

Brunswick Harbor Modifications Study, Glynn County, GA

Attachment B-4

Engineering and Design

***Subsurface Exploration and Geotechnical Engineering Data
Report***

**U.S. ARMY CORPS OF ENGINEERS
SAVANNAH DISTRICT
100 WEST OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401**



July 2021

**BRUNSWICK HARBOR MODIFICATION STUDY
SUBSURFACE EXPLORATION AND
GEOTECHNICAL ENGINEERING DATA REPORT
BRUNSWICK, GLYNN COUNTY, GEORGIA**

Prepared for:



**U.S. Army Corps of Engineers
Savannah District
Georgia**

February 2021

Prepared by:



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Ardaman & Associates, Inc.

Geotechnical, Environmental, and
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A Tetra Tech Company

February 9, 2021
File Number 20-13-0122

U.S. Army Engineer District, Savannah
100 West Oglethorpe Avenue
Savannah, GA 31402

Attention: Mr. Michael R. Loveland, P.G.

Subject: Brunswick Harbor Modification Study, Subsurface Exploration and Geotechnical
Engineering Data Report, Glynn County, Georgia

Dear Mr. Loveland:

As authorized, we have completed a subsurface soil exploration program for the Brunswick Harbor Modification Study at Glynn County, Georgia. The purpose of performing this exploration was to collect samples to be used in evaluating the general subsurface conditions at the proposed dredge locations.

It is our understanding that the data from the exploration and laboratory testing will be used to identify and characterize the soil that will be encountered during dredging of the turning basin and channel bend widener expansion. This data report summarizes the work efforts undertaken and the findings derived from the completed field geotechnical exploration and laboratory soil testing program.

We appreciate the opportunity of assisting the U.S. Army Corps of Engineers on this interesting project and look forward to working with you on future projects. If you have any questions or comments, please contact the undersigned.

Very truly yours,
ARDAMAN & ASSOCIATES, INC.
A Tetra Tech Company

John E. Garlanger, Ph.D., P.E.
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 02/09/2021
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EXECUTIVE SUMMARY

Navigation channel improvements are proposed at the channel Turning Basin and Bend Widener areas as part of the Brunswick harbor modification study. These areas are proposed to be dredged to -36 feet (MLLW) with a 2-foot over-depth. Tetra Tech was tasked by the U.S. Army Corps of Engineers (USACE), Savannah District to perform subsurface exploration for the Brunswick Harbor modification study under Corps of Engineers Contract Number W912HN-17-D-0005 and Delivery Order W912HN20F2042.

Subsurface exploration was performed at the Turning Basin and Bend Widener areas and laboratory testing was performed on the samples collected. The drilling program was conducted between October 21 and November 24, 2020. Twenty-four Standard Penetration Test (SPT) borings were advanced to elevations between -48.29 and -52.53 feet (MLLW) and one coring was performed between elevations -35.82 and -40.82 feet (MLLW).

Tetra Tech - Ardaman & Associates, Inc. (Tetra Tech – AAI) was retained to perform the following tasks on this phase of the project:

- Advance fifteen borings/corings over water at locations designated by the U.S. Army Corps of Engineers (USACE) along the turning basin (Section A) area and collect representative disturbed soil samples for laboratory testing.
- Advance five borings/corings over water at locations designated by the USACE along the bend widener (Section B) area and collect representative disturbed soil samples for laboratory testing.
- Conduct visual classification of the soils and perform sieve analysis, Atterberg limits, specific gravity and sedimentation rate tests on disturbed samples from the borings selected by USACE.
- Conduct unconfined compression, split tensile, point load, Cerchar abrasivity index and permeability tests on core samples from the corings selected by USACE.
- Prepare a geotechnical data report that will include the boring location plan, boring logs and laboratory testing results.

The materials encountered in the Section A borings generally consist of very loose to loose sand to silty sand and clayey sand with shell fragments to approximate elevation -24 feet (MLLW) underlain by generally very loose to medium dense sand to silty sand and clayey sand with shell, limestone and sandstone fragments to the boring termination elevations of -48.9 to -52.3 feet (MLLW). High blow count material (N-value greater than 30) were encountered in the following borings: very dense silty sand between approximate elevations -43.5 and -48.5 feet (MLLW) in boring TB-B-02B; hard clay with limestone fragments between approximate elevations -26.9 and -28.4 feet (MLLW) and dense clayey sand with limestone fragments between approximate elevations -34.4 and -35.9 feet (MLLW) in boring TB-B-04; dense clayey sand with limestone fragments between approximate elevations -28.5 and -30.0 feet (MLLW) and between approximate elevations -40.5 and -43.5 feet (MLLW) in boring TB-B-06; hard clay with limestone fragments between approximate elevations -28.3 and -29.8 feet (MLLW) and very dense silty sand between approximate elevations -47.8 and -49.3 feet (MLLW) in boring

TB-B-07; dense sand between approximate elevations -37.6 and -39.1 feet (MLLW) in boring TB-B-08; dense sand with shell fragments between approximate elevations -17.6 and -19.1 feet (MLLW), hard clay with shell fragments between approximate elevations -31.1 and -34.1 feet (MLLW) and dense clayey sand with shell and limestone fragments between approximate elevations -40.1 and -41.6 feet (MLLW) in boring TB-B-09; dense to very dense clayey sand with shell and sandstone fragments between approximate elevations -27.5 and -30.5 feet (MLLW) and between approximate elevations -33.5 and -35.0 feet (MLLW) in boring TB-B-10; sandstone fragments between approximate elevations -29.7 and -30.2 feet (MLLW) and very dense clayey sand with shell and limestone fragments between approximate elevations -31.7 and -33.2 feet (MLLW) in boring TB-B-11; and hard sandy clay between approximate elevations -29.9 and -32.9 feet (MLLW), dense clayey sand between approximate elevations -32.9 and -34.4 feet (MLLW), dense clayey sand with limestone fragments between approximate elevations -37.4 and -39.3 feet (MLLW) and dense silty sand with limestone fragments between approximate elevations -39.3 and -40.4 feet (MLLW) in boring TB-B-13. Stiff to hard clay at varying elevations were encountered in the following borings: TB-B-02A, TB-B-04, TB-B-07, TB-B-09, TB-B-10, TB-B-11, TB-B-13, TB-B-14A and TB-B-15B.

The materials encountered in the Section B borings generally consist of very loose to medium dense sand to silty sand and clayey sand with shell, limestone and sandstone fragments to the boring termination elevations of -48.3 to -51.0 feet (MLLW). High blow count material (N-value greater than 30) were encountered at the following locations: dense sand with sandstone fragments between approximate elevations -28.0 and -31.0 feet (MLLW), dense clayey sand with sandstone fragments between approximate elevations -32.5 and -34.0 feet (MLLW) and approximate elevations -35.5 and -37.0 feet (MLLW), very dense sand between approximate elevations -38.5 and -40.0 feet (MLLW) and undetermined strata between approximate elevations -40.0 and -41.5 feet (MLLW) in boring BW-B-01; very dense clayey sand with sandstone fragments between approximate elevations -33.0 and -34.5 feet (MLLW), hard clay with gravel between approximate elevations -34.5 and -36.5 feet (MLLW) and very dense clayey sand between approximate elevations -48.0 and -49.5 feet (MLLW) in boring BW-B-02; very dense clayey sand with shell fragments between approximate elevations -34.8 and -37.8 feet (MLLW), limestone between approximate elevations -37.8 and -39.3 feet (MLLW) and very dense sand with shell and siltstone fragments between approximate elevations -39.3 and -40.8 feet (MLLW) in boring BW-B-03; dense clayey sand and hard clay with sand between approximate elevations -43.4 and -49.4 feet (MLLW) in boring BW-B-04; and dense sand with shell fragments between approximate elevations -26.7 and -28.2 feet (MLLW), hard clay between approximate elevations -39.2 and -40.2 feet (MLLW), dense clayey sand between approximate elevations -44.7 and -46.2 feet (MLLW) and dense sand with shell fragments between approximate elevations -46.2 and -49.2 feet (MLLW) in boring BW-B-05. Very stiff to hard clay at varying elevations were encountered in borings BW-B-02, BW-B-03 and BW-B-05.

1.0 INTRODUCTION AND SCOPE OF WORK

Portions of the Brunswick navigation channel Turning Basin (Section A) and Bend Widener (Section B) are proposed to be dredged to -36 feet (MLLW) with a 2-foot over-depth as part of improvements for the Brunswick Harbor modification study. To identify and characterize the soil that will be encountered during dredging, subsurface exploration was performed at these areas and laboratory testing were performed on the samples collected

The subsurface exploration program was conducted between October 21 and November 24, 2020. Seventeen Standard Penetration Test (SPT) borings at seventeen locations were advanced continuously from the mudline to depths of 15.0 to 36.0 feet (Elevation -48.3 to -52.0 feet MLLW). Seven SPT borings at three locations were continuously advanced to depths of 3.0 to 18.0 feet (Elevation -35.2 to -52.5 feet MLLW) from the existing mudline or from wash depths when a previous boring from the same general location was terminated shallower than the intended depth. Coring was performed in one location between Elevation -35.8 and -40.8 feet MLLW. All samples and cores were brought to our Orlando, Florida laboratory.

Sieve analysis, Atterberg limits, specific gravity and sedimentation rate tests, on disturbed samples from the borings selected by the U.S. Army Corps of Engineers (USACE), were performed in our Orlando, Florida laboratory. The USACE designated unconfined compression, split tensile and axial point load tests for the three available cores. One core sample was tested for unconfined compression strength in our Orlando, Florida laboratory. Two cores were sent to GeoTesting Express in Acton, MA for split tensile and axial point load tests.

The purpose of this report is to present the results of the field exploration and laboratory testing performed on selected samples obtained along the turning basin and bend widener areas.

The extent of our services for this phase of the project was as follows:

- Advance fifteen borings/corings over water at locations designated by the USACE along the turning basin (Section A) area and collect representative disturbed soil samples for laboratory testing.
- Advance five borings/corings over water at locations designated by the USACE along the bend widener (Section B) area and collect representative disturbed soil samples for laboratory testing.
- Conduct visual classification of the soils and perform sieve analysis, Atterberg limits, specific gravity and sedimentation rate tests on disturbed samples from the borings selected by USACE.
- Conduct unconfined compression, split tensile, point load, Cerchar abrasivity index and permeability tests on core samples from the corings selected by USACE.
- Prepare a geotechnical data report that will include the boring location plan, boring logs and laboratory testing results.

Tetra Tech - AAI has prepared this report for the exclusive use of the USACE for the specific application of identifying and characterizing the soil that will be encountered during dredging of the Brunswick Harbor turning basin and channel bend widener expansion areas in Brunswick, Glynn County, Georgia. The report was prepared in accordance with generally accepted geotechnical engineering practice. No other warranty, expressed or implied, is made.

The findings of this data report are based on the results of the field exploration and laboratory tests performed. While the borings and coring are representative of subsurface conditions at their respective locations and for their respective vertical reaches, local variations are anticipated and may be encountered during construction activities. The boring and coring logs and related information are based on the drilling logs, coring log, visual examination of selected samples in the laboratory and laboratory index testing and coring testing results. The delineations between soil types shown on the logs are approximate and the description represents our interpretation of subsurface conditions at the designated boring locations on the date drilled.

2.0 FIELD EXPLORATION PROGRAM

The field exploration program consisted of twenty-four Standard Penetration Test (SPT) borings and one coring. An overview of the boring location plan for the Brunswick Harbor modification study area, showing Section A and Section B, is presented in Figure 1.

2.1 *Standard Penetration Testing*

Standard Penetration Test (SPT) borings were advanced using a truck-mounted CME 55 drilling equipment on a 30- x 60-ft barge using the methodology outlined in ASTM D1586. A summary of this field procedure is included in Appendix A. Field logs for each boring were prepared by a field geotechnical engineer. These logs included visual classifications of the material encountered during drilling. Soil samples were generally obtained continuously from the existing mudline surface to the termination depth of the boreholes. All samples, which were visually field classified, were classified in accordance with the Unified Soils Classification System (USCS) as required in Engineering Manual 1110-1-1804. A photograph was taken of the split-spoon sample, using a ruler for scale, before representative portions of the samples were placed in sealed sample jars. Each jar was uniquely identified on the top of the jar lid and exterior side of the jar body. Information recorded on the jar lid and exterior side included Project Number, Boring ID, Sample Number and Depth (from __ to __). The SPT sample jars were successively placed in core boxes.

Nineteen SPT borings were advanced at fifteen general locations in the turning basin area (Section A) as presented in Figure 2. Twelve SPT borings at twelve locations (TB-B-01, TB-B-03 to TB-B-13) were advanced continuously from the existing mudline to depths of 18.0 to 36.0 feet (Elevation -49.0 to -52.0 feet MLLW) to the boring termination depth. At three general locations, the initial boring (TB-B-02A, TB-B-14A and TB-B-15A) was drilled continuously from the existing mudline but was terminated shallower than the intended depth (Elevation -48.0 feet MLLW) due to either stopping work because of bad weather or the barge spuds being pulled out because of rising water due to incoming tide. Sister borings (TB-B-02B, TB-B-14B and TB-B-15B) were drilled next to the initial boring and were advanced continuously from the wash depths to the boring termination depths except at TB-B-14B where another sister boring, TB-B-

14C, was drilled and advanced from the wash depth to the boring termination depth. The seven SPT borings (TB-B-02A, TB-B-02B, TB-B-14A, TB-B-14B, TB-B-14C, TB-B-15A and TB-B-15B) were continuously advanced to depths of 3.0 to 18.0 feet (Elevation -35.2 to -52.5 feet MLLW) from the existing mudline or from wash depths. The subsurface exploration program in Section A was conducted between October 21 and November 17, 2020.

Five SPT borings were advanced at five general locations in the bend widener area (Section B) as presented in Figure 3. The borings were advanced continuously from the existing mudline to depths of 15.0 to 24.0 feet (Elevation -48.3 to -51.0 feet MLLW) to the boring termination depth. The subsurface exploration program in Section B was conducted between November 20 and 23, 2020.

All the borings were located on site by a Tetra Tech - AAI engineer using a Trimble Geo7X differential Global Positioning System (GPS), which has a typical accuracy of 1 foot. Positions of the boreholes are reported in Georgia State Plane NAD83 coordinates (feet).

Mudline elevation at each boring location was determined by plotting the boring coordinates on the hydrographic survey maps, located at <https://navigation.usace.army.mil/Survey/Hydro>, provided by the USACE. The most recent survey at each location was used. Most of the mudline elevation was determined using the hydrographic survey dated 09/25/2020 except borings TB-B-09, TB-B-11, TB-B-13 and TB-B-14 where the hydrographic survey dated 06/21/19 and borings BW-B-01, BW-B-03 and BW-B-05 where the hydrographic survey dated 12/18/17 were used. In addition, the mudline elevation was also calculated by measuring the water depth at each boring location and subtracting it from the predicted tide height at the Howe St Pier Station (<https://tidesandcurrents.noaa.gov/noaatidepredictions.html?id=8677406>) prior to start of drilling. The more conservative determined mudline elevation, i.e., the higher elevation, was used to determine boring depth to terminate past elevation -48.0 feet MLLW.

Tables 1A and 1B summarize the Section A and Section B field exploration, respectively, conducted for the project. The mudline elevation used in this report are those determined from the hydrographic surveys. The individual test boring logs are presented in Appendix B. Photographs of the samples are presented in Appendix C.

All soil samples recovered during the field exploration program were brought back to our laboratory in Orlando, Florida for additional classification and testing. All laboratory tests, where applicable, were performed in general accordance with ASTM standards.

2.2 Core Sampling

The hard strata encountered in the SPT borings were normally a thin layer, no thicker than 1-2 feet, except in boring BW-B-03 where about 3 feet of hard material was encountered. Coring was performed using a 4-inch diameter and 5 feet long core barrel near the location of BW-B-03 from a depth of 8.0 to 13.0 feet (Elevation -35.8 to -40.8 feet MLLW) on November 24, 2020.

Three cores were recovered from BW-B-03 Core and were approximately 17 inches in total length. A photograph was taken of the core samples with a ruler for scale. The cores were individually wrapped in plastic and taped tight to maintain its moisture prior to placement in the core box. The core samples were brought back to our laboratory in Orlando, Florida for

additional classification and testing. All laboratory tests, where applicable, were performed in general accordance with ASTM standards.

The BW-B-03 Core information is summarized in Table 1B. The core log is presented in Appendix B and core photographs are presented in Appendix D.

Table 1A Summary of Section A Field Exploration

Boring Name	Georgia State Plane Coordinates (feet, NAD83)		Mudline Elevation (feet, MLLW)	Total Depth (feet)	End of Boring Elevation (feet, MLLW)	Start of Drilling	Completion of Drilling
	Northing	Easting					
TB-B-01	412,934.005	853,765.036	-28.5	21.0	-49.5	11/17/2020	11/17/2020
TB-B-02A	412,715.236	854,194.765	-20.2	15.0	-35.2	10/21/2020	10/21/2020
TB-B-02B	412,718.236	854,194.265	-19.5	33.0	-52.5	10/22/2020	10/22/2020
TB-B-03	412,473.952	854,534.897	-31.5	20.5	-52.0	10/29/2020	10/29/2020
TB-B-04	412,440.058	854,880.848	-13.4	36.0	-49.4	10/29/2020	10/29/2020
TB-B-05	412,242.861	855,199.795	-31.1	18.0	-49.1	10/23/2020	10/23/2020
TB-B-06	412,129.581	855,659.706	-22.5	27.0	-49.5	11/07/2020	11/07/2020
TB-B-07	411,964.473	855,945.882	-21.3	28.0	-49.3	11/01/2020	11/01/2020
TB-B-08	411,866.568	856,124.927	-29.6	20.0	-49.6	11/16/2020	11/16/2020
TB-B-09	412,009.438	856,321.106	-13.1	36.0	-49.1	10/28/2020	10/28/2020
TB-B-10	411,900.872	856,576.343	-18.5	31.5	-50.0	10/27/2020	10/27/2020
TB-B-11	411,931.108	856,782.625	-19.7	31.5	-51.2	10/26/2020	10/26/2020
TB-B-12	411,770.122	856,952.449	-30.6	20.5	-51.1	10/28/2020	10/28/2020
TB-B-13	411,855.282	857,200.656	-23.9	25.5	-49.4	10/25/2020	10/25/2020
TB-B-14A	411,953.828	857,429.247	-27.5	12.0	-39.5	10/24/2020	10/24/2020
TB-B-14B	411,994.583	857,432.139	-27.2	15.0	-42.2	10/24/2020	10/24/2020
TB-B-14C	411,952.222	857,468.938	-29.8	22.5	-52.3	10/25/2020	10/25/2020
TB-B-15A	411,661.428	857,437.202	-39.0	7.5	-46.5	10/23/2020	10/23/2020
TB-B-15B	411,673.741	857,427.744	-38.4	10.5	-48.9	10/24/2020	10/24/2020

Table 1B Summary of Section B Field Exploration

Boring Name	Georgia State Plane Coordinates (feet, NAD83)		Mudline Elevation (feet, MLLW)	Total Depth (feet)	End of Boring Elevation (feet, MLLW)	Start of Drilling	Completion of Drilling
	Northing	Easting					
BW-B-01	402,886.394	879,294.947	-28.0	21.0	-49.0	11/22/2020	11/22/2020
BW-B-02	402,653.563	879,701.010	-33.0	18.0	-51.0	11/23/2020	11/23/2020
BW-B-03	402,809.630	880,151.887	-27.3	21.0	-48.3	11/20/2020	11/20/2020
BW-B-03 Core	402,813.444	880,186.528	-27.8	8.0 - 13.0	-40.8	11/24/2020	11/24/2020
BW-B-04	402,573.885	880,506.694	-34.4	15.0	-49.4	11/23/2020	11/23/2020
BW-B-05	402,828.000	880,813.892	-25.2	24.0	-49.2	11/21/2020	11/21/2020

3.0 LABORATORY TESTING PROGRAM

The laboratory testing program was mostly conducted in our USACE approved laboratory in Orlando, Florida on selected samples from the field exploration. The program included visual classification, water content, particle-size distribution, Atterberg limits determinations, specific gravity and sedimentation rate test on selected samples obtained from the borings. The testing assignments were provided to us by the USACE.

In addition, strength testing consisting of unconfined compression, split tensile and point load tests were performed on core samples. The unconfined compression testing was performed in our Orlando, Florida laboratory while the split tensile and point load tests were performed by GeoTesting Express in Acton, Massachusetts. GeoTesting Express is also an USACE approved laboratory. As with the soil samples, the core test assignments were provided to us by USACE.

3.1 Index Testing

3.1.1 Soil Classification

Visual classifications of soil samples were performed in accordance with ASTM Standard D2488 on representative portions of each soil sample. Unified soil classification was performed on selected soil samples in accordance with ASTM Standard D2847.

3.1.2 Water Content Determination

Water content determinations were performed in accordance with ASTM Standard D2216 on representative portions of selected soil samples oven dried at 107.5±2.5°C. Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water.

3.1.3 Particle-Size Distribution

The particle-size distributions of soil samples were determined using mechanical sieving test methods in general accordance with ASTM Standard D6913.

3.1.4 Atterberg Limits

Liquid and plastic limit measurements were performed on soil samples in general accordance with ASTM Standard D4318 (Method A).

3.1.5 Specific Gravity

Specific gravity of soil samples was determined in general accordance with ASTM Standard D854.

Tables 2A and 2B summarize the index testing results for Section A and Section B, respectively, conducted for this project. The plots of particle-size analyses are presented in Appendix E.

Table 2A Summary of Index Test Results for Section A Borings

Boring Name	Stratum Upper Elev. (ft MLLW)	Stratum Lower Elev. (ft MLLW)	Sample Number	Soil Description	SPT N-value (blows/ft)	Water Content (%)	Percent Passing U.S. Std. No. 200 Sieve (%)	Liquid Limit	Plasticity Index
TB-B-01	-36.0	-37.5	5	SAND WITH SILT (SP-SM), fine to medium; gray, trace shell fragments, calcareous.	WOH ¹	29	7	-	-
	-37.5	-39.0	6	SILTY SAND (SM), fine to medium; gray, with gravel, with shell and limestone fragments, calcareous.	4	18	14	-	-
TB-B-02A	-21.7	-23.2	2	SILTY SAND (SM), fine; dark greenish gray, slightly calcareous.	1	82	43	-	-
TB-B-02B	-36.0	-37.5	12	CLAYEY SAND (SC), fine to medium; light gray, calcareous. Specific Gravity = 2.70	18	-	-	-	-
TB-B-04	-19.4	-20.9	3	SAND (SP), fine; gray. Specific Gravity = 2.66	2	-	-	-	-
	-25.9	-26.9	9	SANDY CLAY (CL), gray, with shell fragments, calcareous.	17	19	66	34	19
	-31.4	-32.9	14	CLAYEY SAND (SC), fine; gray, with limestone fragments, calcareous.	15	26	30	-	-
TB-B-05	-37.1	-38.6	4	SAND WITH SILT (SP-SM), medium to coarse; light gray, some shell fragments, calcareous. Specific Gravity = 2.69	15	22	6	-	-

(Continued)

¹ WOH = SPT split-spoon sampler advanced by Weight of Hammer

Table 2A Summary of Index Test Results for Section A Borings (Cont'd)

Boring Name	Stratum Upper Elev. (ft MLLW)	Stratum Lower Elev. (ft MLLW)	Sample Number	Soil Description	SPT N-value (blows/ft)	Water Content (%)	Percent Passing U.S. Std. No. 200 Sieve (%)	Liquid Limit	Plasticity Index
TB-B-06	-25.5	-27.0	3	SILTY SAND (SM), fine; gray, some clay, some limestone fragments, calcareous.	18	24	35	-	-
	-28.5	-30.0	5	CLAYEY SAND (SC), fine to medium; gray, with limestone fragments, trace shell fragments, calcareous. Specific Gravity = 2.70	40	-	-	-	-
TB-B-07	-29.8	-31.1	2	CLAYEY SAND (SC), dark gray, calcareous.	25	29	50	50	36
	-37.3	-38.8	7	CLAYEY SAND (SC), gray, trace limestone fragments, trace shell fragments, calcareous.	21	26	45	-	-
TB-B-08	-37.6	-39.1	1	SAND (SP), fine; gray, with shell fragments, calcareous.	31	34	4	-	-
TB-B-09	-16.1	-17.6	3	SAND (SP), fine; gray, trace shell fragments, calcareous. Specific Gravity = 2.66	5	-	-	-	-
	-22.1	-23.6	7	CLAYEY SAND (SC), gray, some silt, some shell fragments, calcareous.	5	41	39	-	-
	-29.6	-31.1	12	SANDY CLAY (CL), gray, trace shell fragments, calcareous.	29	19	70	27	10
TB-B-10	-27.5	-29.0	10	CLAYEY CLAY (SC), gray, trace shell fragments, calcareous.	52	21	50	36	24
	-38.0	-39.5	20	SILTY SAND (SM), fine to medium; gray, some clay, some limestone fragments, calcareous.	25	21	20	-	-
TB-B-11	-27.2	-28.7	6	SILTY SAND (SM), fine; gray, with shell fragments, calcareous. Specific Gravity = 2.72	12	-	-	-	-
	-30.2	-31.7	9	CLAY WITH SAND (CL), gray, trace shell fragments, calcareous.	29	18	74	-	-
TB-B-13	-26.9	-27.9	4	SILTY SAND (SM), fine; gray, some shell fragments, some clay, calcareous.	18	30	13	-	-
	-31.4	-32.9	8	SANDY CLAY (CL), gray, calcareous.	49	21	60	33	19
TB-B-14A	-33.5	-35.0	5	CLAY WITH SAND (CL), gray, calcareous.	22	24	76	38	21
	-35.0	-36.5	6	CLAY WITH SAND (CL), gray, calcareous.	25	30	70	-	-

Table 2B Summary of Index Test Results for Section B Borings

Boring Name	Stratum Upper Elev. (ft MLLW)	Stratum Lower Elev. (ft MLLW)	Sample Number	Soil Description	SPT N-value (blows/ft)	Water Content (%)	Percent Passing U.S. Std. No. 200 Sieve (%)	Liquid Limit	Plasticity Index
BW-B-01	-38.5	-40.0	8	SAND (SP), fine; gray. Specific Gravity = 2.66	76	-	-	-	-
BW-B-02	-34.5	-36.0	2	SANDY CLAY (CL), gray, trace gravel.	50/4"	14	56	38	16
BW-B-03	-28.8	-30.3	2	SAND WITH SILT (SP-SM), fine; gray, with shell fragments, calcareous.	19	20	10	-	-
	-31.8	-33.3	4	CLAY WITH SAND (CH), gray.	20	61	82	112	71
BW-B-04	-37.4	-38.9	5	SAND WITH SILT (SP-SM), fine; gray, with shell fragments.	6	26	6	-	-
BW-B-05	-26.7	-27.7	2	SAND (SP), fine; gray, trace shell fragments, calcareous. Specific Gravity = 2.67	38	-	-	-	-
	-31.2	-32.7	6	SAND WITH CLAY (SP-SC), fine; gray, with shell fragments, calcareous.	6	32	10	-	-

3.2 Sedimentation Rate Testing

Sedimentation tests were conducted on four composite soil samples from depth intervals and borings designated by the USACE (BW-B-01, TB-B-02A, TB-B-07 and TB-B-14A) created by combining two to four Standard Penetration Test jar samples from each boring. The resulting composite samples were homogenized and scalped on the U.S. Standard No. 4 sieve for obtaining specimens for testing. The sedimentation tests were performed in general accordance with the USACE South Atlantic Division Laboratory's sedimentation-rate test procedure using initial suspension concentrations of 50 and 100 grams (wet mass basis) per liter (see Appendix F). Water collected from Brunswick Harbor was used for the sedimentation tests.

The results of the sedimentation tests are presented in Appendix F with plots of height of suspended sediment versus both time and log time. Sieve analysis test results for the composite sample are also presented in Appendix F. A summary of test results is tabulated in Table 3 below.

Table 3 Summary of Sedimentation Rate Test Results

Boring	Samples	Description [As-received]	Particle-Size Fraction (%, dry mass basis)						Minus No.4 Fraction Water Content (%)	Initial Suspension Concentration		Initial Settling Velocity (cm/min)	Final Settled Sediment Concentration and Dry Density		
			Sample	Gravel Size	Sand Size			Silt & Clay Size		Wet Mass (gr/liter)	Dry Mass (gr/liter)		Wet Mass (gr/liter)	Dry Mass (gr/liter)	Dry Mass (lb/ft ³)
					Coarse	Medium	Fine								
BW-B 01	2; 3	Gray silty sand (SM)	As-Received	9.4	12.6	35.3	29.8	12.9	16.3	50	43	---*	1,429	1,228	75.8
			Scalped	0	13.8	39.0	32.9	14.3		100	86		1,449	1,246	76.9
TB-B 02A	5A;5B 6A;6B	Greenish-gray sand with clay and shell (SP- SC)	As-Received	11.3	12.4	37.9	28.6	9.8	29.9	50	38	1.4	877	675	41.7
			Scalped	0	13.6	42.9	32.4	11.1		100	77		1.1	917	706
TB-B 07	3A;3B 4A;4B	Gray clayey sand with gravel and trace shell (SC)	As-Received	15.0	5.8	27.7	26.4	25.1	27.8	50	39	1.3	806	631	38.9
			Scalped	0	6.7	32.6	31.1	29.6		100	78		0.8	820	641
TB-B 14A	21;2B 3A;3B	Greenish-gray clayey sand with gravel (SC)	As-Received	19.8	5.1	11.6	30.2	33.3	27.0	50	39	0.8	917	722	44.6
			Scalped	0	6.5	14.3	37.7	41.5		100	79		0.6	847	667

*Sample was sandy and settled immediately. Suspension did not develop an interface.

3.3 *Strength Testing of Cores*

Strength testing consisting of unconfined compression, split tensile and point load tests were performed on core samples from BW-B-03 Core. The unconfined compression testing was performed in our Orlando, Florida laboratory while the split tensile and point load tests were performed by GeoTesting Express in Acton, Massachusetts.

3.3.1 Unconfined Compression Test

Unconfined compression test was performed in general accordance with ASTM Standard D7012 on the top core from boring BW-B-03 Core.

The result of the test shows an unconfined compressive strength of 56 psi for the tested core. The stress-strain plot of the sample tested is presented in Appendix G. Initial and final test specimen conditions are also summarized on the same figure.

3.3.2 Split Tensile Test

Split tensile test was performed in general accordance with ASTM Standard D3967 on the middle core from boring BW-B-03 Core.

The result of the test shows a split tensile strength of 52 psi for the tested core. Test results as well as initial and final test specimen conditions are presented in Appendix H.

3.3.3 Point Load Test

Point load test was performed in general accordance with ASTM Standard D5731 on the bottom core from boring BW-B-03 Core. The sample was loaded axially.

The result of the test shows a point load strength index (corrected for size) of 25 psi for the tested core with an estimated compressive strength of 434 psi. Test results as well as initial and final test specimen conditions are presented in Appendix I.

4.0 SUBSURFACE CONDITIONS

The samples were visually classified in accordance with ASTM Standard D2488 and by Unified soil classification in accordance with ASTM Standard D2847 based on the results of the index and strength tests. Soil boring profiles for Section A borings are presented in Figure 4 for borings TB-B-01 to TB-B-08 and in Figure 5 for borings TB-B-08 to TB-B-15. Soil boring profiles for Section B borings are presented in Figure 6 for borings WB-B-01 to WB-B-05. The plots of SPT N-value, fines content and water content of Sections A and B borings are plotted versus elevation in Figures 7 and 8, respectively.

The materials encountered in the Section A borings generally consist of very loose to loose sand to silty sand and clayey sand with shell fragments to approximate elevation -24 feet (MLLW) underlain by generally very loose to medium dense sand to silty sand and clayey sand with shell, limestone and sandstone fragments to the boring termination elevations of -48.9 to -52.3 feet (MLLW). Note that high blow count material (N-value greater than 30) were encountered in the following borings: very dense silty sand between approximate elevations -43.5 and -48.5 feet (MLLW) in boring TB-B-02B; hard clay with limestone fragments between

approximate elevations -26.9 and -28.4 feet (MLLW) and dense clayey sand with limestone fragments between approximate elevations -34.4 and -35.9 feet (MLLW) in boring TB-B-04; dense clayey sand with limestone fragments between approximate elevations -28.5 and -30.0 feet (MLLW) and between approximate elevations -40.5 and -43.5 feet (MLLW) in boring TB-B-06; hard clay with limestone fragments between approximate elevations -28.3 and -29.8 feet (MLLW) and very dense silty sand between approximate elevations -47.8 and -49.3 feet (MLLW) in boring TB-B-07; dense sand between approximate elevations -37.6 and -39.1 feet (MLLW) in boring TB-B-08; dense sand with shell fragments between approximate elevations -17.6 and -19.1 feet (MLLW), hard clay with shell fragments between approximate elevations -31.1 and -34.1 feet (MLLW) and dense clayey sand with shell and limestone fragments between approximate elevations -40.1 and -41.6 feet (MLLW) in boring TB-B-09; dense to very dense clayey sand with shell and sandstone fragments between approximate elevations -27.5 and -30.5 feet (MLLW) and between approximate elevations -33.5 and -35.0 feet (MLLW) in boring TB-B-10; sandstone fragments between approximate elevations -29.7 and -30.2 feet (MLLW) and very dense clayey sand with shell and limestone fragments between approximate elevations -31.7 and -33.2 feet (MLLW) in boring TB-B-11; and hard sandy clay between approximate elevations -29.9 and -32.9 feet (MLLW), dense clayey sand between approximate elevations -32.9 and -34.4 feet (MLLW), dense clayey sand with limestone fragments between approximate elevations -37.4 and -39.3 feet (MLLW) and dense silty sand with limestone fragments between approximate elevations -39.3 and -40.4 feet (MLLW) in boring TB-B-13. Stiff to hard clay at varying elevations were encountered in the following borings: TB-B-02A, TB-B-04, TB-B-07, TB-B-09, TB-B-10, TB-B-11, TB-B-13, TB-B-14A and TB-B-15B. Refer to Appendix B for soil profile details.

The materials encountered in the Section B borings generally consist of very loose to medium dense sand to silty sand and clayey sand with shell, limestone and sandstone fragments to the boring termination elevations of -48.3 to -51.0 feet (MLLW). Note that high blow count material (N-value greater than 30) were encountered at the following locations: dense sand with sandstone fragments between approximate elevations -28.0 and -31.0 feet (MLLW), dense clayey sand with sandstone fragments between approximate elevations -32.5 and -34.0 feet (MLLW) and approximate elevations -35.5 and -37.0 feet (MLLW), very dense sand between approximate elevations -38.5 and -40.0 feet (MLLW) and undetermined stratum between approximate elevations -40.0 and -41.5 feet (MLLW) in boring BW-B-01; very dense clayey sand with sandstone fragments between approximate elevations -33.0 and -34.5 feet (MLLW), hard clay with gravel between approximate elevations -34.5 and -36.5 feet (MLLW) and very dense clayey sand between approximate elevations -48.0 and -49.5 feet (MLLW) in boring BW-B-02; very dense clayey sand with shell fragments between approximate elevations -34.8 and -37.8 feet (MLLW), limestone between approximate elevations -37.8 and -39.3 feet (MLLW) and very dense sand with shell and siltstone fragments between approximate elevations -39.3 and -40.8 feet (MLLW) in boring BW-B-03; dense clayey sand and hard clay with sand between approximate elevations -43.4 and -49.4 feet (MLLW) in boring BW-B-04; and dense sand with shell fragments between approximate elevations -26.7 and -28.2 feet (MLLW), hard clay between approximate elevations -39.2 and -40.2 feet (MLLW), dense clayey sand between approximate elevations -44.7 and -46.2 feet (MLLW) and dense sand with shell fragments between approximate elevations -46.2 and -49.2 feet (MLLW) in boring BW-B-05. Very stiff to hard clay at varying elevations were encountered in borings BW-B-02, BW-B-03 and BW-B-05. Refer to Appendix B for soil profile details.

5.0 CLOSURE

We understand that the Turning Basin (Section A) and Bend Widener (Section B) areas are proposed to be dredged to elevation -36 feet (MLLW) plus 2 feet of over-dredge. Based on the results of our subsurface exploration and laboratory program, the materials that will be encountered in Section A during dredging will most likely be very loose to loose sand to silty sand and clayey sand with shell fragments to approximate elevation -24 feet (MLLW) underlain by generally very loose to medium dense sand to silty sand and clayey sand with shell, limestone and sandstone fragments. Note that high blow count material (N-value greater than 30) were encountered in the following borings: hard clay with limestone fragments between approximate elevations -26.9 and -28.4 feet (MLLW) and dense clayey sand with limestone fragments between approximate elevations -34.4 and -35.9 feet (MLLW) in boring TB-B-04; dense clayey sand with limestone fragments between approximate elevations -28.5 and -30.0 feet (MLLW) in boring TB-B-06; hard clay with limestone fragments between approximate elevations -28.3 and -29.8 feet (MLLW) in boring TB-B-07; dense sand between approximate elevations -37.6 and -39.1 feet (MLLW) in boring TB-B-08; dense sand with shell fragments between approximate elevations -17.6 and -19.1 feet (MLLW), hard clay with shell fragments between approximate elevations -31.1 and -34.1 feet (MLLW) in boring TB-B-09; dense to very dense clayey sand with shell and sandstone fragments between approximate elevations -27.5 and -30.5 feet (MLLW) and between approximate elevations -33.5 and -35.0 feet (MLLW) in boring TB-B-10; sandstone fragments between approximate elevations -29.7 and -30.2 feet (MLLW) and very dense clayey sand with shell and limestone fragments between approximate elevations -31.7 and -33.2 feet (MLLW) in boring TB-B-11; and hard sandy clay between approximate elevations -29.9 and -32.9 feet (MLLW), dense clayey sand between approximate elevations -32.9 and -34.4 feet (MLLW), and dense clayey sand with limestone fragments between approximate elevations -37.4 and -39.3 feet (MLLW) in boring TB-B-13. Stiff to hard clay at varying elevations were encountered in the following borings: TB-B-02A, TB-B-04, TB-B-07, TB-B-09, TB-B-10, TB-B-11, TB-B-13 and TB-B-14A.


The materials that will be encountered in Section B during dredging to elevation -36 feet (MLLW) plus 2 feet of over-dredge will most likely be very loose to medium dense sand to silty sand and clayey sand with shell, limestone and sandstone fragments. Note that high blow count material (N-value greater than 30) were encountered at the following locations: dense sand with sandstone fragments between approximate elevations -28.0 and -31.0 feet (MLLW), dense clayey sand with sandstone fragments between approximate elevations -32.5 and -34.0 feet (MLLW) and approximate elevations -35.5 and -37.0 feet (MLLW) in boring BW-B-01; very dense clayey sand with sandstone fragments between approximate elevations -33.0 and -34.5 feet (MLLW) and hard clay with gravel between approximate elevations -34.5 and -36.5 feet (MLLW) in boring BW-B-02; very dense clayey sand with shell fragments between approximate elevations -34.8 and -37.8 feet (MLLW), limestone between approximate elevations -37.8 and -39.3 feet (MLLW) in boring BW-B-03; and dense sand with shell fragments between approximate elevations -26.7 and -28.2 feet (MLLW) in boring BW-B-05. Hard clay was encountered in boring BW-B-02 between approximate elevations -34.5 and -36.0 feet (MLLW), and very stiff fat clay was encountered in boring BW-B-03 between approximate elevations -31.8 and -33.3 feet (MLLW).

The data submitted herein are based on the samples obtained from the soil borings presented in Appendix B and the results of the laboratory tests. The delineations between soil types shown


on the logs are approximate and the description represents our interpretation of subsurface conditions at the designated boring locations on the particular date drilled. This report does not reflect any variations which may occur adjacent to or between the borings. The nature and extent of the variations between the borings may not become evident until during construction.

This data report has been prepared for the exclusive use of the U.S. Army Corps of Engineers in accordance with generally accepted geotechnical engineering practices for the Brunswick Harbor Modification Study in Brunswick, Glynn County, Georgia. No other warranty, expressed or implied, is made.




 0 1500 3000
SCALE: 1"=3000'
 NOTE
 STATE PLANE GEORGIA EAST.
 DATED 11/10/2019, BY USDA

LEGEND

 SPT BORING

- SECTION A**
- TB-B-1
 - TB-B-2A
 - TB-B-2B
 - TB-B-3
 - TB-B-4
 - TB-B-5
 - TB-B-6
 - TB-B-7
 - TB-B-8
 - TB-B-10
 - TB-B-11
 - TB-B-12
 - TB-B-14B
 - TB-B-14A
 - TB-B-14C
 - TB-B-15B
 - TB-B-15A
 - TB-B-13

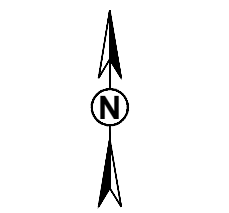
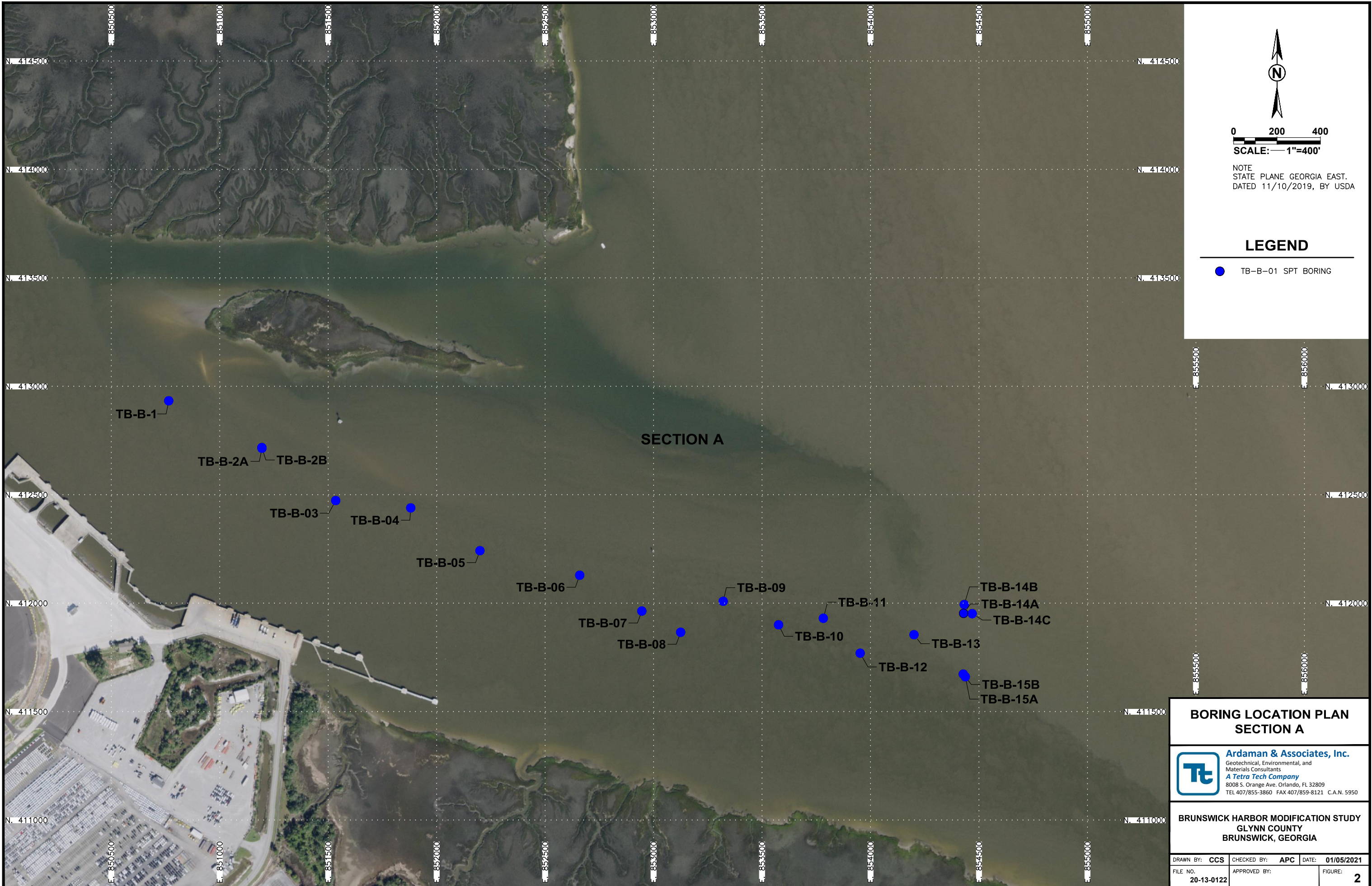
- SECTION B**
- BW-B-01
 - BW-B-02
 - BW-B-03
 - BW-B-04
 - BW-B-05

**BORING LOCATION PLAN
SECTIONS A AND B**


Ardaman & Associates, Inc.
 Geotechnical, Environmental, and
 Materials Consultants
A Tetra Tech Company
 8008 S. Orange Ave. Orlando, FL 32809
 TEL 407/855-3860 FAX 407/859-8121 C.A.N. 5950

BRUNSWICK HARBOR MODIFICATION STUDY
 GLYNN COUNTY
 BRUNSWICK, GEORGIA

DRAWN BY: CSS	CHECKED BY: APC	DATE: 01/11/2021	
FILE NO. 20-13-0122	APPROVED BY:	FIGURE:	1



0 200 400
SCALE: 1"=400'

NOTE
STATE PLANE GEORGIA EAST.
DATED 11/10/2019, BY USDA

LEGEND

● TB-B-01 SPT BORING

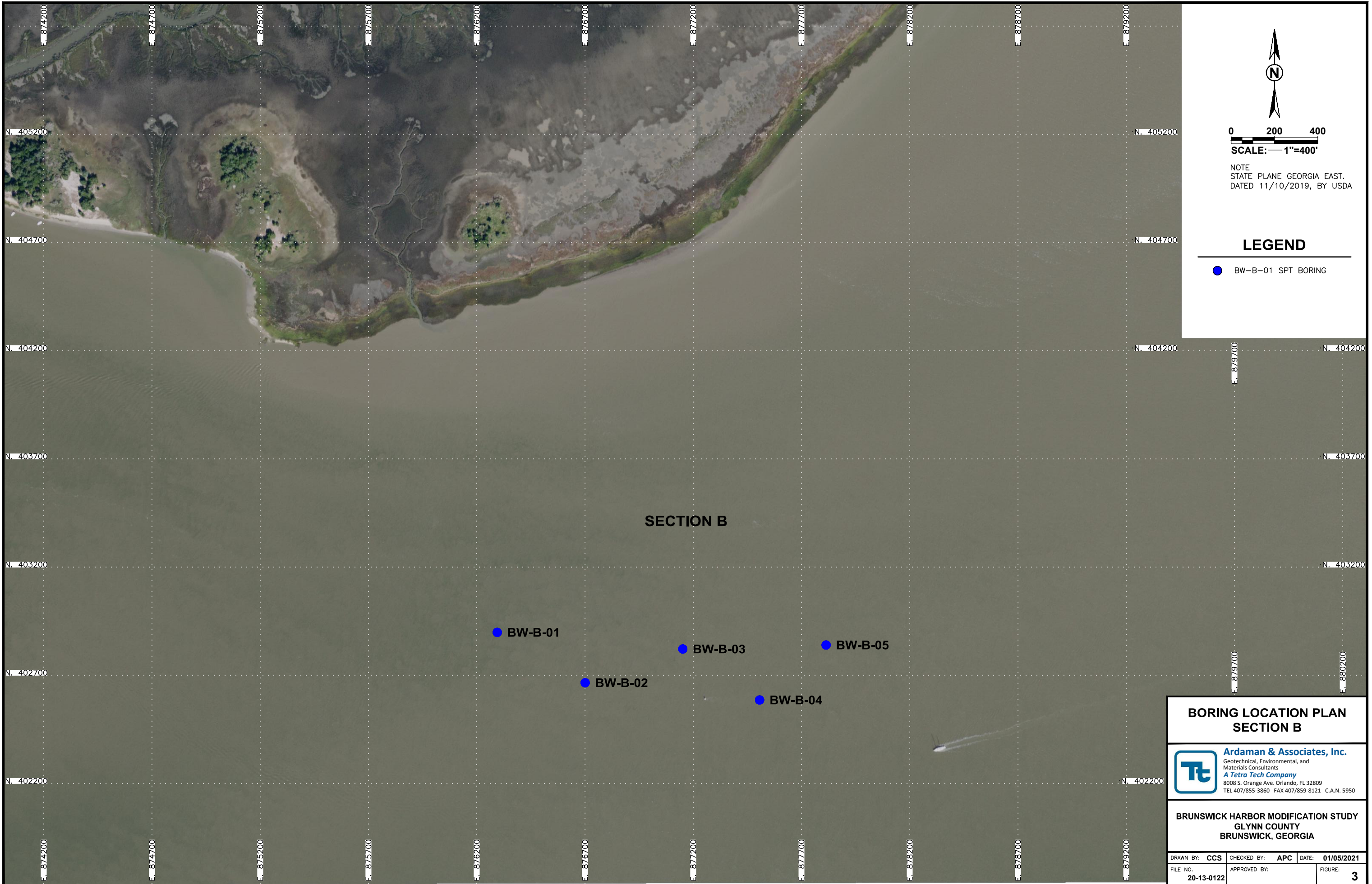
SECTION A


**BORING LOCATION PLAN
SECTION A**

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**BRUNSWICK HARBOR MODIFICATION STUDY
GLYNN COUNTY
BRUNSWICK, GEORGIA**

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FILE NO. 20-13-0122	APPROVED BY:	FIGURE: 2




 0 200 400
SCALE: 1"=400'
 NOTE
 STATE PLANE GEORGIA EAST.
 DATED 11/10/2019, BY USDA


LEGEND

 BW-B-01 SPT BORING

SECTION B

- BW-B-01
- BW-B-03
- BW-B-05
- BW-B-02
- BW-B-04

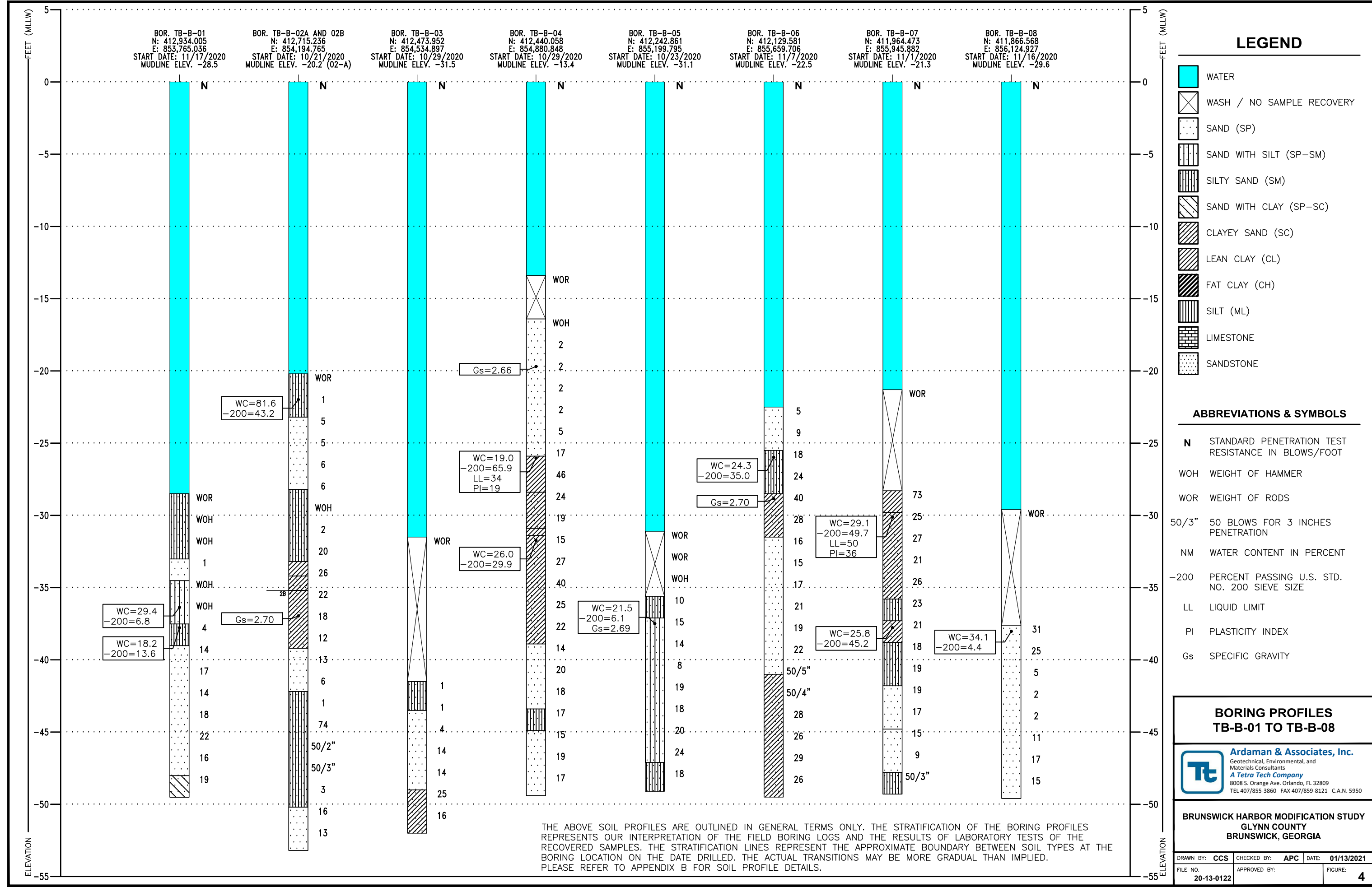
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SECTION B**



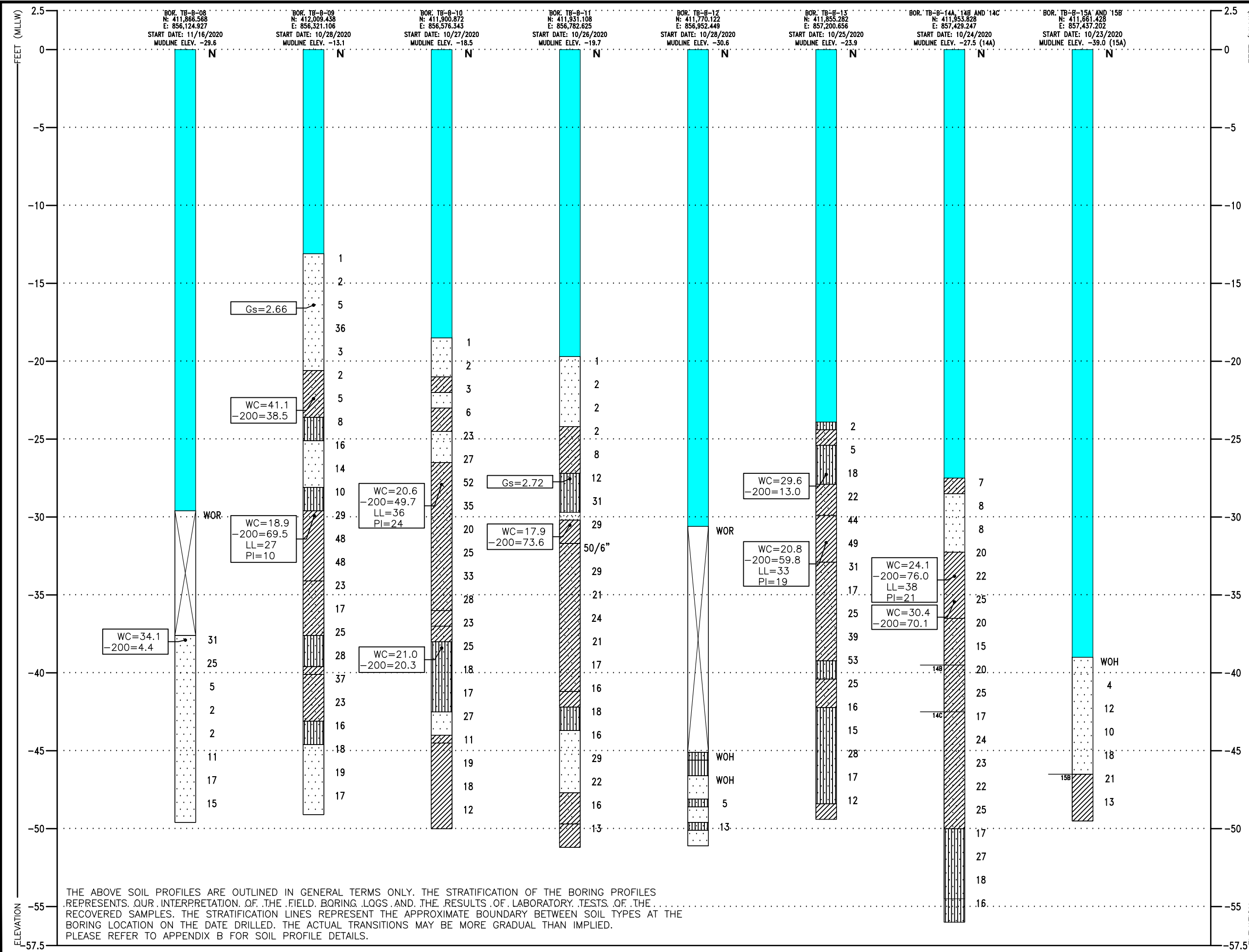
Ardaman & Associates, Inc.
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**BRUNSWICK HARBOR MODIFICATION STUDY
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BRUNSWICK, GEORGIA**

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FILE NO. 20-13-0122	APPROVED BY:	FIGURE: 3



THE ABOVE SOIL PROFILES ARE OUTLINED IN GENERAL TERMS ONLY. THE STRATIFICATION OF THE BORING PROFILES REPRESENTS OUR INTERPRETATION OF THE FIELD BORING LOGS AND THE RESULTS OF LABORATORY TESTS OF THE RECOVERED SAMPLES. THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AT THE BORING LOCATION ON THE DATE DRILLED. THE ACTUAL TRANSITIONS MAY BE MORE GRADUAL THAN IMPLIED. PLEASE REFER TO APPENDIX B FOR SOIL PROFILE DETAILS.



