAVD 88)	Top of Wall (NAVD 88)	Required Factor of Safety	Minimum Optimized Factor Of Safety	Comments
East Alt 2 - I-10 Median Wall	4 - 1 of 6	TOW	Q-Case	Protected Side	6	18	6	18	1.4	3.10	
	4 - 2 of 6	SWL	Q-Case	Protected Side	6	11	6	18	1.5	7.45	This case also represents the intermediate case.
South Alt 1 - Lake Surge Barrier	4 - 3 of 6	TOW	Q-Case	Protected Side	-6	18	0	18	1.4	3.80	
	4 - 4 of 6	SWL	Q-Case	Protected Side	-6	11	0	18	1.5	6.24	This case also represents the intermediate case.
South Alt 2 - Floodwall Along Lakeview Dr	4 - 1 of 6	TOW	Q-Case	Protected Side	6	18	6	18	1.4		These analyses are the same as East Alt 2.
	4 - 2 of 6	SWL	Q-Case	Protected Side	6	11	6	18	1.5		
West Alt 3 - Hwy 11 Floodwall	4 - 5 of 6	TOW	Q-Case	Protected Side	8	18	8	18	1.4	3.80	
	4 - 6 of 6	SWL	Q-Case	Protected Side	8	11	8	18	1.5	12.67	This case also represents the intermediate case.

17 August 2023

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Attention Mr. Glenn Ledet, Jr., P.E.
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Ladies and Gentlemen:

Conceptual Design Report
Geotechnical Exploration
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4
Eustis Engineering Project No. 24493.02/.03

Transmitted is an electronic copy of our report covering professional geotechnical services for the subject project. Hard copies are available upon request.

Thank you for asking us to perform these geotechnical services. If you have any questions or require further clarification, please do not hesitate to contact us.

Yours very truly,

EUSTIS ENGINEERING L.L.C.

STATE OF LOUISIANA
HENRY C. WORLEY
License No. 45424
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

HENRY C. WORLEY, P.E.

HCW:bmm/kms

CONCEPTUAL DESIGN REPORT

GEOTECHNICAL EXPLORATION

ST. TAMMANY PARISH GOVERNMENT

COASTAL FLOOD PROTECTION PROJECT

ST. TAMMANY PARISH, LOUISIANA

AMENDMENT NOS. 3 AND 4

EUSTIS ENGINEERING PROJECT NO. 24493.02/.03

FOR
NEEL-SCHAFFER, INC.
BATON ROUGE, LOUISIANA

BY

EUSTIS ENGINEERING L.L.C.
SINCE 1946

BATON ROUGE, LOUISIANA

17 AUGUST 2023

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COASTAL FLOOD PROTECTION PROJECT

ST. TAMMANY PARISH, LOUISIANA

AMMENDMENT NOS. 3 AND 4

EUSTIS ENGINEERING PROJECT NO. 24493.02/.03

INTRODUCTION

1. This report contains the results of a geotechnical exploration for the proposed St. Tammany Parish Coastal Flood Protection project in St. Tammany Parish, Louisiana. This report covers the flood protection alignments referred to as "West Slidell" and "Eden Isles". The site vicinity of these two flood protection alignments is presented on Figure 1. Our services were performed in general accordance with Eustis Engineering L.L.C.'s proposals dated 7 July 2022 (Eustis Engineering Project No. 24493.02) and 10 March 2023 (Eustis Engineering Project No. 24493.03). Authorization to proceed was provided by Neel-Schaffer, Inc. (Neel-Schaffer), with Amendment No. 3, dated 26 July 2022, and Amendment No. 4, dated 22 March 2023, to the Subconsultant Agreement made on 9 November 2020.

2. This report is part of a phased approach to advance the project from conceptual level design, which was presented in our report under Eustis Engineering Project No. 24493 (EE 22493) dated 27 August 2021, to a preliminary design phase. Once flood protection alignments and types are finalized, a geotechnical program for final design will be required.

SCOPE OF SERVICE

3. The scope of the field exploration for Eustis Engineering Project No. 24493.02 (EE 24493.02) included drilling five soil borings and performing thirteen cone penetration tests (CPTs) for the Eden Isles alignment. The scope of the field exploration for Eustis Engineering Project No. 24493.03 (EE 24493.03) included drilling three soil borings and performing six CPTs for the northwestern portion of the West Slidell alignment. Soil mechanics laboratory tests, performed on samples obtained from the undisturbed borings, were used to evaluate the physical properties of the various substrata. Engineering analyses performed for this report were based on the soil borings, laboratory test results, and CPTs performed for these explorations.

4. This report includes a review of previous analyses and recommendations from our conceptual level design report dated 27 August 2021. This report also includes conceptual level evaluation of the following: a pump station located at the entrance of the Grand Lagoon in Eden Isles; a LA Highway 11 median/T-wall; and a retaining wall for Lakeview Drive. This geotechnical report includes levee foundation settlement estimates due to new loading, seepage potential evaluation for cutoff requirements below the T-walls, deep-seated global stability analyses for levees and T-walls, and ultimate axial pile load capacity estimates for support of the T-walls and pump station.

COMPUTER PROGRAMS

5. The following computer programs were used to evaluate the proposed project features.

- Microsoft Excel®, Version for Microsoft Office 365®
- Stability Analysis, Spencer's Method with optimization search routine using SLOPE/W, Version 2021.3, 11.2, by GEOSLOPE International Ltd.
- Stability Analysis, Janbu's Method using SLOPE/W, Version 2021.3, 11.2, by GEOSLOPE International Ltd. (in lieu of the United States Army Corps of Engineers' [USACE] Lower Mississippi Valley Division's [LMVD] Method of Planes [MOP])
- Settle3, Version 5.011, 2021, by Rocscience Inc.
- CWALSHT, Design/Analysis of Sheetpile Walls by Classical Methods, Waterways Experiment Station, USACE

GEOTECHNICAL AND HYDRAULIC DESIGN CRITERIA

6. The project design criteria used in the geotechnical analyses are described in detail in the USACE's Hurricane and Storm Damage Risk Reduction System Design Guidelines (HSDRRSDG), dated 14 June 2012. Additional design criteria prepared by the USACE and referenced for our analyses include:

- EM 1110-2-2502, Retaining and Flood Walls, dated September 1989;
- EM 1110-2-2504, Design of Sheet Pile Walls, dated March 1994;
- EM 1110-2-2906, Design of Pile Foundations, dated January 1991;
- EM 1110-2-1902, Slope Stability, dated October 2003;
- EM 1110-2-1913, Design & Construction of Levees, dated April 2000;
- EM 1110-2-1901, Seepage Analysis and Control for Dams, dated April 1993;
- EM 1110-1-1904, Settlement Analysis, dated September 1990;

- EM 1110-1-1804, Geotechnical Investigations, dated January 2001;
- ER 1110-1-1807, Drilling in Earth Embankment Dams and Levees, dated December 2014;
- DIVR 1110-1-400, Soil Mechanic Data, dated December 1998;
- ETL 1110-2-569, Design Guidance for Levee Underseepage, dated May 2005;
- Engineering Manual (EM) 1110-1-1904; Settlement Analysis, dated September 1990;
- EM 1110-1-1905, Bearing Capacity of Soils, dated October 1992;
- Geotechnical Design Memorandums for WSLP;
- Engineering Technical Letter (ETL) 1110-2-569, Design Guidance for Levee Underseepage, dated May 2005;
- Division Regulation (DIVR) 1110-1-400, Soil Mechanic Data, Section 8, Groundwater and Seepage, dated December 1998; and
- LPILE®, Ensoft, Inc., Method for Evaluating Bending Moments in Batter Piles Due to Ground Settlement for Pile-Supported Floodwalls in New Orleans and Vicinity, Final Contract Report, dated September 2012.

7. The HSDRRSDG shall supersede all applicable EM and ETL criteria. Table 1 summarizes the geotechnical criteria and required factors of safety.

TABLE 1: GEOTECHNICAL DESIGN CRITERIA

ITEM	LOADING CONDITIONS		FACTOR OF SAFETY	CONDITION
	WATER LEVEL[1]	SHEAR STRENGTH PARAMETER[2]		
Pile Capacity (Axial)	N/A	Q	2.0	With Load Test
	N/A	Q	3.0	Without Load Test
	N/A	Q	2.5	With Dynamic Pile Test (Compression)
Deep-Seated Stability of Pile-Supported Structures using Spencer's Method (and Optimization Search Routine)	SWL	Q	1.4	If Target Factor of Safety is not Achieved, Determine Required Unbalanced Force to Achieve this Target Factor of Safety
	EWL/TOW	Q	1.3	
	LWL	Q	1.3	
	LWL	S	1.3	
Deep-Seated Stability of Pile-Supported Structures using Janbu's Method[3][4]	SWL	Q	1.3	
	EWL	Q	1.2	
	LWL	Q	1.2	
Deep-Seated Global Stability of Levee using Spencer's Method	LWL	Q	1.3	-
	LWL	Q	1.2	Local Stability of Maintenance Berm
	LWL	S	1.3	-
	SWL	Q	1.4	-
	PGL	Q	1.3	-
	CGL	Q	1.2	-
Deep-Seated Global Stability of Levee using Janbu's Method[5]	LWL	Q	1.2	-
	LWL	S	1.2	-
	SWL	Q	1.3	-
	PGL	Q	1.2	-
	CGL	Q	N/A	-
Local Stability of Braced Floodwall	SWL	Q/S	1.5	
	EWL/TOW	Q/S	1.1	

(1) SWL = still water level; EWL = extreme water level; TOW = top of wall; LWL = low water level; PGL = project grade level (net grade); CGL = construction grade level (PGL + overbuild).

(2) Q = unconsolidated undrained shear strengths (quick, short-term); S = consolidated drained shear strengths (slow, long-term).

(3) Janbu's Method is used as a design check for T-walls. Janbu's Method was used in lieu of the USACE's Method of Planes (MOP) as a check of the factor of safety using force equilibrium.

(4) LWL S-case analyses were also evaluated for the structures, but insufficient driving forces were computed to determine a factor of safety.

(5) Janbu's Method was used in lieu of the USACE's MOP as a check of the factor of safety using force equilibrium.

8. The furnished hydraulic design criteria were provided as presented in Table 2. The application of factors of safety is discussed in detail in this report.

TABLE 2: HYDRAULIC DESIGN CRITERIA

DESIGN FEATURE	ELEVATION (NAVD 88)	
	TOP OF WALL (EWL) OR LEVEE CROWN ELEVATION (PGL)	INTERMEDIATE TOP OF WALL (EWL) OR LEVEE CROWN ELEVATION (PGL)
Eden Isles Levees	18.0	11.0
Eden Isles T-Wall	18.0	11.0
Grand Lagoon Pump Station	12.0	N/A
LA Highway 11 Median/T-wall	11.5	N/A
West Slidell Levees	17.5	13.5

9. The low water design elevation (LWL) for non-hurricane conditions was assumed at the existing ground surface. We conservatively assumed a still water level (SWL) for design flood events at the levee crown elevation (PGL). For these analyses, a unit weight of water of 62.4 pcf was used on the flood side and protected side of the proposed flood protection. For final design, HSDRRSDG criteria will require a water unit weight of 64.0 pcf and 62.4 pcf for the flood side and protected side, respectively, of the flood protection.

FIELD EXPLORATION

10. The scope of the field service for the projects included drilling soil borings and performing CPTs. The general vicinity of the sites is provided on Figure 1. The approximate exploration locations are shown in Figure 2. A summary of the exploration locations,

exploration depths, and dates performed is provided in Figure 3. Detailed descriptive logs of the borings made for these explorations are shown in both tabular and graphical form in Appendices I and II, for EE 24493.02 and EE 24493.03, respectively. The results of the CPTs were plotted graphically with depth and are provided in Appendices III and IV, for EE 24493.02 and EE 24493.03, respectively.

11. The current explorations are part of a phased program to bring the project to a preliminary design level. Prior to the current explorations we did not have any site-specific data along the alignments. The current explorations have a boring/CPT spacing of approximately 1,500 feet. The requirements for the final exploration will vary with the level of flood protection. Exploration points will be required every 500 feet for levees and T-walls. For 100-year protection, the exploration program should follow the HSDRRSDG. The USACE requires a combination of CPTs, 5-in. diameter fixed piston undisturbed sample type borings, and supplemental continuous 3-in. diameter fixed piston borings along levees and T-walls. A 5-in. diameter fixed piston undisturbed sample type boring will also be required at each structure. For 50-year protection, the exploration program should follow Louisiana Flood Protection Design Guidelines (LFPDG). The guidelines require a combination of CPTs and 3-in. diameter fixed piston borings.

12. Exploration locations were located in the field using a handheld GPS unit. Recorded GPS coordinates for the boring and CPT locations are shown on the boring logs and CPT records in terms of latitude and longitude in Appendices I through IV. Upon completion of the field operations, the soil borings and CPTs were grouted and/or sealed with cement-grout mix in accordance with current regulatory requirements by the State of Louisiana.

Soil Borings

13. The soil borings were drilled using a tracked Geoprobe® rig. Samples of cohesive or semi-cohesive subsoils were obtained at close intervals or changes in strata using 3-in. diameter by 30-in. long thinwall Shelby tube sampling barrels. The samples were immediately extruded from the sampling barrel, inspected, and visually classified by Eustis Engineering's soil technician. Pocket penetrometer tests were performed on the trimmed ends of appropriate 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." Representative portions of these undisturbed soil samples were then promptly placed in moisture-proof containers and sealed for preservation of their natural moisture content.

14. Samples of cohesionless and semi-cohesive materials were obtained during the performance of in-situ Standard Penetration Tests (SPTs). These tests consist 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 SPTs are shown on the boring logs under the column heading "SPT." The samples were retained in moisture-proof containers for preservation of their natural moisture content.

Cone Penetration Tests

15. The CPTs were performed with a tracked Geoprobe rig using an electronic piezocone penetrometer. Testing was performed in accordance with methods and procedures

outlined in ASTM D5778-20. The CPTs were performed using a 10-cm2 cross-sectional area cone with a 60° apex-angled tip and 150-cm2 sleeve area with 2.5-ton and 10.0-ton capacities. The penetrometer was hydraulically advanced into the ground at a rate of 2 cm/sec. During cone penetration testing, CPT parameters (tip resistance, friction resistance, and pore pressure) were recorded at 2-cm depth intervals. In Appendices III and IV, the CPT plots provide the measured tip resistance (qt), sleeve friction (fs), and pore pressure (u2). The estimated undrained shear strength (Su), equivalent standard penetration resistance (N60), and interpreted soil behavior type (SBT) are also shown on the CPT records. These values are interpreted from correlations developed by Lunne, Robertson, and Powell (1997 and 1986) 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 to estimate Su based on a study performed by the USACE entitled "Cone Penetration Test Correlations in New Orleans Area Practice, Report Submitted to the New Orleans District, U.S. Army Corps of Engineers" by the Department of Civil and Environmental Engineering, Virginia Tech, Blacksburg, Virginia, dated November 2010, and other projects where CPTs and 5-in. diameter undisturbed borings were performed.

LABORATORY TESTS

16. Soil mechanics laboratory tests, consisting of natural water content, unit weight, unconfined compression shear (UC), and one-point unconsolidated undrained triaxial compression shear (OB), were performed on undisturbed samples obtained from the borings. Atterberg liquid limits (LL) and plastic limits (PL) tests were also performed on selected representative samples to aid in classification of the subsoils and to give an indication of their strength and relative compressibility. In addition, the test to determine

the percent passing the U.S. Standard No. 200 mesh sieve (-#200) was performed on a selected representative sample to determine the distribution of sand and fine-grained particles. The results of these laboratory tests are tabulated on the boring logs in Appendices I and II.

17. Grain size sieve (SV) analyses were performed on selected representative samples to determine their particle size distribution. These tests were performed to help classify cohesionless soils encountered in the borings. Separate plots of these test results are provided in Appendices I and II following the boring logs.

SUBSURFACE SOIL CONDITIONS

General

18. For the purposes of this report, we divided the Eden Isles alignment into two reaches and the West Slidell alignment into three reaches. The reaches are summarized in Table 3.

TABLE 3: REACH SUMMARY

PROJECT FEATURE	REACH	EXPLORATION LOCATIONS (EE PROJECT NO.)	SUBSURFACE PROFILE FIGURE NO.
Eden Isles	1	B-6, B-7, CPT-13 through CPT-19 (24493.02)	4 (Sheets 1 and 2)
	2	B-8, B-9, B-10, CPT-20 through CPT-25 (24493.02)	5 (Sheets 1 and 2)
West Slidell	1	B-1, B-2, CPT-1, CPT-2 (24493.03)	6
	2	B-3, CPT-3, CPT-4 (24493.03)	7
	3	CPT-5, CPT-6 (24493.03)	8

Subsurface Stratigraphy

19. Our interpretation of the stratigraphy at the boring locations is shown on the boring logs in Appendices I and II. Correlated SBT at the CPT locations are presented on the CPT records in Appendices III and IV. We present subsurface soil profiles in Figures 4 through 8. The subsurface profiles do not attempt to identify subsurface conditions between or away from the specific exploratory locations. Rather, the profiles are a schematic of the generalized stratigraphy considered for our analyses. The groupings are based on similar stratigraphy, project features, and engineering design parameters. The groupings are not based on geologic variations, and geophysical testing was not conducted to assess subsurface variations.

20. Eden Isles – Reach 1. Loose to medium dense clayey sand was encountered in the borings to depths of approximately 2 to 5 feet. Below these depths, soft lean clay and fat clay were generally encountered to the depth of approximately 20 feet followed by medium stiff to stiff lean clay and fat clay to the terminal depth of the borings at 50 feet below the ground surface. Review of the CPT records indicates SBTs are in general agreement with the borings, with the exception of CPT-13, which shows a stratum of medium dense sand to a depth of 20 feet. The soil profile is presented in Figure 4 (Sheets 1 and 2).

21. Eden Isles – Reach 2. Loose clayey sand was encountered in the borings to depths of approximately 6 feet in Boring B-9, 16 feet in Boring B-10, and 21 feet with interbedded strata of soft fat clay and loose silt in Boring B-8. Below these depths, soft fat clay was generally encountered to a depth of approximately 22 feet followed by medium stiff to stiff lean clay and fat clay to the terminal depth of the borings at 50 feet below the ground surface. A stratum of loose silty sand was encountered in Boring B-9 from the depths of

approximately 23 to 28 feet. Review of the CPT records indicates SBTs are in general agreement with the borings with the upper sand strata with an approximate thickness of 3 to 8 feet. Note, CPT-24 refused in dense sand deposits at a depth of approximately 60 feet. The soil profile is presented in Figure 5 (Sheets 1 and 2).

22. West Slidell – Reach 1. Medium stiff to stiff lean clay was encountered in the borings to depths of approximately 5 to 10 feet. Below these depths, loose to medium dense sands were encountered to a depth of approximately 42 feet with strata of stiff to very stiff lean clay and fat clay in Boring B-1 from a depth of 12 to 32 feet. Below the sand deposits, stiff lean and fat clay was encountered to the terminal depth of the borings at 50 feet below the ground surface. Review of the CPT records indicates SBTs are in general agreement with the borings. The soil profile is presented on Figure 6.

23. West Slidell – Reach 2. Medium dense silty sand was encountered in Boring B-3 to a depth of 2 feet followed by medium stiff lean clay to a depth of 6 feet. Below this depth, loose gray clayey sand was encountered to a depth of 12 feet. Below the sand deposits, medium stiff to stiff lean clay and fat clay was encountered to the terminal depth of the boring at 50 feet below the ground surface. Review of the CPT records indicates SBTs are in general agreement with the borings. The soil profile is presented on Figure 7.

24. West Slidell – Reach 3. Review of the CPT records indicates stiff fat clay and lean clay are present to the terminal depth of the CPTs at 50 feet below the ground surface. The soil profile is presented on Figure 8.

Groundwater

25. To determine the groundwater conditions at the time of the field exploration, observations were made in select soil borings or in auger borings made adjacent to the boring locations. The borings were made without the addition of water to the depth where groundwater was initially encountered. Initial observations were made in the borings and after observation periods between 15.00 minutes and 4.75 hours at select boring locations. Our observations are summarized in Table 4.

TABLE 4: GROUNDWATER OBSERVATIONS

BORING DESIGNATION (EUSTIS ENGINEERING PROJECT NO.)	ALIGNMENT	OBSERVED INITIAL GROUNDWATER DEPTH BELOW EXISTING GRADE IN FEET	OBSERVED GROUNDWATER DEPTH BELOW EXISTING GRADE IN FEET (AFTER OBSERVATION PERIOD IN HOURS)
B-8 (24493.02)	Eden Isles	6.0	4.5 (4.75)
B-10 (24493.02)	Eden Isles	5.0	2.5 (4.25)
B-3 (24493.03)	West Slidell	15.0	11.0 (0.25)

26. The depth to groundwater should be expected to vary with climatic conditions; changes in topography; drainage improvements; water levels in nearby ditches, marshes, and Lake Pontchartrain; and other factors. The groundwater level should be determined by those persons responsible for construction immediately prior to beginning work.

Soil Design Parameters

27. Soil parameters for the Eden Isles Ring Levee and West Slidell Ring Levee, respectively, are presented on Figures 9 and 10. For drained (S-case) analyses, clays were assigned a friction angle of 23° and a cohesion of 0 psf, as outlined in Chapter 3 of the HSDRRSDG. For compacted, uncompacted, and granular fill, recommended values from the HSDRRSDG were referenced for our calculations.

FURNISHED INFORMATION

Eden Isles Alignment

28. Based on correspondence with Neel-Schaffer, we understand the floodwall along LA Highway 11, and the floodwall and levee along Lakeview Drive are no longer being considered for the Eden Isles portion of the project. However, as a part of this report, we have still analyzed these features to ensure there are no significant changes from our recommendations presented in our conceptual level design report. In place of these features, the most recent plans indicate the roadway along Lakeview Drive and LA Highway 11 will be raised to el 8.5 (NAVD 88). For LA Highway 11, a concrete median with a TOW at el 11.5 will act as a T-wall. A cantilever retaining wall will be installed on the lake side of Lakeview Drive with a TOW at el 7.0 with the ground surface sloping upward away from the retaining wall to the Lakeview Drive Roadway.

29. The most recent plans also indicate a pump station and braced floodwall is proposed at the entrance of Grand Lagoon. The floodwall for the pump station is proposed to have a

TOW at el 12.00 with a pump-off at el 0.05. Preliminary drawings furnished by Neel-Schaffer are presented in Appendix V.

West Slidell Alignment

30. Based on correspondence with Neel-Schaffer, we understand the levee will be constructed in two lifts. The initial lift will be to el 13.5. The second lift will occur 3 to 5 years later with a final target of el 17.5. Based on correspondence with Neel-Schaffer, the existing ground surface elevation at the various reaches was assumed as summarized in Table 5.

TABLE 5: WEST SLIDELL ASSUMED EXISTING GROUND SURFACE BY REACH

REACH	ASSUMED EXISTING GROUND SURFACE ELEVATION (NAVD 88)
1	9
2	5
3	1

FOUNDATION ANALYSES

General

31. For this report we have reviewed the previous analyses and recommendations regarding the levee along Lakeview Drive, the T-wall along Lakeview Drive, and the T-wall along LA Highway 11 in our conceptual level design report dated 27 August 2021. The analyses and recommendations in our previous report were not based on site-specific geotechnical data. Based on the geotechnical data from our current exploration, there are no

significant changes to the recommendations provided in our previous report. Note, we did not analyze the levee on the western side of Eden Isles along the railroad tracks west of LA Highway 11 as we still do not have site-specific data for the alignment. Stability berms may still be required for this feature.

32. This report contains analyses and preliminary recommendations for a conceptual cantilever retaining wall in place of the flood control structures along Lakeview Drive and a conceptual median/T-wall along LA Highway 11 to replace the previous T-wall along the Eden Isles alignment. This report also contains preliminary analyses and recommendations for a conceptual pump station and braced floodwall at the Grand Lagoon entrance along the Eden Isles alignment.

33. This report also contains preliminary analyses and recommendations for earthen levees along the West Slidell alignment using site-specific data from our current exploration. Analyses and recommendations for the levee were provided in our conceptual level report, however those were not based on site-specific data, and levee heights and assumed existing ground surface elevations have changed since our previous report. Note, based on the relatively stronger soils encountered in the current site-specific exploration, stability berms are not required for the West Slidell levee.

Pump Station and Floodwall at Grand Lagoon – Conceptual Level Design.

34. Methodology and Assumptions. Eustis Engineering utilized the USACE's program CWALSHT for local stability evaluations of the proposed braced sheetpile floodwall. Global stability of the floodwall was evaluated following Spencer's Method for

non-optimized and optimized non-circular failure surfaces using SLOPE/W software by GEOSLOPE International Ltd.

35. Based on furnished information, the TOW of for the floodwall was assumed at el 12.00 with a mudline at el -18.50. The pump-off elevation is el 0.05 on the protected side. We have conservatively assumed an SWL equal to the TOW. For our analyses, a water level at the TOW was modeled on the flood side and a water level at the pump-off elevation was modeled for the protected side. A brace was assumed at el 9.00. Typically, the brace should be above the mean high-water level and no more than 3 feet below the TOW.

36. Local Stability Analyses. Long-term drained (S-case) and short-term undrained (Q-case) analyses were performed. We present the results of our local stability analyses in Table 6. Tip embedments were established using a factor of safety of 1.5. The factor of safety was applied to the soil shear strengths for the calculated earthen pressures. We recommend a minimum sheetpile tip at el -49.0 for the sheetpile floodwall. Maximum moment, anchor forces, and scaled deflections are unfactored determined using a factor of safety of 1.0 applied to the soil strengths. Adequate factors of safety should be applied to structural components by the structural engineer. To obtain deflection in inches, divide the maximum scaled deflection by the product of the modulus of elasticity of the sheetpiles in psi and the sheetpile moment of inertia in in.4.

TABLE 6: RESULTS OF LOCAL STABILITY ANALYSES FOR SHEETPILE WINGWALLS

SHEETPILE TIP ELEVATION (NAVD 88)	ANCHOR FORCE IN LB/FT	MAXIMUM MOMENT IN FT-LB/FT	SCALED DEFLECTION IN LB-IN.3
-49.0	11,600	119,700	3.53×10^{10}

37. Deep-Seated Global Stability Analyses. Engineering analyses were performed using Spencer's Method of Slices with the program SLOPE/W, Version 11.2.2, to evaluate the potential of a global stability failure of the entire sheetpile wingwall system. A minimum required factor of safety equal to 1.4 was assumed for deep-seated global stability. Our analyses for deep-seated global stability utilized the floodwall conditions described previously. Q-case and S-case analyses were performed.

38. Our analyses indicate a floodwall with a sheetpile tip at el -49 results in a factor of safety of 2.85 with respect to deep-seated global stability of the system.

39. Piping Analyses Design Method and Assumptions. We evaluated piping potential of the braced floodwalls using the Lane's Weighted Creep Ratio (LWCR) method. The analyses are based on a mudline at el -18.50 and TOW at el 12.00. LWCR analyses are based on a maximum hydrostatic head differential of flood water at TOW and protected side at the pump-off elevation (i.e., 0.05). A minimum LWCR of 3 (clay) was assumed. Our analyses indicate the tip required by our local stability analyses provides a sufficient embedment to achieve a LWCR of 3.

Retaining Wall at Lakeview Drive – Conceptual Level Design

40. Methodology and Assumptions. Eustis Engineering utilized the USACE's program CWALSHT for local stability evaluations of the proposed cantilever sheetpile retaining wall. Global stability of the retaining wall was evaluated following Spencer's Method for non-optimized and optimized non-circular failure surfaces using SLOPE/W software by GEOSLOPE International Ltd. When applicable, tension cracks filled with water were

incorporated in the global stability analyses to eliminate negative base normal and negative interslice forces found within active slices.

41. Based on furnished information, the TOW for the retaining wall will be at el 7.0 with the ground surface sloping upward away from the retaining wall to Lakeview Drive at el 8.5. A 250 psf traffic surcharge was assumed for Lakeview Drive. For our analyses, a water level at the TOW was modeled on the retained side and a water level at the ground surface was modeled on the lake side. We did not evaluate temporary conditions that may exist during construction. This should be considered as part of the final design.

42. Local Stability Analyses. Long-term drained (S-case) and short-term undrained (Q-case) analyses were performed. We present the results of our local stability analyses in Table 7. Tip embedments were established using a factor of safety of 1.5. The factor of safety was applied to the soil shear strengths. We recommend a minimum sheetpile tip at el -11.5 for the sheetpile retaining wall. Maximum moment, anchor forces, and scaled deflections are unfactored determined using a factor of safety of 1.0 applied to the soil strengths. Adequate factors of safety should be applied to structural components by the structural engineer. To obtain deflection in inches, divide the maximum scaled deflection by the product of the modulus of elasticity of the sheetpiles in psi and the sheetpile moment of inertia in in.4.

TABLE 7: RESULTS OF LOCAL STABILITY ANALYSES FOR SHEETPILE WINGWALLS

SHEETPILE TIP ELEVATION IN FEET (NAVD 88)	MAXIMUM MOMENT IN FT-LB/FT	SCALED DEFLECTION IN LB-IN.3
-11.5	4,500	3.70×10^8

43. Deep-Seated Global Stability Analyses. Engineering analyses were performed using Spencer's Method of Slices with the program SLOPE/W, Version 11.2.2, to evaluate the potential of a global stability failure of the entire retaining wall system. A minimum required factor of safety equal to 1.4 was assumed for deep-seated global stability. Our analyses for deep-seated global stability utilized the floodwall conditions described previously. Q-case and S-case analyses were performed.

44. Our analyses indicate a retaining wall with a sheetpile tip at el -11.50 results in a factor of safety of 2.03 with respect to deep-seated global stability of the system.

LA Highway 11 Median Wall/T-wall – Conceptual Level Design

45. Design Methods and Assumptions. Deep-seated stability analyses were performed for the LA Highway 11 median wall serving as a T-wall with the program SLOPE/W, Version 11.2.2, by GEOSLOPE International Ltd. Our analyses generally follow criteria provided in the HSDRRSDG and shown in Tables 1 and 2 of this report. The guidelines require analyses by the Spencer's Method for non-circular failures. Analyses by Janbu's Method were performed as a check. We evaluated Q-case conditions. For our analyses, we assumed a T-wall slab thickness of 5.0 feet and a width of 10.0 feet. Based on correspondence with Neel-Schaffer, we have assumed a TOW at el 11.5 and the LA Highway 11 roadway at el 8.5. For the purpose of this report, we have conservatively assumed a SWL equal to the TOW.

46. For the Spencer's analyses, if the factor of safety of a critical surface is greater than that required in Table 1, the structural design can proceed without the need of applying an

unbalanced force in the pile group analysis software. If the factor of safety of the critical failure surface is less than required, the analysis proceeds to Step 2 of the guidelines.

47. Step 2 includes computation of an unbalanced force (FUB) necessary to achieve the required minimum factor of safety. The FUB is estimated through a trial-and-error process where the load is varied until the desired factor of safety is achieved. The critical failure plane is defined as a failure surface that produces the greatest unbalanced load. Where unbalanced loads are present, the axial pile capacity developed above the critical failure plane is disregarded.

48. Results. Based on our analyses, the T-wall meets the minimum required factor of safety and unbalanced loads are not necessary.

49. Piping Analyses - Design Methods and Assumptions. We evaluated piping potential using LWCR. Our piping analyses is based on a worst-case scenario as seen in CPT-13, which has the thickest sand strata. Sheetpile tip penetrations were designed to provide a minimum LWCR of 8.5 which is appropriate for sandy soils. Our design assumes the flow path only to be the penetration of the sheetpile without consideration of any horizontal contacts along the base of the T-wall structure. Based on water levels at the TOW and the existing ground surface and a foundation base at el 3.5, the required sheetpile tip based on LWCR is el -10.0.

Pile Foundations

50. Design Methods and Assumptions. Computations were made to estimate the ultimate single pile load capacity for steel H-Piles for support of the LA Highway 11 median T-wall.

Steel H-piles are typically used for support of T-walls. The base of the T-wall was assumed at el 3.5. Our pile capacity estimates were computed for Q-case soil parameters which typically govern in southeast Louisiana where the foundation deposits are generally soft to medium stiff clays. The analyses procedure followed the HSDRRSDG. We performed additional analyses for steel H-piles and square, precast concrete piles to support the pump station at Grand Lagoon with a mudline at el -18.5. Note, piles capacities for the pump station were estimated by assuming the dense sand that CPT-24 refused in extends to el -80.0. Further field investigation should be performed to determine the extents of the sand strata.

51. Results. The estimated ultimate single pile load capacities (factor of safety = 1.0) are provided on Figure 11 for the LA Highway 11 median T-wall and Figures 12 and 13 for the pump station. Application of factors of safety should follow Table 1.

52. Structural Capacity. The estimated pile load capacities provided are based on a soil-pile relationship only. The structural capacity of the individual piles to transmit these loads, and any connections between the piles and the bulkhead wall, should be determined by a structural engineer.

53. Steel Piles. We recommend steel H-piles meet the requirements outlined in Section 1013.11 of the Louisiana Standard Specifications for Roads and Bridges (LSSRB), 2016 edition. The H-pile sections assumed in our analyses are presented on Figures 11 and 12. The steel piles should be designed to have sections (i.e., wall thicknesses for pipe piles) that are structurally sufficient to withstand handling and driving stresses.

54. Square, Prestressed, Precast Concrete Piles. We recommend precast concrete piles meet the requirements outlined in Sections 804 and 805 of the LSSRB. Precast concrete piles should be designed to have a strand prestress structurally sufficient to facilitate handling and driving the piles without damage. Our analyses are based on a solid, square pile. Alternate precast pile configurations (pipe, triangle, etc.) should be further evaluated. The pile dimensions assumed in our analyses are provided on Figure 13.

55. Pile Weight. The pile capacity estimates we present on Figures 11 through 13 do not include the weight of the pile. When computing the resultant net compressive capacity of precast concrete piles, a net load of 40 pcf may be used for the weight of the concrete (weight of the concrete minus the weight of soil removed). The full buoyant weight of the concrete of 87 pcf may be used to calculate the tensile capacity of the pile provided the pile is designed to transmit these loads. Similar methods may be utilized for the steel piles.

56. Protrusion of Connections or Welds. Pile connections protruding outside the web and flange of steel H-piles reduce the frictional resistance acting on the pile surface above the protrusion. For this reason, your specifications should require all welds to be machined and/or ground such that no more than a ⅛-in. protrusion is present. If the welds or splice collars protrude past the pile's outside dimensions, the soil-pile adhesion is disturbed during installation of the pile, and the pile's capacity may be reduced. Likewise, the square, precast concrete (SPC) splices should be contained within the pile section.

57. Batter Piles. The ultimate pile load capacity estimates we present on Figures 11 through 13 are for vertically driven pile installations, but these estimates can also be used to estimate load capacity for piles driven with a batter (i.e., inclined piles). The vertical pile

load capacity estimate is equivalent to the vertical component of a batter pile that has the same tip elevation. From this relationship, you can use the batter (inclination) geometry to estimate axial capacity and the horizontal component of a batter pile as shown on Figure 14. These correlations should also be used when assessing static load test requirements.

58. Pile Group Capacity. Piles firmly embedded in medium dense to dense sand deposits encountered below approximately el -55, as presented in Figures 12 and 13 for the pump station, will derive significant capacity through end bearing; thus, it will not be necessary to consider group action. All other piles will derive the majority of their supporting capacity through skin friction; therefore, it is necessary to consider the effect of group action. In this regard, the supporting value of friction piles driven in groups should be investigated on the basis of group perimeter shear by the formula shown on Figure 15. When evaluating the tensile capacity of pile groups, the second term of the formula should be neglected. The minimum spacing between individual piles should be determined by the formula given on Figure 16.

59. Estimated Settlement of Single Piles Due to Structural Loads. We estimate single isolated piles presented in this report will settle ¼ inch or less due to subsoil consolidation under the influence of sustained structural loads. Eustis Engineering should be contacted to verify this settlement estimate once structure loadings, dimensions, and pile layouts are finalized. The settlement estimates do not include elastic deformation of the piles which should be added to the settlement estimates. For end bearing piles, elastic deformation may be estimated as 100% of the static column strain of a pile acting as a column. For friction piles, elastic deformation may be estimated as 67% to 75% of the static column strain of a pile acting as a column.

60. Our estimates of settlement assume piles will be installed in small groups or widely spaced rows. We have assumed the largest group dimension will be no greater than 20% of the pile length, and the center-to-center spacing between groups will be no closer than twice the largest group dimension. We have assumed the center-to-center spacing between rows or single piles will be no closer than 8 feet or 9 pile diameters/side dimensions, whichever is greater. In the event any of our assumptions are not met, Eustis Engineering should be contacted to evaluate the potential settlement of the pile foundations. Significantly higher settlements would be anticipated for lager pile groups and should be evaluated further. Settlement due to structural loads is also additive to pile settlement due to fill placement. Once foundation plans are finalized, Eustis Engineering should be contacted to evaluate pile group settlement.

61. Estimated Settlement due to Fill Placement (Downdrag). As fill settles from consolidation of the underlying subsoils, negative skin friction (drag loads) is induced on the piles as the soil settles along the piles. These drag loads may result in additional pile settlement for deep foundation elements with the majority of its support derived from skin friction or an increase in the structural loading of end bearing piles. Downdrag settlement should be considered additive to settlement estimated for the piles due to structural loading. At this time, fill placement in the area of the T-wall and pump station is expected to be minimal. Once grading plans are finalized, Eustis Engineering should be contacted to provide estimates of downdrag settlement.

62. Settlement-Induced Bending Moment. Settlement-induced bending moments (SIBM) are a design consideration that should be considered when designing floodwall connections to levee alignments. SIBM is generated when settlements are caused by fill placement (i.e., levee embankments), and inclined (batter) piles that are positioned within a settling

foundation deposit. The piles will tend to deflect and have an associated bending moment induced. This becomes a structural design check on the pile, and this is handled in final design.

63. Differential Settlement. Your design should recognize the potential for differential settlement between pile-supported features and grade-supported features. Differential settlements should be considered in the geotechnical and structural designs during the preliminary design phase of this project.

Installation of Driven Piles

64. Quality Control. Close field supervision should be maintained by experienced personnel to ensure proper procedures are followed and accurate records are kept for all pile driving operations. The driving record should include, as a minimum, the date; type and size of pile; overall length; embedment below finished grade; depth and diameter of predrill; hammer type; and number of blows per foot of penetration. An accurate driving record is especially important to verify the piles are installed to the required tip embedment and to give an indication of any unusual driving characteristics which may indicate pile breakage.

65. Air Hammers. Generally, we recommend a single-acting air hammer be used to install precast concrete piles and steel H-piles. The manufacturer's rated energy required to drive the piles will depend on the piles' ultimate compressive capacity. The estimated hammer energy versus ultimate compressive capacity (factor of safety ≈ 1.0) for piles recommended in this report is provided in Table 8. For precast concrete piles, we also

recommend the ram stroke be limited to 3 feet, and the ram weight be approximately one-half of the pile weight.

TABLE 8: ESTIMATED HAMMER ENERGY VERSUS ULTIMATE PILE LOAD CAPACITY IN COMPRESSION

ESTIMATED ULTIMATE SINGLE PILE LOAD COMPRESSIVE CAPACITY IN TONS FACTOR OF SAFETY ≈ 1.0	APPROXIMATE RATED SINGLE-ACTING HAMMER ENERGY IN FT-LB PER BLOW
Up to 120	19,500
120 to 240	24,000
240 to 300	32,000

66. Hydraulic or Diesel Hammer. In lieu of an air hammer, a diesel or hydraulic hammer may be used for the installation of the concrete and steel piles. We recommend the diesel hammer have a rated energy of one and one-half times the energy recommended for a comparable installation with a single-acting air hammer. Hydraulic hammers should be selected based on their efficiency and ability to produce similar energy as a corresponding air hammer. Hammer driveability analyses, or direct measurement through dynamic pile testing (DPT), may be required if a hydraulic hammer or diesel hammer is selected for installation of precast concrete piles.

67. Alternate Installation Methods. We do not recommend vibratory methods be utilized for pile installation. If a vibratory hammer is selected for the project, Eustis Engineering should be contacted to evaluate the reduction in the estimated ultimate pile load capacities presented. Also, we do not recommend the use of jetting to aid in the installation of the piles. If any other alternate installation methods are selected, Eustis Engineering should be contacted to evaluate the effects on our estimates of capacity presented in this report.

68. <u>Pile Refusal.</u> Refusal criteria for the concrete and steel piles should be determined based on the results of a test pile program. If the piles are driven with the aid of a follower, or if the pile driving helmet is allowed to impact the ground surface, Eustis Engineering should be consulted to adjust these refusal criteria.

69. <u>Predrilling.</u> Predrilling may be considered to minimize vibrations, identify obstructions, or to penetrate near-surface crusts or fill soils while installing H-piles or SPC piles. Shallow predrilling may be performed by dry auger methods to depths of 6 to 8 feet below grade. Dry auger predrilling should be performed with the auger bit diameter sized no larger than 75% of the side dimension of H-piles and SPC piles. Deeper predrilling may be required to assist installation of piles through interbedded sand and silt deposits, particularly for SPC piles. If required, deeper predrilling should be performed by wet rotary methods. For deeper predrilling, the drill bit should be sized no larger than 75% of the side width for H-piles and SPC piles. In all cases, piles should have a final embedment a minimum of 10 feet beyond the predrill depth. Actual requirements for predrilling should be determined during the performance of the test pile program.

70. <u>Dynamic Analyses.</u> The precast concrete piles and steel H-piles should be designed by a structural engineer to have a cross-section which is structurally sufficient to facilitate handling and driving of the piles without damage. Dynamic analyses or Wave Equation Analysis Program (WEAP) can be performed to evaluate driving stresses, pile cushion, and driveability once the hammer and appurtenant equipment have been selected. WEAP is particularly important if a diesel hammer is proposed for installation of precast concrete piles or if segmented steel piles are selected for the project. Structural requirements can then be verified by a structural engineer and installation criteria can be established

Test Piles and Load Test

71. Eustis Engineering considers a test pile program and load test as an extension of our geotechnical exploration; therefore, Eustis Engineering should be retained to perform these services. The actual number of test piles should be determined based on the number and types of piles used in the foundations. Eustis Engineering should be consulted to develop a test pile program consistent with the project's scope. Note, the test pile program will be used to evaluate installation requirements as well as capacity.

72. A test pile should be the same type and embedment anticipated for the job piles and installed with the same equipment and techniques proposed for the job piles. The test pile will provide definitive information regarding the anticipated driving resistance, refusal depths, requirements for predrilling, and vibrations from pile driving. Note, static testing may be conducted on a vertical pile and thus may require installation of additional piles if only battered anchor piles are proposed.

73. The structural and geotechnical engineers should select the piles to be used for performance of a static load test if a factor of safety of 2.0 is utilized as the basis of design. The test piles should be allowed to set for at least 14 days subsequent to the installation of the reaction system. The piles should then be load tested to failure in accordance with ASTM D1143 assuming the governing load case is the compressive capacity. A lateral load test or tensile load test may be required depending on the final design. The results should be evaluated by Eustis Engineering to verify the estimated pile load capacities presented in this report.

74. Dynamic Pile Tests. The initial installation of driven precast concrete and steel H-piles, test piles, and job piles may be monitored and evaluated using DPT with a Pile Driving Analyzer® (PDA). The performance of DPT may be used to evaluate actual driving stresses, penetration resistances, and integrity and capacity of the test piles and/or job piles. The PDA can also monitor energy transferred to the pile from the hammer and evaluate installation efficiency. In order to evaluate pile capacity, "restrike" DPT should be performed at least 14 days after its initial installation of friction piles. Shorter set times may be considered, but the ultimate capacity of the pile may not be realized. In addition, an increased hammer energy may be required for restrike DPT to fully mobilize the pile. Data from this restrike should be further evaluated by signal matching verification (i.e., CAPWAP® analyses). Eustis Engineering is available to perform and evaluate the results of DPT and CAPWAP analyses. If a PDA is used as the sole means to evaluate capacity, the factor of safety to establish allowable capacities should be 2.5, and the capacities shown on Figures 8 through 11 adjusted accordingly.

Preliminary Geotechnical Design and Analyses of West Slidell Ring Levees

75. Design Approach. Our design approach included selection of design overbuild heights based on settlement estimates for our typical levee section analyses. Strength gain estimates beneath the levee centerline were not estimated for our analyses because they were not necessary to achieve adequate factors of safety against slope stability failure. Additionally, stability berms were not required to achieve the required factor of safety for deep-seated global stability.

76. Levee Geometry Assumptions. Our stability analyses consider a typical levee cross-section with a 10-ft crown width with 3 horizontal on 1 vertical (3H:1V) side slopes. Three

reaches were considered for our analyses as summarized previously. Two lifts were considered; an initial lift to el 13.5, followed by the final lift to a target elevation at el 17.5 approximately 4 years later.

77. Levee Consolidation Settlement. To estimate levee overbuilds, settlement estimates were performed using Settle3, Rocscience Inc. applying Westergaard's theory of stress distribution in soils. Our settlement estimates consider two lifts. Magnitudes and rates of consolidation settlement are based on Terzaghi's One-Dimensional Consolidation Theory. Our analyses consider design parameters for the West Slidell ring as presented in Figure 10, Sheet 1 through 3. A summary of settlement and levee overbuild estimates are presented in Table 9.

TABLE 9: SETTLEMENT AND LEVEE OVERBUILD ESTIMATES

LEVEE DESIGN REACH	FINAL FLOOD PROTECTION ELEVATION (NAVD 88)	GROUND SURFACE ELEVATION (NAVD 88)	ESTIMATED SETTLEMENT/ OVERBUILD IN FEET	CROWN ELEVATION WITH OVERBUILD (NAVD 88)
1	17.50	9.00	0.25	17.75
2	17.50	5.00	0.50	18.00
3	17.50	1.00	0.75	18.25

78. Based on the surficial deposits encountered in our field exploration, we do not anticipate lateral spread will be an issue.

79. Deep-Seated Global Stability. Deep-seated stability analyses of the earthen levees were performed for typical levee sections using Spencer's and Janbu's Methods with the program SLOPE/W, Version 11.2.2, GEOSLOPE International Ltd. These analyses were performed using Q-case and S-case soil parameters as outlined in Table 1. Janbu's Method was used in place of the USACE's MOP analyses to check force equilibrium and

serves as an analysis check, not the design method. This check is for comparison and verification of Spencer's Method results and was not used as the design tool for the levee section. We considered circular slip surfaces with optimization for Spencer's Method and unoptimized non-circular searches for Janbu's Method. Undrained, Q-case analyses consider tension crack lines in the active slices for Spencer's Method. Note, we are not presenting analyses for the initial lift as our analyses indicate factors of safety for the final lift exceed minimum factor of safety requirements. For the purposes of this report, we conservatively assumed a SWL equal to the PGL, and the LWL was assumed at the existing ground surface. We provide a summary of our deep-seated global stability analyses in Table 10. Outputs from our analyses are provided in Appendices VI through VIII.

TABLE 10: SUMMARY OF DEEP-SEATED GLOBAL STABILITY

LEVEE DESIGN REACH	APPENDIX	WATER CONDITION	SOIL CONDITION	MINIMUM REQUIRED FACTOR OF SAFETY (SPENCER/JANBU)	MINIMUM FACTOR OF SAFETY ACHIEVED (SPENCER/JANBU)
1	VI	CGL	Q-Case	1.2/NA	3.51/3.29
	VI	PGL/SWL	Q-Case	1.4/1.3	3.53/3.33
	VI	LWL	Q-Case	1.2/1.2	3.82/3.61
	VI	LWL	S-Case	1.3/1.2	1.52/1.43
2	VII	CGL	Q-Case	1.2/NA	2.57/2.33
	VII	PGL/SWL	Q-Case	1.4/1.3	2.59/2.36
	VII	LWL	Q-Case	1.2/1.2	2.61/2.42
	VII	LWL	S-Case	1.3/1.2	1.44/1.42
3	VIII	CGL	Q-Case	1.2/NA	2.35/2.31
	VIII	PGL/SWL	Q-Case	1.4/1.3	2.39/2.32
	VIII	LWL	Q-Case	1.2/1.2	2.40/2.33
	VIII	LWL	S-Case	1.3/1.2	1.41/1.40

80. We do not anticipate the need for a surcharge program or the use of high strength geotextile fabric along this portion of the levee alignment.