LEGEND

- WATER
- WASH / NO SAMPLE RECOVERY
- SAND (SP)
- SAND WITH SILT (SP-SM)
- SILTY SAND (SM)
- SAND WITH CLAY (SP-SC)
- CLAYEY SAND (SC)
- LEAN CLAY (CL)
- FAT CLAY (CH)
- SILT (ML)
- LIMESTONE
- SANDSTONE

ABBREVIATIONS & SYMBOLS

- N** STANDARD PENETRATION TEST RESISTANCE IN BLOWS/FOOT
- WOH** WEIGHT OF HAMMER
- WOR** WEIGHT OF RODS
- 50/3"** 50 BLOWS FOR 3 INCHES PENETRATION
- NM** WATER CONTENT IN PERCENT
- 200** PERCENT PASSING U.S. STD. NO. 200 SIEVE SIZE
- LL** LIQUID LIMIT
- PI** PLASTICITY INDEX
- Gs** SPECIFIC GRAVITY

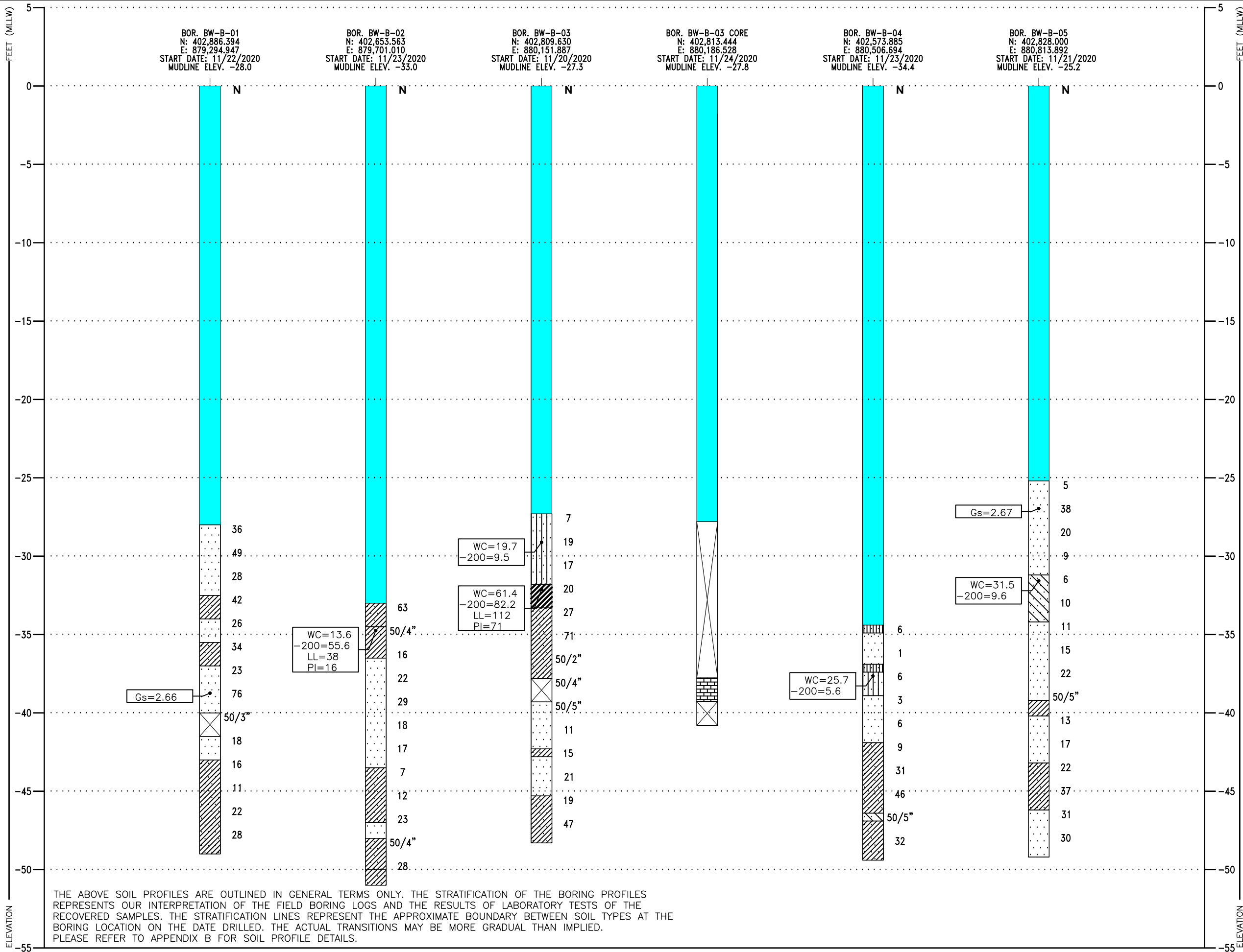
BORING PROFILES TB-B-08 TO TB-B-15

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**BRUNSWICK HARBOR MODIFICATION STUDY
GLYNN COUNTY
BRUNSWICK, GEORGIA**

DRAWN BY: CCS	CHECKED BY: APC	DATE: 01/13/2021
FILE NO. 20-13-0122	APPROVED BY:	FIGURE: 5

THE ABOVE SOIL PROFILES ARE OUTLINED IN GENERAL TERMS ONLY. THE STRATIFICATION OF THE BORING PROFILES REPRESENTS OUR INTERPRETATION OF THE FIELD BORING LOGS AND THE RESULTS OF LABORATORY TESTS OF THE RECOVERED SAMPLES. THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AT THE BORING LOCATION ON THE DATE DRILLED. THE ACTUAL TRANSITIONS MAY BE MORE GRADUAL THAN IMPLIED. PLEASE REFER TO APPENDIX B FOR SOIL PROFILE DETAILS.



LEGEND

- WATER
- WASH / NO SAMPLE RECOVERY
- SAND (SP)
- SAND WITH SILT (SP-SM)
- SILTY SAND (SM)
- SAND WITH CLAY (SP-SC)
- CLAYEY SAND (SC)
- LEAN CLAY (CL)
- FAT CLAY (CH)
- SILT (ML)
- LIMESTONE
- SANDSTONE

ABBREVIATIONS & SYMBOLS

- N** STANDARD PENETRATION TEST RESISTANCE IN BLOWS/FOOT
- WOH** WEIGHT OF HAMMER
- WOR** WEIGHT OF RODS
- 50/3"** 50 BLOWS FOR 3 INCHES PENETRATION
- NM** WATER CONTENT IN PERCENT
- 200** PERCENT PASSING U.S. STD. NO. 200 SIEVE SIZE
- LL** LIQUID LIMIT
- PI** PLASTICITY INDEX
- Gs** SPECIFIC GRAVITY

BORING PROFILES BW-B-01 TO BW-B-05

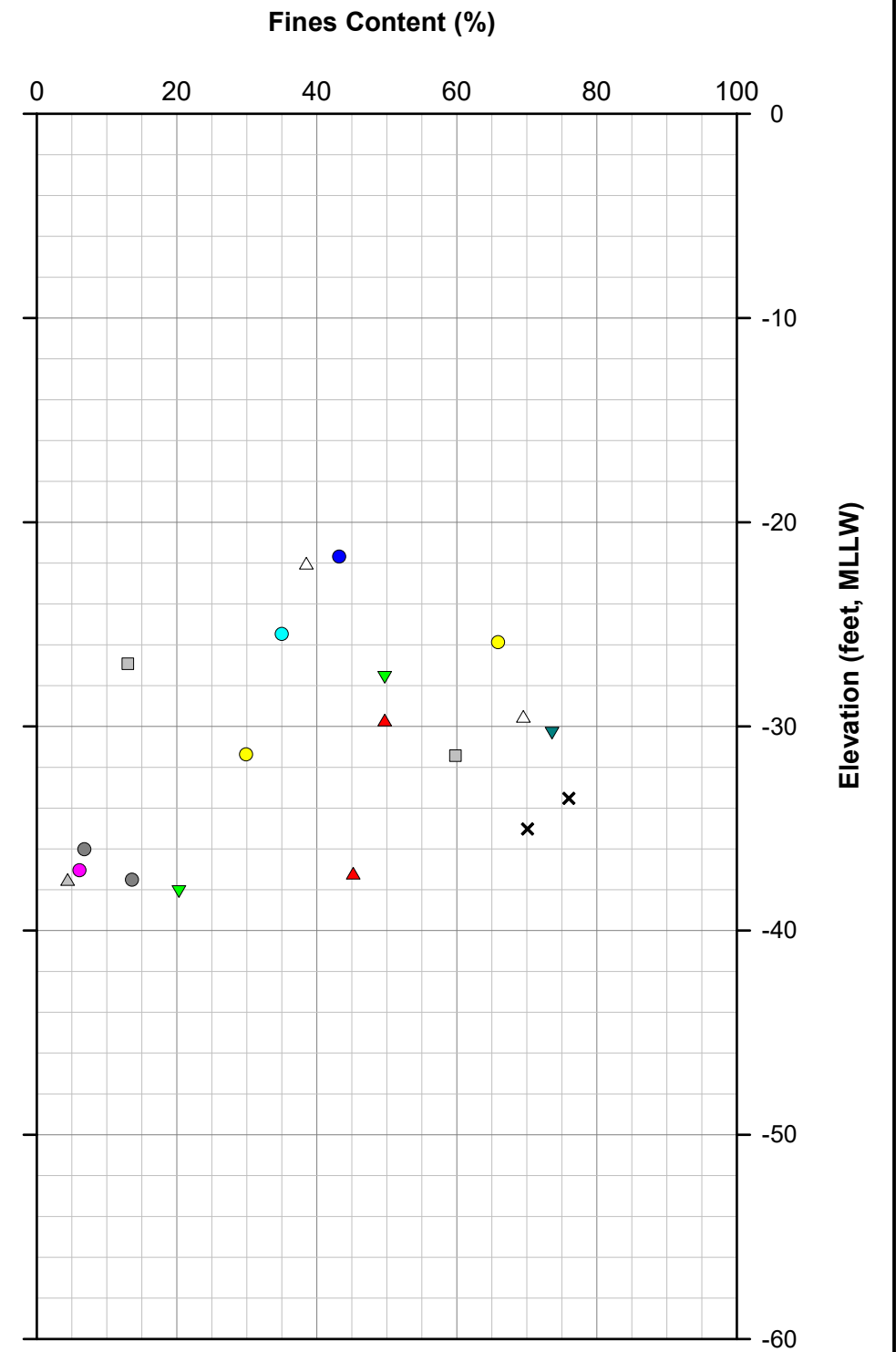
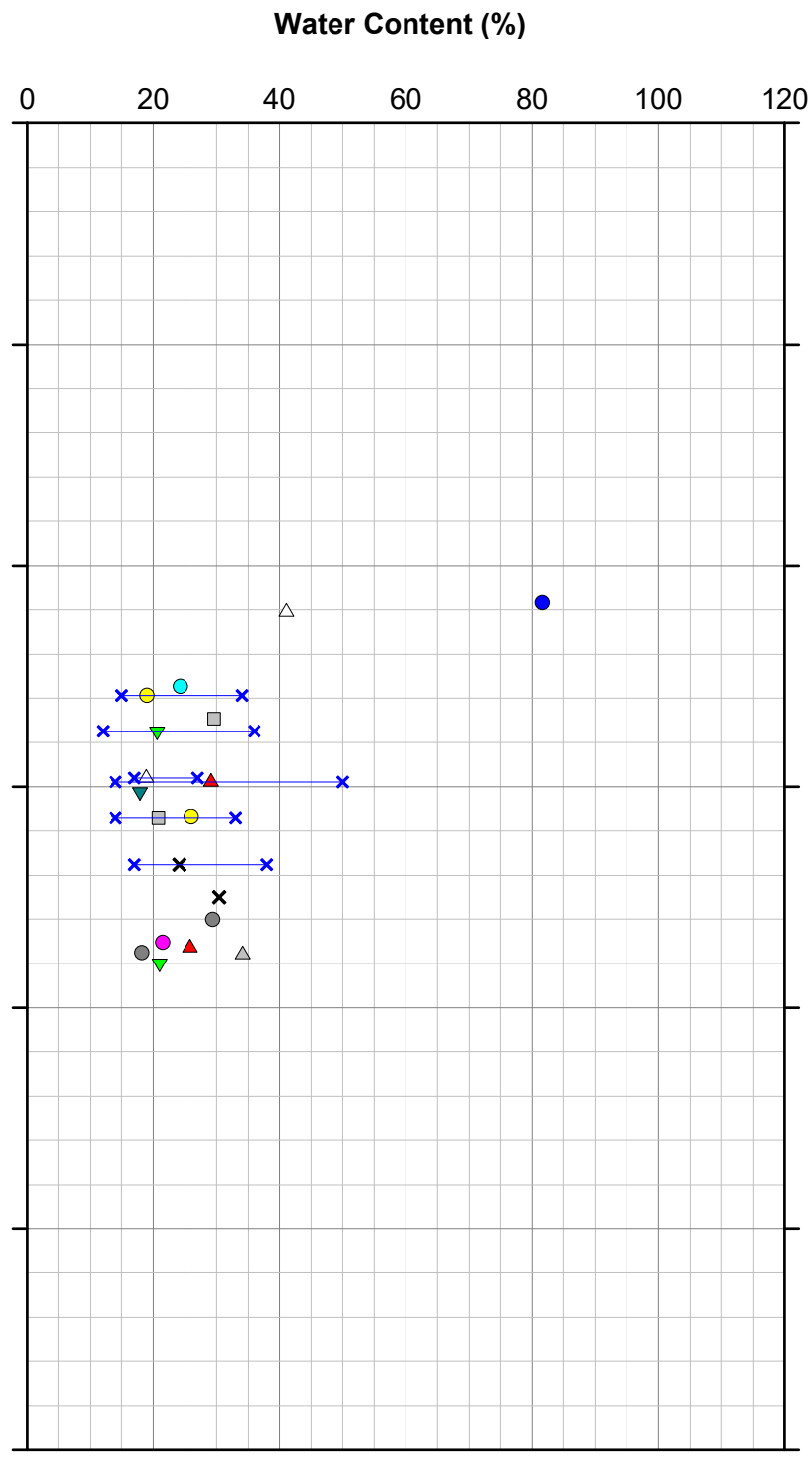
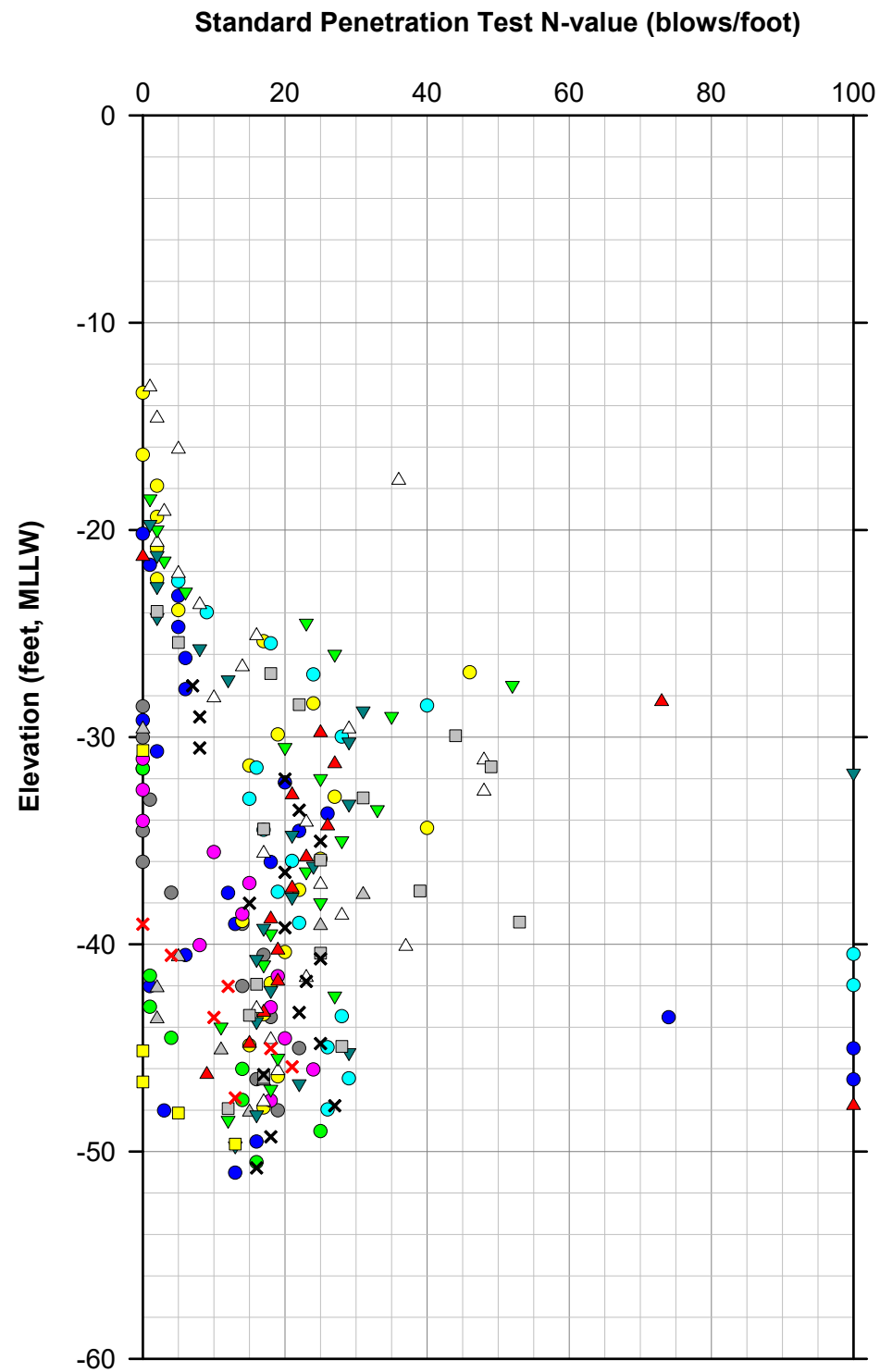
Ardaman & Associates, Inc.
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BRUNSWICK HARBOR MODIFICATION STUDY GLYNN COUNTY BRUNSWICK, GEORGIA

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FILE NO. 20-13-0122	APPROVED BY:	FIGURE: 6

THE ABOVE SOIL PROFILES ARE OUTLINED IN GENERAL TERMS ONLY. THE STRATIFICATION OF THE BORING PROFILES REPRESENTS OUR INTERPRETATION OF THE FIELD BORING LOGS AND THE RESULTS OF LABORATORY TESTS OF THE RECOVERED SAMPLES. THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AT THE BORING LOCATION ON THE DATE DRILLED. THE ACTUAL TRANSITIONS MAY BE MORE GRADUAL THAN IMPLIED. PLEASE REFER TO APPENDIX B FOR SOIL PROFILE DETAILS.


S:\Projects\2020\20-13-0122 Brunswick Harbor Mod Study\Laboratory_Testing\Geotech\Figure 7 N vs El Section A borings.JNB



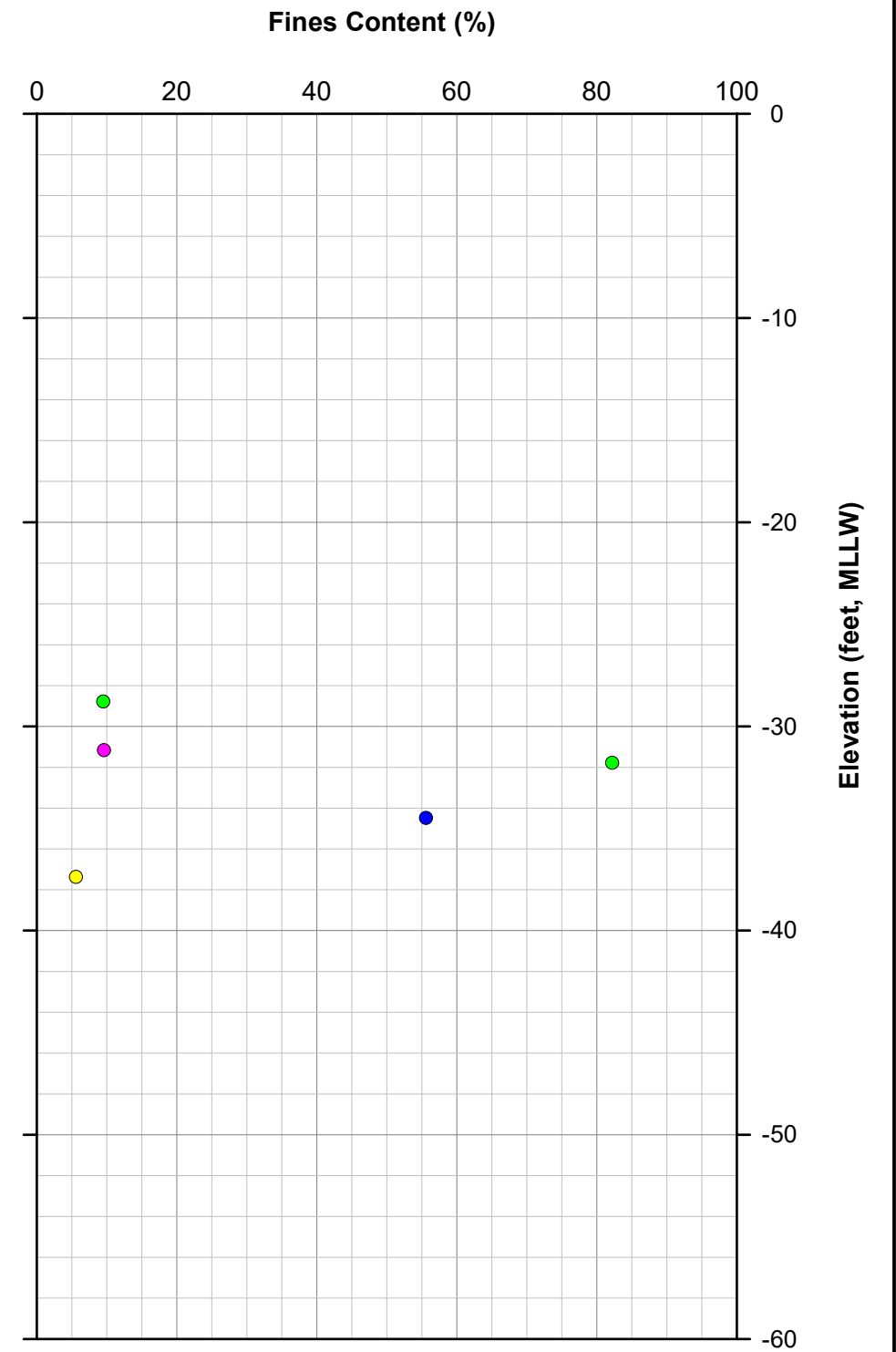
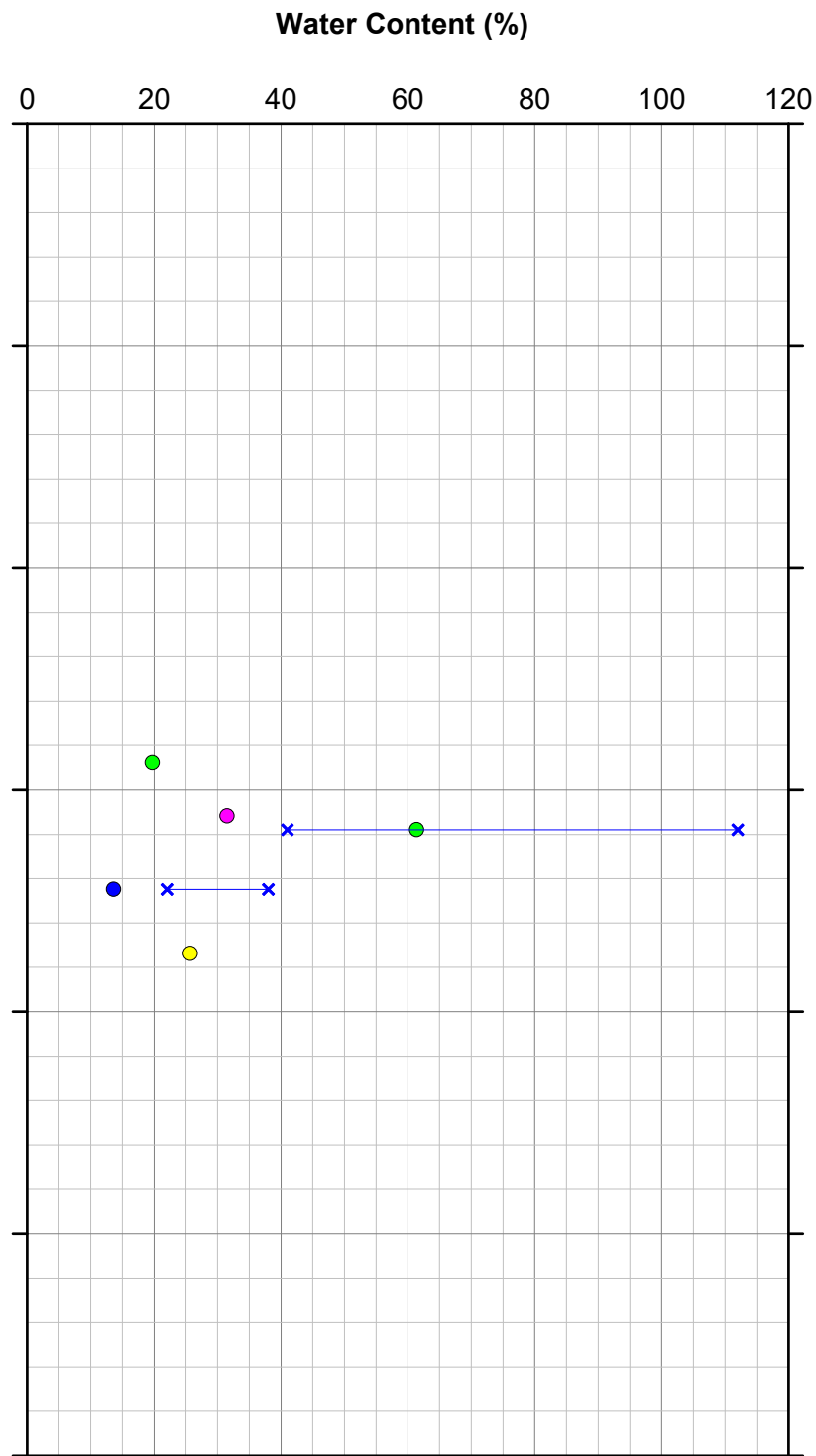
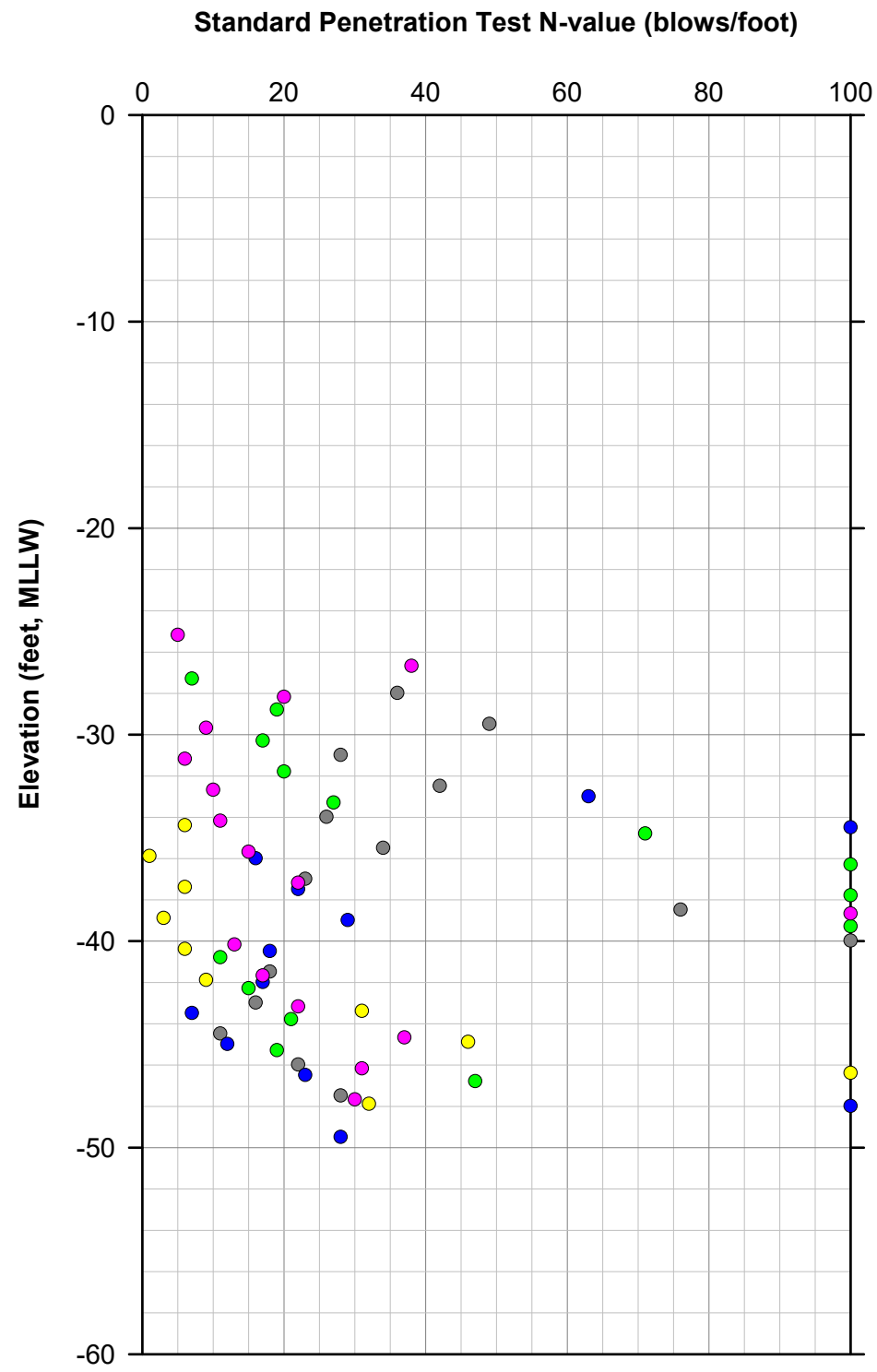
- TB-B-1
- TB-B-2A/2B
- TB-B-3
- TB-B-4
- TB-B-5
- TB-B-6
- ▲ TB-B-7
- ▲ TB-B-8
- ▲ TB-B-9
- ▼ TB-B-10
- ▼ TB-B-11
- TB-B-12
- TB-B-13
- × TB-B-14A/14B/14C
- × TB-B-15A/15B

×—× ATTERBERG LIMITS (PL---LL)

Note: All SPT split-spoon samplers encountering refusal were considered to have an N-value of 100


SPT N-VALUE, WATER CONTENT, AND FINES CONTENT VERSUS ELEVATION SECTION A BORINGS		
 Ardaman & Associates, Inc. <small>Geotechnical, Environmental, and Materials Consultants A Tetra Tech Company 8028 S. Orange Ave. Orlando, FL 32809 TEL 407/855-3860 FAX 407/859-8121 C.A.N. 5950</small>		
BRUNSWICK HARBOR MODIFICATION STUDY GLYNN COUNTY BRUNSWICK, GEORGIA		
DRAWN BY: AP	CHECKED BY: APC	DATE: 01/13/2021
FILE NO: 20-13-0122	APPROVED BY:	FIGURE: 7

S:\Projects\2020\20-13-0122 Brunswick Harbor Mod Study\Laboratory_Testing\Geotech\Figure 8 N vs EI Section B borings.JNB



- BW-B-1
- BW-B-2
- BW-B-3
- BW-B-4
- BW-B-5
- ×—× ATTERBERG LIMITS (PL---LL)

Note: All SPT split-spoon samplers encountering refusal were considered to have an N-value of 100

SPT N-VALUE, WATER CONTENT, AND FINES CONTENT VERSUS ELEVATION SECTION B BORINGS		
 Ardaman & Associates, Inc. <small>Geotechnical, Environmental, and Materials Consultants A Tetra Tech Company 8028 S. Orange Ave. Orlando, FL 32809 TEL 407/855-3860 FAX 407/859-8121 C.A.N. 5950</small>		
BRUNSWICK HARBOR MODIFICATION STUDY GLYNN COUNTY BRUNSWICK, GEORGIA		
DRAWN BY: AP	CHECKED BY: APC	DATE: 01/13/2021
FILE NO: 20-13-0122	APPROVED BY:	FIGURE: 8

APPENDIX A

FIELD EXPLORATION AND SAMPLING METHODS

STANDARD PENETRATION TEST

The standard penetration test is a widely accepted test method of *in situ* testing of foundation soils (ASTM D1586). A 2-foot long, 2-inch O.D. split-barrel sampler attached to the end of a string of drilling rods is driven 18 inches into the ground by successive blows of a 140-pound hammer freely dropping 30 inches. The number of blows needed for each 6 inches of penetration is recorded. The sum of the blows required for penetration of the second and third 6-inch increments of penetration constitutes the test result or N-value. After the test, the sampler is extracted from the ground and opened to allow visual examination and classification of the retained soil sample. The N-value has been empirically correlated with various soil properties allowing a conservative estimate of the behavior of soils under load.

The tests are usually performed at 5-foot intervals. However, more frequent or continuous testing is done by our firm through depths where a more accurate definition of the soils is required. The test holes are advanced to the test elevations by rotary drilling with a cutting bit, using circulating fluid to remove the cuttings and hold the fine grains in suspension. The circulating fluid, which is a bentonitic drilling mud, is also used to keep the hole open below the water table by maintaining an excess hydrostatic pressure inside the hole. In some soil deposits, particularly highly pervious ones, NX-size flush-coupled casing must be driven to just above the testing depth to keep the hole open and/or prevent the loss of circulating fluid.

Representative split-spoon samples from the soils at every 5 feet of drilled depth and from every different stratum are brought to our laboratory in air-tight jars for further evaluation and testing, if necessary. Samples not used in testing are stored for 30 days prior to being discarded. After completion of a test boring, the hole is kept open until a steady state groundwater level is recorded. The hole is then sealed, if necessary, and backfilled.

APPENDIX B
BORING AND CORING LOGS

Boring Designation TB-B-01

DRILLING LOG		DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET 1 OF 3 SHEETS
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane		HORIZONTAL : VERTICAL NAD83 : MLLW
2. HOLE NUMBER TB-B-01		LOCATION COORDINATES N 412,934.0 E 853,765.0		10. SIZE AND TYPE OF BIT 2 7/8" Tricone
3. DRILLING AGENCY Tetra Tech - AAI		11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge		12. TOTAL SAMPLES DISTURBED : 13 UNDISTURBED : 0
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER (ft)
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL ---	BEARING	15. DATE BORING STARTED : 11/17/20 COMPLETED : 11/17/20
6. THICKNESS OF OVERBURDEN 49.5		16. ELEVATION TOP OF BORING (ft) 0.0		17. TOTAL CORE RECOVERY FOR BORING N/A
7. DEPTH DRILLED INTO ROCK 0.0		18. SIGNATURE AND TITLE OF INSPECTOR Mark Zrallack Project Engineer		
8. TOTAL DEPTH OF BORING 49.5'				

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class	
					0' to 28.52': WATER.											40' of 4" casing

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 2 OF 3 SHEETS
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane		HORIZONTAL VERTICAL NAD83 MLLW
LOCATION COORDINATES N 412,934.0 E 853,765.0		ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
						0' to 28.52': WATER. (continued)												
-28.5	28.5																	
		1				28.52' to 30.02': NO RETURN, WEIGHT OF ROD.	0	-										
-30.0	30.0	0	WOR															
		0	WOH			30.02' to 33.02': SILTY SAND (SM), fine; gray.	30	1										
-33.0	33.0	0	WOH				20	2										
		0		1		33.02' to 34.52': SAND (SP), fine; gray, trace shell fragments.	40	3										
-34.5	34.5	1																
		0	WOH			34.52' to 37.52': SAND WITH SILT (SP-SM), fine to medium; gray, trace shell fragments, calcareous.	30	4										
-37.5	37.5	0	WOH				20	5	0	93	7			29	SP-SM			
		1		4		37.52' to 39.02': SILTY SAND (SM), fine to medium; gray, with gravel, with shell and limestone fragments, calcareous.	50	6	18	69	14			18	SM			
-39.0	39.0	2																
		4		14		39.02' to 42.02': SAND (SP), fine to medium; gray, with shell fragments, with limestone fragments, trace clay, calcareous.	60	7										
-42.0	42.0	8		17			50	8										
		8				42.02' to 48.02': SAND (SP), medium; gray, with shell fragments, with limestone fragments, calcareous.	50	9										
		9																
		6		14														
		6																
		8																
		7																

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 3 OF 3 SHEETS	
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane		HORIZONTAL VERTICAL NAD83 MLLW	
LOCATION COORDINATES N 412,934.0 E 853,765.0		ELEVATION TOP OF BORING (ft) 0.0			

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class		
		9	18		[Symbol: dots in a square]	42.02' to 48.02': SAND (SP), medium; gray, with shell fragments, with limestone fragments, calcareous. (continued)	50	10									45.0
		9															
		10	22														
		12															
		7			[Symbol: dots in a square]												47.5
		8	16														
-48.0	48.0	8															
		8			[Symbol: diagonal lines in a square]	48.02' to 49.52': SAND WITH CLAY (SP-SC), medium; gray, with shell fragments, with limestone fragments, calcareous.											
		9	19														
-49.5	49.5	10															

Bottom of hole at 49.5 feet.

NOTES:

1. BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
2. Soils are visually classified in accordance with the Unified Soil Classification System.
3. SPT boring performed using an automatic hammer.
4. WOR = Weight of Rods
5. WOH = Weight of Hammer
6. 50/3" = 50 Blows for 3 inches penetration
7. Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

Boring Designation TB-B-02A

DRILLING LOG		DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET 1 OF 2 SHEETS
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane		HORIZONTAL NAD83 VERTICAL MLLW
2. HOLE NUMBER TB-B-02A		LOCATION COORDINATES N 412,715.2 E 854,194.8		10. SIZE AND TYPE OF BIT 2 7/8" Tricone
3. DRILLING AGENCY Tetra Tech - AAI		11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge		12. TOTAL SAMPLES DISTURBED: 10 UNDISTURBED: 0
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER (ft)
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL ---	BEARING	
6. THICKNESS OF OVERBURDEN 35.2		15. DATE BORING STARTED: 10/21/20 COMPLETED: 10/21/20		16. ELEVATION TOP OF BORING (ft) 0.0
7. DEPTH DRILLED INTO ROCK 0.0		17. TOTAL CORE RECOVERY FOR BORING N/A		18. SIGNATURE AND TITLE OF INSPECTOR Jeremy Clark Project Engineer
8. TOTAL DEPTH OF BORING 35.2'				

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
						0' to 20.19': WATER.												0.0
																		2.5
																		5.0
																		7.5
																		10.0
																		12.5
																		15.0
																		17.5
																		20.0
-20.2	-20.2	0 0 0	WOR			20.19' to 23.19': SILTY SAND (SM), fine; dark greenish gray, slightly calcareous.		1										

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)	INSTALLATION Brunswick, Georgia		SHEET 2 OF 2 SHEETS
	PROJECT BRUNSWICK HARBOR MODIFICATION STUDY	COORDINATE SYSTEM GA State Plane	HORIZONTAL : VERTICAL NAD83 : MLLW
LOCATION COORDINATES N 412,715.2 E 854,194.8	ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/0.5ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class		
-23.2	23.2	0	1					2	0	57	43				82	SM	
		1				23.19' to 28.19': SAND (SP), medium to coarse; greenish gray, some shells, slightly calcareous.		3									
		2	5														
		2															
		2	5					4									
		3															
		2															
		3	6					5									
		3															
-28.2	28.2	2															
		3	6			28.19' to 29.19': SAND WITH CLAY (SP-SC), fine to medium; greenish gray, with shell fragments.		6									
-29.2	29.2	3															
		3															
		0	WOH			29.19' to 33.19': SILTY SAND (SM), fine to medium; dark greenish gray, some shells, slightly calcareous.		7									
		0															
		1	2					8									
		1															
		2															
-33.2	33.2	3	20					9									
		17				33.19' to 34.19': CLAY (CL), light gray, calcareous.											
-34.2	34.2	10															
		14	26			34.19' to 35.19': CLAYEY SAND (SC), fine to medium; light gray, some coarse limestone fragments, calcareous.		10									
-35.2	35.2	12															

Bottom of hole at 35.2 feet.

NOTES:

1. BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
2. Soils are visually classified in accordance with the Unified Soil Classification System.
3. SPT boring performed using an automatic hammer.
4. WOR = Weight of Rods
5. WOH = Weight of Hammer
6. 50/3" = 50 Blows for 3 inches penetration
7. Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009 08 18.GDT 2/5/21

Boring Designation TB-B-02B

DRILLING LOG		DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET 1
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane	HORIZONTAL NAD83	VERTICAL MLLW
2. HOLE NUMBER TB-B-02B		10. SIZE AND TYPE OF BIT 2 7/8" Tricone		
3. DRILLING AGENCY Tetra Tech - AAI		11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge		
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		12. TOTAL SAMPLES DISTURBED 12 UNDISTURBED 0		
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL ---	BEARING	
6. THICKNESS OF OVERBURDEN 52.5		13. TOTAL NUMBER CORE BOXES 0		
7. DEPTH DRILLED INTO ROCK 0.0		14. ELEVATION GROUND WATER (ft)		
8. TOTAL DEPTH OF BORING 52.5'		15. DATE BORING STARTED 10/22/20 COMPLETED 10/22/20		
		16. ELEVATION TOP OF BORING (ft) 0.0		
		17. TOTAL CORE RECOVERY FOR BORING N/A		
		18. SIGNATURE AND TITLE OF INSPECTOR Jeremy Clark Project Engineer		

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
					WATER	0' to 19.53': WATER.												0.0
																		2.5
																		5.0
																		7.5
																		10.0
																		12.5
																		15.0
																		17.5
																		20.0
-19.5	19.5				WASH BORING	19.53' to 34.53': WASH BORING.												

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 2 OF 3 SHEETS
		PROJECT BRUNSWICK HARBOR MODIFICATION STUDY	COORDINATE SYSTEM GA State Plane	HORIZONTAL NAD83
LOCATION COORDINATES N 412,718.2 E 854,194.3		ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory						REMARKS		
									Gravel	Sand	Fines	LI	PI	MC		ASTM Class	
						19.53' to 34.53': WASH BORING. (continued)											
-34.5	34.5																
-35.3	35.3	8				34.53' to 35.28': CLAYEY SAND (SC), fine to medium; light gray, some coarse limestone fragments, calcareous.		11 11A									
		10	22			35.28' to 38.53': CLAYEY SAND (SC), fine to medium; light gray, calcareous.		12									
		6															
		8	18														
		10															
-38.5	38.5	4															
		5	12					13									
		7															
		3				38.53' to 41.53': SAND (SP), fine to medium; light gray.											
		6	13					14									
		7															
-41.5	41.5	6															
		5	6					15 15B									
		1				41.53' to 49.53': SILTY SAND (SM), fine; greenish gray, calcareous.											
		1															
		0	1					16									
		1															
		3															

Specific Gravity = 2.70

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)	INSTALLATION Brunswick, Georgia		SHEET 3 OF 3 SHEETS
	PROJECT BRUNSWICK HARBOR MODIFICATION STUDY	COORDINATE SYSTEM GA State Plane	HORIZONTAL VERTICAL NAD83 MLLW
LOCATION COORDINATES N 412,718.2 E 854,194.3		ELEVATION TOP OF BORING (ft) 0.0	

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class		
-49.5	49.5	37	74			41.53' to 49.53': SILTY SAND (SM), fine; greenish gray, calcareous. (continued)		17								45.0	
		37															
		17	50/2"														
		29															
		50	50/3"														
-52.5	52.5	50	50/3"			49.53' to 52.53': SAND (SP), medium to coarse; gray, some limestone fragments, some shells, calcareous.		18								47.5	
		50															
		0															
		1	3														
		2															
		5															
		8	16														
-52.5	52.5	8						19								50.0	
		5															
		6	13														
		7						20									
								21									
								22									

Bottom of hole at 52.5 feet.

NOTES:

1. BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
2. Soils are visually classified in accordance with the Unified Soil Classification System.
3. SPT boring performed using an automatic hammer.
4. WOR = Weight of Rods
5. WOH = Weight of Hammer
6. 50/3" = 50 Blows for 3 inches penetration
7. Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

Boring Designation TB-B-03

DRILLING LOG		DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET 1 OF 3 SHEETS
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane		HORIZONTAL NAD83 VERTICAL MLLW
2. HOLE NUMBER TB-B-03		LOCATION COORDINATES N 412,474.0 E 854,534.9		10. SIZE AND TYPE OF BIT 2 7/8" Tricone
3. DRILLING AGENCY Tetra Tech - AAI		11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge		12. TOTAL SAMPLES DISTURBED 7 UNDISTURBED 0
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER (ft)
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL ---	BEARING	
6. THICKNESS OF OVERBURDEN 52.0		15. DATE BORING STARTED 10/29/20 COMPLETED 10/29/20		16. ELEVATION TOP OF BORING (ft) 0.0
7. DEPTH DRILLED INTO ROCK 0.0		17. TOTAL CORE RECOVERY FOR BORING N/A		18. SIGNATURE AND TITLE OF INSPECTOR Mark Zrallack Project Engineer
8. TOTAL DEPTH OF BORING 52'				

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class	
					0' to 31.52': WATER.											50' of 4" casing

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 2 OF 3 SHEETS	
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane		HORIZONTAL VERTICAL NAD83 MLLW	
LOCATION COORDINATES N 412,474.0 E 854,534.9		ELEVATION TOP OF BORING (ft) 0.0			

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
						0' to 31.52': WATER. (continued)												
-31.5	31.5					31.52' to 41.52': NO RETURN, WEIGHT OF ROD.												
-41.5	41.5					41.52' to 43.52': SILTY SAND (SM), gray to dark gray.	50	1										
-43.5	43.5	0 0 1	1			43.52' to 44.52': SAND (SP), fine; gray, calcareous.	60	2 3										

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 3 OF 3 SHEETS	
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane		HORIZONTAL VERTICAL NAD83 MLLW	
LOCATION COORDINATES N 412,474.0 E 854,534.9		ELEVATION TOP OF BORING (ft) 0.0			

ELEV (ft)	DEPTH (ft)	Blows/ 0.5ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
-44.5	44.5	0																
		2				44.52' to 46.02': SAND (SP), fine; gray, trace silt, calcareous.	50	4										45.0
		2	4															
-46.0	46.0	2																
		7				46.02' to 48.02': SAND (SP), fine to medium; gray, some shell fragments, calcareous.	50	5										47.5
		5	14															
		9																
-48.0	48.0	1																
		5	14			48.02' to 49.02': SAND (SP), fine to medium; light gray, some shell fragments, calcareous.	60	6										
		9						7										
-49.0	49.0	9																
		7				49.02' to 52.02': CLAYEY SAND (SC), fine to medium; light gray, some shell fragments, calcareous.	70	8										50.0
		9	25															
		16																
		4																
		6	16															
-52.0	52.0	10						9										

Bottom of hole at 52 feet.

NOTES:

1. BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
2. Soils are visually classified in accordance with the Unified Soil Classification System.
3. SPT boring performed using an automatic hammer.
4. WOR = Weight of Rods
5. WOH = Weight of Hammer
6. 50/3" = 50 Blows for 3 inches penetration
7. Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

Boring Designation TB-B-04

DRILLING LOG		DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET OF 3 SHEETS 1
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane		HORIZONTAL NAD83
2. HOLE NUMBER TB-B-04		LOCATION COORDINATES N 412,440.1 E 854,880.8		VERTICAL MLLW
3. DRILLING AGENCY Tetra Tech - AAI		10. SIZE AND TYPE OF BIT 2 7/8" Tricone		11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		12. TOTAL SAMPLES 26		DISTURBED 0
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL ---		BEARING
6. THICKNESS OF OVERBURDEN 49.4		13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER (ft)
7. DEPTH DRILLED INTO ROCK 0.0		15. DATE BORING 10/29/20		STARTED 10/29/20
8. TOTAL DEPTH OF BORING 49.4'		16. ELEVATION TOP OF BORING (ft) 0.0		COMPLETED 10/29/20
		17. TOTAL CORE RECOVERY FOR BORING N/A		18. SIGNATURE AND TITLE OF INSPECTOR Mark Zrallack Project Engineer

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class		
					[Wavy Pattern]	0' to 13.38': WATER.											0.0
					X	13.38' to 16.38': NO RETURN, WEIGHT OF ROD.	0										2.5
					•••	16.38' to 23.38': SAND (SP), fine; gray.	20	1									17.5
							40	2									20.0

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)					INSTALLATION Brunswick, Georgia		SHEET 2 OF 3 SHEETS										
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY					COORDINATE SYSTEM GA State Plane		HORIZONTAL VERTICAL NAD83 MLLW										
LOCATION COORDINATES N 412,440.1 E 854,880.8					ELEVATION TOP OF BORING (ft) 0.0												
ELEV (ft)	DEPTH (ft)	Blows/0.5ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class		
-23.4	23.4	1	2			16.38' to 23.38': SAND (SP), fine; gray. (continued)	30	3								Specific Gravity = 2.66	20.0
		1					30	4							22.5		
		1	2				60	5									
		1					60	6									
		1	2				60	7									
-25.9	25.9	2	5			23.38' to 25.88': SAND (SP), fine; gray, some shell fragments, trace clay, calcareous.	60	7							Sieve Analysis was performed on Sample 9	25.0	
		2					70	8	0	34	66	34	19	19		CL	
		3					70	9									
-26.9	26.9	5	17			25.88' to 26.88': SANDY CLAY (CL), gray, with shell fragments, calcareous.	70	8									
		12					70	10									
-28.4	28.4	12	46			26.88' to 28.38': CLAY (CL), gray, with limestone fragments, calcareous.	70	10								27.5	
		21					100	11									
		25					100	12									
-30.9	30.9	8	24			28.38' to 30.88': CLAYEY SAND (SC), gray, with limestone fragments, trace shells, calcareous.	100	11								30.0	
		14					100	13									
-31.4	31.4	8	19			30.88' to 31.38': CLAY (CL), gray, with limestone fragments, calcareous.	40	14	2	68	30		26	SC		32.5	
		9					90	15									
		10					90	16									
		13	40				90	17									
		27					90	18									
-35.9	35.9	12	25			31.38' to 35.88': CLAYEY SAND (SC), fine; gray, with limestone fragments, calcareous.	90	17								35.0	
		12					90	18									
		13					90	19									
-38.4	38.4	7	22			35.88' to 38.38': CLAYEY SAND (SC), gray, some silt, some limestone fragments, calcareous.	90	18								37.5	
		11					90	19									
-38.9	38.9	11				38.38' to 38.88': CLAYEY SAND (SC), fine to medium; gray, some limestone fragments, calcareous.	50	20								40.0	
		7	14				50	21									
-43.4	43.4	7				38.88' to 43.38': SAND (SP), fine to medium; gray, some shell fragments, some limestone fragments, calcareous.	60	22								42.5	
		7					70	23									
		7															
		9	20														
		11															
		8	18														
		9															
		8															
		9	17														

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 3 OF 3 SHEETS
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane		HORIZONTAL VERTICAL NAD83 MLLW
LOCATION COORDINATES N 412,440.1 E 854,880.8		ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
-44.9	44.9	8				43.38' to 44.88' : SILTY SAND (SM), fine to medium; gray, some shell fragments, some limestone fragments, calcareous. <i>(continued)</i> 44.88' to 49.38' : SAND (SP), fine to medium; gray, some shell fragments, some limestone fragments, calcareous.												
		8					60	24										
		7	15															
		8																
		8																
		9	19				60	25										
		10																
		6																
		7	17				40	26										
-49.4	49.4	10																

Bottom of hole at 49.4 feet.

NOTES:

1. BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
2. Soils are visually classified in accordance with the Unified Soil Classification System.
3. SPT boring performed using an automatic hammer.
4. WOR = Weight of Rods
5. WOH = Weight of Hammer
6. 50/3" = 50 Blows for 3 inches penetration
7. Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

45.0

47.5




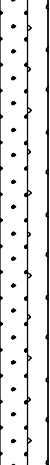
Boring Designation TB-B-05

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET 1 OF 3 SHEETS
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane	HORIZONTAL : VERTICAL NAD83 : MLLW
2. HOLE NUMBER TB-B-05		10. SIZE AND TYPE OF BIT 2 7/8" Tricone	
3. DRILLING AGENCY Tetra Tech - AAI		11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge	
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		12. TOTAL SAMPLES 11	DISTURBED : UNDISTURBED 11 : 0
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		13. TOTAL NUMBER CORE BOXES 0	14. ELEVATION GROUND WATER (ft)
6. THICKNESS OF OVERBURDEN 49.1		15. DATE BORING 10/23/20	STARTED : COMPLETED 10/23/20 : 10/23/20
7. DEPTH DRILLED INTO ROCK 0.0		16. ELEVATION TOP OF BORING (ft) 0.0	17. TOTAL CORE RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 49.1'		18. SIGNATURE AND TITLE OF INSPECTOR Jeremy Clark Project Engineer	

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class	
					0' to 31.05': WATER.											55' of 4" casing

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)	INSTALLATION Brunswick, Georgia		SHEET 2 OF 3 SHEETS
	PROJECT BRUNSWICK HARBOR MODIFICATION STUDY	COORDINATE SYSTEM GA State Plane	HORIZONTAL NAD83
LOCATION COORDINATES N 412,242.9 E 855,199.8	VERTICAL MLLW		
		ELEVATION TOP OF BORING (ft) 0.0	

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS				
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class					
						0' to 31.05': WATER. (continued)														
-31.1	31.1	0				31.05' to 35.55': NO RETURN.	0													
		0	WOR																	
		0	WOR				0													
		0	WOH				0													
-35.6	35.6	0																		
		4				35.55' to 37.05': SILTY SAND (SM), fine to medium; greenish gray, some shell fragments, slightly calcareous.		3												
-37.1	37.1	4	10																	
		6				37.05' to 47.05': SAND WITH SILT (SP-SM), medium to coarse; light gray, some shell fragments, calcareous.		4	12	81	6			22	SP-SM	Specific Gravity = 2.69				
		7	15																	
		6						4												
		9																		
		5						5												
		7	14																	
		7																		
		3																		
		3	8					6												
		5																		
		6																		
		8	19					7												
		11																		
		5																		
		8	18					8												

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 3 OF 3 SHEETS
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane		HORIZONTAL VERTICAL NAD83 MLLW
LOCATION COORDINATES N 412,242.9 E 855,199.8		ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS			
									Gravel	Sand	Fines	L	PI	MC	ASTM Class				
		10				37.05' to 47.05': SAND WITH SILT (SP-SM), medium to coarse; light gray, some shell fragments, calcareous. (continued)													
		6																	
		8	20						9										45.0
		12																	
		3				47.05' to 49.05': SILTY SAND (SM), fine to medium; greenish gray, some shell fragments, some limestone fragments, calcareous.													
-47.1	47.1	11	24						10										
		13																	
		5																	
		7	18																
-49.1	49.1	11						11											

Bottom of hole at 49.1 feet.

NOTES:

1. BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
2. Soils are visually classified in accordance with the Unified Soil Classification System.
3. SPT boring performed using an automatic hammer.
4. WOR = Weight of Rods
5. WOH = Weight of Hammer
6. 50/3" = 50 Blows for 3 inches penetration
7. Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

Boring Designation TB-B-06

DRILLING LOG		DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET 1 OF 3 SHEETS
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane		HORIZONTAL : NAD83 VERTICAL : MLLW
2. HOLE NUMBER TB-B-06		LOCATION COORDINATES N 412,129.6 E 855,659.7		10. SIZE AND TYPE OF BIT 2 7/8" Tricone
3. DRILLING AGENCY Tetra Tech - AAI		11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge		12. TOTAL SAMPLES DISTURBED : 19 UNDISTURBED : 0
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER (ft)
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL ---	BEARING	
6. THICKNESS OF OVERBURDEN 49.5		16. ELEVATION TOP OF BORING (ft) 0.0		15. DATE BORING STARTED : 11/7/20 COMPLETED : 11/7/20
7. DEPTH DRILLED INTO ROCK 0.0		17. TOTAL CORE RECOVERY FOR BORING N/A		18. SIGNATURE AND TITLE OF INSPECTOR Mark Zrallack Project Engineer
8. TOTAL DEPTH OF BORING 49.5'				

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
					0' to 22.48': WATER.													

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 2 OF 3 SHEETS
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane		HORIZONTAL VERTICAL NAD83 MLLW
LOCATION COORDINATES N 412,129.6 E 855,659.7		ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/0.5ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS			
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class				
-22.5	22.5					0' to 22.48': WATER. (continued)													
-24.0	24.0	5 2 3	5			22.48' to 23.98': SAND (SP), fine; gray, trace shell fragments, trace clay, calcareous.	30	1											
-25.5	25.5	3 1 8	9			23.98' to 25.48': SAND (SP), fine; gray, trace clay, trace limestone fragments, calcareous.	30	2											
-27.0	27.0	3 6 12	18			25.48' to 26.98': SILTY SAND (SM), fine; gray, some clay, some limestone fragments, calcareous.	80	3	5	60	35			24	SM				
-28.5	28.5	8 10 14	24			26.98' to 28.48': SILTY SAND (SM), fine; gray, with limestone fragments, trace clay and shell fragments, calcareous.	80	4											
-31.5	31.5	11 19 21 8 13 15	40 28			28.48' to 31.48': CLAYEY SAND (SC), fine to medium; gray, with limestone fragments, trace shell fragments, calcareous.	70	5											Specific Gravity = 2.70
-41.0	41.0	9 8 8 3 7 8 6 8 9 8 11 10 10 9 10 8 10 12 6	16 15 17 21 19 22			31.48' to 40.98': SAND (SP), fine to medium; gray, with limestone fragments, calcareous.	50	7											
-42.0	42.0	23 50	50/5"			40.98' to 41.98': CLAYEY SAND (SC), fine; gray, trace limestone fragments.	70	13 14											
-43.5	43.5	50 30	50/4"			41.98' to 43.48': CLAYEY SAND (SC), fine; gray, with limestone fragments, calcareous.	10	15											

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 3 OF 3 SHEETS	
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane		HORIZONTAL VERTICAL NAD83 MLLW	
LOCATION COORDINATES N 412,129.6 E 855,659.7		ELEVATION TOP OF BORING (ft) 0.0			

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class		
-45.0	45.0	10	28			43.48' to 44.98': CLAYEY SAND (SC), fine; gray, trace sandstone fragments. (continued)	70	16									45.0 47.5
		18															
		7	26			44.98' to 47.98': CLAYEY SAND (SC), fine; gray, with shell fragments, calcareous.	90	17									
		11															
		15															
		7	29				80	18									
-48.0	48.0	9															
		20															
		17	26			47.98' to 49.48': CLAYEY SAND (SC), gray to dark gray, with shell fragments, calcareous.	80	19									
-49.5	49.5	12															
		14															

Bottom of hole at 49.5 feet.

NOTES:

1. BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
2. Soils are visually classified in accordance with the Unified Soil Classification System.
3. SPT boring performed using an automatic hammer.
4. WOR = Weight of Rods
5. WOH = Weight of Hammer
6. 50/3" = 50 Blows for 3 inches penetration
7. Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

Boring Designation TB-B-07

DRILLING LOG		DIVISION South Atlantic	INSTALLATION Brunswick, Georgia		SHEET 1 OF 3 SHEETS
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY			9. COORDINATE SYSTEM GA State Plane	HORIZONTAL NAD83	VERTICAL MLLW
2. HOLE NUMBER TB-B-07		LOCATION COORDINATES N 411,964.5 E 855,945.9		10. SIZE AND TYPE OF BIT 2 7/8" Tricone	
3. DRILLING AGENCY Tetra Tech - AAI			12. TOTAL SAMPLES 15		UNDISTURBED 0
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins			13. TOTAL NUMBER CORE BOXES 0		
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL ---	BEARING		14. ELEVATION GROUND WATER (ft)
6. THICKNESS OF OVERBURDEN 49.3			16. ELEVATION TOP OF BORING (ft) 0.0		15. DATE BORING 11/1/20
7. DEPTH DRILLED INTO ROCK 0.0			17. TOTAL CORE RECOVERY FOR BORING N/A		COMPLETED 11/1/20
8. TOTAL DEPTH OF BORING 49.3'			18. SIGNATURE AND TITLE OF INSPECTOR Mark Zrallack Project Engineer		

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class		
					WATER	0' to 21.28': WATER.											40' of 4" casing

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 2 OF 3 SHEETS
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane		HORIZONTAL VERTICAL NAD83 MLLW
LOCATION COORDINATES N 411,964.5 E 855,945.9		ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	L	PI	MC	ASTM Class			
-21.3	21.3					0' to 21.28': WATER. (continued)												20.0
						21.28' to 28.28': NO RETURN, WEIGHT OF ROD.	0											22.5
						28.28' to 29.78': CLAY (CL), gray to dark gray, trace limestone fragments, calcareous.	90	1										25.0
						29.78' to 31.28': CLAYEY SAND (SC), dark gray, calcareous.	80	2	0	50	50	50	36	29	SC			27.5
						31.28' to 35.78': CLAYEY SAND (SC), gray, with limestone fragments, calcareous.	80	3										30.0
							90	4										32.5
							80	5										35.0
						35.78' to 37.28': SILTY SAND (SM), fine to medium; gray, trace clay, calcareous.	70	6										37.5
						37.28' to 38.78': CLAYEY SAND (SC), gray, trace limestone fragments, trace shell fragments, calcareous.	70	7	1	54	45			26	SC			40.0
						38.78' to 41.78': SILTY SAND (SM), fine to medium; gray, with limestone fragments, calcareous.	70	8										42.5
							60	9										
						41.78' to 44.78': SAND (SP), fine to medium; gray, some limestone fragments, some shell fragments, calcareous.	40	10										
							40	11										

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 3 OF 3 SHEETS
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane		HORIZONTAL VERTICAL NAD83 MLLW
LOCATION COORDINATES N 411,964.5 E 855,945.9		ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/0.5ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
-44.8	44.8	8																
		7				44.78' to 47.78': SAND (SP), fine to medium; gray, some sandstone fragments, some shell fragments, calcareous.	30	12										45.0
		7	15															
		8																
		5				47.78' to 48.28': SILTY SAND (SM), dark gray, trace clay.	30	13										47.5
		5	9															
-47.8	47.8	4																
-48.3	48.3	2				47.78' to 48.28': SILTY SAND (SM), dark gray, trace clay.	50	14										
		11	50/3"			48.28' to 49.28': SILTY SAND (SM), gray.												
-49.3	49.3	50						15										

Bottom of hole at 49.3 feet.

NOTES:

1. BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
2. Soils are visually classified in accordance with the Unified Soil Classification System.
3. SPT boring performed using an automatic hammer.
4. WOR = Weight of Rods
5. WOH = Weight of Hammer
6. 50/3" = 50 Blows for 3 inches penetration
7. Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

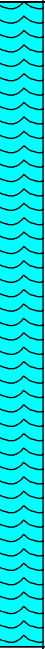

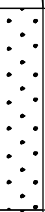
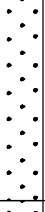

Boring Designation TB-B-08

DRILLING LOG		DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET 1 OF 3 SHEETS
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane		HORIZONTAL : VERTICAL NAD83 : MLLW
2. HOLE NUMBER TB-B-08		LOCATION COORDINATES N 411,866.6 E 856,124.9		10. SIZE AND TYPE OF BIT 2 7/8" Tricone
3. DRILLING AGENCY Tetra Tech - AAI		11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge		12. TOTAL SAMPLES DISTURBED : 8 UNDISTURBED : 0
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER (ft)
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL ---	BEARING	15. DATE BORING STARTED : 11/16/20 COMPLETED : 11/16/20
6. THICKNESS OF OVERBURDEN 49.6		16. ELEVATION TOP OF BORING (ft) 0.0		17. TOTAL CORE RECOVERY FOR BORING N/A
7. DEPTH DRILLED INTO ROCK 0.0		18. SIGNATURE AND TITLE OF INSPECTOR Mark Zrallack Project Engineer		
8. TOTAL DEPTH OF BORING 49.6'				

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class	
					0' to 29.6': WATER.											45' of 4" casing

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 2 OF 3 SHEETS	
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane		HORIZONTAL NAD83	VERTICAL MLLW
LOCATION COORDINATES N 411,866.6 E 856,124.9		ELEVATION TOP OF BORING (ft) 0.0			

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class		
						0' to 29.6': WATER. (continued)											20.0
-29.6	29.6																
						29.6' to 37.6': NO RETURN, WEIGHT OF ROD.											
							0										
-37.6	37.6																
		12	31			37.6' to 40.6': SAND (SP), fine; gray, with shell fragments, calcareous.	20	1	0	96	4			34	SP		
		20															
		11															
		11	25				40	2									
-40.6	40.6	15															
		10															
		3	5			40.6' to 43.6': SAND (SP), fine; gray, trace shell fragments.	10	3									
		3															
		2															
		1	2				30	4									
-43.6	43.6	1															
		0				43.6' to 45.1': SAND (SP), fine; gray, trace clay.											

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 3 OF 3 SHEETS
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane		HORIZONTAL VERTICAL NAD83 MLLW
LOCATION COORDINATES N 411,866.6 E 856,124.9		ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/ 0.5ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
-45.1	-45.1	1	2		•••••	43.6' to 45.1': SAND (SP), fine; gray, trace clay. (continued)	20	5										
-46.6	-46.6	1 3 8	11		•••••	45.1' to 46.6': SAND (SP), fine to medium; gray, trace shell fragments, trace clay, calcareous.	30	6										
-49.6	-49.6	9 8 9 4 6 9	17 15		•••••	46.6' to 49.6': SAND (SP), fine to medium; gray, with shell fragments, calcareous.	40 40	7 8										

Bottom of hole at 49.6 feet.

NOTES:

1. BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
2. Soils are visually classified in accordance with the Unified Soil Classification System.
3. SPT boring performed using an automatic hammer.
4. WOR = Weight of Rods
5. WOH = Weight of Hammer
6. 50/3" = 50 Blows for 3 inches penetration
7. Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

45.0

47.5

Boring Designation TB-B-09

DRILLING LOG		DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET 1 OF 3 SHEETS
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane		HORIZONTAL NAD83 VERTICAL MLLW
2. HOLE NUMBER TB-B-09		LOCATION COORDINATES N 412,009.4 E 856,321.1		10. SIZE AND TYPE OF BIT 2 7/8" Tricone
3. DRILLING AGENCY Tetra Tech - AAI		11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge		12. TOTAL SAMPLES DISTURBED: 26 UNDISTURBED: 0
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER (ft)
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL ---	BEARING	
6. THICKNESS OF OVERBURDEN 49.1		16. ELEVATION TOP OF BORING (ft) 0.0		15. DATE BORING STARTED: 10/28/20 COMPLETED: 10/28/20
7. DEPTH DRILLED INTO ROCK 0.0		17. TOTAL CORE RECOVERY FOR BORING N/A		18. SIGNATURE AND TITLE OF INSPECTOR Mark Zrallack Project Engineer
8. TOTAL DEPTH OF BORING 49.1'				

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class		
					[Wavy Pattern]	0' to 13.1': WATER.											0.0
					[Wavy Pattern]												2.5
					[Wavy Pattern]												5.0
					[Wavy Pattern]												7.5
					[Wavy Pattern]												10.0
					[Wavy Pattern]												12.5
-13.1	13.1				[Wavy Pattern]												15.0
		1			[Wavy Pattern]												17.5
		0	1		[Wavy Pattern]	13.1' to 14.6': SAND (SP), fine; gray, with limestone fragments, calcareous.	65	1									20.0
-14.6	14.6	1			[Wavy Pattern]												
		1			[Wavy Pattern]												
		1	2		[Wavy Pattern]	14.6' to 19.1': SAND (SP), fine; gray, trace shell fragments, calcareous.	20	2									
		1			[Wavy Pattern]												
		2	5		[Wavy Pattern]		60	3									
		3			[Wavy Pattern]												
		19			[Wavy Pattern]												
		18	36		[Wavy Pattern]		60	4									
-19.1	19.1	18			[Wavy Pattern]												
		2			[Wavy Pattern]												
		1	3		[Wavy Pattern]	19.1' to 20.6': SAND (SP), fine; gray, some shell fragments, calcareous.	50	5									

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia	SHEET 2 OF 3 SHEETS
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane	HORIZONTAL VERTICAL NAD83 MLLW
LOCATION COORDINATES N 412,009.4 E 856,321.1		ELEVATION TOP OF BORING (ft) 0.0	

ELEV (ft)	DEPTH (ft)	Blows/ 0.5ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
-20.6	20.6	2																20.0
		2				20.6' to 22.1': CLAYEY SAND (SC), gray, some silt, trace shell fragments, calcareous.	60	6										
-22.1	22.1	1	2															
		1				22.1' to 23.6': CLAYEY SAND (SC), gray, some silt, some shell fragments, calcareous.	80	7	2	59	39			41	SC			22.5
-23.6	23.6	3		5														
		2				23.6' to 25.1': SILTY SAND (SM), fine; gray, some shell fragments.	40	8										
-25.1	25.1	3	8															
		5				25.1' to 28.1': SAND (SP), fine; gray, trace silt, some shell fragments, calcareous.	50	9										25.0
		6	16															
		10																
		9					60	10										27.5
-28.1	28.1	7	14															
		6				28.1' to 29.6': SILTY SAND (SM), gray, with shell fragments, calcareous.	80	11										
-29.6	29.6	5	10															
		5																
		8				29.6' to 31.1': SANDY CLAY (CL), gray, trace shell fragments, calcareous.	90	12	0	30	70	27	10	19	CL			30.0
-31.1	31.1	11	29															
		18																
		10				31.1' to 32.6': CLAY (CL), gray, some shell fragments, calcareous.	80	13										
-32.6	32.6	18	48															
		30																
		20				32.6' to 34.1': CLAY (CL), gray, trace shell fragments, calcareous.	90	14										32.5
-34.1	34.1	20	48															
		20																
		28																
		7				34.1' to 37.6': CLAYEY SAND (SC), gray, some limestone fragments, calcareous.	90	15										35.0
		10	23															
		13																
		4																
		8	17				80	16										
-37.6	37.6	9																
		4																
		10	25			37.6' to 39.6': SILTY SAND (SM), fine to medium; gray, some limestone fragments, calcareous.	90	17										37.5
		15																
		6																
-39.6	39.6	13	28				80	19										
		15																
-40.1	40.1	15				39.6' to 40.1': CLAY (CL), gray to dark gray, calcareous.		20										40.0
		16																
		18	37			40.1' to 41.6': CLAYEY SAND (SC), fine to medium; gray, some limestone fragments, calcareous.	80	21										
-41.6	41.6	19																
		8																
		11	23			41.6' to 43.1': CLAYEY SAND (SC), fine to medium; gray, some shell fragments, some limestone fragments, calcareous.	70	22										42.5
-43.1	43.1	12																
		5																
		8	16				70	23										

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 3 OF 3 SHEETS
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane		HORIZONTAL VERTICAL NAD83 MLLW
LOCATION COORDINATES N 412,009.4 E 856,321.1		ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	L	PI	MC	ASTM Class			
-44.6	-44.6	8				43.1' to 44.6': SILTY SAND (SM), fine to medium; gray, trace clay, some shells and limestone fragments, calcareous. (continued)												
		8	18				50	24										
		9																
		9				44.6' to 47.6': SAND (SP), fine to medium; gray, trace silt, some shells and limestone fragments, calcareous.	70	25										
		8	19															
-47.6	-47.6	10				47.6' to 49.1': SAND (SP), fine to medium; gray, some shells and limestone fragments, calcareous.												
		4					50	26										
		7	17															
-49.1	-49.1	10																

Bottom of hole at 49.1 feet.

NOTES:

- BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
- Soils are visually classified in accordance with the Unified Soil Classification System.
- SPT boring performed using an automatic hammer.
- WOR = Weight of Rods
- WOH = Weight of Hammer
- 50/3" = 50 Blows for 3 inches penetration
- Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

45.0

47.5

Boring Designation TB-B-10

DRILLING LOG		DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET 1 OF 3 SHEETS
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane		HORIZONTAL NAD83
				VERTICAL MLLW
2. HOLE NUMBER TB-B-10		LOCATION COORDINATES N 411,900.9 E 856,576.3		10. SIZE AND TYPE OF BIT 2 7/8" Tricone
3. DRILLING AGENCY Tetra Tech - AAI		11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge		12. TOTAL SAMPLES DISTURBED: 28 UNDISTURBED: 0
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER (ft)
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL ---		BEARING
6. THICKNESS OF OVERBURDEN 50.0		15. DATE BORING STARTED: 10/27/20 COMPLETED: 10/27/20		16. ELEVATION TOP OF BORING (ft) 0.0
7. DEPTH DRILLED INTO ROCK 0.0		17. TOTAL CORE RECOVERY FOR BORING N/A		18. SIGNATURE AND TITLE OF INSPECTOR Mark Zrallack Project Engineer
8. TOTAL DEPTH OF BORING 50'				

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS			
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class				
					[Wavy Pattern]	0' to 18.49': WATER.													
-18.5	18.5	0	1		[Dotted Pattern]	18.49' to 20.99': SAND (SP), fine; gray, with shell fragments, calcareous.	10	1											

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)						INSTALLATION Brunswick, Georgia		SHEET 2 OF 3 SHEETS													
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY						COORDINATE SYSTEM GA State Plane		HORIZONTAL NAD83													
LOCATION COORDINATES N 411,900.9 E 856,576.3						VERTICAL MLLW															
						ELEVATION TOP OF BORING (ft) 0.0															
ELEV (ft)	DEPTH (ft)	Blows/ 0.5ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS					
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class						
-21.0	21.0	1	2		[Symbol]		60	2												20.0	
		1			[Symbol]	20.99' to 21.99': CLAYEY SAND (SC), gray, with shell fragments, calcareous.		3													
-22.0	22.0	1			[Symbol]																
		1	3		[Symbol]	21.99' to 22.99': SAND (SP), fine; gray, with shell fragments, calcareous.	70	4													22.5
-23.0	23.0	2			[Symbol]			5													
		2			[Symbol]	22.99' to 24.49': CLAYEY SAND (SC), fine; gray, some shell fragments, calcareous.	50	6													
-24.5	24.5	4	6		[Symbol]																
		15			[Symbol]	24.49' to 26.49': SAND (SP), fine; gray, some clay, some shell fragments, calcareous.	60	7													25.0
		13	23		[Symbol]																
		10			[Symbol]																
-26.5	26.5	10			[Symbol]																
		11	27		[Symbol]	26.49' to 29.49': CLAYEY SAND (SC), gray, trace shell fragments, calcareous.	70	8													27.5
		16			[Symbol]			9													
		12			[Symbol]																
		22	52		[Symbol]		80	10	4	46	50	36	24	21	SC						
		30			[Symbol]																
-29.5	29.5	14			[Symbol]																
		15	35		[Symbol]	29.49' to 35.99': CLAYEY SAND (SC), gray, with sandstone fragments, calcareous.	90	11													30.0
		20			[Symbol]			12													
		6			[Symbol]																
		10	20		[Symbol]		90	13													
		10			[Symbol]																
		6			[Symbol]																
		10	25		[Symbol]		80	14													32.5
		15			[Symbol]																
		12			[Symbol]																
		15	33		[Symbol]		80	15													
		18			[Symbol]																
		6			[Symbol]																
-36.0	36.0	12	28		[Symbol]		80	16													
		16			[Symbol]	35.99' to 36.99': CLAY (CL), gray, with shell fragments, calcareous.		17													
-37.0	37.0	6			[Symbol]																
		10	23		[Symbol]	36.99' to 37.99': CLAYEY SAND (SC), fine to medium; gray, some limestone fragments, calcareous.	90	18													37.5
-38.0	38.0	13			[Symbol]			19													
		8			[Symbol]	37.99' to 39.49': SILTY SAND (SM), fine to medium; gray, some clay, some limestone fragments, calcareous.	60	20	10	70	20			21	SM						
-39.5	39.5	13	25		[Symbol]																
		7			[Symbol]	39.49' to 42.49': SILTY SAND (SM), fine to medium; gray, some limestone fragments, calcareous.	60	21													40.0
		9	18		[Symbol]																
		9			[Symbol]																
		7			[Symbol]																
		8	17		[Symbol]		50	22													
-42.5	42.5	9			[Symbol]																
		11			[Symbol]	42.49' to 43.99': SAND (SP), medium; gray, with limestone fragments, calcareous.	50	23													42.5
		11	27		[Symbol]																
-44.0	44.0	16			[Symbol]																

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009 08 18.GDT 2/5/21

DRILLING LOG (Cont Sheet)	INSTALLATION Brunswick, Georgia		SHEET 3 OF 3 SHEETS
	PROJECT BRUNSWICK HARBOR MODIFICATION STUDY	COORDINATE SYSTEM GA State Plane	HORIZONTAL NAD83
LOCATION COORDINATES N 411,900.9 E 856,576.3	VERTICAL MLLW		
		ELEVATION TOP OF BORING (ft) 0.0	

ELEV (ft)	DEPTH (ft)	Blows/ 0.5ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	L	PI	MC	ASTM Class		
-44.5	44.5	16			[Hatched Legend]	43.99' to 44.49': CLAYEY SAND (SC), fine to medium; gray, with limestone fragments, calcareous. (continued)	80	24									45.0
-45.5	45.5	5	11	6													
		5			[Hatched Legend]	44.49' to 45.49': CLAY (CL), gray to dark gray, with shell fragments, trace limestone fragments.	80	26									47.5
-47.0	47.0	8	19	11													
		8			[Hatched Legend]	45.49' to 46.99': CLAY (CL), dark gray, trace shell fragments. 46.99' to 49.99': CLAY (CL), gray.	80	27									50.0
		7	18	11													
-50.0	50.0	6			[Hatched Legend]		80	28									
		5	12	7													

Bottom of hole at 50 feet.

NOTES:

1. BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
2. Soils are visually classified in accordance with the Unified Soil Classification System.
3. SPT boring performed using an automatic hammer.
4. WOR = Weight of Rods
5. WOH = Weight of Hammer
6. 50/3" = 50 Blows for 3 inches penetration
7. Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

Boring Designation TB-B-11

DRILLING LOG		DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET 1 OF 3 SHEETS
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane		HORIZONTAL NAD83
				VERTICAL MLLW
2. HOLE NUMBER TB-B-11		LOCATION COORDINATES N 411,931.1 E 856,782.6		10. SIZE AND TYPE OF BIT 2 7/8" Tricone
3. DRILLING AGENCY Tetra Tech - AAI		11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge		12. TOTAL SAMPLES DISTURBED: 24 UNDISTURBED: 0
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER (ft)
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL ---		BEARING
6. THICKNESS OF OVERBURDEN 51.2		15. DATE BORING STARTED: 10/26/20 COMPLETED: 10/26/20		16. ELEVATION TOP OF BORING (ft) 0.0
7. DEPTH DRILLED INTO ROCK 0.0		17. TOTAL CORE RECOVERY FOR BORING N/A		18. SIGNATURE AND TITLE OF INSPECTOR Mark Zrallack Project Engineer
8. TOTAL DEPTH OF BORING 51.2'				

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class	
-19.7	19.7				••	0' to 19.73': WATER.										40' of 4" casing

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 2 OF 3 SHEETS
		PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane
LOCATION COORDINATES N 411,931.1 E 856,782.6		ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/0.5ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class	
-21.2	21.2	4	1		[Dotted]	19.73' to 21.23': SAND (SP), fine; gray, trace shell fragments, trace silt, calcareous. (continued)	10	1								Specific Gravity = 2.72
		0														
		1	2		[Dotted]	21.23' to 24.23': SAND (SP), fine; gray to brown, trace shell fragments, calcareous.	10	2								
		1														
		1	2		[Dotted]		50	3								
-24.2	24.2	1														
		2	2		[Diagonal]	24.23' to 27.23': CLAYEY SAND (SC), gray, with shell fragments, some silt, calcareous.	60	4								
		1														
		2	8		[Diagonal]		50	5								
-27.2	27.2	3														
		5	12		[Diagonal]	27.23' to 29.73': SILTY SAND (SM), fine; gray, with shell fragments, calcareous.	60	6								
		8														
		6														
		6														
-29.7	29.7	8	31		[Diagonal]	29.73' to 30.23': SANDSTONE FRAGMENTS, dark gray, calcareous.	60	7								
		22														
-30.2	30.2	9			[Dotted]	30.23' to 31.73': CLAY WITH SAND (CL), gray, trace shell fragments, calcareous.	60	8								
		11	29		[Diagonal]											
		12														
-31.7	31.7	17			[Diagonal]	31.73' to 33.23': CLAYEY SAND (SC), gray, trace shell fragments, trace limestone fragments, calcareous.	90	10	0	26	74		18	CL		
		22	50/6"		[Diagonal]											
-33.2	33.2	30			[Diagonal]	33.23' to 37.73': CLAYEY SAND (SC), gray, with limestone fragments, trace shell fragments, calcareous.	100	11								
		50														
		11	29		[Diagonal]											
		12														
		17														
		7	21		[Diagonal]		100	12								
		8														
		13														
		7	24		[Diagonal]		100	13								
-37.7	37.7	9														
		15														
		7	21		[Diagonal]	37.73' to 41.23': CLAYEY SAND (SC), gray, some silt, some limestone fragments, calcareous.	100	14								
		9														
		12														
		9	17		[Diagonal]		80	15								
		10														
-41.2	41.2	7														
		6	16		[Diagonal]	41.23' to 42.23': CLAY (CL), gray to dark gray, with limestone fragments, calcareous.	80	16								
		7														
-42.2	42.2	9			[Dotted]	42.23' to 43.73': SILTY SAND (SM), gray, some clay, trace limestone fragments, calcareous.	60	17								
		4	18		[Diagonal]											
		7														
-43.7	43.7	11			[Dotted]											
		7														

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 3 OF 3 SHEETS	
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane		HORIZONTAL VERTICAL NAD83 MLLW	
LOCATION COORDINATES N 411,931.1 E 856,782.6		ELEVATION TOP OF BORING (ft) 0.0			

ELEV (ft)	DEPTH (ft)	Blows/0.5ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
		7	16		[Dotted pattern]	43.73' to 47.73': SAND (SP), fine to medium; gray, trace limestone fragments, calcareous. (continued)	60	19									45.0	
		9																
		8																
		11	29						60	20								
		18																
		7																
-47.7	-47.7	12	22				70	21									47.5	
-48.2	-48.2	10			[Diagonal hatching]	47.73' to 48.23': CLAYEY SAND (SC), fine to medium; gray, some limestone fragments, calcareous.												
		11																
		9	16						40	23								
-49.7	-49.7	7																
		3																
		5	13															
-51.2	-51.2	8				49.73' to 51.23': CLAY WITH SAND (CL), gray to dark gray, calcareous.	70	24									50.0	

Bottom of hole at 51.2 feet.

NOTES:

1. BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
2. Soils are visually classified in accordance with the Unified Soil Classification System.
3. SPT boring performed using an automatic hammer.
4. WOR = Weight of Rods
5. WOH = Weight of Hammer
6. 50/3" = 50 Blows for 3 inches penetration
7. Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009 08 18.GDT 2/5/21

Boring Designation TB-B-12

DRILLING LOG		DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET 1 OF 3 SHEETS
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane		HORIZONTAL : VERTICAL NAD83 : MLLW
2. HOLE NUMBER TB-B-12		LOCATION COORDINATES N 411,770.1 E 856,952.4		10. SIZE AND TYPE OF BIT 2 7/8" Tricone
3. DRILLING AGENCY Tetra Tech - AAI		11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge		12. TOTAL SAMPLES DISTURBED : 8 UNDISTURBED : 0
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER (ft)
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL ---	BEARING	
6. THICKNESS OF OVERBURDEN 51.1		16. ELEVATION TOP OF BORING (ft) 0.0		15. DATE BORING STARTED : 10/28/20 COMPLETED : 10/28/20
7. DEPTH DRILLED INTO ROCK 0.0		17. TOTAL CORE RECOVERY FOR BORING N/A		18. SIGNATURE AND TITLE OF INSPECTOR Mark Zrallack Project Engineer
8. TOTAL DEPTH OF BORING 51.1'				

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class	
					0' to 30.64': WATER.											40' of 4" casing

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET OF 3 SHEETS
		PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane
LOCATION COORDINATES N 411,770.1 E 856,952.4		ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class		
					[Wavy Pattern]	0' to 30.64': WATER. <i>(continued)</i>											20.0
-30.6	30.6					30.64' to 45.14': NO RETURN, WEIGHT OF ROD.											22.5
			WOR		[X Pattern]		0										25.0
																	27.5
																	30.0
																	32.5
																	35.0
																	37.5
																	40.0
																	42.5

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)	INSTALLATION Brunswick, Georgia		SHEET 3 OF 3 SHEETS
	PROJECT BRUNSWICK HARBOR MODIFICATION STUDY	COORDINATE SYSTEM GA State Plane	HORIZONTAL : VERTICAL NAD83 : MLLW
LOCATION COORDINATES N 411,770.1 E 856,952.4		ELEVATION TOP OF BORING (ft) 0.0	

ELEV (ft)	DEPTH (ft)	Blows/0.5ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
-45.1	-45.1				X	30.64' to 45.14': NO RETURN, WEIGHT OF ROD. (continued)												
-45.6	-45.6	0				45.14' to 45.64': SILTY SAND (SM), gray, with shell fragments, calcareous.	60	1										45.0
-46.6	-46.6	0	WOH			45.64' to 46.64': SILT (ML), gray, with shell fragments, calcareous.		2										
-48.1	-48.1	0			•••	46.64' to 48.14': SAND (SP), fine to medium; gray, with shell fragments, calcareous.	60	3										47.5
-48.6	-48.6	1				48.14' to 48.64': SILTY SAND (SM), gray, with shell fragments, calcareous.		4										
-49.6	-49.6	3	5		•••	48.64' to 49.64': SAND (SP), fine to medium; gray, with shell fragments, with limestone fragments, calcareous.	70	5										
-50.1	-50.1	5	13			49.64' to 50.14': SILTY SAND (SM), dark gray, with shell fragments, with limestone fragments, calcareous.	60	6										50.0
-51.1	-51.1	8			•••	50.14' to 51.14': SAND (SP), medium to coarse; gray, with shell fragments, with limestone fragments, calcareous.		7										

Bottom of hole at 51.1 feet.

NOTES:

1. BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
2. Soils are visually classified in accordance with the Unified Soil Classification System.
3. SPT boring performed using an automatic hammer.
4. WOR = Weight of Rods
5. WOH = Weight of Hammer
6. 50/3" = 50 Blows for 3 inches penetration
7. Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009 08 18.GDT 2/5/21

Boring Designation TB-B-13

DRILLING LOG		DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET 1 OF 3 SHEETS
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane		HORIZONTAL NAD83 VERTICAL MLLW
2. HOLE NUMBER TB-B-13		LOCATION COORDINATES N 411,855.3 E 857,200.7		10. SIZE AND TYPE OF BIT 2 7/8" Tricone
3. DRILLING AGENCY Tetra Tech - AAI		11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge		12. TOTAL SAMPLES DISTURBED: 22 UNDISTURBED: 0
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER (ft)
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL ---	BEARING	
6. THICKNESS OF OVERBURDEN 49.4		16. ELEVATION TOP OF BORING (ft) 0.0		15. DATE BORING STARTED: 10/25/20 COMPLETED: 10/25/20
7. DEPTH DRILLED INTO ROCK 0.0		17. TOTAL CORE RECOVERY FOR BORING N/A		18. SIGNATURE AND TITLE OF INSPECTOR Mark Zrallack Project Engineer
8. TOTAL DEPTH OF BORING 49.4'				

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class	
					0' to 23.93': WATER.											40' of 4" casing

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 2 OF 3 SHEETS
		PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane
LOCATION COORDINATES N 411,855.3 E 857,200.7		ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
						0' to 23.93': WATER. (continued)												
-23.9	23.9																	20.0
-24.4	24.4	1	2			23.93' to 24.43': SILTY SAND (SM), fine; dark gray, some clay, some shell fragments, calcareous.	70	1										22.5
-25.4	25.4	1				24.43' to 25.43': CLAYEY SAND (SC), fine; gray, some shell fragments, some silt, calcareous.		2										25.0
		2	5			25.43' to 27.93': SILTY SAND (SM), fine; gray, some shell fragments, some clay, calcareous.	80	3										
-27.9	27.9	8	18			27.93' to 28.43': CLAYEY SAND (SC), gray, some shell fragments, calcareous.	70	4	12	75	13			30	SM			27.5
-28.4	28.4	10				28.43' to 29.93': CLAYEY SAND (SC), gray, with shell fragments, calcareous.	70	5										
-29.9	29.9	14	22			29.93' to 32.93': SANDY CLAY (CL), gray, calcareous.	90	6										30.0
		13	44				90	7										
-32.9	32.9	12	49				90	8	2	38	60	33	19	21	CL			32.5
		19																
-34.4	34.4	10	31			32.93' to 34.43': CLAYEY SAND (SC), gray, calcareous.	80	9										
		12																
		19																
		7	17			34.43' to 37.43': CLAYEY SAND (SC), gray, some silt, few limestone fragments, calcareous.	70	10										35.0
		8																
		9																
-37.4	37.4	12	25				80	11										
		8																
		15	39			37.43' to 39.26': CLAYEY SAND (SC), gray, some silt, some limestone fragments, calcareous.	70	12										37.5
		24																
-39.3	39.3	18	53			39.26' to 40.43': SILTY SAND (SM), gray, some clay, some limestone fragments, calcareous.	60	13										
		23																
-40.4	40.4	30				40.43' to 42.26': CLAYEY SAND (SC), gray, some silt, some limestone fragments, calcareous.	70	14										40.0
		10	25															
		11																
-42.3	42.3	14				42.26' to 48.43': SILTY SAND (SM), gray, some clay, some limestone fragments, calcareous.	70	15										
		7	16															
		8					70	16										42.5
		8						17										
		7	15															

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 3 OF 3 SHEETS
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane		HORIZONTAL VERTICAL NAD83 MLLW
LOCATION COORDINATES N 411,855.3 E 857,200.7		ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class		
		8				42.26' to 48.43': SILTY SAND (SM), gray, some clay, some limestone fragments, calcareous. (continued)	60	18									45.0 47.5
		8					50	19									
		13	28														
		15															
		4															
		7	17				50	20									
		10															
-48.4	48.4	4				48.43' to 49.43': CLAY (CL), dark gray, with shell fragments, calcareous.	60	21									
		4	12					22									
-49.4	49.4	8															







Bottom of hole at 49.4 feet.

NOTES:

1. BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
2. Soils are visually classified in accordance with the Unified Soil Classification System.
3. SPT boring performed using an automatic hammer.
4. WOR = Weight of Rods
5. WOH = Weight of Hammer
6. 50/3" = 50 Blows for 3 inches penetration
7. Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)	INSTALLATION Brunswick, Georgia		SHEET OF 2 SHEETS 2
	PROJECT BRUNSWICK HARBOR MODIFICATION STUDY	COORDINATE SYSTEM GA State Plane	HORIZONTAL VERTICAL NAD83 MLLW
LOCATION COORDINATES N 411,953.8 E 857,429.2		ELEVATION TOP OF BORING (ft) 0.0	

ELEV (ft)	DEPTH (ft)	Blows/0.5ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
-27.5	27.5					0' to 27.52': WATER. (continued)												
-28.5	28.5	0 4 3	7			27.52' to 28.52': CLAYEY SAND (SC), fine to medium; greenish gray, some shell fragments, calcareous.		1A 1B										
-30.5	30.5	1 2 6	8			28.52' to 30.52': SAND (SP), medium to coarse; greenish gray, some shell fragments, some clay, interbedded clayey sand and some sandstone.		2										
-32.3	32.3	5 2 6	8			30.52' to 32.27': SAND (SP), medium to coarse; light gray, some shell fragments, some silt, some limestone fragments, calcareous.		3										
-36.5	36.5	3 8 12 6 7 15 12 9 16	20 25			32.27' to 36.52': CLAY WITH SAND (CL), gray, calcareous.		4		5	5	19	76	38	21	24	CL	
-36.5	36.5							6		7		23	70			30	CL	
-39.5	39.5	7 11 9 2 6 9	20 15			36.52' to 39.52': CLAYEY SAND (SC), fine to medium; greenish gray, some silt, some sandstone fragments, calcareous.		7 8										

Bottom of hole at 39.5 feet.

NOTES:

1. BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
2. Soils are visually classified in accordance with the Unified Soil Classification System.
3. SPT boring performed using an automatic hammer.
4. WOR = Weight of Rods
5. WOH = Weight of Hammer
6. 50/3" = 50 Blows for 3 inches penetration
7. Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21




Boring Designation TB-B-14B

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET 1 OF 2 SHEETS
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane	HORIZONTAL : VERTICAL NAD83 : MLLW
2. HOLE NUMBER : LOCATION COORDINATES TB-B-14B : N 411,994.6 E 857,432.1		10. SIZE AND TYPE OF BIT : 2 7/8" Tricone	
3. DRILLING AGENCY Tetra Tech - AAI		12. TOTAL SAMPLES : DISTURBED : UNDISTURBED 2 : 0	
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		13. TOTAL NUMBER CORE BOXES : 0	
5. DIRECTION OF BORING : DEG FROM VERTICAL : BEARING <input checked="" type="checkbox"/> VERTICAL : --- <input type="checkbox"/> INCLINED		14. ELEVATION GROUND WATER (ft)	
6. THICKNESS OF OVERBURDEN : 42.2		15. DATE BORING : STARTED : COMPLETED 10/24/20 : 10/24/20	
7. DEPTH DRILLED INTO ROCK : 0.0		16. ELEVATION TOP OF BORING (ft) : 0.0	
8. TOTAL DEPTH OF BORING : 42.2'		17. TOTAL CORE RECOVERY FOR BORING : N/A	
18. SIGNATURE AND TITLE OF INSPECTOR Jeremy Clark Project Engineer			

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS			
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class				
					WATER	0' to 27.2': WATER.													
																			45' of 4" casing

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 2 OF 2 SHEETS	
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane		HORIZONTAL VERTICAL NAD83 MLLW	
LOCATION COORDINATES N 411,994.6 E 857,432.1		ELEVATION TOP OF BORING (ft) 0.0			

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class			
						0' to 27.2': WATER. (continued)												
-27.2	27.2					27.2' to 39.2': WASH BORING.												
						39.2' to 42.2': CLAYEY SAND (SC), fine to medium; greenish gray, some silt, some limestone fragments, calcareous.												
-39.2	39.2	3																
		8	20					9										
		12																
		11																
		14	25															
-42.2	42.2	11						10										

Bottom of hole at 42.2 feet.

NOTES:

1. BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
2. Soils are visually classified in accordance with the Unified Soil Classification System.
3. SPT boring performed using an automatic hammer.
4. WOR = Weight of Rods
5. WOH = Weight of Hammer
6. 50/3" = 50 Blows for 3 inches penetration
7. Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

Boring Designation TB-B-14C

DRILLING LOG		DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET 1 OF 3 SHEETS
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane		HORIZONTAL : VERTICAL NAD83 : MLLW
2. HOLE NUMBER TB-B-14C		LOCATION COORDINATES N 411,952.2 E 857,468.9		10. SIZE AND TYPE OF BIT 2 7/8" Tricone
3. DRILLING AGENCY Tetra Tech - AAI		11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge		12. TOTAL SAMPLES DISTURBED : 9 UNDISTURBED : 0
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER (ft)
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL ---	BEARING	15. DATE BORING STARTED : 10/25/20 COMPLETED : 10/25/20
6. THICKNESS OF OVERBURDEN 52.3		16. ELEVATION TOP OF BORING (ft) 0.0		17. TOTAL CORE RECOVERY FOR BORING N/A
7. DEPTH DRILLED INTO ROCK 0.0		18. SIGNATURE AND TITLE OF INSPECTOR Mark Zrallack Project Engineer		
8. TOTAL DEPTH OF BORING 52.3'				

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class	
					0' to 29.79': WATER.											40' of 4" casing

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)

INSTALLATION
Brunswick, Georgia

SHEET 2
OF 3 SHEETS

PROJECT
BRUNSWICK HARBOR MODIFICATION STUDY

COORDINATE SYSTEM
GA State Plane
HORIZONTAL
VERTICAL
NAD83
MLLW

LOCATION COORDINATES
N 411,952.2 E 857,468.9

ELEVATION TOP OF BORING (ft)
0.0

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
						0' to 29.79': WATER. (continued)												
						29.79' to 38.79': WASH BORING.												
						38.79' to 43.29': CLAYEY SAND (SC), fine; gray, some silt, some limestone fragments, calcareous.	80	11										
		3	17															
		2																
		15																
		13	24				80	12										
		9																
		15																
		13	23				80	13										
		9																
		14																
		8																
		8	22				80	14										

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)	INSTALLATION Brunswick, Georgia		SHEET 3 OF 3 SHEETS
	PROJECT BRUNSWICK HARBOR MODIFICATION STUDY	COORDINATE SYSTEM GA State Plane	HORIZONTAL : VERTICAL NAD83 : MLLW
LOCATION COORDINATES N 411,952.2 E 857,468.9		ELEVATION TOP OF BORING (ft) 0.0	

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS			
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class				
-44.8	44.8	14			[Diagonal Hatching]	43.29' to 44.79' : CLAYEY SAND (SC), fine; gray, some sandstone fragments, calcareous. <i>(continued)</i>													
		9																	
		12	25		[Diagonal Hatching]	44.79' to 46.29' : CLAYEY SAND (SC), fine; gray, with limestone fragments, some shell fragments, calcareous.	90	15											45.0
-46.3	46.3	13																	
		6			[Vertical Dashed]	46.29' to 50.79' : SILTY SAND (SM), fine to medium; greenish gray, some limestone fragments, calcareous.	70	16											
		8	17																
		9			[Vertical Dashed]		80	17											
		8	27																
		13			[Vertical Dashed]														
		14																	
		12			[Vertical Dashed]														
		9	18																
-50.8	50.8	9			[Vertical Dashed]		70	18											
		7																	
		8	16		[Vertical Dashed]		70	19											
-52.3	52.3	8																	

Bottom of hole at 52.3 feet.

NOTES:

- BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
- Soils are visually classified in accordance with the Unified Soil Classification System.
- SPT boring performed using an automatic hammer.
- WOR = Weight of Rods
- WOH = Weight of Hammer
- 50/3" = 50 Blows for 3 inches penetration
- Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

Boring Designation TB-B-15A

DRILLING LOG		DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET 1 OF 3 SHEETS
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane		HORIZONTAL NAD83
				VERTICAL MLLW
2. HOLE NUMBER TB-B-15A		LOCATION COORDINATES N 411,661.4 E 857,437.2		10. SIZE AND TYPE OF BIT 2 7/8" Tricone
3. DRILLING AGENCY Tetra Tech - AAI		11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge		12. TOTAL SAMPLES DISTURBED 5 UNDISTURBED 0
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER (ft)
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL ---	BEARING	15. DATE BORING STARTED 10/23/20 COMPLETED 10/23/20
6. THICKNESS OF OVERBURDEN 46.5		16. ELEVATION TOP OF BORING (ft) 0.0		17. TOTAL CORE RECOVERY FOR BORING N/A
7. DEPTH DRILLED INTO ROCK 0.0		18. SIGNATURE AND TITLE OF INSPECTOR Jeremy Clark Project Engineer		
8. TOTAL DEPTH OF BORING 46.5'				

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class	
					WATER	0' to 39.03': WATER.										50' of 4" casing

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)	INSTALLATION Brunswick, Georgia	SHEET 2 OF 3 SHEETS	
	PROJECT BRUNSWICK HARBOR MODIFICATION STUDY	COORDINATE SYSTEM GA State Plane	HORIZONTAL NAD83
LOCATION COORDINATES N 411,661.4 E 857,437.2	ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
					[Wavy Pattern]	0' to 39.03': WATER. (continued)												20.0
-39.0	39.0	0			[Wavy Pattern]													22.5
		0	WOH		[Wavy Pattern]													25.0
		0			[Wavy Pattern]													27.5
		2	4		[Wavy Pattern]													30.0
		2			[Wavy Pattern]													32.5
-42.8	42.8	3	12		[Wavy Pattern]	39.03' to 42.78': SAND (SP), medium to coarse; greenish gray, some shell fragments, trace silt, calcareous.		1										35.0
		9			[Wavy Pattern]													37.5
		2			[Wavy Pattern]													40.0
		9			[Wavy Pattern]	42.78' to 46.53': SAND (SP), medium to coarse; light gray, some shell fragments, some limestone and gravel, calcareous.		3A 3B										42.5
		2			[Wavy Pattern]													20.0

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 3 OF 3 SHEETS
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane	HORIZONTAL NAD83	VERTICAL MLLW
LOCATION COORDINATES N 411,661.4 E 857,437.2		ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	L	PI	MC	ASTM Class			
		5	10		•••••	42.78' to 46.53': SAND (SP), medium to coarse; light gray, some shell fragments, some limestone and gravel, calcareous. (continued)		4										
		5			•••••													
		7			•••••													
		10	18		•••••			5										
-46.5	46.5	8			•••••													

45.0

Bottom of hole at 46.5 feet.

NOTES:

- BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
- Soils are visually classified in accordance with the Unified Soil Classification System.
- SPT boring performed using an automatic hammer.
- WOR = Weight of Rods
- WOH = Weight of Hammer
- 50/3" = 50 Blows for 3 inches penetration
- Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

Boring Designation TB-B-15B

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET 1 OF 3 SHEETS
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane	HORIZONTAL : VERTICAL NAD83 : MLLW
2. HOLE NUMBER TB-B-15B		10. SIZE AND TYPE OF BIT 2 7/8" Tricone	
3. DRILLING AGENCY Tetra Tech - AAI		11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge	
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		12. TOTAL SAMPLES	DISTURBED : UNDISTURBED 2 : 0
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		13. TOTAL NUMBER CORE BOXES	0
DEG FROM VERTICAL : BEARING --- : ---		14. ELEVATION GROUND WATER (ft)	
6. THICKNESS OF OVERBURDEN 48.9		15. DATE BORING	STARTED : COMPLETED 10/24/20 : 10/24/20
7. DEPTH DRILLED INTO ROCK 0.0		16. ELEVATION TOP OF BORING (ft) 0.0	
8. TOTAL DEPTH OF BORING 48.9'		17. TOTAL CORE RECOVERY FOR BORING N/A	
18. SIGNATURE AND TITLE OF INSPECTOR Jeremy Clark Project Engineer			

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class		
					WATER	0' to 38.41': WATER.											50' of 4" casing

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)	INSTALLATION Brunswick, Georgia		SHEET 2 OF 3 SHEETS
	PROJECT BRUNSWICK HARBOR MODIFICATION STUDY	COORDINATE SYSTEM GA State Plane	HORIZONTAL : VERTICAL NAD83 : MLLW
LOCATION COORDINATES N 411,673.7 E 857,427.7		ELEVATION TOP OF BORING (ft) 0.0	

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class		
					Water	0' to 38.41': WATER. (continued)											20.0 22.5 25.0 27.5 30.0 32.5 35.0 37.5 40.0 42.5
-38.4	38.4				X	38.41' to 45.91': WASH BORING.											

FISH PASS TEST-ACE_1836-A [DRILLING LOG]_20-13-0122 BRUNSWICK HARBOR MOD STUDY_WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT_2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 3 OF 3 SHEETS
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane		HORIZONTAL VERTICAL NAD83 MLLW
LOCATION COORDINATES N 411,673.7 E 857,427.7		ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS					
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class						
-45.9	45.9				X	38.41' to 45.91': WASH BORING. (continued)															
		7				45.91' to 48.91': CLAY (CL), greenish gray, trace fine sand, some limestone and gravel, slightly calcareous.		1													
		9	21																		
		12																			
		3						2													
		5	13																		
-48.9	48.9	8																			

45.0

47.5

Bottom of hole at 48.9 feet.

NOTES:

- BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
- Soils are visually classified in accordance with the Unified Soil Classification System.
- SPT boring performed using an automatic hammer.
- WOR = Weight of Rods
- WOH = Weight of Hammer
- 50/3" = 50 Blows for 3 inches penetration
- Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

Boring Designation BW-B-01

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET 1 OF 3 SHEETS
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane	HORIZONTAL NAD83 VERTICAL MLLW
2. HOLE NUMBER BW-B-01		10. SIZE AND TYPE OF BIT 2 7/8" Tricone	
3. DRILLING AGENCY Tetra Tech - AAI		11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge	
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		12. TOTAL SAMPLES DISTURBED 13 UNDISTURBED 0	
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		13. TOTAL NUMBER CORE BOXES 0	
6. THICKNESS OF OVERBURDEN 49.0		14. ELEVATION GROUND WATER (ft)	
7. DEPTH DRILLED INTO ROCK 0.0		15. DATE BORING STARTED 11/22/20 COMPLETED 11/22/20	
8. TOTAL DEPTH OF BORING 49'		16. ELEVATION TOP OF BORING (ft) 0.0	
		17. TOTAL CORE RECOVERY FOR BORING N/A	
		18. SIGNATURE AND TITLE OF INSPECTOR Mark Zrallack Project Engineer	

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class		
						0' to 27.98': WATER.											0.0
																	2.5
																	5.0
																	7.5
																	10.0
																	12.5
																	15.0
																	17.5
																	20.0

DRILLING LOG (Cont Sheet)	INSTALLATION Brunswick, Georgia		SHEET 2 OF 3 SHEETS
	PROJECT BRUNSWICK HARBOR MODIFICATION STUDY	COORDINATE SYSTEM GA State Plane	HORIZONTAL NAD83
LOCATION COORDINATES N 402,886.4 E 879,294.9	VERTICAL MLLW		
		ELEVATION TOP OF BORING (ft) 0.0	

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class			
						0' to 27.98': WATER. (continued)												
-28.0	28.0																	
		18				27.98' to 32.48': SILTY SAND (SM), fine; gray, with sandstone fragments.	70	1										
		16	36															
		20																
		9																
		20	49				60	2										
		29																
		10																
		15	28				60	3										
-32.5	32.5	13																
		12				32.48' to 33.98': CLAYEY SAND (SC), fine; gray, trace sandstone fragments.	60	4										
		19	42															
		23																
-34.0	34.0																	
		5				33.98' to 35.48': SAND (SP), coarse; gray, trace clay.	60	5										
		8	26															
		18																
-35.5	35.5																	
		5				35.48' to 36.98': CLAYEY SAND (SC), fine; gray, trace sandstone fragments, with gravel.	70	6										
		19	34															
		15																
-37.0	37.0																	
		4				36.98' to 38.48': SAND (SP), fine; gray, trace clay.	50	7										
		7	23															
		16																
-38.5	38.5																	
		13				38.48' to 39.98': SAND (SP), fine; gray.	60	8										
		26	76															
		50																
-40.0	40.0																	
		50				39.98' to 41.48': NO RETURN (NS).												
			50/3"															
-41.5	41.5																	
		9				41.48' to 42.98': SAND (SP), medium; gray, trace clay.	40	9										
		10	18															
		8																
-43.0	43.0																	
		4				42.98' to 45.98': CLAYEY SAND (SC), fine; gray, with gravel.	70	10										
		8	16															

Specific Gravity = 2.66

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)	INSTALLATION Brunswick, Georgia		SHEET 3 OF 3 SHEETS
	PROJECT BRUNSWICK HARBOR MODIFICATION STUDY	COORDINATE SYSTEM GA State Plane	HORIZONTAL : VERTICAL NAD83 : MLLW
LOCATION COORDINATES N 402,886.4 E 879,294.9		ELEVATION TOP OF BORING (ft) 0.0	

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	L	PI	MC	ASTM Class	
-46.0	46.0	8	11			42.98' to 45.98': CLAYEY SAND (SC), fine; gray, with gravel. (continued)	70	11								45.0
		3														
		5														
-49.0	49.0	6	22			45.98' to 48.98': CLAYEY SAND (SC), fine; gray.	60	12								47.5
		7														
		9														
		13														
-49.0	49.0	5	28				60	13								
		12														
		16														

Bottom of hole at 49 feet.

NOTES:

- BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
- Soils are visually classified in accordance with the Unified Soil Classification System.
- SPT boring performed using an automatic hammer.
- WOR = Weight of Rods
- WOH = Weight of Hammer
- 50/3" = 50 Blows for 3 inches penetration
- Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

Boring Designation BW-B-02

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Brunswick, Georgia			SHEET 1 OF 3 SHEETS	
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY				9. COORDINATE SYSTEM GA State Plane		HORIZONTAL NAD83		VERTICAL MLLW
2. HOLE NUMBER BW-B-02		LOCATION COORDINATES N 402,653.6 E 879,701.0		10. SIZE AND TYPE OF BIT 2 7/8" Tricone				11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge
3. DRILLING AGENCY Tetra Tech - AAI				12. TOTAL SAMPLES 16		DISTURBED 0		UNDISTURBED 0
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins				13. TOTAL NUMBER CORE BOXES 0				
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL ---		BEARING		14. ELEVATION GROUND WATER (ft)		
6. THICKNESS OF OVERBURDEN 51.0				15. DATE BORING 11/23/20		STARTED 11/23/20		COMPLETED 11/23/20
7. DEPTH DRILLED INTO ROCK 0.0				16. ELEVATION TOP OF BORING (ft) 0.0				
8. TOTAL DEPTH OF BORING 51'				17. TOTAL CORE RECOVERY FOR BORING N/A				
				18. SIGNATURE AND TITLE OF INSPECTOR Mark Zrallack Project Engineer				

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class	
					0' to 32.99': WATER.											45' of 4" casing

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 2 OF 3 SHEETS
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane		HORIZONTAL VERTICAL NAD83 MLLW
LOCATION COORDINATES N 402,653.6 E 879,701.0		ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
						0' to 32.99': WATER. (continued)												
-33.0	33.0																	
-34.5	34.5	8 13 50	63			32.99' to 34.49': CLAYEY SAND (SC), fine; gray, with sandstone fragments, with gravel.	80	1										First three feet of borehole might have elevated SPT-N values due to overdriven casing
		50	50/4"			34.49' to 36.49': SANDY CLAY (CL), gray, trace gravel.	30	2	4	41	56	38	16	14	CL			
-36.5	36.5	12																
		8	16			36.49' to 37.49': SAND (SP), fine to medium; gray, with gravel, trace clay.	60	3										
-37.5	37.5	8				37.49' to 43.49': SAND (SP), medium; gray, with gravel, calcareous.	40	5										
		6 9 13 13 10 19	22 29				40	6										
		11 9 9	18				40	7										
		7 8 9	17				40	8										
-43.5	43.5	3				43.49' to 44.99': CLAYEY SAND (SC), fine; gray.												

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)	INSTALLATION Brunswick, Georgia		SHEET 3 OF 3 SHEETS
	PROJECT BRUNSWICK HARBOR MODIFICATION STUDY	COORDINATE SYSTEM GA State Plane	HORIZONTAL : VERTICAL NAD83 : MLLW
LOCATION COORDINATES N 402,653.6 E 879,701.0		ELEVATION TOP OF BORING (ft) 0.0	

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	L	PI	MC	ASTM Class	
-45.0	45.0	3 4	7		[Diagonal Hatching]	44.99' to 46.99': CLAYEY SAND (SC), fine; gray, trace gravel.	70	9								45.0
		3 4 8	12				70	10								
-47.0	47.0	3 10	23		[Dotted]	46.99' to 47.99': SAND (SP), fine; gray.	60	11							47.5	
-48.0	48.0	13					60	12								
-49.0	49.0	8 33	50/4"		[Diagonal Hatching]	47.99' to 48.99': CLAYEY SAND (SC), gray.	70	13							50.0	
		50					70	14								
-50.5	50.5	5 11	28		[Diagonal Hatching]	48.99' to 50.49': CLAYEY SAND (SC), light gray.	70	15							50.0	
-51.0	51.0	17					70	16								

Bottom of hole at 51 feet.

NOTES:

1. BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
2. Soils are visually classified in accordance with the Unified Soil Classification System.
3. SPT boring performed using an automatic hammer.
4. WOR = Weight of Rods
5. WOH = Weight of Hammer
6. 50/3" = 50 Blows for 3 inches penetration
7. Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009 08 18.GDT 2/5/21

Boring Designation BW-B-03

DRILLING LOG		DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET 1 OF 3 SHEETS
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane		HORIZONTAL NAD83
2. HOLE NUMBER BW-B-03		LOCATION COORDINATES N 402,809.6 E 880,151.9		VERTICAL MLLW
3. DRILLING AGENCY Tetra Tech - AAI		10. SIZE AND TYPE OF BIT 2 7/8" Tricone		
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge		
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL	BEARING	
6. THICKNESS OF OVERBURDEN 48.3		12. TOTAL SAMPLES DISTURBED 17 UNDISTURBED 0		
7. DEPTH DRILLED INTO ROCK 0.0		13. TOTAL NUMBER CORE BOXES 0		
8. TOTAL DEPTH OF BORING 48.3'		14. ELEVATION GROUND WATER (ft)		
		15. DATE BORING STARTED 11/20/20 COMPLETED 11/20/20		
		16. ELEVATION TOP OF BORING (ft) 0.0		
		17. TOTAL CORE RECOVERY FOR BORING N/A		
		18. SIGNATURE AND TITLE OF INSPECTOR Mark Zrallack Project Engineer		

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
						0' to 27.29': WATER.												0.0
																		2.5
																		5.0
																		7.5
																		10.0
																		12.5
																		15.0
																		17.5
																		20.0

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)	INSTALLATION Brunswick, Georgia	SHEET 2 OF 3 SHEETS	
	PROJECT BRUNSWICK HARBOR MODIFICATION STUDY	COORDINATE SYSTEM GA State Plane	HORIZONTAL NAD83
LOCATION COORDINATES N 402,809.6 E 880,151.9	ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
-27.3	27.3					0' to 27.29': WATER. (continued)												
-31.8	31.8	2	7	19		27.29' to 31.79': SAND WITH SILT (SP-SM), fine; gray, with shell fragments, calcareous.	80	1										
		100					2	4	87	10		20	SP-SM					
		50					3											
-33.3	33.3	5	20	20		31.79' to 33.29': CLAY WITH SAND (CH), gray.	70	4	0	18	82	112	71	61	CH			
-34.3	34.3	4	27	27		33.29' to 34.29': CLAYEY SAND (SC), fine; gray, with shell fragments.	70	5										
-34.8	34.8	22																
-36.3	36.3	24	71	71		34.29' to 34.79': CLAYEY SAND (SC), light gray, trace shell fragments.	60	7										
		32																36.29' to 36.29': CLAYEY SAND (SC), fine to medium; light gray, with shell fragments.
		39																
-37.8	37.8	19	50/2"	50/2"		36.29' to 37.79': CLAYEY SAND (SC), light gray, with shell fragments, with gravel.	60	8										
		50																
-39.3	39.3	50	50/4"	50/4"		37.79' to 39.29': NO RETURN (NS).	0											
-40.8	40.8	50	50/5"	50/5"		39.29' to 40.79': SAND (SP), fine; gray, with shell fragments, trace siltstone fragments.	10	9										
-42.3	42.3	5	11	11		40.79' to 42.29': SAND (SP), fine; gray, with shell fragments, some gravel.	50	10										
-42.8	42.8	3	15	15		42.29' to 42.79': CLAYEY SAND (SC), fine; gray, with shell fragments.	70	11										
		6																
		9																
		5																42.79' to 45.29': SAND (SP), fine to medium; gray, trace shell fragments.

FISH PASS TEST-ACE 1836-A (DRILLING LOG) 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 3 OF 3 SHEETS
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane		HORIZONTAL VERTICAL NAD83 MLLW
LOCATION COORDINATES N 402,809.6 E 880,151.9		ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
-45.3	45.3	9 12	21		[Symbol]	42.79' to 45.29': SAND (SP), fine to medium; gray, trace shell fragments. (continued)	60	13										
		12 11 8	19		[Symbol]	45.29' to 47.79': CLAYEY SAND (SC), fine; gray, trace shell fragments, some gravel.	60	14										
-47.8	47.8	11	47		[Symbol]		70	15										
-48.3	48.3	36			[Symbol]	47.79' to 48.29': CLAYEY SAND (SC), light gray, trace shell fragments.		16										

Bottom of hole at 48.3 feet.

NOTES:

1. BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
2. Soils are visually classified in accordance with the Unified Soil Classification System.
3. SPT boring performed using an automatic hammer.
4. WOR = Weight of Rods
5. WOH = Weight of Hammer
6. 50/3" = 50 Blows for 3 inches penetration
7. Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

Boring Designation BW-B-03 Core

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET 1 OF 2 SHEETS
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane	HORIZONTAL : VERTICAL NAD83 : MLLW
2. HOLE NUMBER BW-B-03 Core		10. SIZE AND TYPE OF BIT 4" Core Bit	
3. DRILLING AGENCY Tetra Tech - AAI		11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge	
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		12. TOTAL SAMPLES	DISTURBED : UNDISTURBED 1 : 0
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		13. TOTAL NUMBER CORE BOXES	1
6. THICKNESS OF OVERBURDEN 40.8		14. ELEVATION GROUND WATER (ft)	
7. DEPTH DRILLED INTO ROCK 0.0		15. DATE BORING	STARTED : COMPLETED 11/24/20 : 11/24/20
8. TOTAL DEPTH OF BORING 40.8'		16. ELEVATION TOP OF BORING (ft)	0.0
		17. TOTAL CORE RECOVERY FOR BORING	N/A
		18. SIGNATURE AND TITLE OF INSPECTOR Mark Zrallack Project Engineer	

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
					0' to 27.82': WATER.													0.0
																		2.5
																		5.0
																		7.5
																		10.0
																		12.5
																		15.0
																		17.5
																		20.0
																		22.5
																		25.0

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)	INSTALLATION Brunswick, Georgia		SHEET 2 OF 2 SHEETS
	PROJECT BRUNSWICK HARBOR MODIFICATION STUDY	COORDINATE SYSTEM GA State Plane	HORIZONTAL : VERTICAL NAD83 : MLLW
LOCATION COORDINATES N 402,813.4 E 880,186.5		ELEVATION TOP OF BORING (ft) 0.0	

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class			
						0' to 27.82': WATER. (continued)												
-27.8	27.8					27.82' to 35.82': WASH BORING.												
						35.82' to 37.79': NO RETURN.												
-35.8	35.8					37.79' to 39.29': SANDY LIMESTONE, gray, Moderately Hard.		C-1										
-37.8	37.8					39.29' to 40.82': NO RETURN.												
-39.3	39.3																	
-40.8	40.8																	


Bottom of hole at 40.8 feet.

NOTES:

1. Core was performed using a 4-inch diameter core barrel.
2. Soils are visually classified in accordance with the Unified Soil Classification System.

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG		DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET 1 OF 3 SHEETS
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane	HORIZONTAL NAD83	VERTICAL MLLW
2. HOLE NUMBER BW-B-04		10. SIZE AND TYPE OF BIT 2 7/8" Tricone		11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge
3. DRILLING AGENCY Tetra Tech - AAI		12. TOTAL SAMPLES 13		DISTURBED 0
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		13. TOTAL NUMBER CORE BOXES 0		
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL	BEARING	
6. THICKNESS OF OVERBURDEN 49.4		14. ELEVATION GROUND WATER (ft)		
7. DEPTH DRILLED INTO ROCK 0.0		15. DATE BORING 11/23/20		STARTED 11/23/20
8. TOTAL DEPTH OF BORING 49.4'		16. ELEVATION TOP OF BORING (ft) 0.0		COMPLETED 11/23/20
		17. TOTAL CORE RECOVERY FOR BORING N/A		
		18. SIGNATURE AND TITLE OF INSPECTOR Mark Zrallack Project Engineer		

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class		
						0' to 34.38':										45' of 4" casing	0.0 2.5 5.0 7.5 10.0 12.5 15.0 17.5 20.0

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)	INSTALLATION Brunswick, Georgia		SHEET 2 OF 3 SHEETS
	PROJECT BRUNSWICK HARBOR MODIFICATION STUDY	COORDINATE SYSTEM GA State Plane	HORIZONTAL : VERTICAL NAD83 : MLLW
LOCATION COORDINATES N 402,573.9 E 880,506.7	ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class			
						0' to 34.38': (continued)												
-34.4	34.4																	
-34.9	34.9	4				34.38' to 34.88': SILT (ML), gray.												
		4	6			34.88' to 36.88': SAND (SP), fine; gray, trace shell fragments.	50	1										First 1.5 feet of borehole might have elevated SPT-N values due to overdriven casing
		2						2										
-36.9	36.9	0	1				70	3										
-37.4	37.4	1				36.88' to 37.38': SILTY SAND (SM), gray.		4										
		1				37.38' to 38.88': SAND WITH SILT (SP-SM), fine; gray, with shell fragments.	50	5	1	93	6			26	SP-SM			
-38.9	38.9	3	6															
		2				38.88' to 41.88': SAND (SP), fine; gray, with sandstone fragments.	40	6										
		2	3															
		1																
		1																
-41.9	41.9	2	6				40	7										
		4																
		3				41.88' to 43.38': CLAYEY SAND (SC), gray.	70	8										
		3	9															
-43.4	43.4	6																
		5				43.38' to 44.88': CLAYEY SAND (SC), gray, trace gravel.	70	9										
		9	31															

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 3 OF 3 SHEETS
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane	HORIZONTAL NAD83	VERTICAL MLLW
LOCATION COORDINATES N 402,573.9 E 880,506.7		ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class	
-44.9	44.9	22				44.88' to 46.38': CLAYEY SAND (SC), gray.	60	10								45.0 47.5
-46.4	46.4	5	46													
-46.9	46.9	22				46.38' to 46.88': SAND WITH CLAY (SP-SC), fine; gray, with gravel. 46.88' to 49.38': CLAYEY SAND (SC), gray, with gravel.	70	11 12								
		24														
		50	50/5"													
		9														
		12	32													
-49.4	49.4	20														

Bottom of hole at 49.4 feet.