81. Levee Underseepage. We do not anticipate levee underseepage will be a critical design case for Reaches 2 and 3 based on the significant width of the levees and the predominance of clay deposits in the subgrade. However, there is potential for levee underseepage at Reach 1 due to the presence of surficial granular deposits as observed in the borings and CPTs. Possible seepage control measures include cutoffs, trenches, seepage berms, pervious toe trenches, and pressure relief wells.

Construction Considerations – West Slidell Levee

82. Groundwater Levels. Evaluations of site conditions should be made prior to initiating construction and throughout construction.

83. Clearing. All undesirable organic matter and deleterious materials should be stripped from the levee footprint before initiating construction. Removal should include all stumps, roots, buried logs, old foundations, old paving, drains, and any objectionable matter. Roots, stumps, or other intrusions over 1.5 inches in diameter should be removed to the mudline or ground surface. Special attention should be given to any weak areas or depressions discovered during the clearing operation. These areas should be thoroughly cleaned out to the surface of firm soil and backfilled with the approved inorganic cohesive soil. Fill material should be placed and compacted under controlled conditions.

84. Consideration of Mud Waves. Based on the conditions observed at the exploration locations for the current project, we do not expect mud waves to be an issue along this portion of the levee alignment.

85. Levee Fill. Embankments shall be constructed of earthen materials naturally occurring or contractor blended. Materials that are classified in accordance with ASTM D2487 as CL or CH with less than 35% sand content are suitable for use as embankment fill. Materials classified as ML are suitable if blended to produce a material that classifies as CH or CL according to ASTM D2487.

86. All fill materials shall be free from masses of organic matter, sticks, branches, roots, and other debris including hazardous and regulated solid wastes. Earthen fill from the designated excavation areas may have sticks/wood and may be considered acceptable in the embankment provided their length does not exceed 1 foot, their cross-sectional area is less than 4 square inches, and they are distributed throughout the fill. Not more than 1% (by volume) of objectionable material shall be contained in the earthen material placed in each cubic yard of the levee section. Pockets and/or zones of wood shall not be placed in the embankment. Materials placed in the section must be at or below an organic content of 12% by weight, as determined by ASTM D2974, Method C.

87. Materials placed in the section must be at or above the plasticity index of 10. As a precaution, contractors are required to notify the contracting officer whenever the in-place plasticity index of the material is 15 or less.

ADDITIONAL GEOTECHNICAL SERVICES

88. As previously discussed, this report was part of a phased approach. Once the flood protection alignments and criteria are more well defined, Eustis Engineering can provide geotechnical services to advance the project to final design. The final design phase would include filling in the data gaps that exist between the existing borings and CPTs and

tailoring the field exploration to meet HSDRRSDG or LFPDG. Geotechnical analyses for final design can be provided and must be based on site-specific survey data.

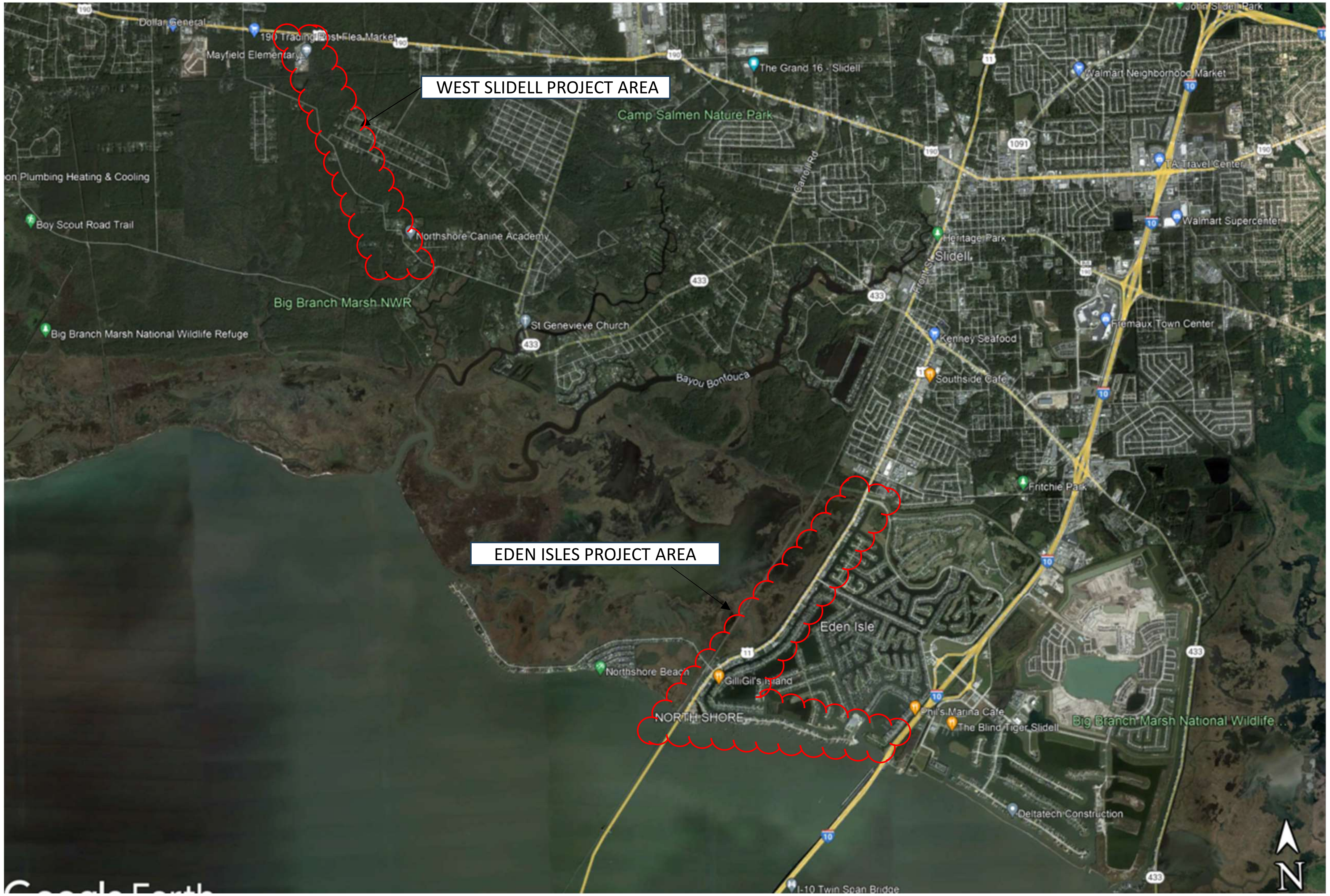
LIMITATIONS

89. Our report has been prepared in accordance with generally accepted geotechnical engineering practice. In the event of any changes in the nature, design, loading, or location of the proposed project features, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed, and the conclusions of this report are modified and verified through written correspondence.

90. Recommendations and conclusions contained in this report are to some degree subjective having partial basis in engineering judgment and experience particular to the design engineer. For this reason, this report and subsequent reports should not be included in the contract plans and specifications.

91. Note, the analyses and recommendations contained in this report are based, in part, on data obtained from soil borings and CPTs performed for these studies. The individual logs of the borings and CPTs completed along this portion of the project are considered representative of subsurface conditions at their respective locations on the dates completed. No warranty is given that the boring and CPT logs are representative of subsurface conditions at other locations or times. The nature and extent of variations in subsurface conditions, between and away from their locations, may not become evident until construction. If such variations then appear, it will be necessary to reevaluate the recommendations contained in this report.

92. The scope of our service 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; groundwater; 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.

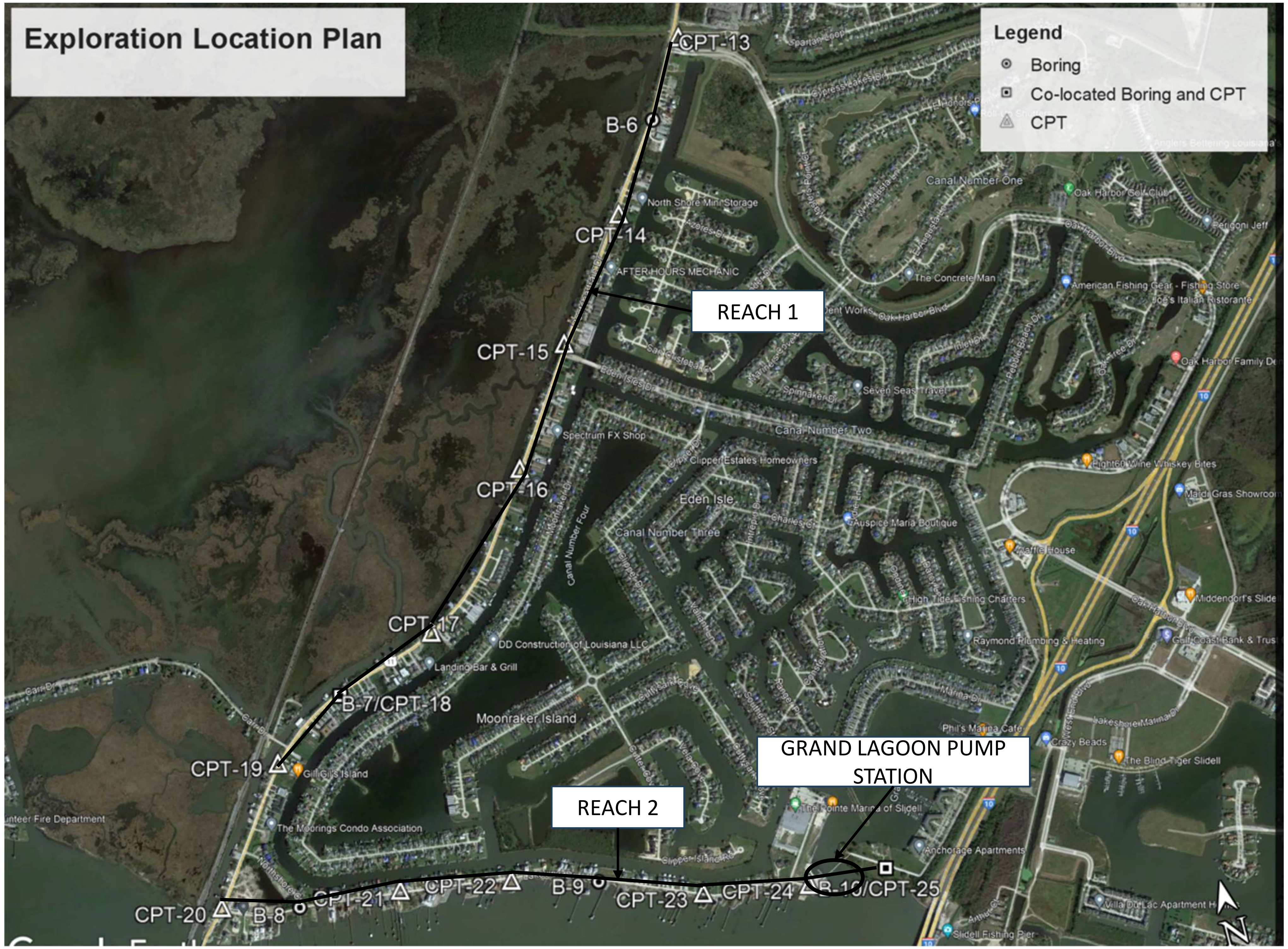


EUSTIS ENGINEERING L.L.C. SINCE 1946

SITE VICINITY MAP

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
AMENDMENT NOS. 3 AND 4

DRAWN BY: H.C.W.	DATE: 13 JUNE 2023	FILENAME: FIG 1.PTP
CHECKED BY: J.J.H.	JOB NO. 24493.02/.03	FIGURE 1



NOTES:

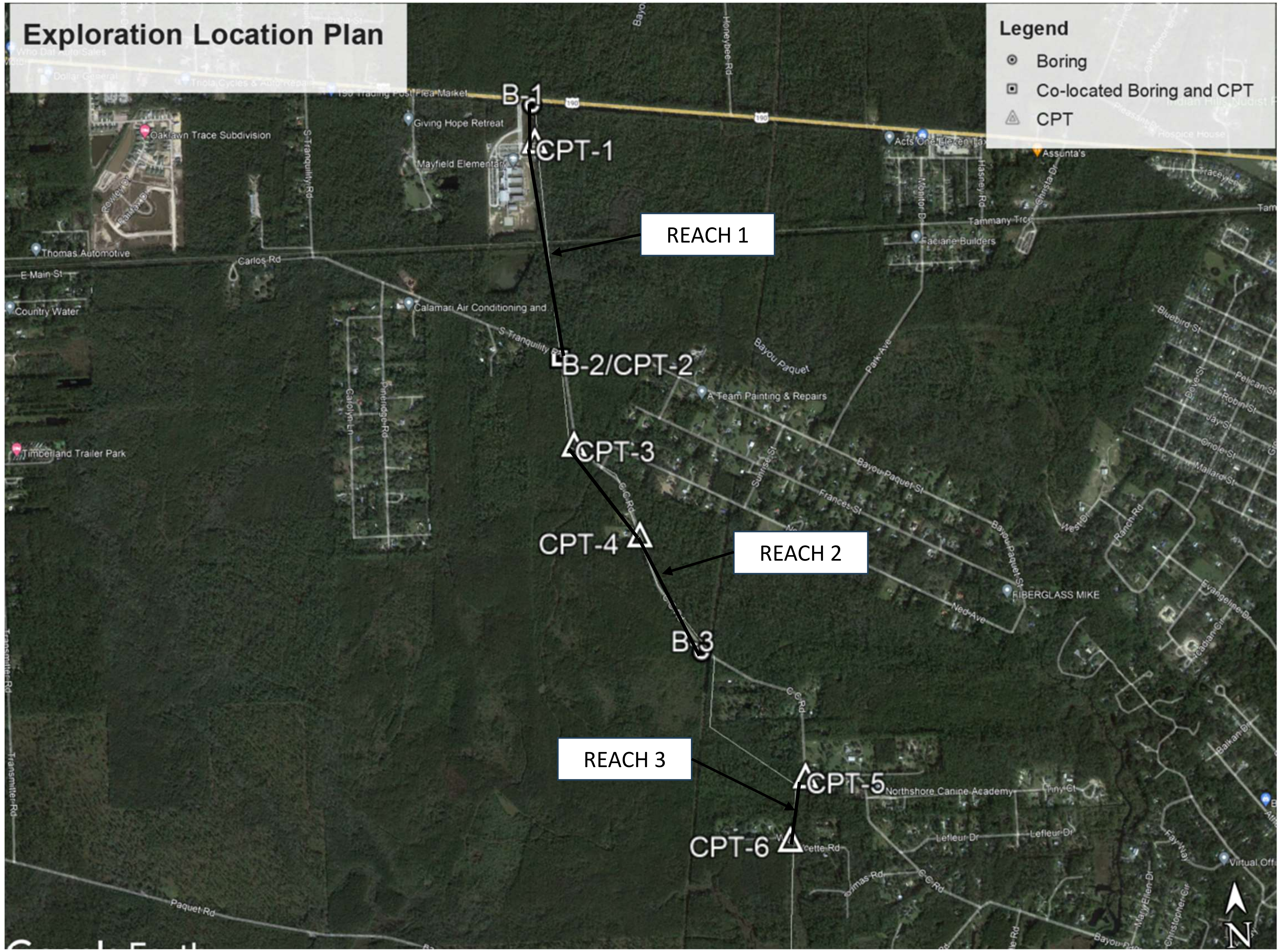
1. EXPLORATION LOCATIONS ARE APPROXIMATE.
2. SOIL BORINGS DRILLED BETWEEN 13 SEPTEMBER AND 7 OCTOBER 2022.
3. CONE PENETRATION TESTS PERFORMED BETWEEN 30 SEPTEMBER AND 5 OCTOBER 2022.

EUSTIS ENGINEERING L.L.C. SINCE 1946

EDEN ISLES EXPLORATION LOCATION PLAN

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
AMENDMENT NOS. 3 AND 4

DRAWN BY: H.C.W.	DATE: 13 JUNE 2023	FILENAME: FIG 1.PTP
CHECKED BY: J.J.H.	JOB NO. 24493.02/.03	FIGURE 2 (SHEET 1 OF 2)



NOTES:

1. EXPLORATION LOCATIONS ARE APPROXIMATE.

2. SOIL BORINGS DRILLED BETWEEN 4 APRIL AND 6 APRIL 2023.

3. CONE PENETRATION TESTS PERFORMED BETWEEN 3 APRIL AND 5 APRIL 2023.

EUSTIS ENGINEERING L.L.C. SINCE 1946

WEST SLIDELL EXPLORATION LOCATION PLAN

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
AMENDMENT NOS. 3 AND 4

DRAWN BY: H.C.W.	DATE: 13 JUNE 2023	FILENAME: FIG 1.PTP
CHECKED BY:J.J.H.	JOB NO. 24493.02/.03	FIGURE 2 (SHEET 2 OF2)

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
AMMENDMENT NOS. 3 AND 4
EUSTIS ENGINEERING PROJECT NO. 24493.02/.03

BORING AND CPT SUMMARY

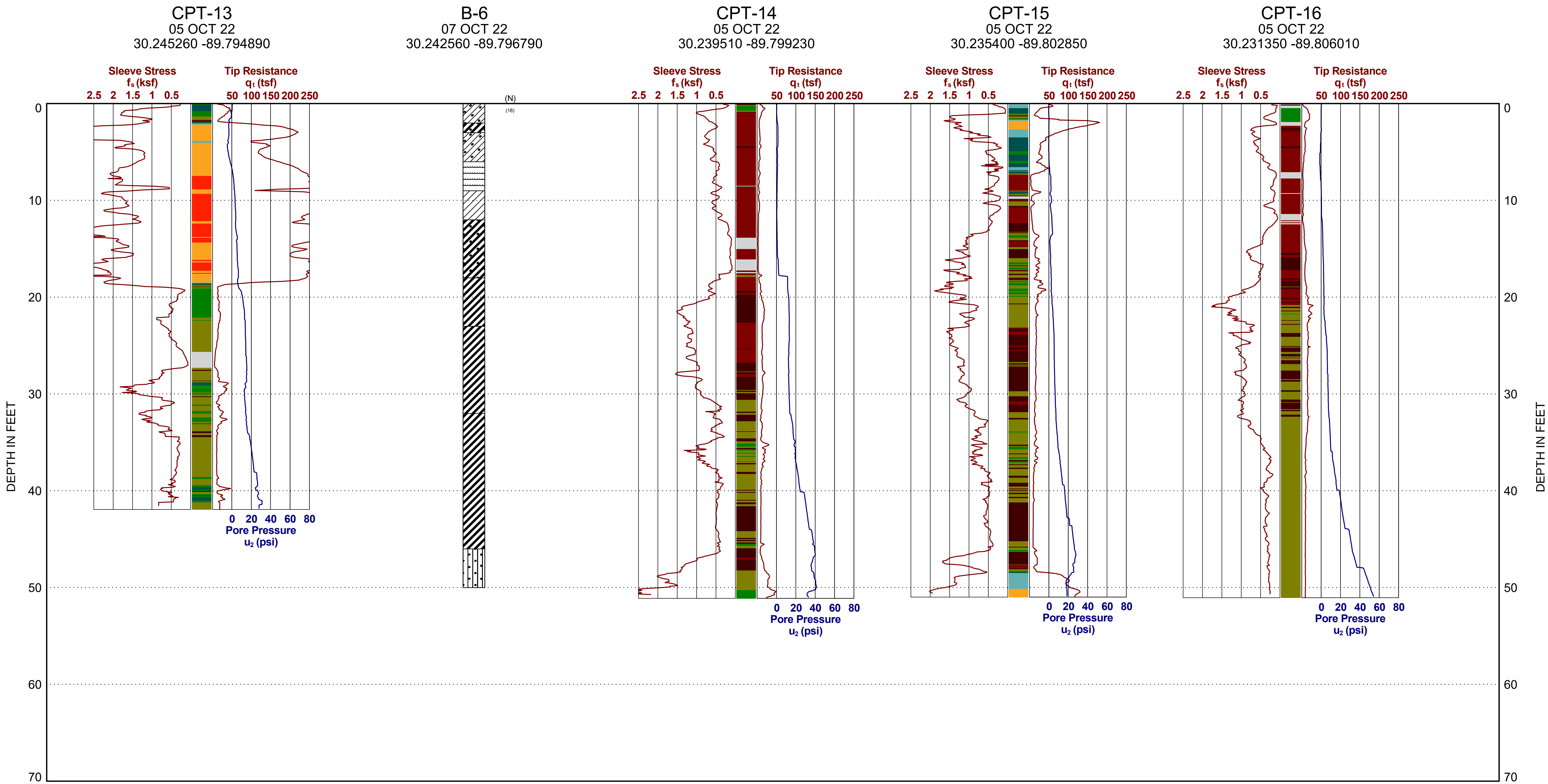
EUSTIS ENGINEERING PROJECT NO.	BORING/CPT NUMBER	EXPLORATION TYPE	DEPTH IN FEET	DATE STARTED	DATE COMPLETED
24493.02	B-6	Boring	50	10/7/2022	10/7/2022
24493.02	B-7	Boring	50	10/6/2022	10/6/2022
24493.02	B-8	Boring	50	9/15/2022	9/15/2022
24493.02	B-9	Boring	50	9/14/2022	9/14/2022
24493.02	B-10	Boring	50	9/13/2022	9/13/2022
24493.02	CPT-13	CPT	42(1)	10/5/2022	10/5/2022
24493.02	CPT-14	CPT	51	10/5/2022	10/5/2022
24493.02	CPT-15	CPT	51	10/5/2022	10/5/2022
24493.02	CPT-16	CPT	51	10/5/2022	10/5/2022
24493.02	CPT-17	CPT	51	10/4/2022	10/4/2022
24493.02	CPT-18	CPT	51	10/4/2022	10/4/2022
24493.02	CPT-19	CPT	51	10/4/2022	10/4/2022
24493.02	CPT-20	CPT	51	10/4/2022	10/4/2022
24493.02	CPT-21	CPT	51	10/3/2022	10/3/2022
24493.02	CPT-22	CPT	54	9/30/2022	9/30/2022
24493.02	CPT-23	CPT	51	9/30/2022	9/30/2022
24493.02	CPT-24	CPT	60(1)	9/30/2022	9/30/2022
24493.02	CPT-25	CPT	51	10/3/2022	10/3/2022
24493.03	B-1	Boring	50	4/5/2023	4/4/2023
24493.03	B-2	Boring	50	4/6/2023	4/3/2023
24493.03	B-3	Boring	50	4/4/2023	4/5/2023
24493.03	CPT-1	CPT	51	4/3/2023	4/3/2023
24493.03	CPT-2	CPT	52	4/5/2023	4/3/2023

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
AMMENDMENT NOS. 3 AND 4
EUSTIS ENGINEERING PROJECT NO. 24493.02/.03

BORING AND CPT SUMMARY

EUSTIS ENGINEERING PROJECT NO.	BORING/CPT NUMBER	EXPLORATION TYPE	DEPTH IN FEET	DATE STARTED	DATE COMPLETED
24493.03	CPT-3	CPT	51	4/3/2023	4/5/2023
24493.03	CPT-4	CPT	51	4/3/2023	4/3/2023
24493.03	CPT-5	CPT	51	4/5/2023	2/5/2023
24493.03	CPT-6	CPT	51	4/3/2023	2/5/2023

(1)CPT refused before reaching proposed depth



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_t vs Rf

BORING MATERIAL GRAPHICS

- CLAY
- SANDY CLAY
- SILTY SAND
- CLAYEY SAND
- PEAT/HUMUS
- USCS Lean Clay

NOTES:

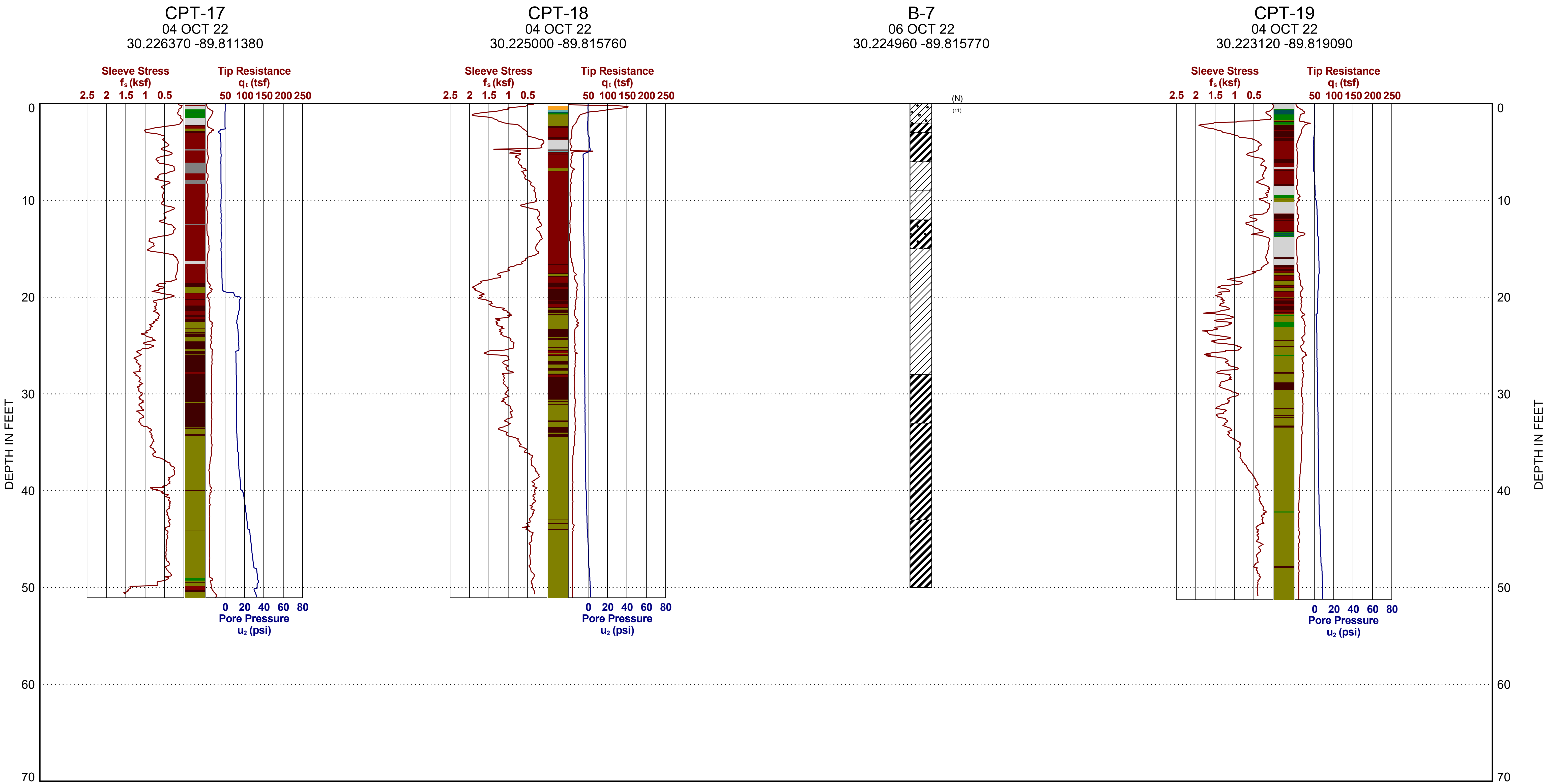
1. THE NUMBERS TO THE RIGHT OF THE BORING LOGS REPRESENT THE RESULTS OF STANDARD PENETRATION TESTS.
2. THE SUBSURFACE PROFILE DOES NOT ATTEMPT TO IDENTIFY SUBSURFACE CONDITIONS BETWEEN AND AWAY FROM THE SPECIFIC EXPLORATORY LOCATIONS. RATHER, THE PROFILE IS A SCHEMATIC OF THE GENERALIZED STRATIGRAPHY CONSIDERED FOR OUR ANALYSES. THIS GROUPING IS BASED ON SIMILAR STRATIGRAPHIES, PROJECT FEATURES, AND ENGINEERING DESIGN ANALYSES. THIS GROUPING IS NOT BASED ON GEOLOGIC VARIATIONS AND GEOPHYSICAL TESTING WAS NOT CONDUCTED TO ASSESS SUBSURFACE VARIATIONS.

SUBSURFACE SOIL PROFILE
REACH 1 - EDEN ISLES

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
AMENDMENT NOS. 3 AND 4

EUSTIS ENGINEERING L.L.C.
SINCE 1946

DRAWN BY: H.C.W..	JOB NO.:24493.02/.03
CHECKED BY: J.J.H.	DATE: 13 JUNE 2023
	FIGURE 4 (SHEET 1 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_t vs Rf

BORING MATERIAL GRAPHICS

- CLAY
- SANDY CLAY
- CLAYEY SAND
- USCS Lean Clay

NOTES:

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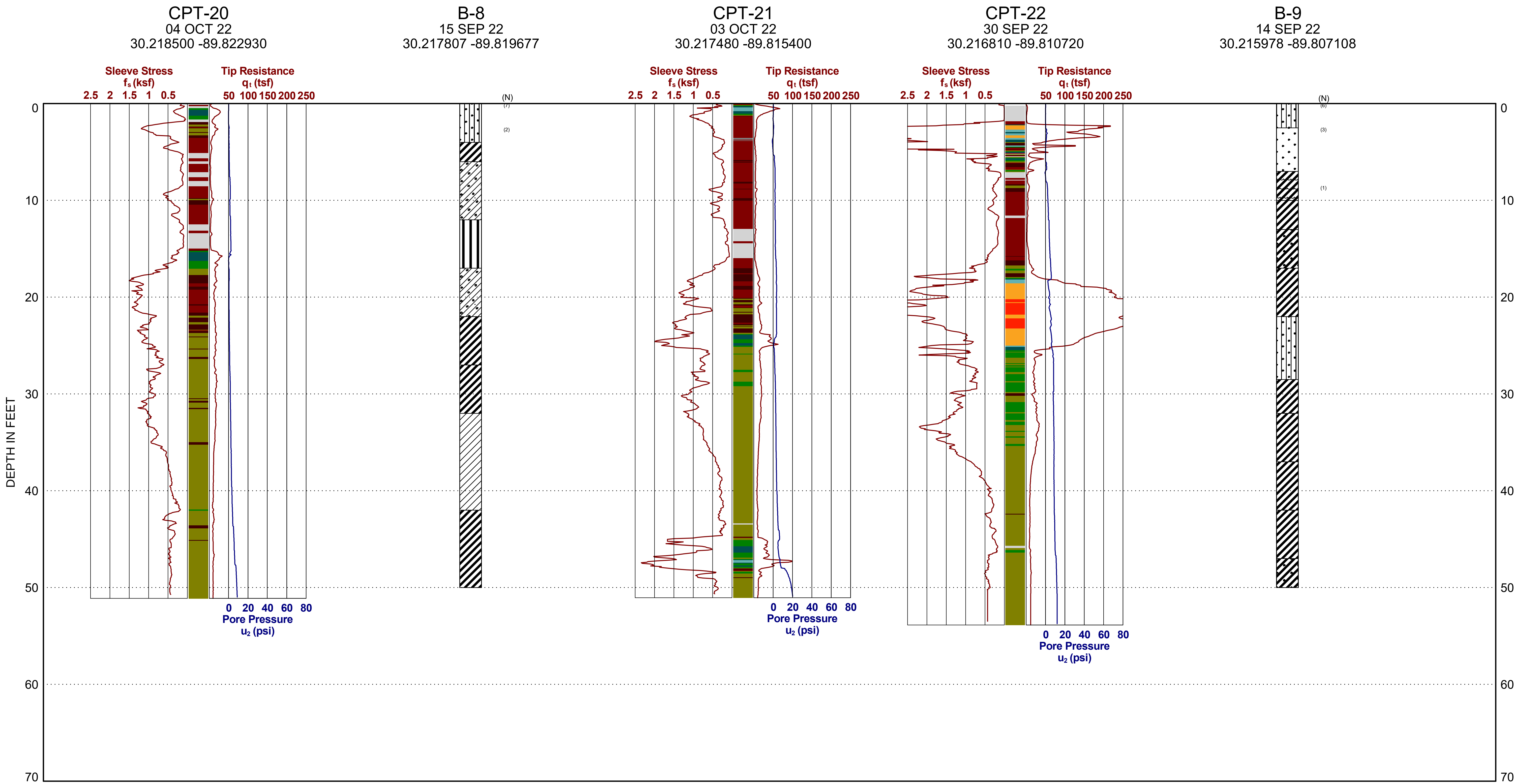
SUBSURFACE SOIL PROFILE
REACH 1 - EDEN ISLES

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
AMENDMENT NOS. 3 AND 4

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: H.C.W..	JOB NO.:24493.02/.03
CHECKED BY: J.J.H.	DATE: 13 JUNE 2023
	FIGURE 4 (SHEET 2 OF 2)



CPT MATERIAL GRAPHICS

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

* OVERCONSOLIDATED OR CEMENTED

Robertson et al (1986) q_t vs Rf

BORING MATERIAL GRAPHICS

- CLAY
- ORGANIC CLAY
- SANDY CLAY
- USCS Lean Clay
- SAND
- SILTY SAND
- CLAYEY SAND
- SILT

NOTES:

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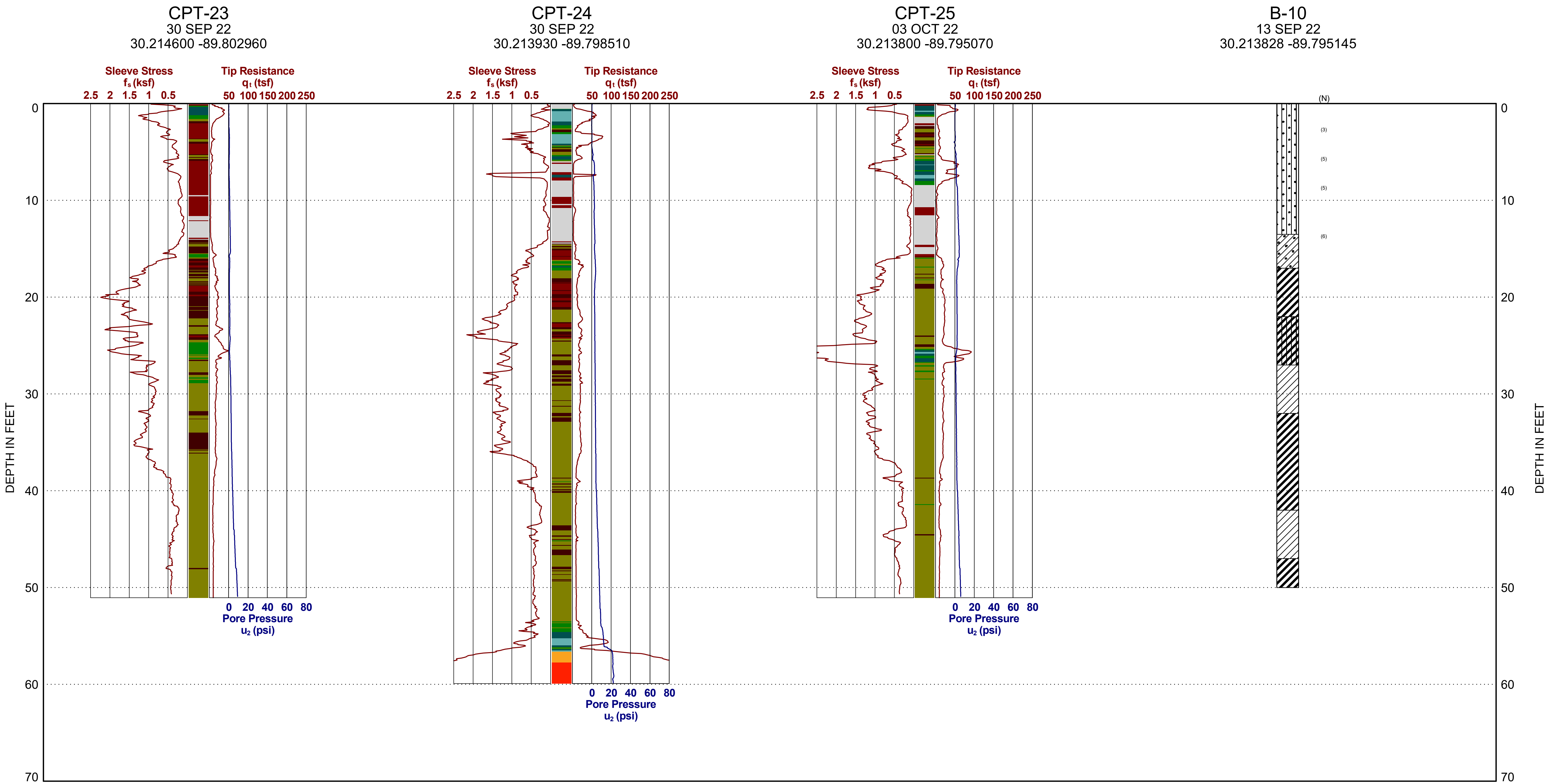
SUBSURFACE SOIL PROFILE
REACH 2 - EDEN ISLES

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
AMENDMENT NOS. 3 AND 4

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: H.C.W..	JOB NO.:24493.02/.03
CHECKED BY: J.J.H.	DATE: 13 JUNE 2023
	FIGURE 5 (SHEET 1 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_t vs Rf

BORING MATERIAL GRAPHICS

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- SILTY CLAY
- SILTY SAND
- CLAYEY SAND
- USCS Lean Clay

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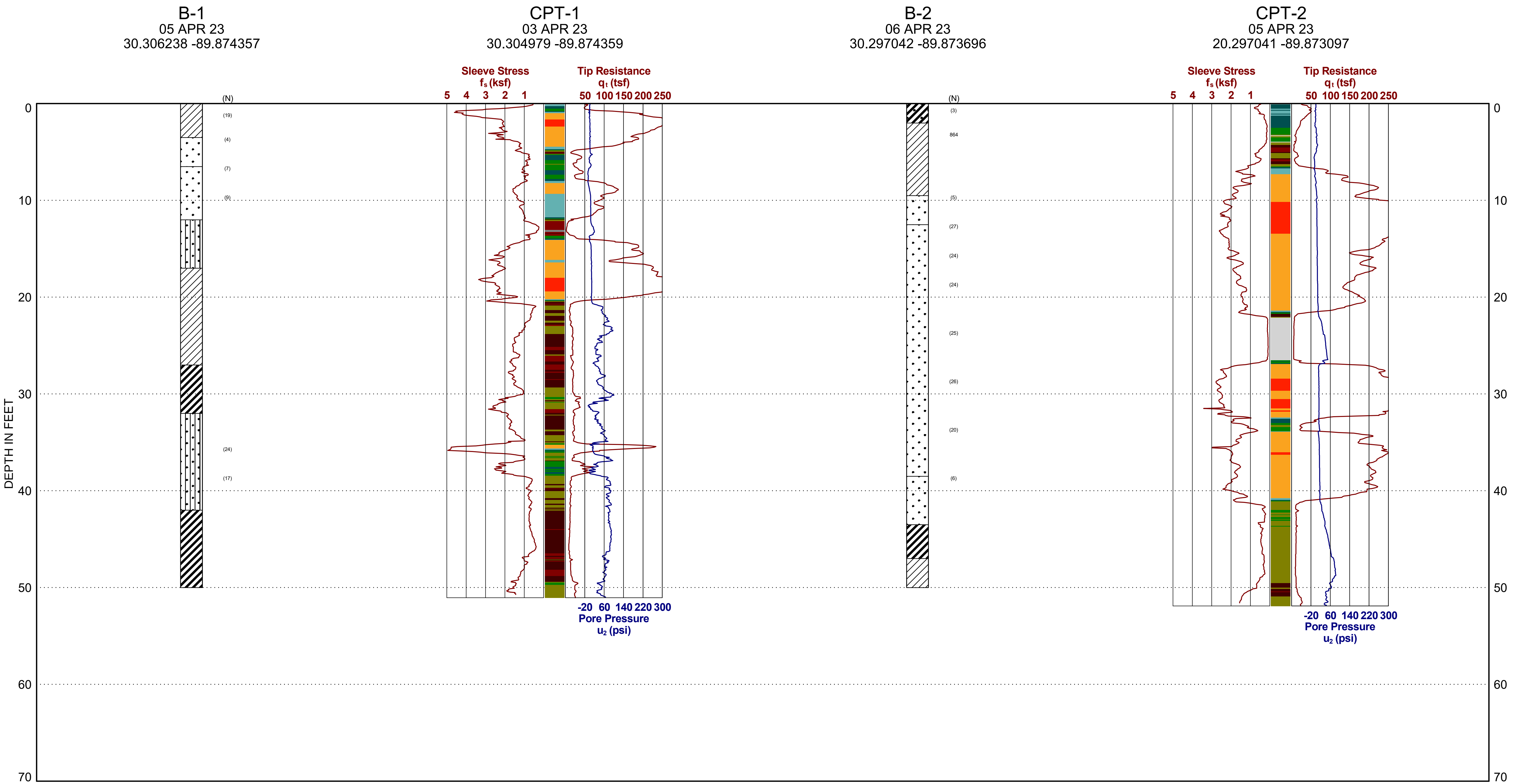
SUBSURFACE SOIL PROFILE
REACH 2 - EDEN ISLES

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
AMENDMENT NOS. 3 AND 4

EUSTIS ENGINEERING L.L.C.
SINCE 1946

DRAWN BY: H.C.W..	JOB NO.:24493.02/.03
CHECKED BY: J.J.H.	DATE: 13 JUNE 2023
	FIGURE 5 (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_t vs Rf

BORING MATERIAL GRAPHICS

- CLAY
- SANDY CLAY
- SAND
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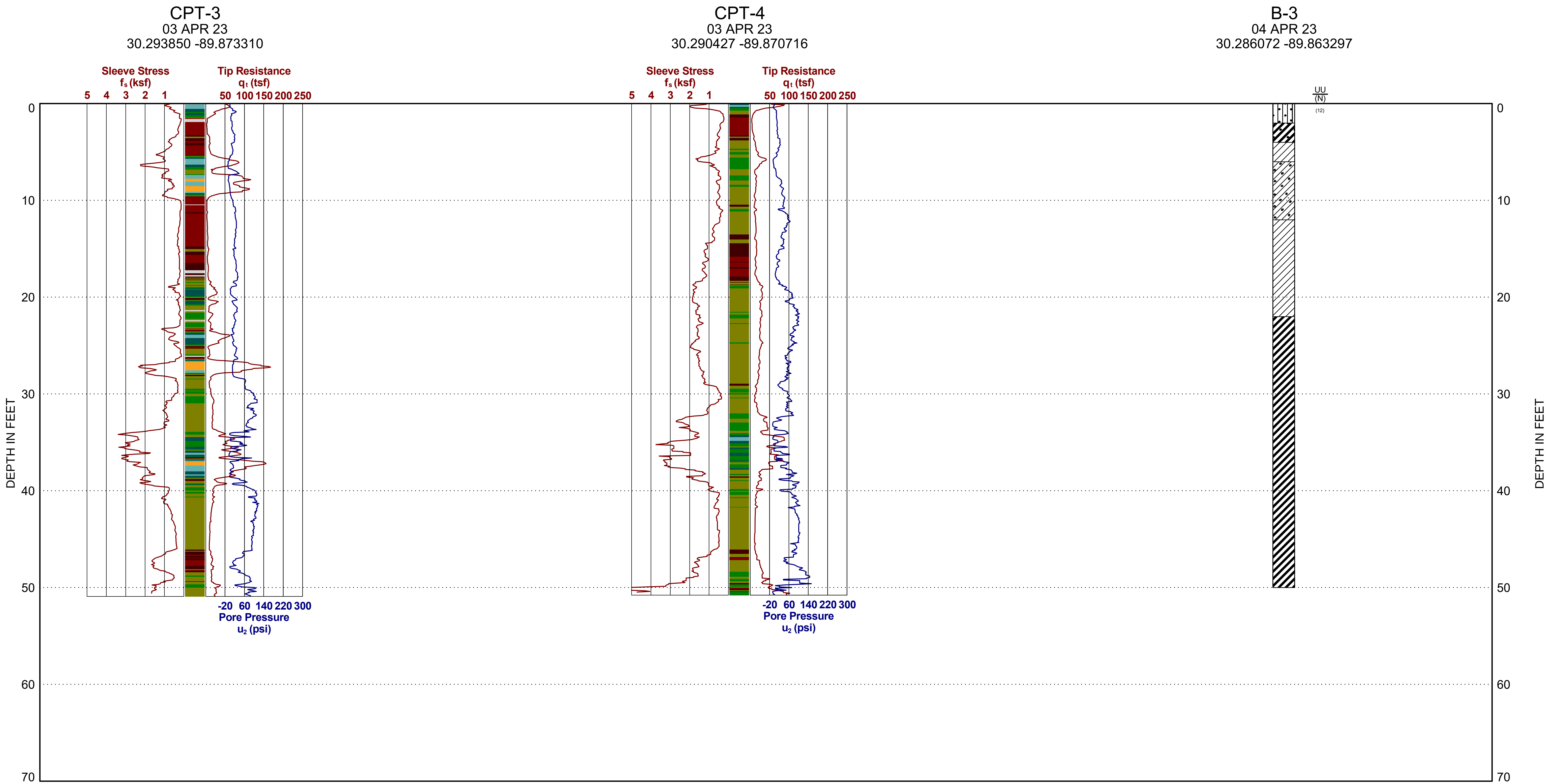
SUBSURFACE SOIL PROFILE
REACH 1 - WEST SLIDELL

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
AMENDMENT NOS. 3 AND 4

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: H.C.W..	JOB NO.:24493.02/.03
CHECKED BY: J.J.H.	DATE: 13 JUNE 2023
	FIGURE 6



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_t vs Rf

BORING MATERIAL GRAPHICS

- CLAY
- SANDY CLAY
- SILTY SAND
- CLAYEY SAND
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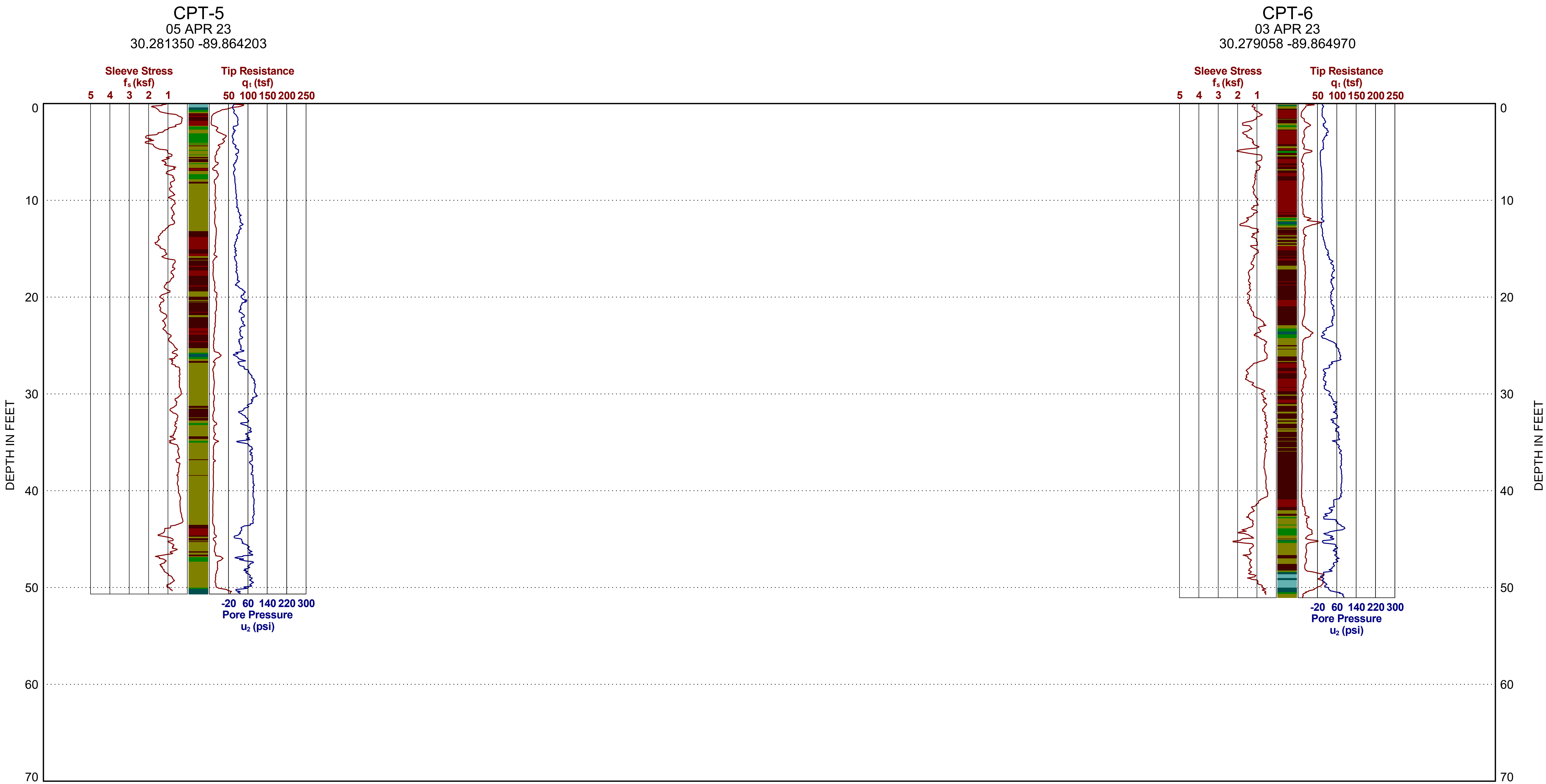
SUBSURFACE SOIL PROFILE
REACH 2 - WEST SLIDELL

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
AMENDMENT NOS. 3 AND 4

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: H.C.W..	JOB NO.:24493.02/.03
CHECKED BY: J.J.H.	DATE: 13 JUNE 2023
	FIGURE 7



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_t vs Rf

NOTES:

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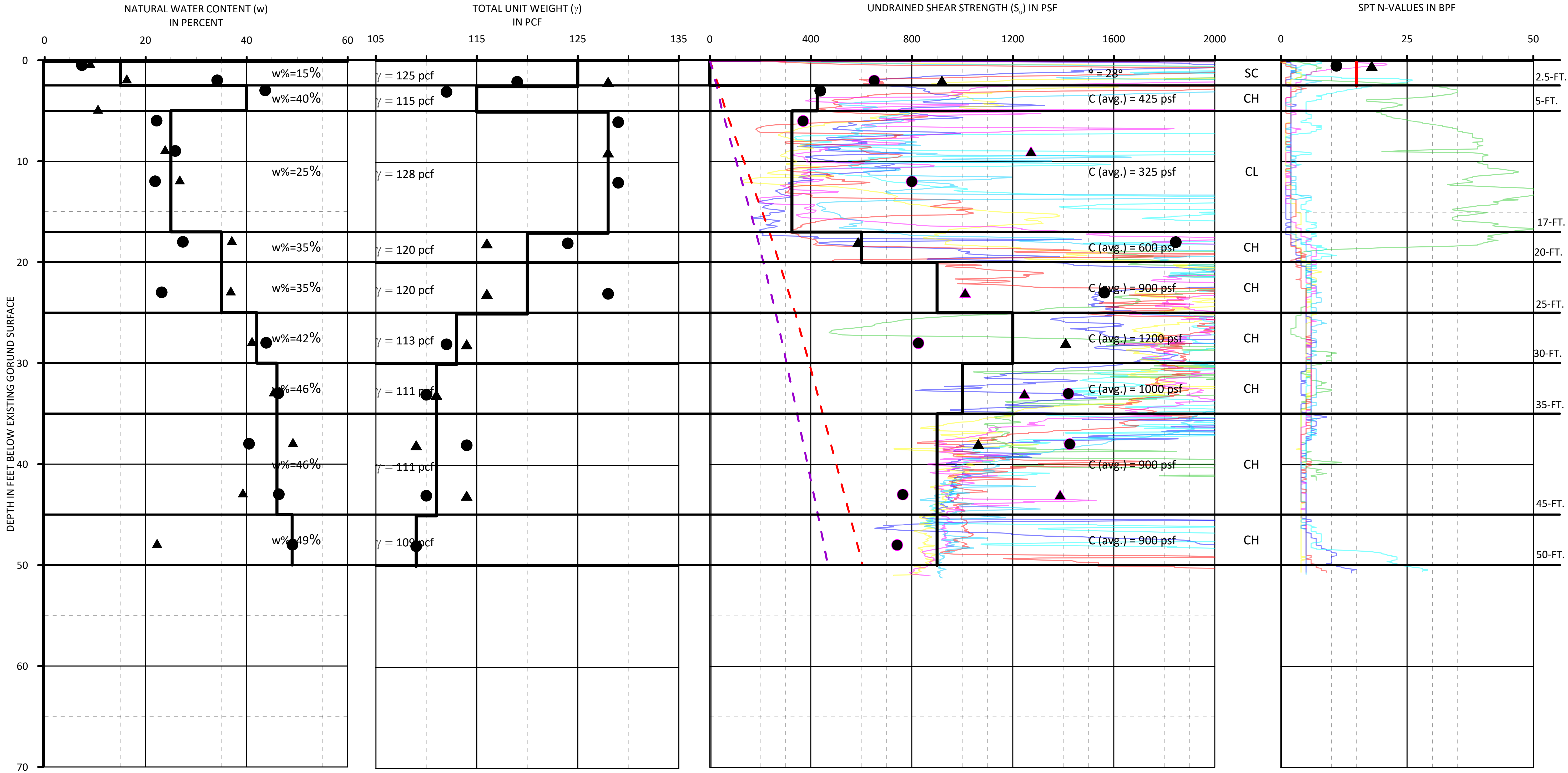
SUBSURFACE SOIL PROFILE
REACH 3 - WEST SLIDELL

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
AMENDMENT NOS. 3 AND 4

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: H.C.W..	JOB NO.:24493.02/.03
CHECKED BY: J.J.H.	DATE: 13 JUNE 2023
	FIGURE 8



NOTES:

1. LOGS OF SOIL BORINGS AND CONE PENETRATION TESTS ARE PROVIDED IN APPENDICES I AND III, RESPECTIVELY.
2. UNIT WEIGHTS SHOWN ARE TOTAL UNIT WEIGHTS AND MUST BE APPROPRIATELY REDUCED TO ESTIMATE EFFECTIVE STRESS STATES.
3. FOR S-CASE PARAMETERS (DRAINED SHEAR STRENGTHS), WE RECOMMEND USING ϕ=23° FOR ALL CLAY STRATA AND ϕ=28° FOR ALL SILT STRATA.
4. INTERPRETATIONS OF CPT UNDRAINED SHEAR STRENGTHS ARE BASED ON $S_{u(2)}$ USING AN N_{kT} VALUE EQUAL TO 15.
5. DESIGN PROFILES SHOWN CANNOT FULLY ANTICIPATE ALL PARAMETERS WHICH MAY INFLUENCE SELECTION OF DESIGN VALUES FOR A SPECIFIC ANALYSIS. FOR THIS REASON, THE USER SHOULD CONTACT EUSTIS ENGINEERING L.L.C. PRIOR TO USE OF DESIGN PROFILES IN ANY ANALYSES.