NOTES:

1. BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
2. Soils are visually classified in accordance with the Unified Soil Classification System.
3. SPT boring performed using an automatic hammer.
4. WOR = Weight of Rods
5. WOH = Weight of Hammer
6. 50/3" = 50 Blows for 3 inches penetration
7. Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

Boring Designation BW-B-05

DRILLING LOG		DIVISION South Atlantic	INSTALLATION Brunswick, Georgia	SHEET 1 OF 3 SHEETS
1. PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		9. COORDINATE SYSTEM GA State Plane		HORIZONTAL NAD83 VERTICAL MLLW
2. HOLE NUMBER BW-B-05		LOCATION COORDINATES N 402,828.0 E 880,813.9		10. SIZE AND TYPE OF BIT 2 7/8" Tricone
3. DRILLING AGENCY Tetra Tech - AAI		11. MANUFACTURER'S DESIGNATION OF DRILL CME-550X/Barge		12. TOTAL SAMPLES DISTURBED 18 UNDISTURBED 0
4. NAME OF DRILLER Donald Tindall, Randy Orr, Andrew Larkins		13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER (ft)
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL	BEARING	15. DATE BORING STARTED 11/21/20 COMPLETED 11/21/20
6. THICKNESS OF OVERBURDEN 49.2		16. ELEVATION TOP OF BORING (ft) 0.0		17. TOTAL CORE RECOVERY FOR BORING N/A
7. DEPTH DRILLED INTO ROCK 0.0		18. SIGNATURE AND TITLE OF INSPECTOR Mark Zrallack Project Engineer		
8. TOTAL DEPTH OF BORING 49.2'				

ELEV (ft)	DEPTH (ft)	Blows/ 0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS	
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class		
					0' to 25.17': WATER.												40' of 4" casing

FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 2 OF 3 SHEETS
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane		HORIZONTAL VERTICAL NAD83 MLLW
LOCATION COORDINATES N 402,828.0 E 880,813.9		ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/0.5ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS		
									Gravel	Sand	Fines	LL	PI	MC	ASTM Class			
						0' to 25.17': WATER. (continued)												
-25.2	-25.2																	
		1																
		2	5				40	1										First three feet of borehole might have elevated SPT-N values due to overdriven casing
-26.7	-26.7	3																
		10																
-27.7	-27.7	20	38				100	2										Specific Gravity = 2.67
		18																
		11																
		13	20				50	4										
-29.7	-29.7	7																
		3																
		4	9				50	5										
-31.2	-31.2	5																
		2																
		2	6				50	6	2	89	10			32	SP-SC			
		4																
		1																
		4	10				50	7										
-34.2	-34.2	6																
		4																
		4	11				50	8										
		7																
		3																
		7	15				50	9										
		8																
		6																
		12	22				60	10										
-38.7	-38.7	10																
		4																
		50	50/5"				50	11										
-39.2	-39.2																	
		8																
		7	13				50	13										
		6																
		3																
		5	17				70	14										
-43.2	-43.2	12																
		6																
		10	22				60	15										

FISH PASS TEST-ACE 1836-A (DRILLING LOG) 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009 08 18.GDT 2/5/21

DRILLING LOG (Cont Sheet)		INSTALLATION Brunswick, Georgia		SHEET 3 OF 3 SHEETS
PROJECT BRUNSWICK HARBOR MODIFICATION STUDY		COORDINATE SYSTEM GA State Plane		HORIZONTAL VERTICAL NAD83 MLLW
LOCATION COORDINATES N 402,828.0 E 880,813.9		ELEVATION TOP OF BORING (ft) 0.0		

ELEV (ft)	DEPTH (ft)	Blows/0.5 ft	N _i	N ₆₀	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	Laboratory							REMARKS
									Gravel	Sand	Fines	LI	PI	MC	ASTM Class	
-46.2	-46.2	12				43.17' to 46.17': CLAYEY SAND (SC), fine to medium; gray, calcareous. (continued)	10	16								45.0
		8														
		12	37													
		25														
-49.2	-49.2	6				46.17' to 49.17': SAND (SP), fine to medium; gray, trace shell fragments, calcareous.	30	17							47.5	
		15	31													
		16														
		11														
		12	30													
		18														

Bottom of hole at 49.2 feet.

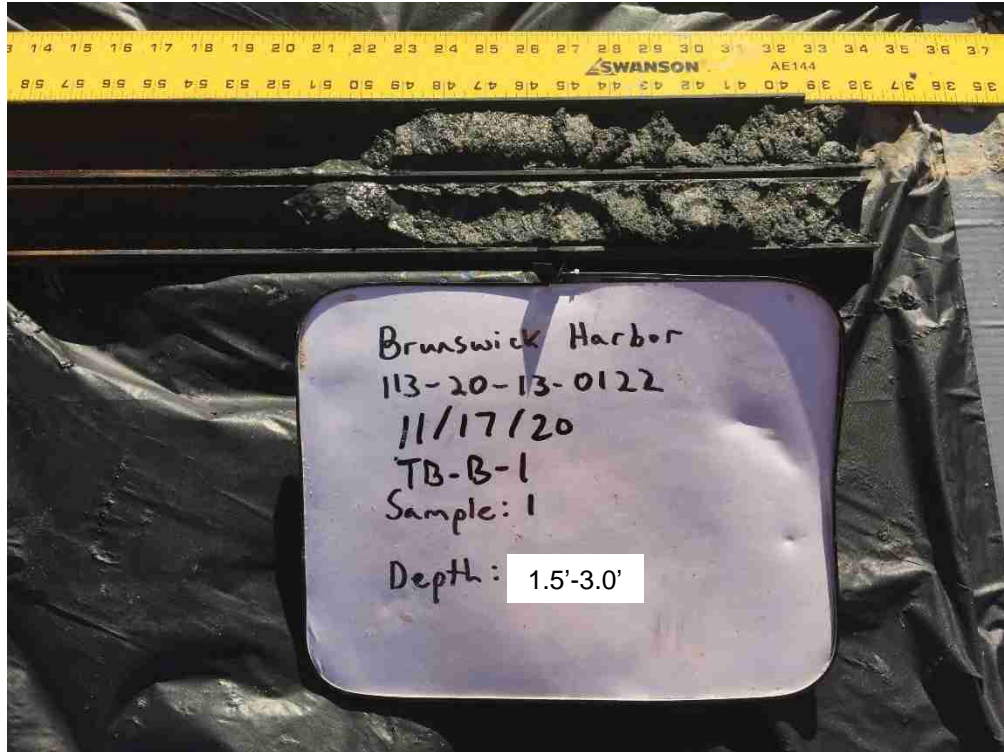
NOTES:

1. BLOWS/FOOT: number required to drive 1 3/8" ID splitspoon with a 140 lb. hammer falling 30 inches.
2. Soils are visually classified in accordance with the Unified Soil Classification System.
3. SPT boring performed using an automatic hammer.
4. WOR = Weight of Rods
5. WOH = Weight of Hammer
6. 50/3" = 50 Blows for 3 inches penetration
7. Water contents are based on measured total dry mass and are not corrected for the salt concentration of the pore water

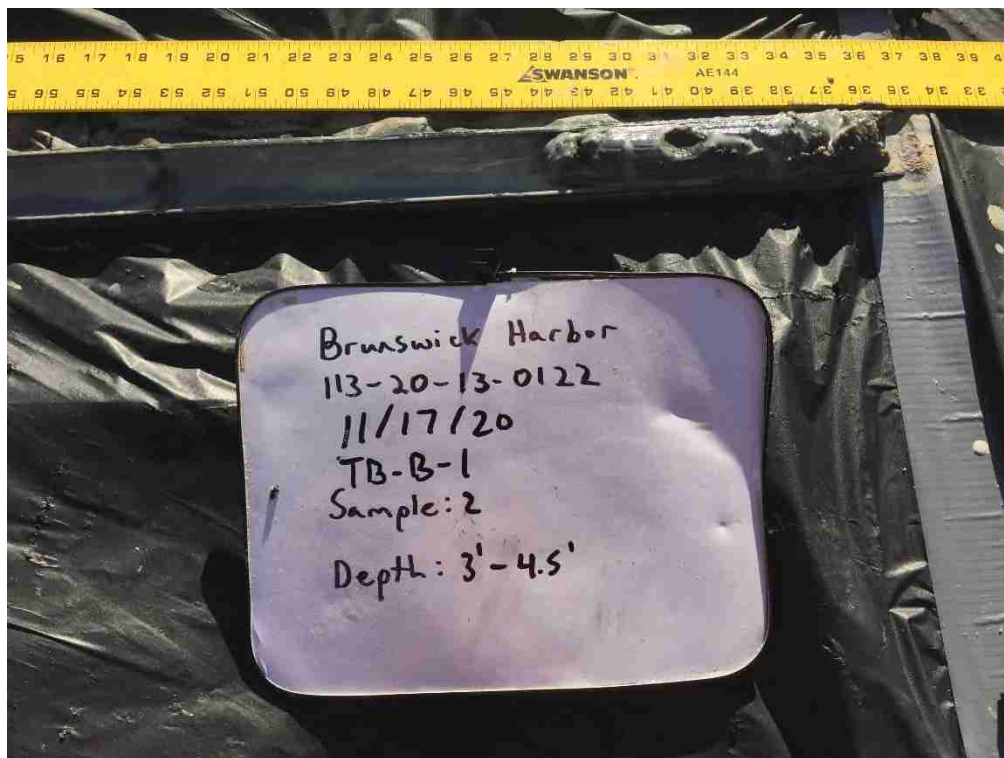
FISH PASS TEST-ACE 1836-A [DRILLING LOG] 20-13-0122 BRUNSWICK HARBOR MOD STUDY WITH LAB RESULTS.GPJ ACE MVD WITH RAPID CPT 2009_08_18.GDT 2/5/21

APPENDIX C
PHOTOGRAPHS OF SPT SAMPLES

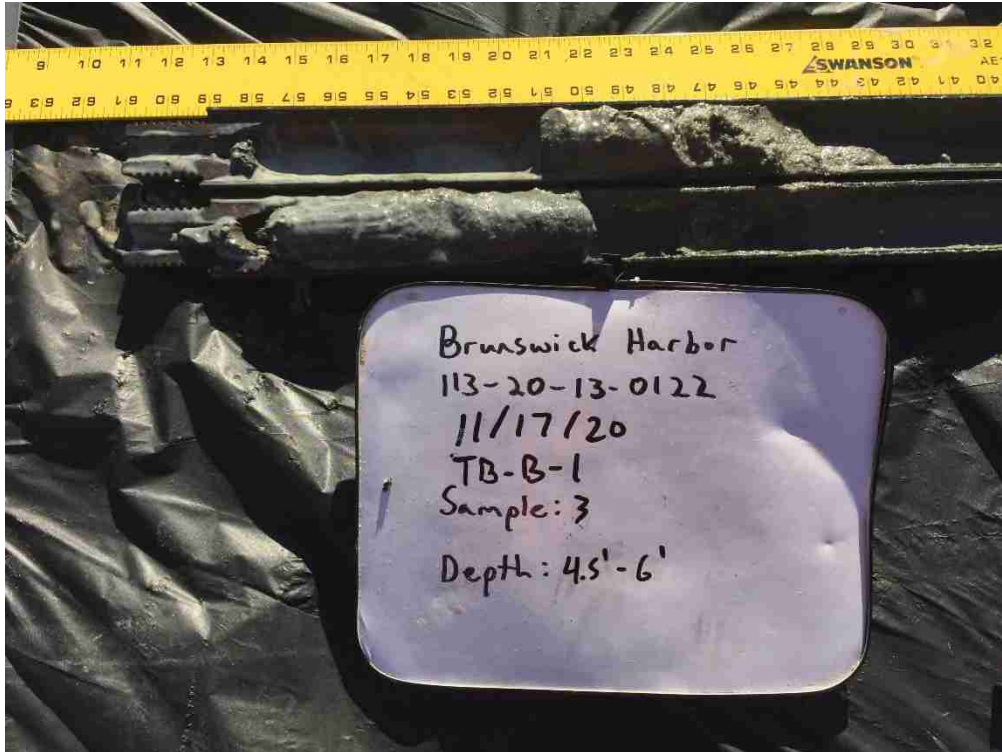
TB-B-01 Photographs



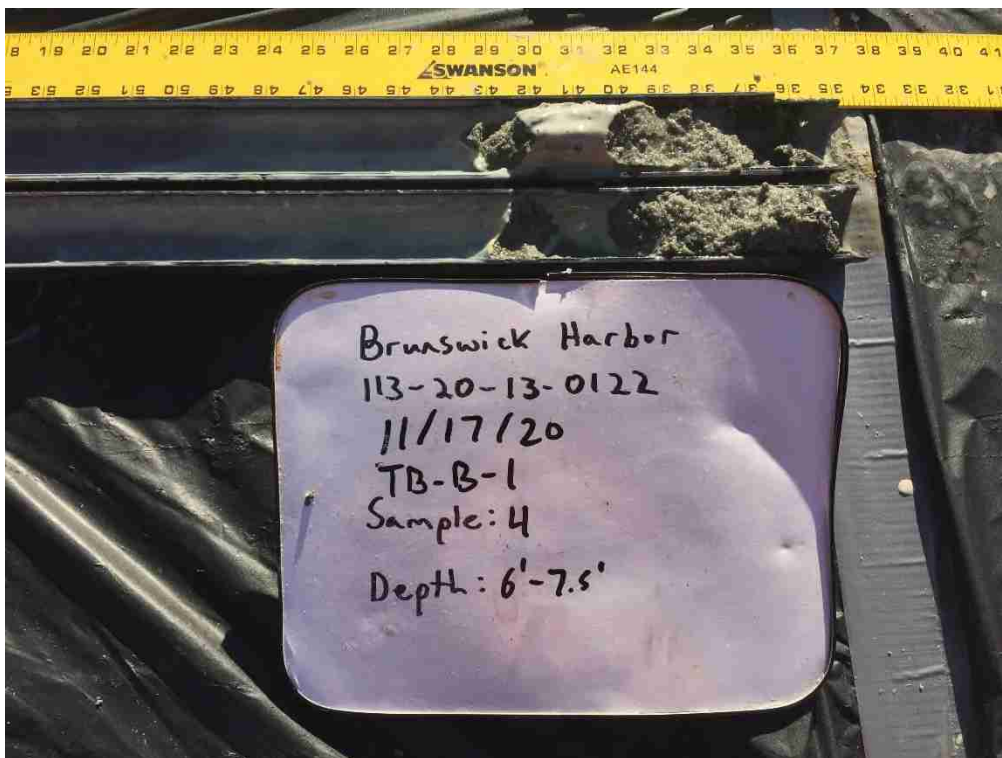
Depth: 1.5 – 3.0 feet; Approximate Elevation: -30.0 to -31.5 feet MLLW



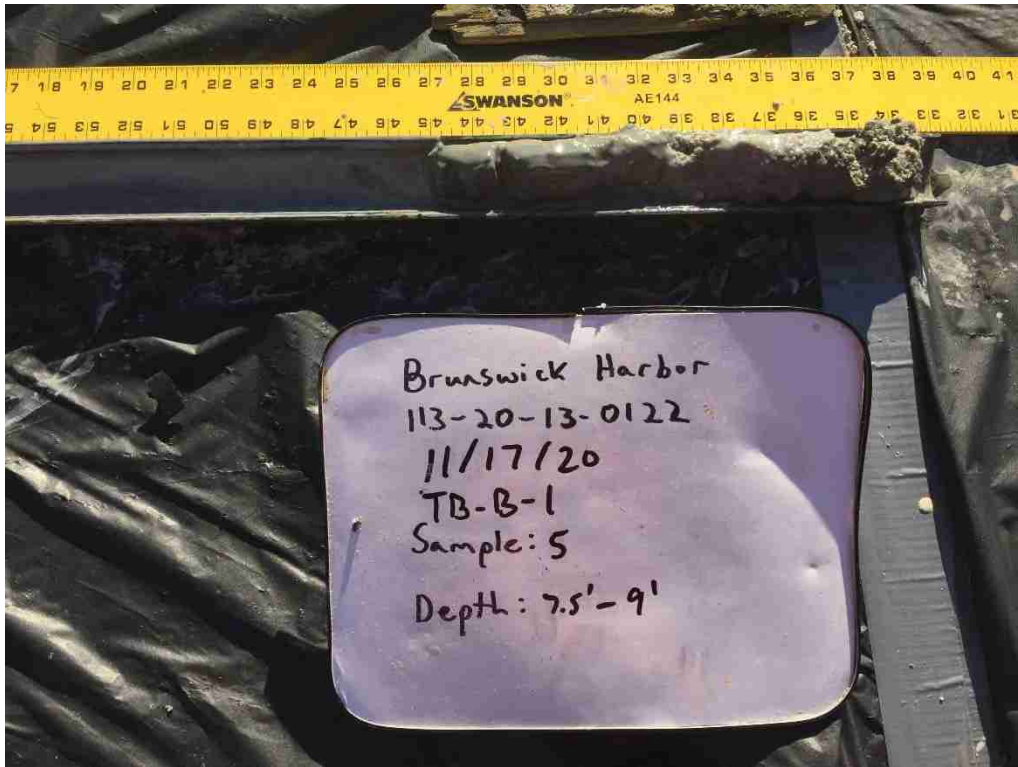
Depth: 3.0 – 4.5 feet; Approximate Elevation: -31.5 to -33.0 feet MLLW



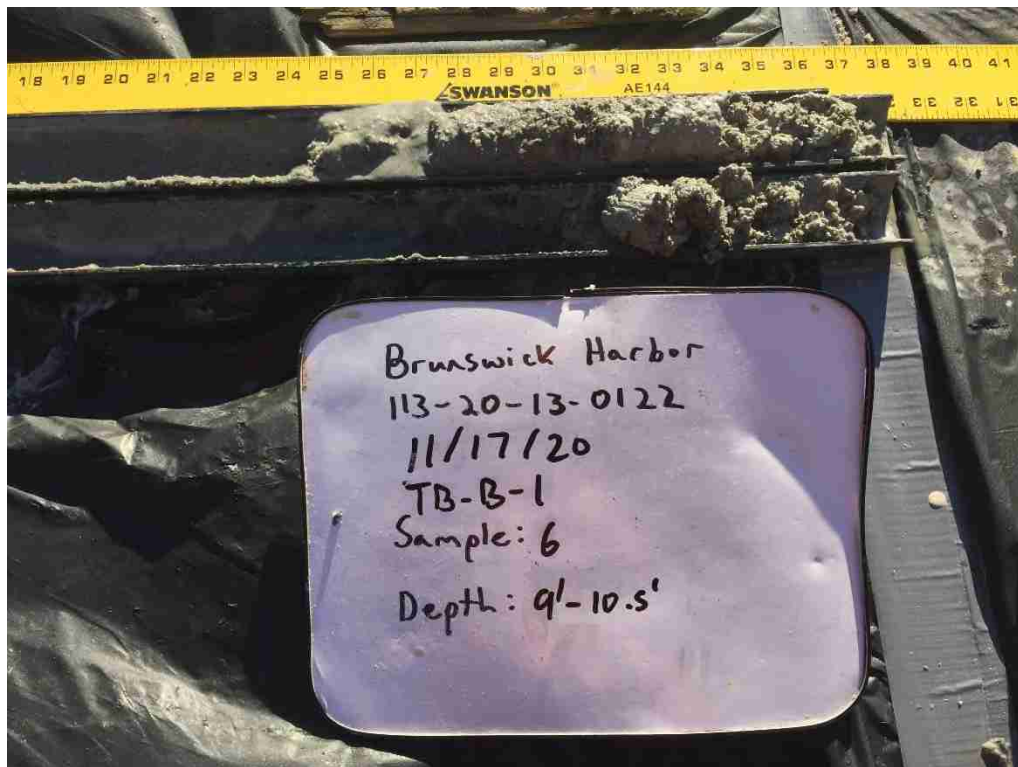
Depth: 4.5 – 6.0 feet; Approximate Elevation: -33.0 to -34.5 feet MLLW



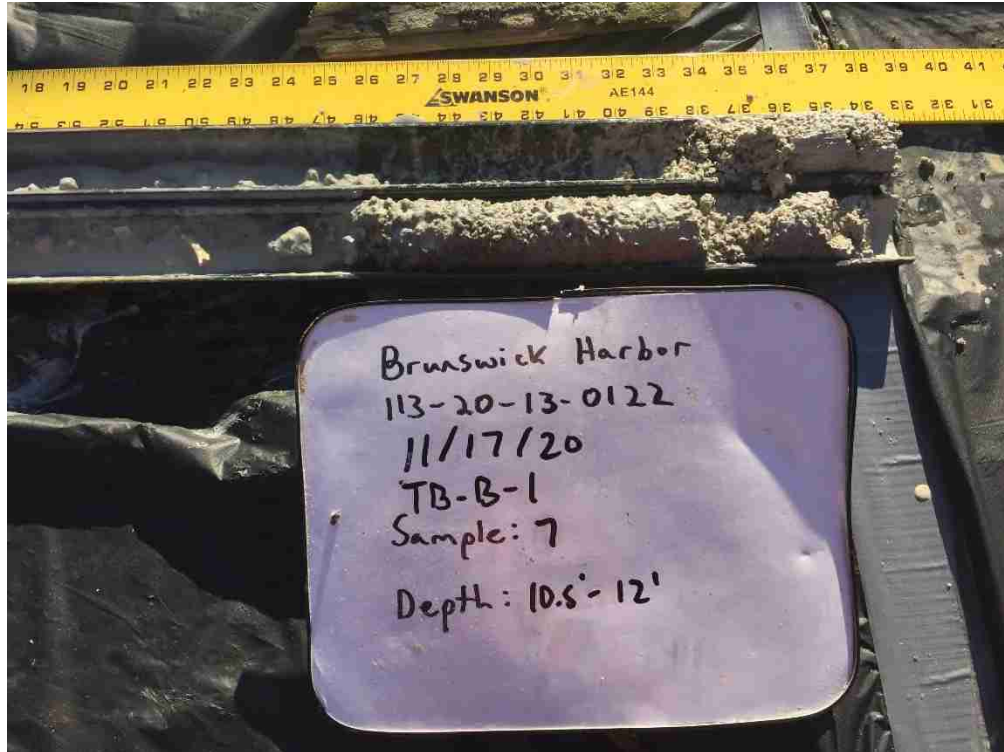
Depth: 6.0 – 7.5 feet; Approximate Elevation: -34.5 to -36.0 feet MLLW



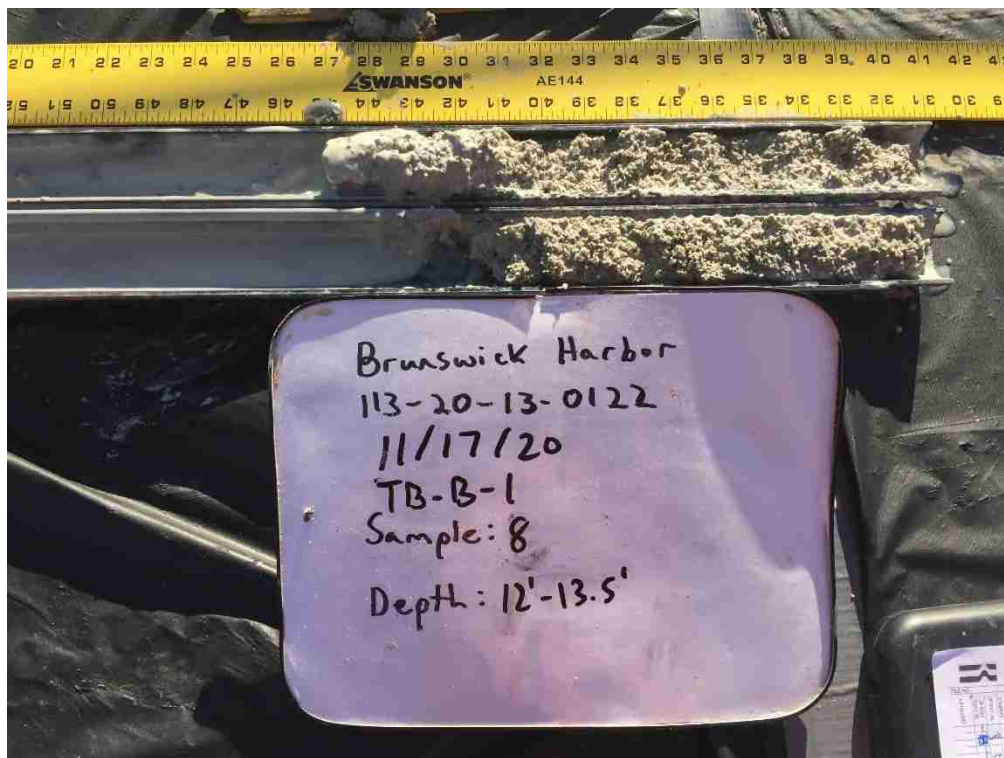
Depth: 7.5 – 9.0 feet; Approximate Elevation: -36.0 to -37.5 feet MLLW



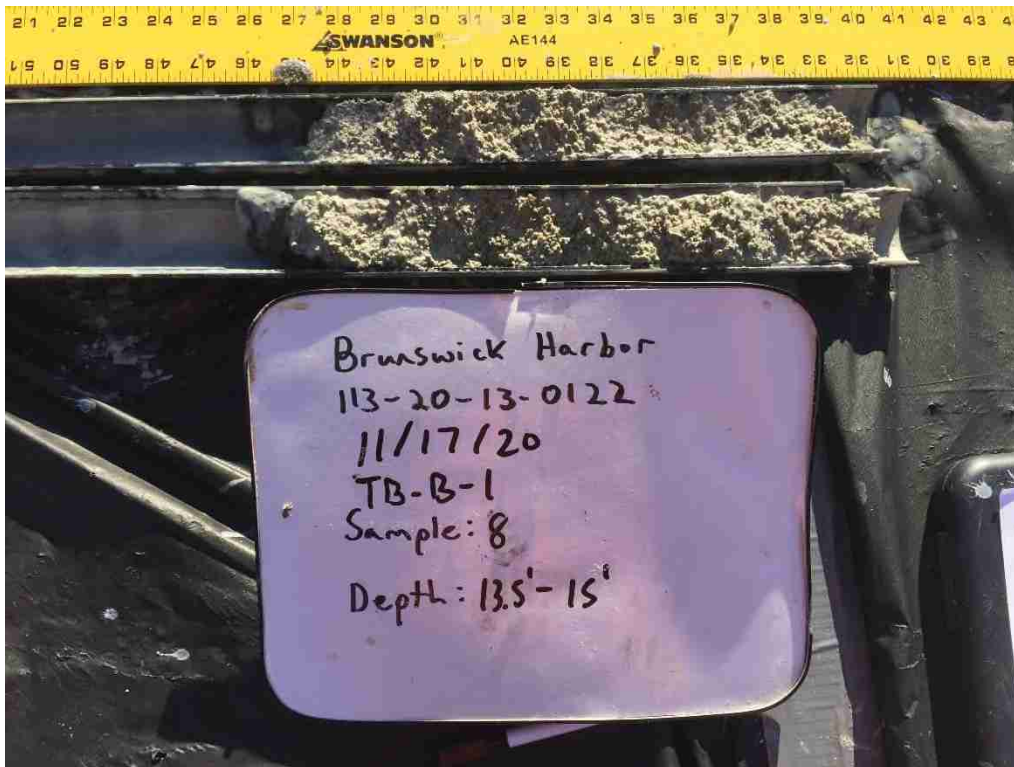
Depth: 9.0 – 10.5 feet; Approximate Elevation: -37.5 to -39.0 feet MLLW



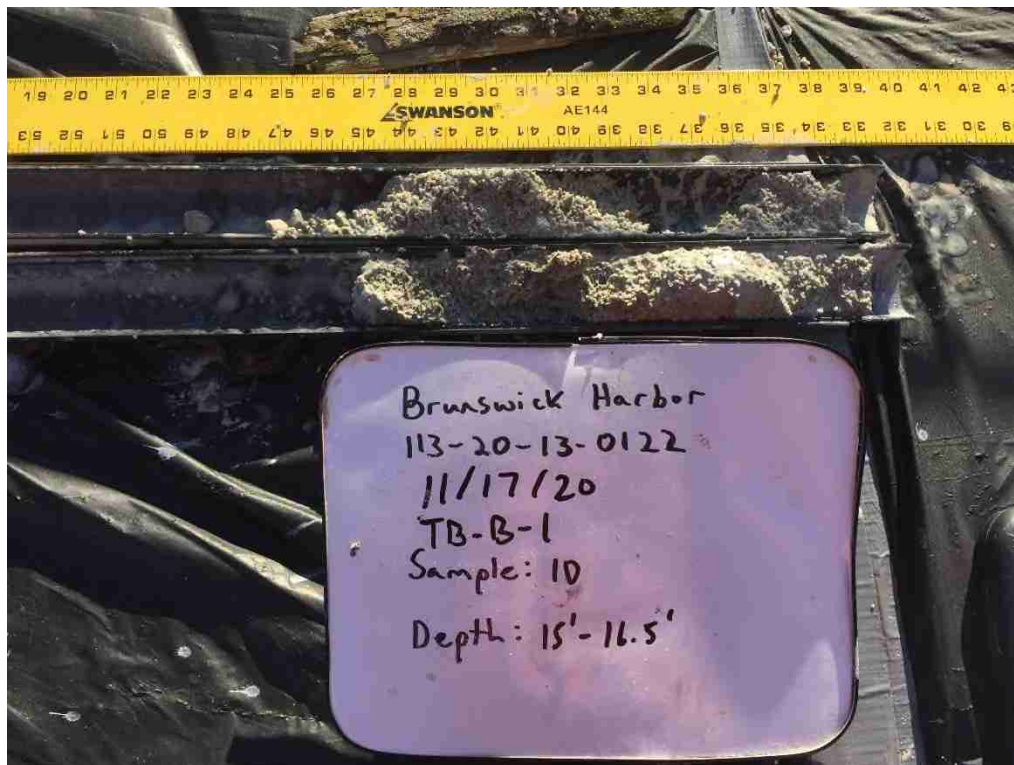
Depth: 10.5 – 12.0 feet; Approximate Elevation: -39.0 to -40.5 feet MLLW



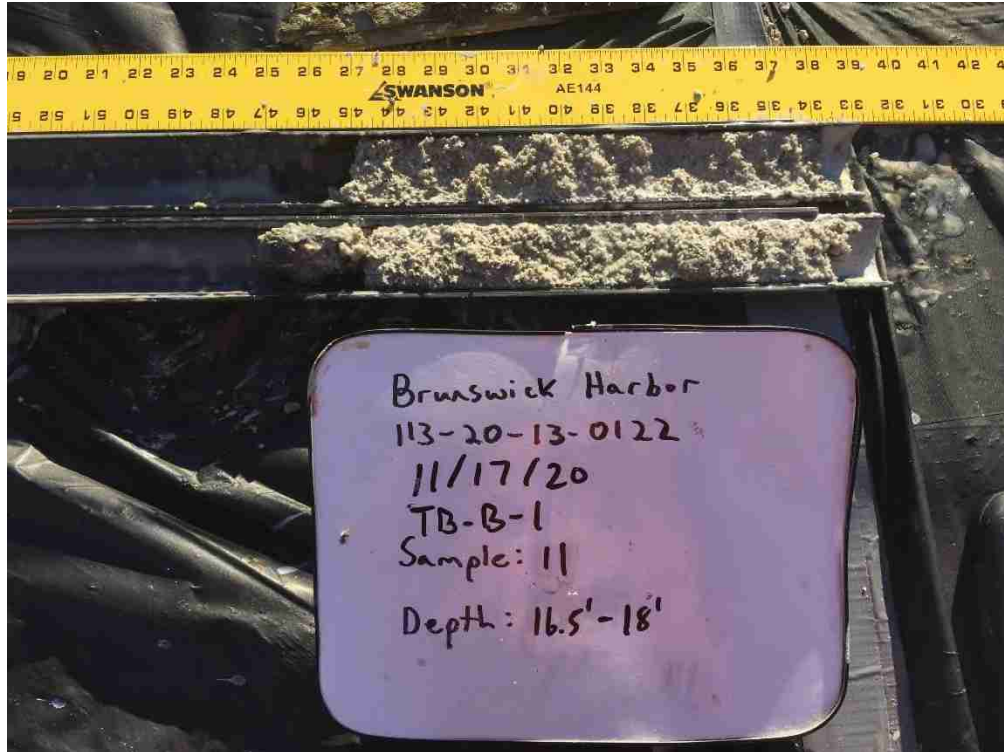
Depth: 12.0 – 13.5 feet; Approximate Elevation: -40.5 to -42.0 feet MLLW



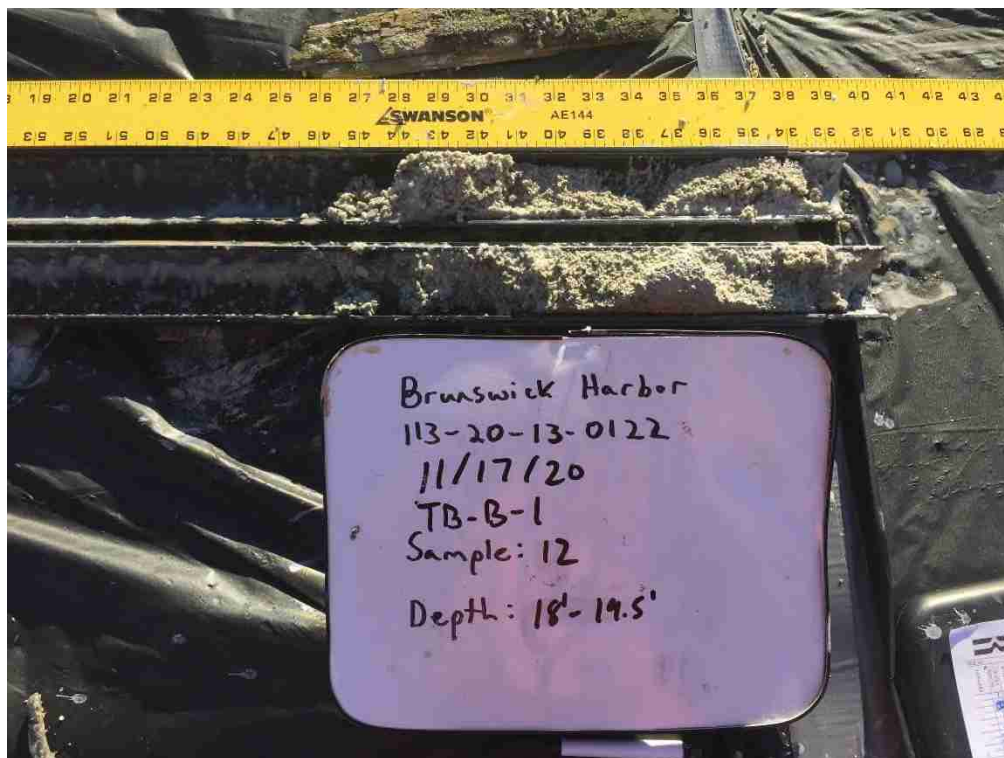
Depth: 13.5 – 15.0 feet; Approximate Elevation: -42.0 to -43.5 feet MLLW



Depth: 15.0 – 16.5 feet; Approximate Elevation: -43.5 to -45.0 feet MLLW



Depth: 16.5 – 18.0 feet; Approximate Elevation: -45.0 to -46.5 feet MLLW



Depth: 18.0 – 19.5 feet; Approximate Elevation: -46.5 to -48.0 feet MLLW



Depth: 19.5 – 21.0 feet; Approximate Elevation: -48.0 to -49.5 feet MLLW

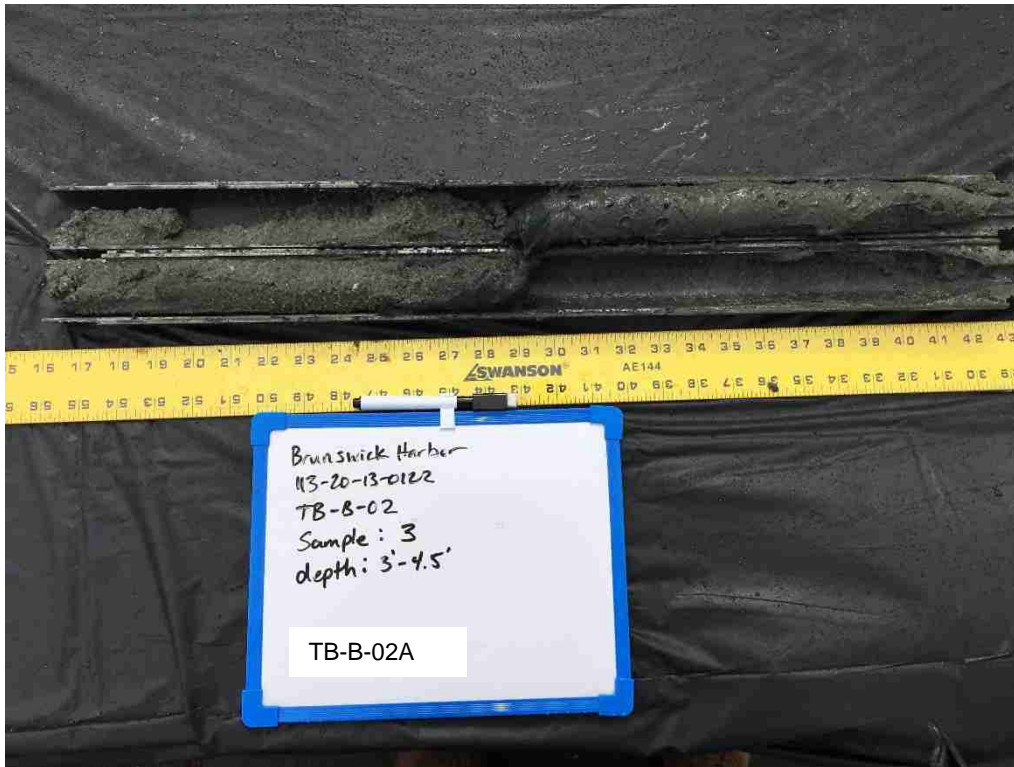
TB-B-02 Photographs



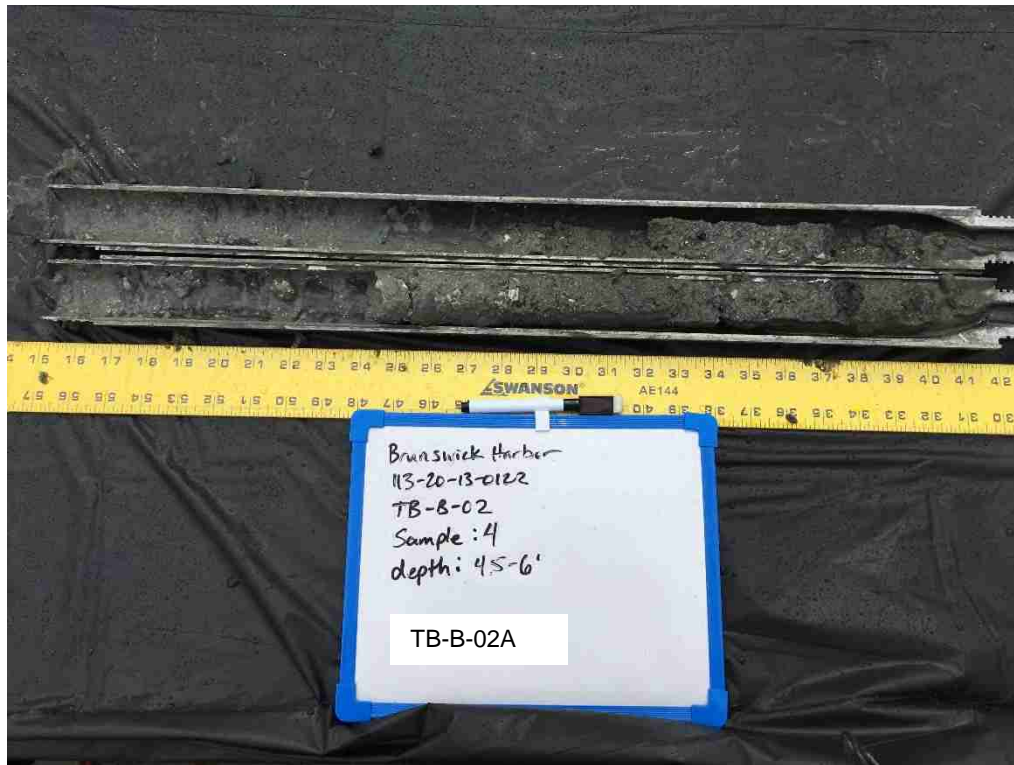
Depth: 0 – 1.5 feet; Approximate Elevation: -20.2 to -21.7 feet MLLW



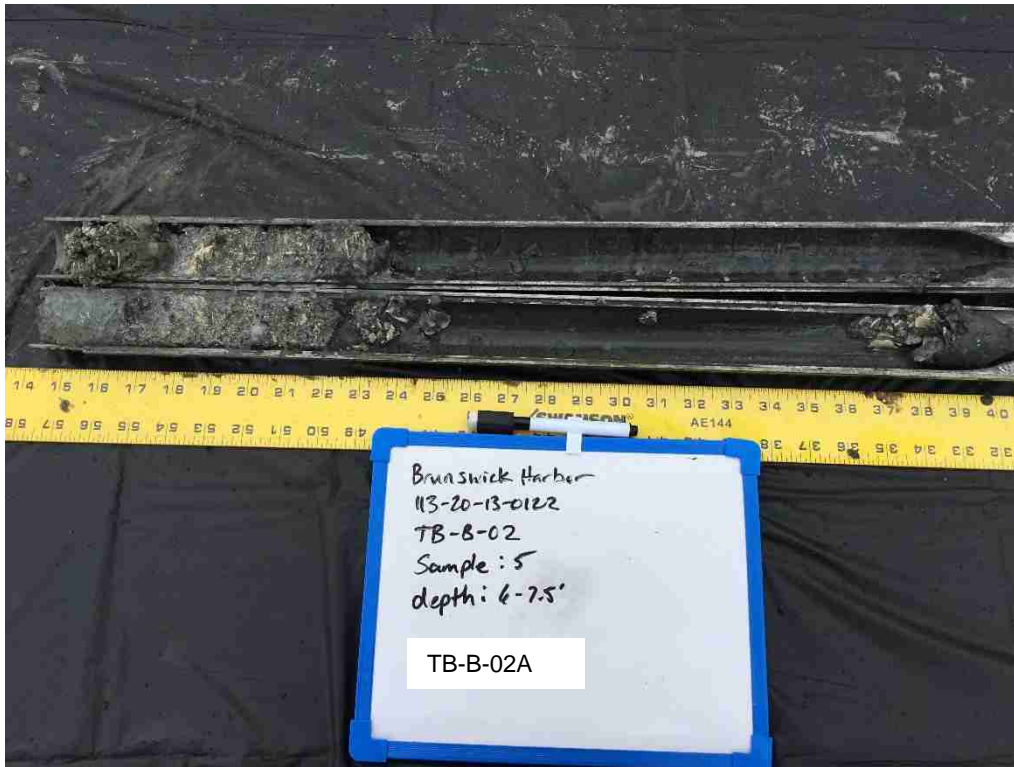
Depth: 1.5 – 3.0 feet; Approximate Elevation: -21.7 to -23.2 feet MLLW



Depth: 3.0 – 4.5 feet; Approximate Elevation: -23.2 to -24.7 feet MLLW



Depth: 4.5 – 6.0 feet; Approximate Elevation: -24.7 to -26.2 feet MLLW



Depth: 6.0 – 7.5 feet; Approximate Elevation: -26.2 to -27.7 feet MLLW



Depth: 7.5 – 9.0 feet; Approximate Elevation: -27.7 to -29.2 feet MLLW



Depth: 9.0 – 10.5 feet; Approximate Elevation: -29.2 to -30.7 feet MLLW



Depth: 10.5 – 12.0 feet; Approximate Elevation: -30.7 to -32.2 feet MLLW



Depth: 12.0 – 13.5 feet; Approximate Elevation: -32.2 to -33.7 feet MLLW



Depth: 13.5 – 15.0 feet; Approximate Elevation: -33.7 to -35.2 feet MLLW



Depth: 15.0 – 16.5 feet; Approximate Elevation: -34.5 to -36.0 feet MLLW



Depth: 16.5 – 18.0 feet; Approximate Elevation: -36.0 to -37.5 feet MLLW



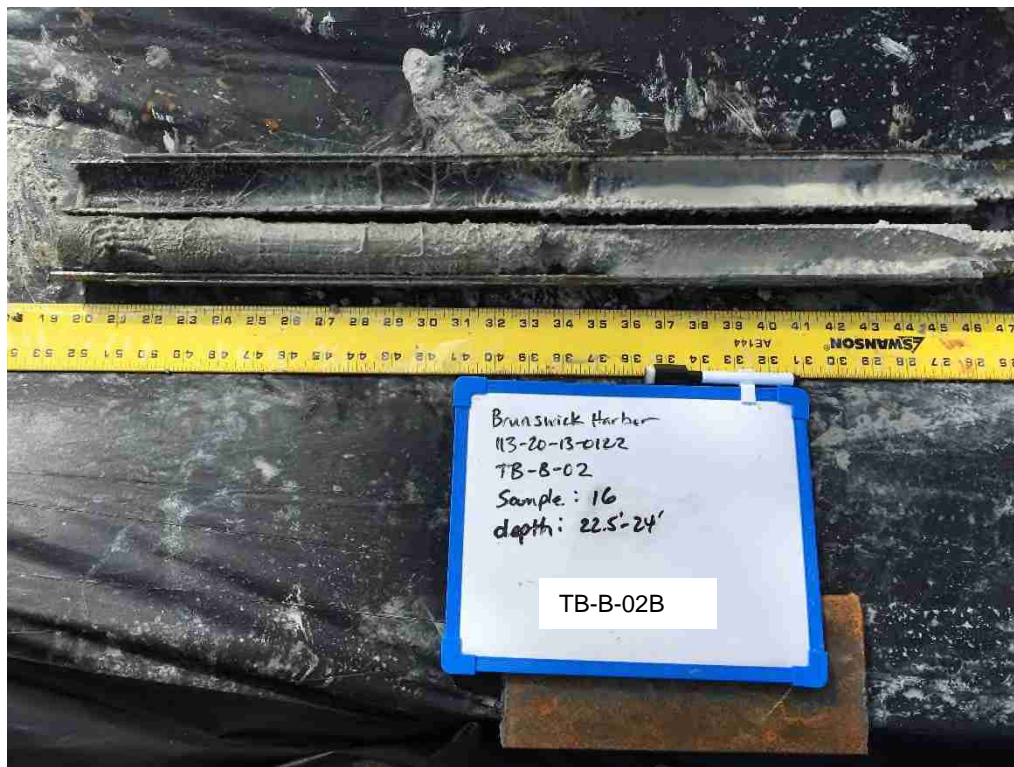
Depth: 18.0 – 19.5 feet; Approximate Elevation: -37.5 to -39.0 feet MLLW



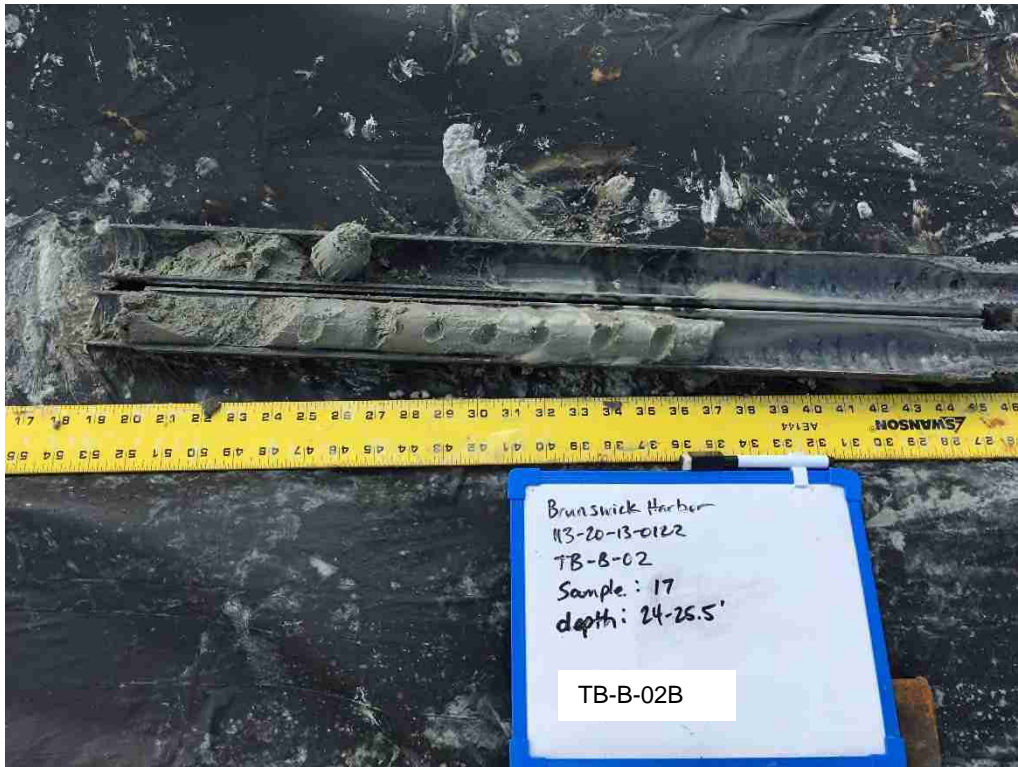
Depth: 19.5 – 21.0 feet; Approximate Elevation: -39.0 to -40.5 feet MLLW



Depth: 21.0 – 22.5 feet; Approximate Elevation: -40.5 to -42.0 feet MLLW



Depth: 22.5 – 24.0 feet; Approximate Elevation: -42.0 to -43.5 feet MLLW



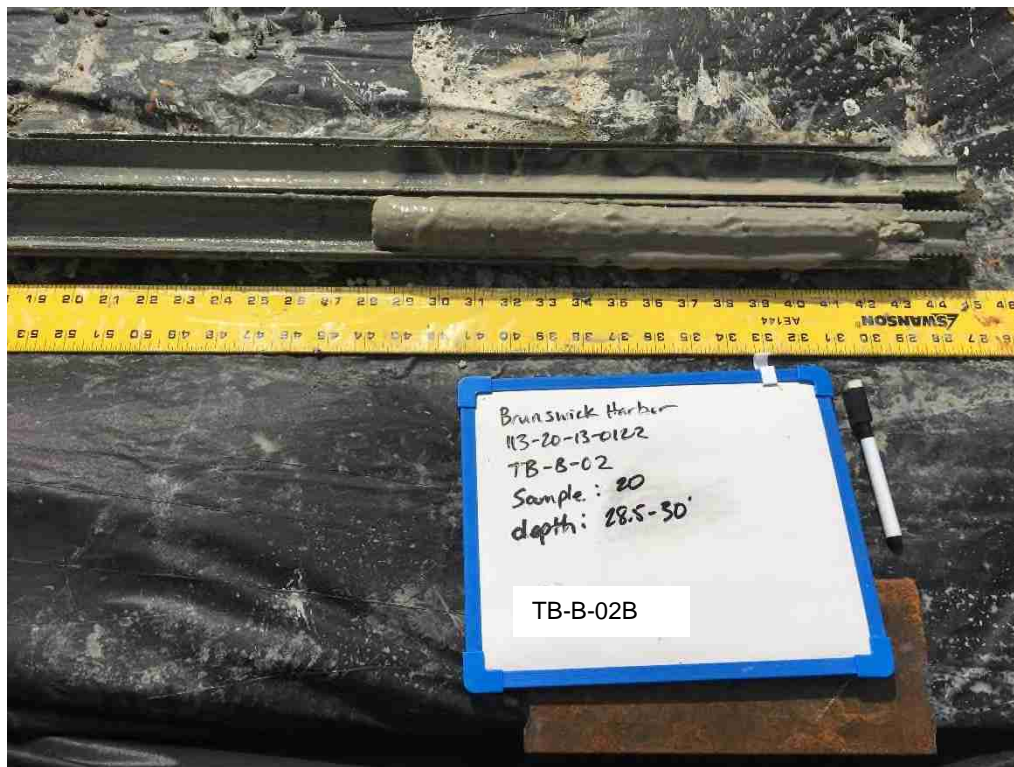
Depth: 24.0 – 25.5 feet; Approximate Elevation: -43.5 to -45.0 feet MLLW



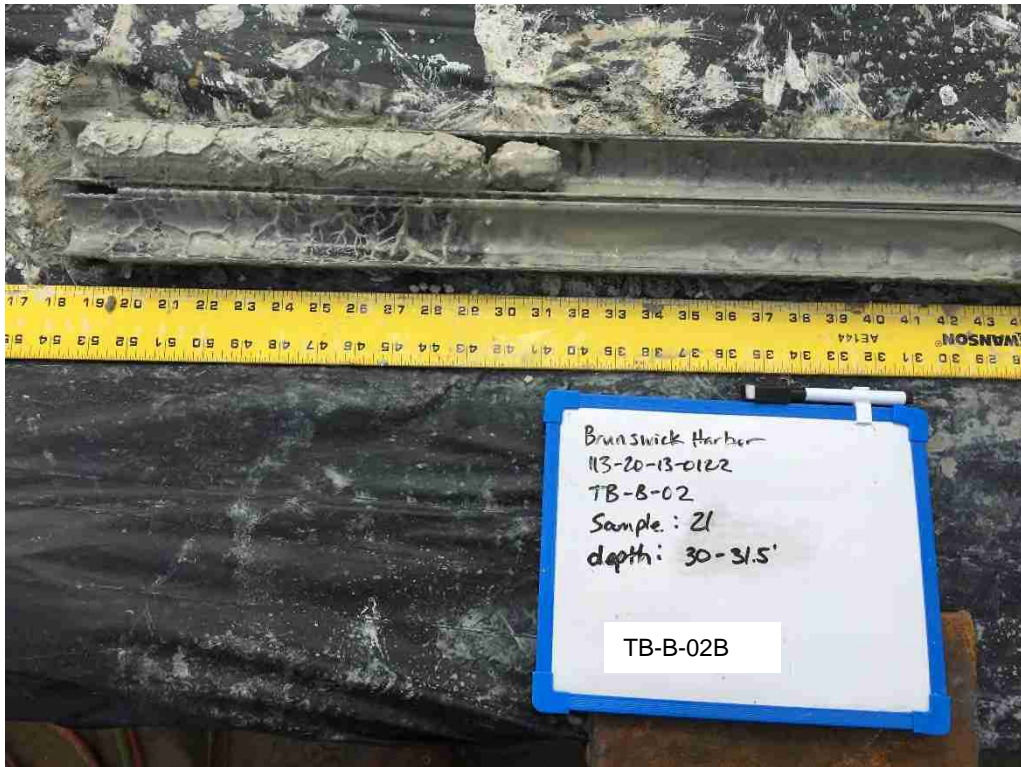
Depth: 25.5 – 27.0 feet; Approximate Elevation: -45.0 to -46.5 feet MLLW



Depth: 27.0 – 28.5 feet; Approximate Elevation: -46.5 to -48.0 feet MLLW



Depth: 28.5 – 30.0 feet; Approximate Elevation: -48.0 to -49.5 feet MLLW



Depth: 30.0 – 31.5 feet; Approximate Elevation: -49.5 to -51.0 feet MLLW



Depth: 31.5 – 33.0 feet; Approximate Elevation: -51.0 to -52.5 feet MLLW

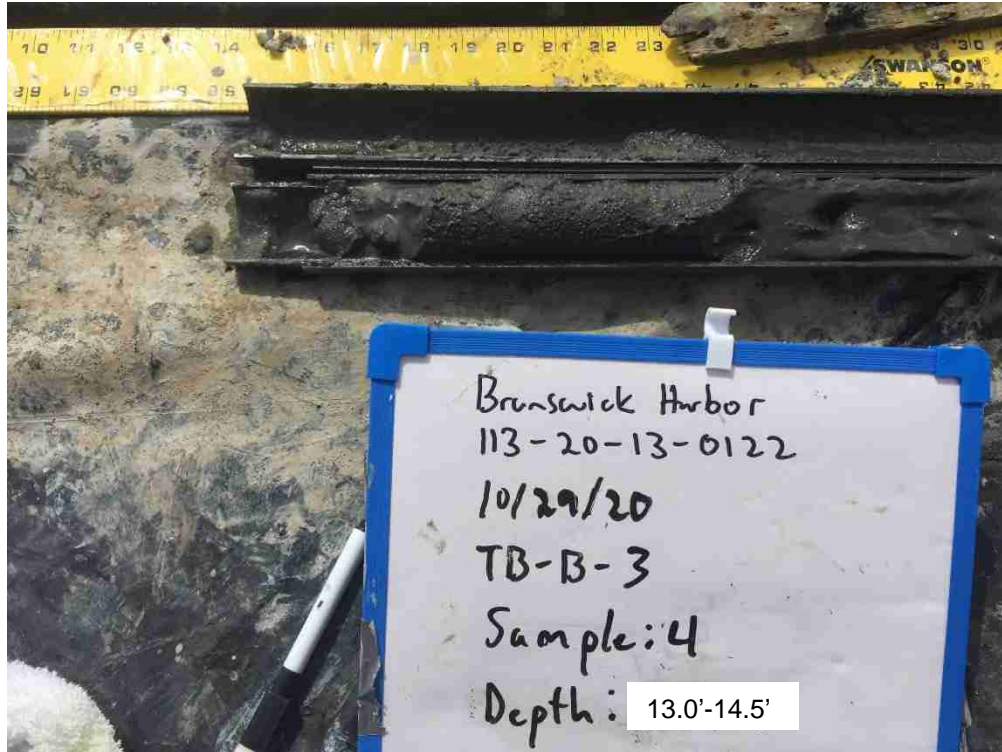
TB-B-03 Photographs



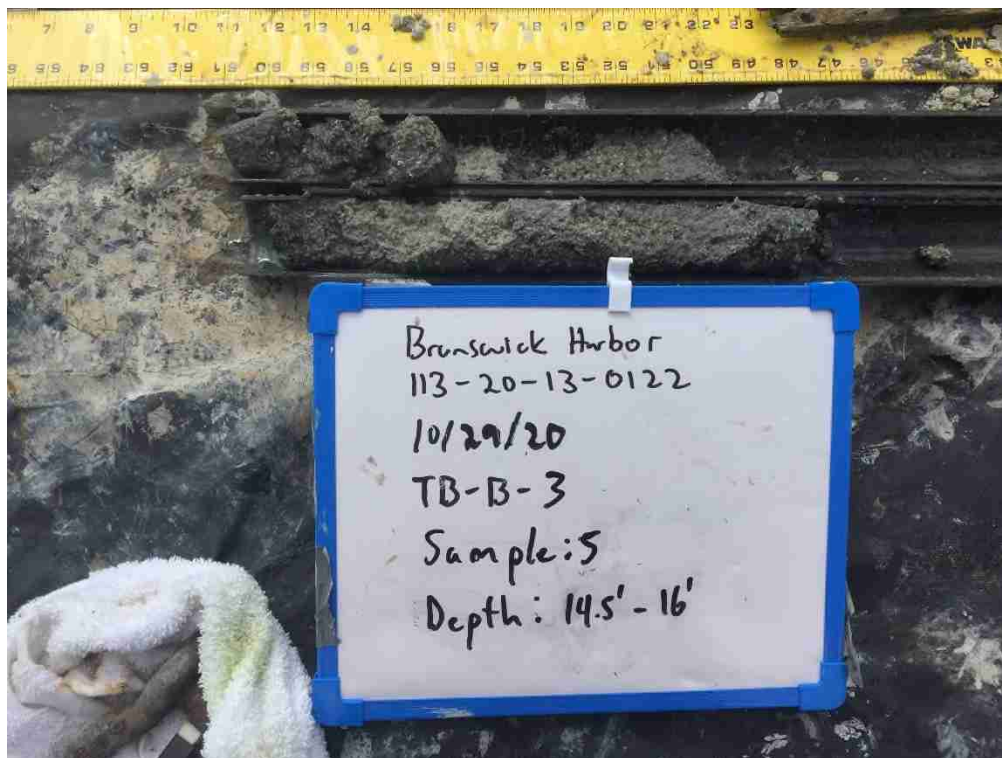
Depth: 10.0 – 11.5 feet; Approximate Elevation: -41.5 to -43.0 feet MLLW



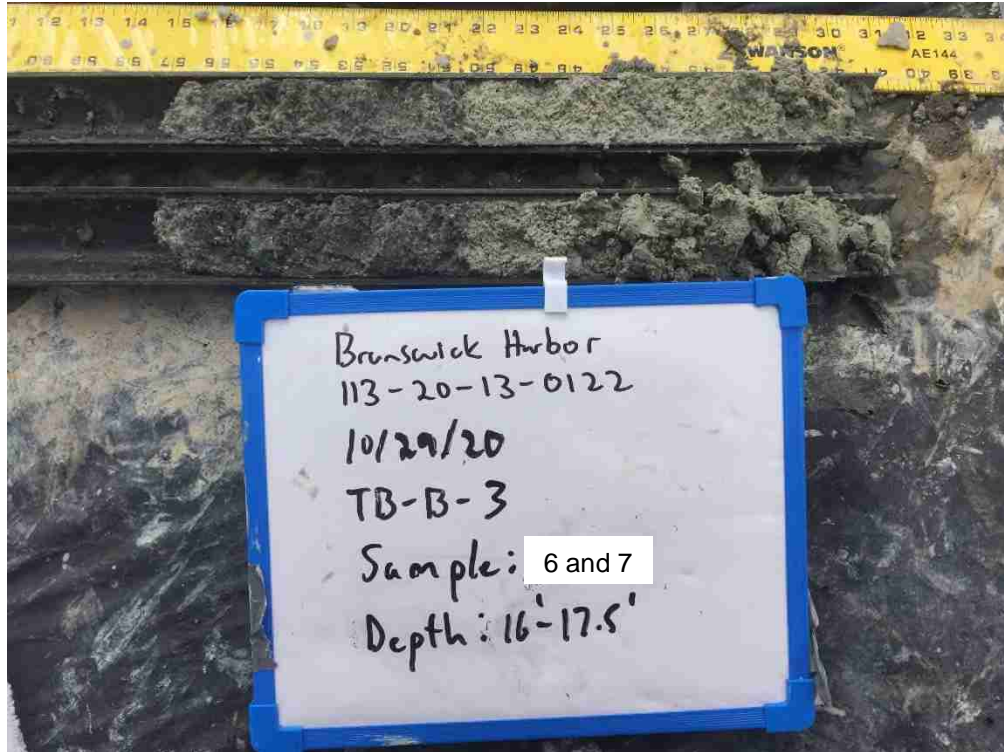
Depth: 11.5 – 13.0 feet; Approximate Elevation: -43.0 to -44.5 feet MLLW



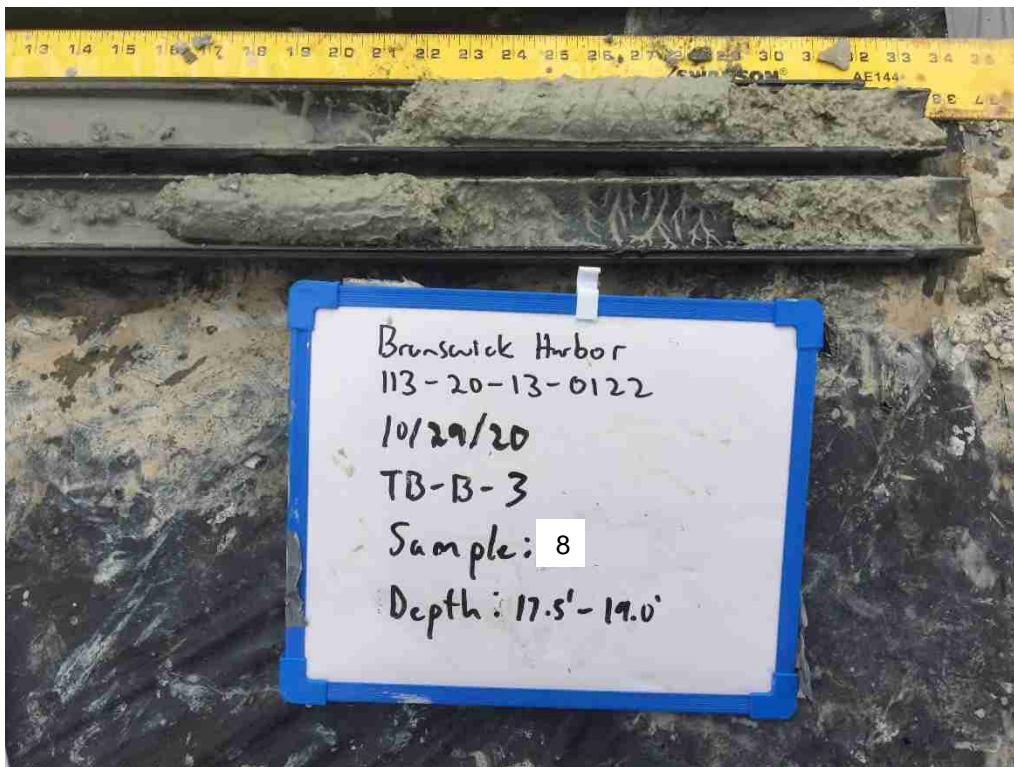
Depth: 13.0 – 14.5 feet; Approximate Elevation: -44.5 to -46.0 feet MLLW



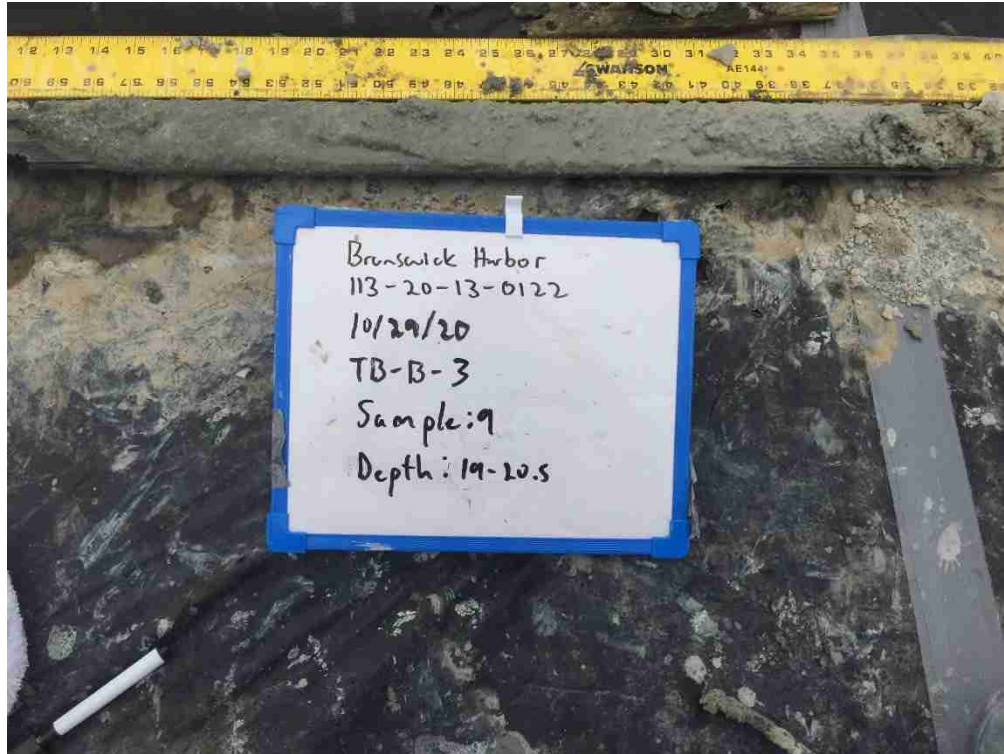
Depth: 14.5 – 16.0 feet; Approximate Elevation: -46.0 to -47.5 feet MLLW



Depth: 16.0 – 17.5 feet; Approximate Elevation: -47.5 to -49.0 feet MLLW

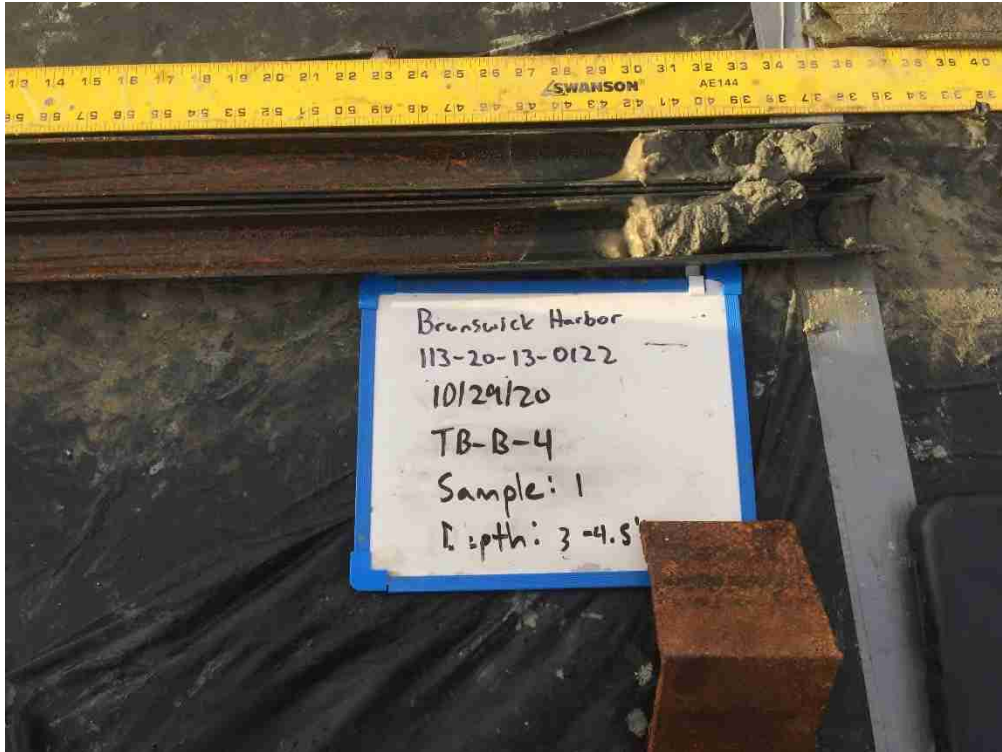


Depth: 17.5 – 19.0 feet; Approximate Elevation: -49.0 to -50.5 feet MLLW

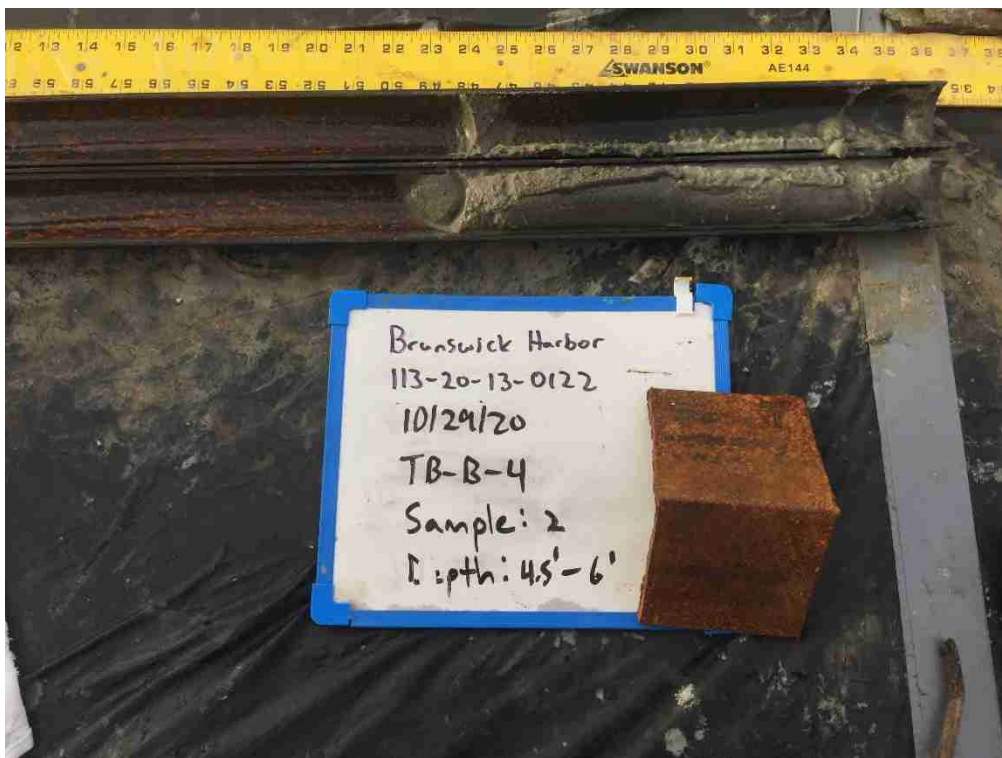


Depth: 19.0 – 20.5 feet; Approximate Elevation: -50.5 to -52.0 feet MLLW

TB-B-04 Photographs



Depth: 3.0 – 4.5 feet; Approximate Elevation: -16.4 to -17.9 feet MLLW



Depth: 4.5 – 6.0 feet; Approximate Elevation: -17.9 to -19.4 feet MLLW



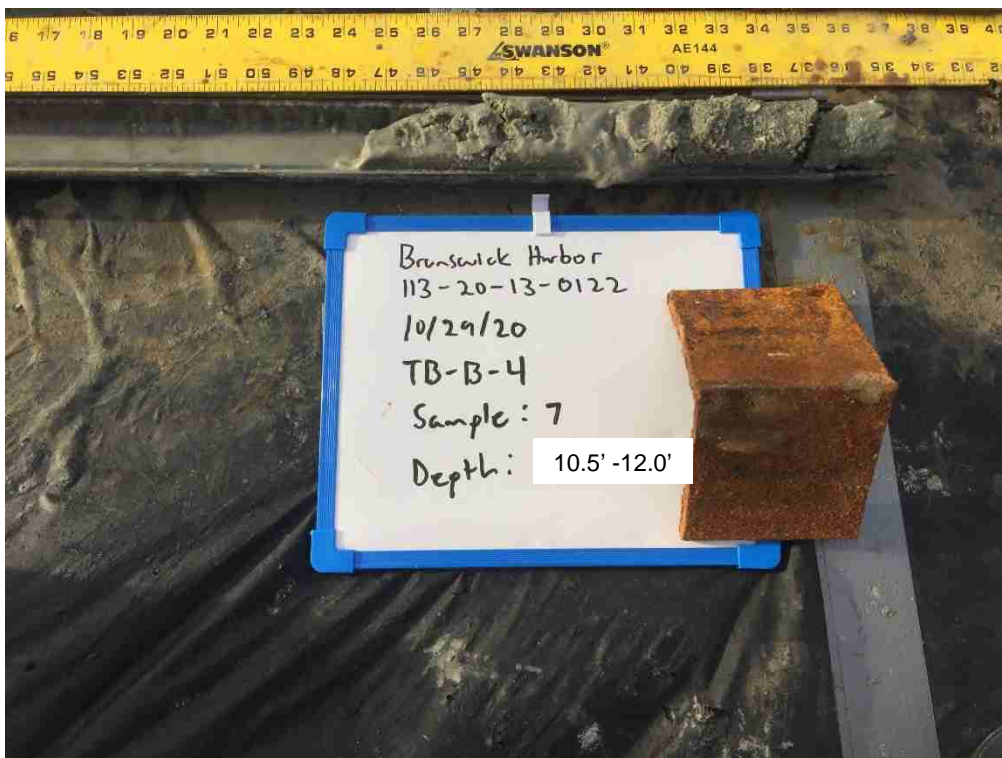
Depth: 6.0 – 7.5 feet; Approximate Elevation: -19.4 to -20.9 feet MLLW



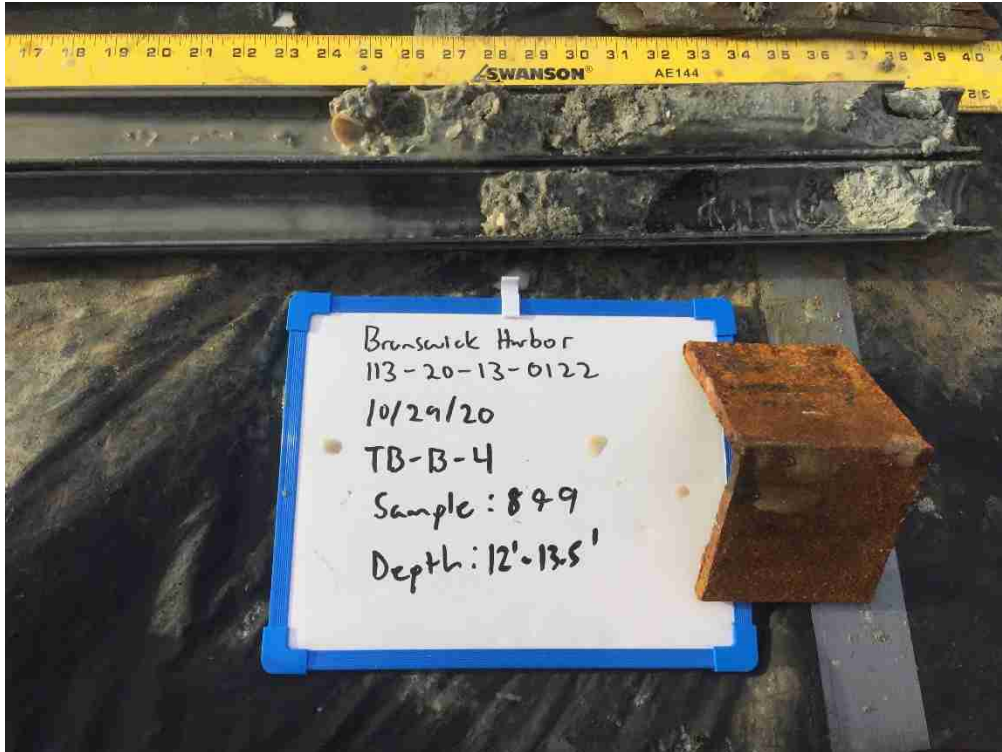
Depth: 7.5 – 9.0 feet; Approximate Elevation: -20.9 to 22.4 feet MLLW



Depth: 9.0 – 10.5 feet; Approximate Elevation: -22.4 to -23.9 feet MLLW



Depth: 10.5 – 12.0 feet; Approximate Elevation: -23.9 to -25.4 feet MLLW



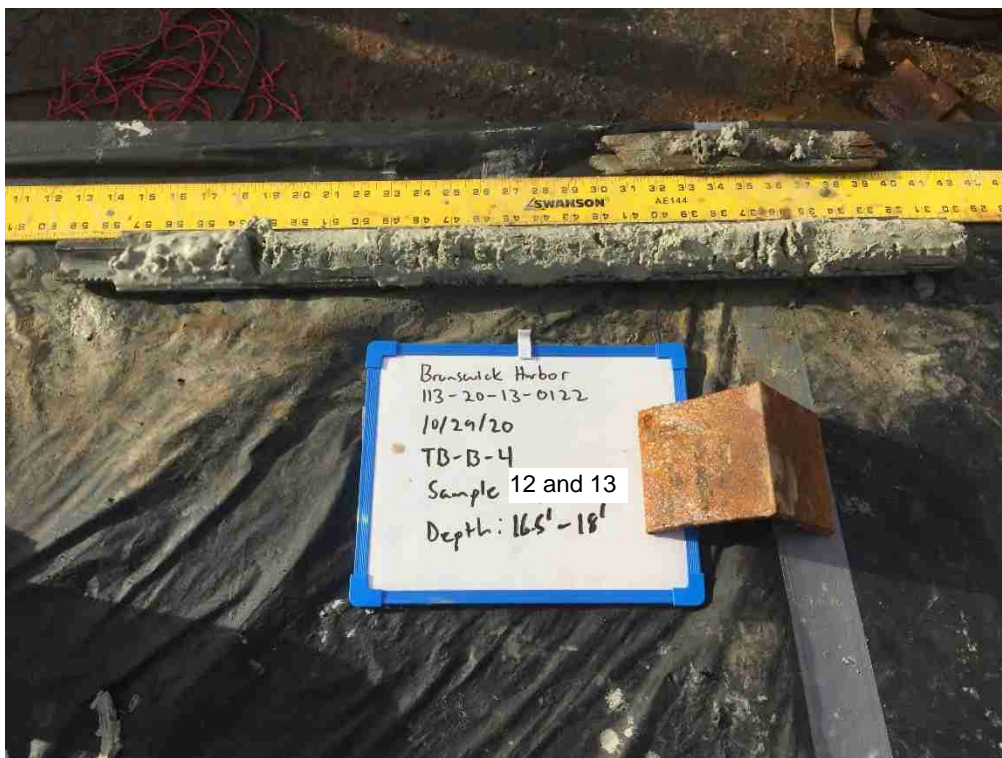
Depth: 12.0 – 13.5 feet; Approximate Elevation: -25.4 to -26.9 feet MLLW



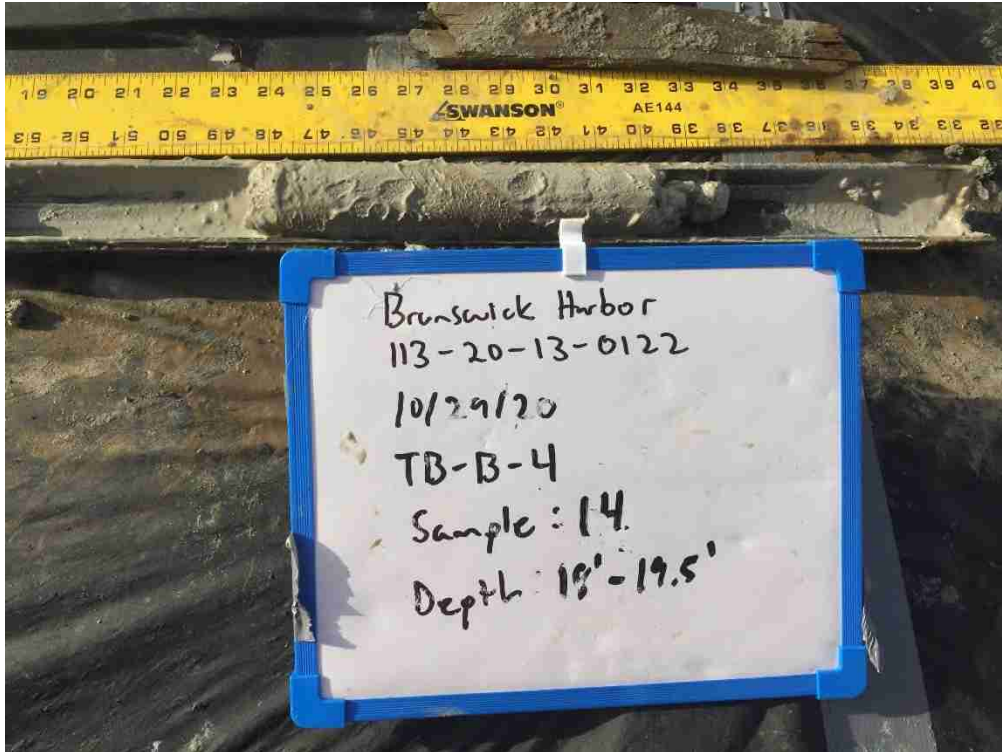
Depth: 13.5 – 15.0 feet; Approximate Elevation: -26.9 to -28.4 feet MLLW



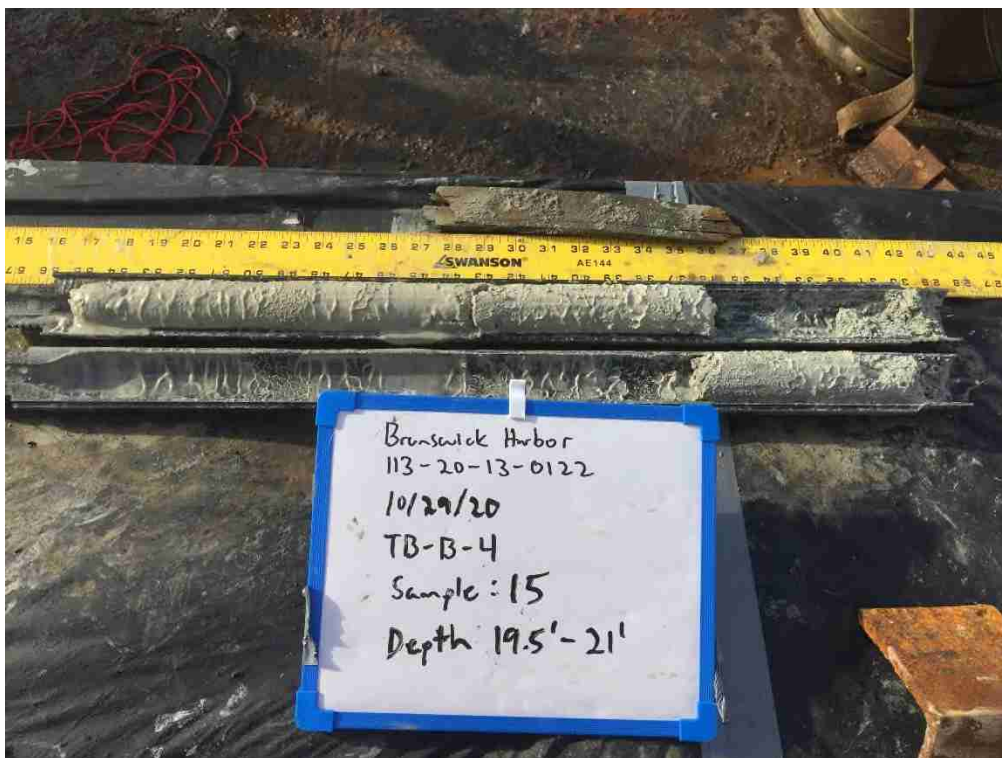
Depth: 15.0 – 16.5 feet; Approximate Elevation: -28.4 to -29.9 feet MLLW



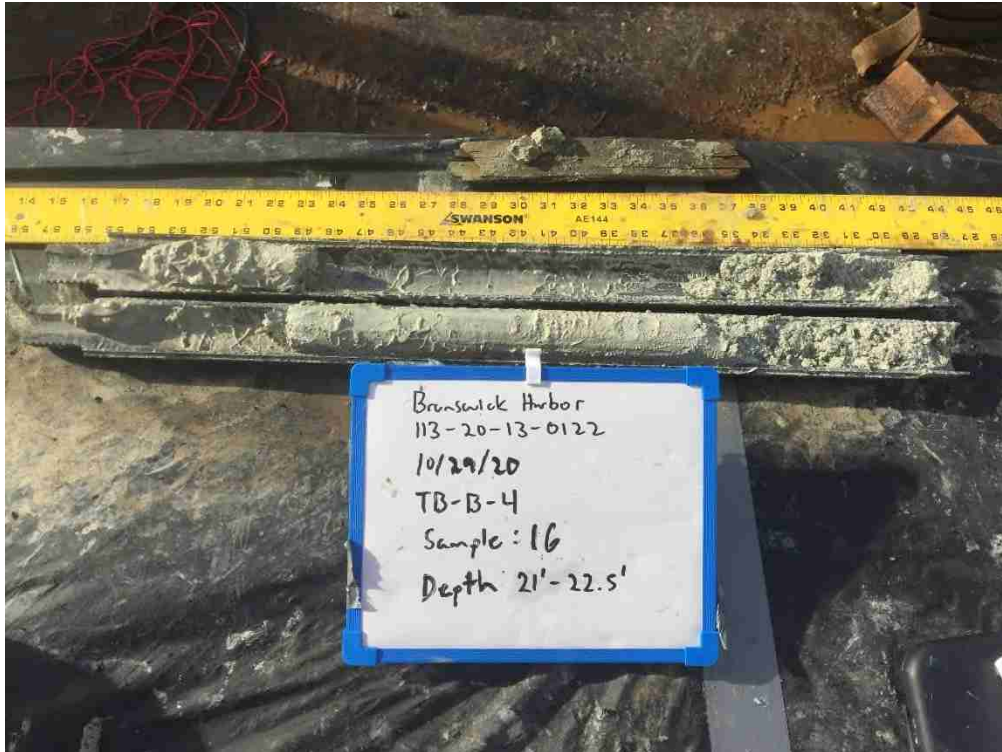
Depth: 16.5 – 18.0 feet; Approximate Elevation: -29.9 to -31.4 feet MLLW



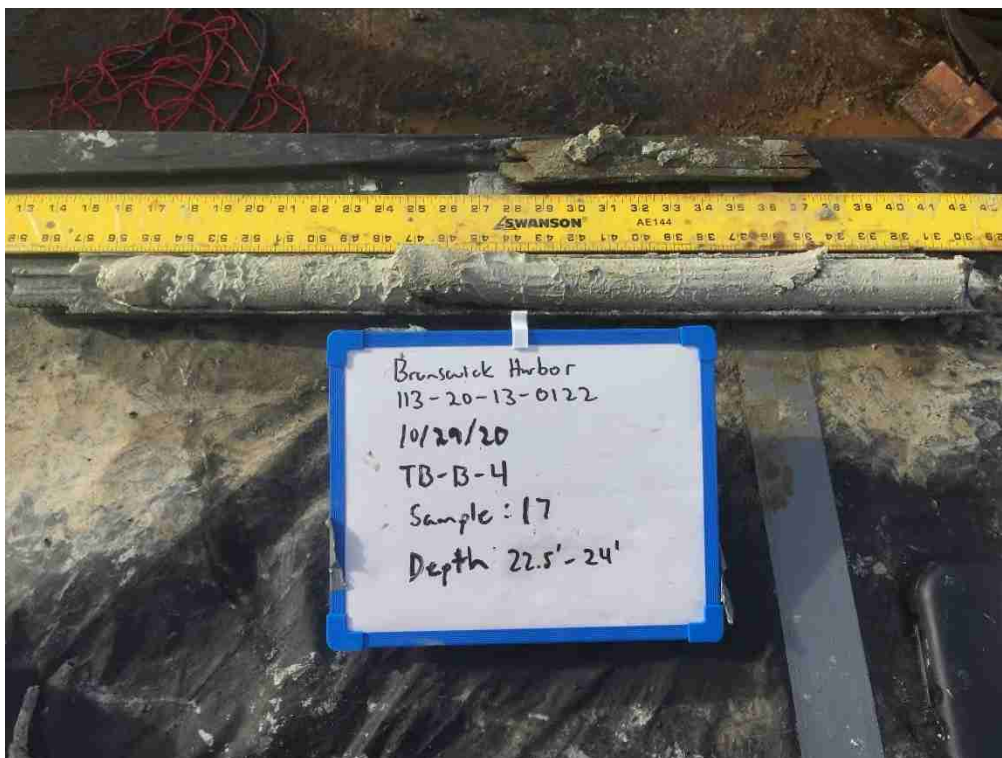
Depth: 18.0 – 19.5 feet; Approximate Elevation: -31.4 to -32.9 feet MLLW



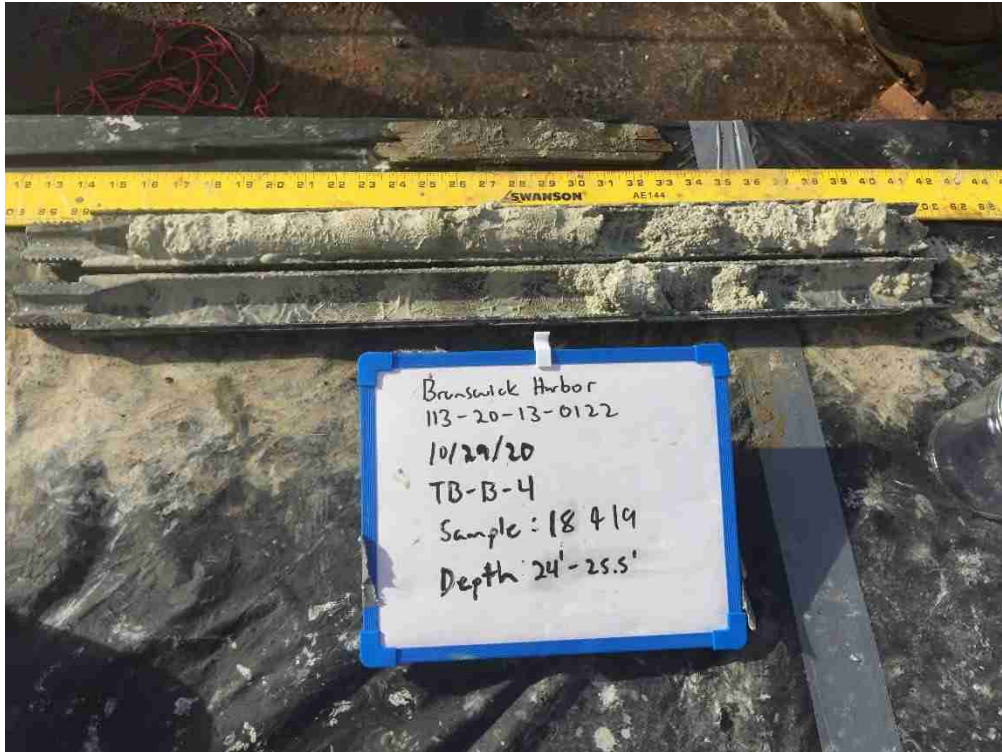
Depth: 19.5 – 21.0 feet; Approximate Elevation: -32.9 to 34.4 feet MLLW



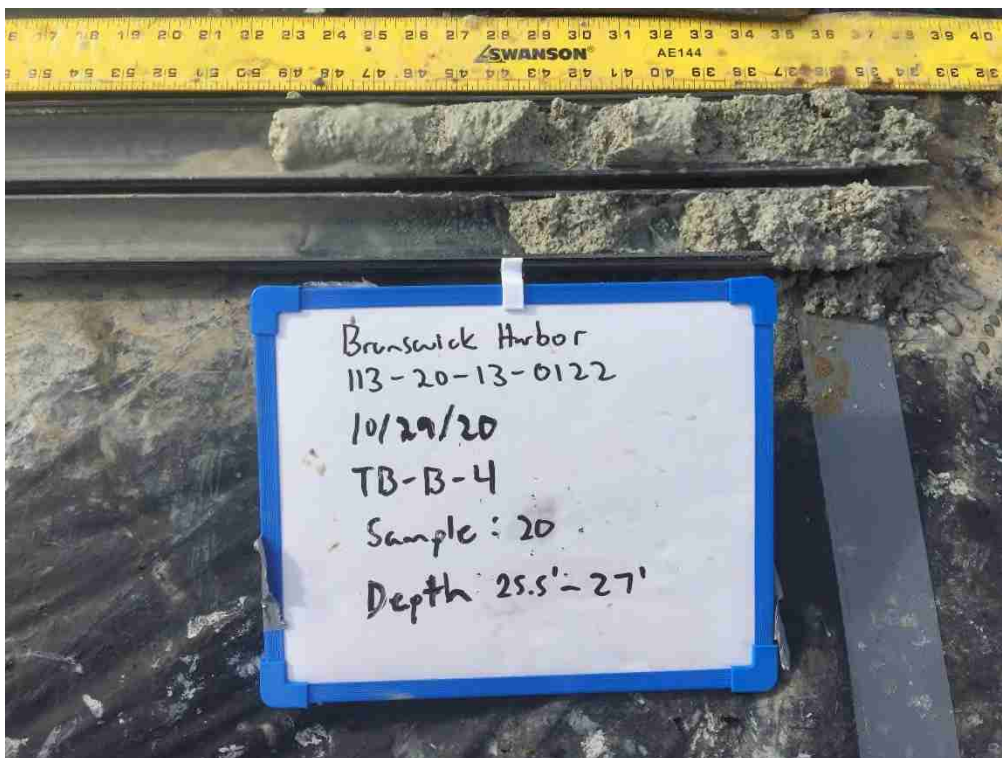
Depth: 21.0 – 22.5 feet; Approximate Elevation: -34.4 to -35.9 feet MLLW



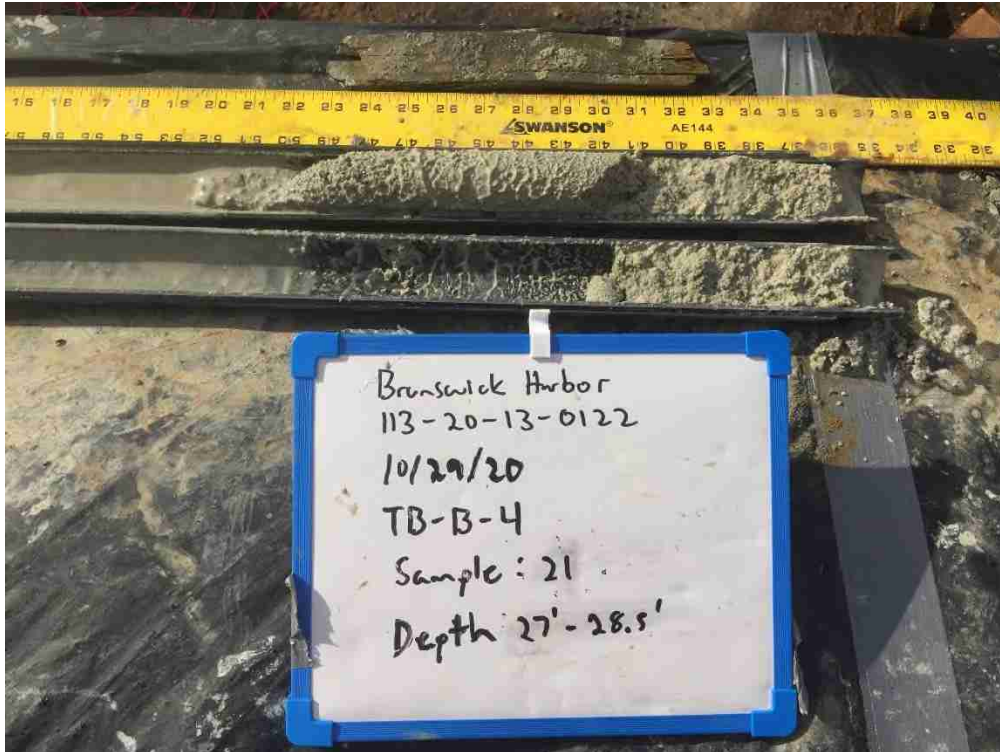
Depth: 22.5 – 24.0 feet; Approximate Elevation: -35.9 to -37.4 feet MLLW



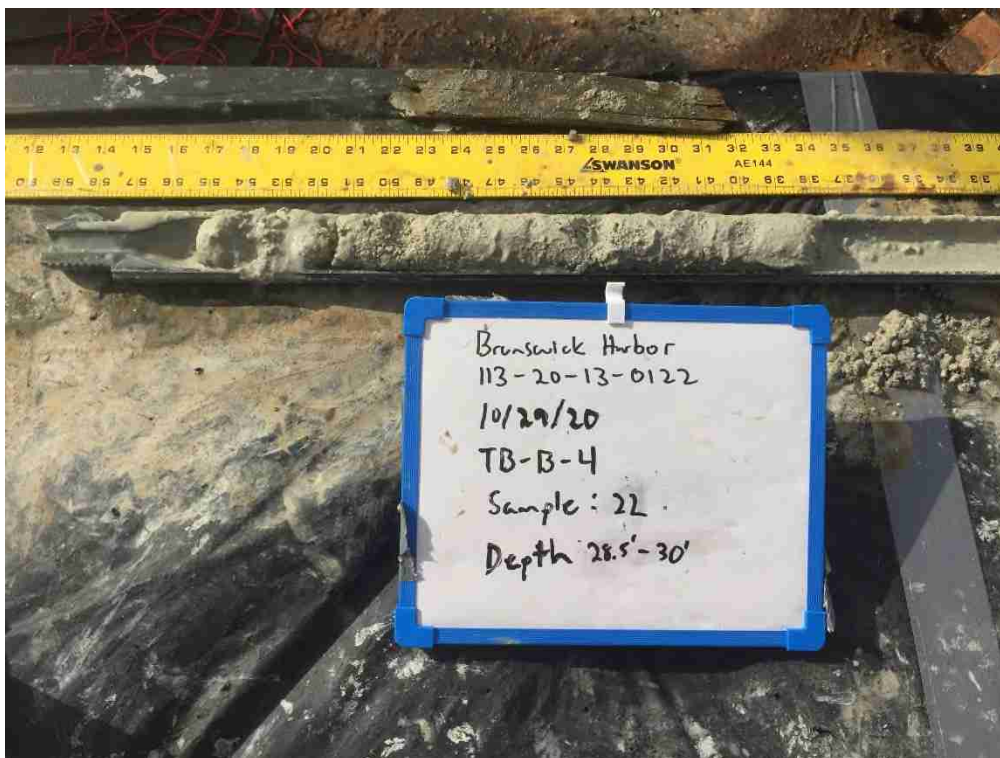
Depth: 24.0 – 25.5 feet; Approximate Elevation: -37.4 to -38.9 feet MLLW



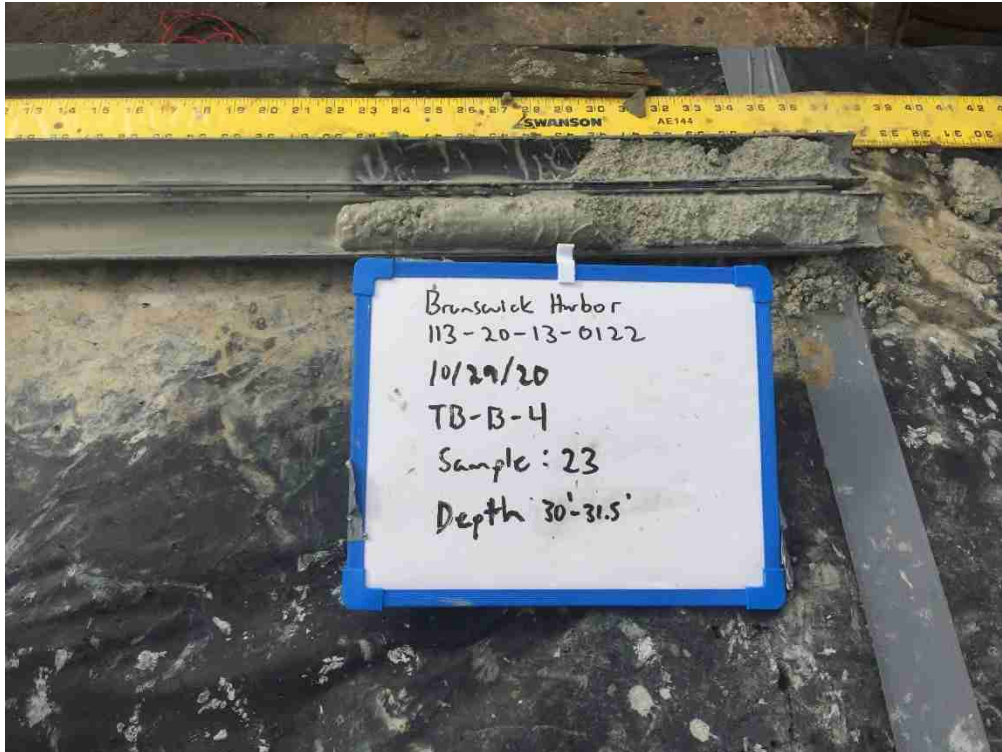
Depth: 25.5 – 27.0 feet; Approximate Elevation: -38.9 to -40.4 feet MLLW



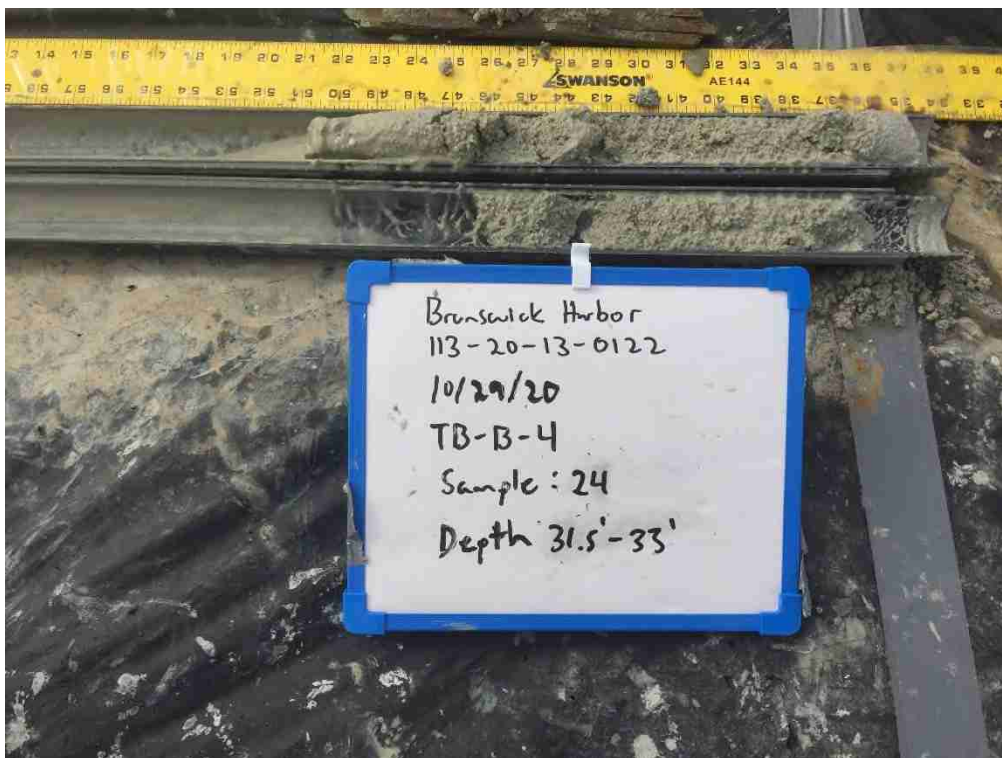
Depth: 27.0 – 28.5 feet; Approximate Elevation: -40.4 to -41.9 feet MLLW



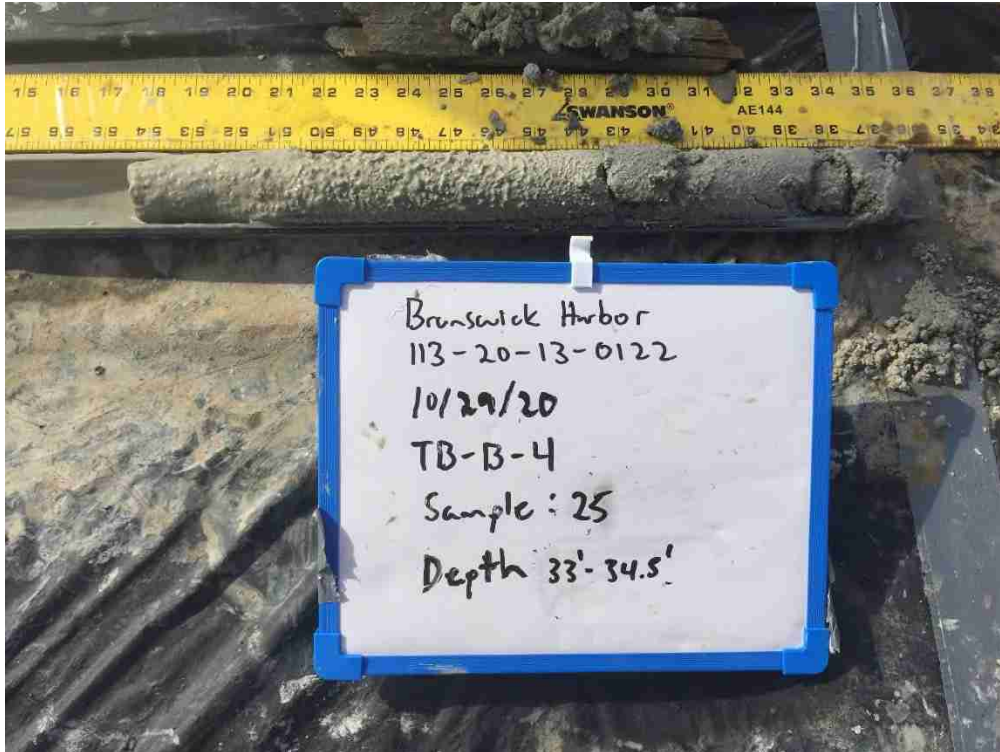
Depth: 28.5 – 30.0 feet; Approximate Elevation: -41.9 to -43.4 feet MLLW



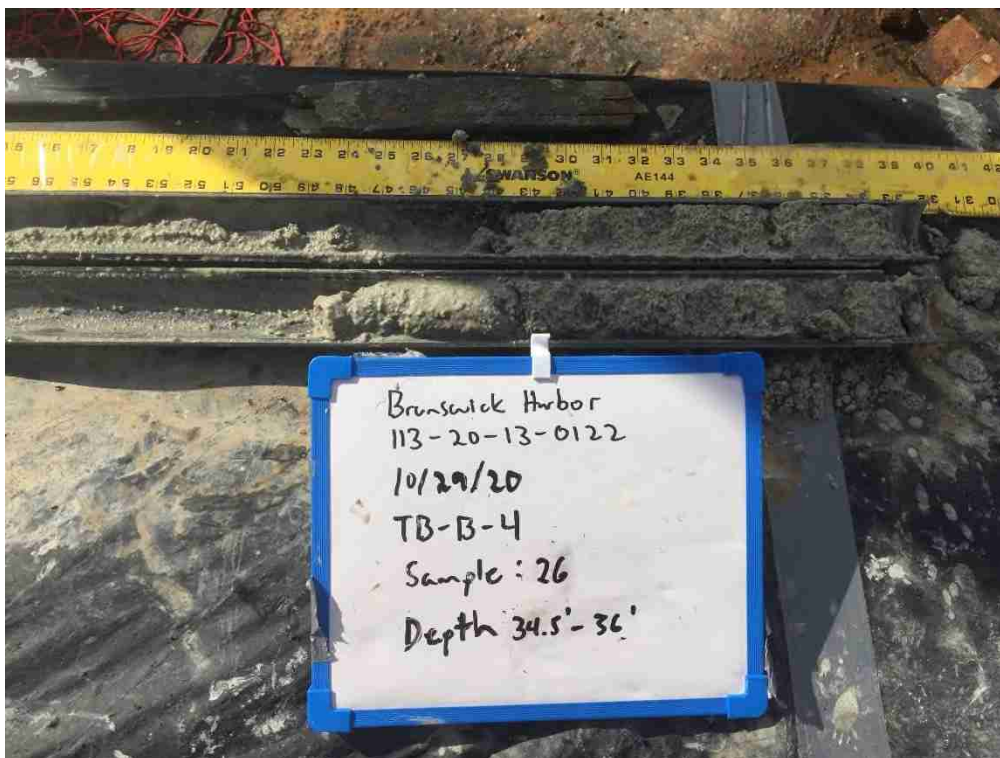
Depth: 30.0 – 31.5 feet; Approximate Elevation: -43.4 to -44.9 feet MLLW



Depth: 31.5 – 33.0 feet; Approximate Elevation: -44.9 to -46.4 feet MLLW

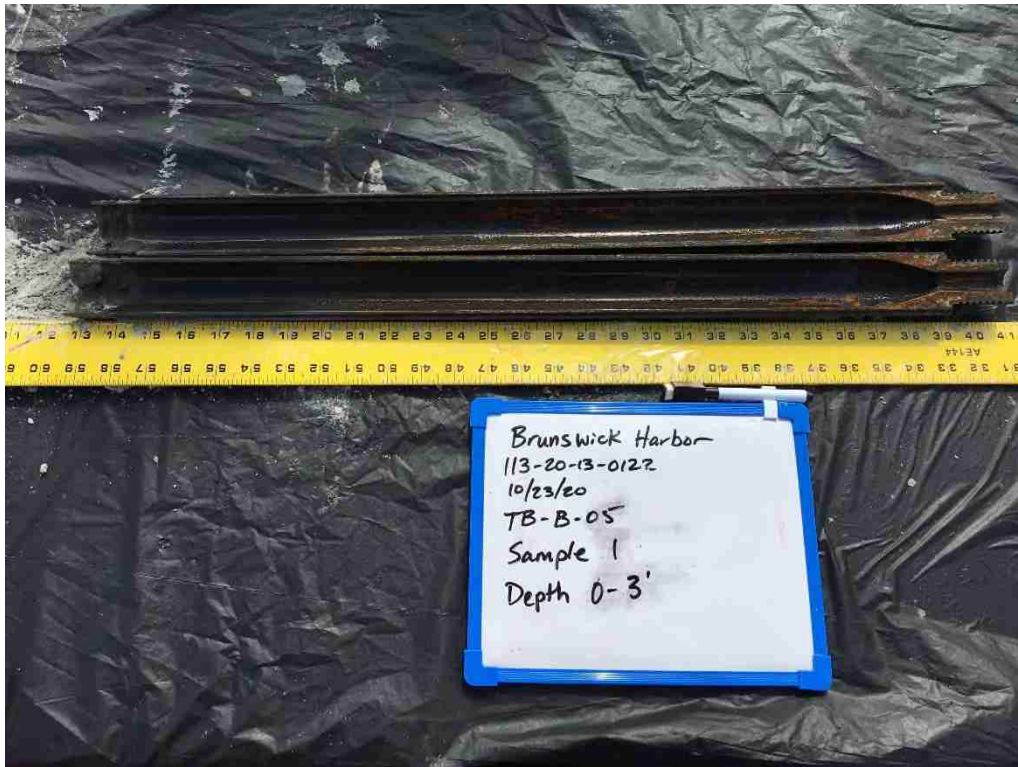


Depth: 33.0 – 34.5 feet; Approximate Elevation: -46.4 to -47.9 feet MLLW

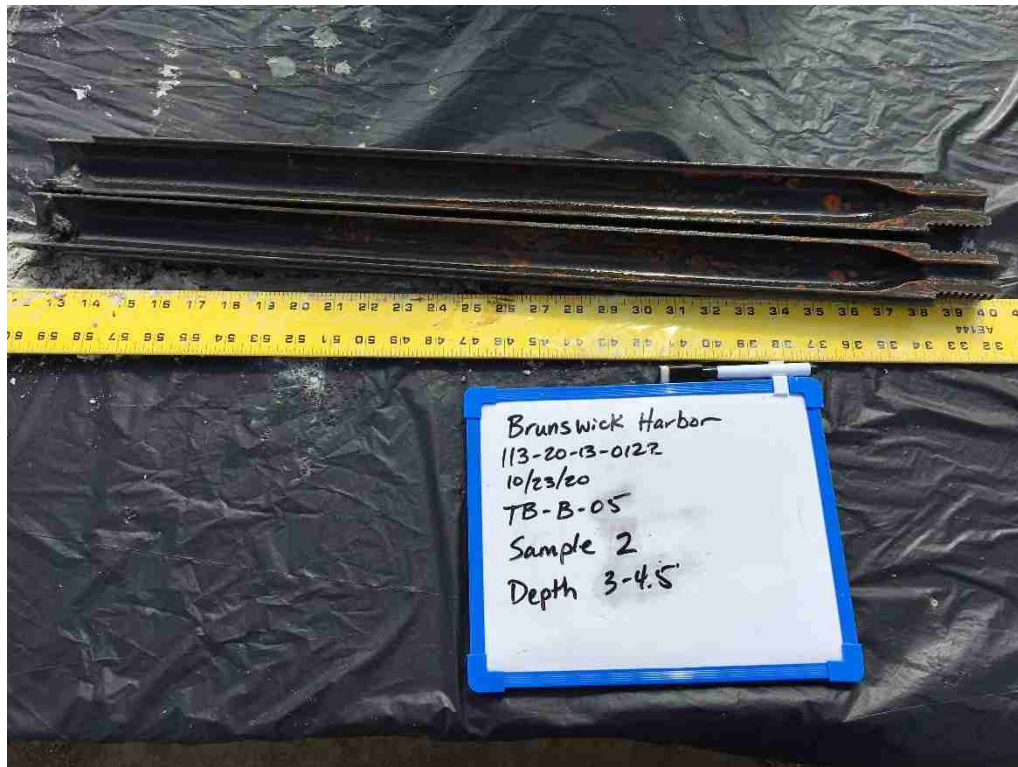


Depth: 34.5 – 36.0 feet; Approximate Elevation: -47.9 to -49.4 feet MLLW

TB-B-05 Photographs



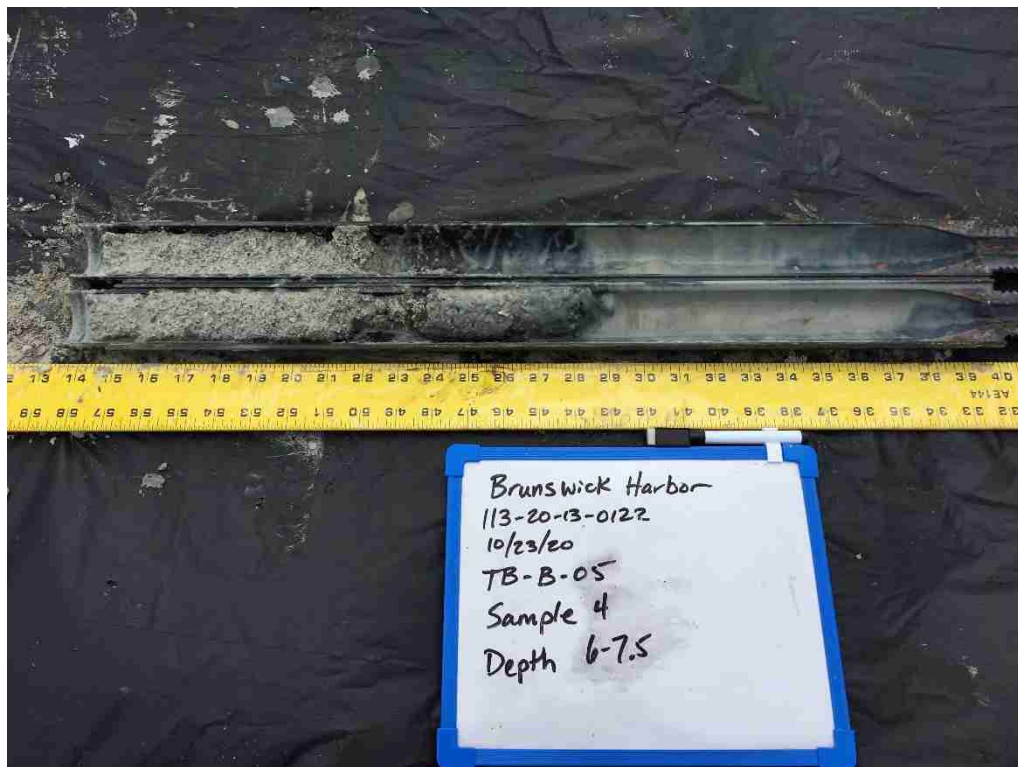
Depth: 0 – 3.0 feet; Approximate Elevation: -31.0 to -34.0 feet MLLW