▲ B-6
● B-7
CPT-13
CPT-14
CPT-15
CPT-16
CPT-17
CPT-18
CPT-19

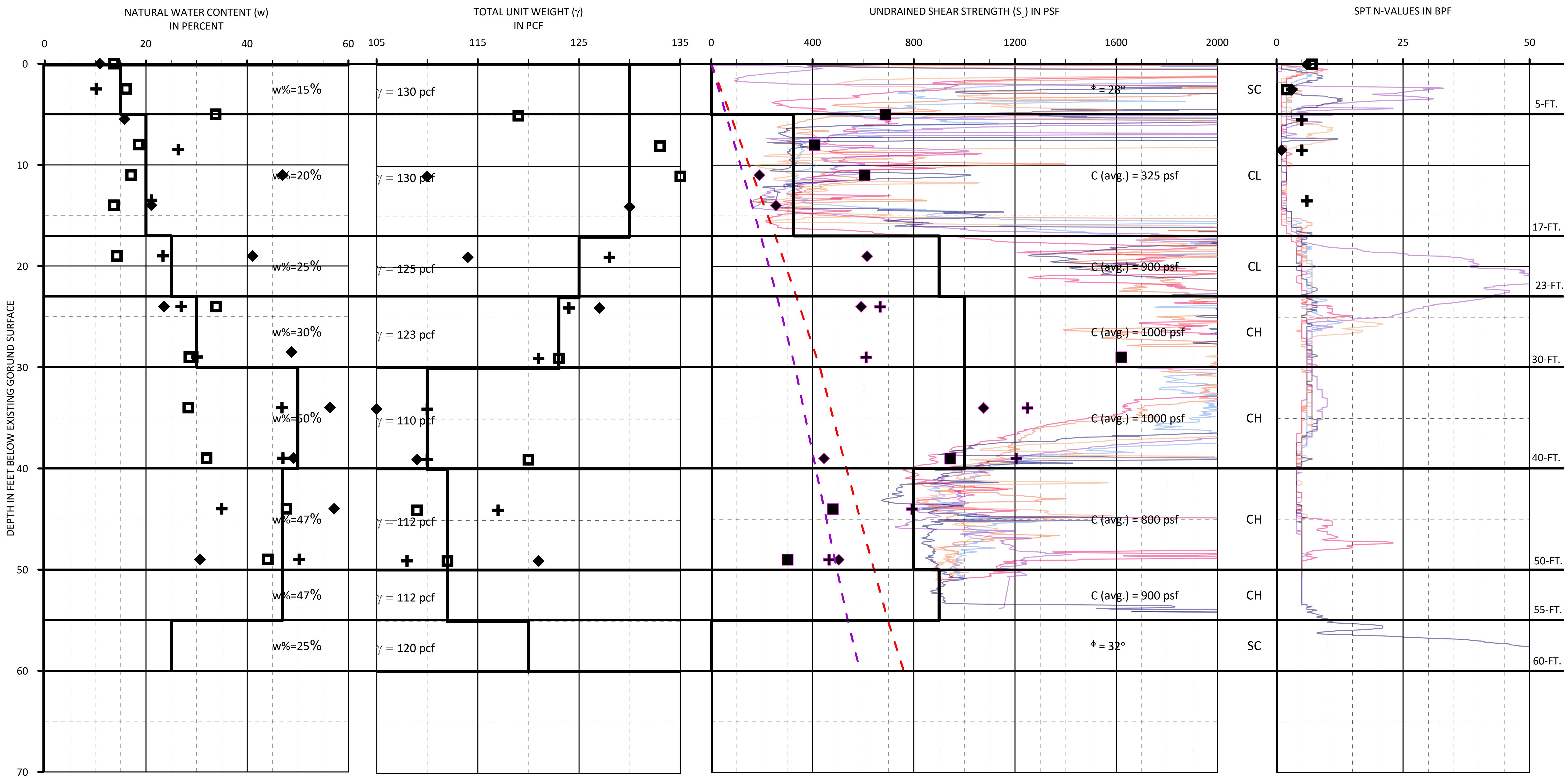
DESIGN LINE
c/P'o = 0.17
c/P'o = 0.22

SOIL PARAMETERS
REACH 1 - EDEN ISLES

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
AMENDMENT NOS. 3 AND 4

EUSTIS ENGINEERING SINCE 1946

DRAWN BY: H.C.W.	JOB NO.: 24493.02
CHECKED BY: J.J.H.	DATE: 10/14/22
FILE NAME: 24493.02 PARAMETERS.GRF	FIGURE 9 (SHEET 1 OF 2)



NOTES:

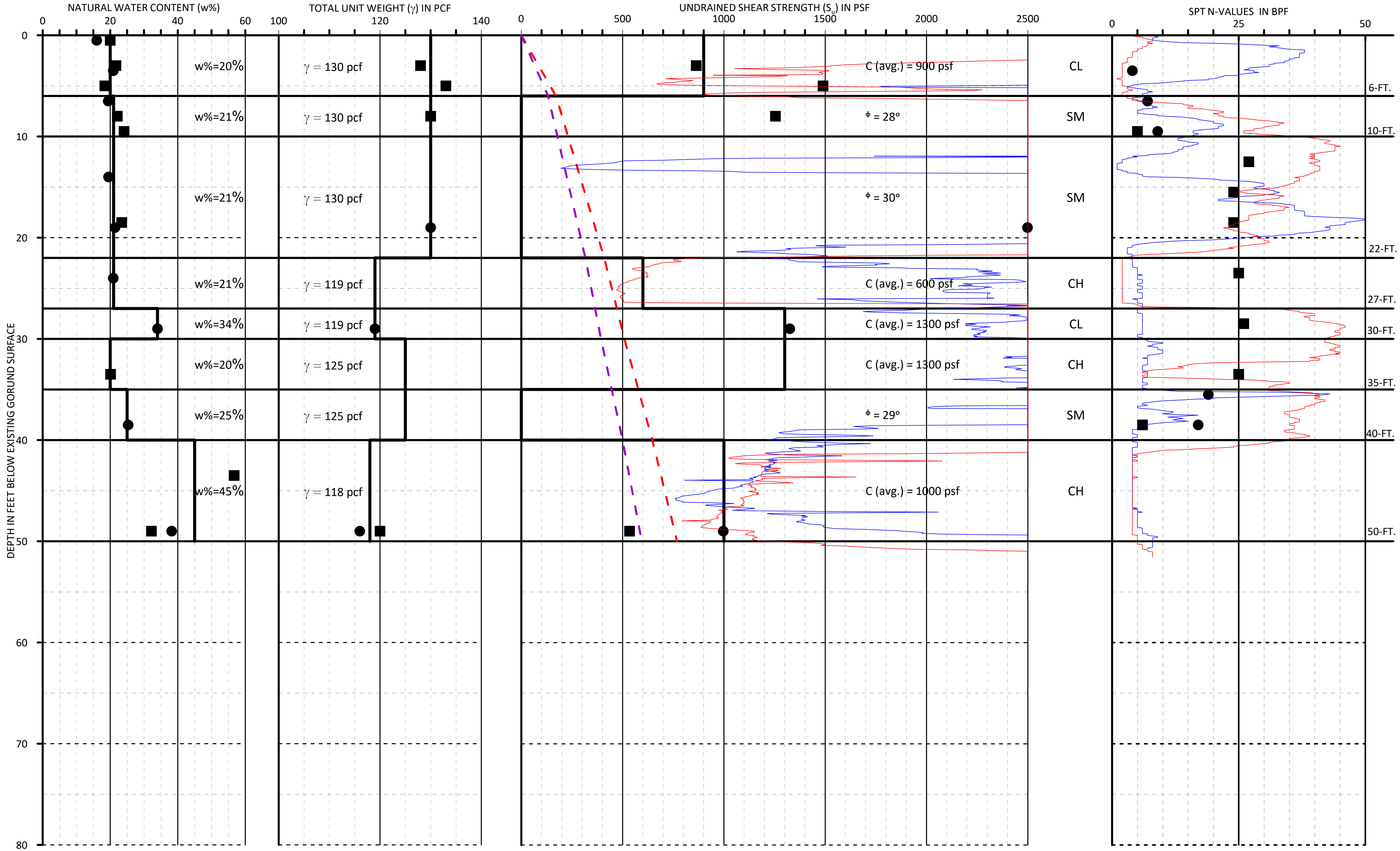
1. LOGS OF SOIL BORINGS AND CONE PENETRATION TESTS ARE PROVIDED IN APPENDICES I AND III, RESPECTIVELY.
2. UNIT WEIGHTS SHOWN ARE TOTAL UNIT WEIGHTS AND MUST BE APPROPRIATELY REDUCED TO ESTIMATE EFFECTIVE STRESS STATES.
3. FOR S-CASE PARAMETERS (DRAINED SHEAR STRENGTHS), WE RECOMMEND USING ϕ=23° FOR ALL CLAY STRATA AND ϕ=28° FOR ALL SILT STRATA.
4. INTERPRETATIONS OF CPT UNDRAINED SHEAR STRENGTHS ARE BASED ON $S_{u(2)}$ USING AN N_{kT} VALUE EQUAL TO 15.
5. DESIGN PROFILES SHOWN CANNOT FULLY ANTICIPATE ALL PARAMETERS WHICH MAY INFLUENCE SELECTION OF DESIGN VALUES FOR A SPECIFIC ANALYSIS. FOR THIS REASON, THE USER SHOULD CONTACT EUSTIS ENGINEERING L.L.C. PRIOR TO USE OF DESIGN PROFILES IN ANY ANALYSES.

SOIL PARAMETERS
REACH 2 - EDEN ISLES

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
AMENDMENT NOS. 3 AND 4

EUSTIS ENGINEERING SINCE 1946

DRAWN BY: H.C.W.	JOB NO.: 24493.02
CHECKED BY: J.J.H.	DATE: 10/14/22
FILE NAME: 24493.03 PARAMETERS.GRF	FIGURE 9 (SHEET 2 OF 2)



●	B-1
■	B-2
— (blue)	CPT-1
— (red)	CPT-2

—	DESIGN LINE
– – (purple)	c/P'o = 0.17
– – (red)	c/P'o = 0.22

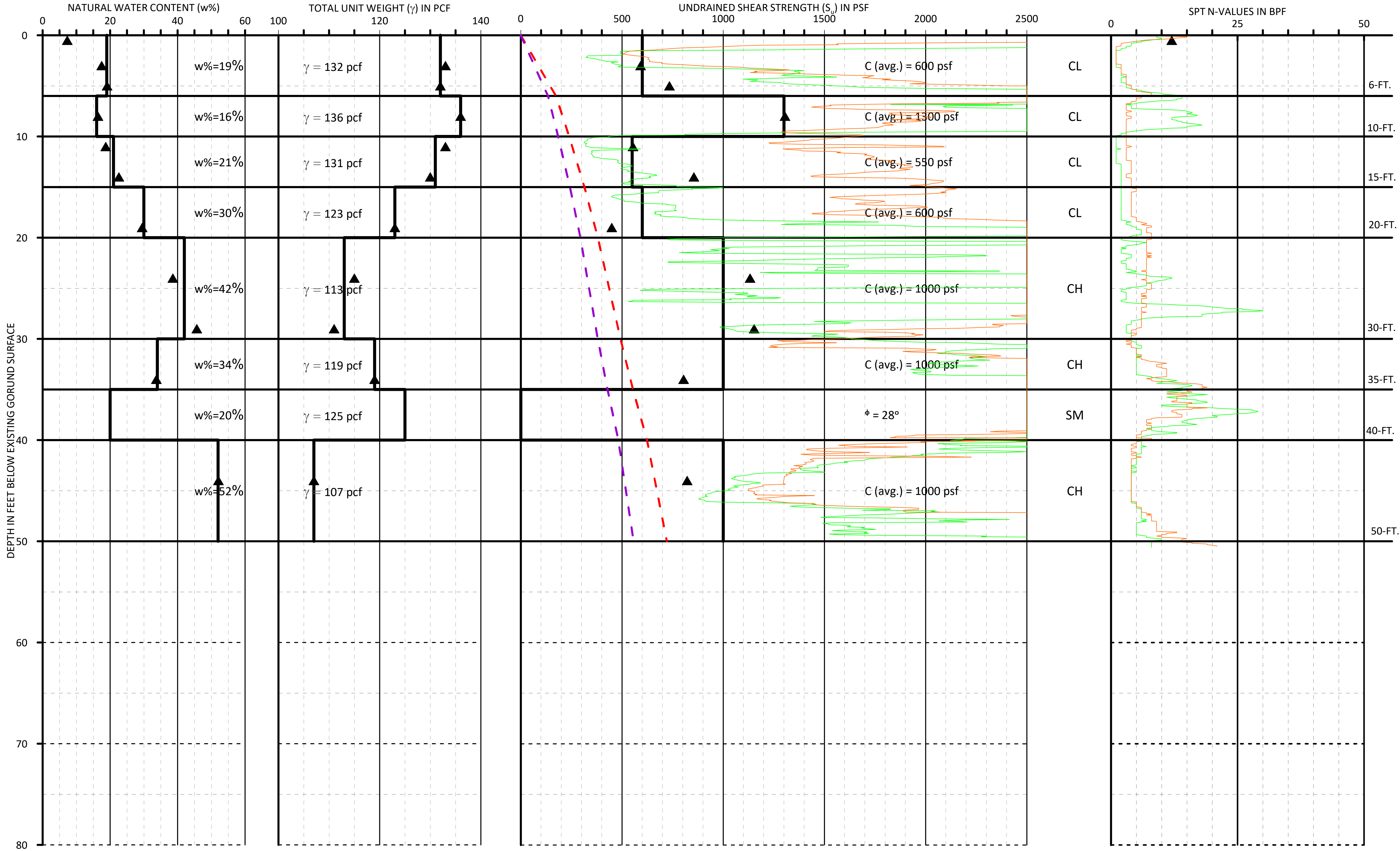
NOTES:
1. LOGS OF SOIL BORINGS AND CONE PENETRATION TESTS ARE PROVIDED IN APPENDICES II AND IV, RESPECTIVELY.
2. UNIT WEIGHTS SHOWN ARE TOTAL UNIT WEIGHTS AND MUST BE APPROPRIATELY REDUCED TO ESTIMATE EFFECTIVE STRESS STATES.
3. FOR S-CASE PARAMETERS (DRAINED SHEAR STRENGTHS), WE RECOMMEND USING ϕ=23° FOR ALL CLAY STRATA AND ϕ=28° FOR ALL SILT STRATA.
4. INTERPRETATIONS OF CPT UNDRAINED SHEAR STRENGTHS ARE BASED ON $S_{u(2)}$ USING AN N_{KT} VALUE EQUAL TO 15.
5. DESIGN PROFILES SHOWN CANNOT FULLY ANTICIPATE ALL PARAMETERS WHICH MAY INFLUENCE SELECTION OF DESIGN VALUES FOR A SPECIFIC ANALYSIS. FOR THIS REASON, THE USER SHOULD CONTACT EUSTIS ENGINEERING L.L.C. PRIOR TO USE OF DESIGN PROFILES IN ANY ANALYSES.

SOIL DESIGN PARAMETERS
REACH 1 - WEST SLIDELL

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
AMENDMENT NOS. 3 AND 4

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: HCW	JOB NO.: 24493.03
CHECKED BY: JJH	DATE: 9 MAY 2023
FILE NAME: 24493.03_Soil Parameters - Reach 1	FIGURE 10 (SHEET 1 OF 3)



CPT-3
CPT-4
B-3

DESIGN LINE
c/P'o = 0.17
c/P'o = 0.22

NOTES:

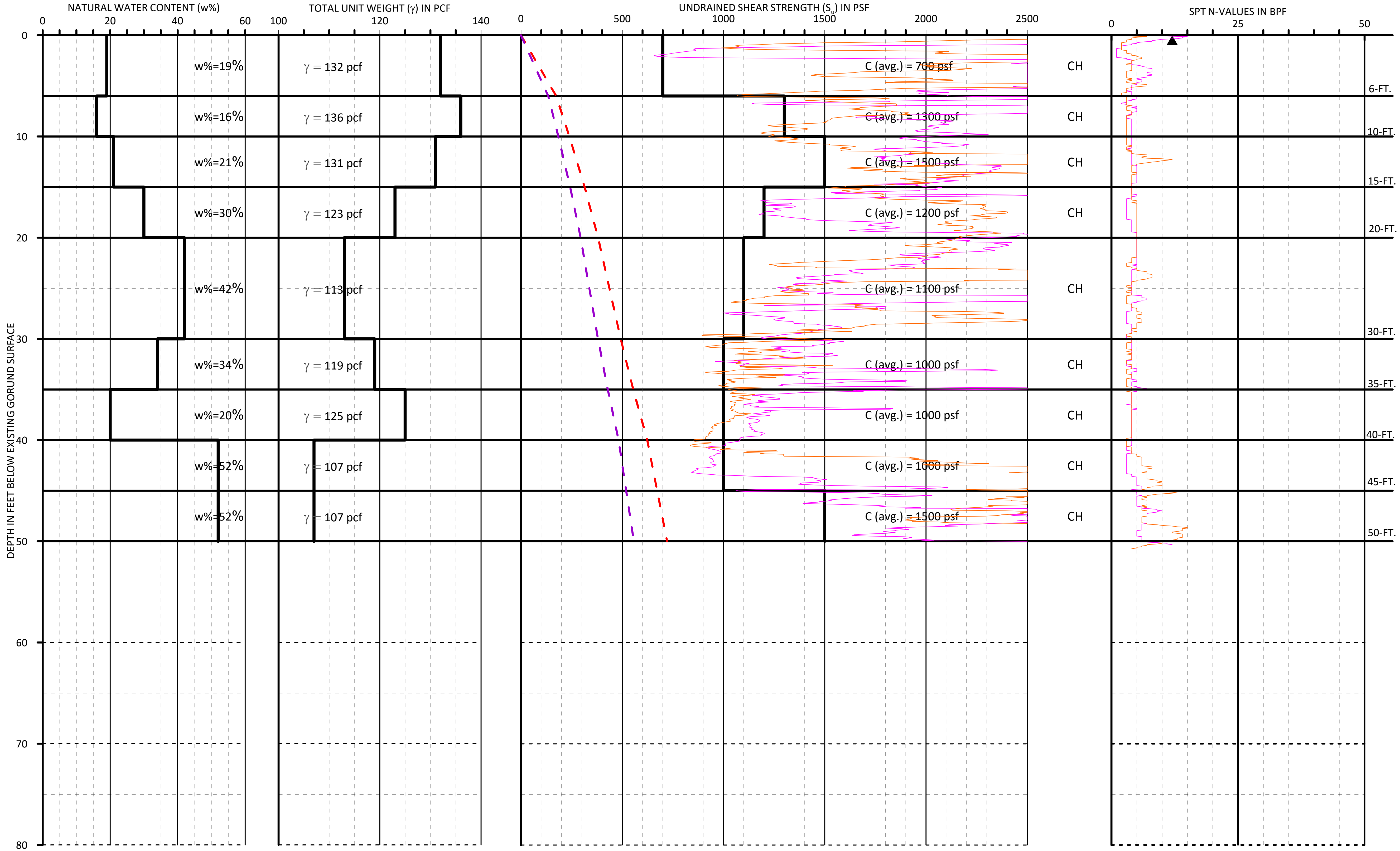
1. LOGS OF SOIL BORINGS AND CONE PENETRATION TESTS ARE PROVIDED IN APPENDICES II AND IV, RESPECTIVELY.
2. UNIT WEIGHTS SHOWN ARE TOTAL UNIT WEIGHTS AND MUST BE APPROPRIATELY REDUCED TO ESTIMATE EFFECTIVE STRESS STATES.
3. FOR S-CASE PARAMETERS (DRAINED SHEAR STRENGTHS), WE RECOMMEND USING ϕ=23° FOR ALL CLAY STRATA AND ϕ=28° FOR ALL SILT STRATA.
4. INTERPRETATIONS OF CPT UNDRAINED SHEAR STRENGTHS ARE BASED ON $S_{u(2)}$ USING AN N_{KT} VALUE EQUAL TO 15.
5. DESIGN PROFILES SHOWN CANNOT FULLY ANTICIPATE ALL PARAMETERS WHICH MAY INFLUENCE SELECTION OF DESIGN VALUES FOR A SPECIFIC ANALYSIS. FOR THIS REASON, THE USER SHOULD CONTACT EUSTIS ENGINEERING L.L.C. PRIOR TO USE OF DESIGN PROFILES IN ANY ANALYSES.

SOIL DESIGN PARAMETERS
REACH 2 - WEST SLIDELL

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
AMENDMENT NOS. 3 AND 4

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: HCW	JOB NO.: 24493.03
CHECKED BY: JJH	DATE: 9 MAY 2023
FILE NAME: 24493.03_Soil Parameters - Reach 2	FIGURE 10 (SHEET 2 OF 3)



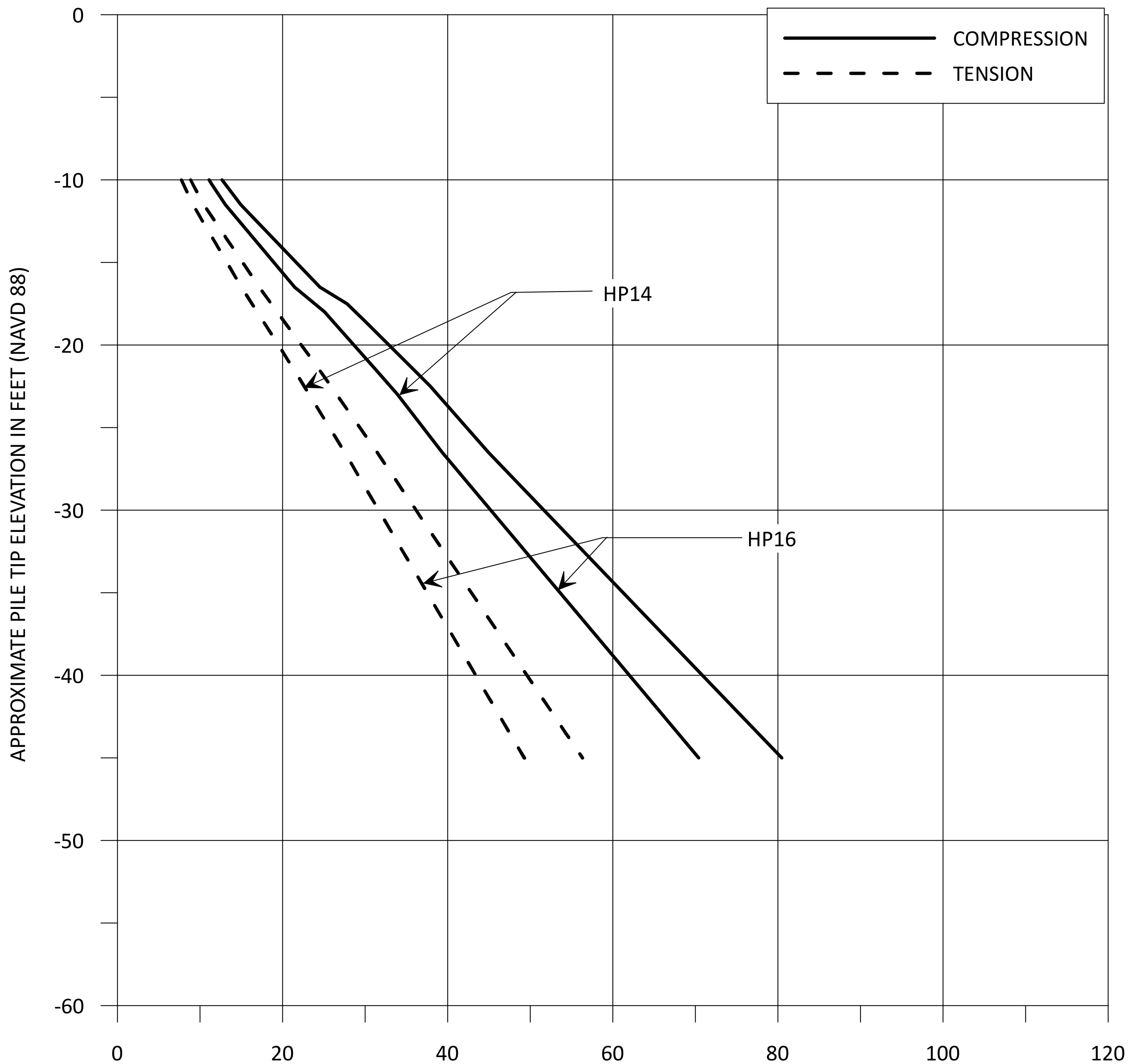
NOTES:
1. LOGS OF CONE PENETRATION TESTS ARE PROVIDED IN APPENDIX IV.
2. UNIT WEIGHTS SHOWN ARE TOTAL UNIT WEIGHTS AND MUST BE APPROPRIATELY REDUCED TO ESTIMATE EFFECTIVE STRESS STATES.
3. FOR S-CASE PARAMETERS (DRAINED SHEAR STRENGTHS), WE RECOMMEND USING ϕ=23° FOR ALL CLAY STRATA AND ϕ=28° FOR ALL SILT STRATA.
4. INTERPRETATIONS OF CPT UNDRAINED SHEAR STRENGTHS ARE BASED ON $S_{u(2)}$ USING AN N_{KT} VALUE EQUAL TO 15.
5. DESIGN PROFILES SHOWN CANNOT FULLY ANTICIPATE ALL PARAMETERS WHICH MAY INFLUENCE SELECTION OF DESIGN VALUES FOR A SPECIFIC ANALYSIS. FOR THIS REASON, THE USER SHOULD CONTACT EUSTIS ENGINEERING L.L.C. PRIOR TO USE OF DESIGN PROFILES IN ANY ANALYSES.

SOIL DESIGN PARAMETERS
REACH 3 - WEST SLIDELL

ST. TAMMANY PARISH GOVERNMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
AMENDMENT NOS. 3 AND 4

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: HCW	JOB NO.: 24493.03
CHECKED BY: JJH	DATE: 9 MAY 2023
FILE NAME: 24493.03_Soil Parameters - Reach 3	FIGURE 10 (SHEET 3 OF 3)



ESTIMATED ULTIMATE SINGLE PILE LOAD CAPACITY IN TONS

Q-CASE PARAMETERS

FACTOR OF SAFETY = 1.0

NOTES:

1. PILE LOAD CAPACITY ESTIMATES PRESENTED ON THIS FIGURE ASSUME A GROUND SURFACE AT EL 8.5 (NAVD 88) AND A BASE OF THE T-WALL AT EL 3.5.

2. PILE LOAD CAPACITIES PRESENTED ON THIS FIGURE DO NOT INCLUDE THE WEIGHT OF THE PILES.

3. PILES ASSUMED TO BE INSTALLED BY IMPACT DRIVING EQUIPMENT WITHOUT ASSISTANCE FROM VIBRATORY EQUIPMENT OR JETTING.

TABLE 3.7: (HSDRRS) RECOMMENDED MINIMUM FACTOR OF SAFETY AXIAL PILE CAPACITY

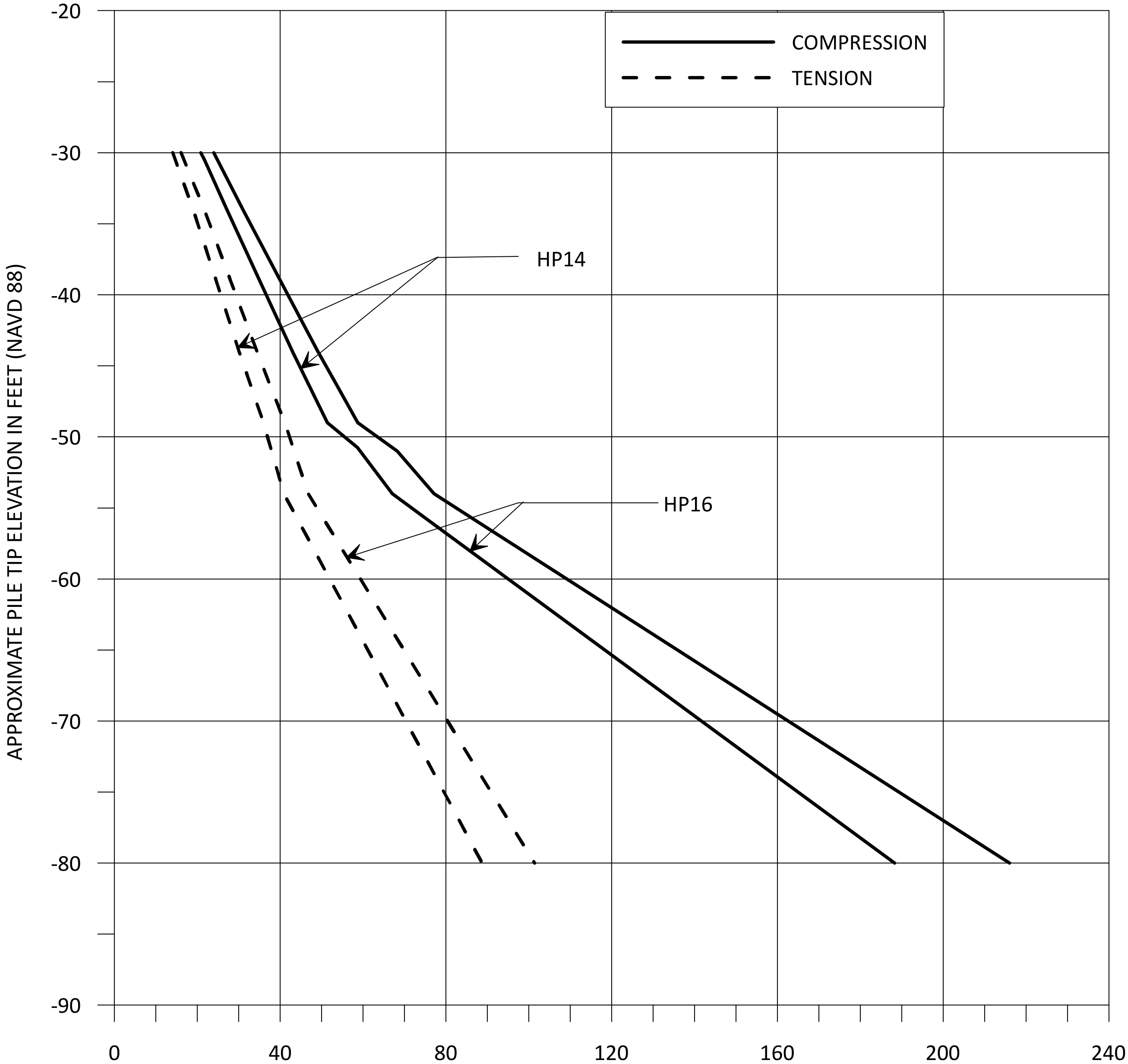
METHOD OF DETERMINING CAPACITY	LOADING CONDITION	MINIMUM FACTOR OF SAFETY	
		COMPRESSION	TENSION
THEORETICAL PREDICTION VERIFIED BY STATIC LOAD TEST	Q-CASE	2.0	2.0
	S-CASE	1.5	1.5
THEORETICAL PREDICTION VERIFIED BY PILE DRIVING ANALYZER	Q-CASE	2.5	3.0
	S-CASE	1.5	1.5
THEORETICAL PREDICTION NOT VERIFIED BY LOAD TEST	Q-CASE	3.0	3.0
	S-CASE	1.5	1.5

ESTIMATED ALLOWABLE SINGLE PILE LOAD CAPACITIES
STEEL H-PILES - Q CASE PARAMETERS
LA HIGHWAY 11 - T-WALL FOUNDATION

ST. TAMMANY PARISH GOVERMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
AMENDMENT NOS. 3 AND 4

EUSTIS ENGINEERING SINCE 1946

DRAWN BY: H.C.W.	JOB NO.: 24493.02
CHECKED BY: J.J.H.	DATE: 12 JUNE 2023
FILE NAME: SH.GRF	FIGURE 11



ESTIMATED ULTIMATE SINGLE PILE LOAD CAPACITY IN TONS

Q-CASE PARAMETERS

FACTOR OF SAFETY = 1.0

NOTES:

1. PILE LOAD CAPACITY ESTIMATES PRESENTED ON THIS FIGURE ASSUME A MUDLINE AT EL -18.5 (NAVD 88).
2. SAND STRATA IN WHICH CPT-24 REFUSED WAS EXTRAPOLATED TO ESTIMATE PIILE CAPACITIES AT LOWER ELEVATIONS.
3. PILE LOAD CAPACITIES PRESENTED ON THIS FIGURE DO NOT INCLUDE THE WEIGHT OF THE PILES.
4. PILES ASSUMED TO BE INSTALLED BY IMPACT DRIVING EQUIPMENT WITHOUT ASSISTANCE FROM VIBRATORY EQUIPMENT OR JETTING.

TABLE 3.7: (HSDRRS) RECOMMENDED MINIMUM FACTOR OF SAFETY AXIAL PILE CAPACITY

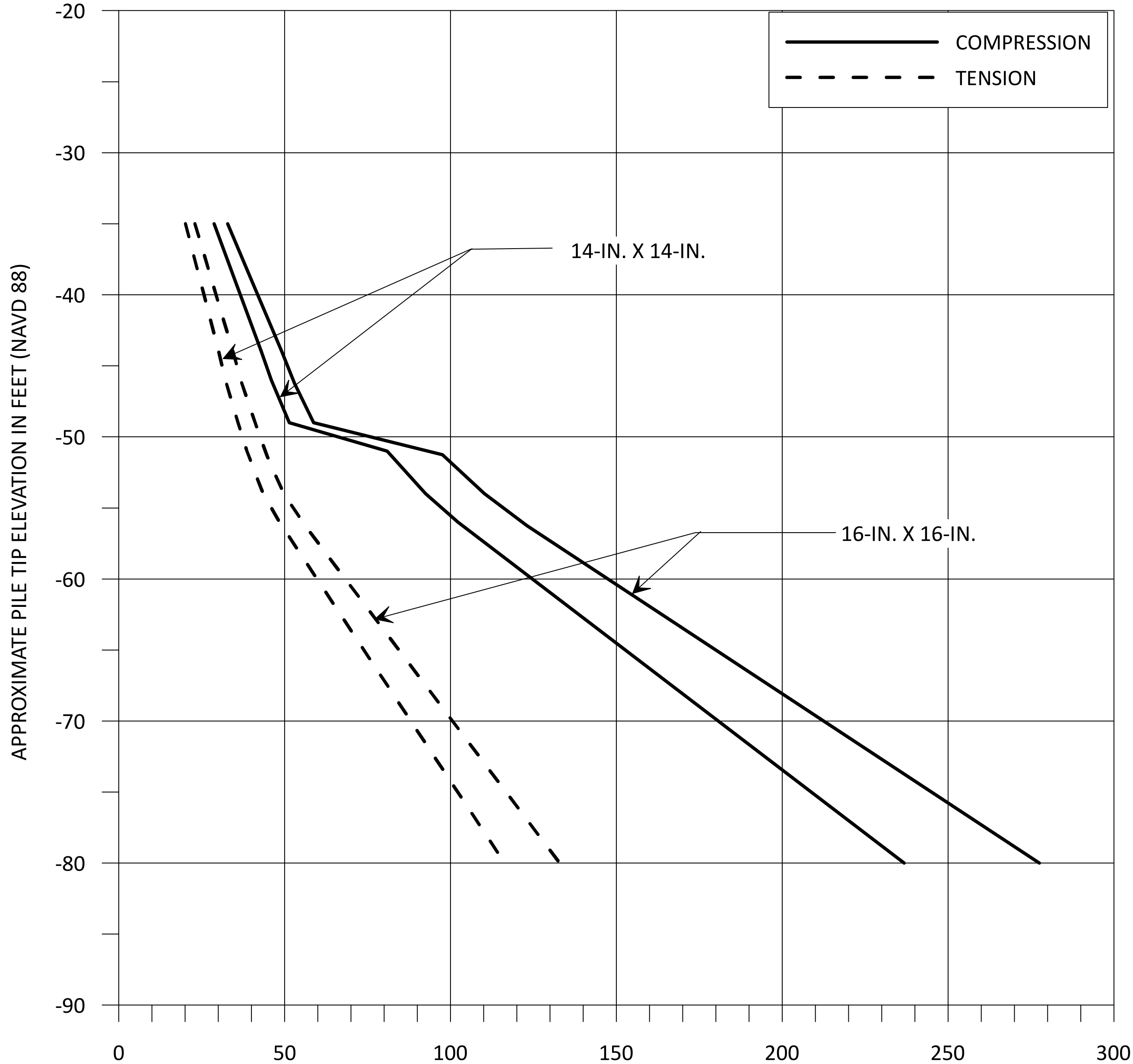
METHOD OF DETERMINING CAPACITY	LOADING CONDITION	MINIMUM FACTOR OF SAFETY	
		COMPRESSION	TENSION
THEORETICAL PREDICTION VERIFIED BY STATIC LOAD TEST	Q-CASE	2.0	2.0
	S-CASE	1.5	1.5
THEORETICAL PREDICTION VERIFIED BY PILE DRIVING ANALYZER	Q-CASE	2.5	3.0
	S-CASE	1.5	1.5
THEORETICAL PREDICTION NOT VERIFIED BY LOAD TEST	Q-CASE	3.0	3.0
	S-CASE	1.5	1.5

ESTIMATED ALLOWABLE SINGLE PILE LOAD CAPACITIES
STEEL H-PILES - Q CASE PARAMETERS
GRAND LAGOON PUMP STATION

ST. TAMMANY PARISH GOVERMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
AMENDMENT NOS. 3 AND 4

EUSTIS ENGINEERING SINCE 1946

DRAWN BY: H.C.W.	JOB NO.: 24493.02
CHECKED BY: J.J.H.	DATE: 8 JUNE 2023
FILE NAME: SH.GRF	FIGURE 12



ESTIMATED ULTIMATE SINGLE PILE LOAD CAPACITY IN TONS

Q-CASE PARAMETERS

FACTOR OF SAFETY = 1.0

NOTES:

1. PILE LOAD CAPACITY ESTIMATES PRESENTED ON THIS FIGURE ASSUME A MUDLINE AT EL -18.5 (NAVD 88).

2. SAND STRATA IN WHICH CPT-24 REFUSED WAS EXTRAPOLATED TO ESTIMATE PIILE CAPACITIES AT LOWER ELEVATIONS.

3. PILE LOAD CAPACITIES PRESENTED ON THIS FIGURE DO NOT INCLUDE THE WEIGHT OF THE PILES.

4. PILES ASSUMED TO BE INSTALLED BY IMPACT DRIVING EQUIPMENT WITHOUT ASSISTANCE FROM VIBRATORY EQUIPMENT OR JETTING.

TABLE 3.7: (HSDRRS) RECOMMENDED MINIMUM FACTOR OF SAFETY AXIAL PILE CAPACITY

METHOD OF DETERMINING CAPACITY	LOADING CONDITION	MINIMUM FACTOR OF SAFETY	
		COMPRESSION	TENSION
THEORETICAL PREDICTION VERIFIED BY STATIC LOAD TEST	Q-CASE	2.0	2.0
	S-CASE	1.5	1.5
THEORETICAL PREDICTION VERIFIED BY PILE DRIVING ANALYZER	Q-CASE	2.5	3.0
	S-CASE	1.5	1.5
THEORETICAL PREDICTION NOT VERIFIED BY LOAD TEST	Q-CASE	3.0	3.0
	S-CASE	1.5	1.5

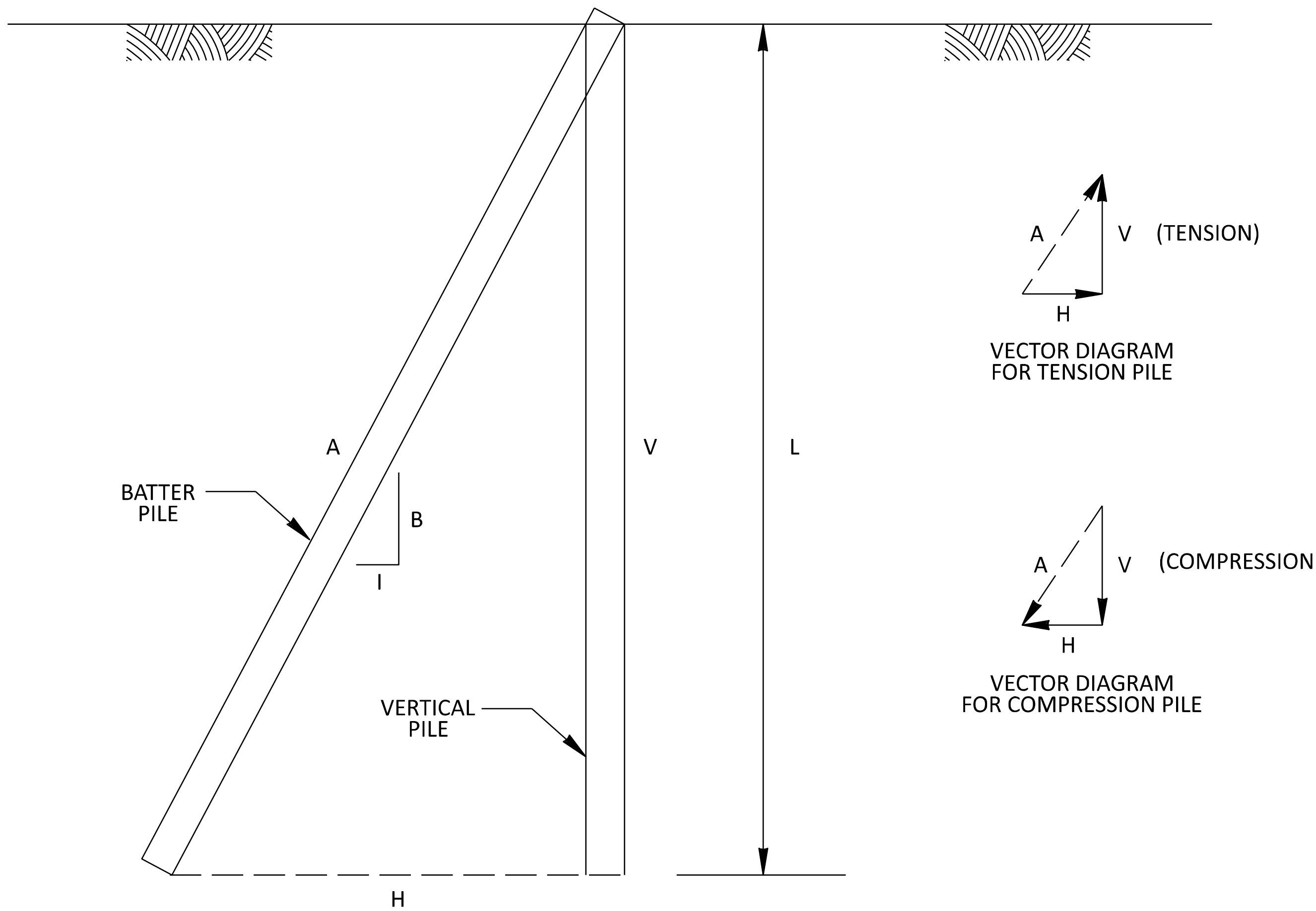
ESTIMATED ALLOWABLE SINGLE PILE LOAD CAPACITIES
SQUARE PRECAST CONCRETE PILES - Q CASE PARAMETERS
GRAND LAGOON PUMP STATION

ST. TAMMANY PARISH GOVERMENT
COASTAL FLOOD PROTECTION PROJECT
ST. TAMMANY PARISH, LOUISIANA
AMENDMENT NOS. 3 AND 4

EUSTIS ENGINEERING SINCE 1946

DRAWN BY: H.C.W.	JOB NO.: 24493.02
CHECKED BY: J.J.H.	DATE: 8 JUNE 2023
FILE NAME: SH.GRF	FIGURE 13

AXIAL AND HORIZONTAL RESISTANCE OF BATTER PILES ESTIMATED FROM ALLOWABLE VERTICAL LOAD CAPACITIES



L = VERTICAL COMPONENT OF BATTER PILE EMBEDMENT LENGTH.

V = ESTIMATED ALLOWABLE SINGLE LOAD CAPACITY OF A PILE DRIVEN VERTICALLY WITH EMBEDMENT LENGTH, L.

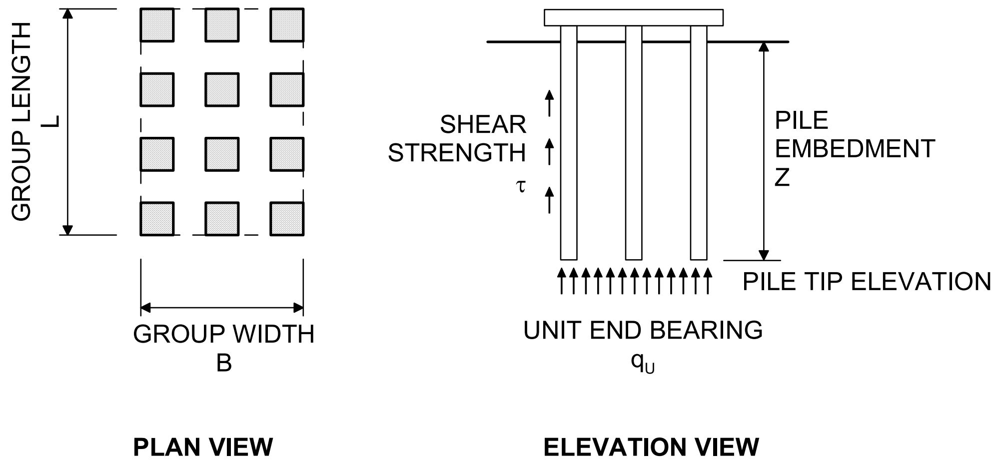
B = BATTER OF PILE EXPRESSED AS A RATIO OF VERTICAL DISTANCE TO ONE FOOT HORIZONTAL DISTANCE.

H = HORIZONTAL RESISTANCE OF BATTER PILE ESTIMATED AS FOLLOWS: $H = \frac{V}{B}$

A = ALLOWABLE AXIAL PILE LOAD CAPACITY OF A SINGLE BATTER PILE ESTIMATED AS FOLLOWS: $A = \sqrt{V^2(1+\frac{1}{B^2})}$

NOTE: THE AXIAL LOAD RESISTANCE OF A VERTICAL PILE, V, IS DEPENDENT ON THE TYPE OF LOADING - TENSION OR COMPRESSION. CAUTION SHOULD BE EXERCISED TO ENSURE THE CORRECT VERTICAL CAPACITY IS USED.

<u>Vertical Load Capacity of Rows or Groups of Piles</u>



The capacity of a row or group of piles may be equal to or less than the sum of the individual load capacities of piles within the group. The pile row or group may be considered a single equivalent pier, in which case the row or group capacity may be investigated using the following formula.

$$P_{GROUP} = \frac{(2L+2B)(\tau)(z)}{FS_{SIDE}} + \frac{2.6(B)(L)(q_U)(1+0.2\frac{B}{L})}{FS_{BASE}}$$

where:

where:	B	=	The width of the pile group in plan dimension,
	L	=	The length of the pile group in plan dimension,
	Z	=	The embedded pile length,
	τ	=	The average unit shear strength acting on the embedded pile length,
	q_U	=	The average unconfined compressive strength of material in the zone immediately below pile tips,
	FS_{SIDE}	=	A factor of safety against mobilization of the ultimate skin friction (typically 2), and
	FS_{BASE}	=	A factor of safety against mobilization of the ultimate end bearing (usually at least 3).

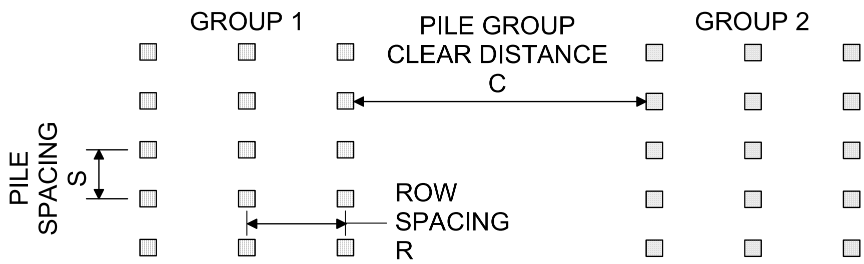
<u>Notes:</u>

(1) The average unit shear strength acting on the embedded pile length may be taken as the weighted average value of undrained shear strength (or undrained cohesion) acting over that length for assessments of the short-term load capacity of the group.

(2) For assessments of the short-term load capacity of the group, the ultimate end bearing is commonly estimated by multiplying an undrained shear strength (or undrained cohesion) by a bearing capacity factor, which typically varies between 5 and 6. The appropriate undrained shear strength and bearing capacity factor should consider the width and length of the pile group and the presence of any weak strata beneath the pile tips. In general, the unit end bearing pressure applicable to the pile group is not the same as the unit end bearing pressure used to estimate the load capacity of a single pile.

(3) The factor of safety against base failure should consider that large deformations may be required to mobilize the ultimate end bearing soil pressure estimated for the pile group.

Spacing of Pile Groups and Spacing of Piles Within Rows or Groups



Piles should be arranged to provide a minimum center-to-center spacing, S, within rows or groups. This minimum recommended spacing may be taken as the largest value from the following criteria:

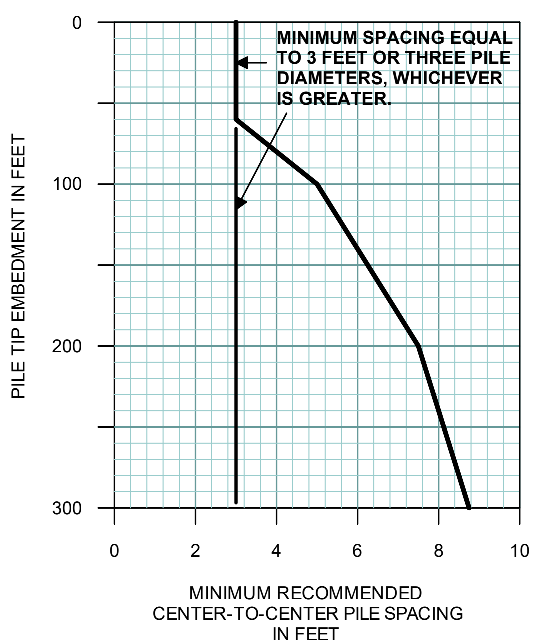
$$S = \frac{L_1}{20} + \frac{L_2}{40} + \frac{L_3}{80} \text{ ,or}$$

$$S = 3B\text{, or}$$

$$S = 3\text{ feet}$$

where	S	=	Center-to-center pile spacing, as illustrated above,
	L_1	=	Pile embedment up to 100 feet,
	L_2	=	Pile embedment between 100 and 200 feet,
	L_3	=	Pile embedment between 200 and 300 feet, and
	B	=	Pile outside diameter or side dimension

These criteria can be presented graphically as follows:



In addition, rows of single piles should provide a minimum center-to-center spacing, R, that is at least as large as the center-to-center pile spacing, S. Finally, individual pile groups should be arranged to provide a clear group spacing, C, equal to twice the largest dimension of the larger pile group. It should be noted that pile spacings greater than the minimum values presented above may be required to minimize the influence of individual piles on each other with respect to lateral load resistance and settlement or to ensure pile group capacity is adequate when investigated for group perimeter shear.

APPENDIX I

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 Geoprobe 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

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]

St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

LOG OF BORING AND TEST RESULTS

Boring: B-6

Project No: 24493.02
Date: 10/07/2022
Latitude: 30.24256°
Longitude: -89.79679°

Water Depth: See Text
Total Depth: 50.0 ft

PP	SPT	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
	18	Moist, medium dense brown coarse to fine CLAYEY SAND w/trace of wood & roots	SC	PB-1	0	9									SV
				PB-2	0.5										
3.00		Moist, medium stiff tan & gray fine SANDY LEAN CLAY w/few fine sand layers	CL	3	2	16	110	128	UC	--	919				
1.00		Moist, loose brown medium to fine CLAYEY SAND	SC	4	5	11									SV
		Moist, very soft dark brown PEAT	PT	5	6	147						196	115	81	
1.50		Moist, stiff gray LEAN CLAY w/trace of organic matter	CL	6	9	24	103	128	OB	0	1272				
		Moist, greenish-gray fine SANDY LEAN CLAY	CL	7	12	27									
1.50		Moist, medium stiff gray & tan FAT CLAY w/few fine sand lenses (flocculated)	CH	8	18	37	85	116	UC	--	587				
2.00		Moist, stiff tan FAT CLAY w/few silt layers	CH	9	23	37	85	116	OB	0	1011				
2.50		w/trace of concretions, organic matter, & silt pockets (fissured)		10	28	41	81	114	UC	--	1409				
2.00		Moist, stiff gray FAT CLAY	CH	11	33	45	76	111	OB	0	1246				
2.00		w/few concretions (fissured)		12	38	49	73	109	UC	--	1063				
2.00		w/trace of shell fragments & concretions		13	43	39	82	114	OB	0	1387				
		Moist, greenish-gray fine SILTY SAND	SM	14	48	22									

NOTES:

EUSTIS_GINT_LIBRARY_4_20_2023.GLB EE STANDARD BORING LOG 24493.02.GPJ 6/13/23

LOG OF BORING AND TEST RESULTS

EUSTIS ENGINEERING SINCE 1946

St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

Boring: B-7

Project No: 24493.02
Date: 10/06/2022
Latitude: 30.22496°
Longitude: -89.81577°

Water Depth: See Text
Total Depth: 50.0 ft

Scale in Feet	PP	SPT	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 LL	Atterberg PL	Atterberg PI	Other Tests
0			Moist, medium dense brown fine CLAYEY SAND w/trace of roots	SC	PB-1	0	7									
		11			PB-2	0.5										
	1.00		Moist, medium stiff gray & tan FAT CLAY w/trace of organic matter	CH	3	2	34	89	119	OB	0	651	63	23	40	
			Moist, soft greenish-gray FAT CLAY w/few organic matter	CH	4	3	44	78	112	UC	--	437				
5	1.50		Moist, gray & tan LEAN CLAY W/SAND (fine) & trace of organic matter	CL	5	6	22	106	129	OB	0	369				
	0.50		Moist, gray LEAN CLAY w/silt pockets	CL	6	9	26						32	16	16	
10	0.50		Moist, medium stiff greenish-gray fine SANDY LEAN CLAY	CL	7	12	22	106	129	OB	0	800				
15	1.00		Moist, stiff tan & greenish-gray LEAN CLAY w/few fine sand pockets	CL												
20	4.00				8	18	27	97	124	UC	--	1845				
25	4.00		w/few fine to medium sand pockets		9	23	23	104	128	UC	--	1562				
30	2.50		Moist, medium stiff gray & tan FAT CLAY (fissured)	CH	10	28	44	78	112	OB	0	826				
35	1.00		Moist, stiff gray FAT CLAY w/trace of concretions, organic matter, & fine sand pockets (fissured)	CH	11	33	46	75	110	OB	0	1420				
40	2.00				12	38	41	81	114	OB	0	1425				
45	0.50		Moist, medium stiff gray FAT CLAY w/few fine sand layers & trace of shell fragments	CH	13	43	46	75	110	OB	0	764				
50	0.50				14	48	49	73	109	OB	0	742				

NOTES:

EUSTIS_GINT_LIBRARY_4_20_2023.GLB EE STANDARD BORING LOG 24493.02.GPJ 6/13/23

LOG OF BORING AND TEST RESULTS

EUSTIS ENGINEERING SINCE 1946

St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

Boring: B-8

Project No: 24493.02
Date: 09/15/2022
Latitude: 30.21781°
Longitude: -89.81968°

Water Depth: See Text
Total Depth: 50.0 ft

Scale in Feet	PP	SPT	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		7	Moist, very loose to loose tan medium to fine SILTY SAND w/trace of organic matter & roots	SM	PB-1	0	14										
		2			PB-2	2.5	16										SV
5	0.75		Moist, medium stidd green FAT CLAY w/fine sand pockets	CH	3	5	34	89	119	OB	0	688	70	21	49		
	0.25		Moist, loose gray medium to fine CLAYEY SAND	SC	4	8	19	112	133	OB	0	408					
10	0.75				5	11	17	115	135	OB	0	605					
15	1.50		Moist, gray loose SILT w/trace of organic matter	ML	6	14	14						17	13	4		
20	2.25		Moist, reddish-brown & gray fine CLAYEY SAND	SC	7	19	14										SV
25	1.25		Moist, greenish-gray & tan FAT CLAY	CH	8	24	34										
30	2.75		Moist, stiff light gray FAT CLAY w/few silt lenses & fine sand pockets (fissured)	CH	9	29	29	96	123	OB	0	1620					
35	2.00		Moist, greenish-gray LEAN CLAY w/few silt & fine sand pockets	CL	10	34	28										
40	2.25		w/few silt lenses (laminated)		11	39	32	91	120	OB	0	944					
45	0.25		Moist, soft gray FAT CLAY w/few fine sand pockets & trace of shell fragments	CH	12	44	48	74	109	OB	0	480					
50					13	49	44	78	112	OB	0	301					

NOTES:

EUSTIS_GINT_LIBRARY_4_20_2023.GLB EE STANDARD BORING LOG 24493.02.GPJ 6/13/23

LOG OF BORING AND TEST RESULTS

EUSTIS ENGINEERING SINCE 1946

St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
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Boring: B-9

Project No: 24493.02
Date: 09/14/2022
Latitude: 30.21598°
Longitude: -89.80711°
Water Depth: See Text
Total Depth: 50.0 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
0		6			Moist, loose brown fine SILTY SAND w/trace of roots	SM	PB-1	0	11										
		3			Moist, loose tan medium to fine POORLY GRADED SAND W/SILT	SP-SM	PB-2	2.5											
5							PB-3	5.5	16										
		1			Wet, very soft black ORGANIC CLAY	OH	PB-4	8.5	158						173	67	106		
10					Moist, very soft dark gray & black FAT CLAY w/few organic matter	CH	5	11	47	75	110	OB	0	190					
15					Moist, soft gray fine SANDY LEAN CLAY	CL	6	14	21	107	130	OB	0	255					
20	2.75				Moist, medium stiff greenish-gray FAT CLAY w/few fine sand pockets (fissured)	CH	7	19	41	81	114	OB	0	615					
25	0.75				Wet, medium dense tan fine SILTY SAND	SM	8	24	24	103	127	OB	0	592					SV
30					Moist, very soft gray FAT CLAY	CH	PB-9	28.5	49						87	28	59		
35	1.25				Moist, stiff gray FAT CLAY (fissured)	CH	10	34	56	67	105	OB	0	1075					
40	0.75				Moist, soft greenish-gray FAT CLAY w/few fine sand layers & pockets (flocculated)	CH	11	39	49	73	109	OB	0	445					
45	1.25				Moist, medium stiff gray FAT CLAY w/trace of fine sand pockets	CH	12	44	57										SV
50	0.25				Moist, medium stiff gray fine SANDY LEAN CLAY	CL	13	49	31	93	121	OB	0	503					

NOTES:

EUSTIS_GINT_LIBRARY_4_20_2023.GLB EE STANDARD BORING LOG 24493.02.GPJ 6/13/23

EUSTIS ENGINEERING SINCE 1946

St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
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LOG OF BORING AND TEST RESULTS

Boring: B-10

Project No: 24493.02
Date: 09/13/2022
Latitude: 30.21383°
Longitude: -89.79515°

Water Depth: See Text
Total Depth: 50.0 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
0					Wet, loose gray fine SILTY SAND	SM	PB-1	0											
		3			w/trace of shells		PB-2	2.5	10										
5		5					PB-3	5.5											
10		5					PB-4	8.5	26										
15		6			Moist, loose gray fine CLAYEY SAND	SC	PB-5	13.5	21										SV
20	3.50				Moist, very stiff greenish-gray & gray FAT CLAY w/few fine sand layers	CH	6	19	23	104	128	UC	--	2095					
25	2.00				Moist, medium stiff green SILTY CLAY W/SAND (fine), (brittle)	CL	7	24	27	98	124	OB	0	667	28	22	6		
30	0.75				Moist, medium stiff greenish-gray & tan LEAN CLAY w/few silt layers (fissured)	CL	8	29	30	93	121	OB	0	612					
35	2.25				Moist, stiff greenish-gray FAT CLAY (fissured)	CH	9	34	47	75	110	OB	0	1249					
40	1.75						10	39	47	75	110	OB	0	1205					
45					Moist, medium stiff gray LEAN CLAY w/few fine sand pockets & trace of shell fragments	CL	11	44	35	87	117	OB	0	793	46	25	21		
50	0.25				Moist, soft gray FAT CLAY (fissured)	CH	12	49	50	72	108	OB	0	465					

NOTES:

EUSTIS_GINT_LIBRARY_4_20_2023.GLB EE STANDARD BORING LOG 24493.02.GPJ 6/13/23

APPENDIX II

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, Geoprobe, 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
- 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

LOG OF BORING AND TEST RESULTS

St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
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Boring: B-1

Project No: 24493.03
Date: 04/05/2023
Latitude: 30.30624°
Longitude: -89.87436°
Water Depth: See Text
Total Depth: 50.0 ft

Scale in Feet	PP	SPT	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			Moist, very stiff tan LEAN CLAY W/SAND	CL	PB-1	0	16										-#200 = 59.9%
		19			PB-2	0.5											
5		4	Moist, very loose tan & gray POORLY GRADED SAND	SP	PB-3	3.5	21										
		7	Moist, loose gray POORLY GRADED SAND W/SILT	SP-SM	PB-4	6.5	19										-#200 = 6.8%
10		9			PB-5	9.5											
15	0.00		Moist, loose tan SILTY SAND	SM	6	14	20										-#200 = 31.8%
20	2.75		Moist, very stiff to extremely stiff gray & greenish-gray LEAN CLAY w/silt pockets	CL	7	19	21	107	130	UC	--	2611					
25	4.50				8	24	21						34	21	13		
30	4.50		Moist, stiff greenish-gray FAT CLAY	CH	9	29	34	89	119	UC	--	1326					
35			Moist, loose to medium dense dark gray SILTY SAND	SM	10	34											
		24			PB-11	35.5											
40		17			PB-12	38.5	25										
45	1.00		Moist, medium stiff gray FAT CLAY w/trace of shell fragments	CH	13	44											
50	1.00				14	49	38	84	116	OB	0	997					

NOTES:

EUSTIS_GINT_LIBRARY_4_20_2023.GLB EE STANDARD BORING LOG 24493.03.GPJ 6/13/23

LOG OF BORING AND TEST RESULTS

EUSTIS ENGINEERING SINCE 1946

St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

Boring: B-2

Project No: 24493.03
Date: 04/06/2023
Latitude: 30.29704°
Longitude: -89.87370°

Water Depth: See Text
Total Depth: 50.0 ft

PP	SPT	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
		Moist, soft gray SANDY LEAN CLAY	CL	PB-1	0	20	111	133	UC	--	1490					-#200 = 56.4%
	3			PB-2	0.5											
2.00		Moist, medium stiff to stiff light gray & gray LEAN CLAY W/SAND	CL	3	3	22	105	128	OB	0	864					
1.00				4	5	18	112	133								
2.00				5	8	22	106	130	UC	--	1255					
	5	Moist, loose light gray POORLY GRADED SAND	SP	PB-6	9.5	24										
	27	Moist, medium dense light brown POORLY GRADED SAND	SP	PB-7	12.5											
	24			PB-8	15.5											
	24			PB-9	18.5	23										-#200 = 5.5%
	25			PB-10	23.5											
	26			PB-11	28.5											
	20			PB-12	33.5	20										-#200 = 2.1%
	6	Moist, loose light brown POORLY GRADED SAND	SP	PB-13	38.5											
	WOH	Moist, very soft gray FAT CLAY	CH	PB-14	43.5	57										
0.50		Moist, medium stiff gray LEAN CLAY W/SAND	CL	15	49	32	91	120	OB	0	535					

NOTES:

LOG OF BORING AND TEST RESULTS

St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

EUSTIS ENGINEERING SINCE 1946

Boring: B-3

Project No: 24493.03
Date: 04/04/2023
Latitude: 30.28607°
Longitude: -89.86330°
Water Depth: See Text
Total Depth: 50.0 ft

Scale in Feet	PP	SPT	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		12	Moist, medium dense brown SILTY SAND w/few gravel	SM	PB-1 PB-2	0 0.5	7										
	0.25		Moist, medium stiff gray SANDY LEAN CLAY w/few wood	CL	3	3	18	113	133	UC	--	592					
5	1.25		Moist, medium stiff gray LEAN CLAY W/SAND	CL	4	5	19	111	132	UC	--	735					
			Moist, loose gray CLAYEY SAND	SC													
	4.00				5	8	16	117	136	UC	--	1306					-#200 = 43.1%
10	0.50				6	11	19	112	133	OB	0	555					-#200 = 15.5%
			Moist, soft to medium stiff gray LEAN CLAY	CL													
15	1.00				7	14	23	106	130	UC	--	856					
20	1.00		w/trace of decayed wood		8	19	30	95	123	UC	--	450					
			Moist, medium stiff to stiff gray FAT CLAY w/trace of shell fragments	CH													
25	1.00				9	24	39	83	115	UC	--	1133					
30	1.00				10	29	46	76	111	UC	--	1154					
35	0.75				11	34	34	89	119	OB	0	805					
40	0.50				12	39											
45	1.00		w/layers of shell fragments		13	44	52	70	107	UC	--	822					
50	0.75				14	49											

EUSTIS_GINT_LIBRARY_4_20_2023.GLB EE STANDARD BORING LOG 24493.03.GPJ 6/13/23

NOTES:

APPENDIX III

EUSTIS ENGINEERING SINCE 1946

CONE PENETRATION SOIL BEHAVIOR TYPE LEGEND

1 - SENSITIVE FINE GRAINED

2 - ORGANIC MATERIAL

3 - CLAY

4 - SILTY CLAY TO CLAY

5 - CLAYEY SILT TO SILTY CLAY

6 - SANDY SILT TO CLAYEY SILT

7 - SILTY SAND TO SANDY SILT

8 - SAND TO SILTY SAND

9 - SAND

10 - GRAVELLY SAND TO SAND

11 - VERY STIFF FINE GRAINED (*)

12 - SAND TO CLAYEY SAND (*)

*OVERCONSOLIDATED OR CEMENTED

EUSTIS ENGINEERING SINCE 1946

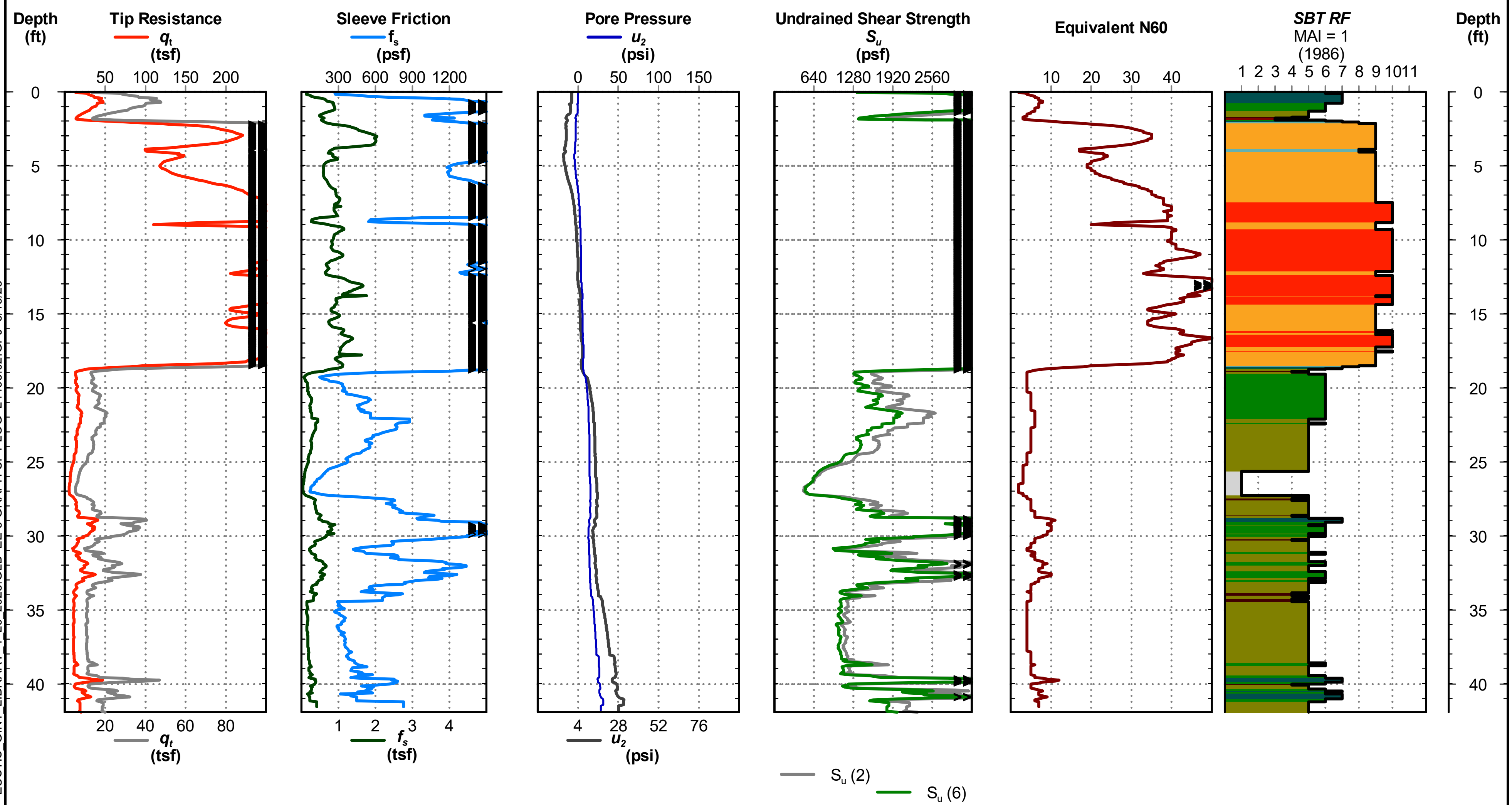
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-13

Project No: 24493.02
Date: 10/05/2022
Latitude: 30.24526°
Longitude: -89.79489°
CPT ID: 5389

Est. Water Depth:
Total Depth: 41.9 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

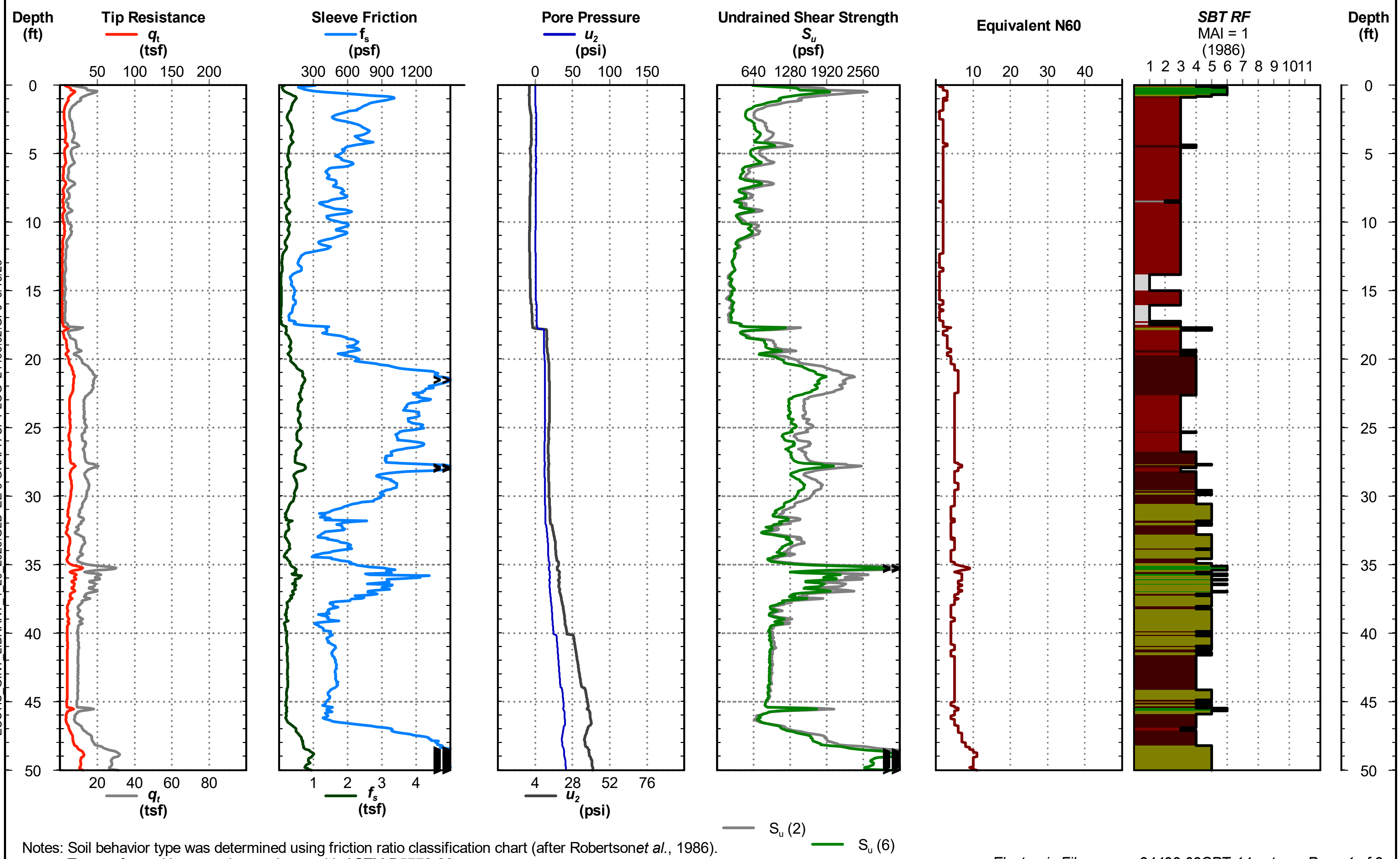
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-14

Project No: 24493.02
Date: 10/05/2022
Latitude: 30.23951°
Longitude: -89.79923°
CPT ID: 5389

Est. Water Depth:
Total Depth: 51.1 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.02CPT-14.cpt

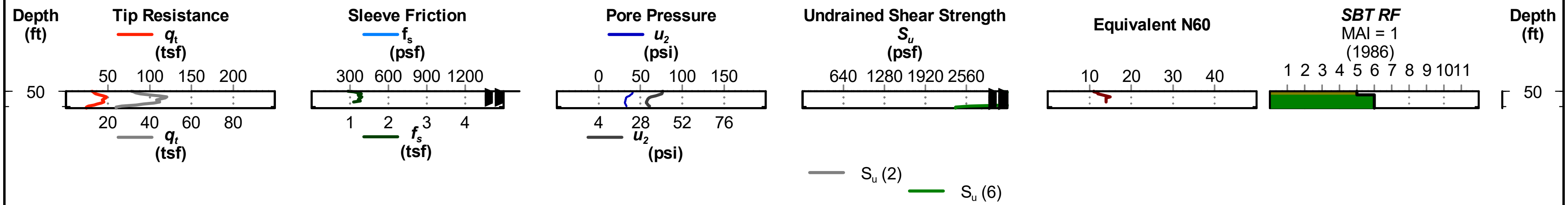
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-14

Project No: 24493.02
Date: 10/05/2022
Latitude: 30.23951°
Longitude: -89.79923°
CPT ID: 5389

Est. Water Depth:
Total Depth: 51.1 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.02CPT-14.cpt

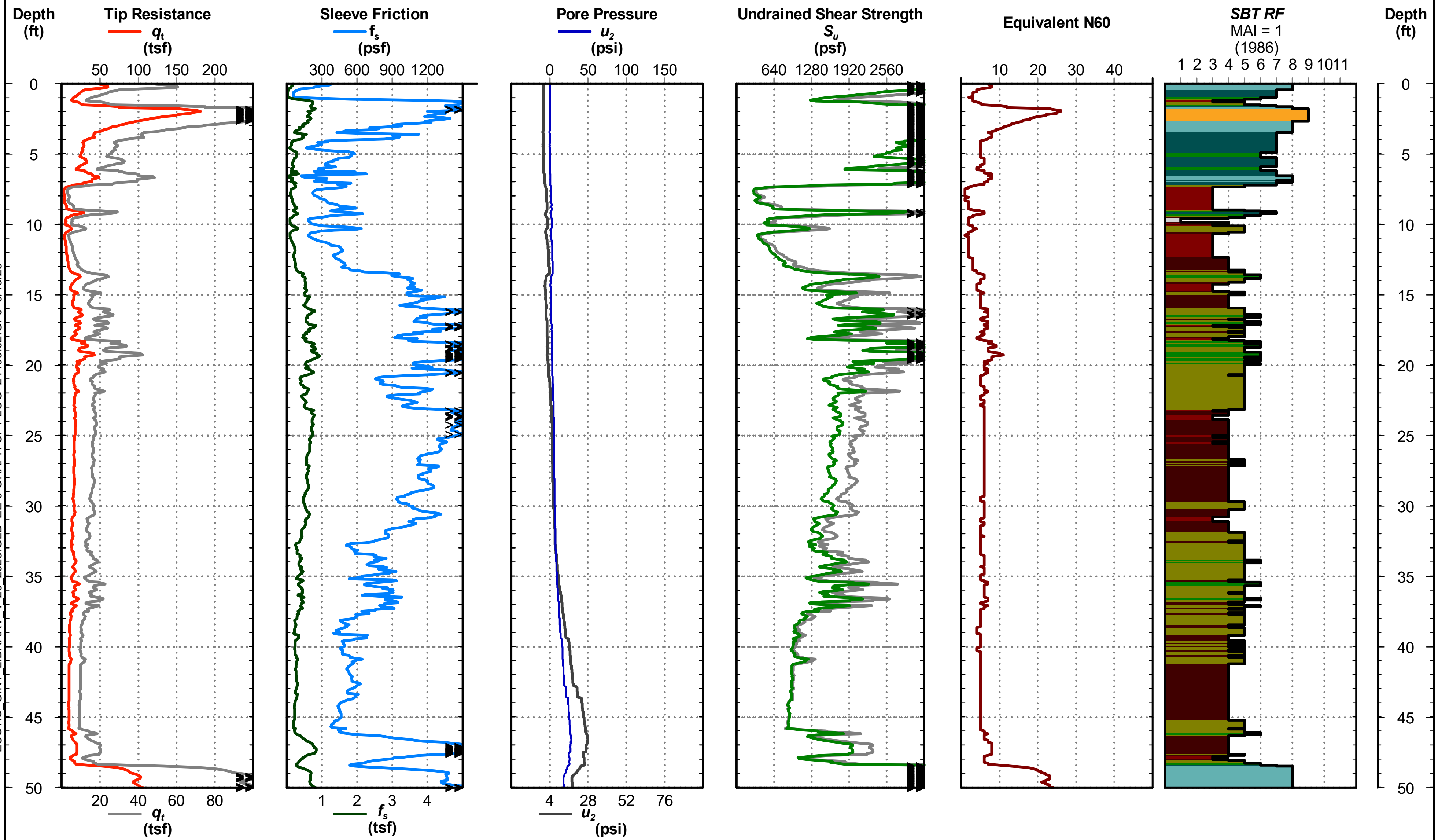
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-15

Project No: 24493.02
Date: 10/05/2022
Latitude: 30.23540°
Longitude: -89.80285°
CPT ID: 5389

Est. Water Depth:
Total Depth: 51.0 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.02CPT-15x.cpt

EUSTIS ENGINEERING SINCE 1946

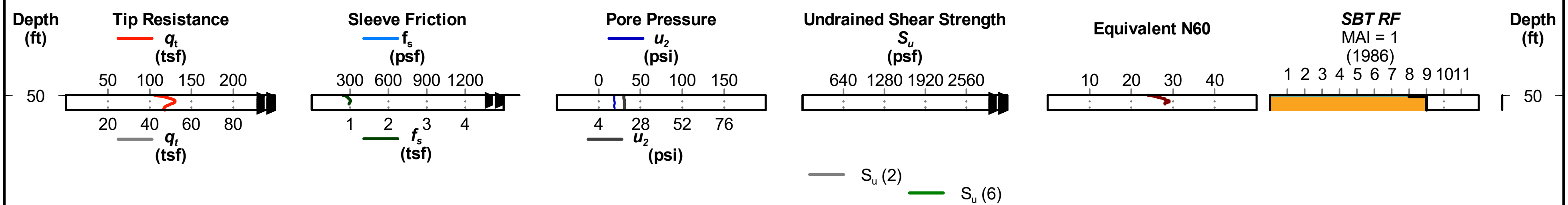
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-15

Project No: 24493.02
Date: 10/05/2022
Latitude: 30.23540°
Longitude: -89.80285°
CPT ID: 5389

Est. Water Depth:
Total Depth: 51.0 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.02CPT-15x.cpt

EUSTIS ENGINEERING SINCE 1946

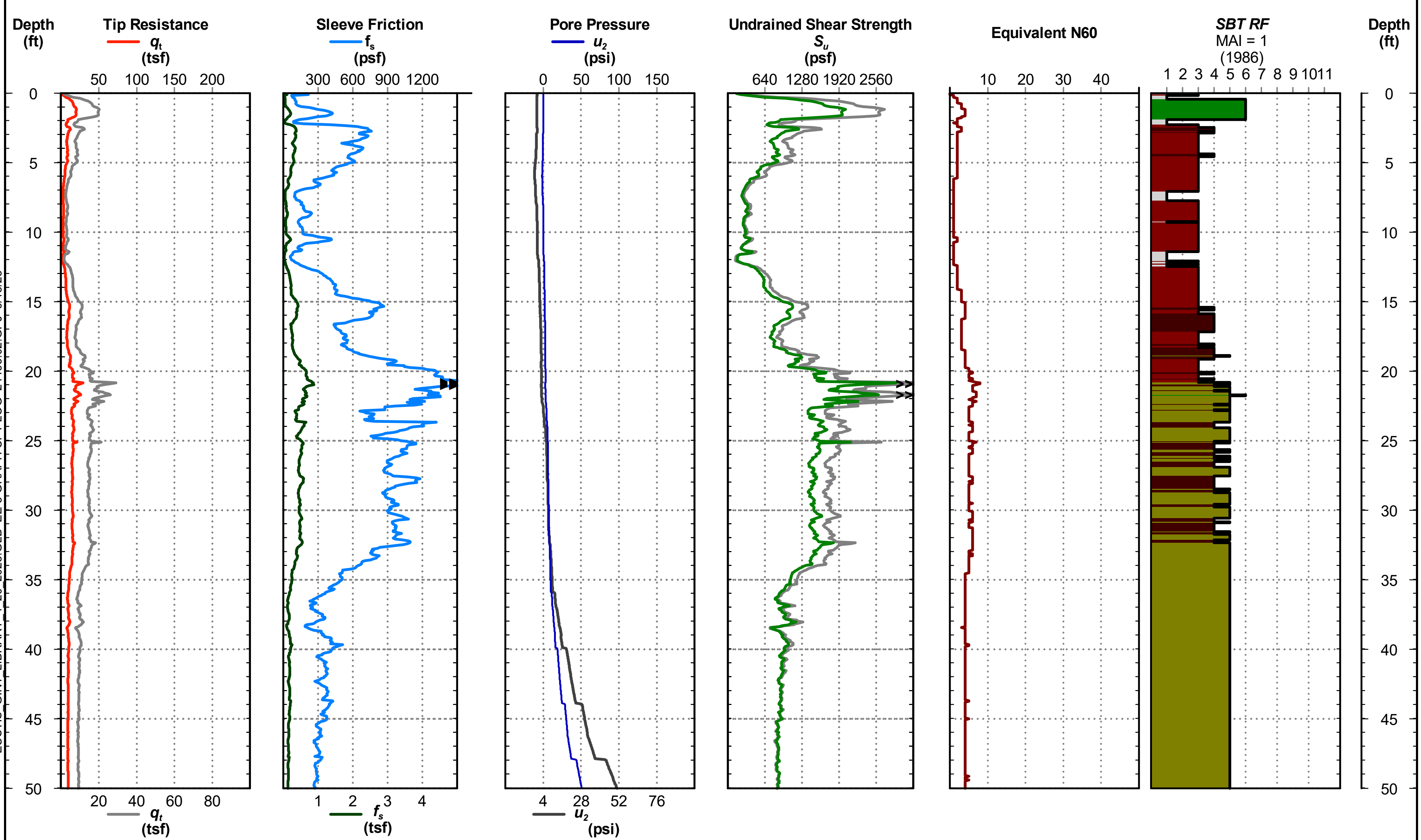
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-16

Project No: 24493.02
Date: 10/05/2022
Latitude: 30.23135°
Longitude: -89.80601°
CPT ID: 5389

Est. Water Depth:
Total Depth: 51.1 ft
Operator: GRR



S_u (2)
S_u (6)

Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

EUSTIS ENGINEERING SINCE 1946

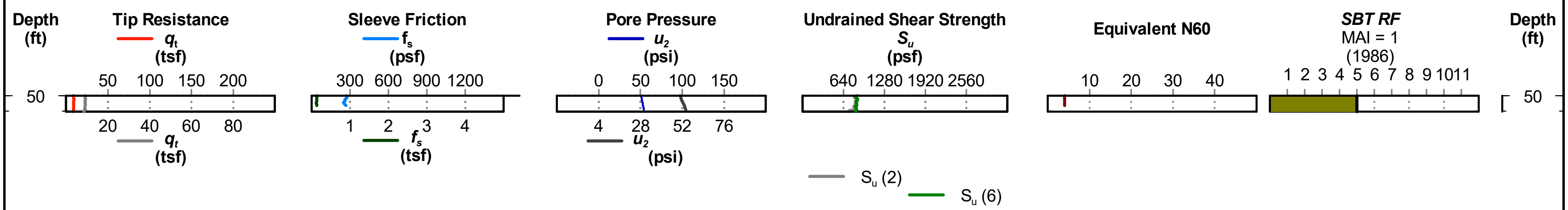
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-16

Project No: 24493.02
Date: 10/05/2022
Latitude: 30.23135°
Longitude: -89.80601°
CPT ID: 5389

Est. Water Depth:
Total Depth: 51.1 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.02CPT-16.cpt

EUSTIS ENGINEERING SINCE 1946

St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
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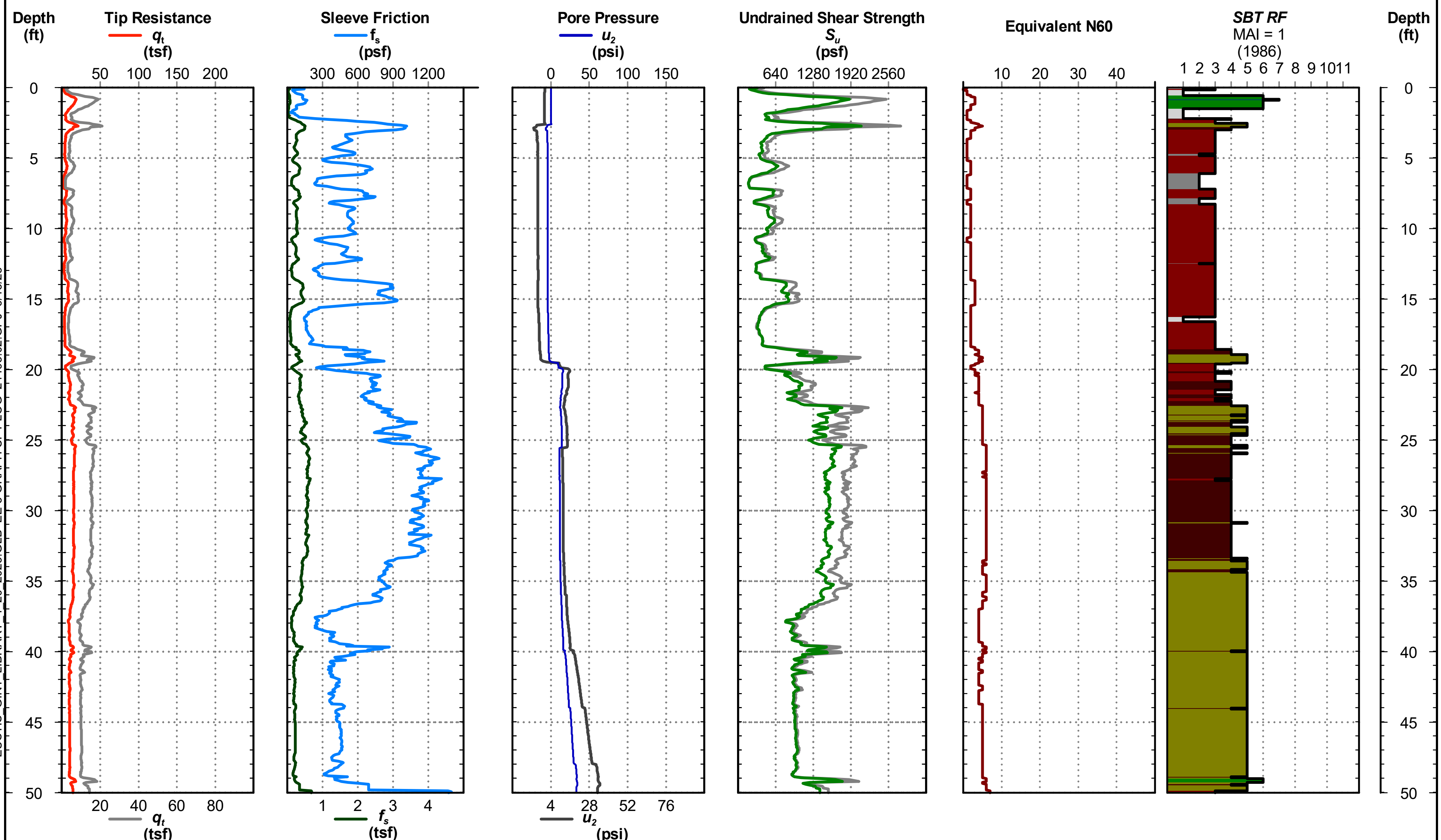
CONE PENETRATION TEST

CPT-17

Project No: 24493.02
Date: 10/04/2022
Latitude: 30.22637°
Longitude: -89.81138°
CPT ID: 5389

Est. Water Depth:
Total Depth: 51.1 ft
Operator: GRR



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Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.02CPT-17.cpt