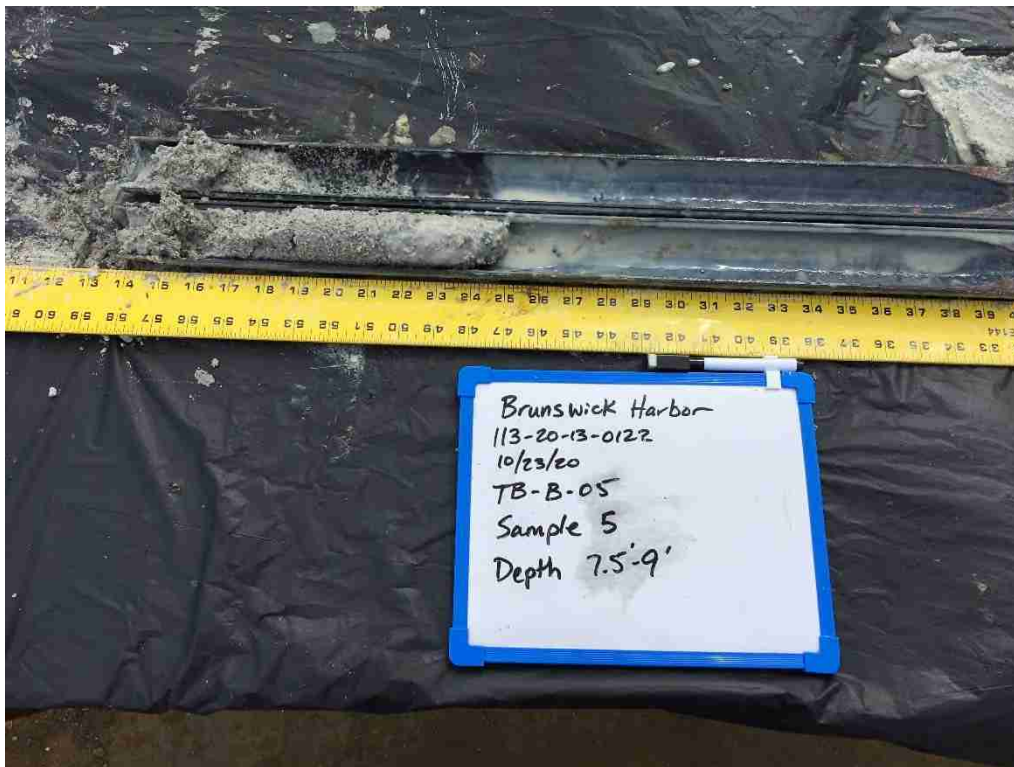
Depth: 3.0 – 4.5 feet; Approximate Elevation: -34.0 to -35.5 feet MLLW



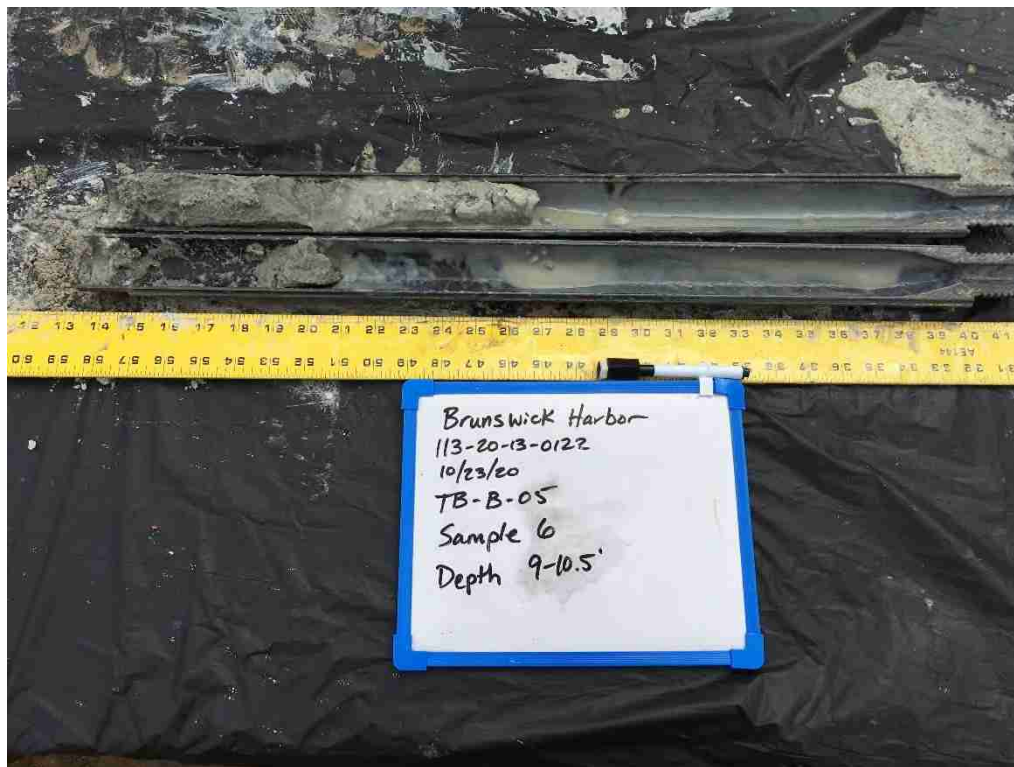
Depth: 4.5 – 6.0 feet; Approximate Elevation: -35.5 to -37.0 feet MLLW



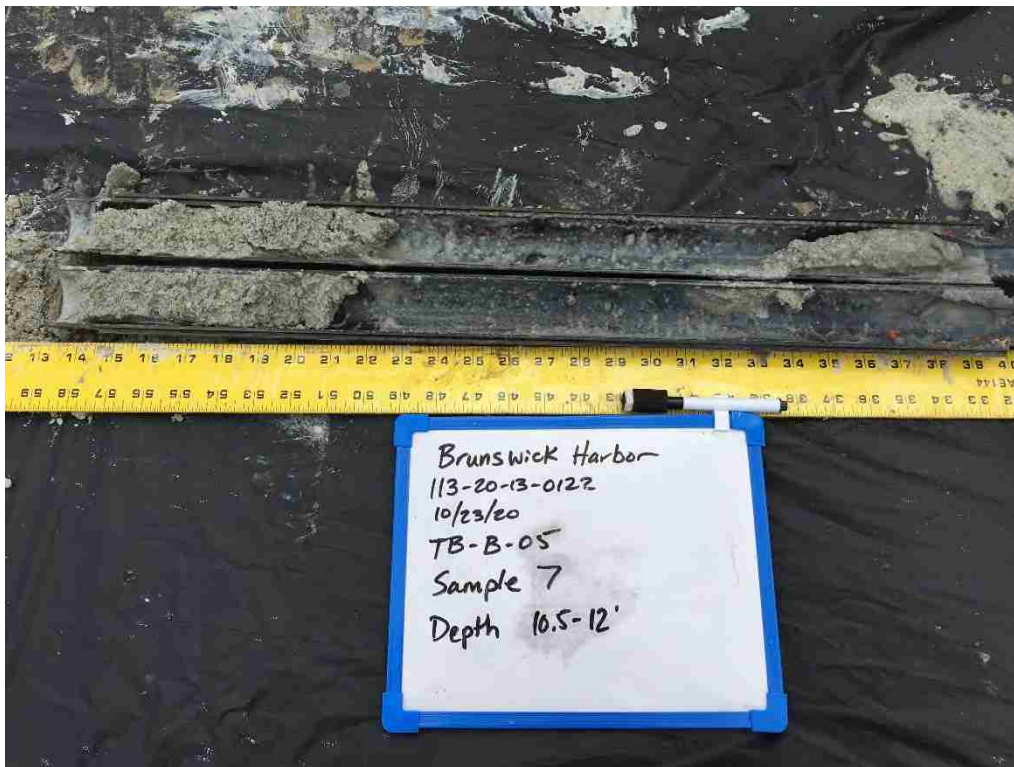
Depth: 6.0 – 7.5 feet; Approximate Elevation: -37.0 to -38.5 feet MLLW



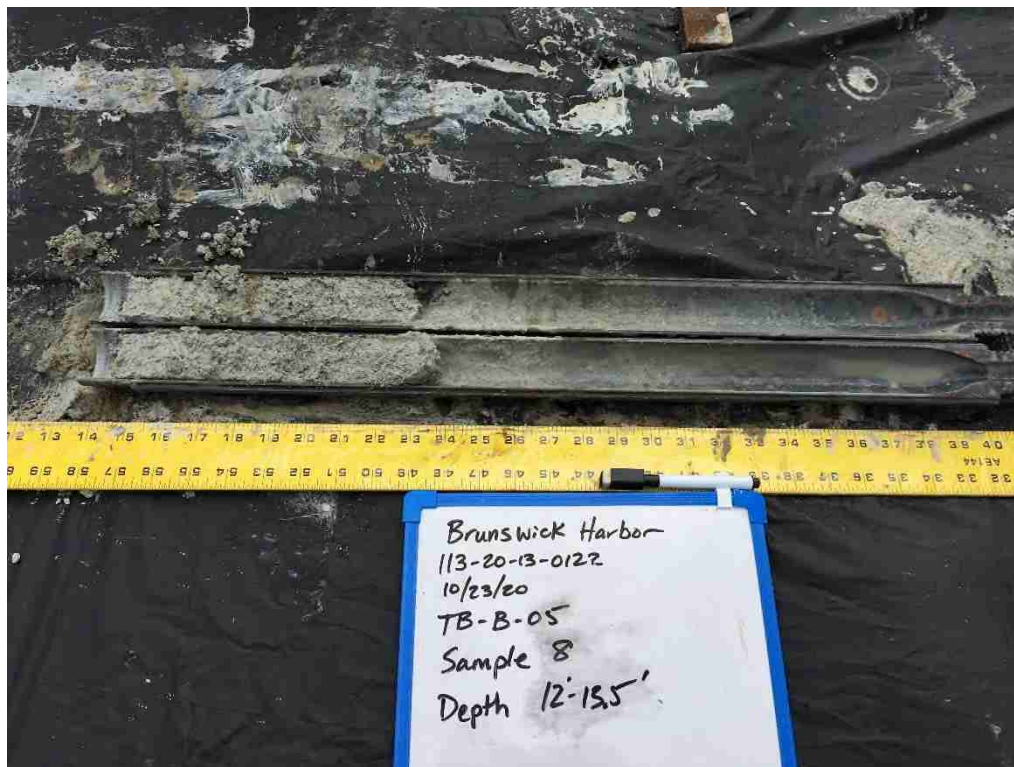
Depth: 7.5 – 9.0 feet; Approximate Elevation: -38.5 to -40.0 feet MLLW



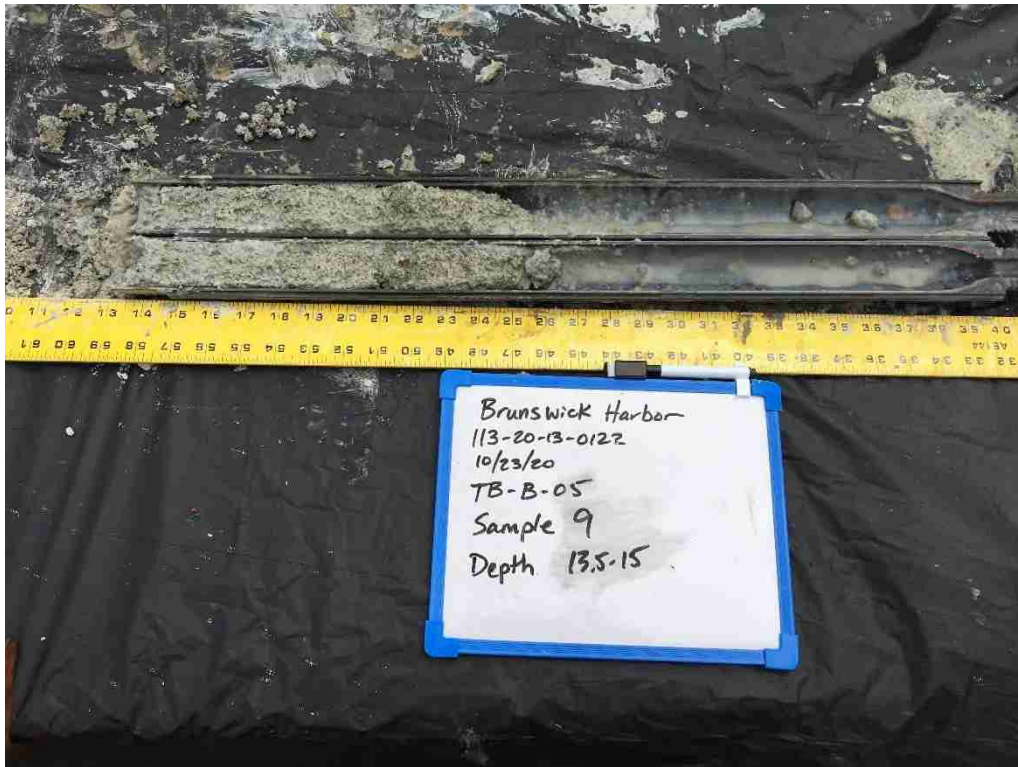
Depth: 9.0 – 10.5 feet; Approximate Elevation: -40.0 to -41.5 feet MLLW



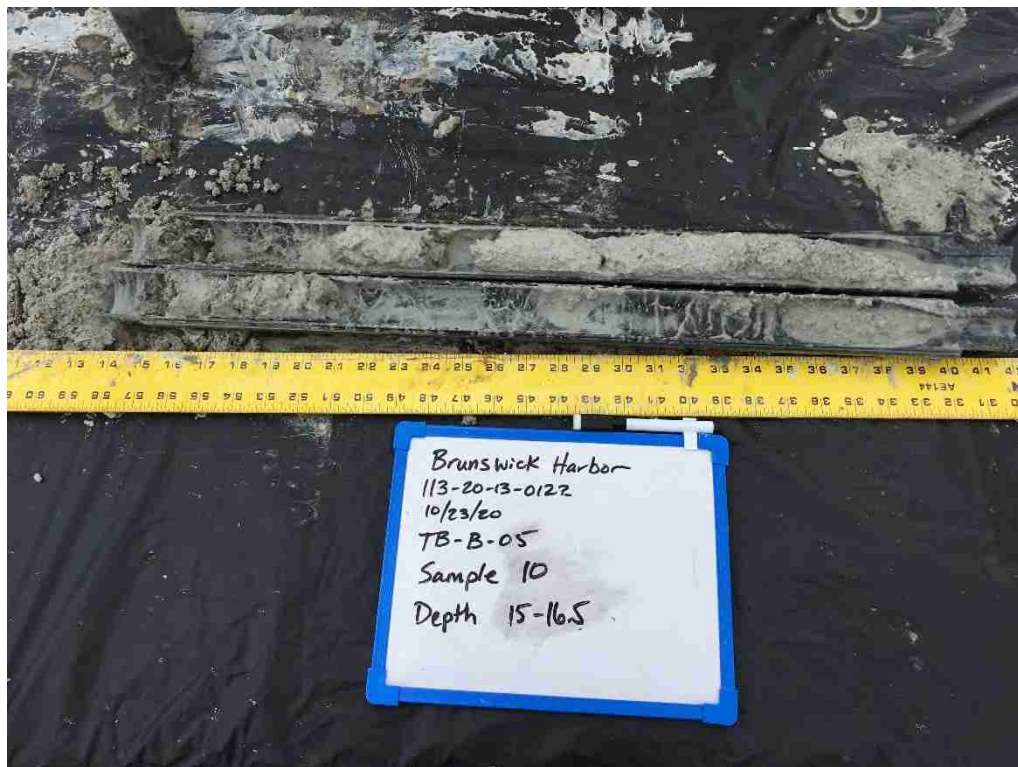
Depth: 10.5 – 12.0 feet; Approximate Elevation: -41.5 to -43.0 feet MLLW



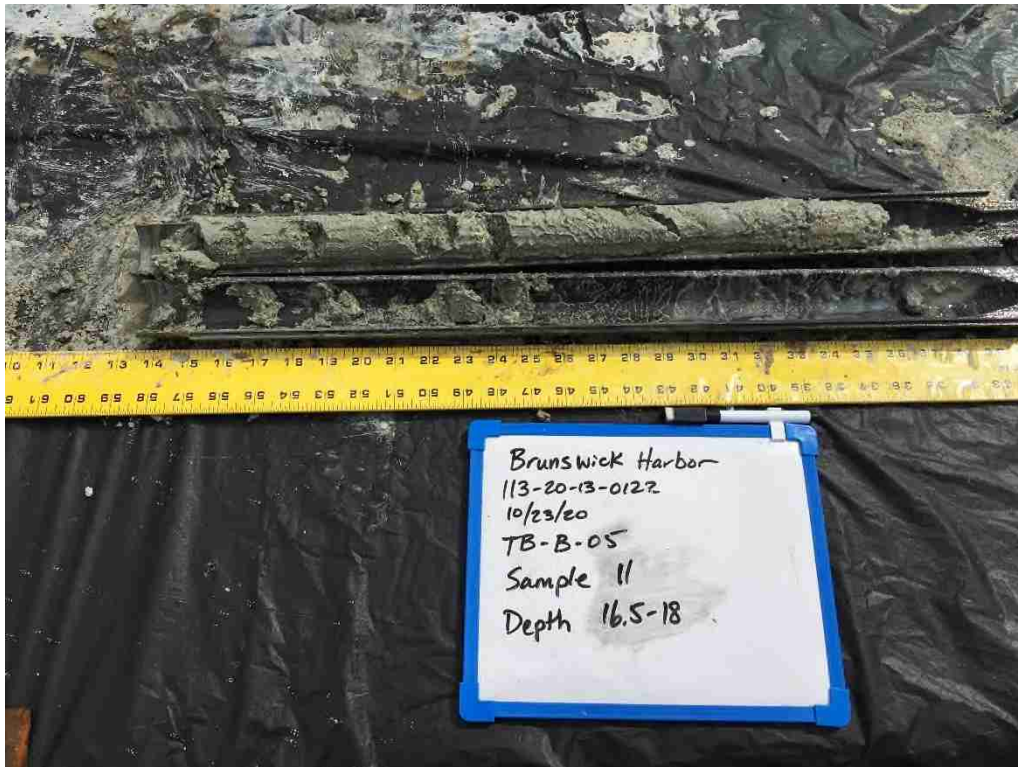
Depth: 12.0 – 13.5 feet; Approximate Elevation: -43.0 to -44.5 feet MLLW



Depth: 13.5 – 15.0 feet; Approximate Elevation: -44.5 to -46.0 feet MLLW t

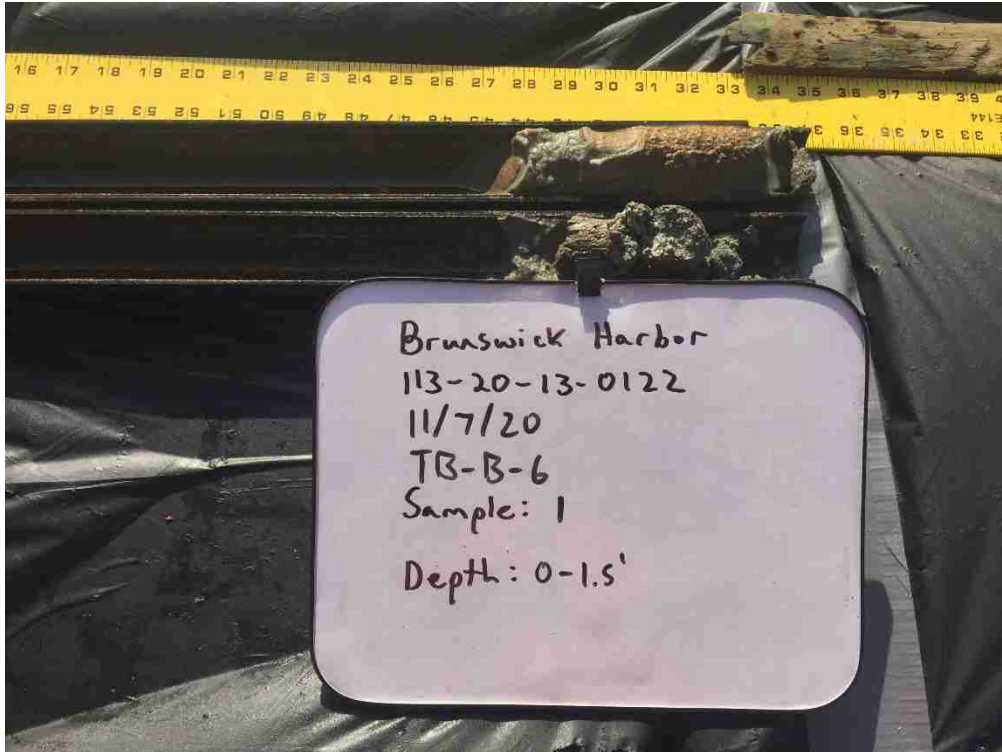


Depth: 15.0 – 16.5 feet; Approximate Elevation: -460 to -47.5 feet MLLW

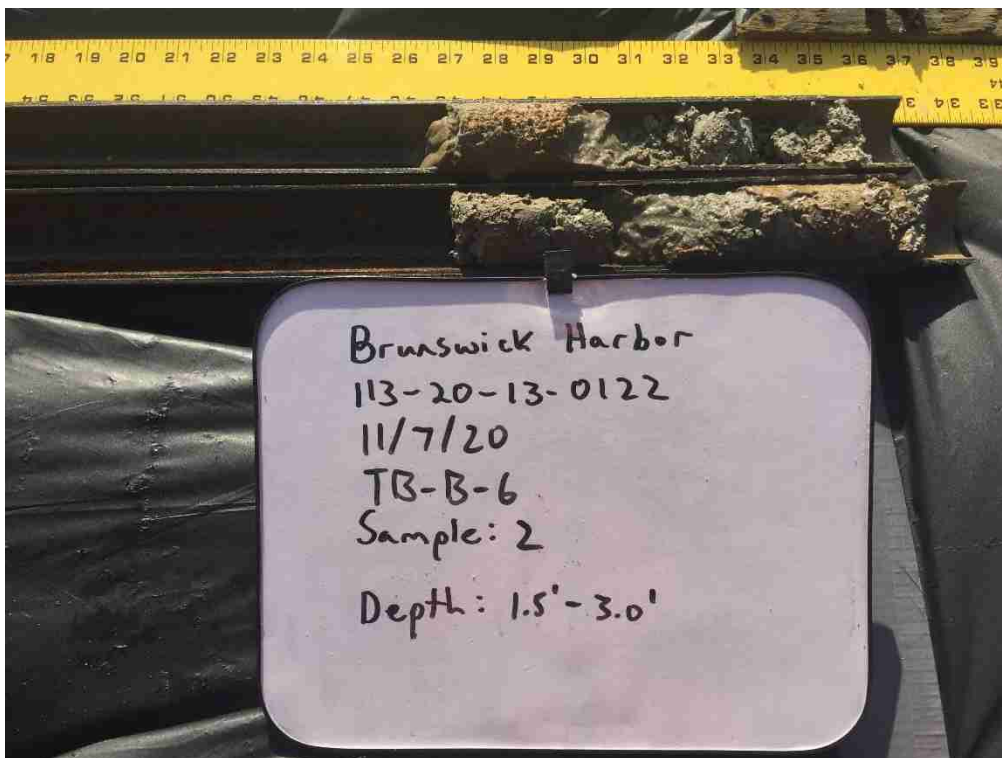


Depth: 16.5 – 18.0 feet; Approximate Elevation: -47.5 to -49.0 feet MLLW

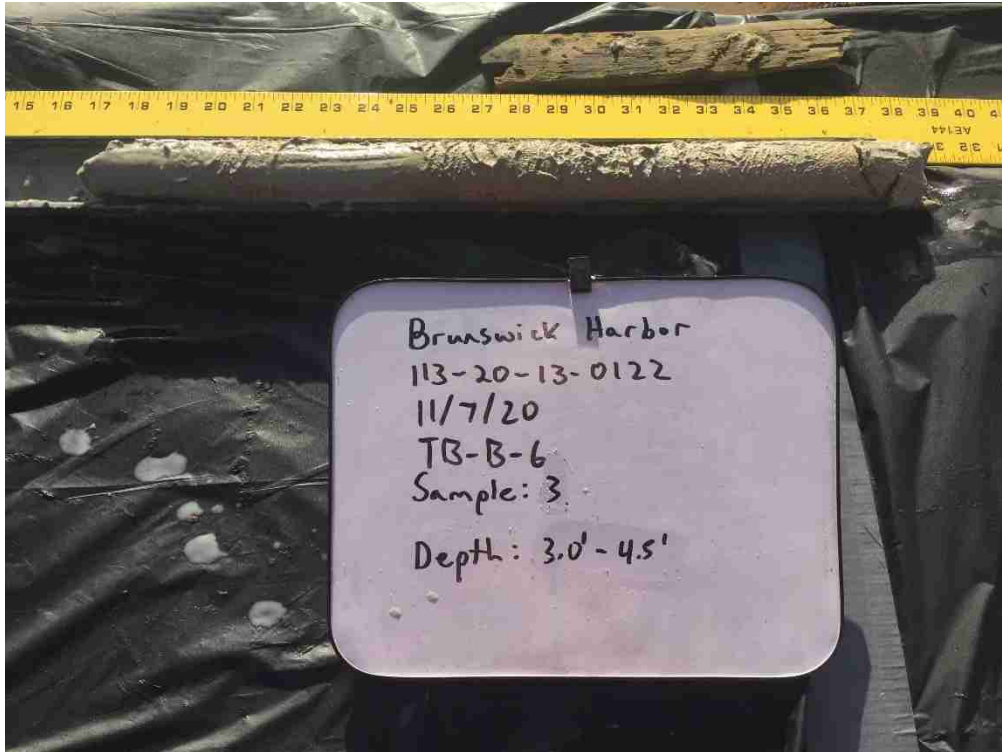
TB-B-06 Photographs



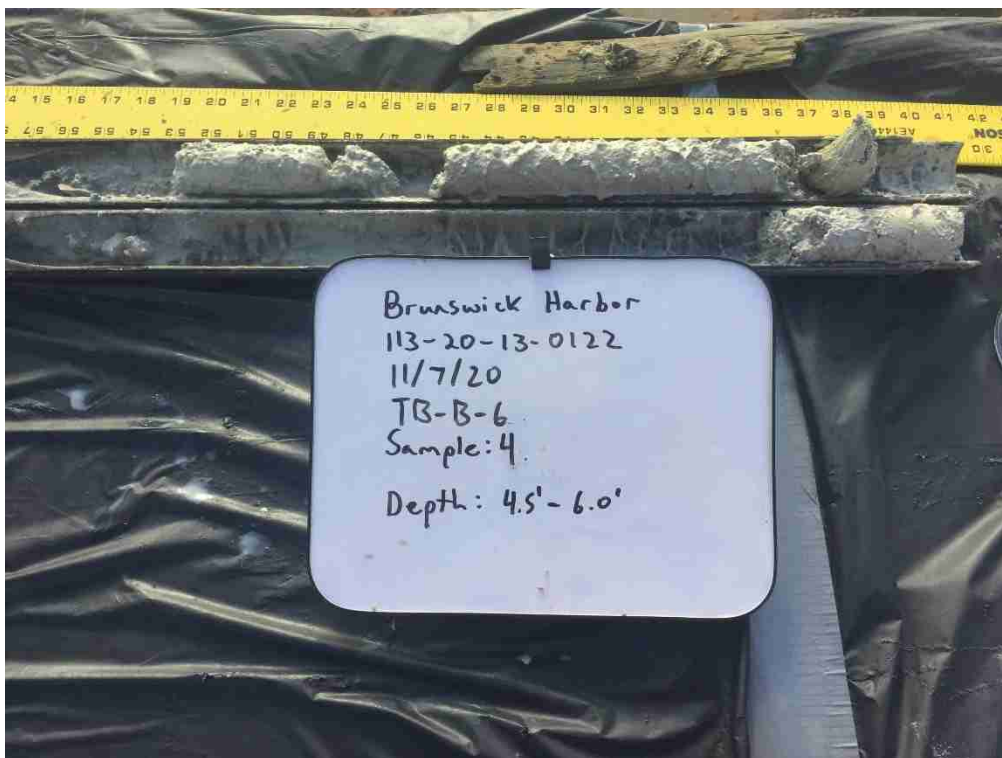
Depth: 0 – 1.5 feet; Approximate Elevation: -22.5 to -24.0 feet MLLW



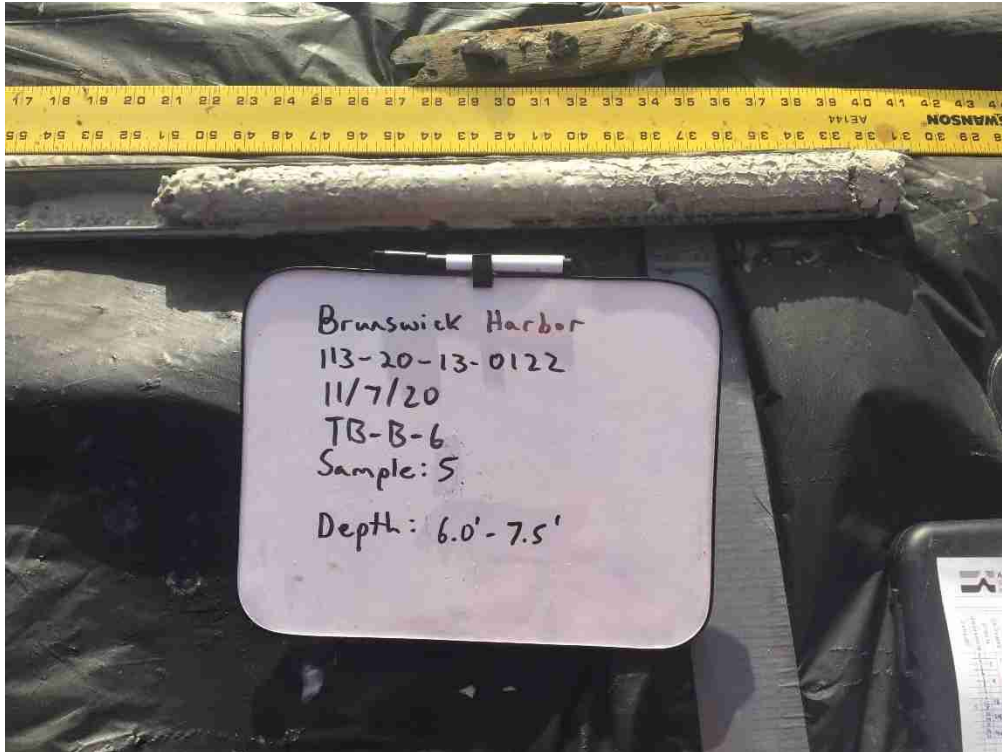
Depth: 1.5 – 3.0 feet; Approximate Elevation: -24.0 to -25.5 feet MLLW



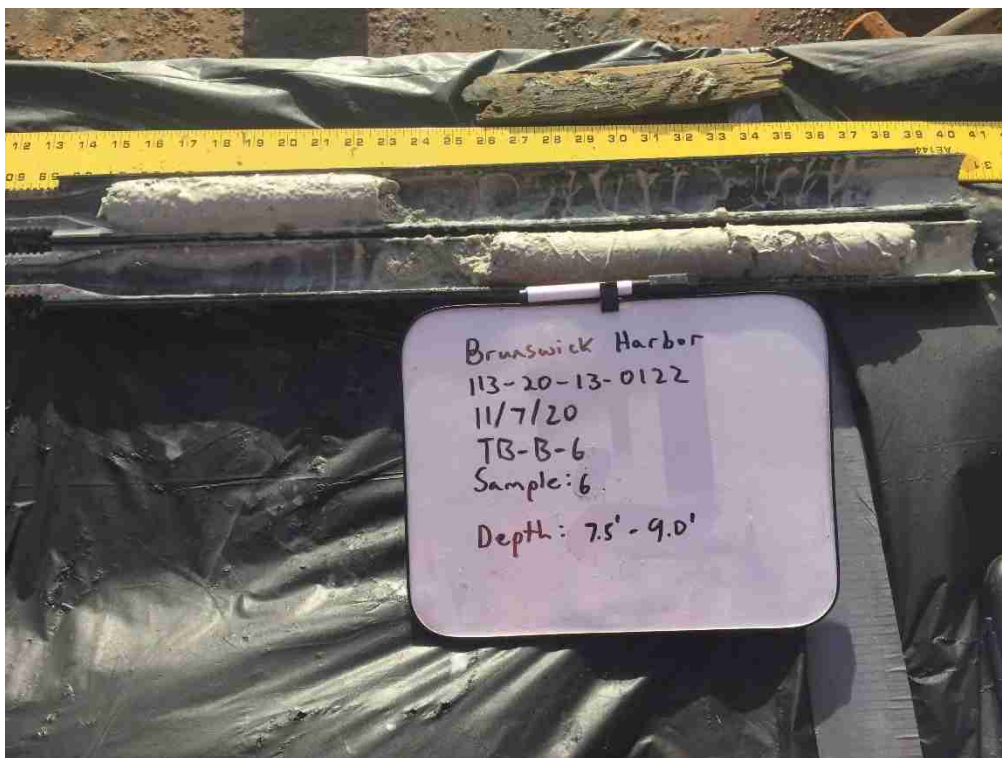
Depth: 3.0 – 4.5 feet; Approximate Elevation: -25.5 to -27.0 feet MLLW



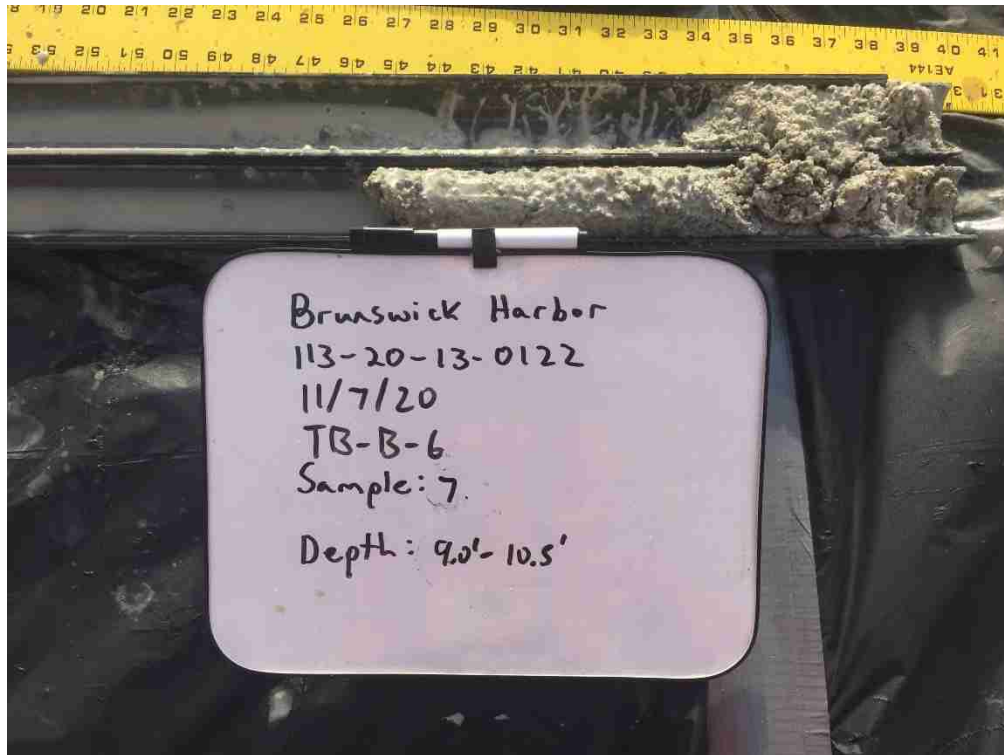
Depth: 4.5 – 6.0 feet; Approximate Elevation: -27.0 to -28.5 feet MLLW



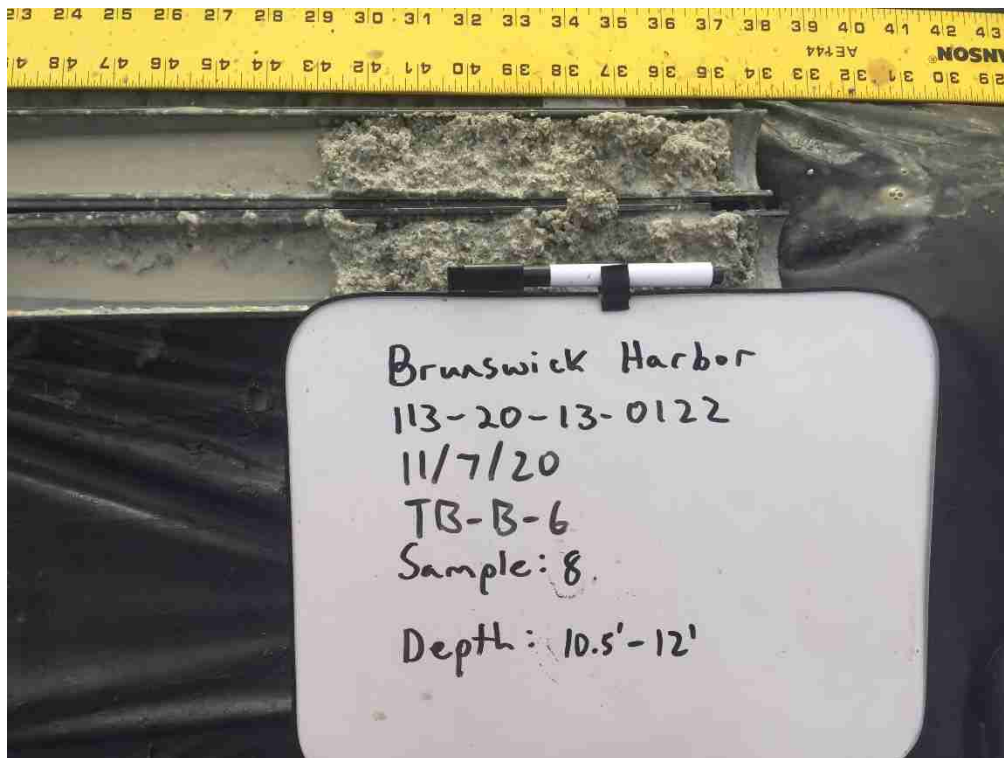
Depth: 6.0 – 7.5 feet; Approximate Elevation: -28.5 to -30.0 feet MLLW



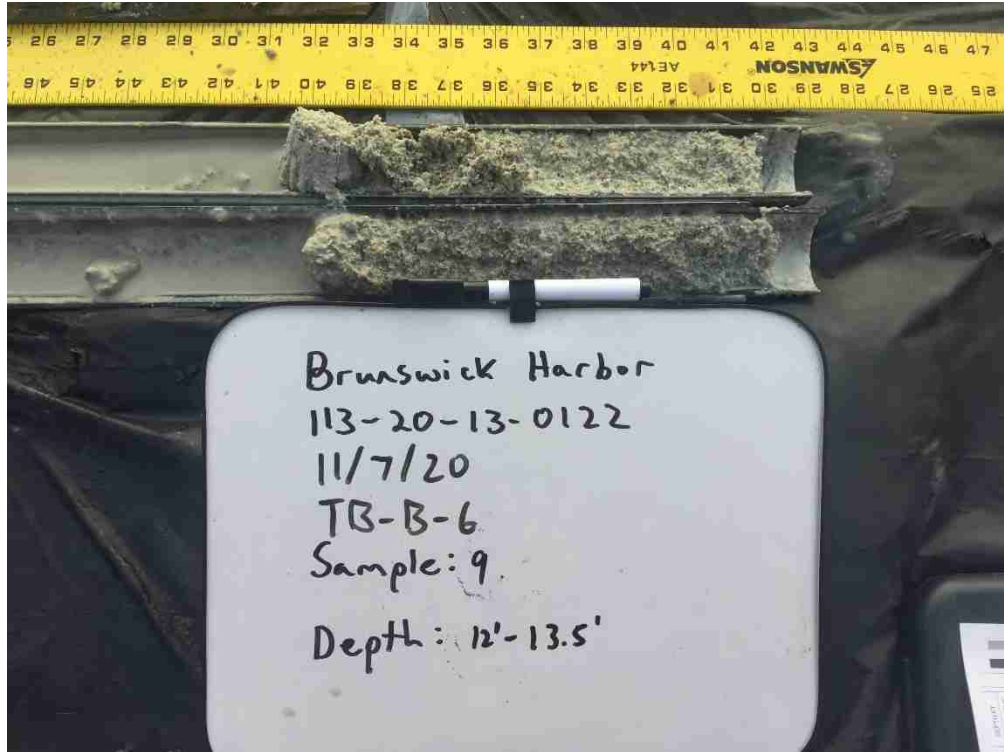
Depth: 7.5 – 9.0 feet; Approximate Elevation: -30.0 to -31.5 feet MLLW



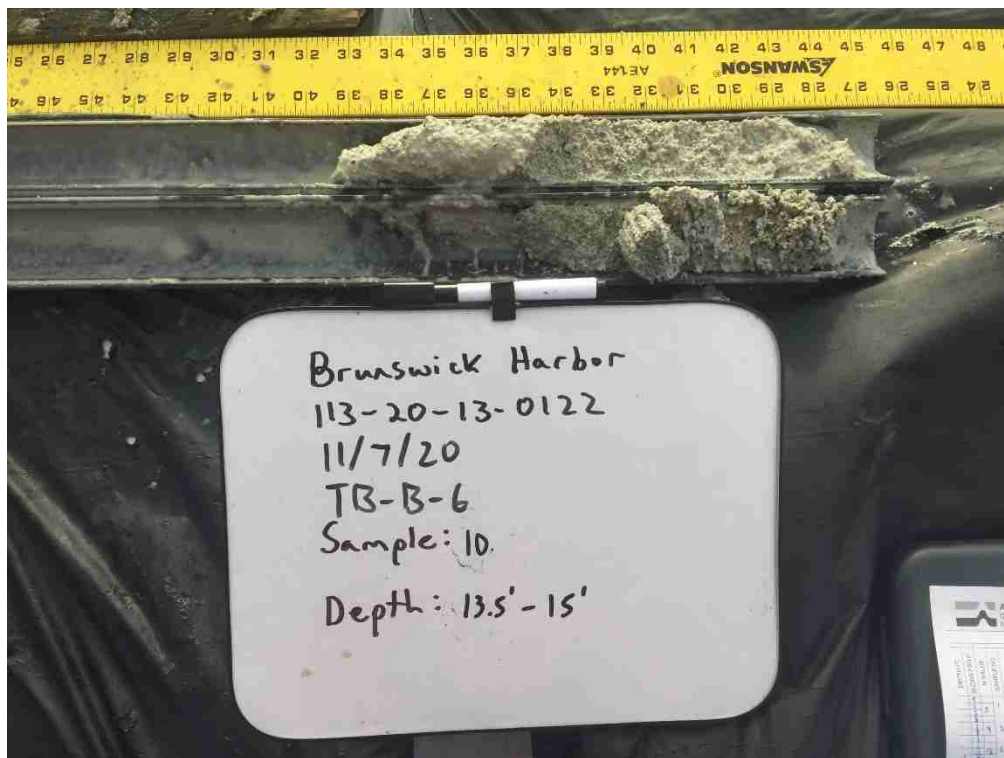
Depth: 9.0 – 10.5 feet; Approximate Elevation: -31.5 to -33.0 feet MLLW



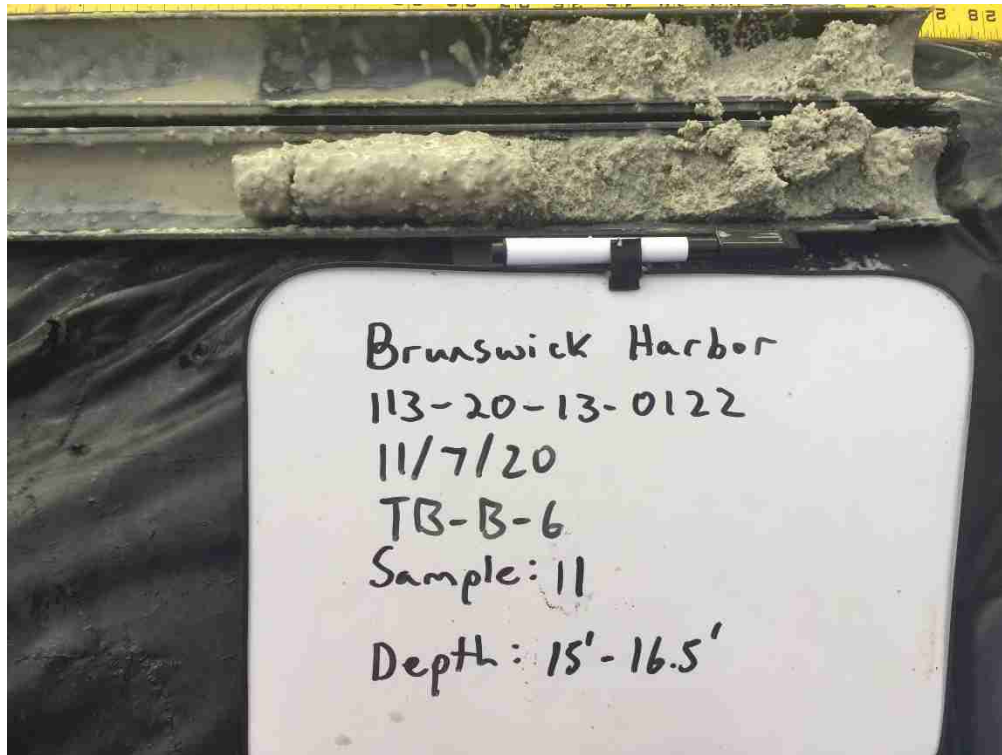
Depth: 10.5 – 12.0 feet; Approximate Elevation: -33.0 to -34.5 feet MLLW



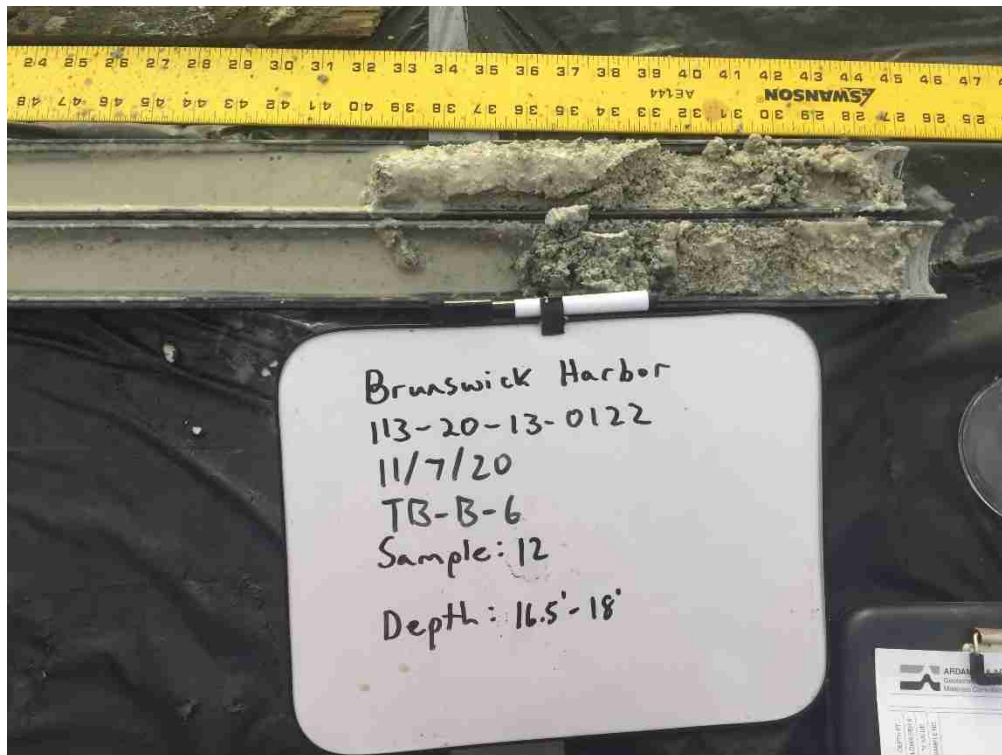
Depth: 12.0 – 13.5 feet; Approximate Elevation: -34.5 to -36.0 feet MLLW



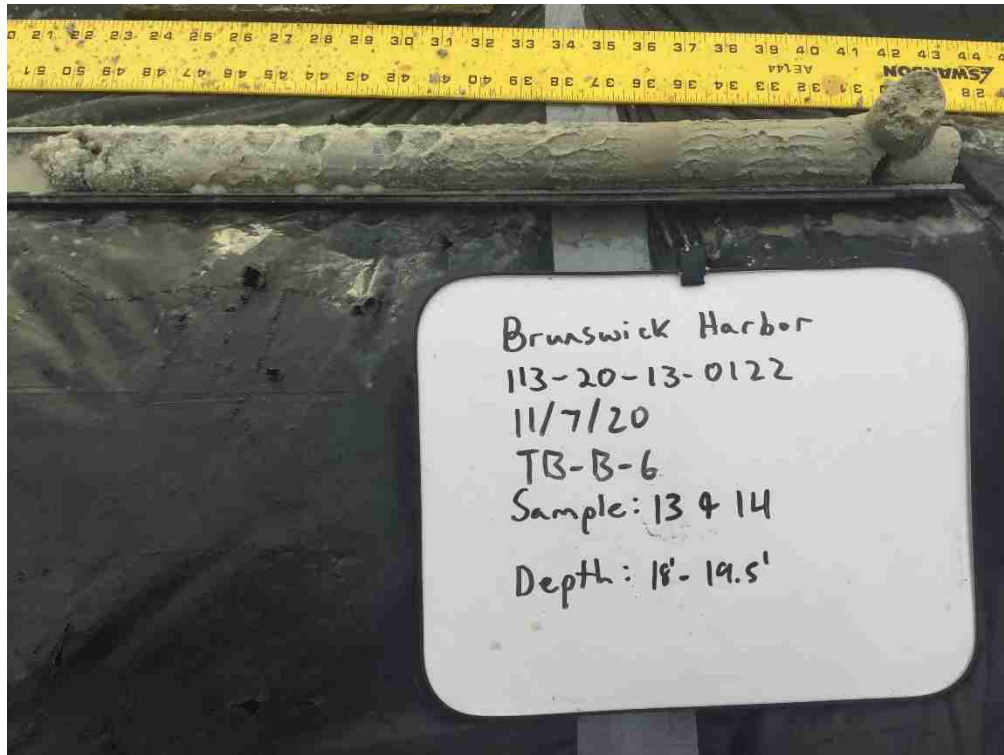
Depth: 13.5 – 15.0 feet; Approximate Elevation: -36.0 to -37.5 feet MLLW



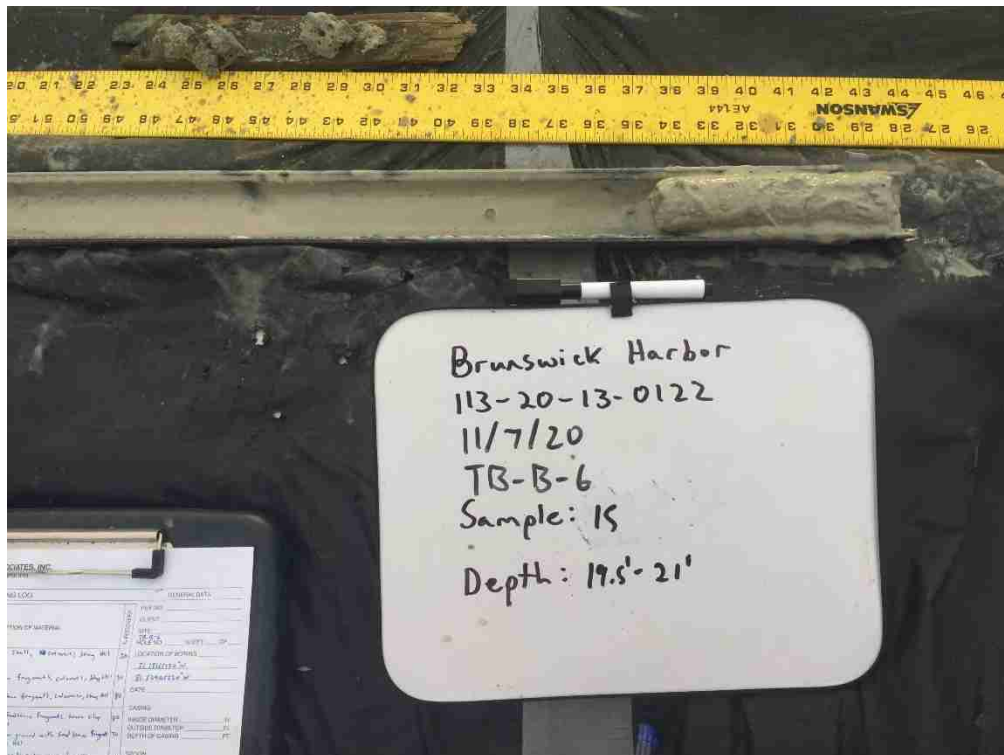
Depth: 15.0 – 16.5 feet; Approximate Elevation: -37.5 to -39.0 feet MLLW



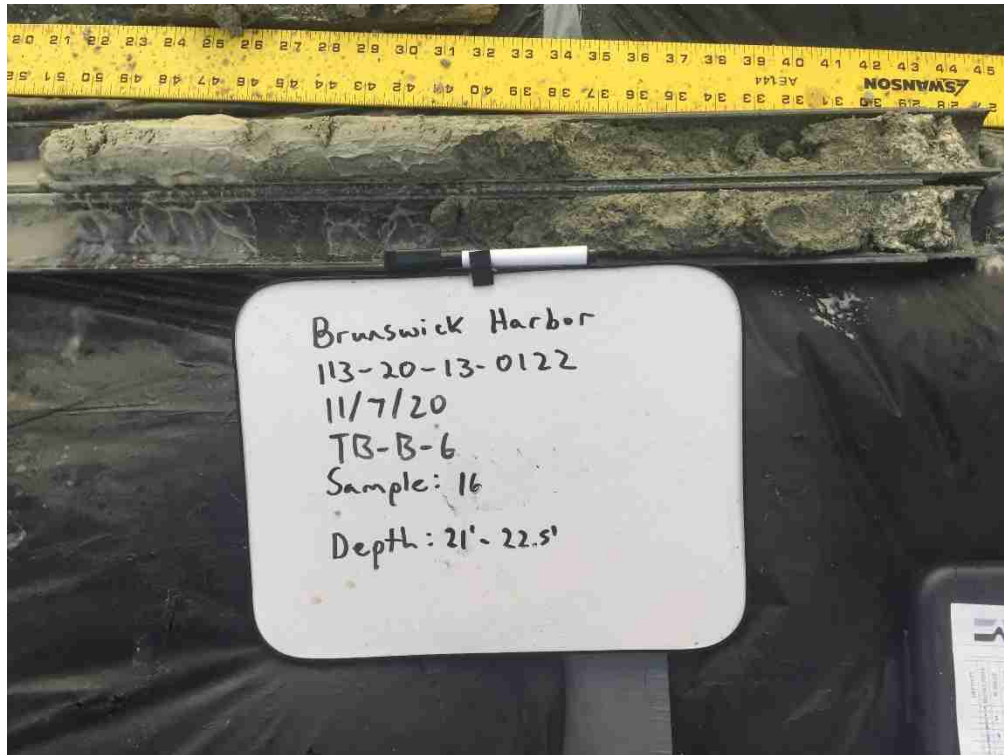
Depth: 16.5 – 18.0 feet; Approximate Elevation: -39.0 to -40.5 feet MLLW



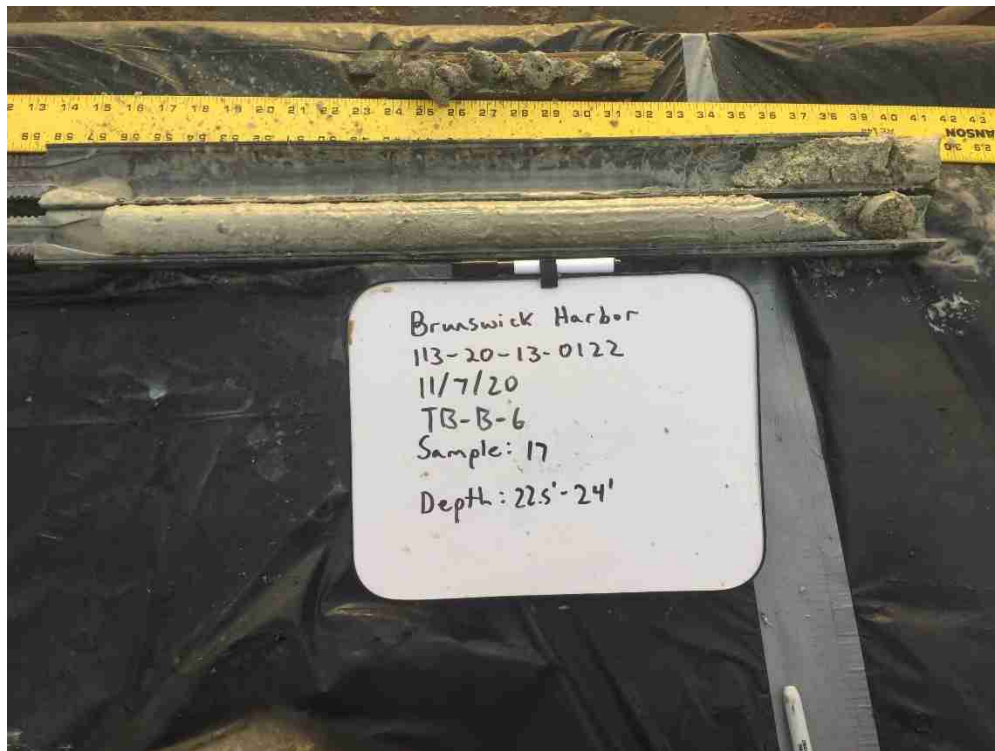
Depth: 18.0 – 19.5 feet; Approximate Elevation: -40.5 to -42.0 feet MLLW



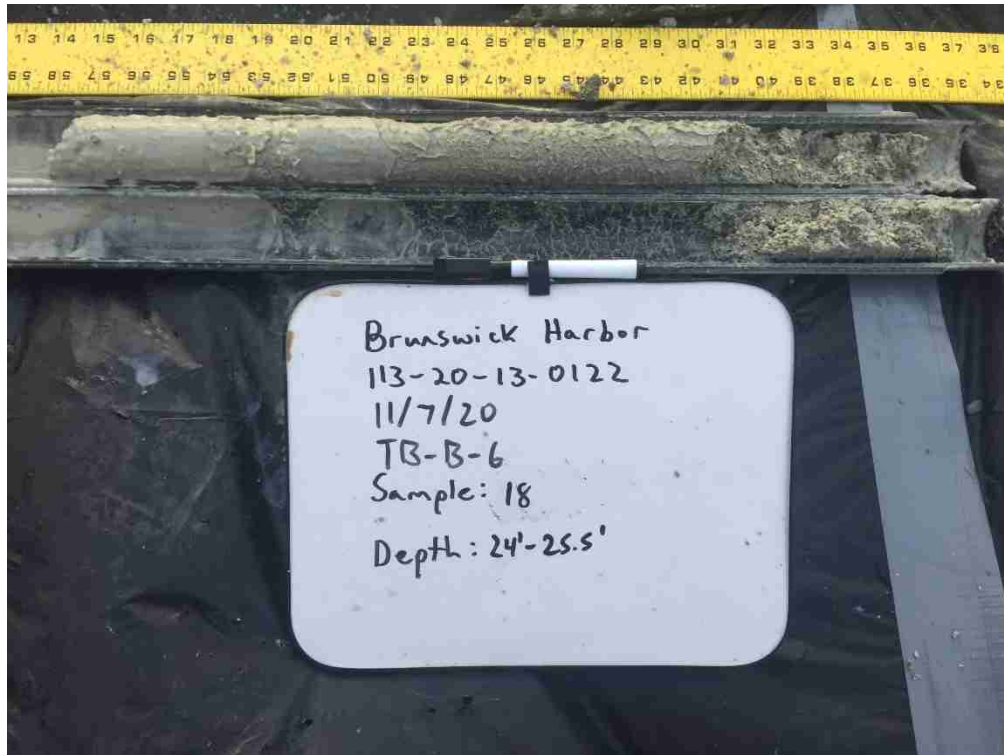
Depth: 19.5 – 21.0 feet; Approximate Elevation: -42.0 to -43.5 feet MLLW