EUSTIS ENGINEERING SINCE 1946

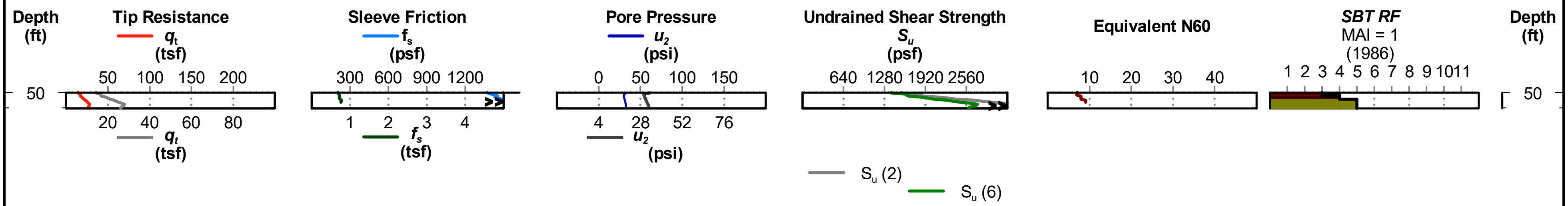
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-17

Project No: 24493.02
Date: 10/04/2022
Latitude: 30.22637°
Longitude: -89.81138°
CPT ID: 5389

Est. Water Depth:
Total Depth: 51.1 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.02CPT-17.cpt

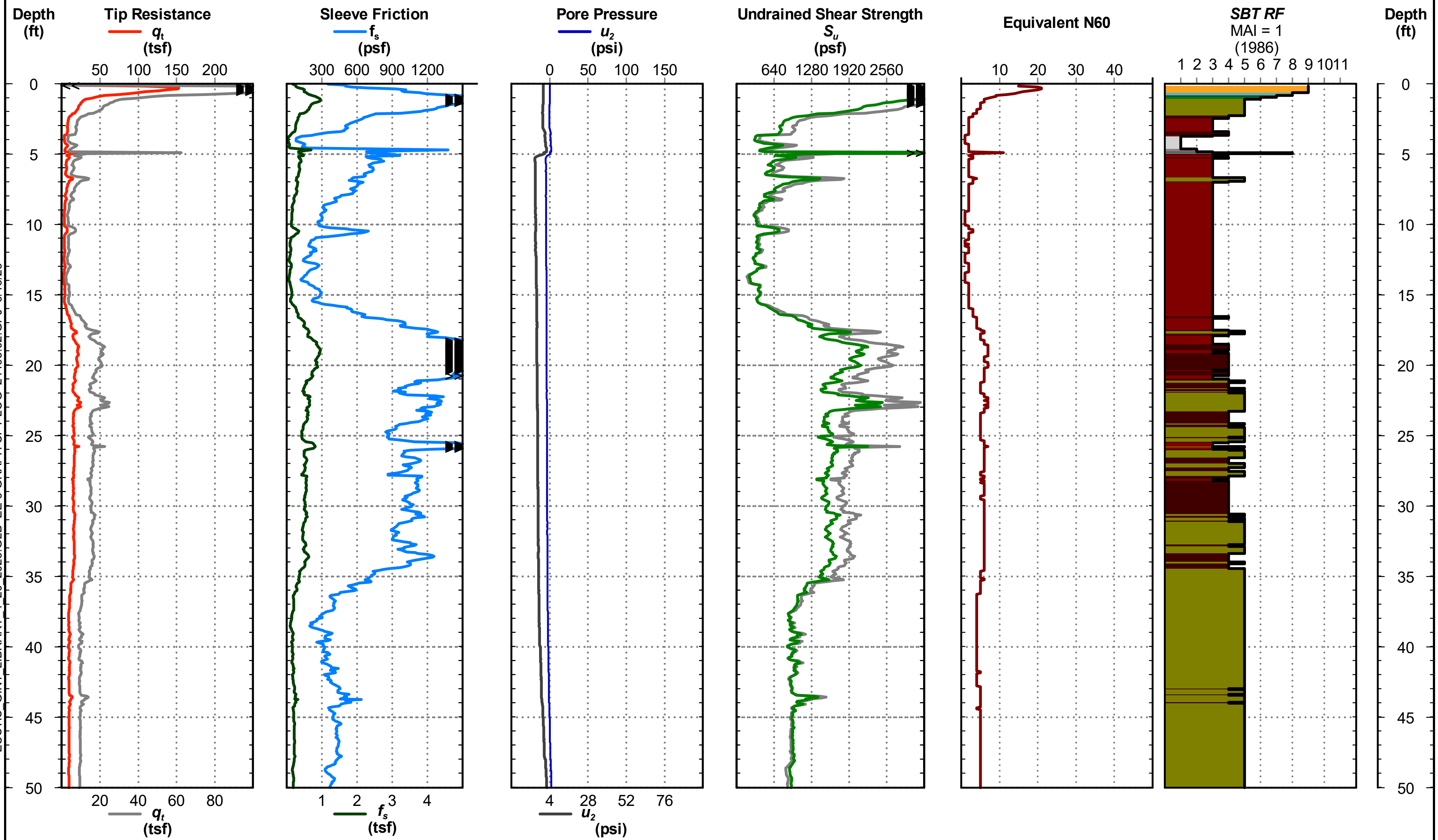
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-18

Project No: 24493.02
Date: 10/04/2022
Latitude: 30.22500°
Longitude: -89.81576°
CPT ID: 5389

Est. Water Depth:
Total Depth: 51.1 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.02CPT-18.cpt

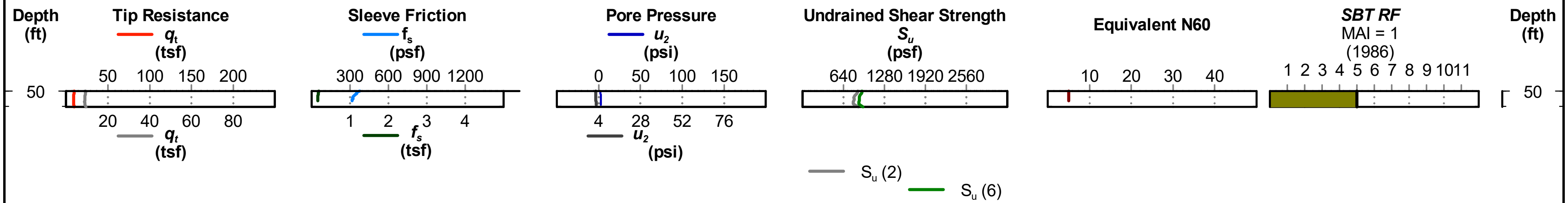
CONE PENETRATION TEST

St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CPT-18

Project No: 24493.02
Date: 10/04/2022
Latitude: 30.22500°
Longitude: -89.81576°
CPT ID: 5389

Est. Water Depth:
Total Depth: 51.1 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.02CPT-18.cpt

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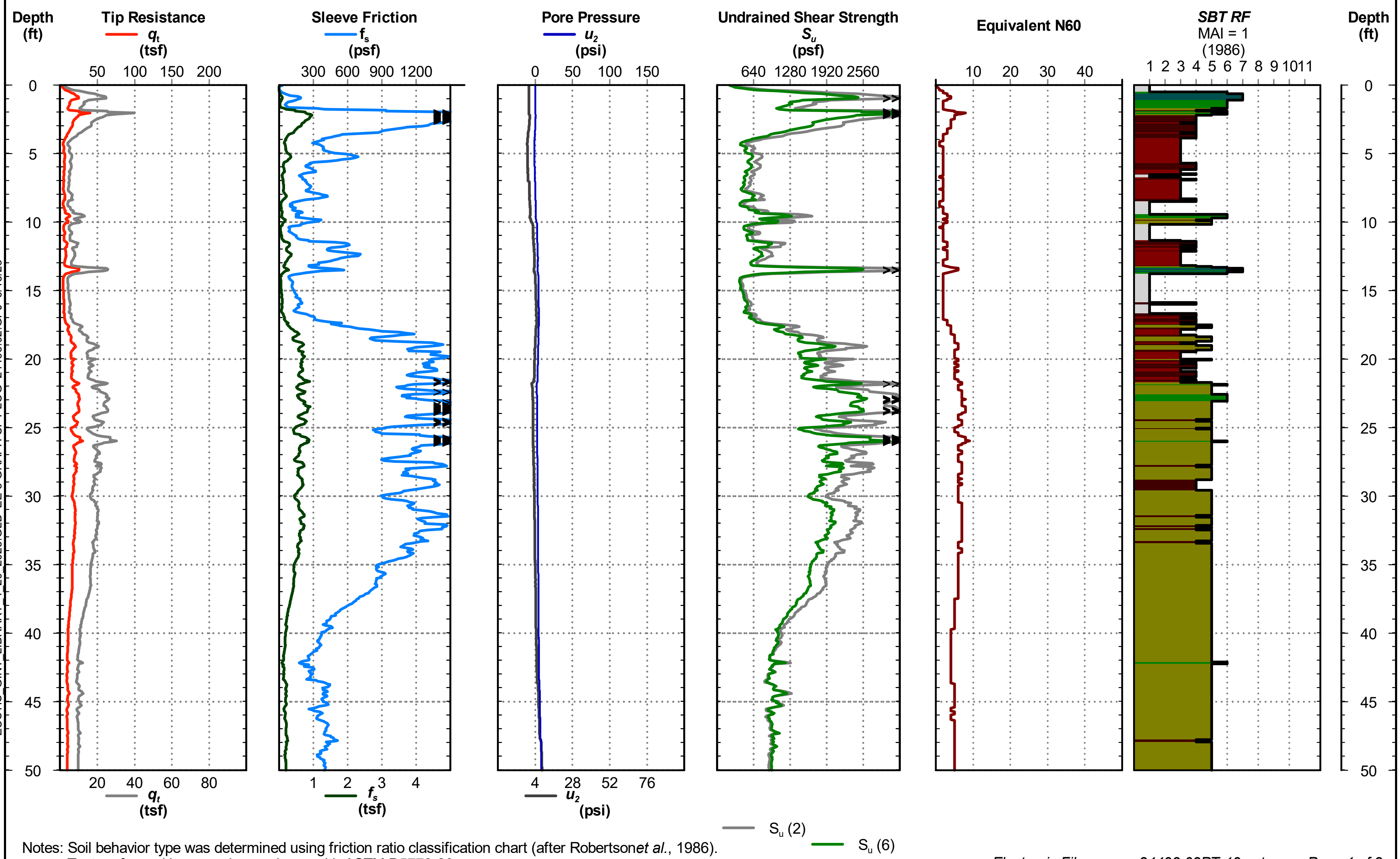
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-19

Project No: 24493.02
Date: 10/04/2022
Latitude: 30.22312°
Longitude: -89.81909°
CPT ID: 5389

Est. Water Depth:
Total Depth: 51.3 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.02PT-19.cpt

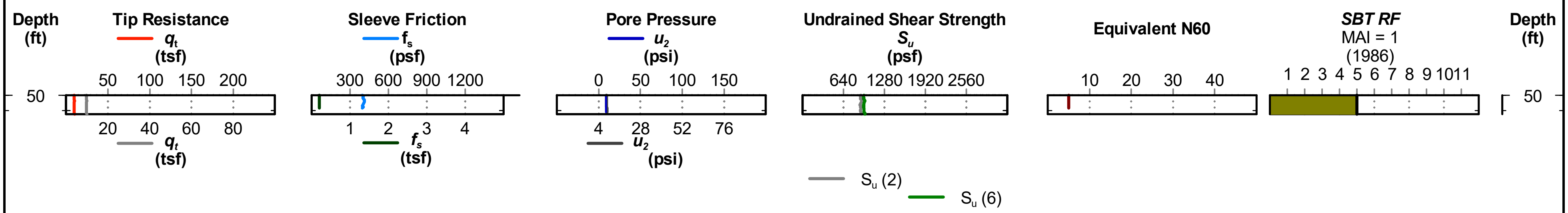
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-19

Project No: 24493.02
Date: 10/04/2022
Latitude: 30.22312°
Longitude: -89.81909°
CPT ID: 5389

Est. Water Depth:
Total Depth: 51.3 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.02PT-19.cpt

EUSTIS ENGINEERING SINCE 1946

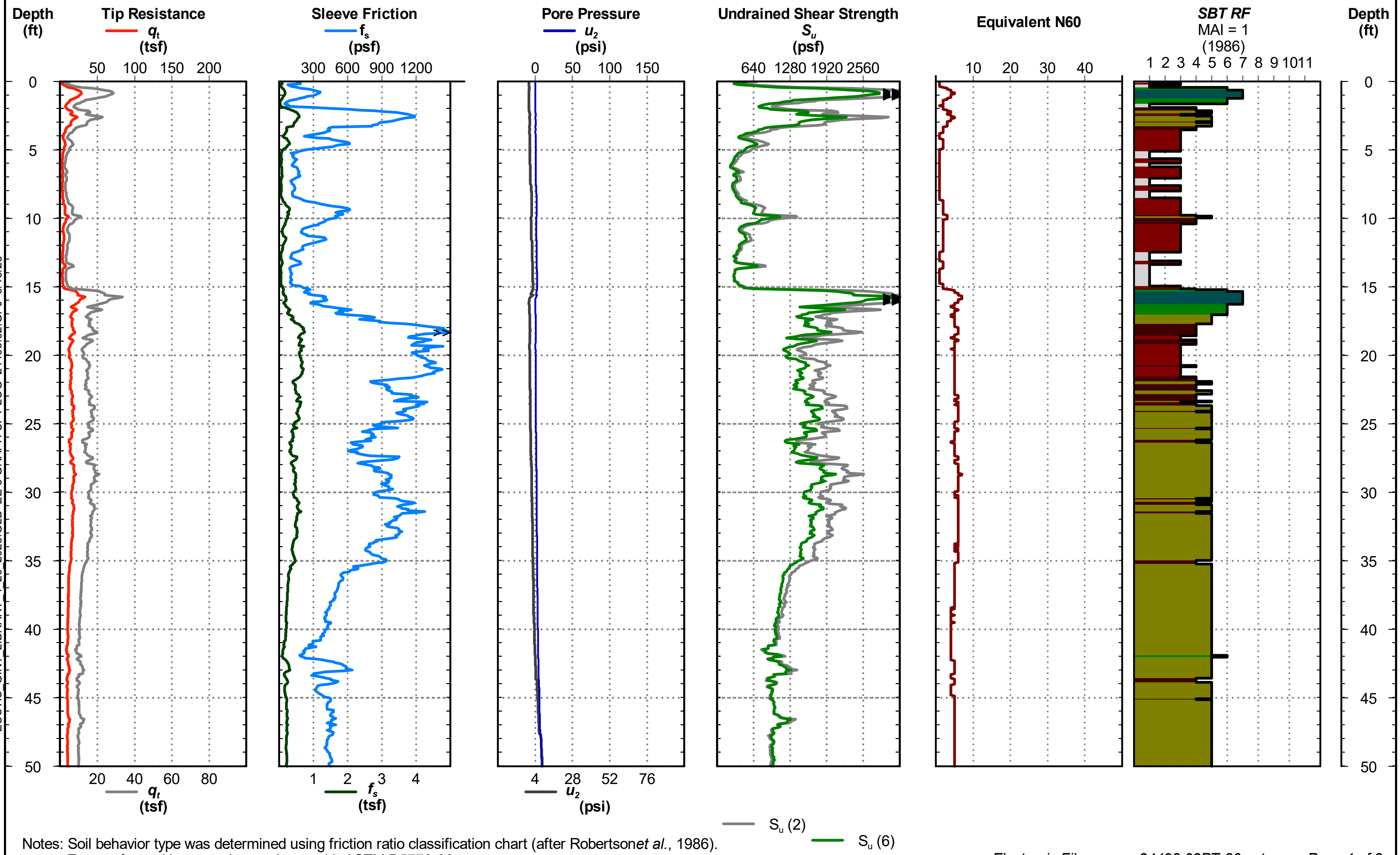
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-20

Project No: 24493.02
Date: 10/04/2022
Latitude: 30.21850°
Longitude: -89.82293°
CPT ID: 5389

Est. Water Depth:
Total Depth: 51.1 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.02PT-20.cpt

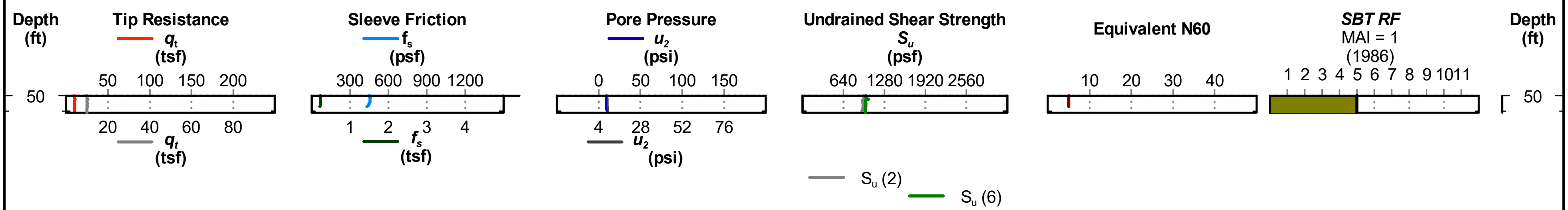
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-20

Project No: 24493.02
Date: 10/04/2022
Latitude: 30.21850°
Longitude: -89.82293°
CPT ID: 5389

Est. Water Depth:
Total Depth: 51.1 ft
Operator: GRR



EUSTIS_GINT_LIBRARY_4_20_2023.GLB EE 5 GRAPH CPT LOG 24493.02.GPJ 6/13/23

Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.02PT-20.cpt

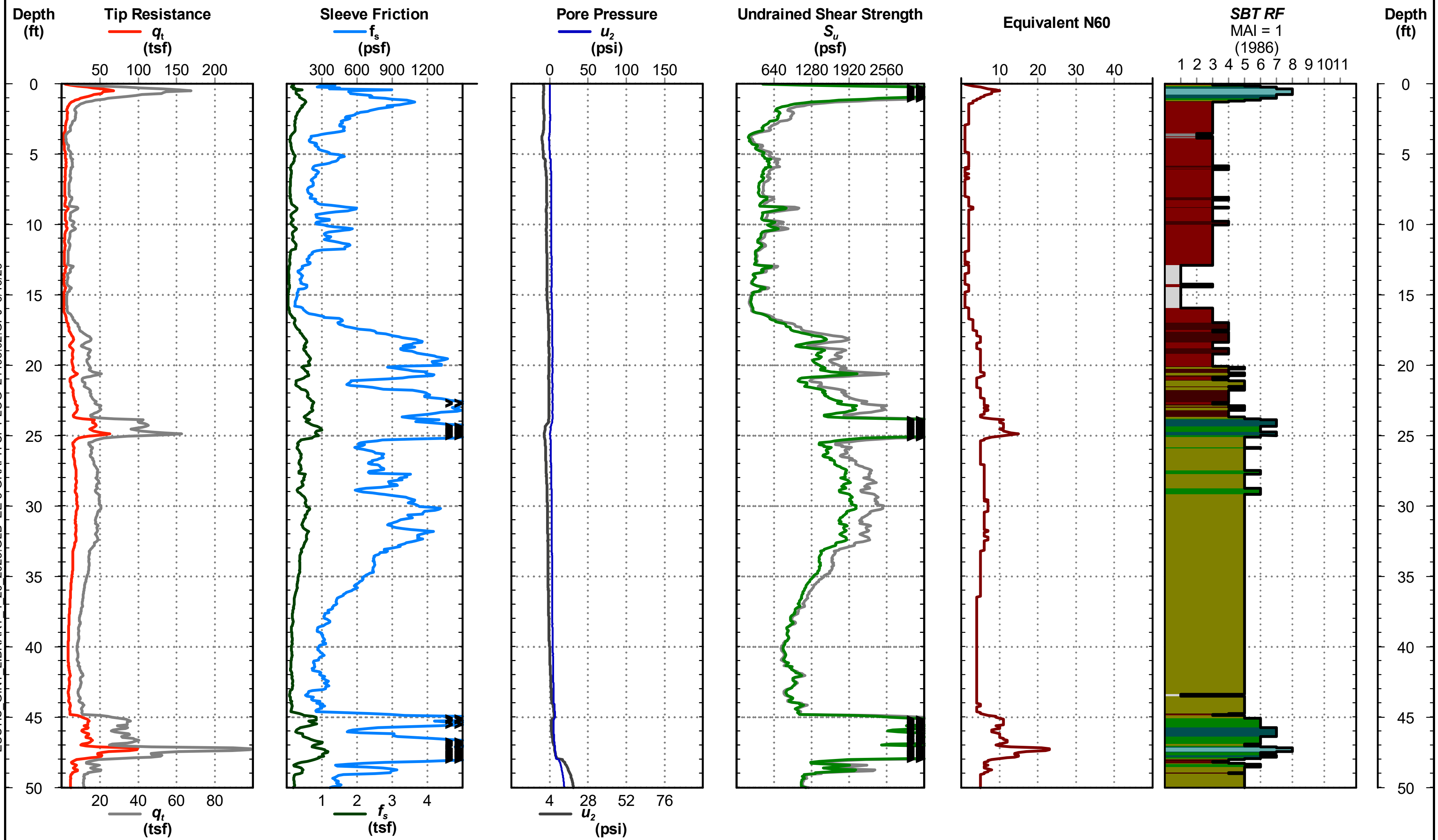
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-21

Project No: 24493.02
Date: 10/03/2022
Latitude: 30.21748°
Longitude: -89.81540°
CPT ID: 5389

Est. Water Depth:
Total Depth: 51.1 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.02CPT-21.cpt

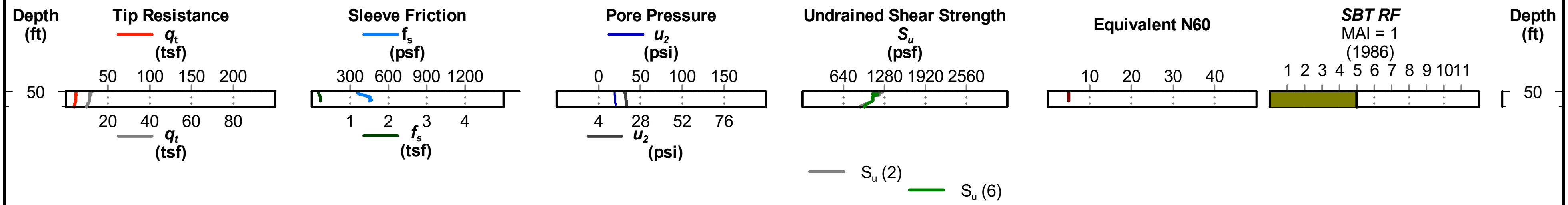
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-21

Project No: 24493.02
Date: 10/03/2022
Latitude: 30.21748°
Longitude: -89.81540°
CPT ID: 5389

Est. Water Depth:
Total Depth: 51.1 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.02CPT-21.cpt

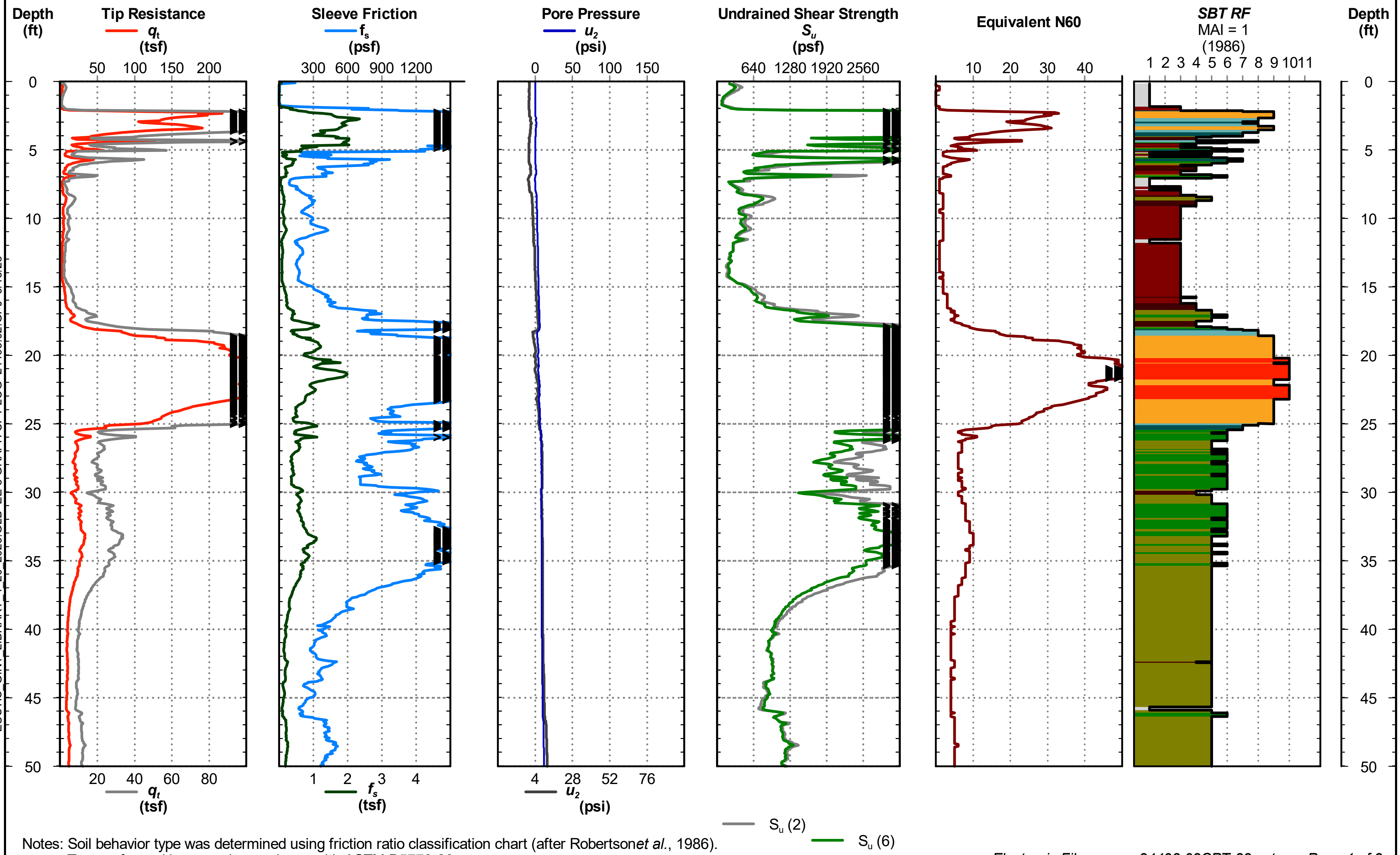
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-22

Project No: 24493.02
Date: 09/30/2022
Latitude: 30.21681°
Longitude: -89.81072°
CPT ID: 5389

Est. Water Depth:
Total Depth: 53.9 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.02CPT-22.cpt

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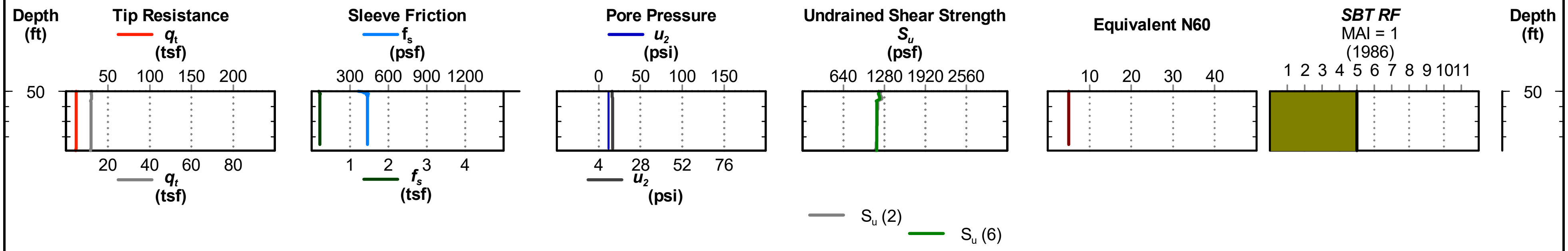
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-22

Project No: 24493.02
Date: 09/30/2022
Latitude: 30.21681°
Longitude: -89.81072°
CPT ID: 5389

Est. Water Depth:
Total Depth: 53.9 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.02CPT-22.cpt

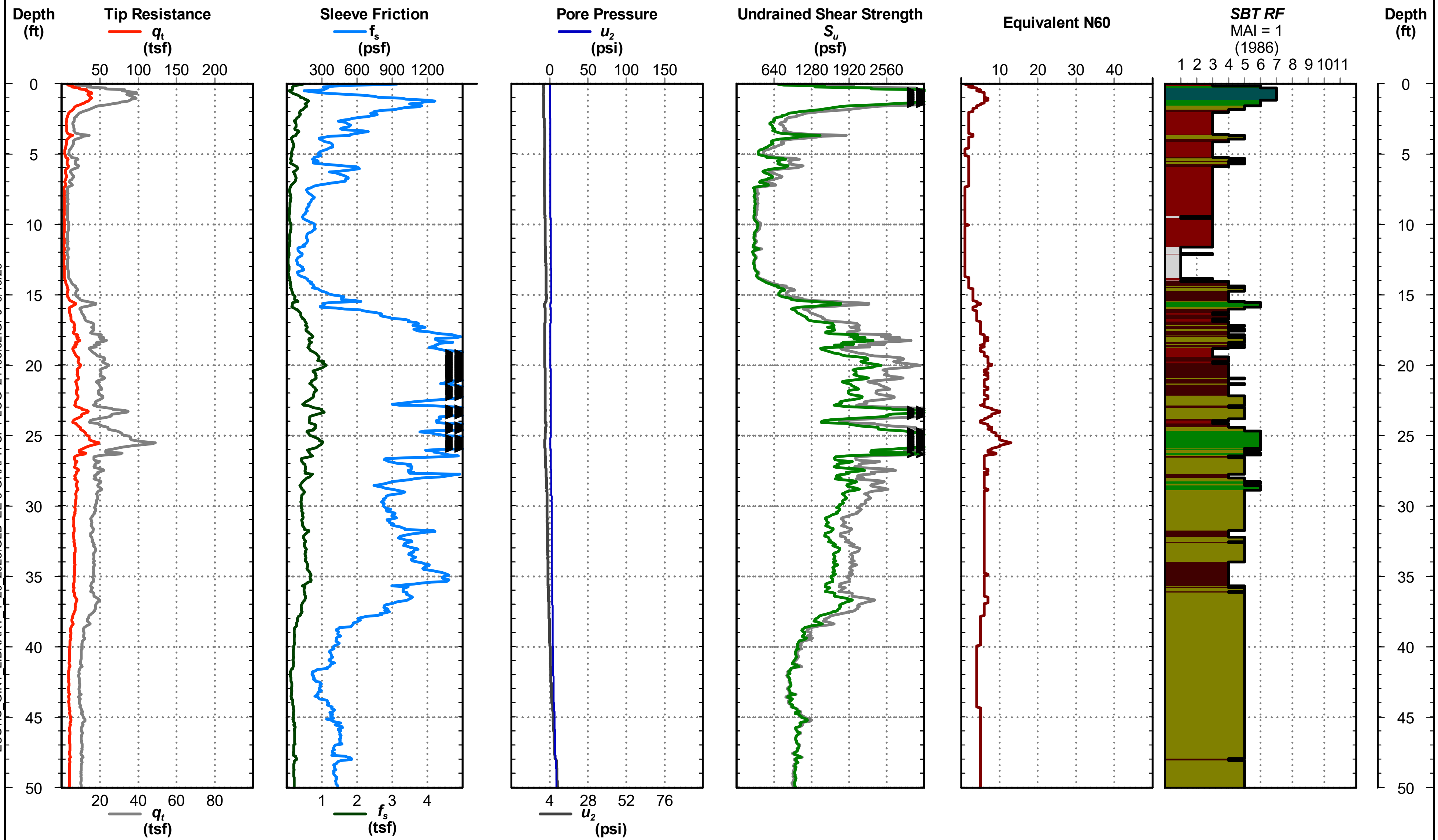
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-23

Project No: 24493.02
Date: 09/30/2022
Latitude: 30.21460°
Longitude: -89.80296°
CPT ID: 5389

Est. Water Depth:
Total Depth: 51.1 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

EUSTIS_GINT_LIBRARY_4_20_2023.GLB EE 5 GRAPH CPT LOG 24493.02.GPJ 6/13/23

Electronic Filename: 24493.02CPT-23.cpt

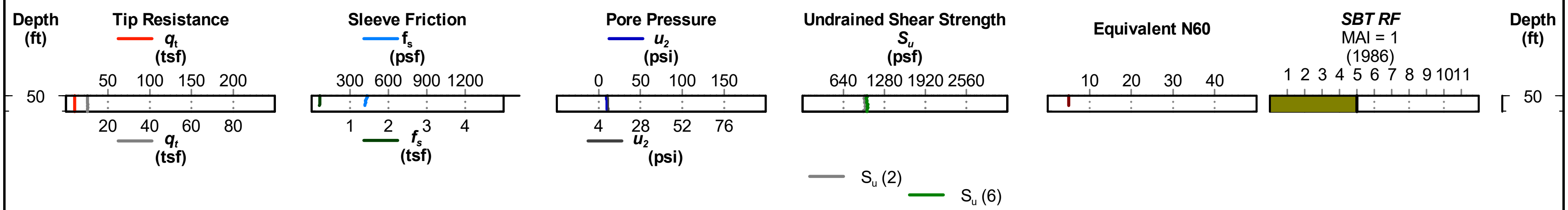
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-23

Project No: 24493.02
Date: 09/30/2022
Latitude: 30.21460°
Longitude: -89.80296°
CPT ID: 5389

Est. Water Depth:
Total Depth: 51.1 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

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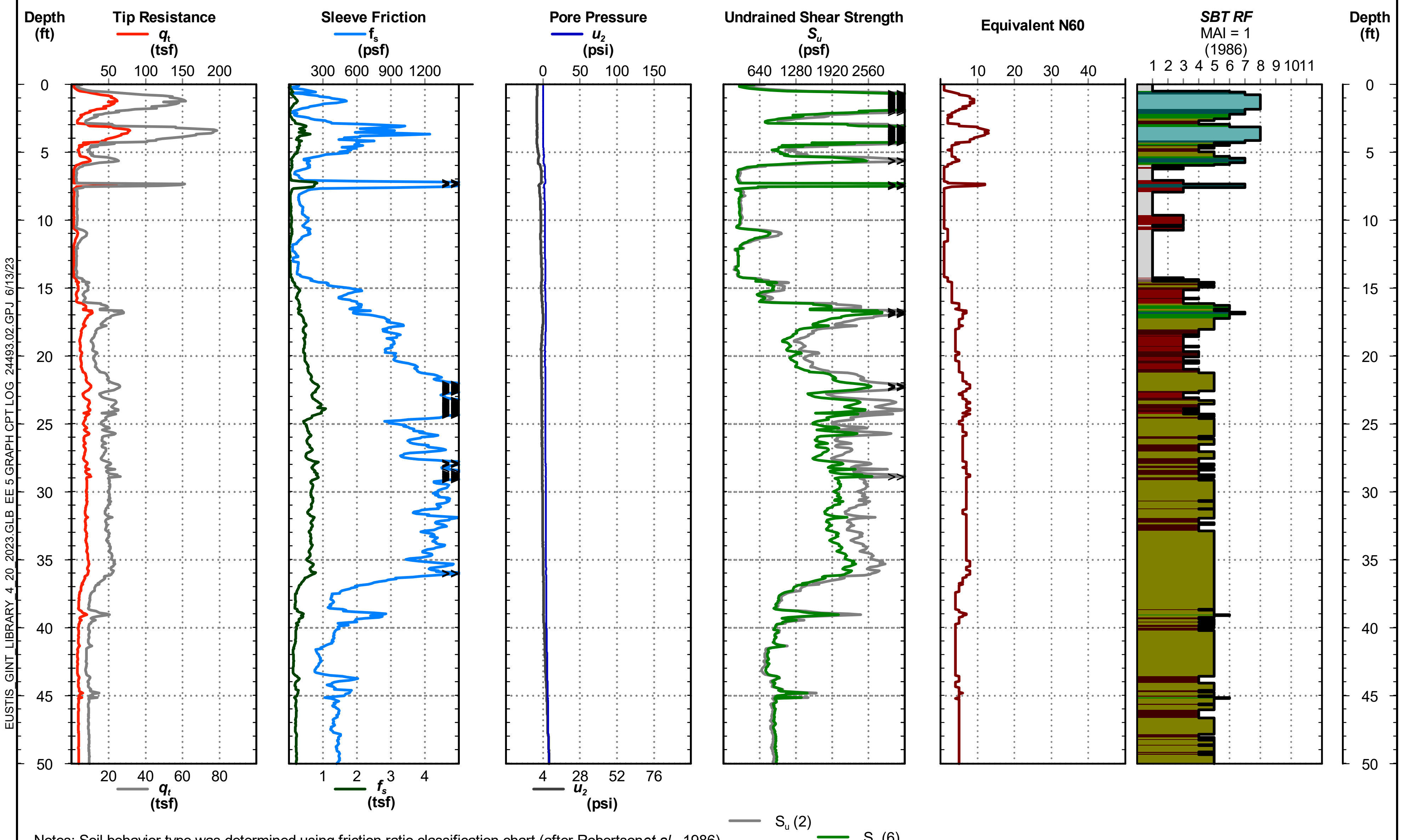
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-24

Project No: 24493.02
Date: 09/30/2022
Latitude: 30.21393°
Longitude: -89.79851°
CPT ID: 193792

Est. Water Depth:
Total Depth: 59.9 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.02CPT-24.cpt

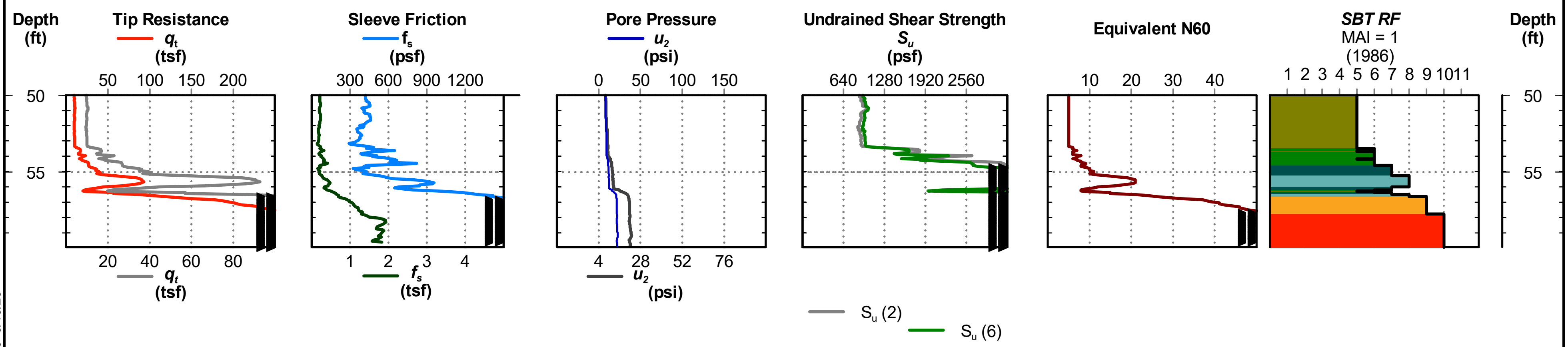
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-24

Project No: 24493.02
Date: 09/30/2022
Latitude: 30.21393°
Longitude: -89.79851°
CPT ID: 193792

Est. Water Depth:
Total Depth: 59.9 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

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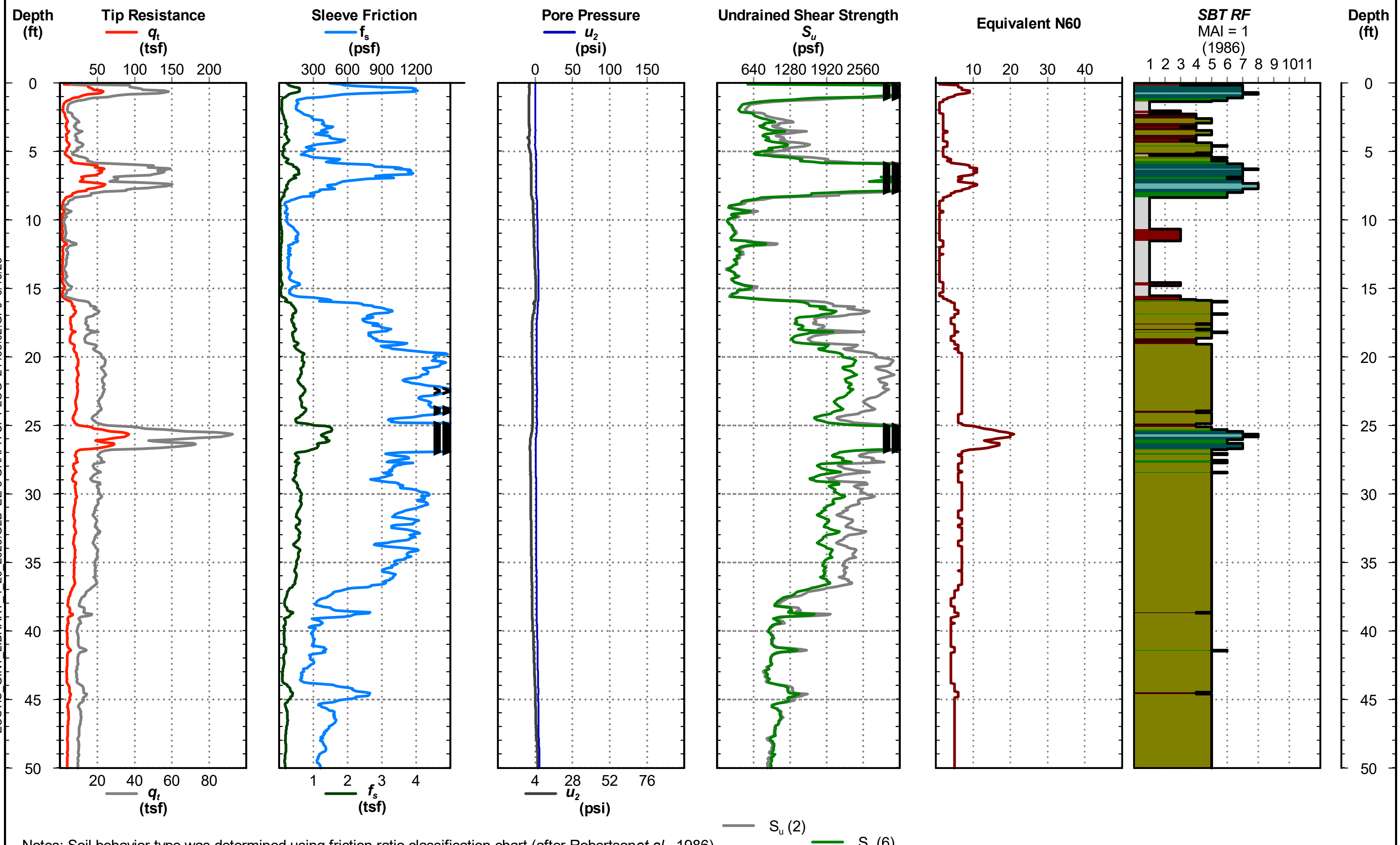
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-25

Project No: 24493.02
Date: 10/03/2022
Latitude: 30.21380°
Longitude: -89.79507°
CPT ID: 5389

Est. Water Depth:
Total Depth: 51.1 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.02CPT-25.cpt

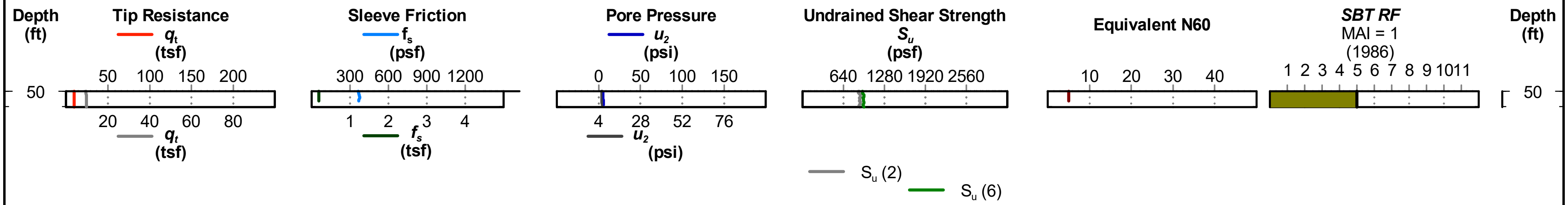
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-25

Project No: 24493.02
Date: 10/03/2022
Latitude: 30.21380°
Longitude: -89.79507°
CPT ID: 5389

Est. Water Depth:
Total Depth: 51.1 ft
Operator: GRR



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.02CPT-25.cpt

CPT Correlations

References are 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 $7 \leq N_u \leq 9$ 10
S_u (2) $S_u = (q_t - \sigma_{vo})/N_{kT}$ where $15 \leq N_{kT} \leq 20$ 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 $15 \leq N_k \leq 20$ 11
S_u (5) $S_u = q_t/N_c$ where XXX ≤ N_c ≤ YYY
S_u (6) $S_u = q_c/N_c$ where XXX ≤ N_c ≤ 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)	$D_R = 1/2.91 * \ln((q_c/(61 * \sigma'_{vo}{}^{0.71}))*100$	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

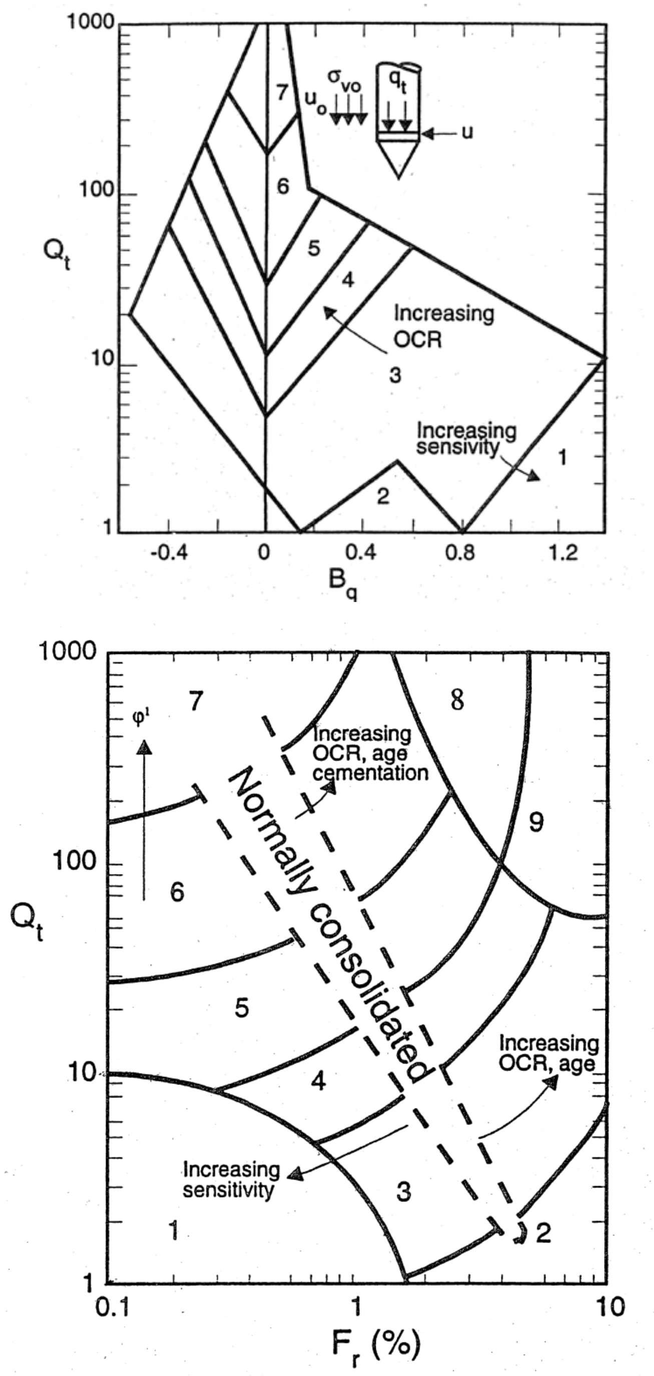
$V_s(4) = 118.8 \cdot \log f_s + 18.5$ (all soils) – m/s and kPa 32

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

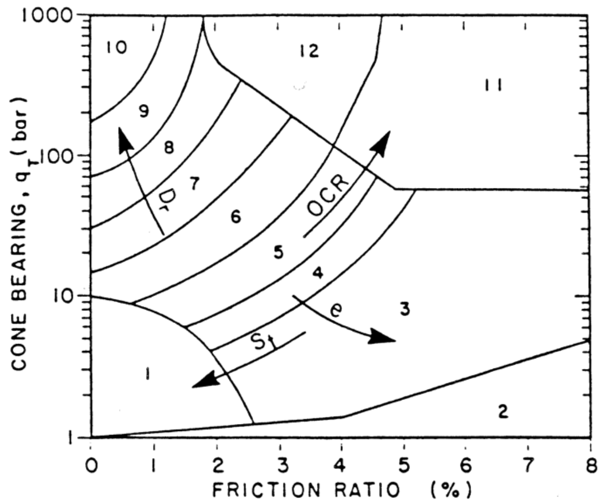
Hydraulic Conductivity

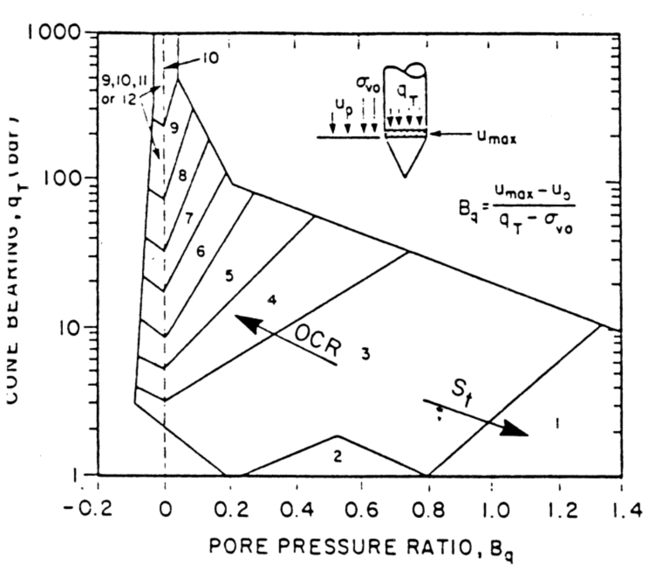
Lookup based on SBT and SBTn (1986 and 1990) 40

Normalized Soil Behavior Types - Robertson & Campanella (1990)



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





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APPENDIX IV

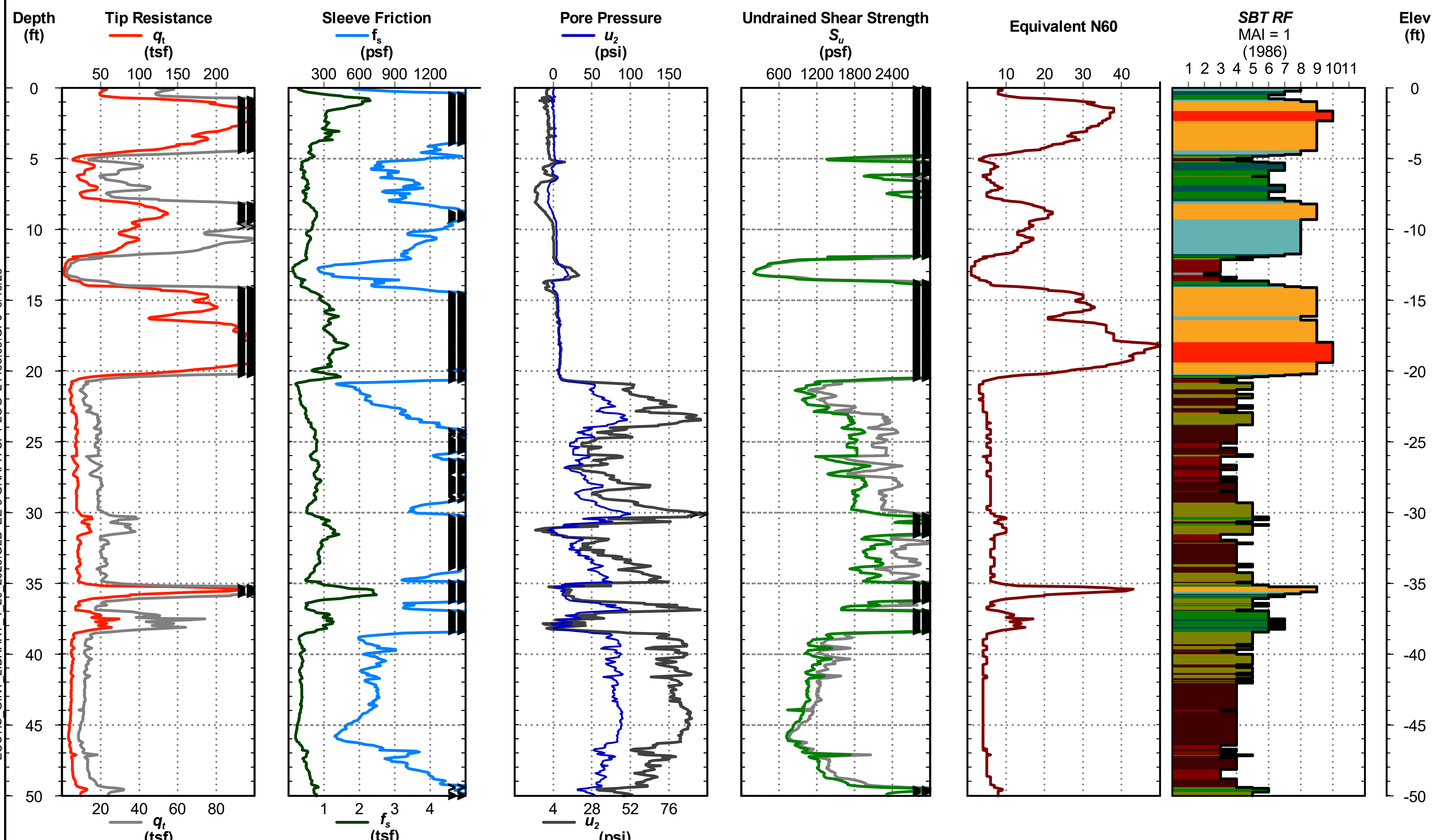
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-1

Project No: 24493.03
Date: 04/03/2023
Latitude: 30.30498°
Longitude: -89.87436°
CPT ID: 5507

Elevation: 0.0
Datum:
Est. Water Depth: 0.0 ft
Total Depth: 51.1 ft
Operator: E. Held



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson et al., 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.03-CPT-1X.cpt

EUSTIS_GINT_LIBRARY_4_20_2023.GLB EE 5 GRAPH CPT LOG 24493.03.GPJ 6/13/23

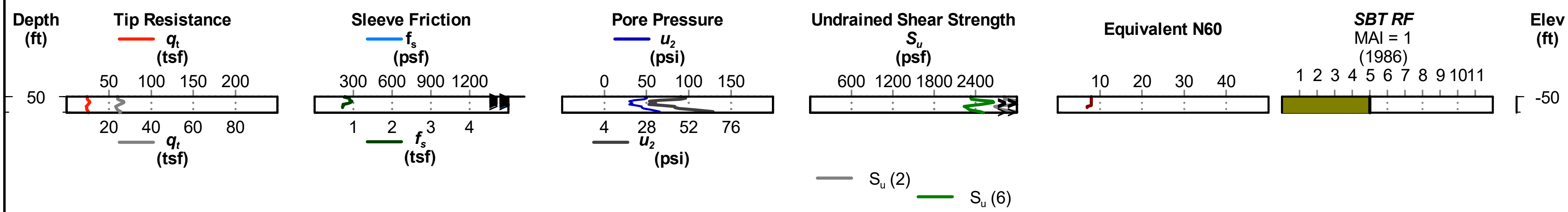
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-1

Project No: 24493.03
Date: 04/03/2023
Latitude: 30.30498°
Longitude: -89.87436°
CPT ID: 5507

Elevation: 0.0
Datum:
Est. Water Depth: 0.0 ft
Total Depth: 51.1 ft
Operator: E. Held



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.03-CPT-1X.cpt

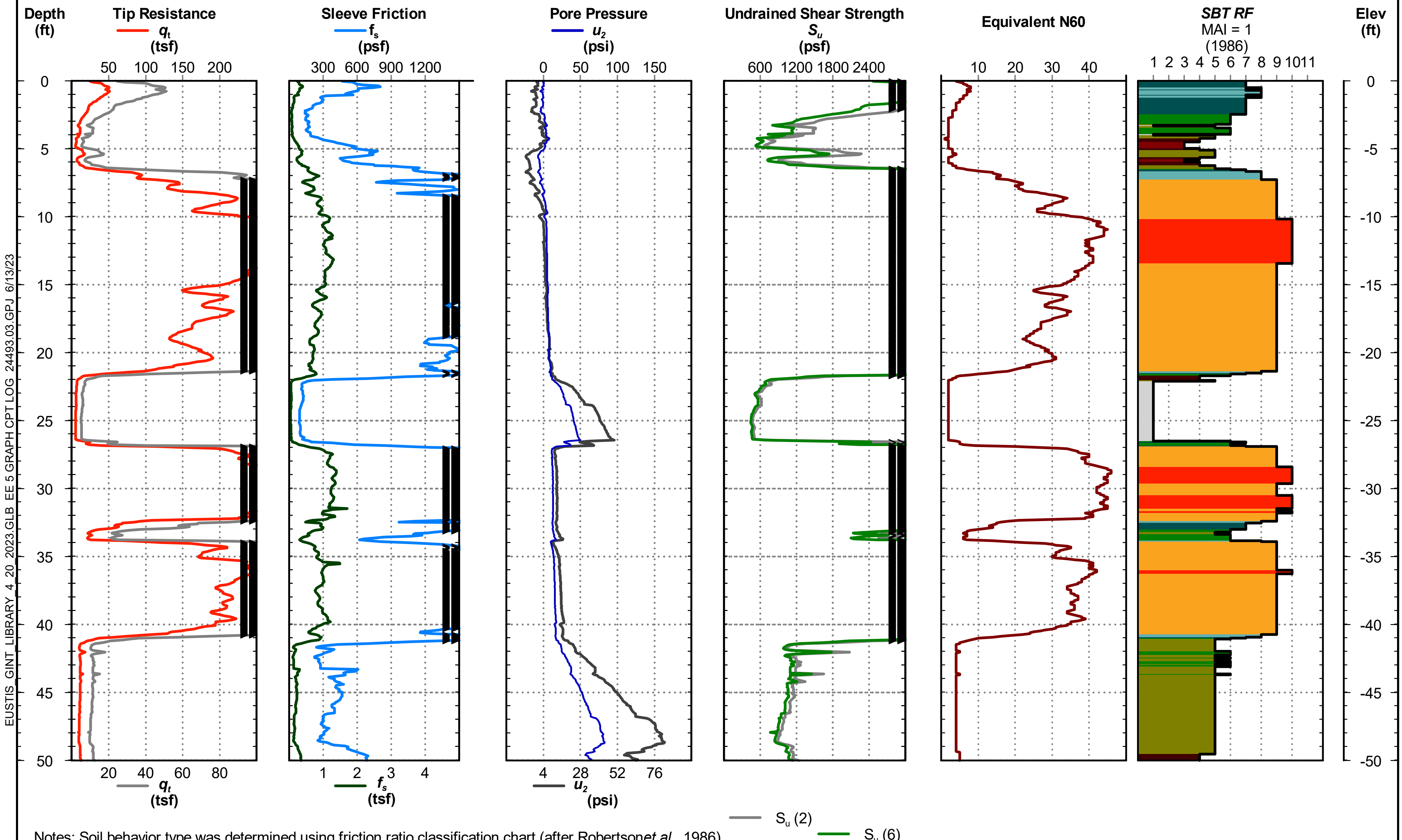
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-2

Project No: 24493.03
Date: 04/05/2023
Latitude: 20.29704°
Longitude: -89.87310°
CPT ID: 5507

Elevation: 0.0
Datum:
Est. Water Depth: 0.0 ft
Total Depth: 51.9 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 D5778-20.

Electronic Filename: 24493.03-CPT-2Y.cpt

EUSTIS
ENGINEERING
SINCE 1946

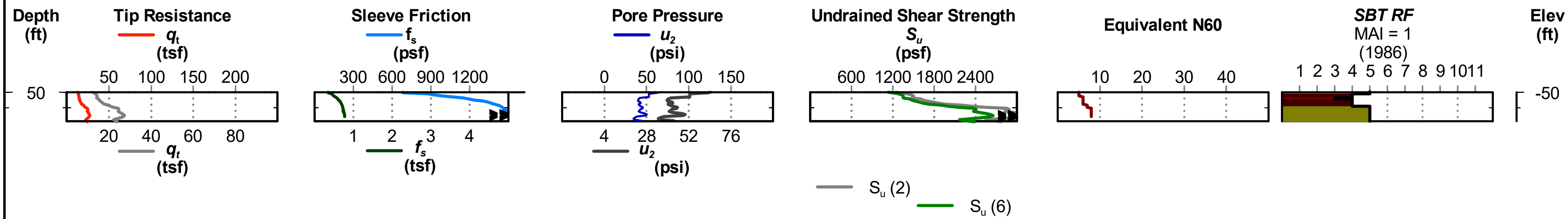
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-2

Project No: 24493.03
Date: 04/05/2023
Latitude: 20.29704°
Longitude: -89.87310°
CPT ID: 5507

Elevation: 0.0
Datum:
Est. Water Depth: 0.0 ft
Total Depth: 51.9 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 D5778-20.

Electronic Filename: 24493.03-CPT-2Y.cpt

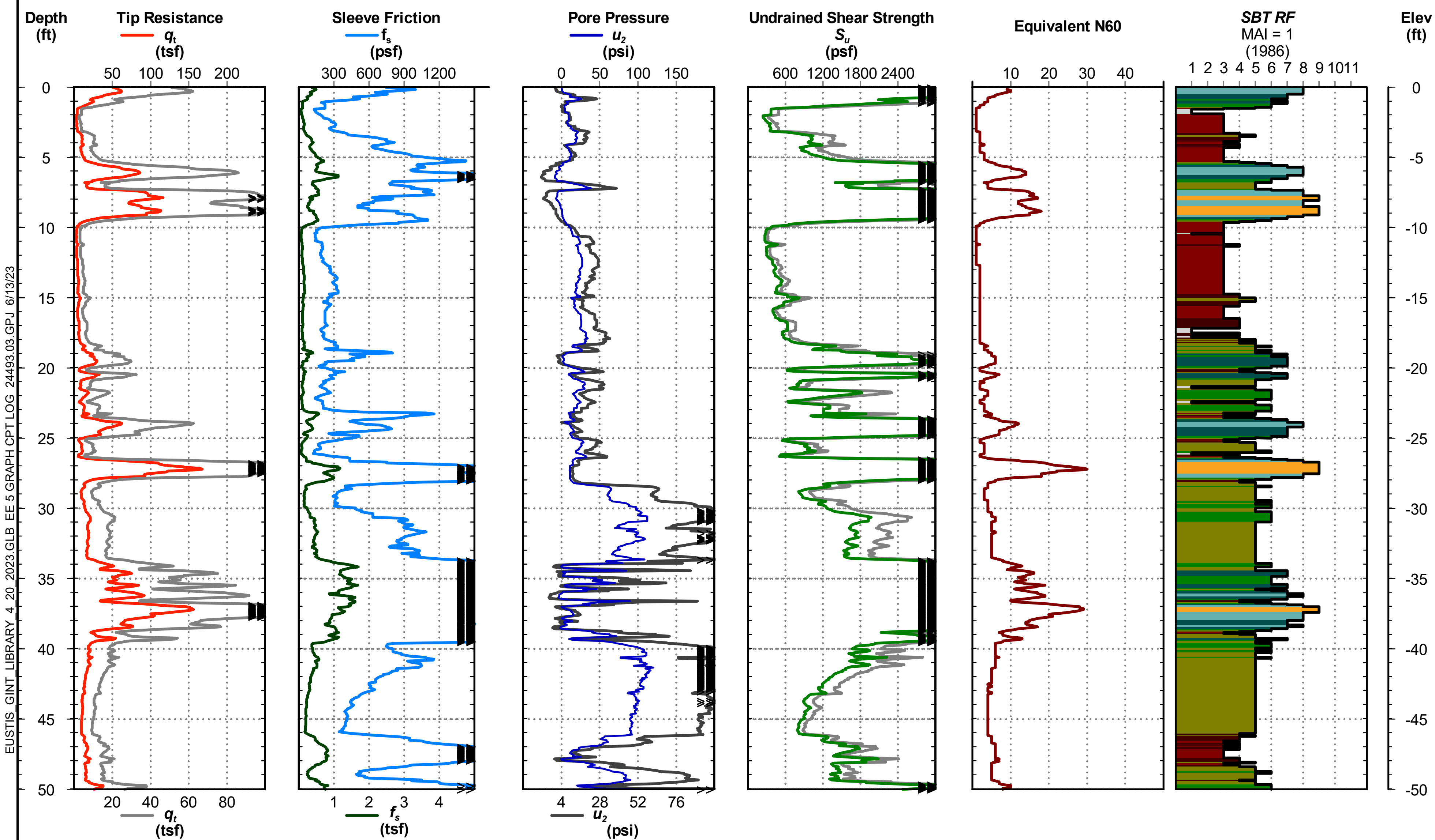
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-3

Project No: 24493.03
Date: 04/03/2023
Latitude: 30.29385°
Longitude: -89.87331°
CPT ID: 5913

Elevation: 0.0
Datum:
Est. Water Depth: 0.0 ft
Total Depth: 50.9 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 D5778-20.

Electronic Filename: 24493.03-CPT-3.cpt

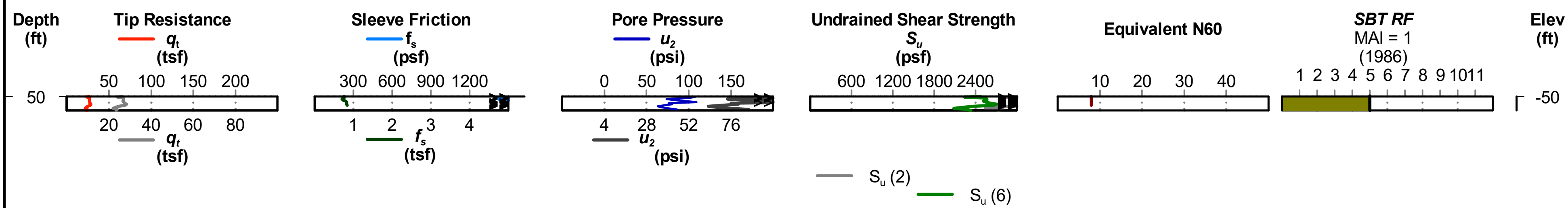
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-3

Project No: 24493.03
Date: 04/03/2023
Latitude: 30.29385°
Longitude: -89.87331°
CPT ID: 5913

Elevation: 0.0
Datum:
Est. Water Depth: 0.0 ft
Total Depth: 50.9 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 D5778-20.

Electronic Filename: 24493.03-CPT-3.cpt

EUSTIS ENGINEERING SINCE 1946

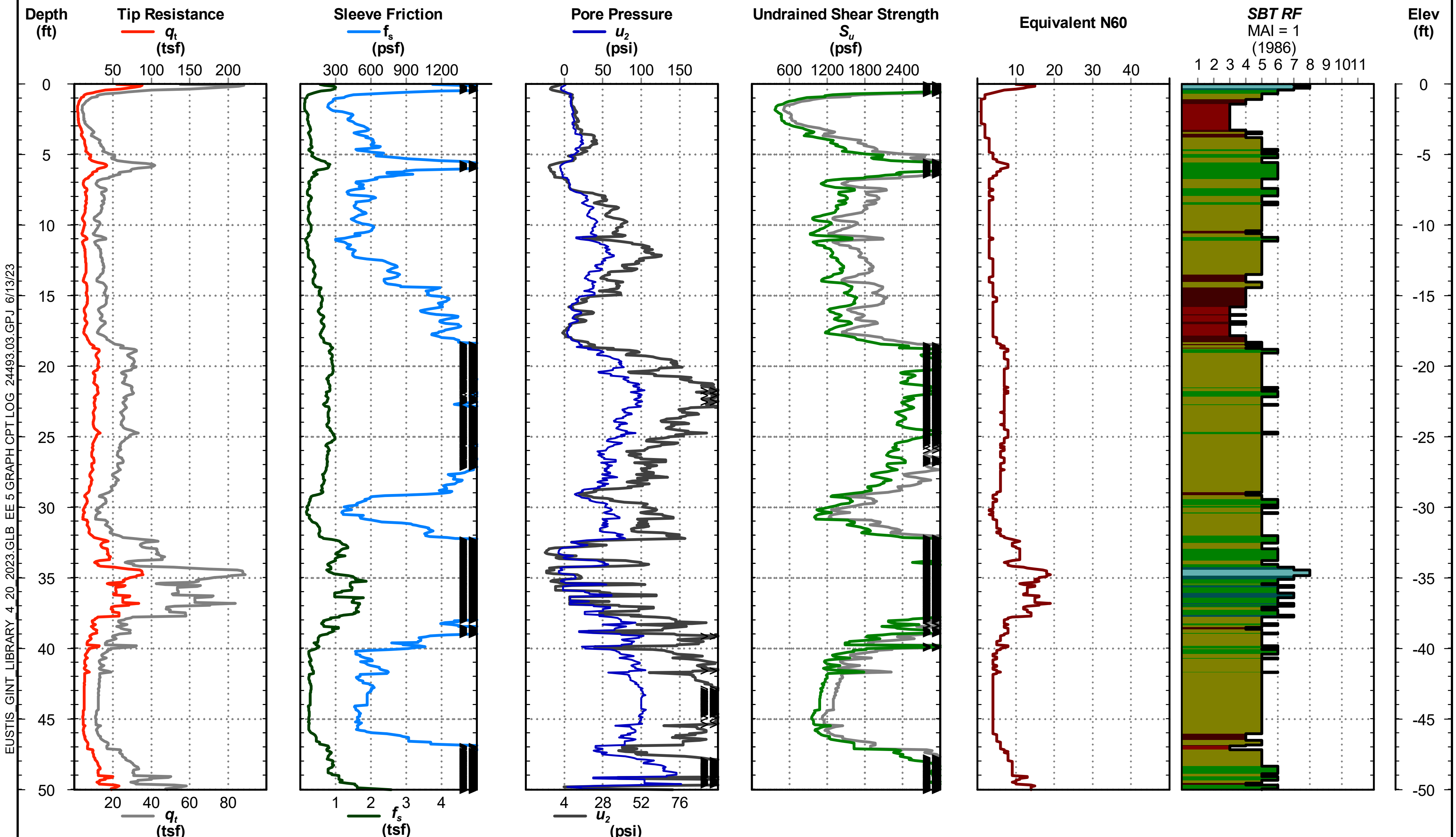
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-4

Project No: 24493.03
Date: 04/03/2023
Latitude: 30.29043°
Longitude: -89.87072°
CPT ID: 5913

Elevation: 0.0
Datum:
Est. Water Depth: 0.0 ft
Total Depth: 50.8 ft
Operator: E.Held



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.03-CPT-4.cpt

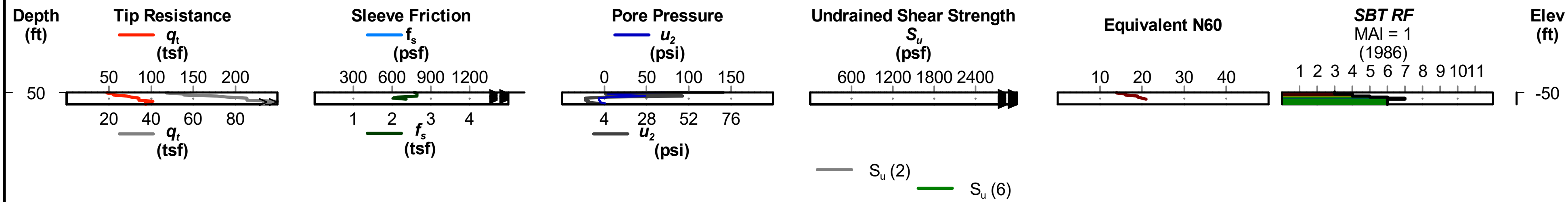
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-4

Project No: 24493.03
Date: 04/03/2023
Latitude: 30.29043°
Longitude: -89.87072°
CPT ID: 5913

Elevation: 0.0
Datum:
Est. Water Depth: 0.0 ft
Total Depth: 50.8 ft
Operator: E.Held



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

EUSTIS ENGINEERING SINCE 1946

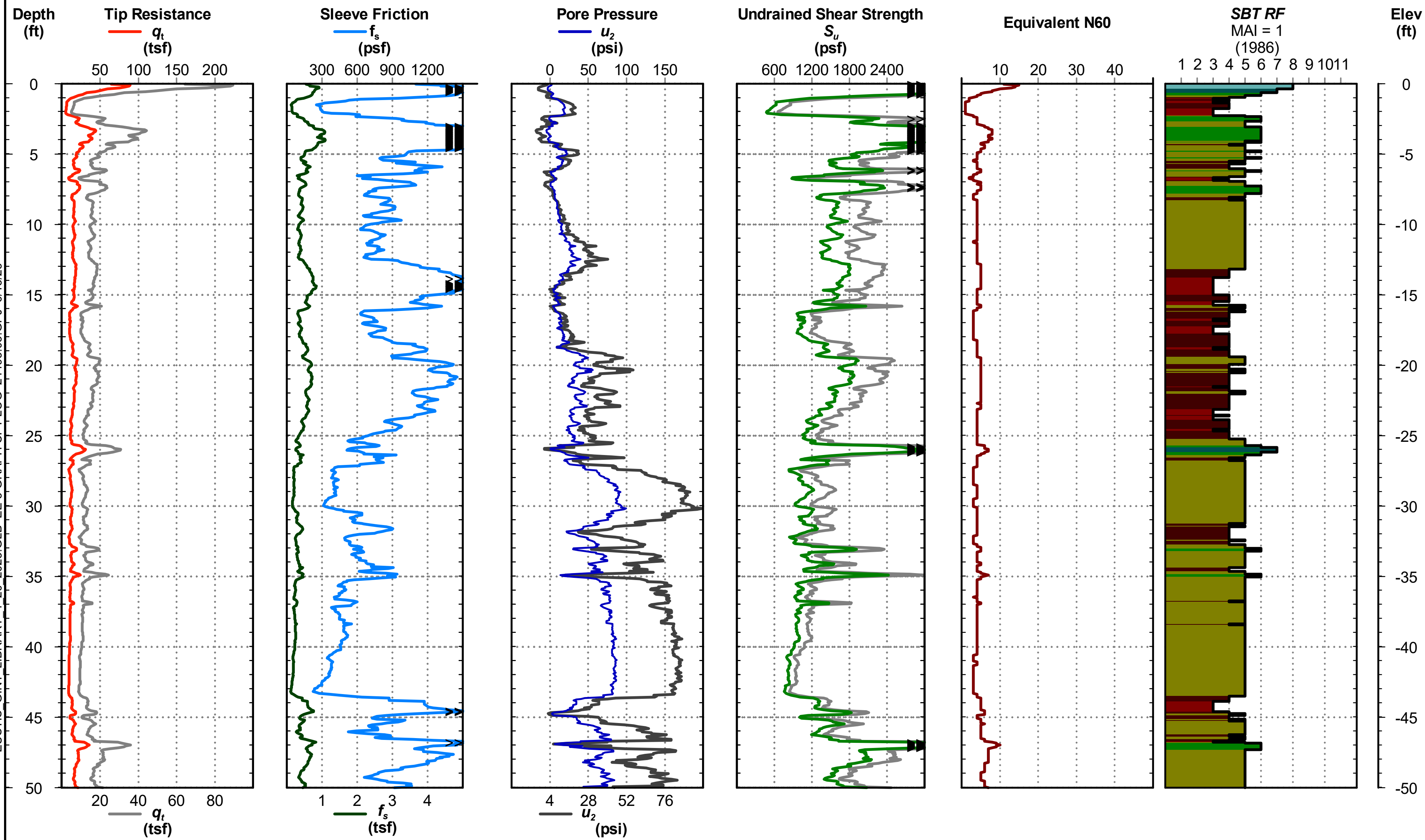
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-5

Project No: 24493.03
Date: 04/05/2023
Latitude: 30.28135°
Longitude: -89.86420°
CPT ID: 5913

Elevation: 0.0
Datum:
Est. Water Depth: 0.0 ft
Total Depth: 50.7 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 D5778-20.

Electronic Filename: 24493.03-CPT-5.cpt

EUSTIS ENGINEERING SINCE 1946

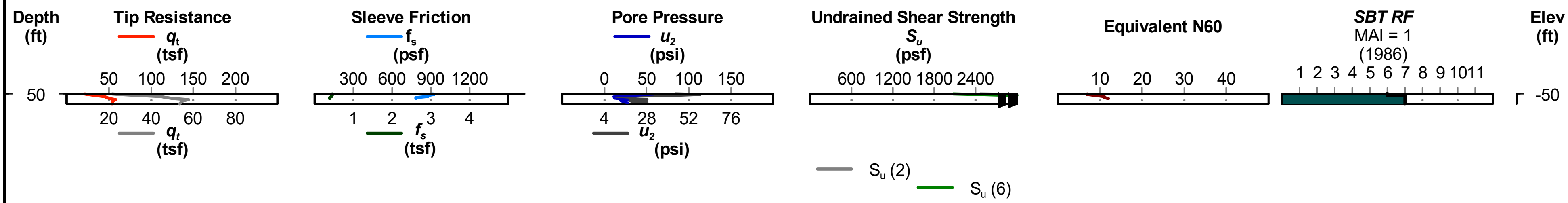
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-5

Project No: 24493.03
Date: 04/05/2023
Latitude: 30.28135°
Longitude: -89.86420°
CPT ID: 5913

Elevation: 0.0
Datum:
Est. Water Depth: 0.0 ft
Total Depth: 50.7 ft
Operator: ELH



EUSTIS_GINT_LIBRARY_4_20_2023.GLB EE 5 GRAPH CPT LOG 24493.03.GPJ 6/13/23

Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

EUSTIS ENGINEERING SINCE 1946

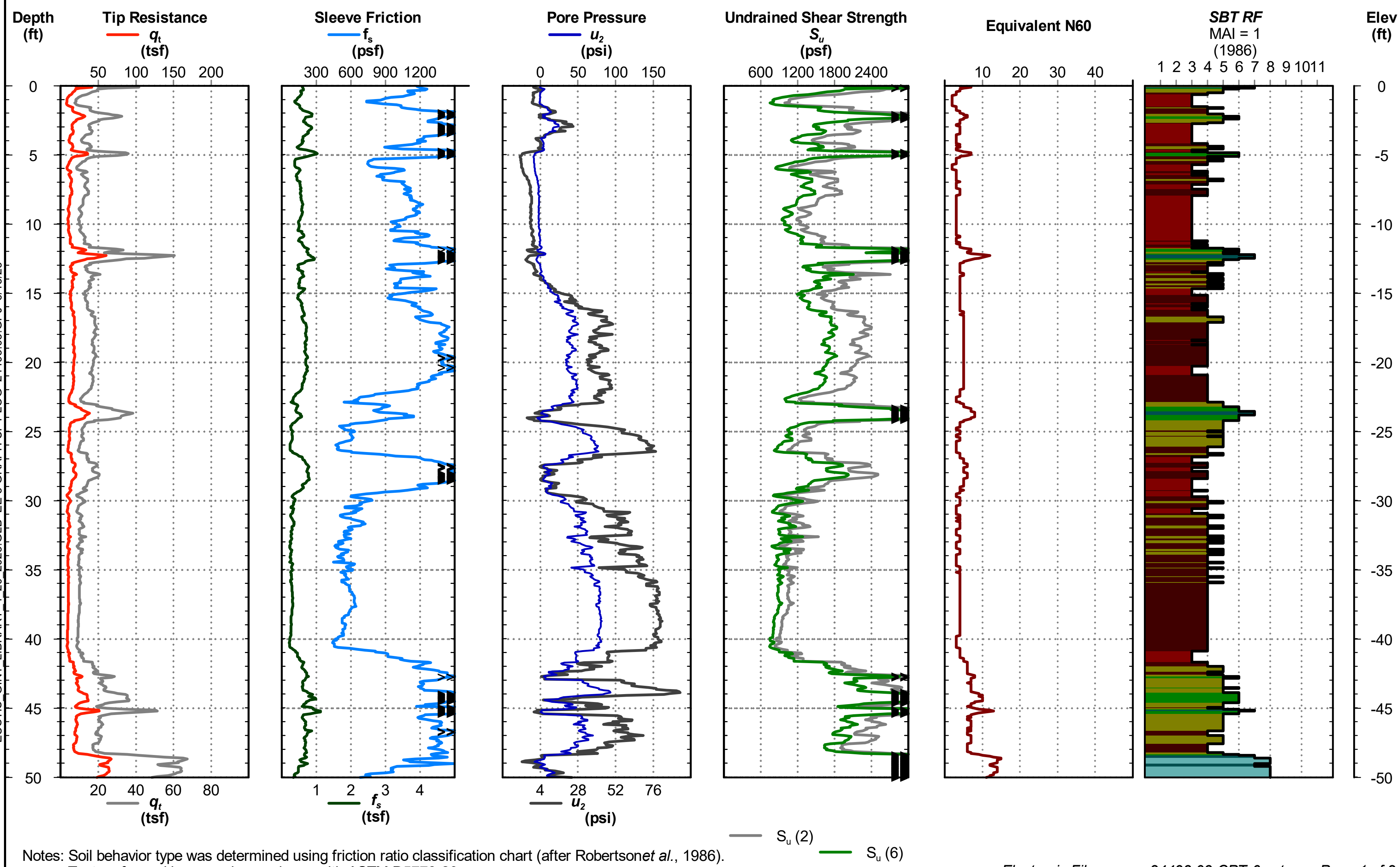
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-6

Project No: 24493.03
Date: 04/03/2023
Latitude: 30.27906°
Longitude: -89.86497°
CPT ID: 5507

Elevation: 0.0
Datum:
Est. Water Depth: 0.0 ft
Total Depth: 51.1 ft
Operator: E. Held



EUSTIS_GINT_LIBRARY_4_20_2023.GLB EE 5 GRAPH CPT LOG 24493.03.GPJ 6/13/23

Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.03-CPT-6.cpt

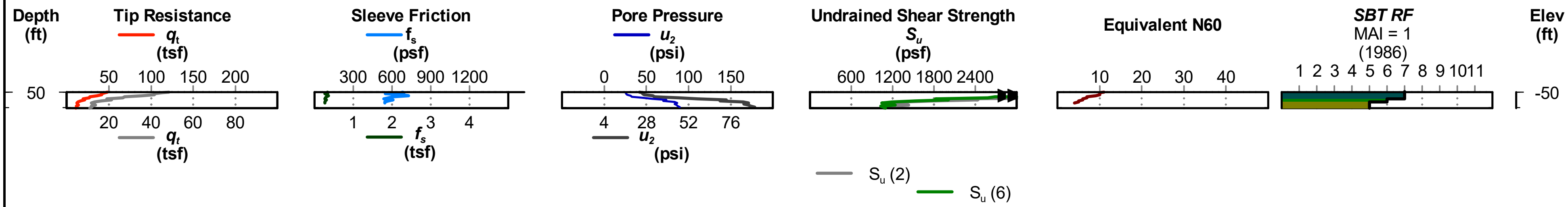
St. Tammany Parish Government
Coastal Flood Protection Project
St. Tammany Parish, Louisiana
Amendment Nos. 3 and 4

CONE PENETRATION TEST

CPT-6

Project No: 24493.03
Date: 04/03/2023
Latitude: 30.27906°
Longitude: -89.86497°
CPT ID: 5507

Elevation: 0.0
Datum:
Est. Water Depth: 0.0 ft
Total Depth: 51.1 ft
Operator: E. Held

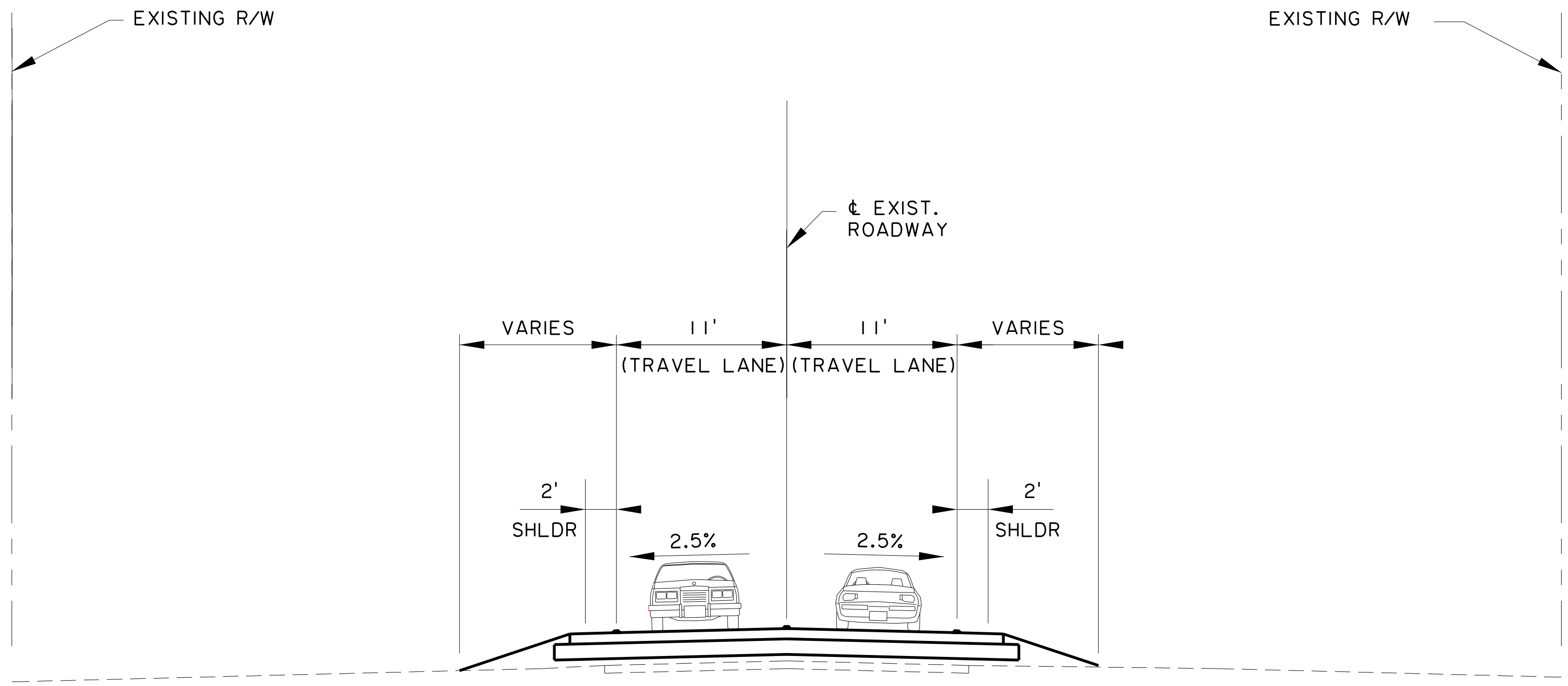


Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson *et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24493.03-CPT-6.cpt

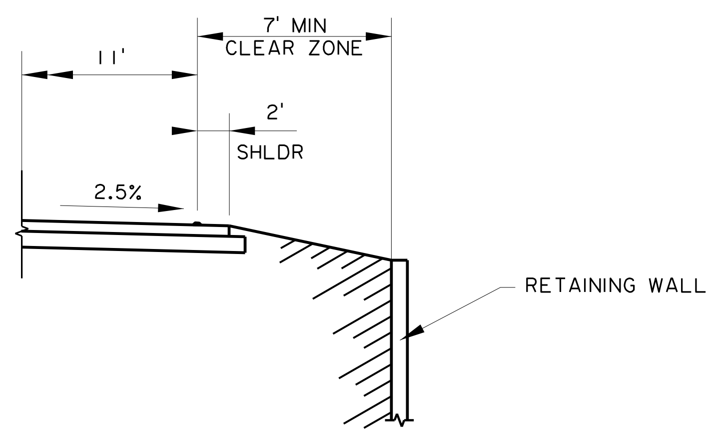
APPENDIX V

℄ CHANNEL
PROTECTED SIDE
FLOODED SIDE
FLOODWALL EL. 12.0'
PUMP HOUSE (110 CFS EA.) BOT. DECK EL. 8.0' TOP DECK MIN. EL. 12.0'
GENERATOR PAD EL. 8.5' (GENERATOR MIN. EL. 12.0')
DECK EL. 12.0'
DECK EL. 8.0'
CONCRETE BULKHEAD EL. 8.0'
DECK EL. 8.0'
FLOODWALL EL. 12.0'
DISCHARGE PIPING (TYP.)
BARGE GATE
DREDGE AS REQ'D
GATES
LIMESTONE PAD EL. 8.0'
RIP RAP AS REQ'D
FLOODWALL EL. 12.0'
LAKEVIEW DR. EL. 8.0' (4.0'± EXIST.)
292.60'
40.00'
331.30'± (LIMITS OF CHANNEL)
547.31'± (LIMITS OF CHANNEL FLOODWALL)
214.71'
DJH
11/9/2022



LAKEVIEW DRIVE
TYPICAL SECTION
N.T.S

(ROADWAY CLASSIFICATION - URBAN LOCAL)
(DESIGN SPEED - 25 MPH)



RETAINING WALL DETAIL (N.T.S.)

SHEET NUMBER 1A-1

PARISH: ST. TAMMANY
CLIENT:
PROJECT NUMBER: H.004983

DESIGN CHECK | DETAIL CHECK | REVIEW SERIES #

PRELIMINARY
FOR REVIEW ONLY

ENGINEER:
DISHILI YOUNG

LICENSE #:
33723

DATE:
9/21/2022

NO.	DATE	REVISION OR CHANGE ORDER DESCRIPTION	BY

TYPICAL SECTION
LAKEVIEW DR

ST. TAMMANY COASTAL PROTECTION PROJECT PHASE III

NEEL-SCHAFFER
INC.

9/21/2022 3:56:06 PM

PLAN SHEET_LAKEVIEW_02.dgn

SHEET NUMBER	IA-2

ST. TAMMANY

PARISH | CLIENT | PROJECT NUMBER

DESIGN CHECK | DETAIL CHECK | REVIEW SERIES #

PRELIMINARY
FOR REVIEW ONLY

ENGINEER:
DISHILI YOUNG

LICENSE #:
33723

DATE:
9/21/2022

NO.	DATE	REVISION OR CHANGE ORDER DESCRIPTION	BY

CONCEPT LAYOUT
LAKEVIEW DRIVE

ST. TAMMANY COASTAL PROTECTION PROJECT PHASE III

NEEL-SCHAFFER
INC.

SHEET NUMBER IA-3

PARISH: ST. TAMMANY

CLIENT

PROJECT NUMBER

DESIGN CHECK

DETAIL CHECK

REVIEW SERIES #

PRELIMINARY
FOR REVIEW ONLY

ENGINEER: DISHILI YOUNG

LICENSE #: 33723

DATE: 9/21/2022

NO.	DATE	REVISION OR CHANGE ORDER DESCRIPTION	BY

CONCEPT LAYOUT
LAKEVIEW DRIVE

ST. TAMMANY COASTAL PROTECTION PROJECT PHASE III

NEEL-SCHAFFER INC.

9/21/2022 3:56:10 PM

PLAN SHEET_LAKEVIEW_04.dgn

SHEET NUMBER: IA-4

ST. TAMMANY

PARISH | CLIENT | PROJECT NUMBER

DESIGN CHECK | DETAIL CHECK | REVIEW SERIES #

PRELIMINARY
FOR REVIEW ONLY

ENGINEER:
DISHILI YOUNG

LICENSE #:
33723

DATE:
9/21/2022

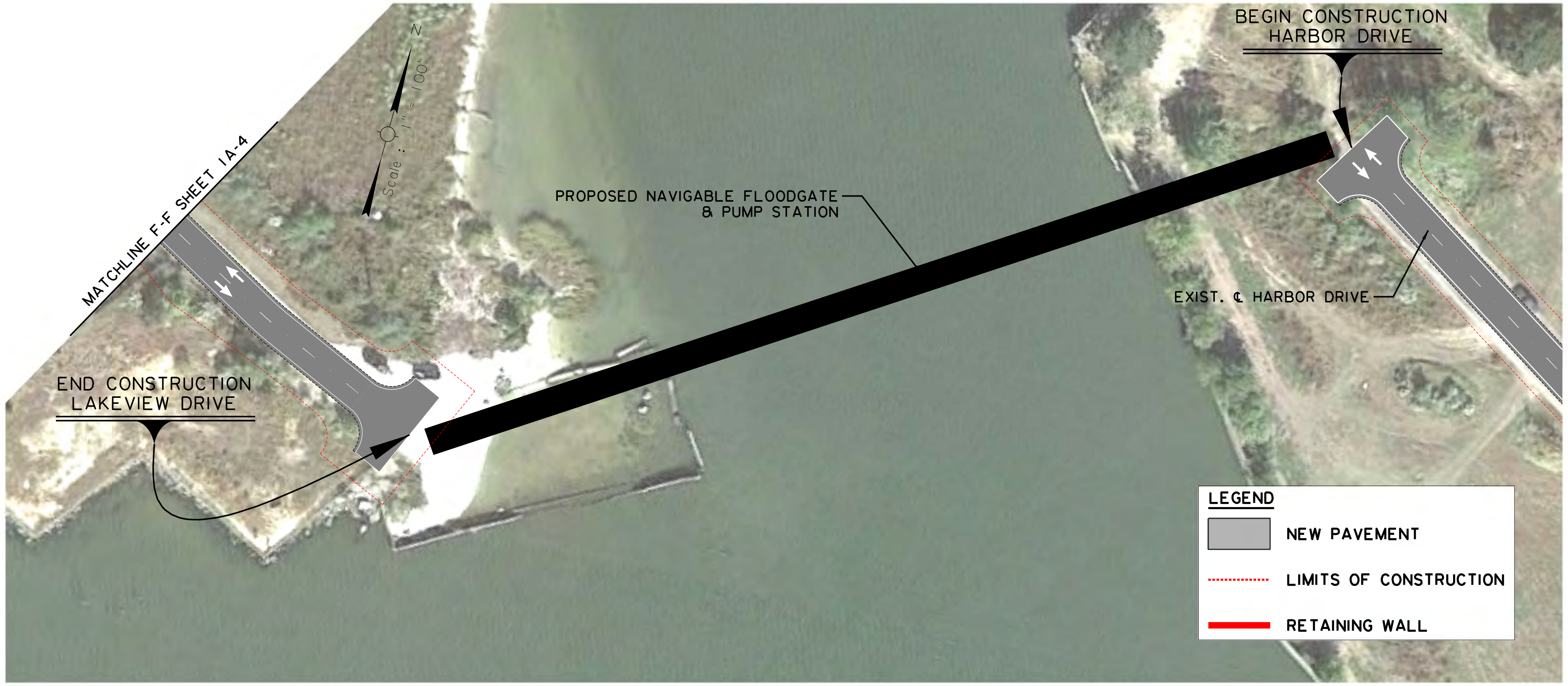
NO.	DATE	REVISION OR CHANGE ORDER DESCRIPTION	BY

CONCEPT LAYOUT
LAKEVIEW DRIVE

ST. TAMMANY COASTAL PROTECTION PROJECT PHASE III

NEEL-SCHAFFER INC.