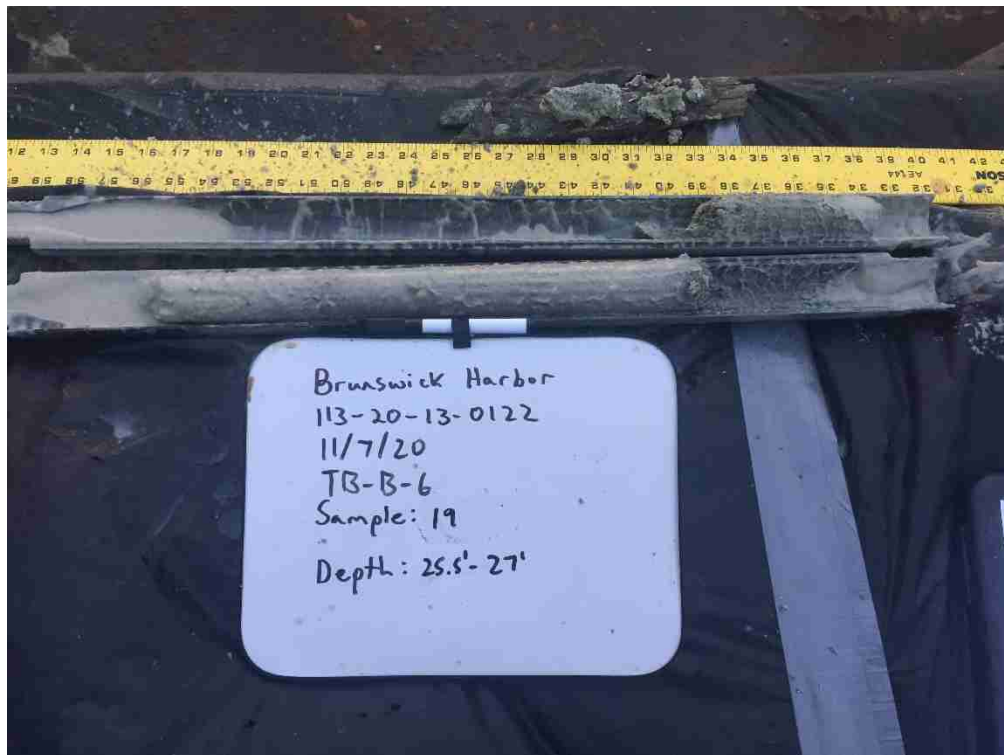
Depth: 21.0 – 22.5 feet; Approximate Elevation: -43.5 to -45.0 feet MLLW



Depth: 22.5 – 24.0 feet; Approximate Elevation: -45.0 to -46.5 feet MLLW

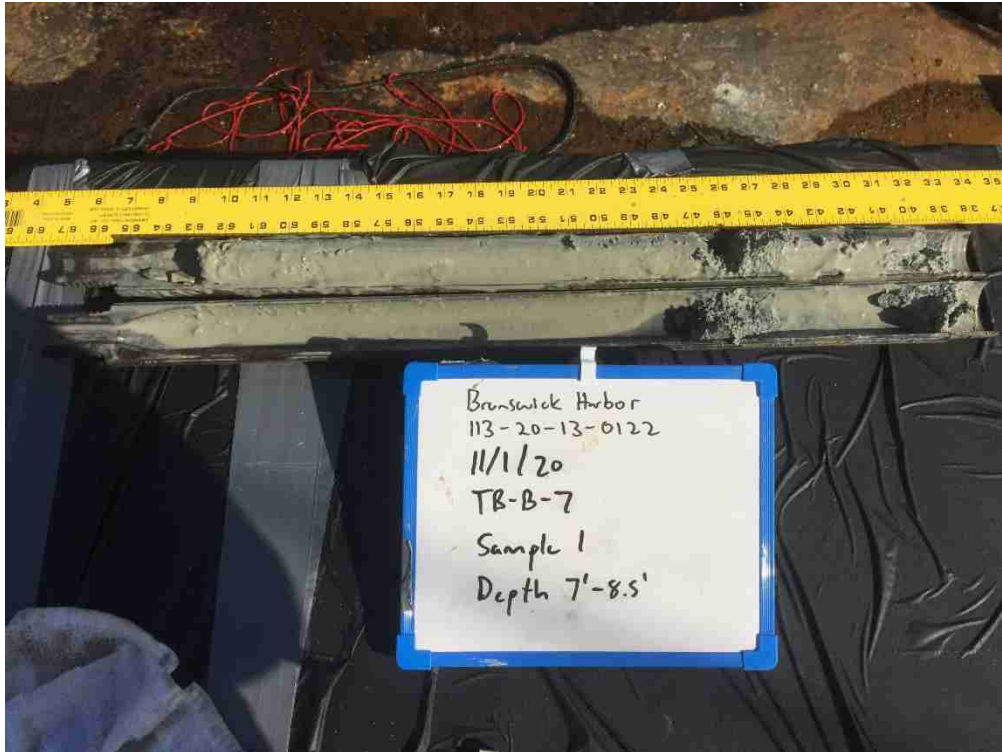


Depth: 24.0 – 25.5 feet; Approximate Elevation: -46.5 to -48.0 feet MLLW

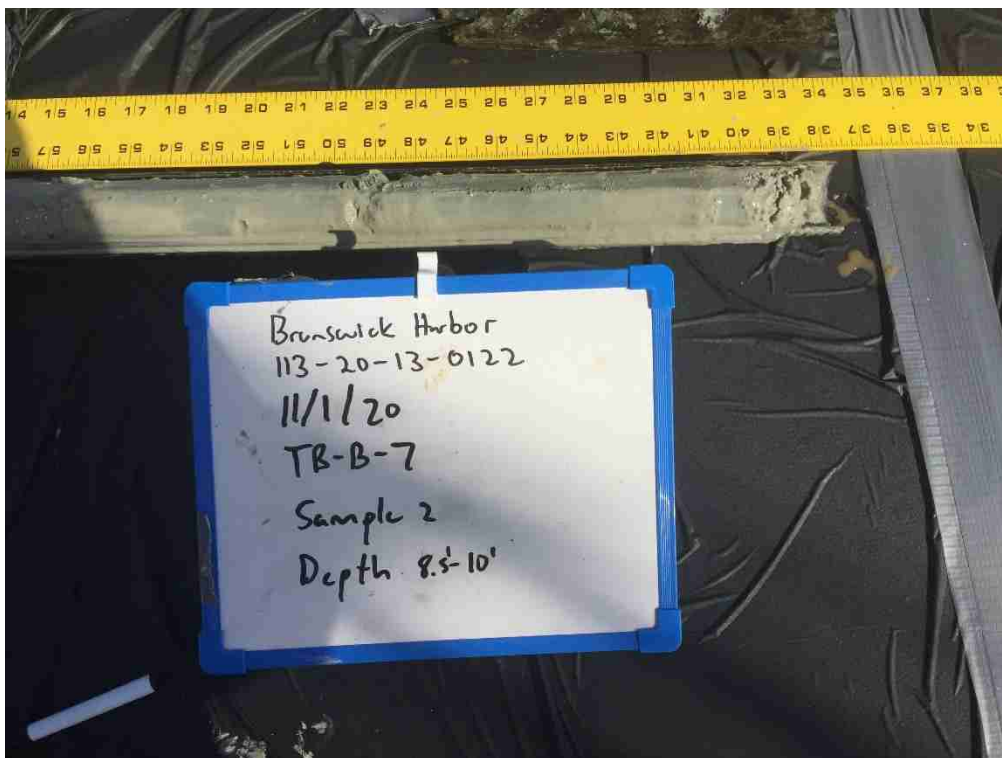


Depth: 25.5 – 27.0 feet; Approximate Elevation: -48.0 to -49.5 feet MLLW

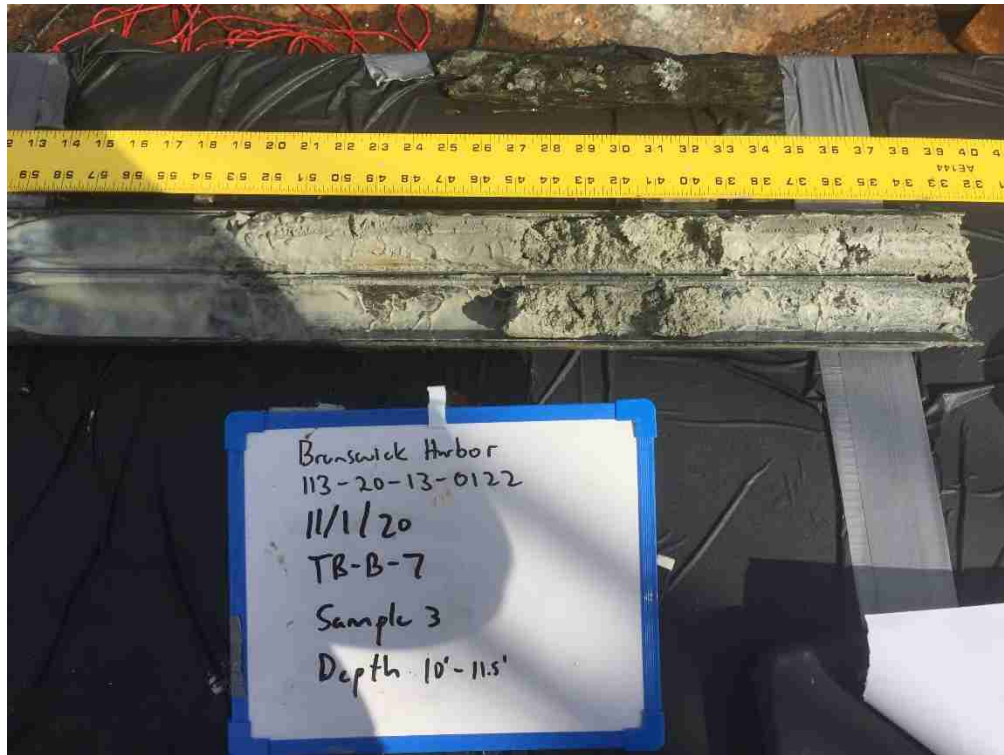
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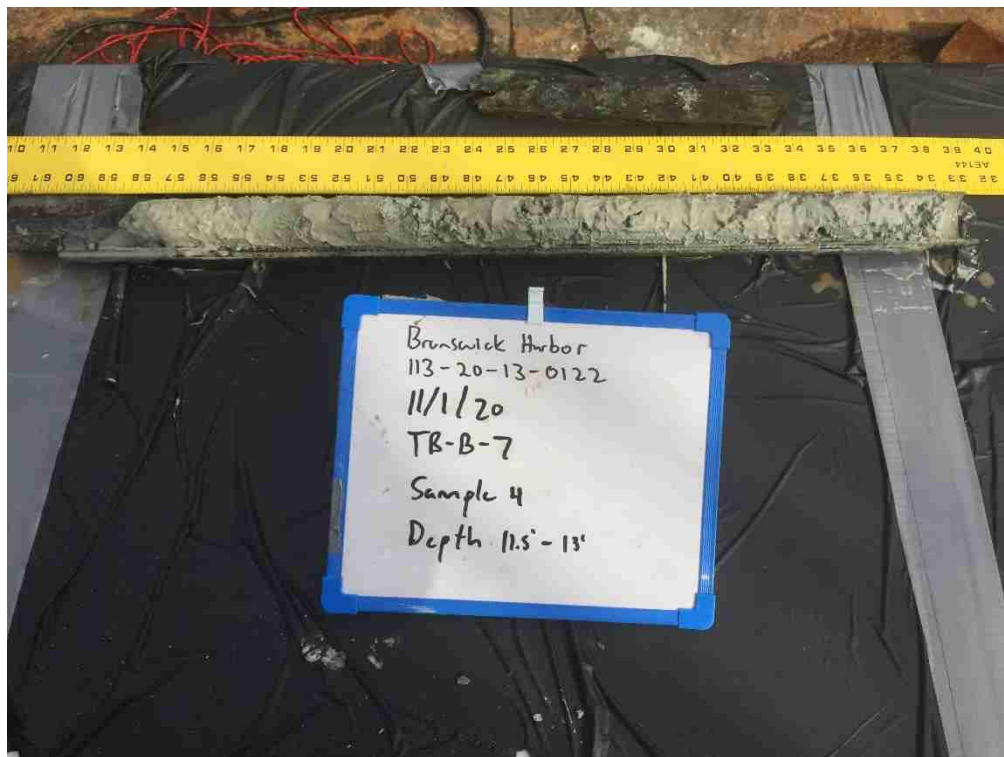
Depth: 7.0 – 8.5 feet; Approximate Elevation: -28.3 to -29.8 feet MLLW



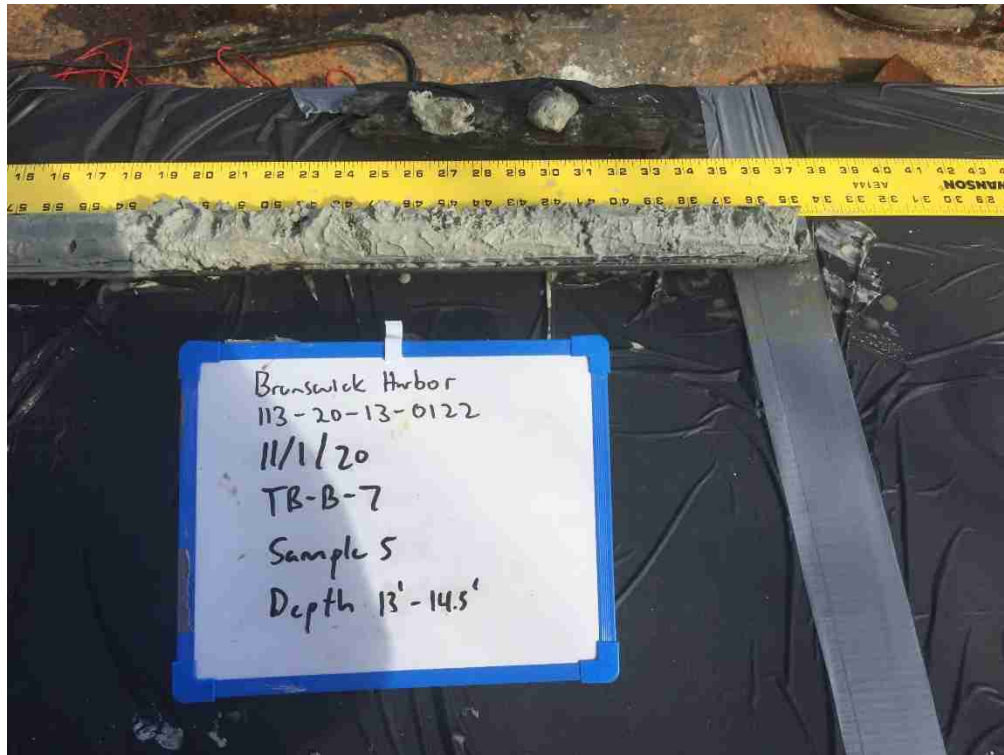
Depth: 8.5 – 10.0 feet; Approximate Elevation: -29.8 to -31.3 feet MLLW



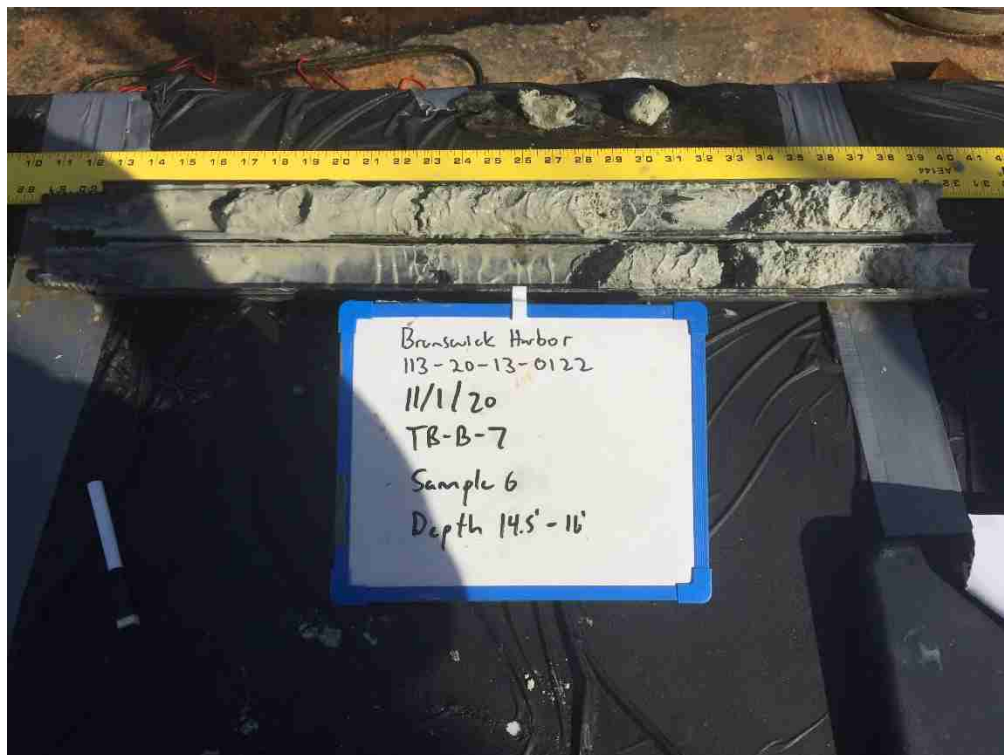
Depth: 10.0 – 11.5 feet; Approximate Elevation: -31.3 to -32.8 feet MLLW



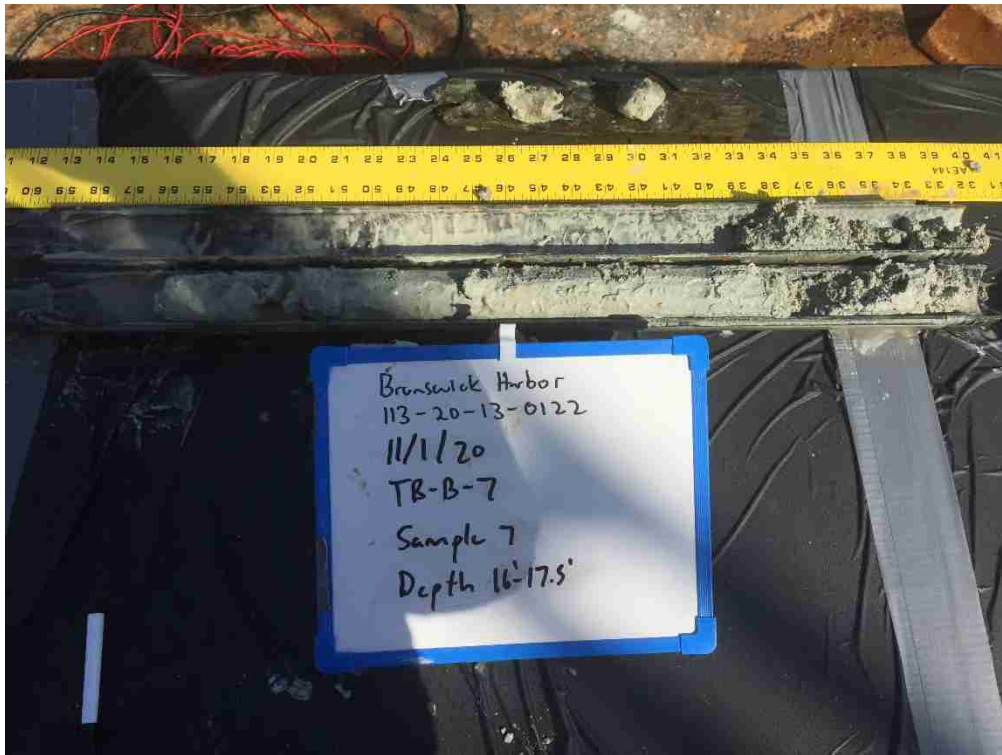
Depth: 11.5 – 13.0 feet; Approximate Elevation: -32.8 to -34.3 feet MLLW



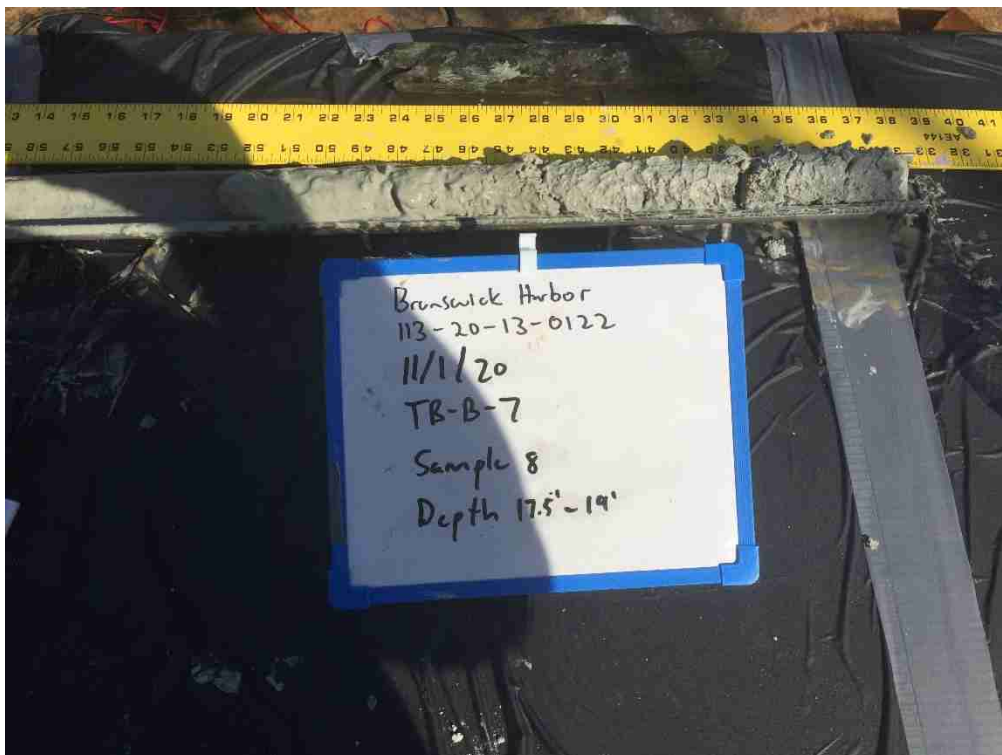
Depth: 13.0 – 14.5 feet; Approximate Elevation: -34.3 to -35.8 feet MLLW



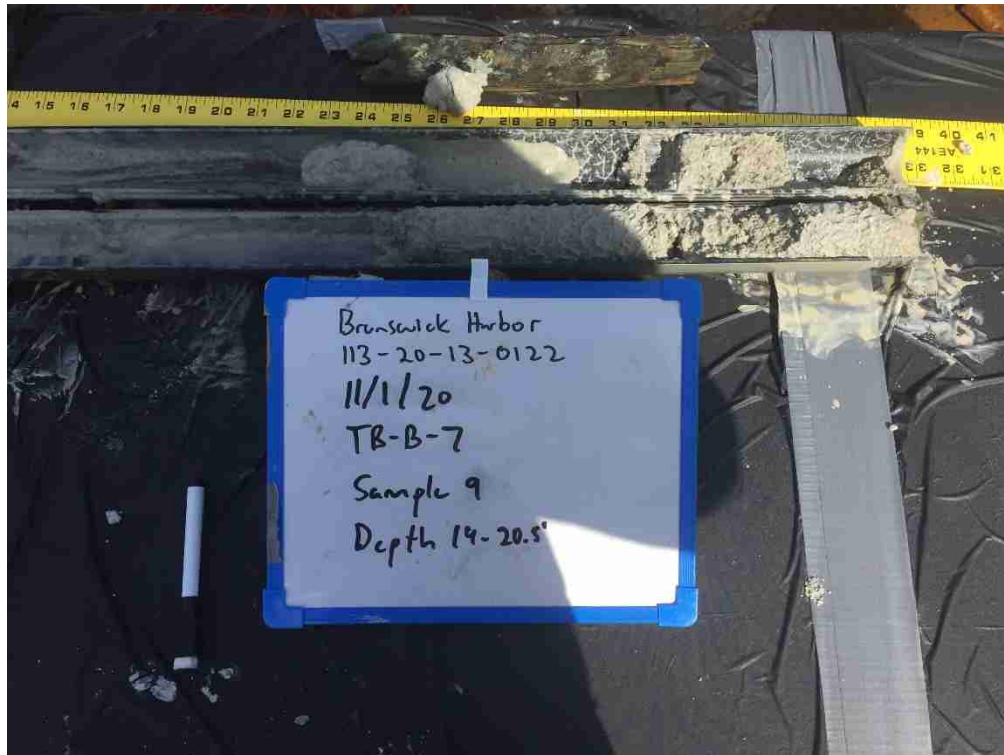
Depth: 14.5 – 16.0 feet; Approximate Elevation: -35.8 to -37.3 feet MLLW



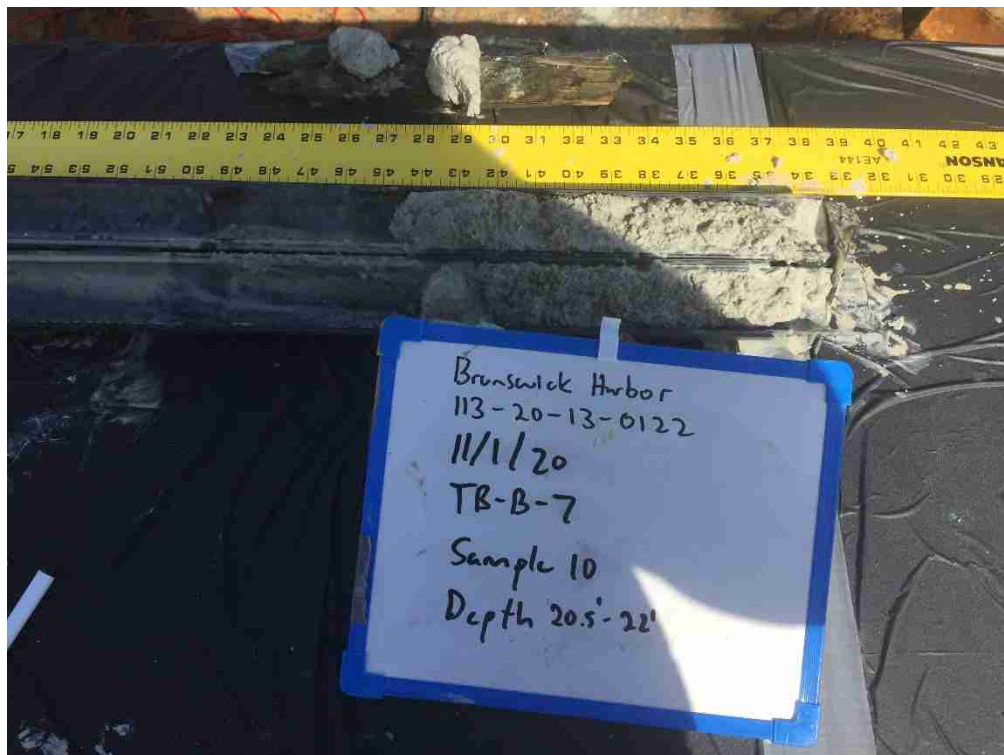
Depth: 16.0 – 17.5 feet; Approximate Elevation: -37.3 to -38.8 feet MLLW



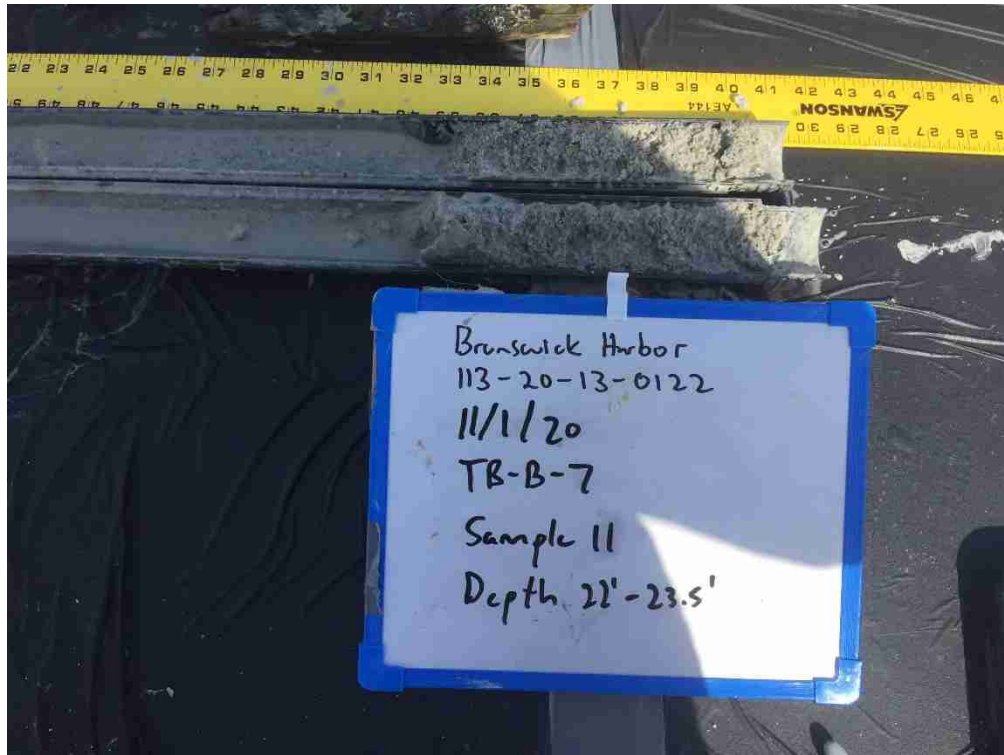
Depth: 17.5 – 19.0 feet; Approximate Elevation: -38.8 to -40.3 feet MLLW



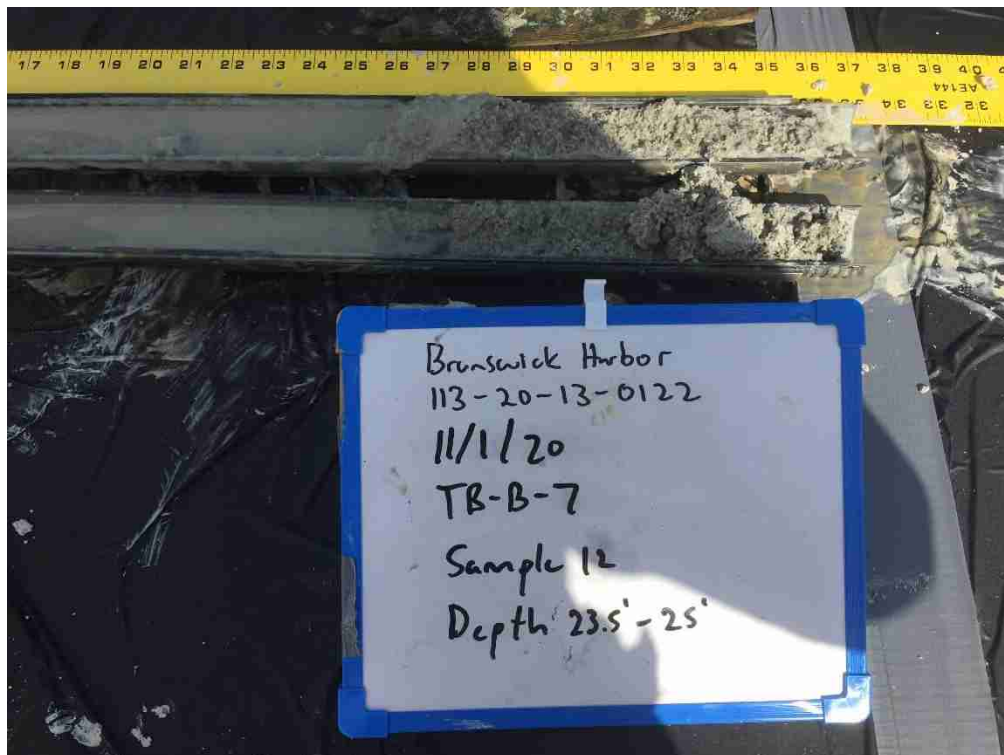
Depth: 19.0 – 20.5 feet; Approximate Elevation: -40.3 to -41.8 feet MLLW



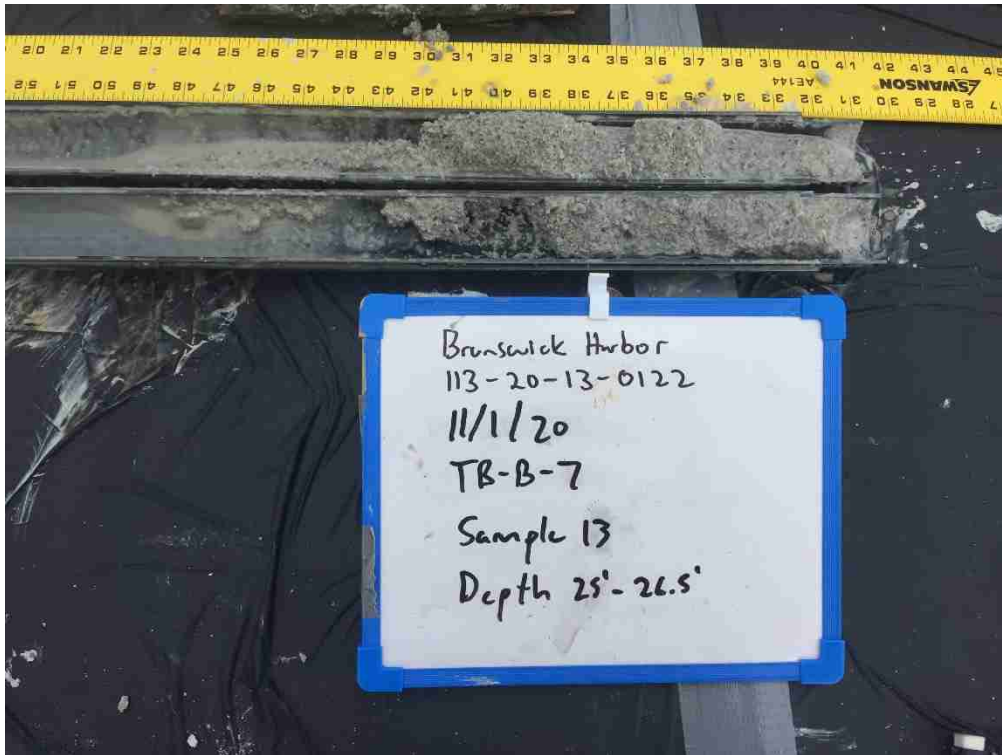
Depth: 20.5 – 22.0 feet; Approximate Elevation: -41.8 to -43.3 feet MLLW



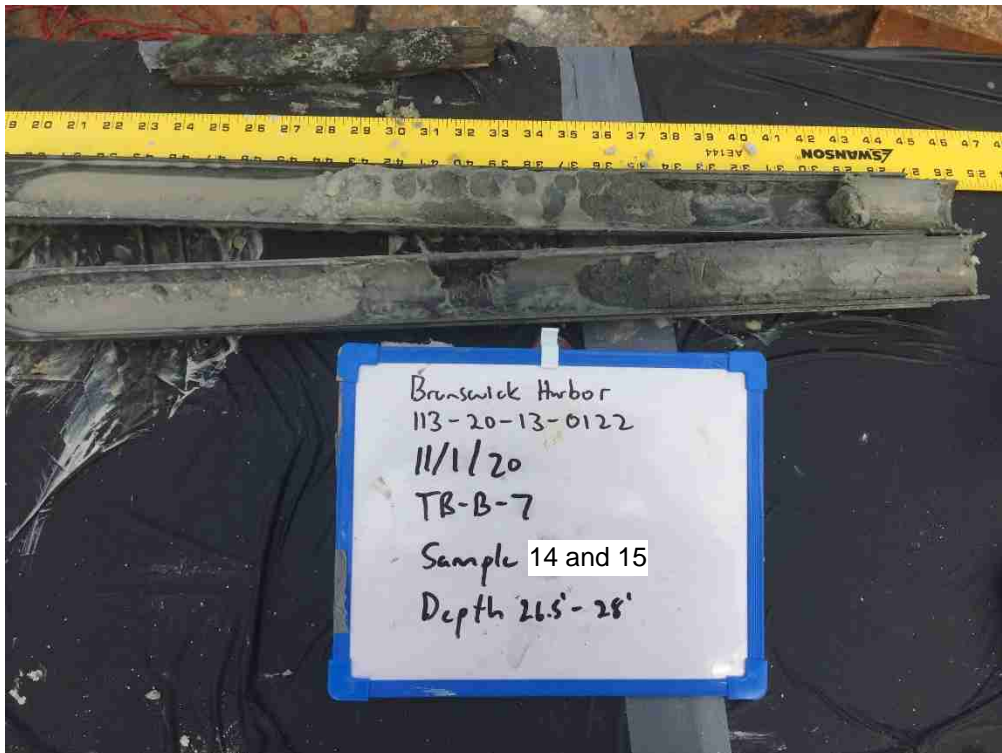
Depth: 22.0 – 23.5 feet; Approximate Elevation: -43.3 to -44.8 feet MLLW



Depth: 23.5 – 25.0 feet; Approximate Elevation: -44.8 to -46.3 feet MLLW

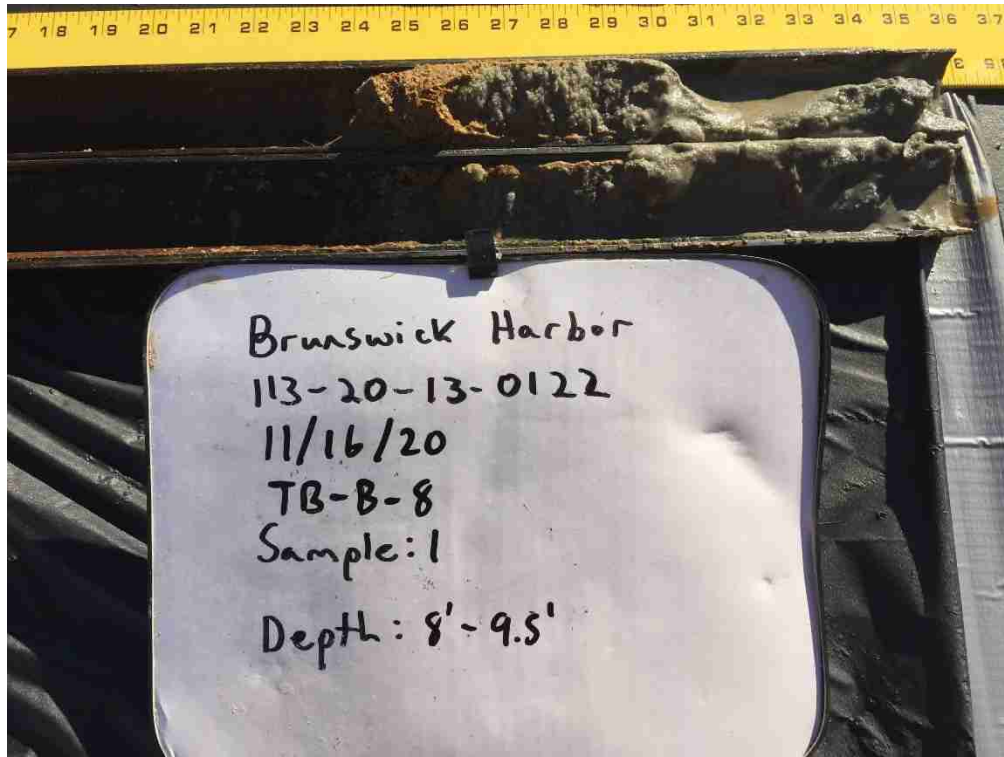


Depth: 25.0 – 26.5 feet; Approximate Elevation: -46.3 to -47.8 feet MLLW

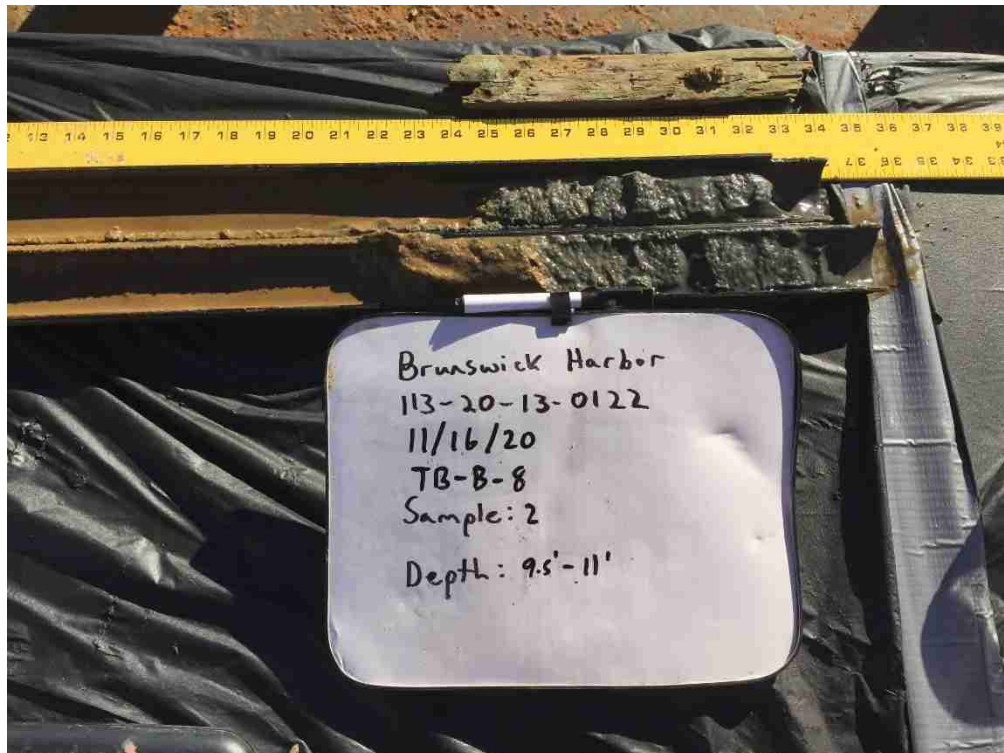


Depth: 26.5 – 28.0; Approximate Elevation: -47.8 to -49.3 feet MLLW

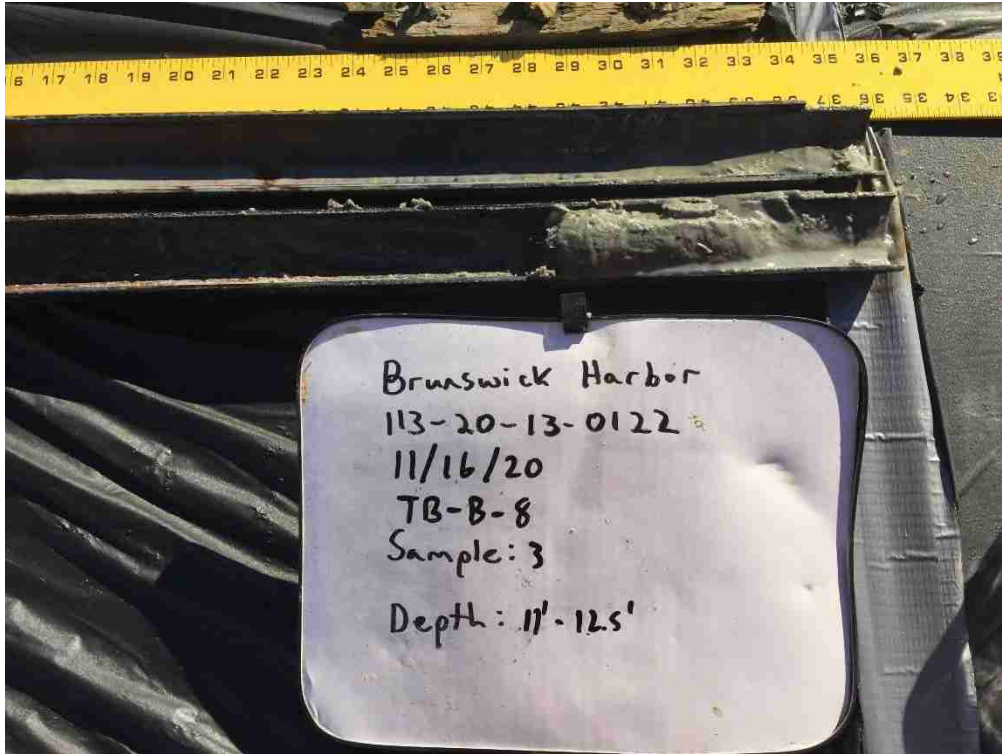
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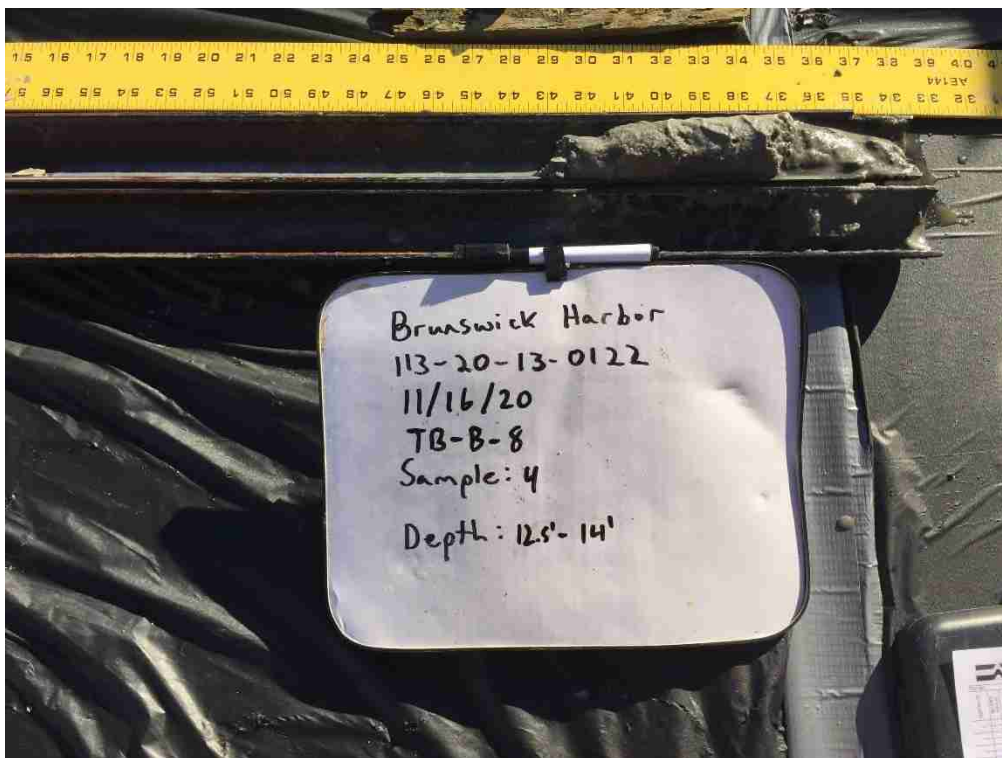
Depth: 8.0 – 9.5 feet; Approximate Elevation: -37.6 to -39.1 feet MLLW



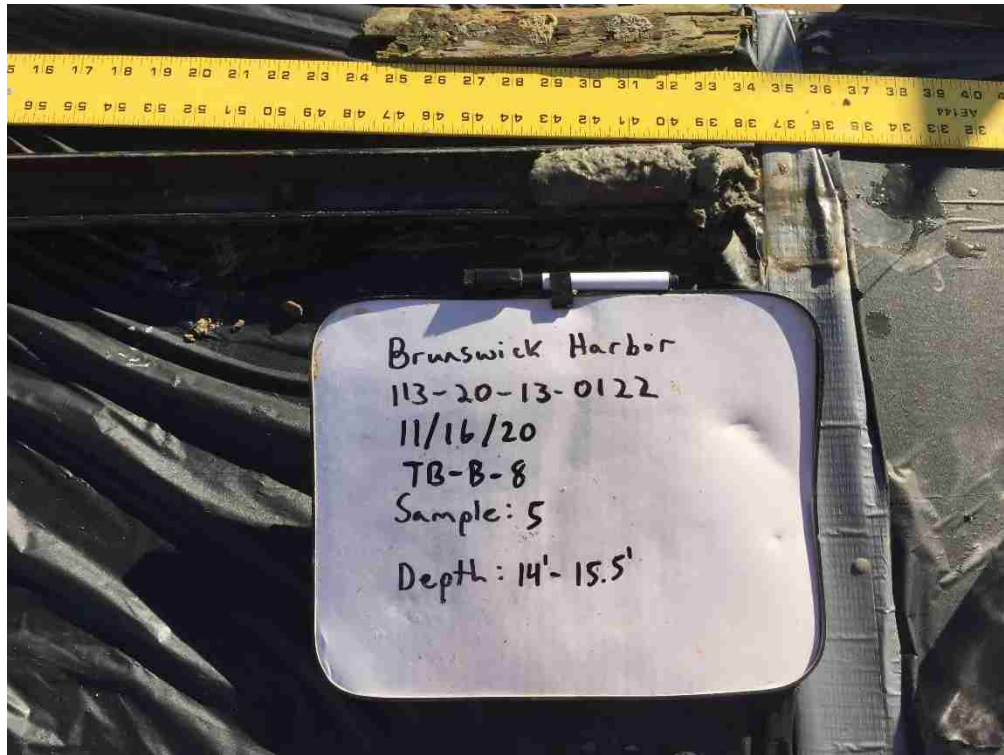
Depth: 9.5 – 11.0 feet; Approximate Elevation: -39.1 to -40.6 feet MLLW



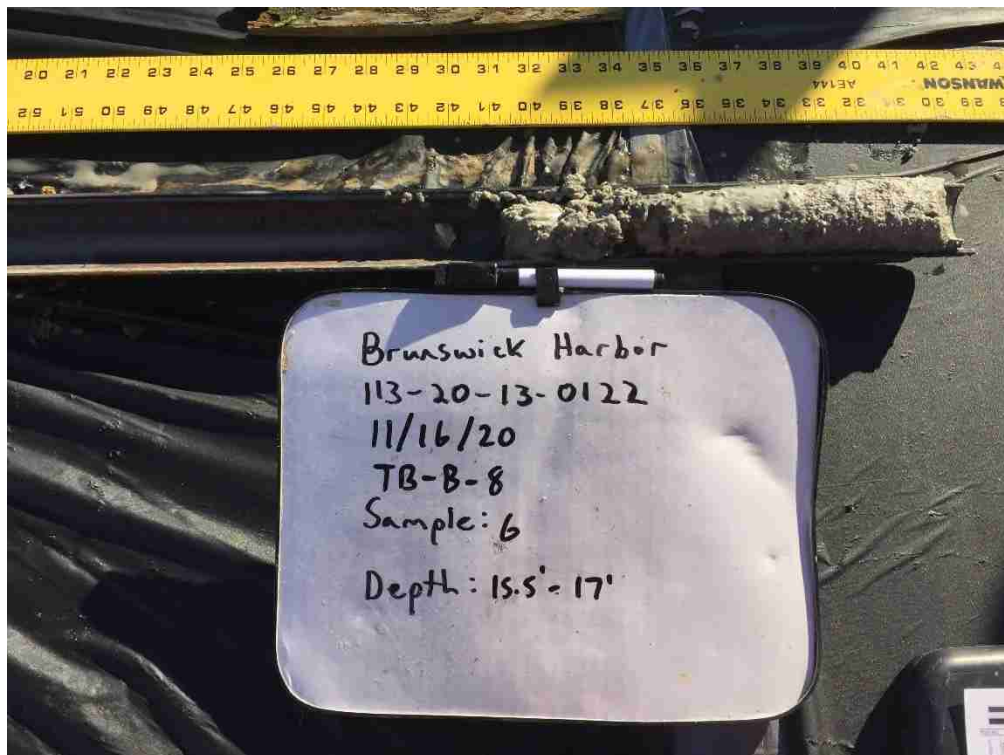
Depth: 11.0 – 12.5 feet; Approximate Elevation: -40.6 to -42.1 feet MLLW



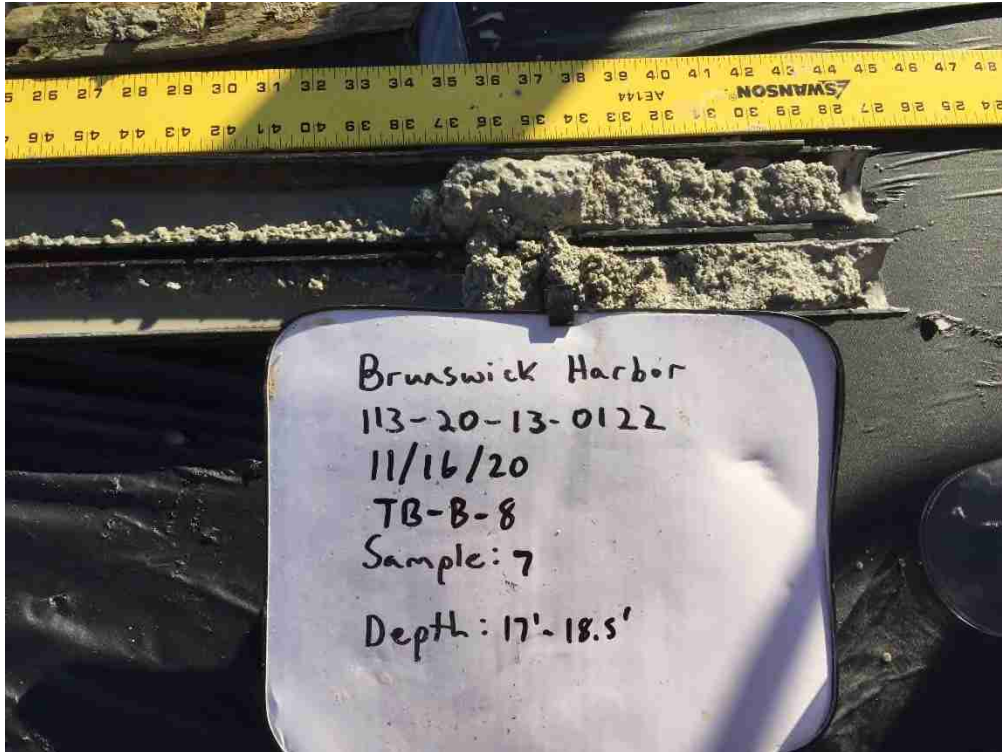
Depth: 12.5 – 14.0 feet; Approximate Elevation: -42.1 to -43.6 feet MLLW



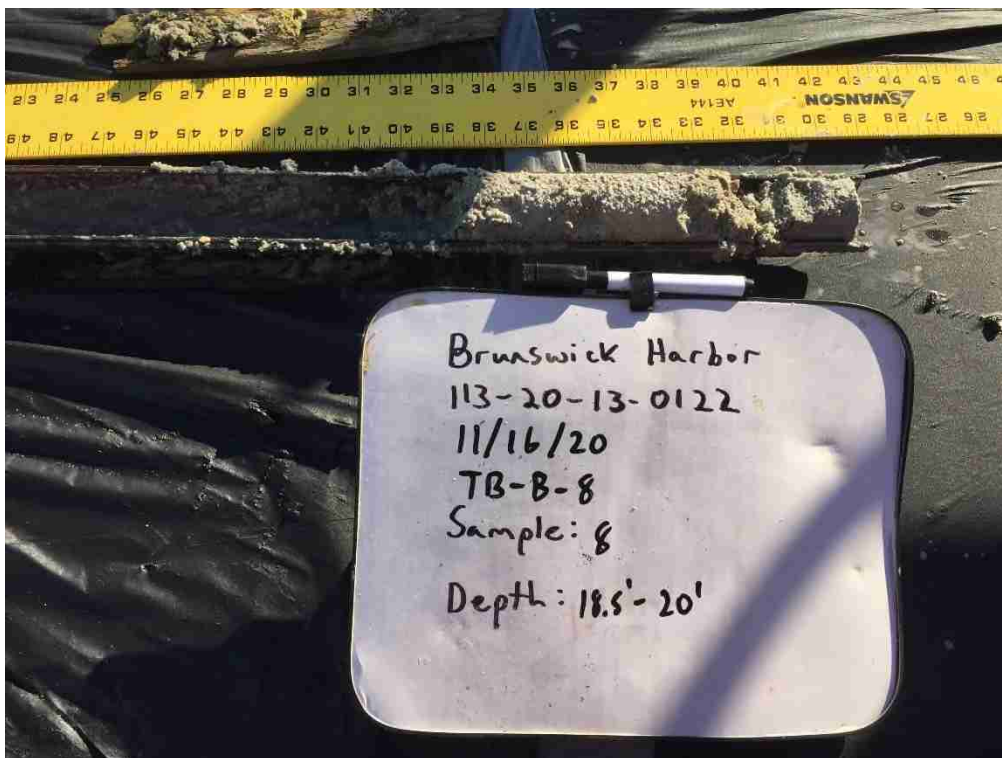
Depth: 14.0 – 15.5 feet; Approximate Elevation: -43.6 to -45.1 feet MLLW



Depth: 15.5 – 17.0 feet; Approximate Elevation: -45.1 to -46.6 feet MLLW



Depth: 17.0 – 18.5 feet; Approximate Elevation: -46.6 to -48.1 feet MLLW

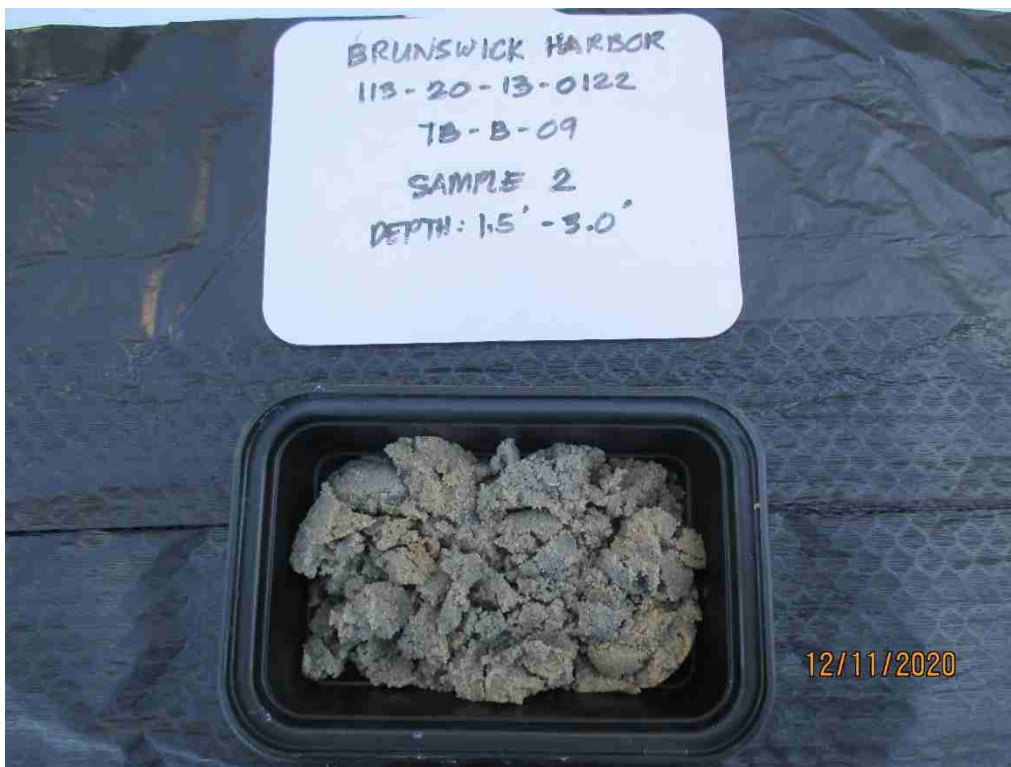


Depth: 18.5 – 20.0 feet; Approximate Elevation: -48.1 to -49.6 feet MLLW

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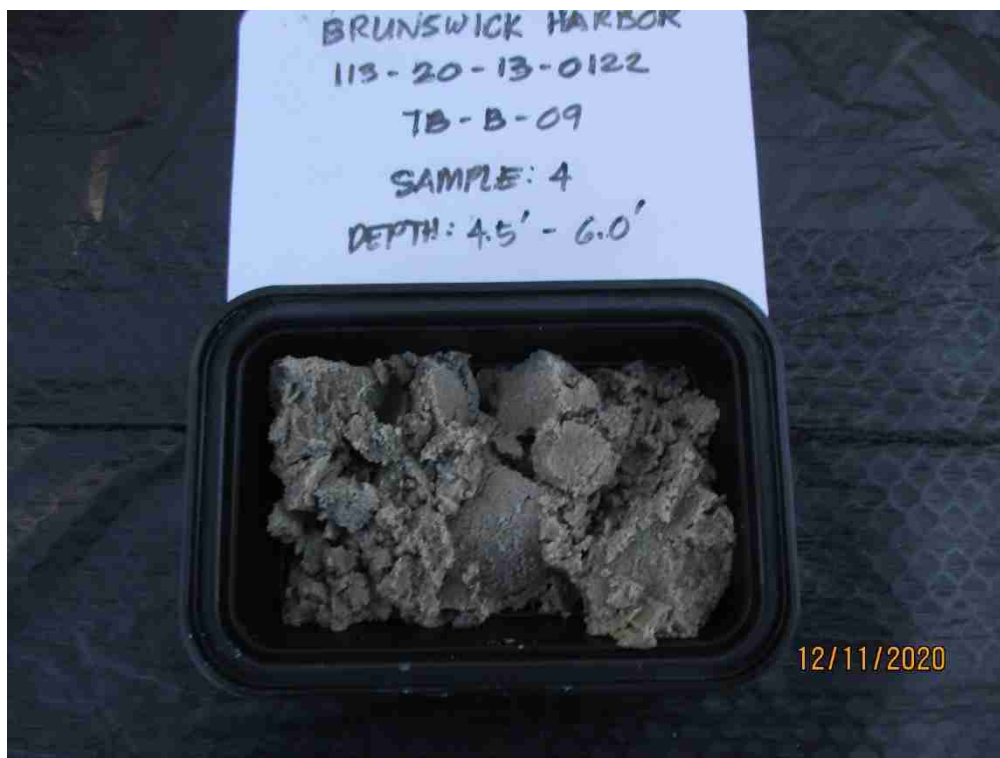
Depth: 0.0 – 1.5 feet; Approximate Elevation: -13.1 to -14.6 feet MLLW