9/21/2022 3:56:12 PM



PLAN SHEET_LAKEVIEW_05.dgn

SHEET NUMBER: IA-5

ST. TAMMANY

PARISH | CLIENT | PROJECT NUMBER

DESIGN CHECK | DETAIL CHECK | REVIEW SERIES #

PRELIMINARY
FOR REVIEW ONLY

ENGINEER:
DISHILI YOUNG

LICENSE #:
33723

DATE:
9/21/2022

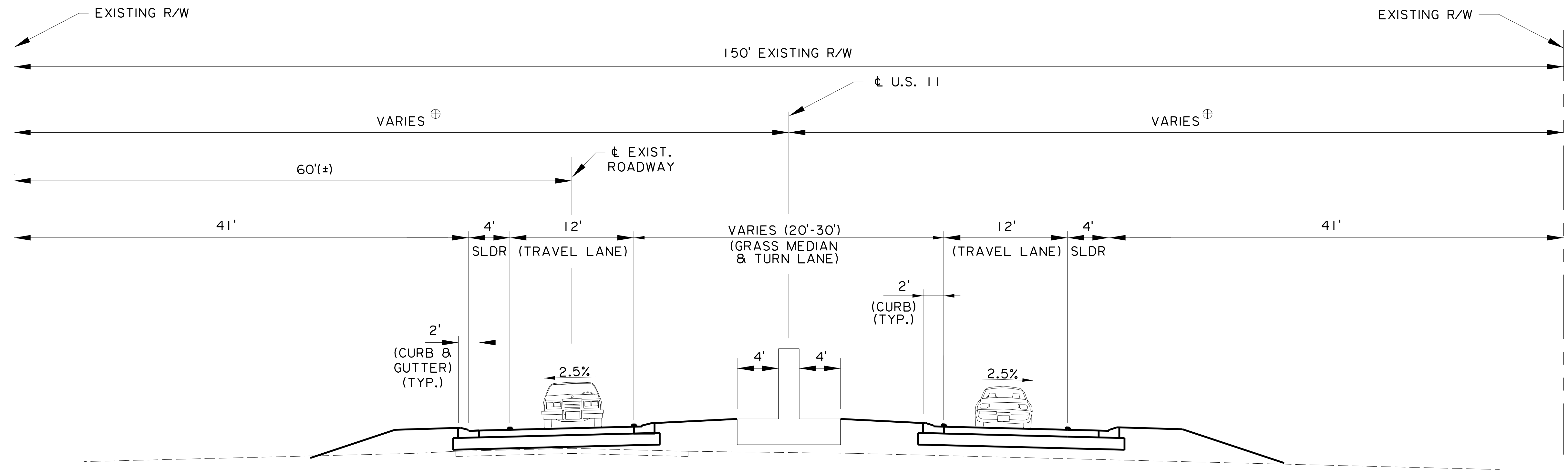
NO.	DATE	REVISION OR CHANGE ORDER DESCRIPTION	BY

CONCEPT LAYOUT
LAKEVIEW DRIVE

ST. TAMMANY COASTAL PROTECTION PROJECT PHASE III

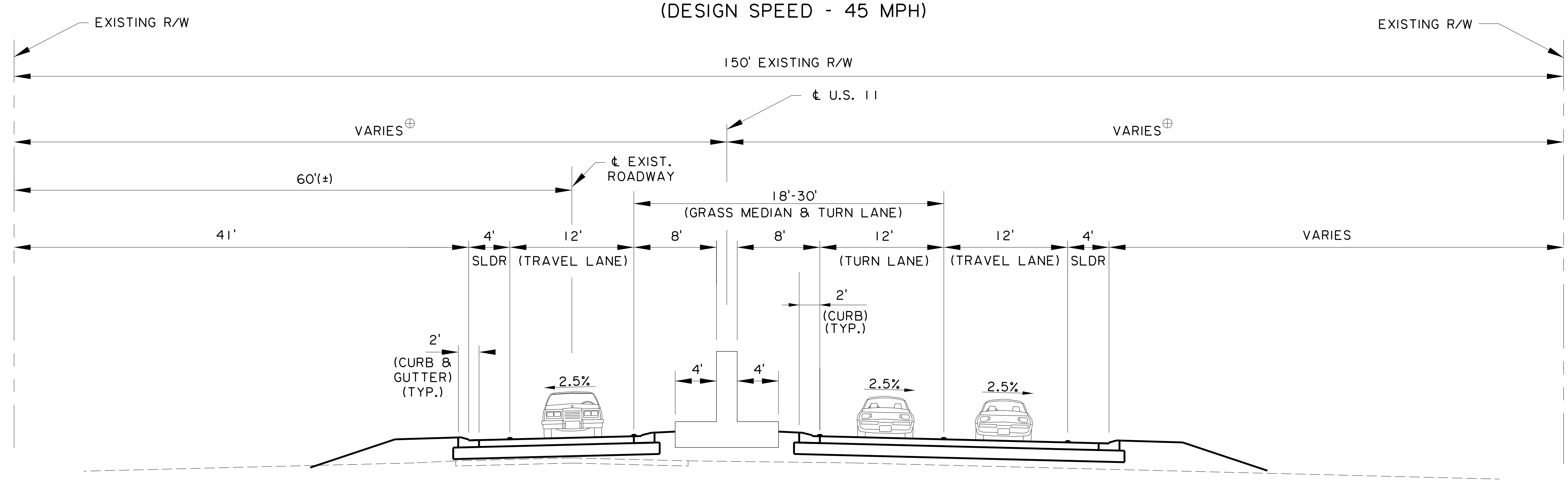
NEEL-SCHAFFER
INC.

10/19/2022 2:18:27 PM



ALTERNATIVE 2C
TYPICAL SECTION
N.T.S

(ROADWAY CLASSIFICATION - URBAN ARTERIAL)
(DESIGN SPEED - 45 MPH)



ALTERNATIVE 2C
TYPICAL SECTION W/ TURN LANES
N.T.S

(ROADWAY CLASSIFICATION - URBAN ARTERIAL)
(DESIGN SPEED - 45 MPH)

⊕ EXISTING RIGHT OF WAY BASED OF EA SPN. H.004983

Alt_1_TYP SECT_FLOOD WALL.dgn

SHEET NUMBER 2C-1

PARISH: ST. TAMMANY
CLIENT:
PROJECT NUMBER: H.004983

DESIGN CHECK | DETAIL CHECK | REVIEW SERIES #

PRELIMINARY
FOR REVIEW ONLY
ENGINEER: DISHILI YOUNG
LICENSE #: 33723
DATE: 10/19/2022

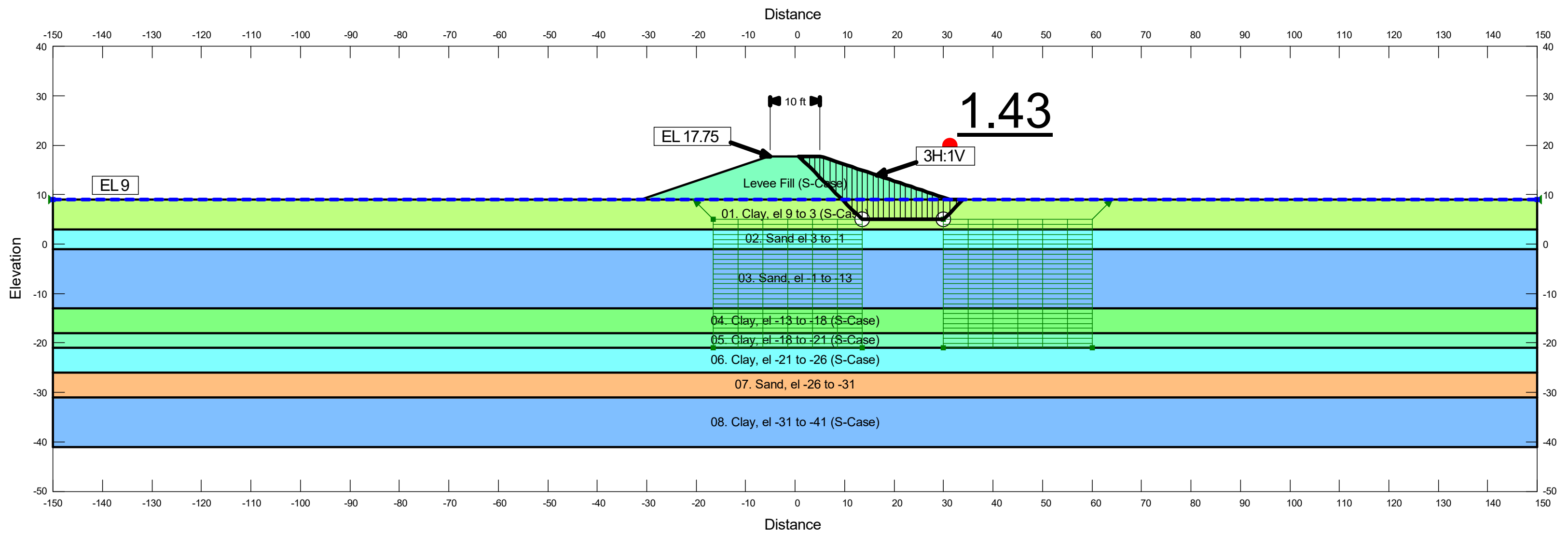
NO. | DATE | REVISION OR CHANGE ORDER DESCRIPTION | BY

TYPICAL SECTION
ALTERNATIVE 2C

ST. TAMMANY COASTAL PROTECTION PROJECT PHASE III

NEEL-SCHAFFER INC.

APPENDIX VI



Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:48:53 AM

Method: Janbu
Direction of movement: Left to Right
Slip Surface Option: Block
Optimize Critical Slip Surface Location: No

Factor of Safety: 1.43

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 9 to 3 (S-Case)	Mohr-Coulomb	130	0	23
	02. Sand el 3 to -1	Mohr-Coulomb	130	0	28
	03. Sand, el -1 to -13	Mohr-Coulomb	130	0	29
	04. Clay, el -13 to -18 (S-Case)	Mohr-Coulomb	119	0	23
	05. Clay, el -18 to -21 (S-Case)	Mohr-Coulomb	119	0	23
	06. Clay, el -21 to -26 (S-Case)	Mohr-Coulomb	125	0	23
	07. Sand, el -26 to -31	Mohr-Coulomb	125	0	29
	08. Clay, el -31 to -41 (S-Case)	Mohr-Coulomb	118	0	23
	Levee Fill (S-Case)	Mohr-Coulomb	115	0	23

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VI

EE PROJECT No. 24493.03 - West Slidell Levee (Reach 1),
1. Levee to el 17.75,

D2) LWL S Case Janbu

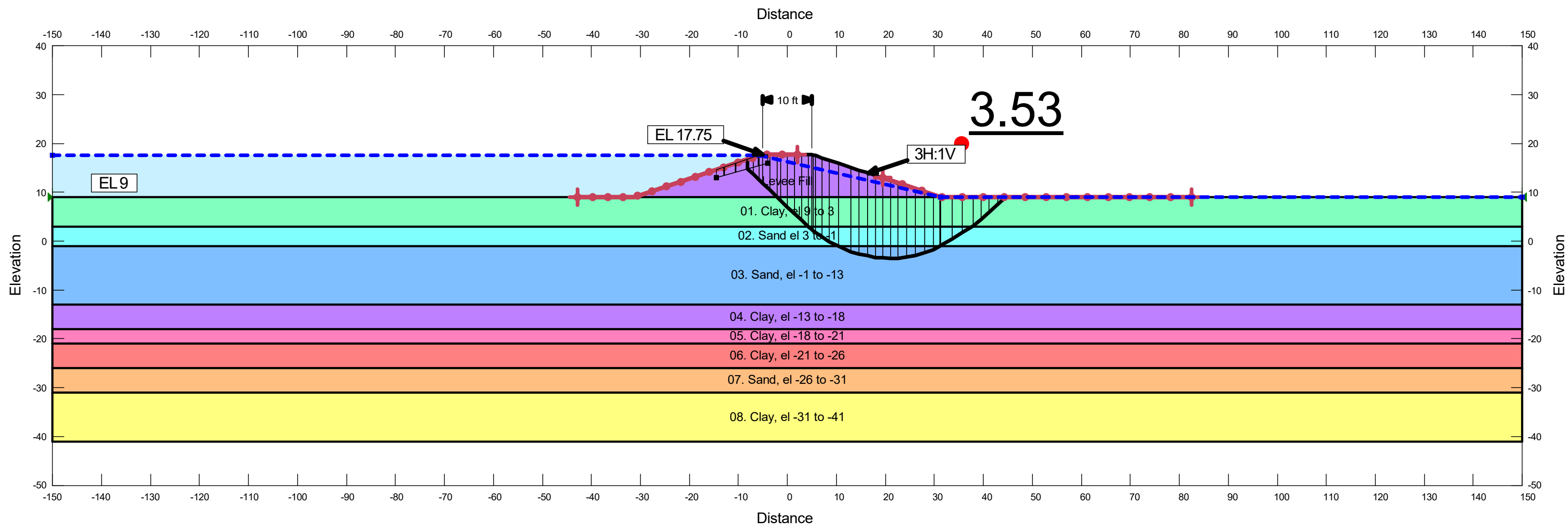
CHECKED BY:

FILENAME:

DRAWN BY: HCW

DATE: 06/14/2023

EUSTIS ENGINEERING L.L.C. SINCE 1946



Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:38:55 AM

Method: Spencer
Direction of movement: Left to Right
Slip Surface Option: Entry and Exit
Optimize Critical Slip Surface Location: Yes

Factor of Safety: 3.53

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 9 to 3	Mohr-Coulomb	130	900	0
	02. Sand el 3 to -1	Mohr-Coulomb	130	0	28
	03. Sand, el -1 to -13	Mohr-Coulomb	130	0	29
	04. Clay, el -13 to -18	Mohr-Coulomb	119	600	0
	05. Clay, el -18 to -21	Mohr-Coulomb	119	1,300	0
	06. Clay, el -21 to -26	Mohr-Coulomb	125	1,300	0
	07. Sand, el -26 to -31	Mohr-Coulomb	125	0	29
	08. Clay, el -31 to -41	Mohr-Coulomb	118	1,000	0
	Levee Fill	Mohr-Coulomb	115	600	0

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VI

A1) PGL Protected Side Spencers

EE PROJECT No. 24493.03 - West Slidell Levee (Reach 1),
1. Levee to el 17.75,

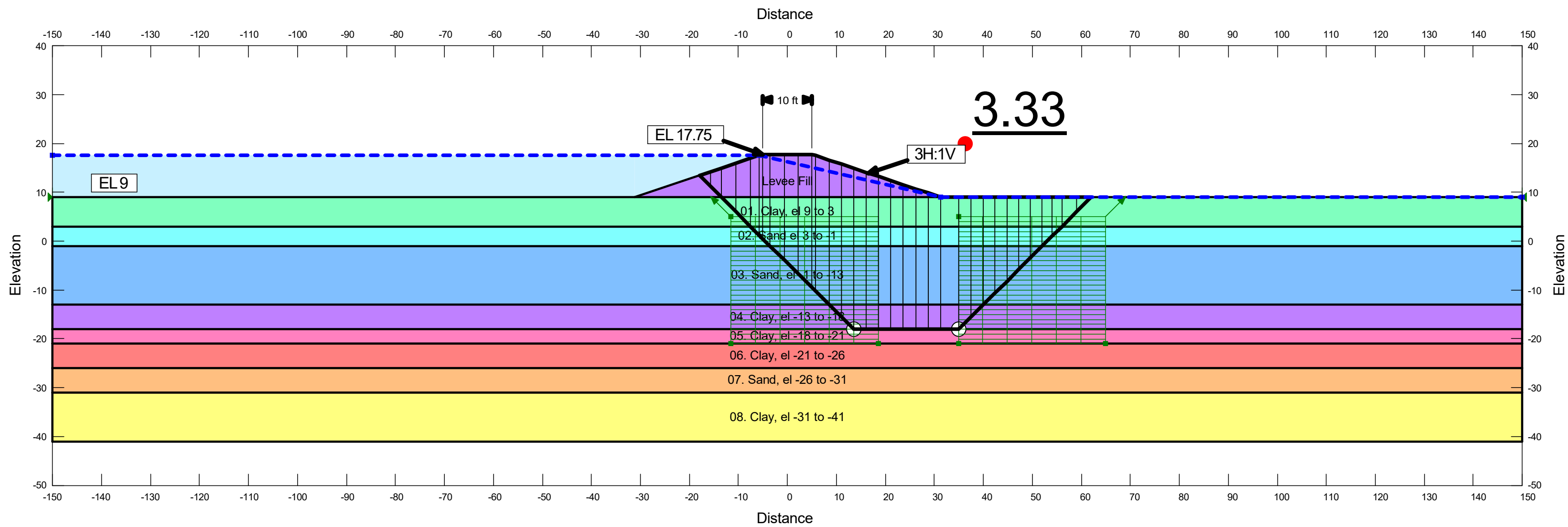
CHECKED BY:

FILENAME:

DRAWN BY: HCW

DATE: 06/14/2023

EUSTIS ENGINEERING L.L.C. SINCE 1946



Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:39:01 AM

Method: Janbu
Direction of movement: Left to Right
Slip Surface Option: Block
Optimize Critical Slip Surface Location: No

Factor of Safety: 3.33

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 9 to 3	Mohr-Coulomb	130	900	0
	02. Sand el 3 to -1	Mohr-Coulomb	130	0	28
	03. Sand, el -1 to -13	Mohr-Coulomb	130	0	29
	04. Clay, el -13 to -18	Mohr-Coulomb	119	600	0
	05. Clay, el -18 to -21	Mohr-Coulomb	119	1,300	0
	06. Clay, el -21 to -26	Mohr-Coulomb	125	1,300	0
	07. Sand, el -26 to -31	Mohr-Coulomb	125	0	29
	08. Clay, el -31 to -41	Mohr-Coulomb	118	1,000	0
	Levee Fill	Mohr-Coulomb	115	600	0

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VI

EE PROJECT No. 24493.03 - West Slidell Levee (Reach 1), 1. Levee to el 17.75,

A2) PGL Protected Side Janbu

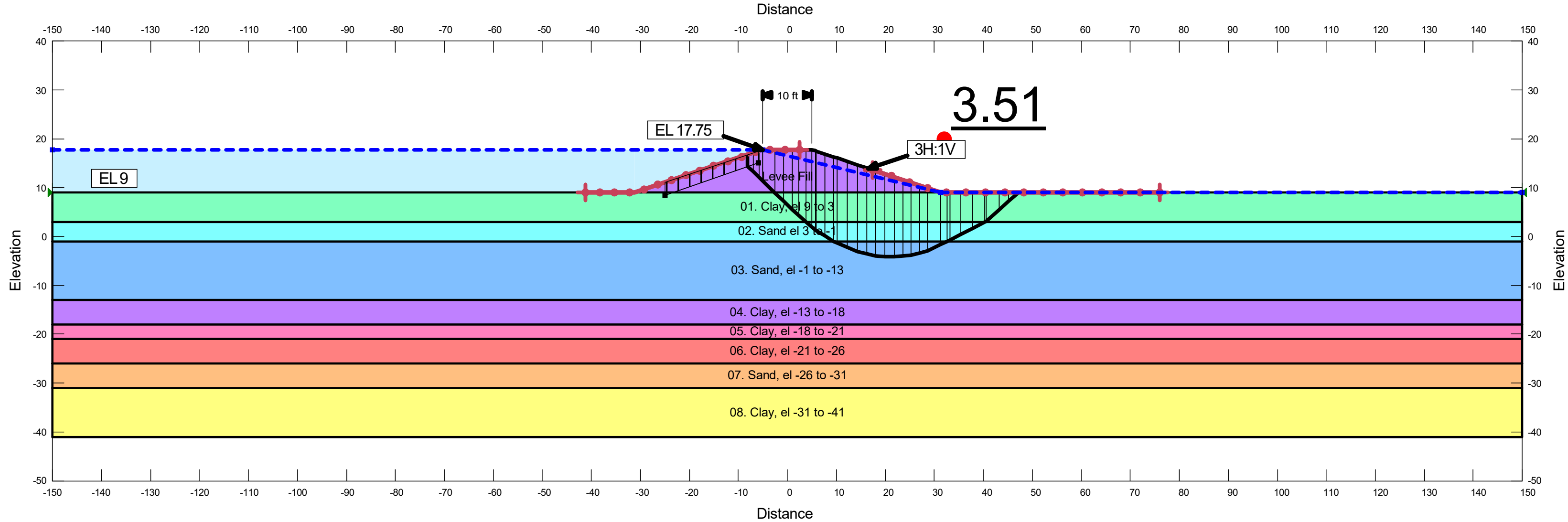
CHECKED BY:

FILENAME:

DRAWN BY: HCW

DATE: 06/14/2023

EUSTIS ENGINEERING L.L.C. SINCE 1946



Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:38:58 AM

Method: Spencer
Direction of movement: Left to Right
Slip Surface Option: Entry and Exit
Optimize Critical Slip Surface Location: Yes

Factor of Safety: 3.51

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 9 to 3	Mohr-Coulomb	130	900	0
	02. Sand el 3 to -1	Mohr-Coulomb	130	0	28
	03. Sand, el -1 to -13	Mohr-Coulomb	130	0	29
	04. Clay, el -13 to -18	Mohr-Coulomb	119	600	0
	05. Clay, el -18 to -21	Mohr-Coulomb	119	1,300	0
	06. Clay, el -21 to -26	Mohr-Coulomb	125	1,300	0
	07. Sand, el -26 to -31	Mohr-Coulomb	125	0	29
	08. Clay, el -31 to -41	Mohr-Coulomb	118	1,000	0
	Levee Fill	Mohr-Coulomb	115	600	0

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VI

B1) CGL Protected Side Spencers

EE PROJECT No. 24493.03 - West Slidell Levee (Reach 1), 1. Levee to el 17.75,

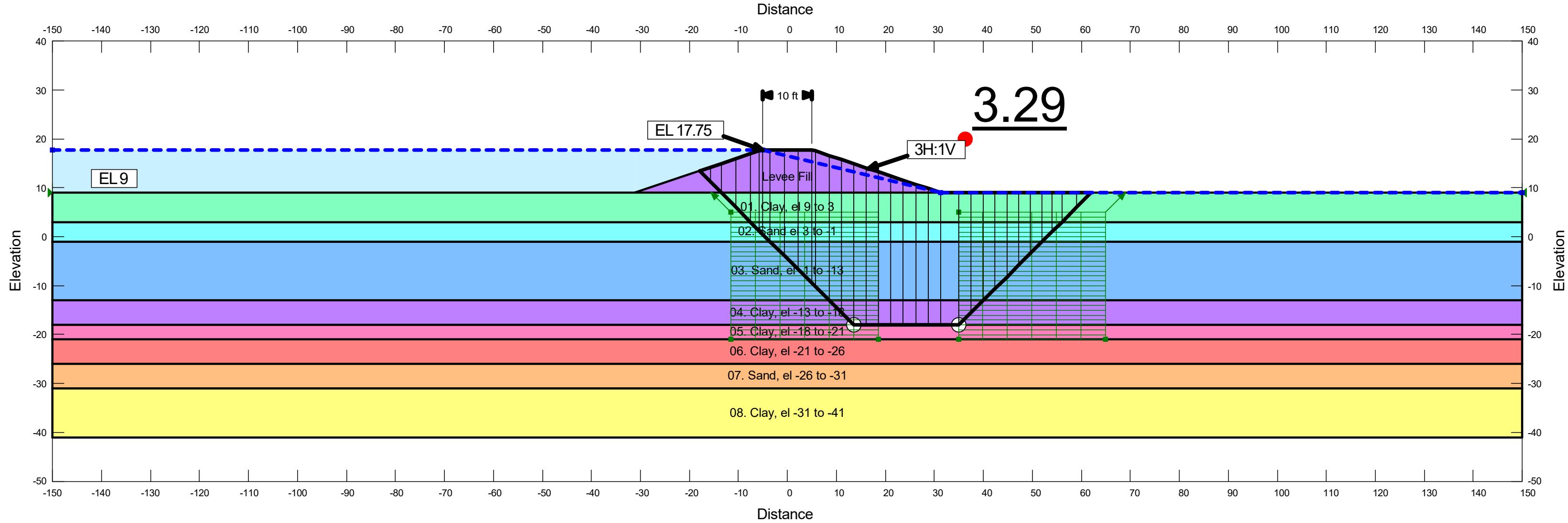
CHECKED BY:

FILENAME:

DRAWN BY: HCW

DATE: 06/14/2023

EUSTIS ENGINEERING L.L.C. SINCE 1946



Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:45:29 AM

Method: Janbu
Direction of movement: Left to Right
Slip Surface Option: Block
Optimize Critical Slip Surface Location: No

Factor of Safety: 3.29

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 9 to 3	Mohr-Coulomb	130	900	0
	02. Sand el 3 to -1	Mohr-Coulomb	130	0	28
	03. Sand, el -1 to -13	Mohr-Coulomb	130	0	29
	04. Clay, el -13 to -18	Mohr-Coulomb	119	600	0
	05. Clay, el -18 to -21	Mohr-Coulomb	119	1,300	0
	06. Clay, el -21 to -26	Mohr-Coulomb	125	1,300	0
	07. Sand, el -26 to -31	Mohr-Coulomb	125	0	29
	08. Clay, el -31 to -41	Mohr-Coulomb	118	1,000	0
	Levee Fill	Mohr-Coulomb	115	600	0

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

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NOT FOR CONSTRUCTION USE

APPENDIX VI

EE PROJECT No. 24493.03 - West Slidell Levee (Reach 1), 1. Levee to el 17.75,

B2) CGL Protected Side Janbu

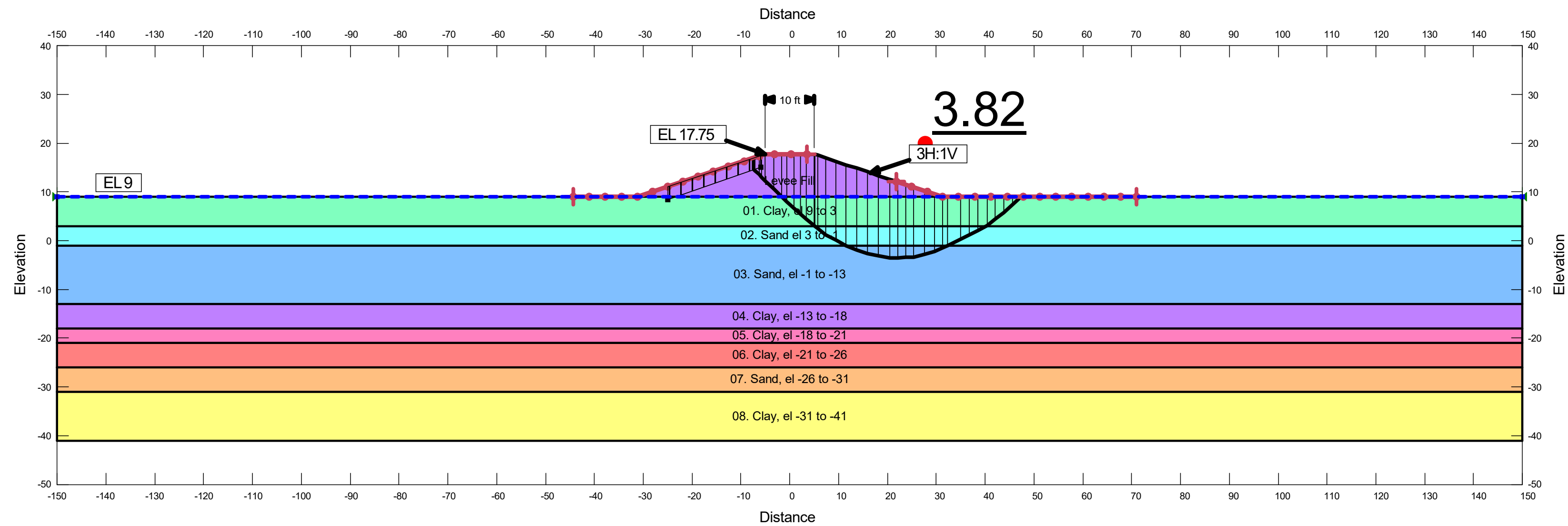
CHECKED BY:

FILENAME:

DRAWN BY: HCW

DATE: 06/14/2023

EUSTIS ENGINEERING L.L.C. SINCE 1946



Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:39:03 AM

Method: Spencer
Direction of movement: Left to Right
Slip Surface Option: Entry and Exit
Optimize Critical Slip Surface Location: Yes

Factor of Safety: 3.82

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 9 to 3	Mohr-Coulomb	130	900	0
	02. Sand el 3 to -1	Mohr-Coulomb	130	0	28
	03. Sand, el -1 to -13	Mohr-Coulomb	130	0	29
	04. Clay, el -13 to -18	Mohr-Coulomb	119	600	0
	05. Clay, el -18 to -21	Mohr-Coulomb	119	1,300	0
	06. Clay, el -21 to -26	Mohr-Coulomb	125	1,300	0
	07. Sand, el -26 to -31	Mohr-Coulomb	125	0	29
	08. Clay, el -31 to -41	Mohr-Coulomb	118	1,000	0
	Levee Fill	Mohr-Coulomb	115	600	0

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VI

EE PROJECT No. 24493.03 - West Slidell Levee (Reach 1),
1. Levee to el 17.75,
C1) LWL Q-Case Spencers

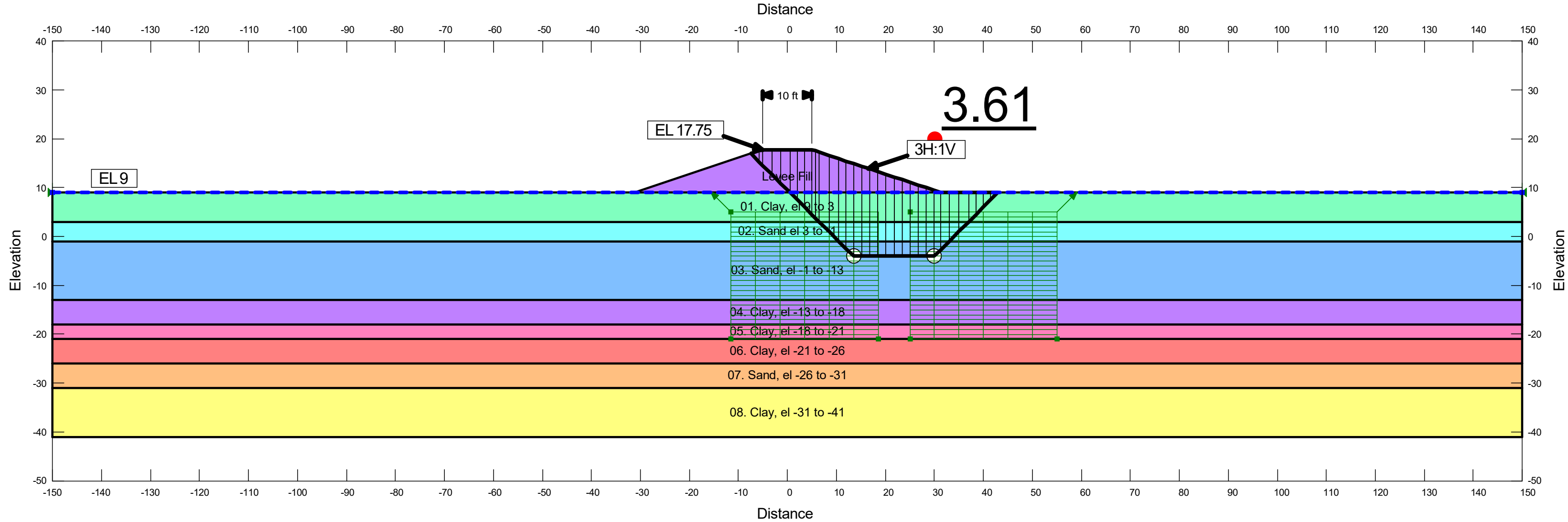
CHECKED BY:

FILENAME:

DRAWN BY: HCW

DATE: 06/14/2023

EUSTIS ENGINEERING L.L.C.
SINCE 1946



Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 9 to 3	Mohr-Coulomb	130	900	0
	02. Sand el 3 to -1	Mohr-Coulomb	130	0	28
	03. Sand, el -1 to -13	Mohr-Coulomb	130	0	29
	04. Clay, el -13 to -18	Mohr-Coulomb	119	600	0
	05. Clay, el -18 to -21	Mohr-Coulomb	119	1,300	0
	06. Clay, el -21 to -26	Mohr-Coulomb	125	1,300	0
	07. Sand, el -26 to -31	Mohr-Coulomb	125	0	29
	08. Clay, el -31 to -41	Mohr-Coulomb	118	1,000	0
	Levee Fill	Mohr-Coulomb	115	600	0

Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:48:53 AM

Method: Janbu
Direction of movement: Left to Right
Slip Surface Option: Block
Optimize Critical Slip Surface Location: No

Factor of Safety: 3.61

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VI

EE PROJECT No. 24493.03 - West Slidell Levee (Reach 1),
1. Levee to el 17.75,
C2) LWL Q-Case Janbu

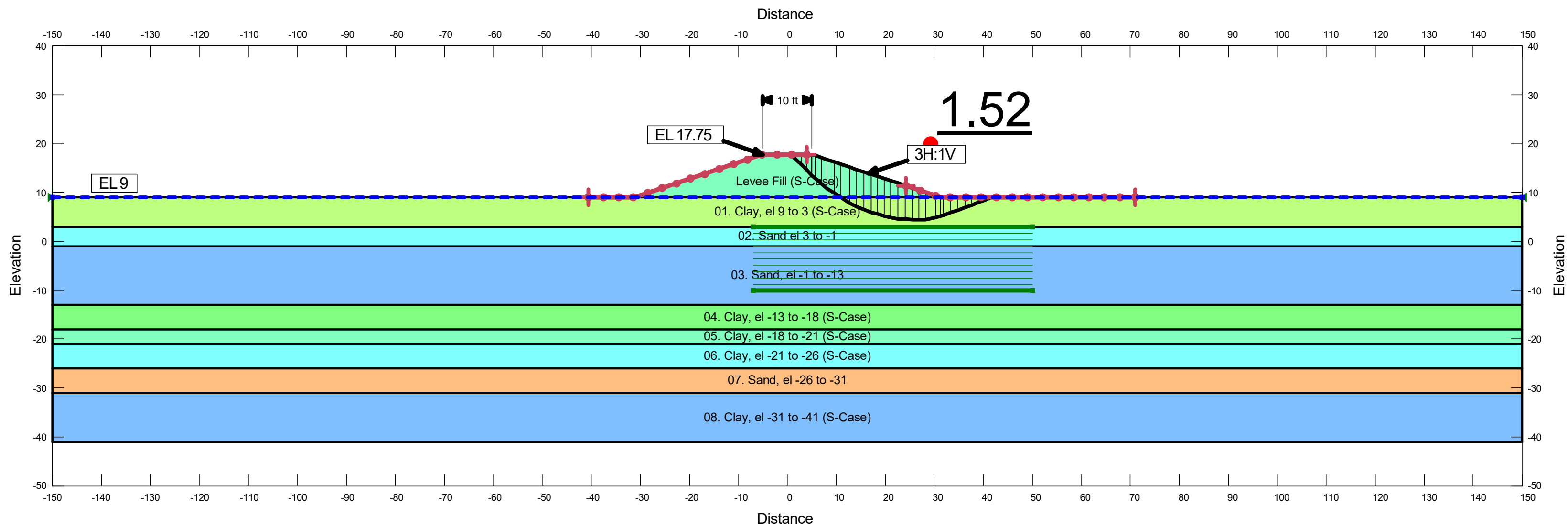
CHECKED BY:

FILENAME:

DRAWN BY:
HCW

DATE:
06/14/2023

EUSTIS
ENGINEERING L.L.C.
SINCE 1946



Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 9 to 3 (S-Case)	Mohr-Coulomb	130	0	23
	02. Sand el 3 to -1	Mohr-Coulomb	130	0	28
	03. Sand, el -1 to -13	Mohr-Coulomb	130	0	29
	04. Clay, el -13 to -18 (S-Case)	Mohr-Coulomb	119	0	23
	05. Clay, el -18 to -21 (S-Case)	Mohr-Coulomb	119	0	23
	06. Clay, el -21 to -26 (S-Case)	Mohr-Coulomb	125	0	23
	07. Sand, el -26 to -31	Mohr-Coulomb	125	0	29
	08. Clay, el -31 to -41 (S-Case)	Mohr-Coulomb	118	0	23
	Levee Fill (S-Case)	Mohr-Coulomb	115	0	23

Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:48:55 AM

Method: Spencer
Direction of movement: Left to Right
Slip Surface Option: Entry and Exit
Optimize Critical Slip Surface Location: Yes

Factor of Safety: 1.52

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VI

EE PROJECT No. 24493.03 - West Slidell Levee (Reach 1), 1. Levee to el 17.75,
D1) LWL S Case Spencers

CHECKED BY:
FILENAME:
DRAWN BY: HCW
DATE: 06/14/2023

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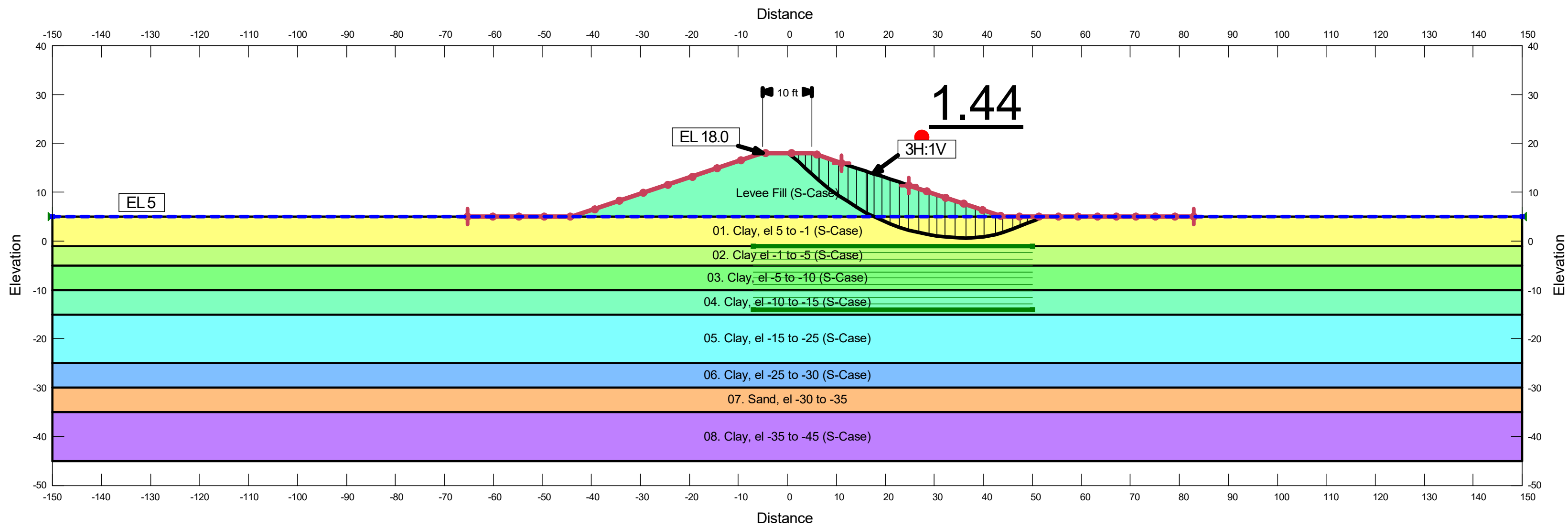
APPENDIX VII



Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 5 to -1 (S-Case)	Mohr-Coulomb	132	0	23
	02. Clay el -1 to -5 (S-Case)	Mohr-Coulomb	136	0	23
	03. Clay, el -5 to -10 (S-Case)	Mohr-Coulomb	131	0	23
	04. Clay, el -10 to -15 (S-Case)	Mohr-Coulomb	123	0	23
	05. Clay, el -15 to -25 (S-Case)	Mohr-Coulomb	113	0	23
	06. Clay, el -25 to -30 (S-Case)	Mohr-Coulomb	118	0	23
	07. Sand, el -30 to -35	Mohr-Coulomb	125	0	29
	08. Clay, el -35 to -45 (S-Case)	Mohr-Coulomb	107	0	23
	Levee Fill (S-Case)	Mohr-Coulomb	115	0	23

Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:23:30 AM

Method: Spencer
Direction of movement: Left to Right
Slip Surface Option: Entry and Exit
Optimize Critical Slip Surface Location: Yes

Factor of Safety: 1.44

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VII

D1) LWL S Case Spencers

EE PROJECT No. 24493.03 - West Slidell Levee (Reach 2), 1. Levee to el 18,

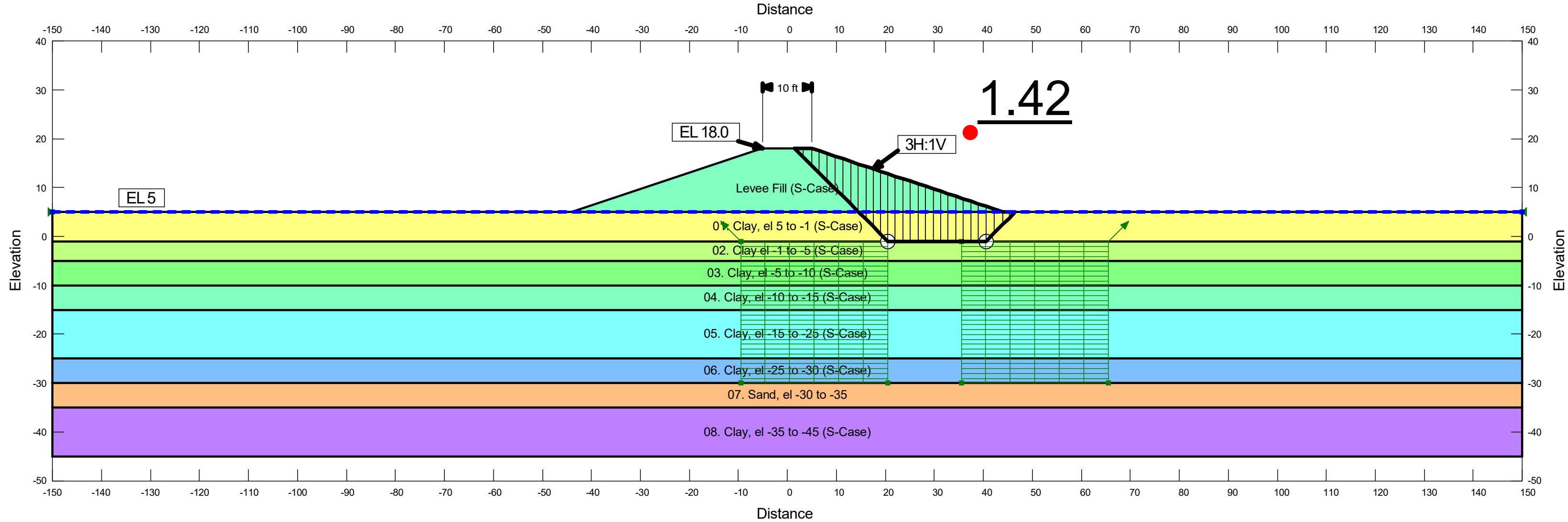
CHECKED BY:

FILENAME:

DRAWN BY: HCW

DATE: 06/14/2023

EUSTIS ENGINEERING L.L.C. SINCE 1946



Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 5 to -1 (S-Case)	Mohr-Coulomb	132	0	23
	02. Clay el -1 to -5 (S-Case)	Mohr-Coulomb	136	0	23
	03. Clay, el -5 to -10 (S-Case)	Mohr-Coulomb	131	0	23
	04. Clay, el -10 to -15 (S-Case)	Mohr-Coulomb	123	0	23
	05. Clay, el -15 to -25 (S-Case)	Mohr-Coulomb	113	0	23
	06. Clay, el -25 to -30 (S-Case)	Mohr-Coulomb	118	0	23
	07. Sand, el -30 to -35	Mohr-Coulomb	125	0	29
	08. Clay, el -35 to -45 (S-Case)	Mohr-Coulomb	107	0	23
	Levee Fill (S-Case)	Mohr-Coulomb	115	0	23

Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:23:32 AM

Method: Janbu
Direction of movement: Left to Right
Slip Surface Option: Block
Optimize Critical Slip Surface Location: No

Factor of Safety: 1.42

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VII

D2) LWL S Case Janbu

EE PROJECT No. 24493.03 - West Slidell Levee (Reach 2), 1. Levee to el 18,

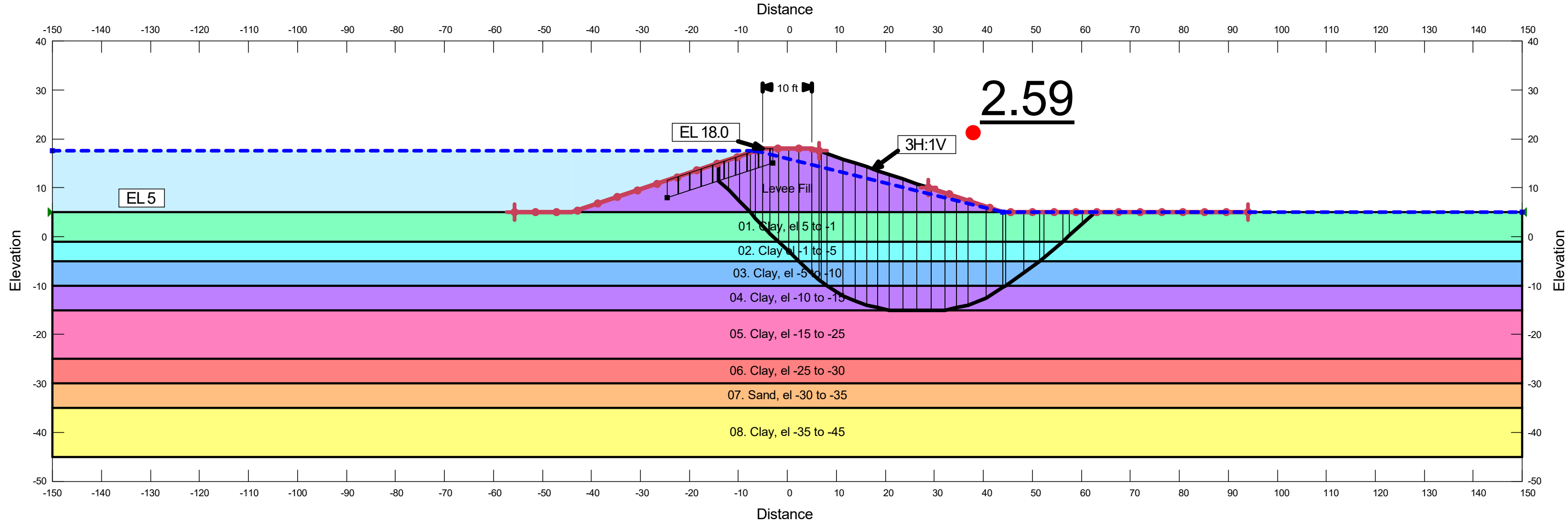
CHECKED BY:

FILENAME:

DRAWN BY: HCW

DATE: 06/14/2023

EUSTIS ENGINEERING L.L.C. SINCE 1946



Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:23:25 AM

Method: Spencer
Direction of movement: Left to Right
Slip Surface Option: Entry and Exit
Optimize Critical Slip Surface Location: Yes

Factor of Safety: 2.59

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 5 to -1	Mohr-Coulomb	132	600	0
	02. Clay el -1 to -5	Mohr-Coulomb	136	1,300	0
	03. Clay, el -5 to -10	Mohr-Coulomb	131	550	0
	04. Clay, el -10 to -15	Mohr-Coulomb	123	600	0
	05. Clay, el -15 to -25	Mohr-Coulomb	113	1,000	0
	06. Clay, el -25 to -30	Mohr-Coulomb	118	1,000	0
	07. Sand, el -30 to -35	Mohr-Coulomb	125	0	29
	08. Clay, el -35 to -45	Mohr-Coulomb	107	1,000	0
	Levee Fill	Mohr-Coulomb	115	600	0

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

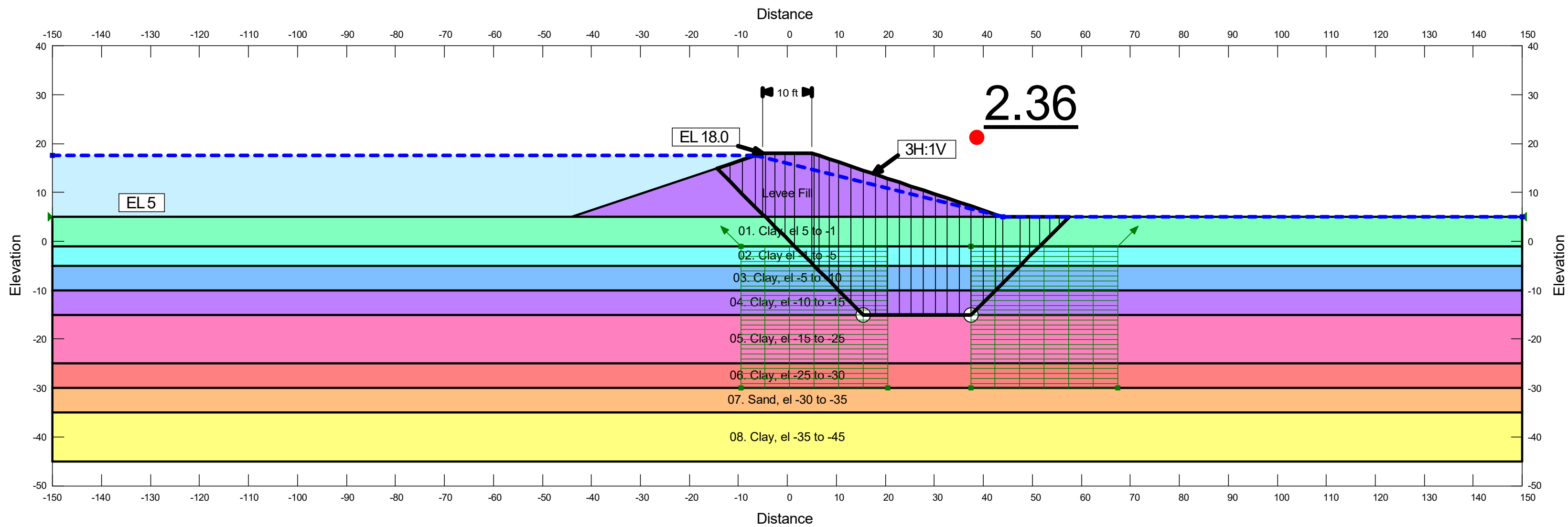
DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VII

EE PROJECT No. 24493.03 - West Slidell Levee (Reach 2),
1. Levee to el 18,
A1) PGL Protected Side Spencers

CHECKED BY:
FILENAME:
DRAWN BY: HCW
DATE: 06/14/2023

EUSTIS ENGINEERING L.L.C.
SINCE 1946



Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 5 to -1	Mohr-Coulomb	132	600	0
	02. Clay el -1 to -5	Mohr-Coulomb	136	1,300	0
	03. Clay, el -5 to -10	Mohr-Coulomb	131	550	0
	04. Clay, el -10 to -15	Mohr-Coulomb	123	600	0
	05. Clay, el -15 to -25	Mohr-Coulomb	113	1,000	0
	06. Clay, el -25 to -30	Mohr-Coulomb	118	1,000	0
	07. Sand, el -30 to -35	Mohr-Coulomb	125	0	29
	08. Clay, el -35 to -45	Mohr-Coulomb	107	1,000	0
	Levee Fill	Mohr-Coulomb	115	600	0

Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:23:31 AM

Method: Janbu
Direction of movement: Left to Right
Slip Surface Option: Block
Optimize Critical Slip Surface Location: No

Factor of Safety: 2.36

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VII

A2) PGL Protected Side Janbu

EE PROJECT No. 24493.03 - West Slidell Levee (Reach 2), 1. Levee to el 18,

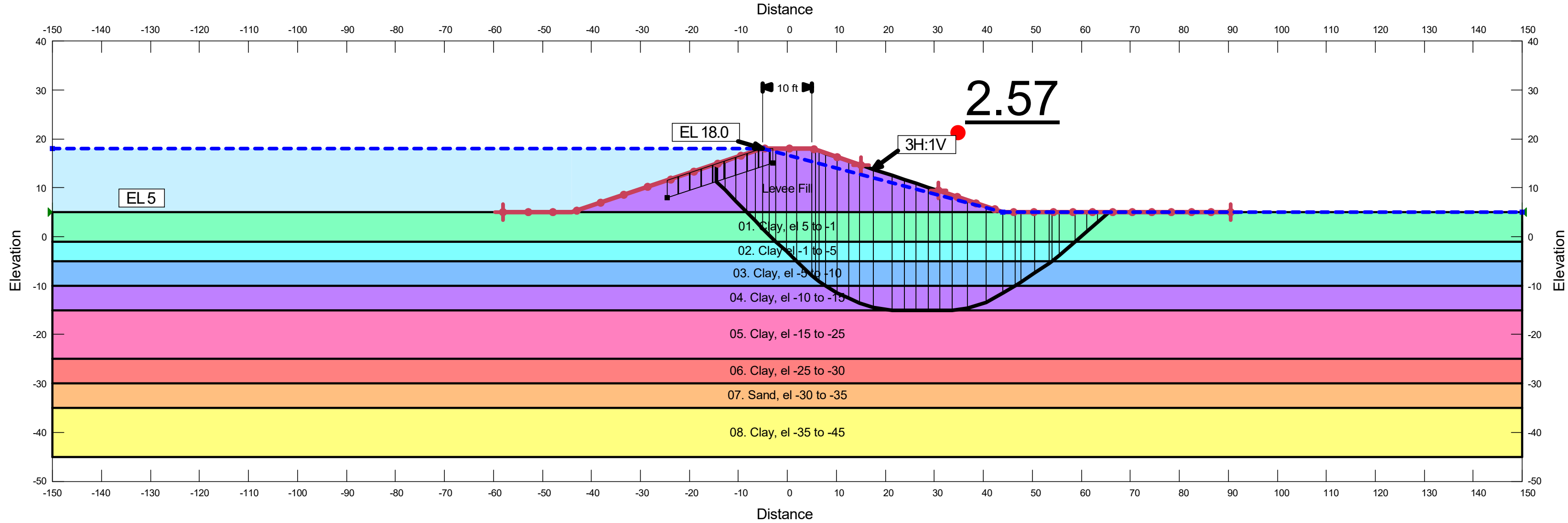
CHECKED BY:

FILENAME:

DRAWN BY: HCW

DATE: 06/14/2023

EUSTIS ENGINEERING L.L.C. SINCE 1946



Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 5 to -1	Mohr-Coulomb	132	600	0
	02. Clay el -1 to -5	Mohr-Coulomb	136	1,300	0
	03. Clay, el -5 to -10	Mohr-Coulomb	131	550	0
	04. Clay, el -10 to -15	Mohr-Coulomb	123	600	0
	05. Clay, el -15 to -25	Mohr-Coulomb	113	1,000	0
	06. Clay, el -25 to -30	Mohr-Coulomb	118	1,000	0
	07. Sand, el -30 to -35	Mohr-Coulomb	125	0	29
	08. Clay, el -35 to -45	Mohr-Coulomb	107	1,000	0
	Levee Fill	Mohr-Coulomb	115	600	0

Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:23:29 AM

Method: Spencer
Direction of movement: Left to Right
Slip Surface Option: Entry and Exit
Optimize Critical Slip Surface Location: Yes

Factor of Safety: 2.57

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VII

B1) CGL Protected Side Spencers

EE PROJECT No. 24493.03 - West Slidell Levee (Reach 2), 1. Levee to el 18,

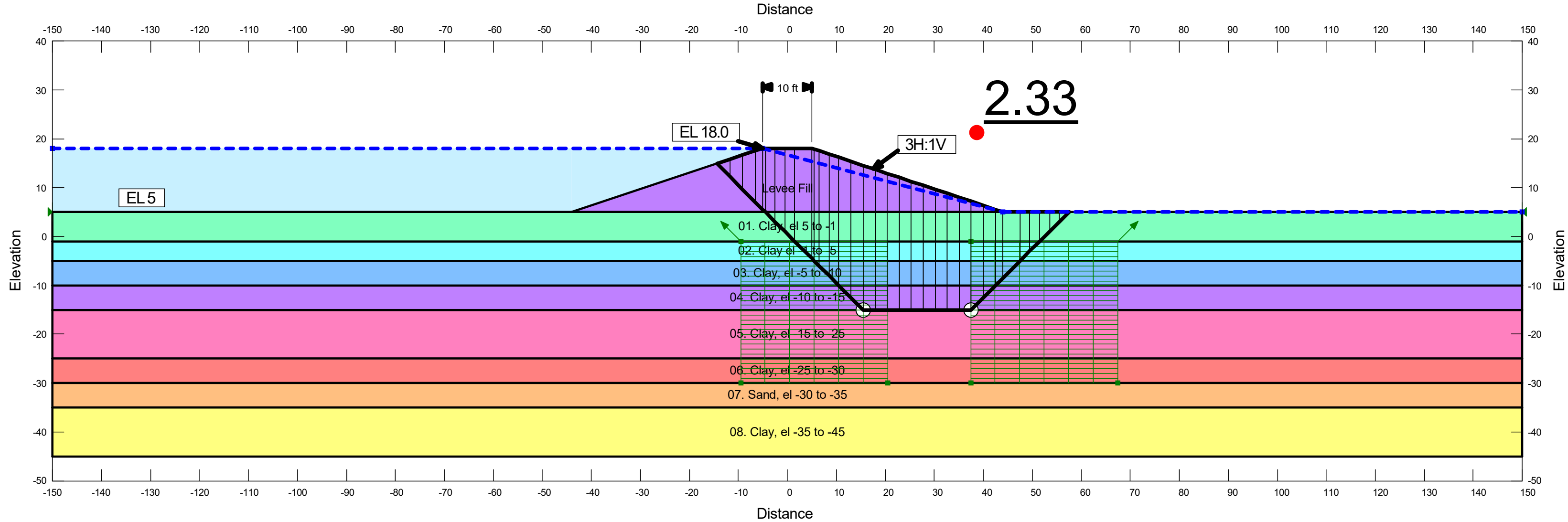
CHECKED BY:

FILENAME:

DRAWN BY: HCW

DATE: 06/14/2023

EUSTIS ENGINEERING L.L.C. SINCE 1946



Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 5 to -1	Mohr-Coulomb	132	600	0
	02. Clay el -1 to -5	Mohr-Coulomb	136	1,300	0
	03. Clay, el -5 to -10	Mohr-Coulomb	131	550	0
	04. Clay, el -10 to -15	Mohr-Coulomb	123	600	0
	05. Clay, el -15 to -25	Mohr-Coulomb	113	1,000	0
	06. Clay, el -25 to -30	Mohr-Coulomb	118	1,000	0
	07. Sand, el -30 to -35	Mohr-Coulomb	125	0	29
	08. Clay, el -35 to -45	Mohr-Coulomb	107	1,000	0
	Levee Fill	Mohr-Coulomb	115	600	0

Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:23:31 AM

Method: Janbu
Direction of movement: Left to Right
Slip Surface Option: Block
Optimize Critical Slip Surface Location: No

Factor of Safety: 2.33

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VII

EE PROJECT No. 24493.03 - West Slidell Levee (Reach 2),
1. Levee to el 18,

B2) CGL Protected Side Janbu

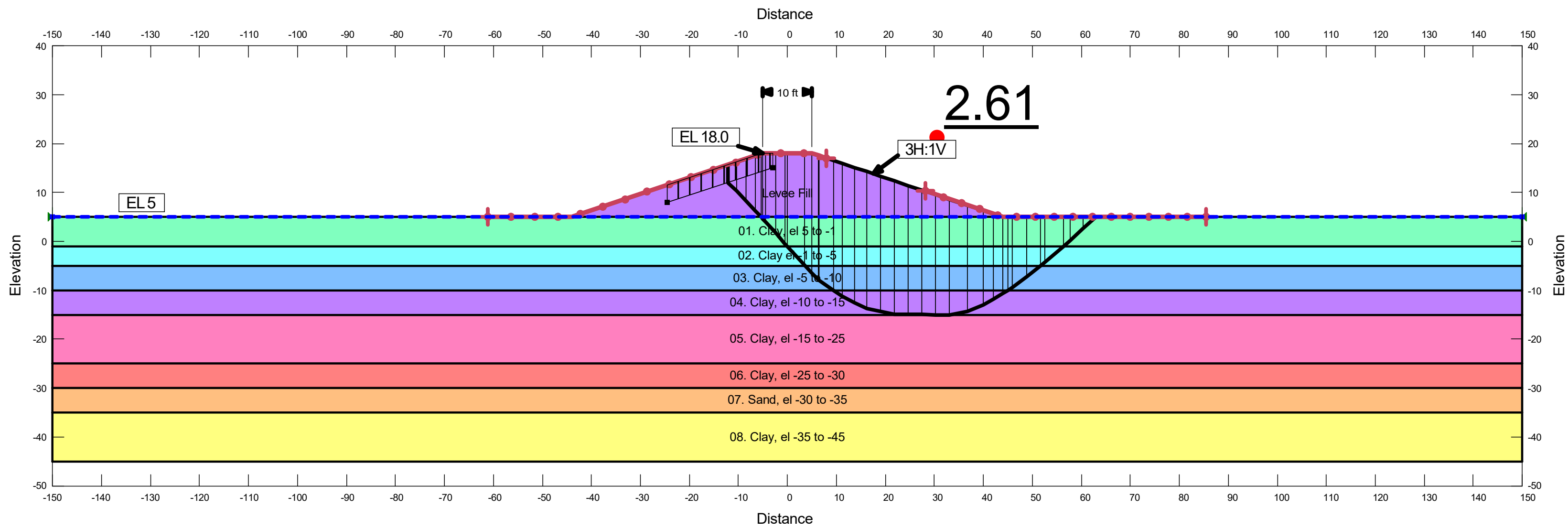
CHECKED BY:

FILENAME:

DRAWN BY:
HCW

DATE:
06/14/2023

EUSTIS ENGINEERING L.L.C. SINCE 1946



Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:23:34 AM

Method: Spencer
Direction of movement: Left to Right
Slip Surface Option: Entry and Exit
Optimize Critical Slip Surface Location: Yes

Factor of Safety: 2.61

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 5 to -1	Mohr-Coulomb	132	600	0
	02. Clay el -1 to -5	Mohr-Coulomb	136	1,300	0
	03. Clay, el -5 to -10	Mohr-Coulomb	131	550	0
	04. Clay, el -10 to -15	Mohr-Coulomb	123	600	0
	05. Clay, el -15 to -25	Mohr-Coulomb	113	1,000	0
	06. Clay, el -25 to -30	Mohr-Coulomb	118	1,000	0
	07. Sand, el -30 to -35	Mohr-Coulomb	125	0	29
	08. Clay, el -35 to -45	Mohr-Coulomb	107	1,000	0
	Levee Fill	Mohr-Coulomb	115	600	0

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VII

C1) LWL Q-Case Spencers

EE PROJECT No. 24493.03 - West Slidell Levee (Reach 2),
1. Levee to el 18,

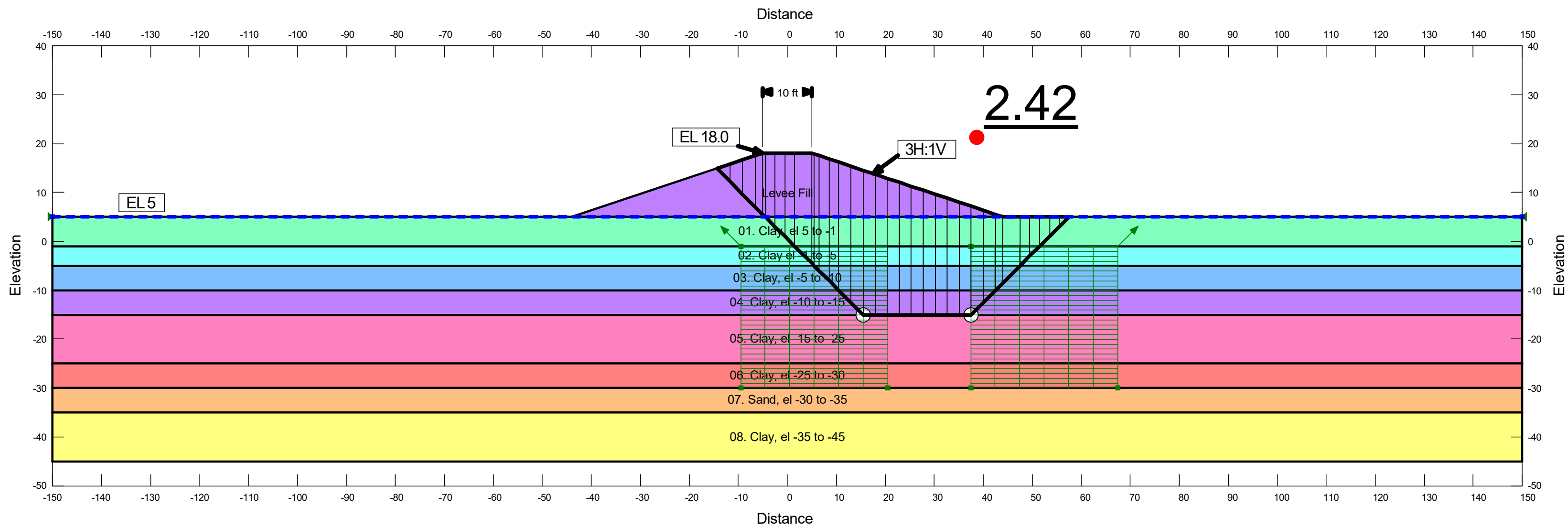
CHECKED BY:

FILENAME:

DRAWN BY: HCW

DATE: 06/14/2023

EUSTIS ENGINEERING L.L.C. SINCE 1946



Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 5 to -1	Mohr-Coulomb	132	600	0
	02. Clay el -1 to -5	Mohr-Coulomb	136	1,300	0
	03. Clay, el -5 to -10	Mohr-Coulomb	131	550	0
	04. Clay, el -10 to -15	Mohr-Coulomb	123	600	0
	05. Clay, el -15 to -25	Mohr-Coulomb	113	1,000	0
	06. Clay, el -25 to -30	Mohr-Coulomb	118	1,000	0
	07. Sand, el -30 to -35	Mohr-Coulomb	125	0	29
	08. Clay, el -35 to -45	Mohr-Coulomb	107	1,000	0
	Levee Fill	Mohr-Coulomb	115	600	0

Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:23:32 AM

Method: Janbu
Direction of movement: Left to Right
Slip Surface Option: Block
Optimize Critical Slip Surface Location: No

Factor of Safety: 2.42

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VII

C2) LWL Q-Case Janbu

EE PROJECT No. 24493.03 - West Slidell Levee (Reach 2), 1. Levee to el 18,

CHECKED BY:

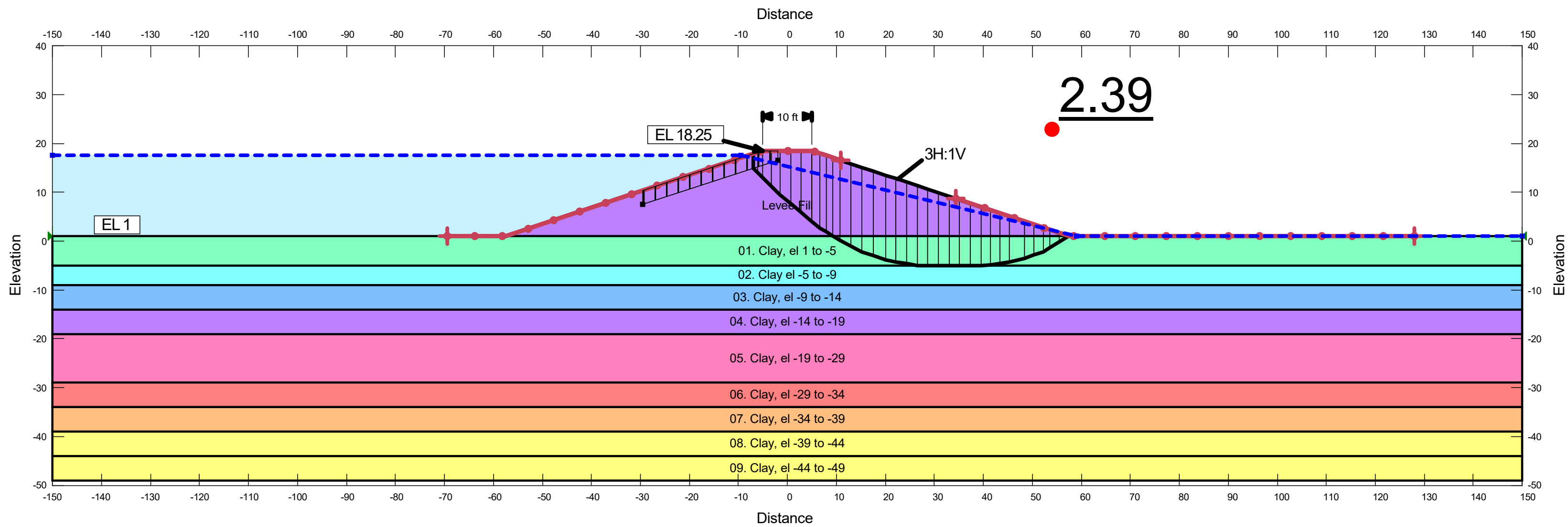
FILENAME:

DRAWN BY: HCW

DATE: 06/14/2023

EUSTIS ENGINEERING L.L.C. SINCE 1946

APPENDIX VIII



Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 1 to -5	Mohr-Coulomb	132	700	0
	02. Clay el -5 to -9	Mohr-Coulomb	136	1,300	0
	03. Clay, el -9 to -14	Mohr-Coulomb	131	1,500	0
	04. Clay, el -14 to -19	Mohr-Coulomb	123	1,200	0
	05. Clay, el -19 to -29	Mohr-Coulomb	113	1,100	0
	06. Clay, el -29 to -34	Mohr-Coulomb	118	1,000	0
	07. Clay, el -34 to -39	Mohr-Coulomb	125	1,000	0
	08. Clay, el -39 to -44	Mohr-Coulomb	107	1,000	0
	09. Clay, el -44 to -49	Mohr-Coulomb	107	1,500	0
	Levee Fill	Mohr-Coulomb	115	600	0

Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:03:57 AM

Method: Spencer
Direction of movement: Left to Right
Slip Surface Option: Entry and Exit
Optimize Critical Slip Surface Location: Yes

Factor of Safety: 2.39

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VIII

EE PROJECT No. 24493.02 - West Slidell Levee (Reach 3),
1. Levee to el 19,
A1) PGL Protected Side Spencers

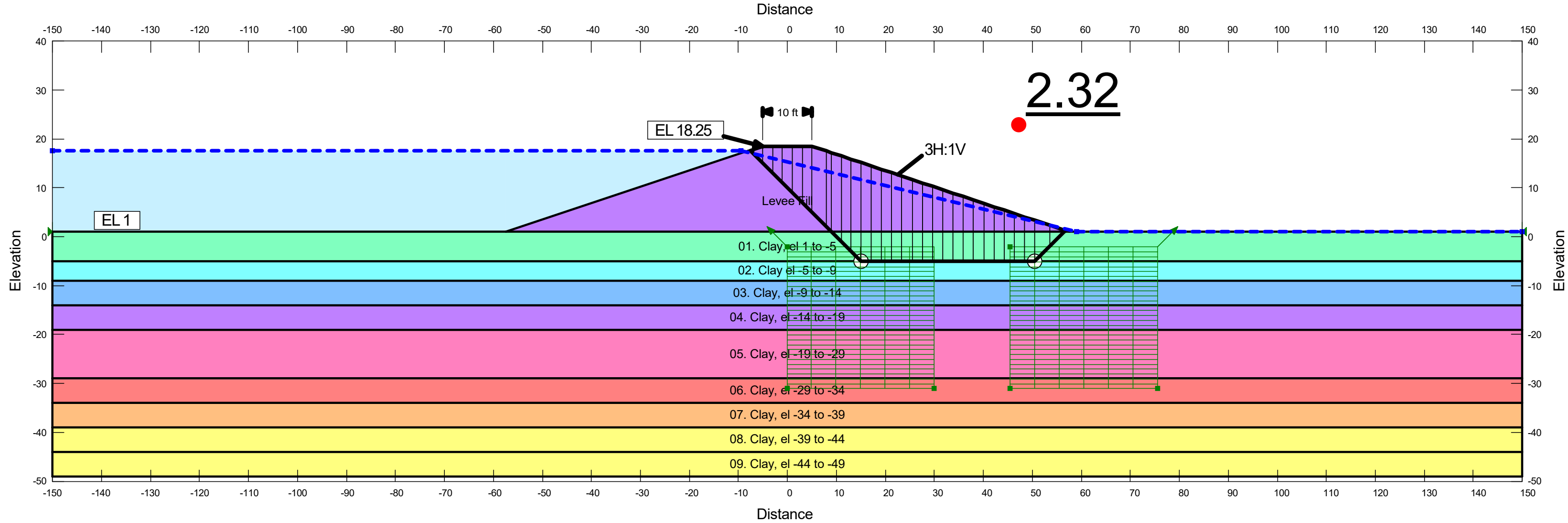
CHECKED BY:

FILENAME:

DRAWN BY: HCW

DATE: 06/14/2023

EUSTIS ENGINEERING L.L.C.
SINCE 1946



Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 1 to -5	Mohr-Coulomb	132	700	0
	02. Clay el -5 to -9	Mohr-Coulomb	136	1,300	0
	03. Clay, el -9 to -14	Mohr-Coulomb	131	1,500	0
	04. Clay, el -14 to -19	Mohr-Coulomb	123	1,200	0
	05. Clay, el -19 to -29	Mohr-Coulomb	113	1,100	0
	06. Clay, el -29 to -34	Mohr-Coulomb	118	1,000	0
	07. Clay, el -34 to -39	Mohr-Coulomb	125	1,000	0
	08. Clay, el -39 to -44	Mohr-Coulomb	107	1,000	0
	09. Clay, el -44 to -49	Mohr-Coulomb	107	1,500	0
	Levee Fill	Mohr-Coulomb	115	600	0

Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:04:05 AM

Method: Janbu
Direction of movement: Left to Right
Slip Surface Option: Block
Optimize Critical Slip Surface Location: No

Factor of Safety: 2.32

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VIII

A2) PGL Protected Side Janbu

EE PROJECT No. 24493.02 - West Slidell Levee (Reach 3),
1. Levee to el 19,

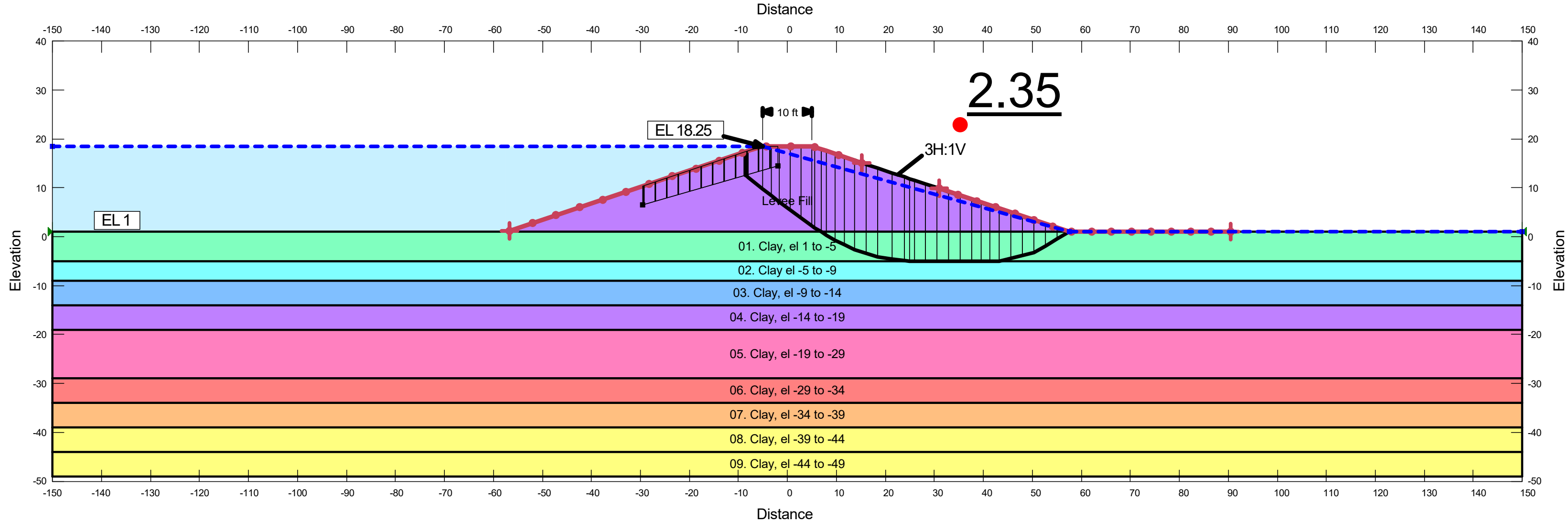
CHECKED BY:

FILENAME:

DRAWN BY:
HCW

DATE:
06/14/2023

EUSTIS
ENGINEERING L.L.C.
SINCE 1946



Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 1 to -5	Mohr-Coulomb	132	700	0
	02. Clay el -5 to -9	Mohr-Coulomb	136	1,300	0
	03. Clay, el -9 to -14	Mohr-Coulomb	131	1,500	0
	04. Clay, el -14 to -19	Mohr-Coulomb	123	1,200	0
	05. Clay, el -19 to -29	Mohr-Coulomb	113	1,100	0
	06. Clay, el -29 to -34	Mohr-Coulomb	118	1,000	0
	07. Clay, el -34 to -39	Mohr-Coulomb	125	1,000	0
	08. Clay, el -39 to -44	Mohr-Coulomb	107	1,000	0
	09. Clay, el -44 to -49	Mohr-Coulomb	107	1,500	0
	Levee Fill	Mohr-Coulomb	115	600	0

Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:04:02 AM

Method: Spencer
Direction of movement: Left to Right
Slip Surface Option: Entry and Exit
Optimize Critical Slip Surface Location: Yes

Factor of Safety: 2.35

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VIII

B1) CGL Protected Side Spencers

EE PROJECT No. 24493.02 - West Slidell Levee (Reach 3),
1. Levee to el 19,

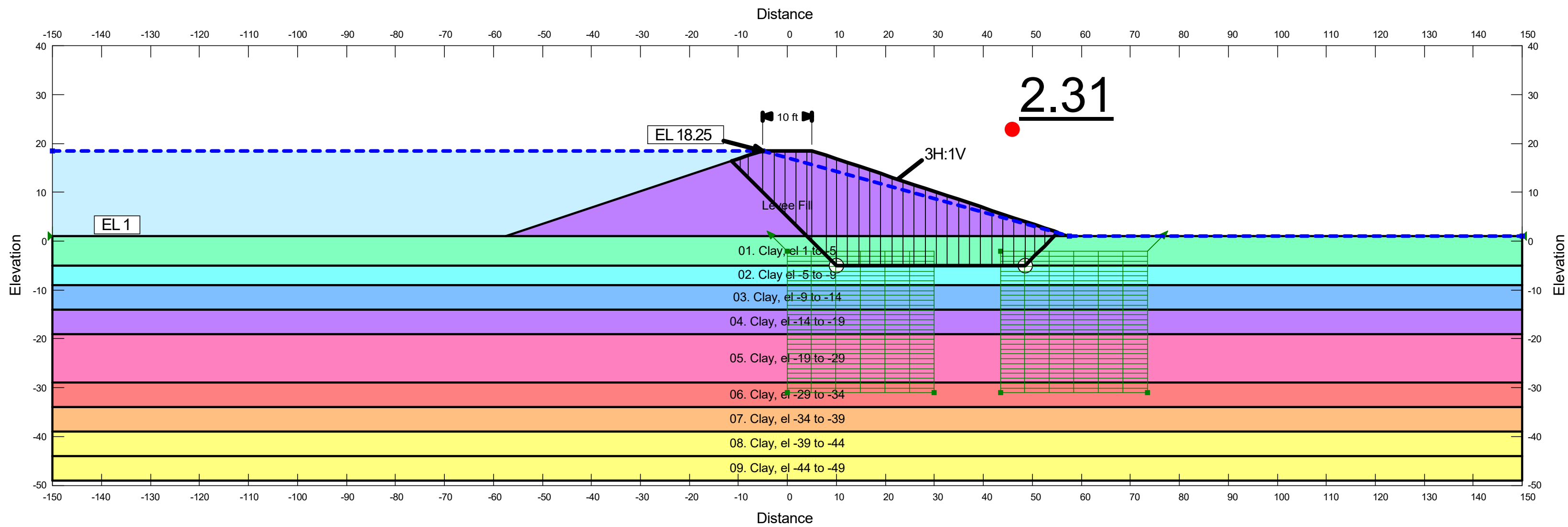
CHECKED BY:

FILENAME:

DRAWN BY: HCW

DATE: 06/14/2023

EUSTIS ENGINEERING L.L.C. SINCE 1946



Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 1 to -5	Mohr-Coulomb	132	700	0
	02. Clay el -5 to -9	Mohr-Coulomb	136	1,300	0
	03. Clay, el -9 to -14	Mohr-Coulomb	131	1,500	0
	04. Clay, el -14 to -19	Mohr-Coulomb	123	1,200	0
	05. Clay, el -19 to -29	Mohr-Coulomb	113	1,100	0
	06. Clay, el -29 to -34	Mohr-Coulomb	118	1,000	0
	07. Clay, el -34 to -39	Mohr-Coulomb	125	1,000	0
	08. Clay, el -39 to -44	Mohr-Coulomb	107	1,000	0
	09. Clay, el -44 to -49	Mohr-Coulomb	107	1,500	0
	Levee Fill	Mohr-Coulomb	115	600	0

Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:04:05 AM

Method: Janbu
Direction of movement: Left to Right
Slip Surface Option: Block
Optimize Critical Slip Surface Location: No

Factor of Safety: 2.31

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VIII

B2) CGL Protected Side Janbu

EE PROJECT No. 24493.02 - West Slidell Levee (Reach 3),
1. Levee to el 19,

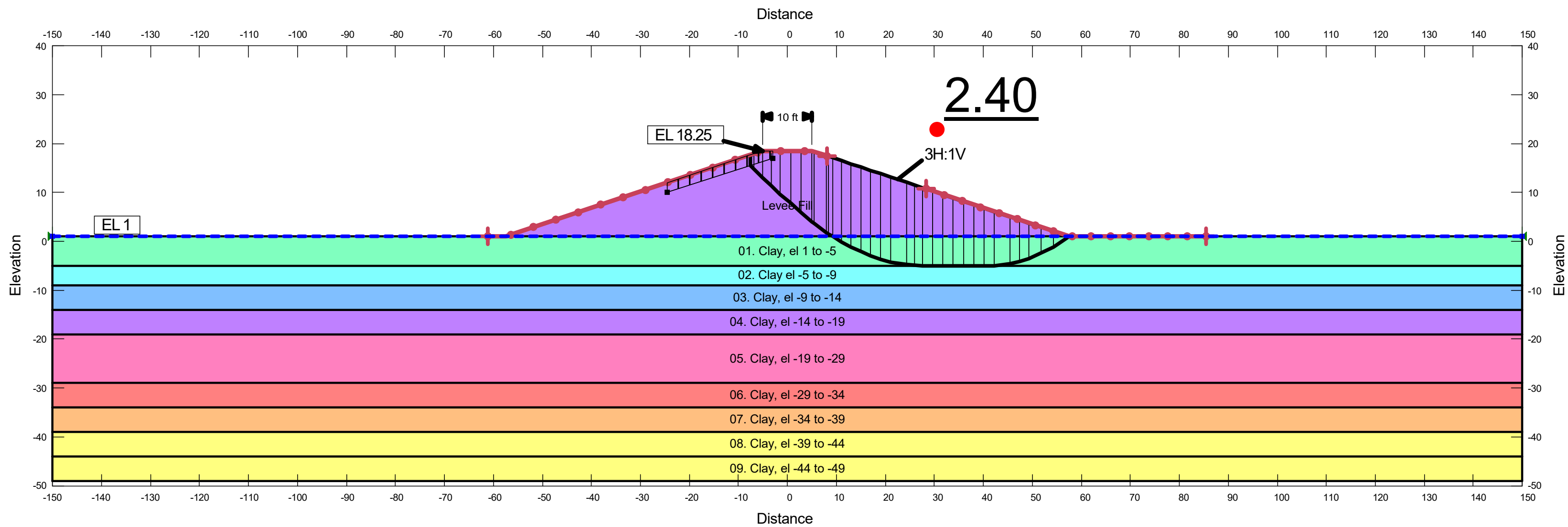
CHECKED BY:

FILENAME:

DRAWN BY:
HCW

DATE:
06/14/2023

EUSTIS
ENGINEERING L.L.C.
SINCE 1946



Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 1 to -5	Mohr-Coulomb	132	700	0
	02. Clay el -5 to -9	Mohr-Coulomb	136	1,300	0
	03. Clay, el -9 to -14	Mohr-Coulomb	131	1,500	0
	04. Clay, el -14 to -19	Mohr-Coulomb	123	1,200	0
	05. Clay, el -19 to -29	Mohr-Coulomb	113	1,100	0
	06. Clay, el -29 to -34	Mohr-Coulomb	118	1,000	0
	07. Clay, el -34 to -39	Mohr-Coulomb	125	1,000	0
	08. Clay, el -39 to -44	Mohr-Coulomb	107	1,000	0
	09. Clay, el -44 to -49	Mohr-Coulomb	107	1,500	0
	Levee Fill	Mohr-Coulomb	115	600	0

Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:04:08 AM

Method: Spencer
Direction of movement: Left to Right
Slip Surface Option: Entry and Exit
Optimize Critical Slip Surface Location: Yes

Factor of Safety: 2.40

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VIII

C1) LWL Q-Case Spencers

EE PROJECT No. 24493.02 - West Slidell Levee (Reach 3),
1. Levee to el 19,

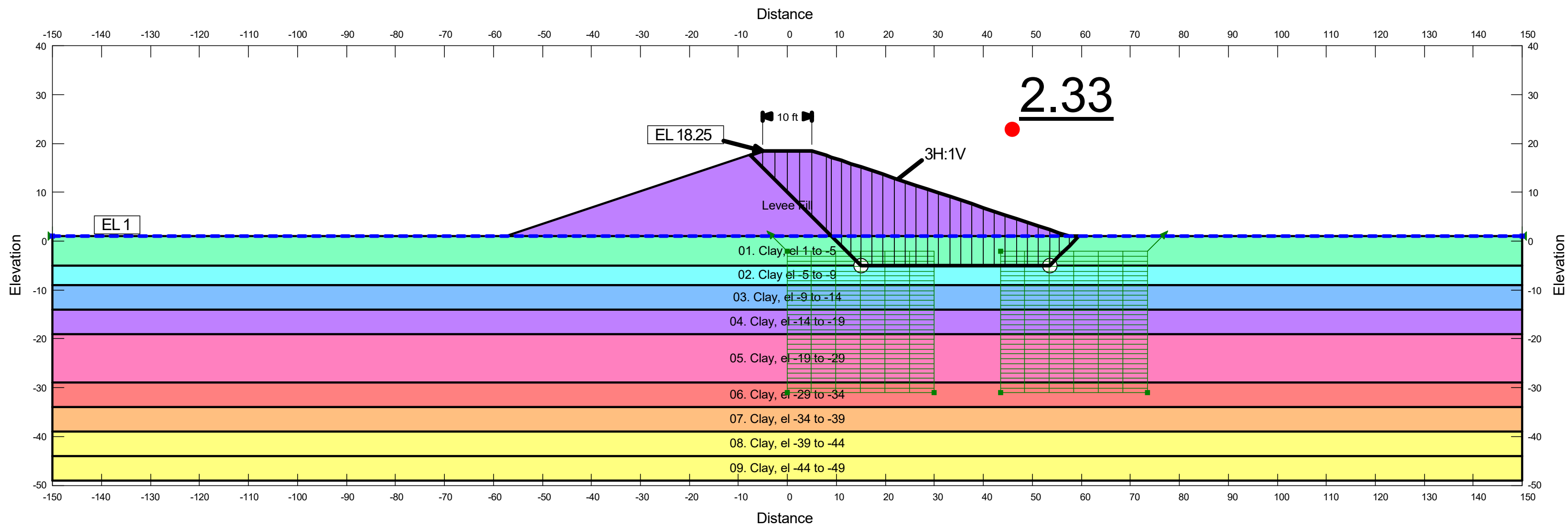
CHECKED BY:

FILENAME:

DRAWN BY:
HCW

DATE:
06/14/2023

EUSTIS
ENGINEERING L.L.C.
SINCE 1946



Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 1 to -5	Mohr-Coulomb	132	700	0
	02. Clay el -5 to -9	Mohr-Coulomb	136	1,300	0
	03. Clay, el -9 to -14	Mohr-Coulomb	131	1,500	0
	04. Clay, el -14 to -19	Mohr-Coulomb	123	1,200	0
	05. Clay, el -19 to -29	Mohr-Coulomb	113	1,100	0
	06. Clay, el -29 to -34	Mohr-Coulomb	118	1,000	0
	07. Clay, el -34 to -39	Mohr-Coulomb	125	1,000	0
	08. Clay, el -39 to -44	Mohr-Coulomb	107	1,000	0
	09. Clay, el -44 to -49	Mohr-Coulomb	107	1,500	0
	Levee Fill	Mohr-Coulomb	115	600	0

Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:04:06 AM

Method: Janbu
Direction of movement: Left to Right
Slip Surface Option: Block
Optimize Critical Slip Surface Location: No

Factor of Safety: 2.33

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VIII

C2) LWL Q-Case Janbu

EE PROJECT No. 24493.02 - West Slidell Levee (Reach 3), 1. Levee to el 19,

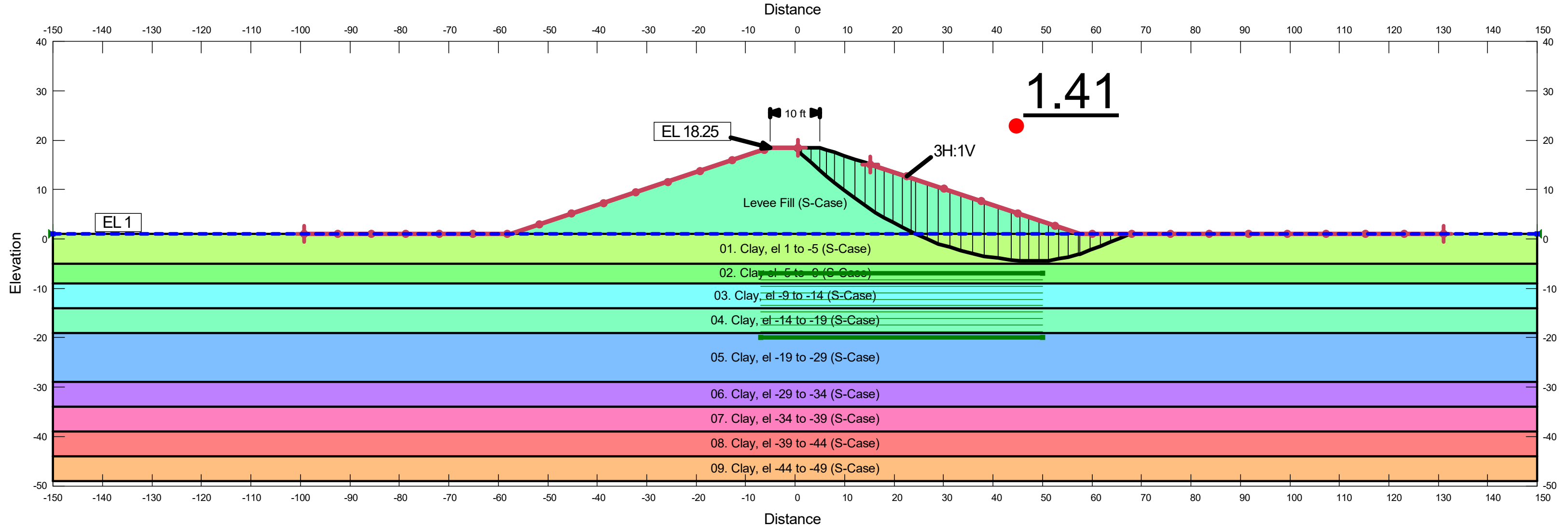
CHECKED BY:

FILENAME:

DRAWN BY: HCW

DATE: 06/14/2023

EUSTIS ENGINEERING L.L.C. SINCE 1946



Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 1 to -5 (S-Case)	Mohr-Coulomb	132	0	23
	02. Clay el -5 to -9 (S-Case)	Mohr-Coulomb	136	0	23
	03. Clay, el -9 to -14 (S-Case)	Mohr-Coulomb	131	0	23
	04. Clay, el -14 to -19 (S-Case)	Mohr-Coulomb	123	0	23
	05. Clay, el -19 to -29 (S-Case)	Mohr-Coulomb	113	0	23
	06. Clay, el -29 to -34 (S-Case)	Mohr-Coulomb	118	0	23
	07. Clay, el -34 to -39 (S-Case)	Mohr-Coulomb	125	0	23
	08. Clay, el -39 to -44 (S-Case)	Mohr-Coulomb	107	0	23
	09. Clay, el -44 to -49 (S-Case)	Mohr-Coulomb	107	0	23
	Levee Fill (S-Case)	Mohr-Coulomb	115	0	23

Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:04:03 AM

Method: Spencer
Direction of movement: Left to Right
Slip Surface Option: Entry and Exit
Optimize Critical Slip Surface Location: Yes

Factor of Safety: 1.41

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VIII

D1) LWL S Case Spencers

EE PROJECT No. 24493.02 - West Slidell Levee (Reach 3),
1. Levee to el 19,

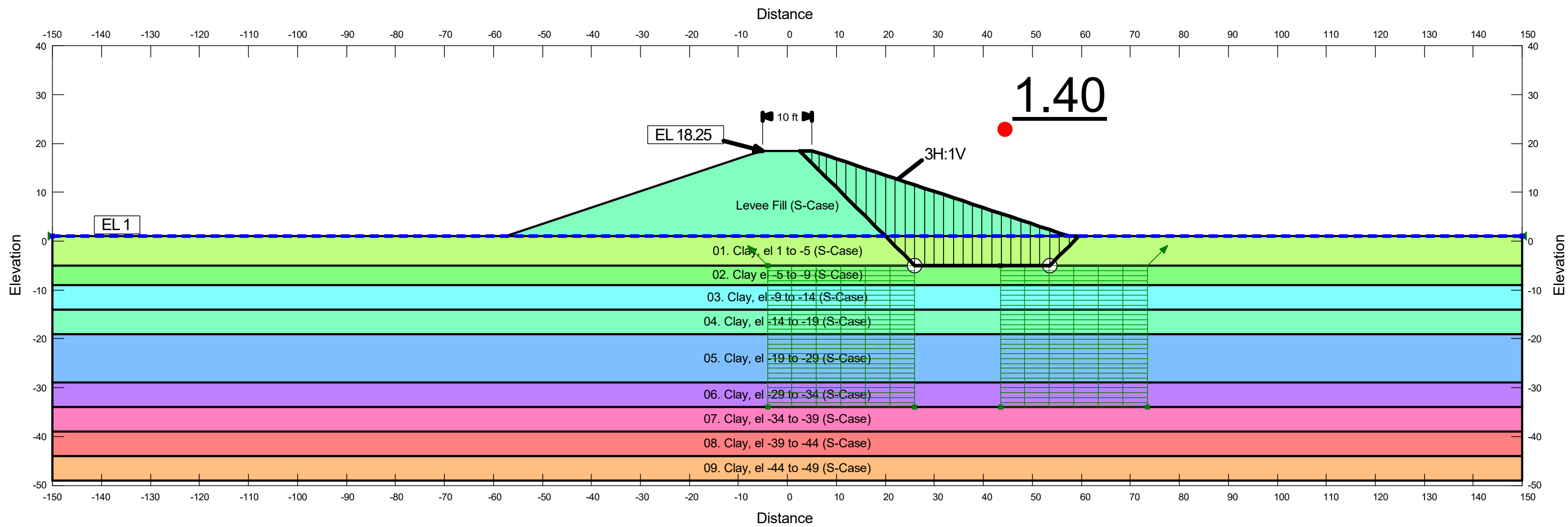
CHECKED BY:

FILENAME:

DRAWN BY:
HCW

DATE:
06/14/2023

EUSTIS ENGINEERING L.L.C.
SINCE 1946



Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	01. Clay, el 1 to -5 (S-Case)	Mohr-Coulomb	132	0	23
	02. Clay el -5 to -9 (S-Case)	Mohr-Coulomb	136	0	23
	03. Clay, el -9 to -14 (S-Case)	Mohr-Coulomb	131	0	23
	04. Clay, el -14 to -19 (S-Case)	Mohr-Coulomb	123	0	23
	05. Clay, el -19 to -29 (S-Case)	Mohr-Coulomb	113	0	23
	06. Clay, el -29 to -34 (S-Case)	Mohr-Coulomb	118	0	23
	07. Clay, el -34 to -39 (S-Case)	Mohr-Coulomb	125	0	23
	08. Clay, el -39 to -44 (S-Case)	Mohr-Coulomb	107	0	23
	09. Clay, el -44 to -49 (S-Case)	Mohr-Coulomb	107	0	23
	Levee Fill (S-Case)	Mohr-Coulomb	115	0	23

Created By: Clay Worley
Last Edited By: Clay Worley
Last Solved Date: 06/14/2023
Last Solved Time: 02:04:06 AM

Method: Janbu
Direction of movement: Left to Right
Slip Surface Option: Block
Optimize Critical Slip Surface Location: No

Factor of Safety: 1.40

NOTES:
1) DEEP-SEATED GLOBAL STABILITY ANALYSES PERFORMED BY SPENCER'S METHOD OF SLICES USING SLOPE/W SOFTWARE VERSION 11.02.
2) THE CROSS-SECTION SHOWN ABOVE IS BASED ON FURNISHED INFORMATION.
3) THIS IS NOT A CONSTRUCTION DRAWING.

DRAWING NOT TO SCALE
NOT FOR CONSTRUCTION USE

APPENDIX VIII

EE PROJECT No. 24493.02 - West Slidell Levee (Reach 3),
1. Levee to el 19,
D2) LWL S Case Janbu

CHECKED BY:

FILENAME:

DRAWN BY: HCW

DATE: 06/14/2023

EUSTIS ENGINEERING L.L.C.
SINCE 1946