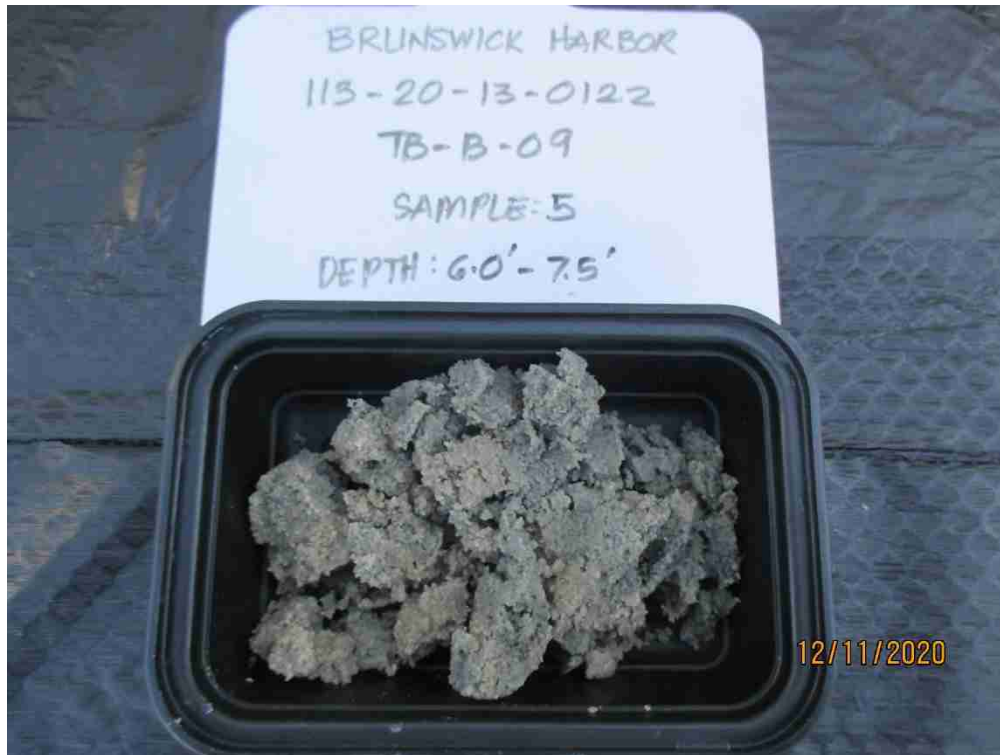
Depth: 1.5 – 3.0 feet; Approximate Elevation: -14.6 to -16.1 feet MLLW



Depth: 3.0 – 4.5 feet; Approximate Elevation: -16.1 to -17.6 feet MLLW



Depth: 4.5 – 6.0 feet; Approximate Elevation: -17.6 to -19.1 feet MLLW



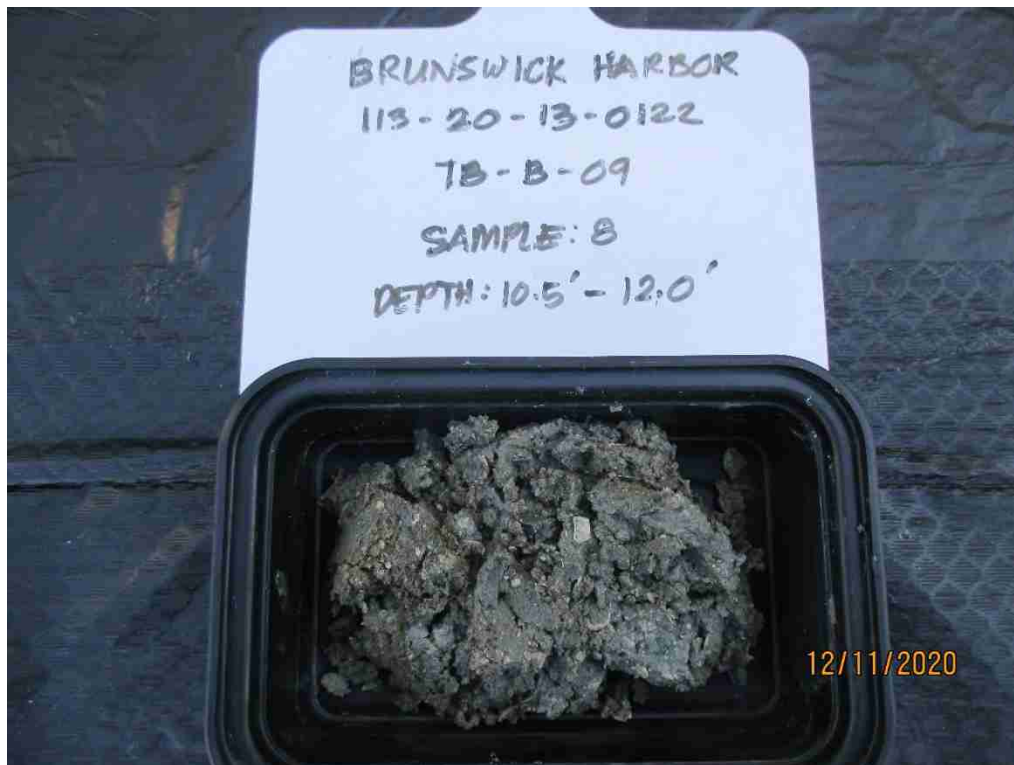
Depth: 6.0 – 7.5 feet; Approximate Elevation: -19.1 to -20.6 feet MLLW



Depth: 7.5 – 9.0 feet; Approximate Elevation: -20.6 to -22.1 feet MLLW



Depth: 9.0 – 10.5 feet; Approximate Elevation: -22.1 to -23.6 feet MLLW



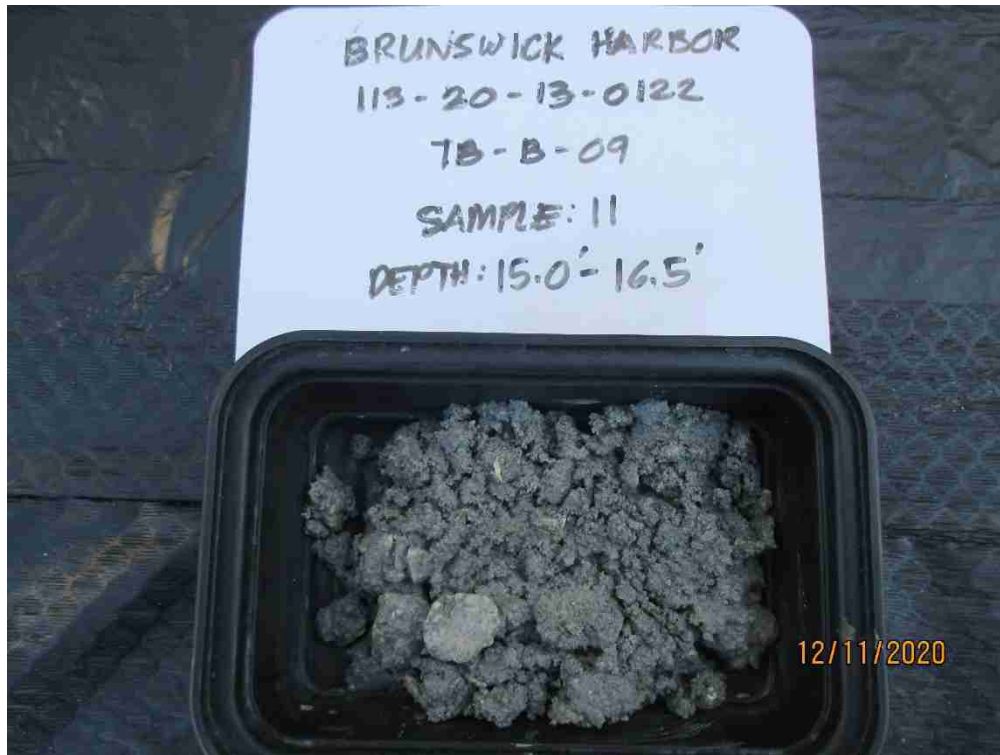
Depth: 10.5 – 12.0 feet; Approximate Elevation: -23.6 to -25.1 feet MLLW



Depth: 12.0 – 13.5 feet; Approximate Elevation: -25.1 to -26.6 feet MLLW



Depth: 13.5 – 15.0 feet; Approximate Elevation: -26.6 to -28.1 feet MLLW



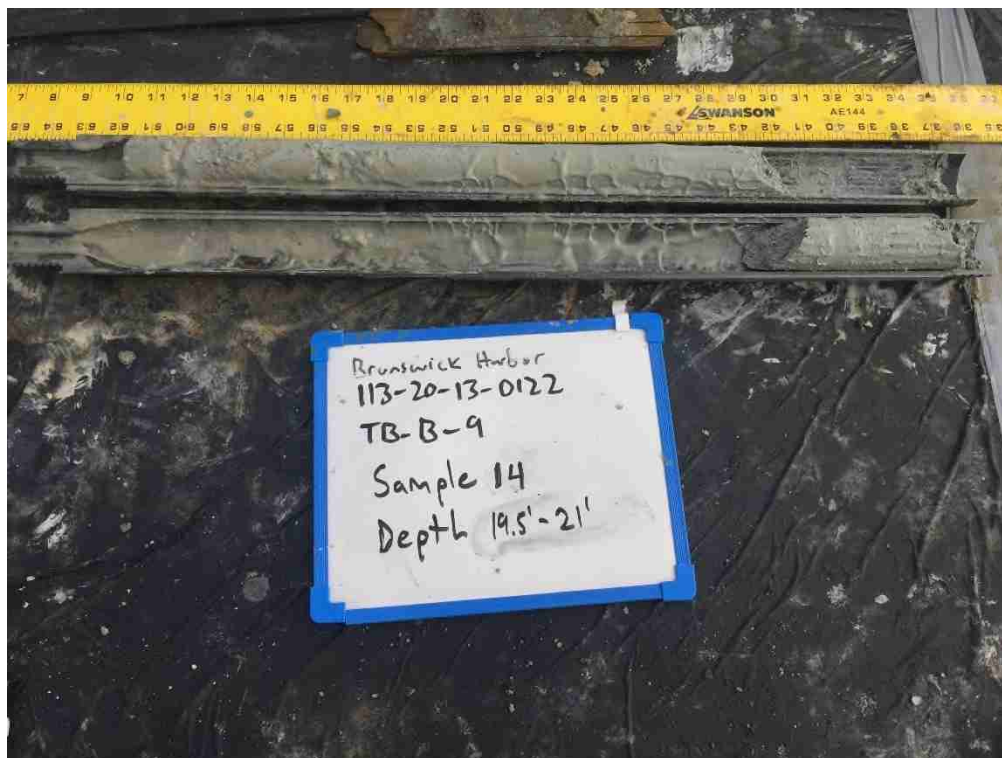
Depth: 15.0 – 16.5 feet; Approximate Elevation: -28.1 to -29.6 feet MLLW



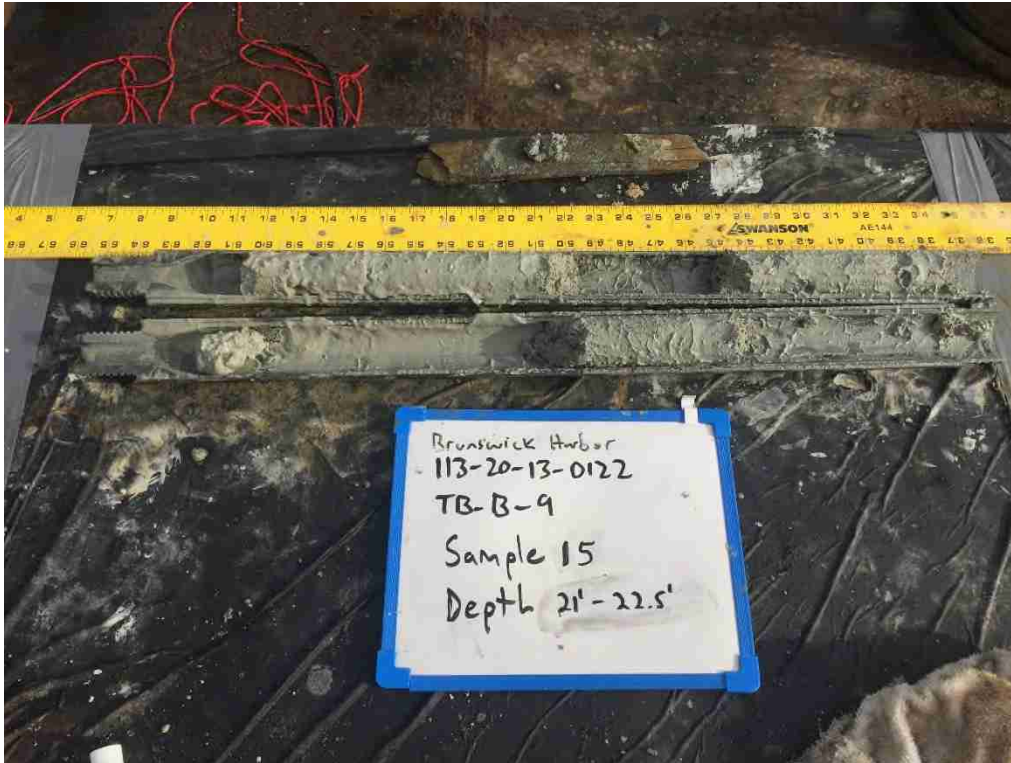
Depth: 16.5 – 18.0 feet; Approximate Elevation: -29.6 to -31.1 feet MLLW



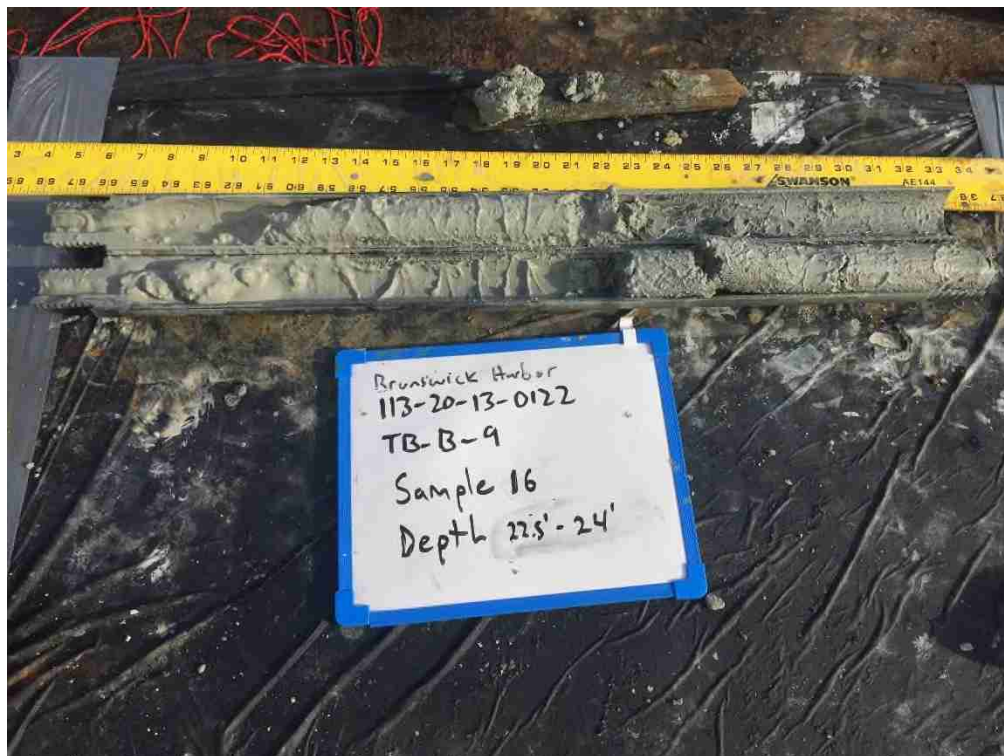
Depth: 18.0 – 19.5 feet; Approximate Elevation: -31.1 to -32.6 feet MLLW



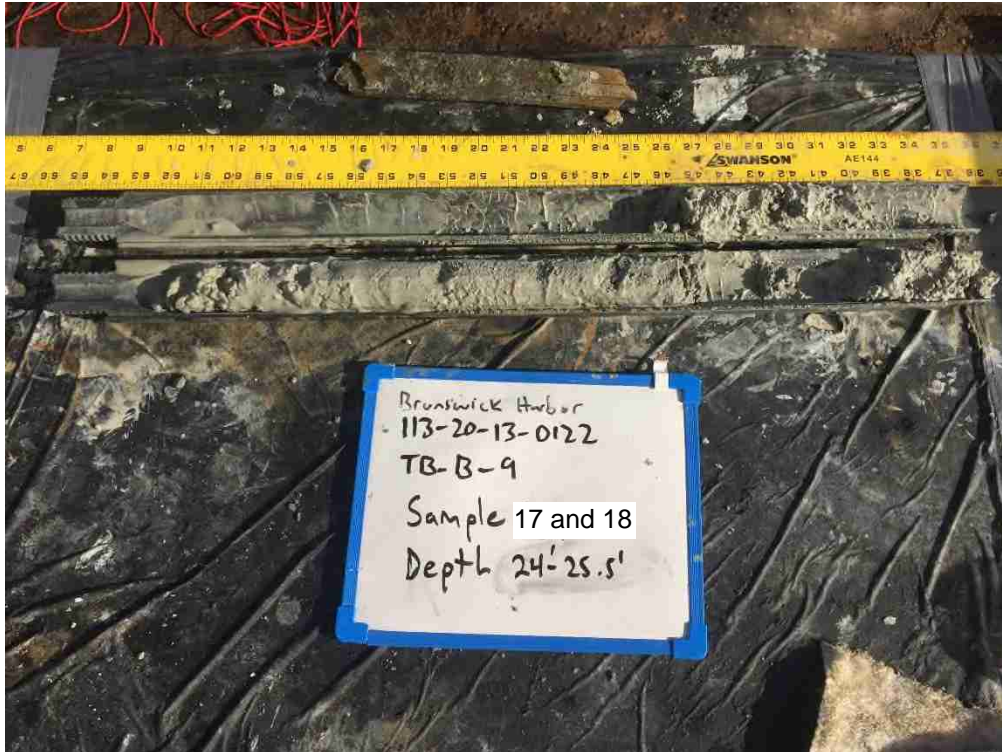
Depth: 19.5 – 21.0 feet; Approximate Elevation: -32.6 to -34.1 feet MLLW



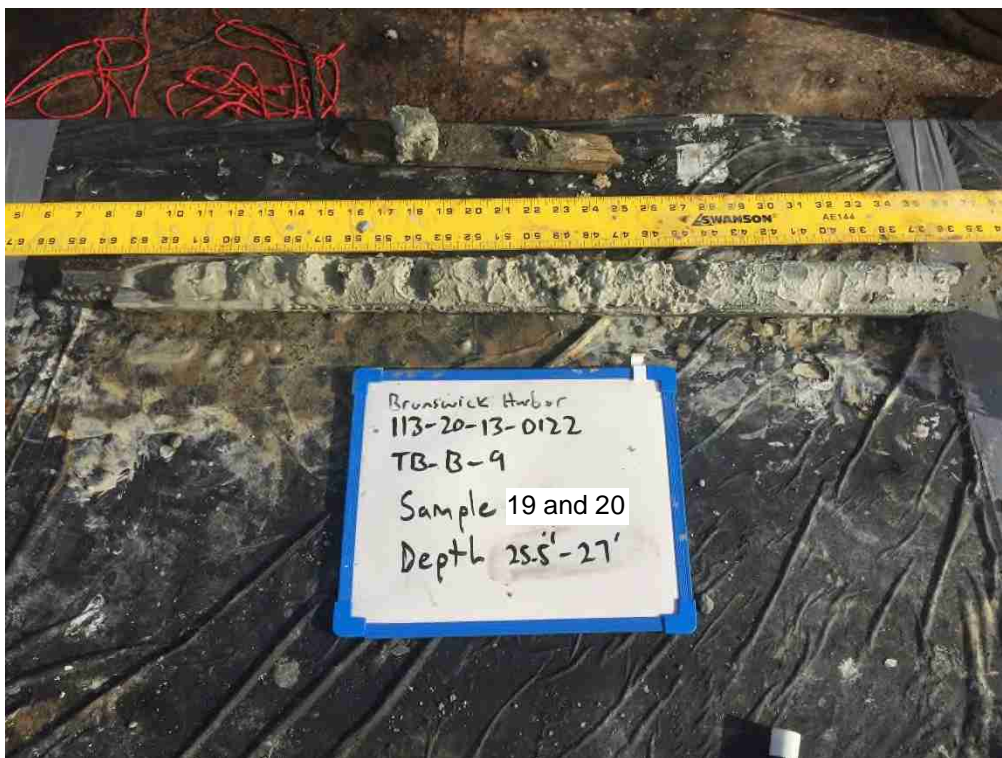
Depth: 21.0 – 22.5 feet; Approximate Elevation: -34.1 to -35.6 feet MLLW



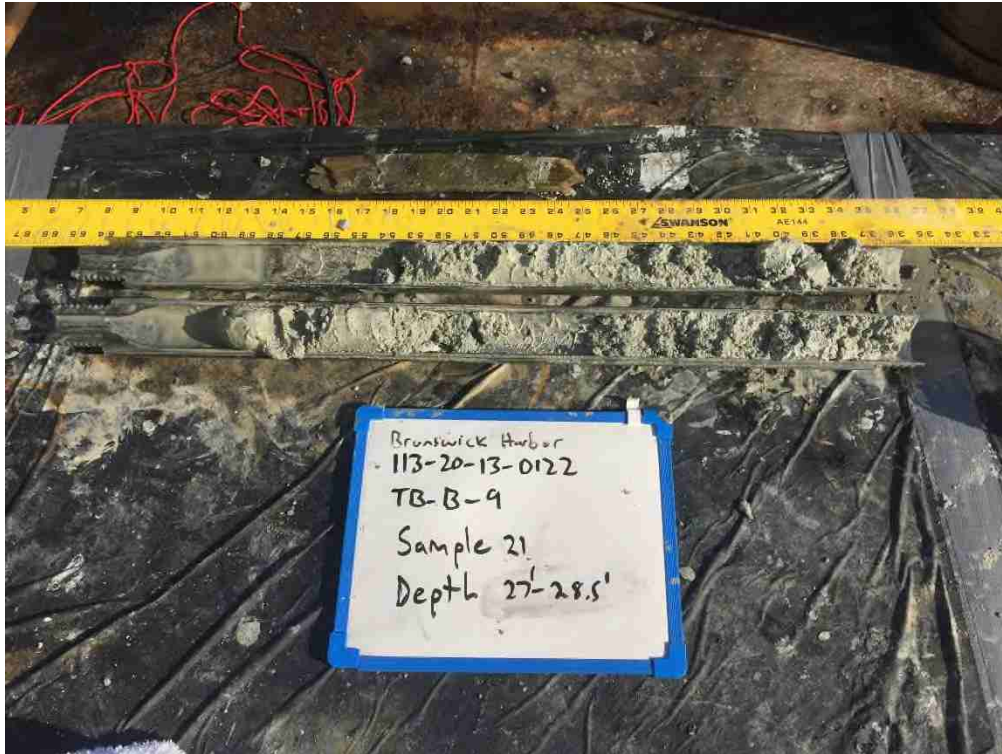
Depth: 22.5 – 24.0 feet; Approximate Elevation: -35.6 to -37.1 feet MLLW



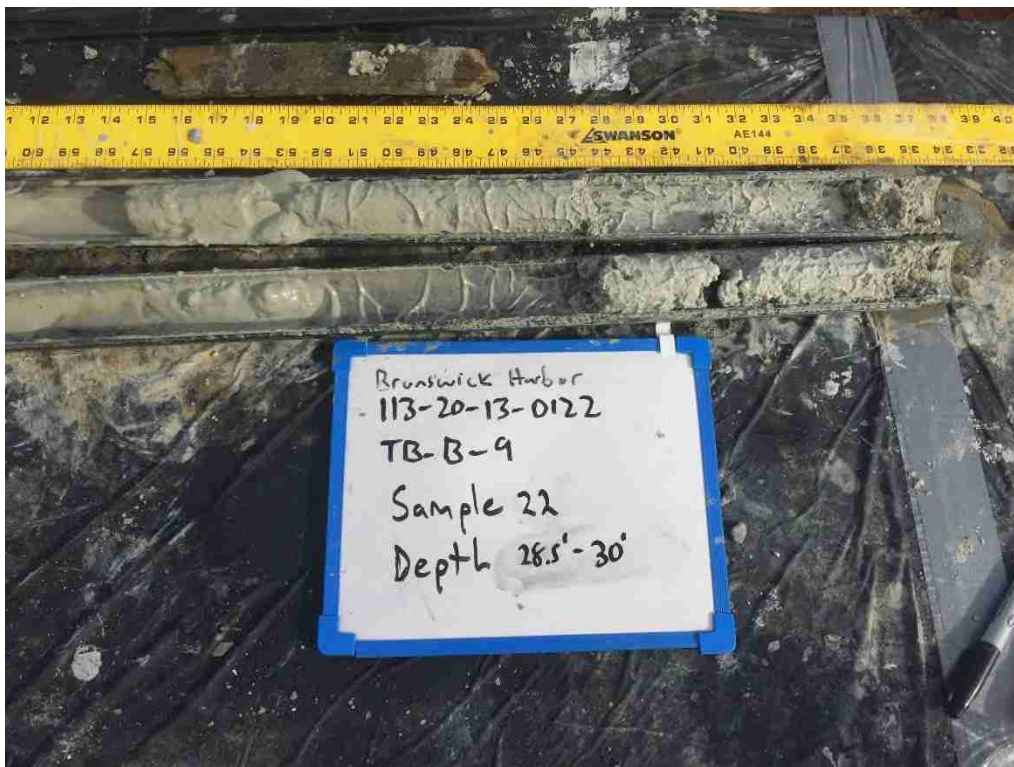
Depth: 24.0 – 25.5 feet; Approximate Elevation: -37.1 to -38.6 feet MLLW



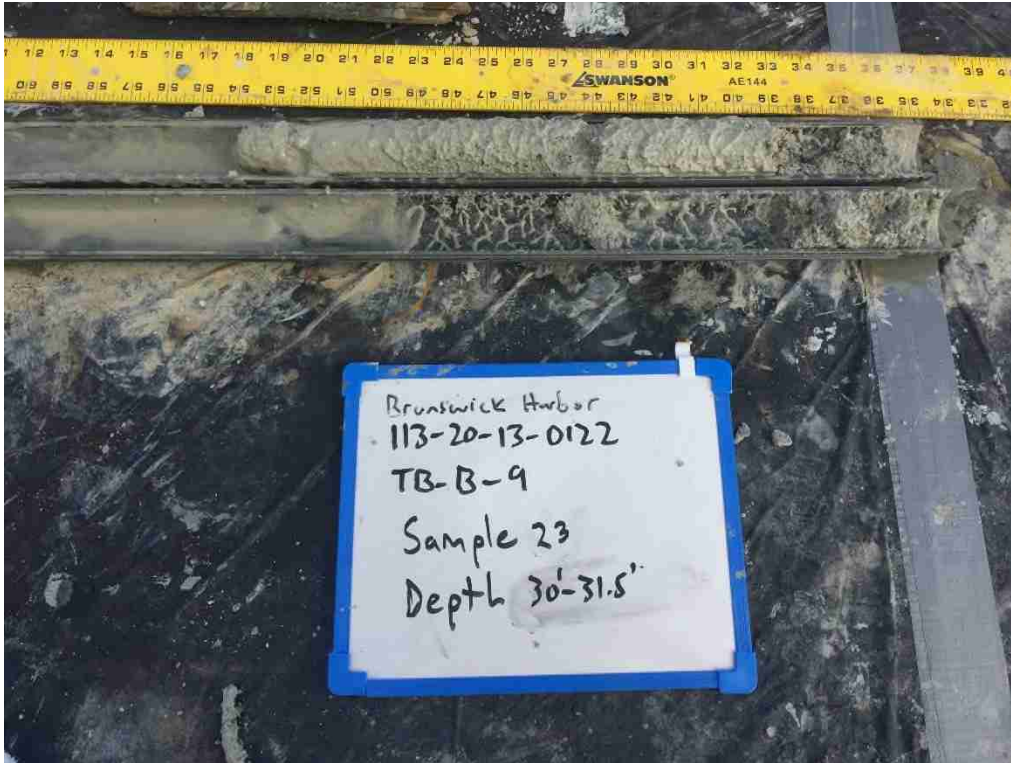
Depth: 25.5 – 27.0 feet; Approximate Elevation: -38.6 to -40.1 feet MLLW



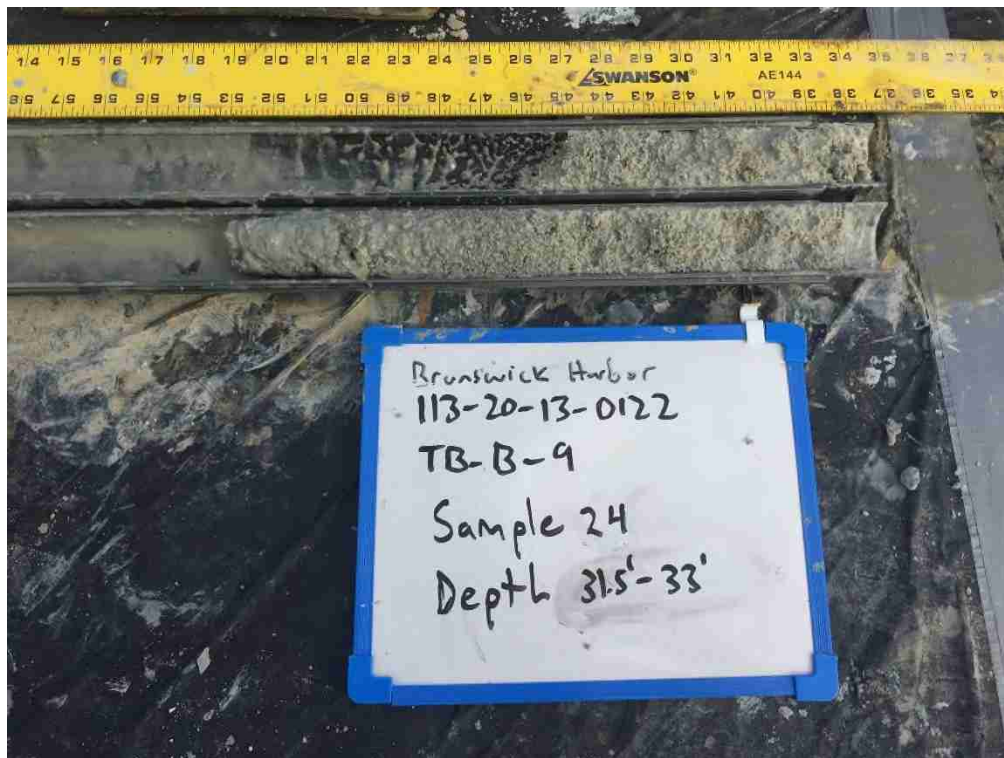
Depth: 27.0 – 28.5 feet; Approximate Elevation: -40.1 to -41.6 feet MLLW



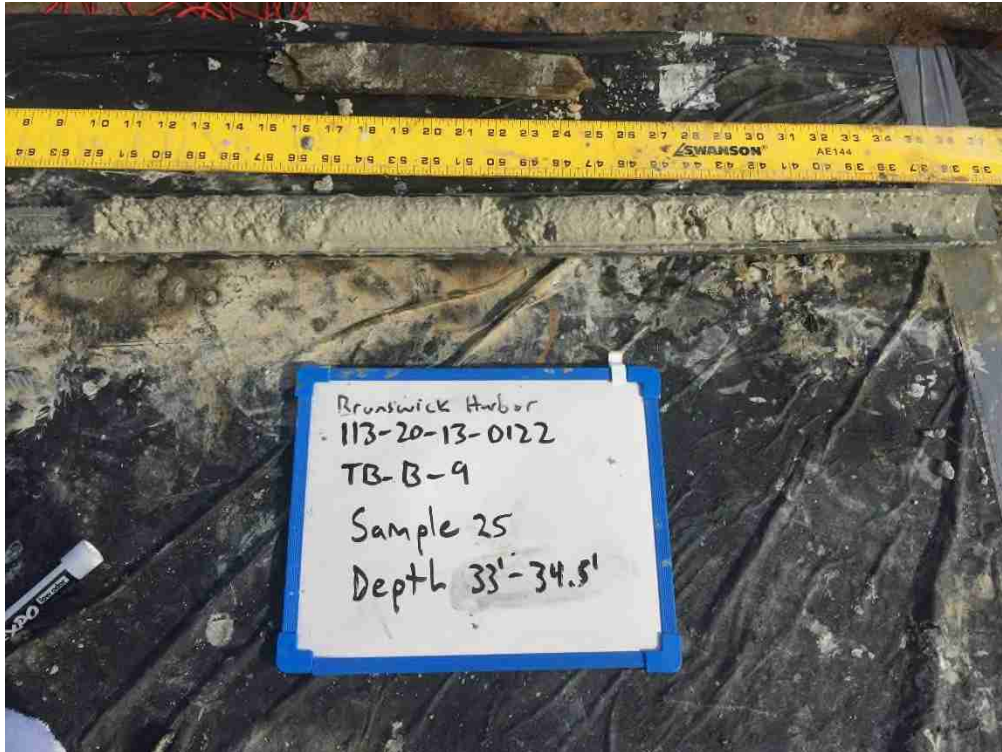
Depth: 28.5 – 30.0 feet; Approximate Elevation: -41.6 to -43.1 feet MLLW



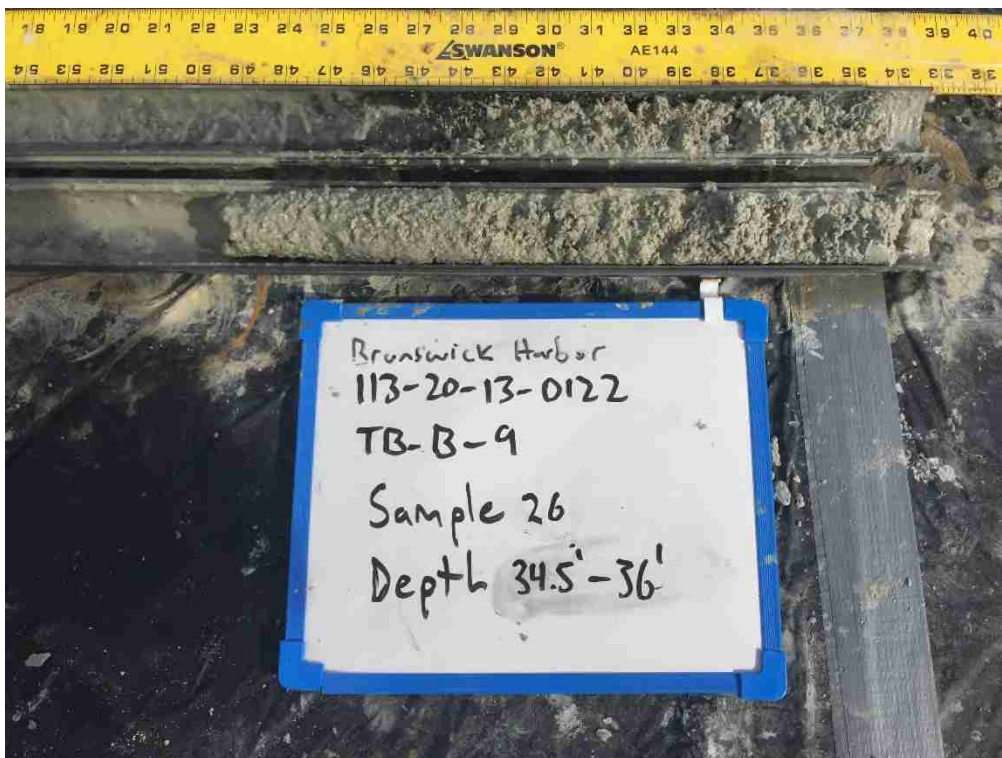
Depth: 30.0 – 31.5 feet; Approximate Elevation: -43.1 to -44.6 feet MLLW



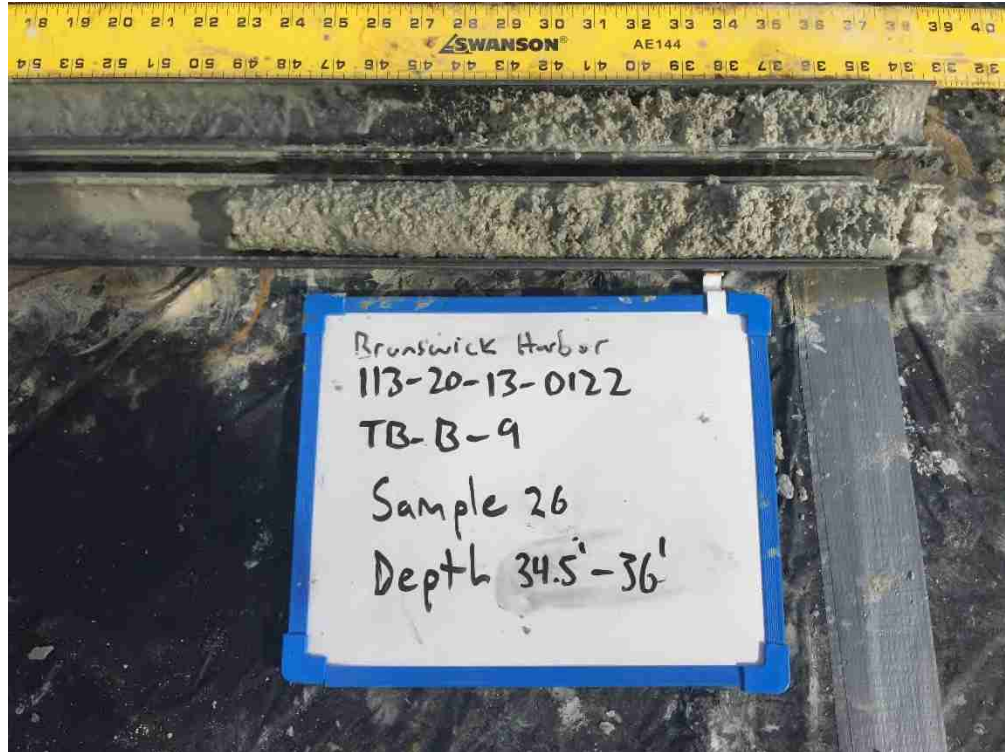
Depth: 31.5 – 33.0 feet; Approximate Elevation: -44.6 to -46.1 feet MLLW



Depth: 33.0 – 34.5 feet; Approximate Elevation: -46.1 to -47.6 feet MLLW

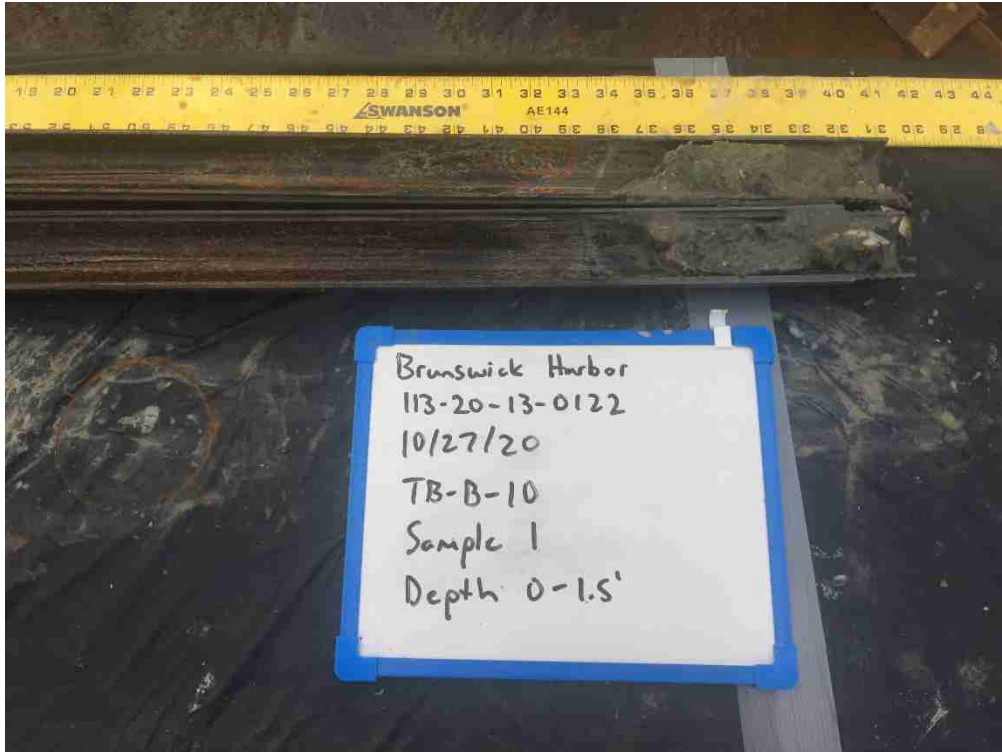


Depth: 34.5 – 36.0 feet; Approximate Elevation: -47.6 to -49.1 feet MLLW

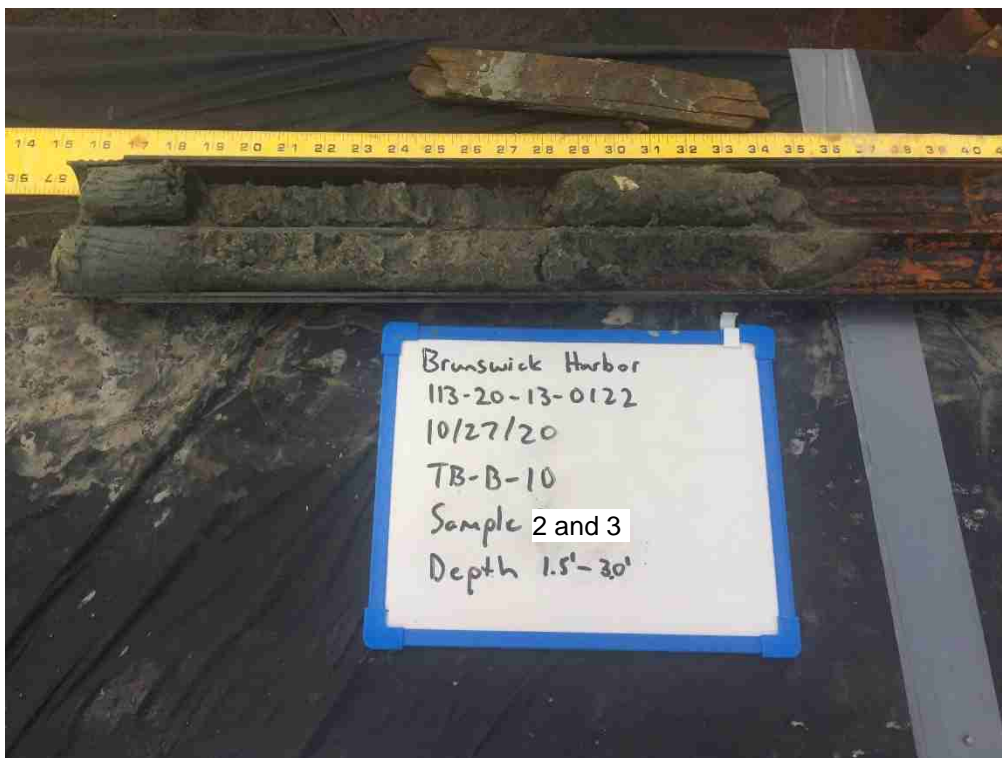


Depth: 34.5 – 36.0 feet; Approximate Elevation: -47.6 to -49.1 feet MLLW

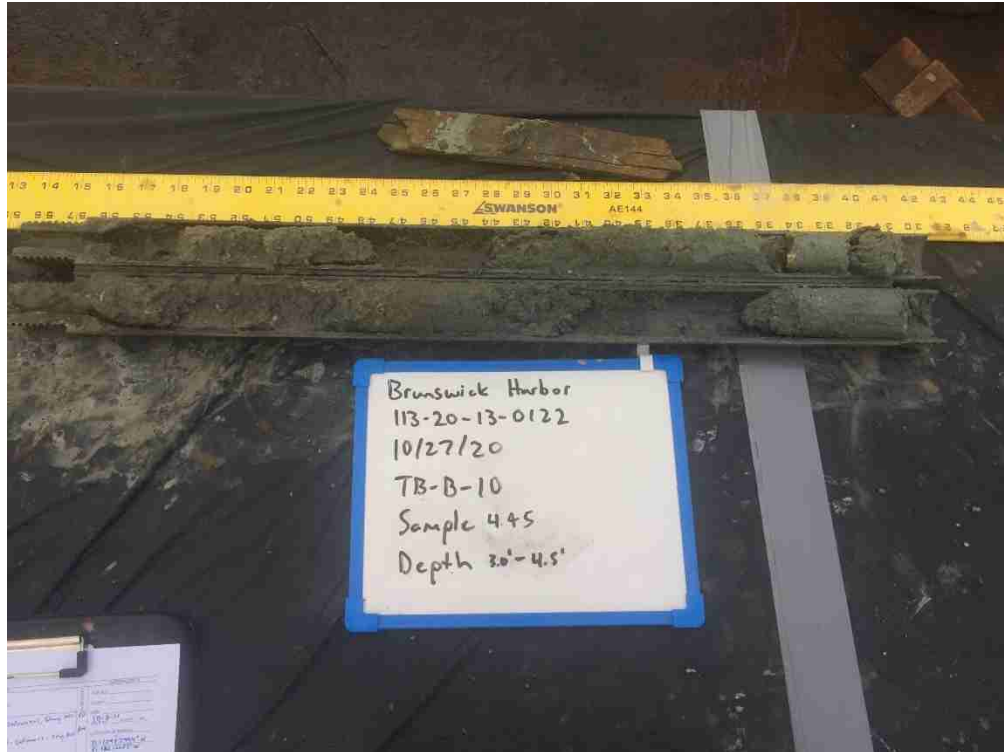
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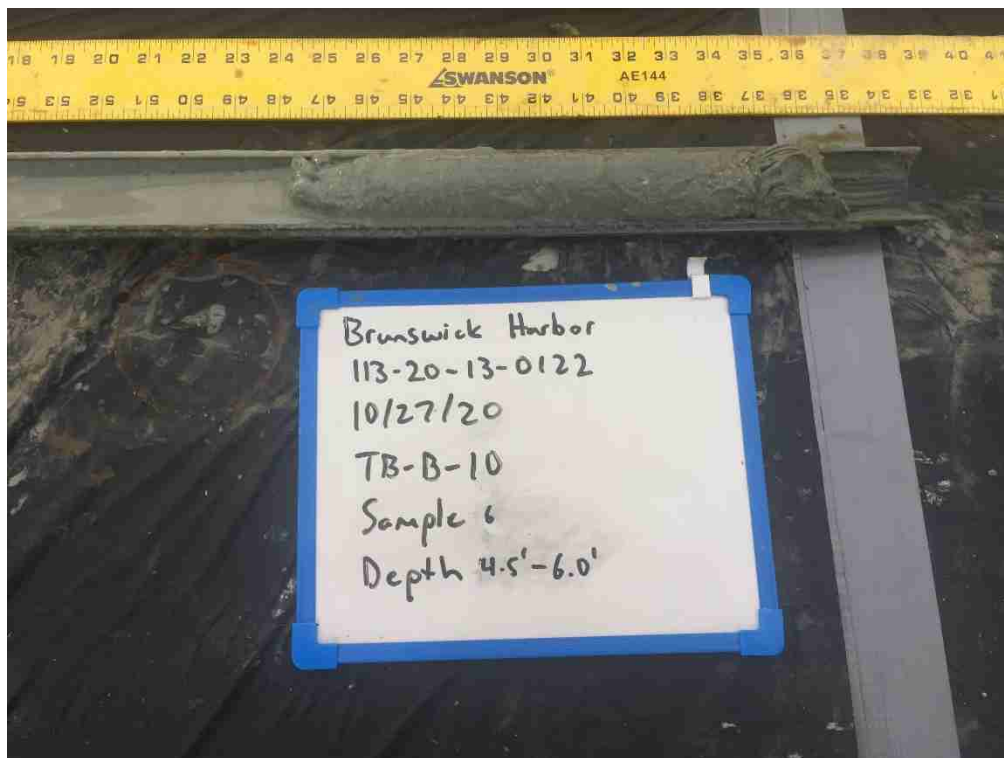
Depth: 0 – 1.5 feet; Approximate Elevation: -18.5 to -20.0 feet MLLW



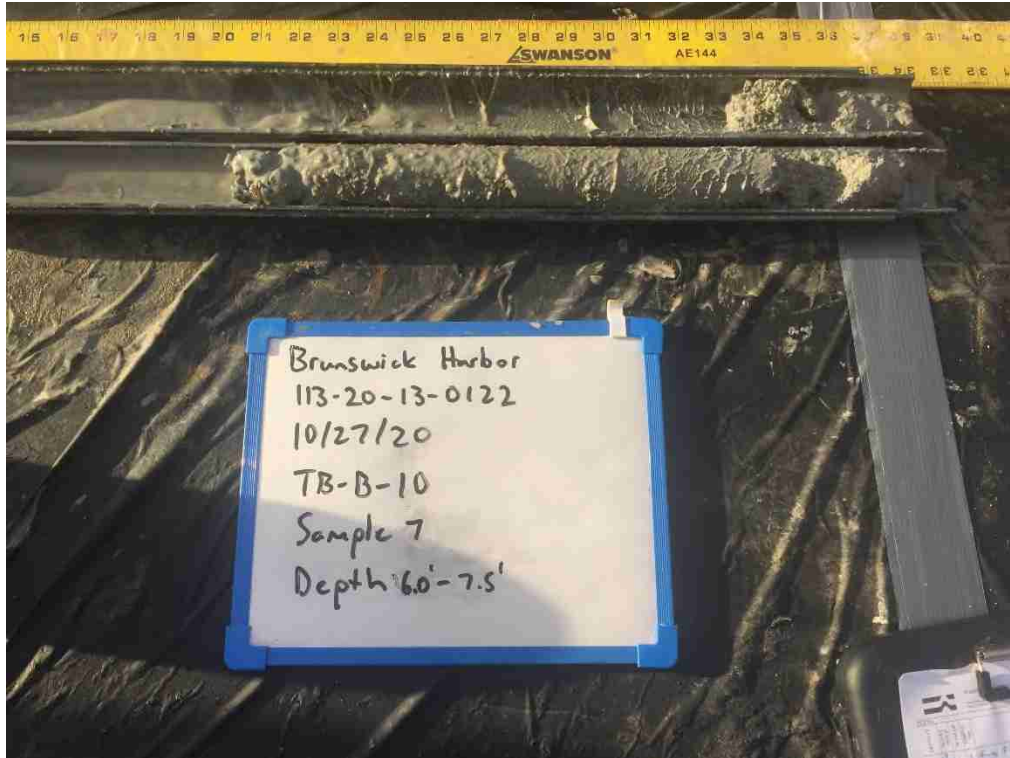
Depth: 1.5 – 3.0 feet; Approximate Elevation: -20.0 to -21.5 feet MLLW



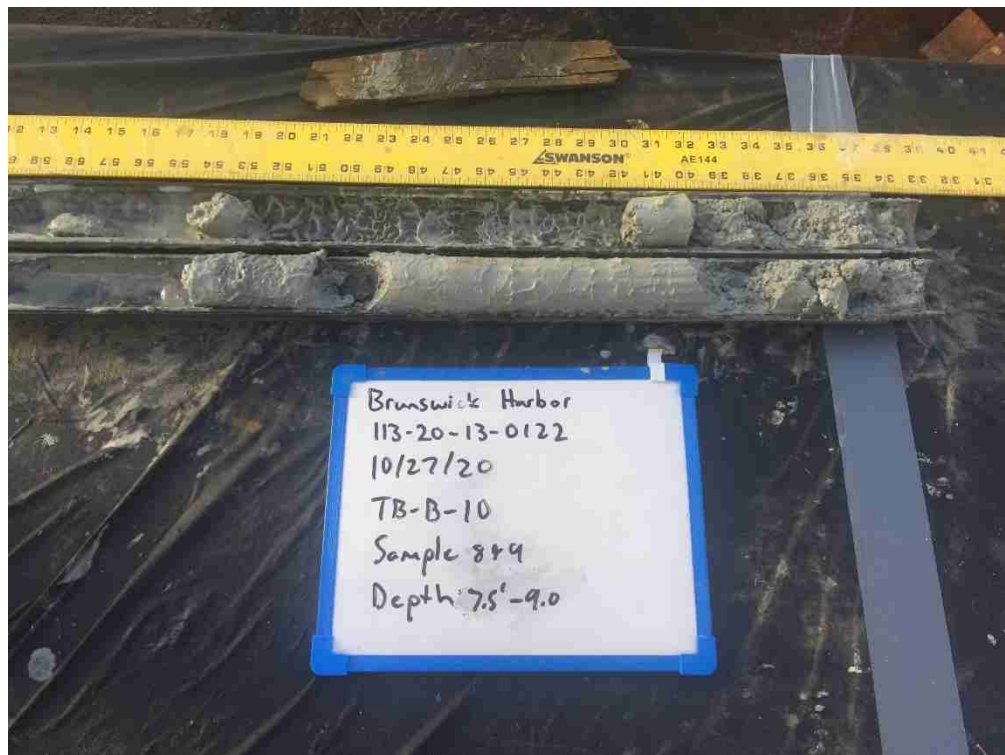
Depth: 3.0 – 4.5 feet; Approximate Elevation: -21.5 to -23.0 feet MLLW



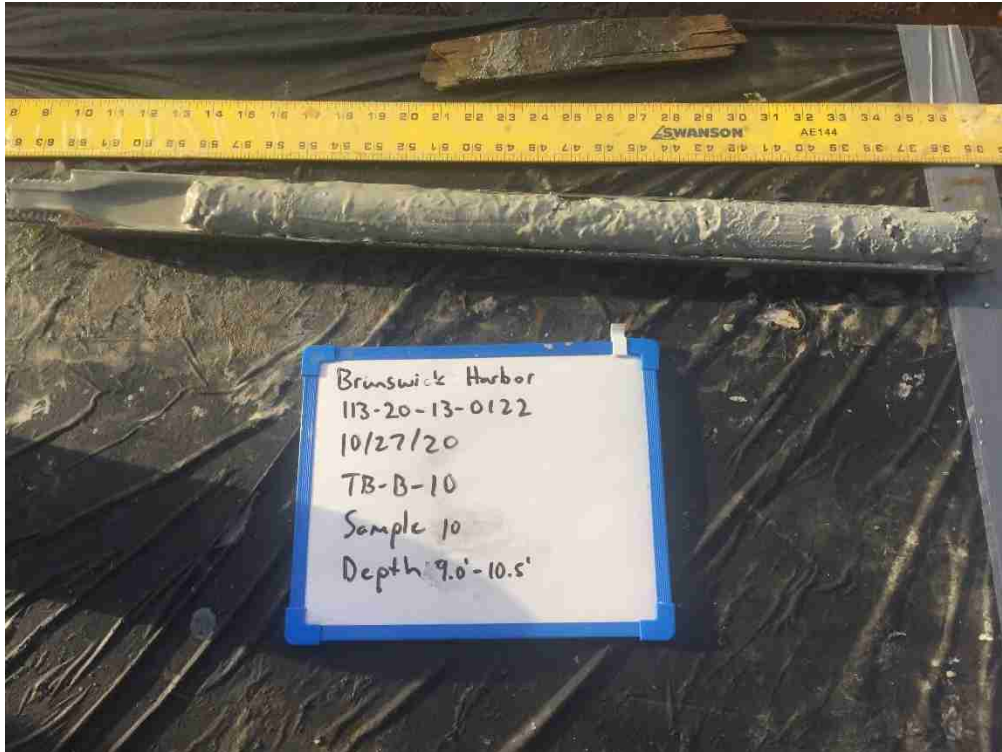
Depth: 4.5 – 6.0 feet; Approximate Elevation: -23.0 to -24.5 feet MLLW



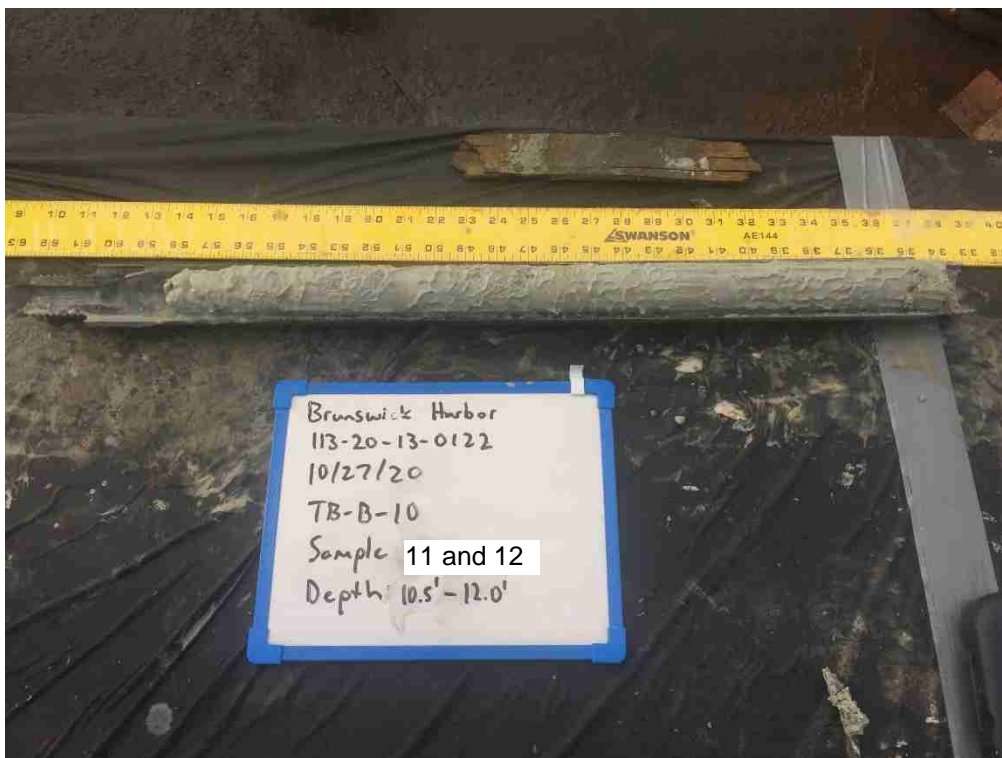
Depth: 6.0 – 7.5 feet; Approximate Elevation: -24.5 to -26.0 feet MLLW



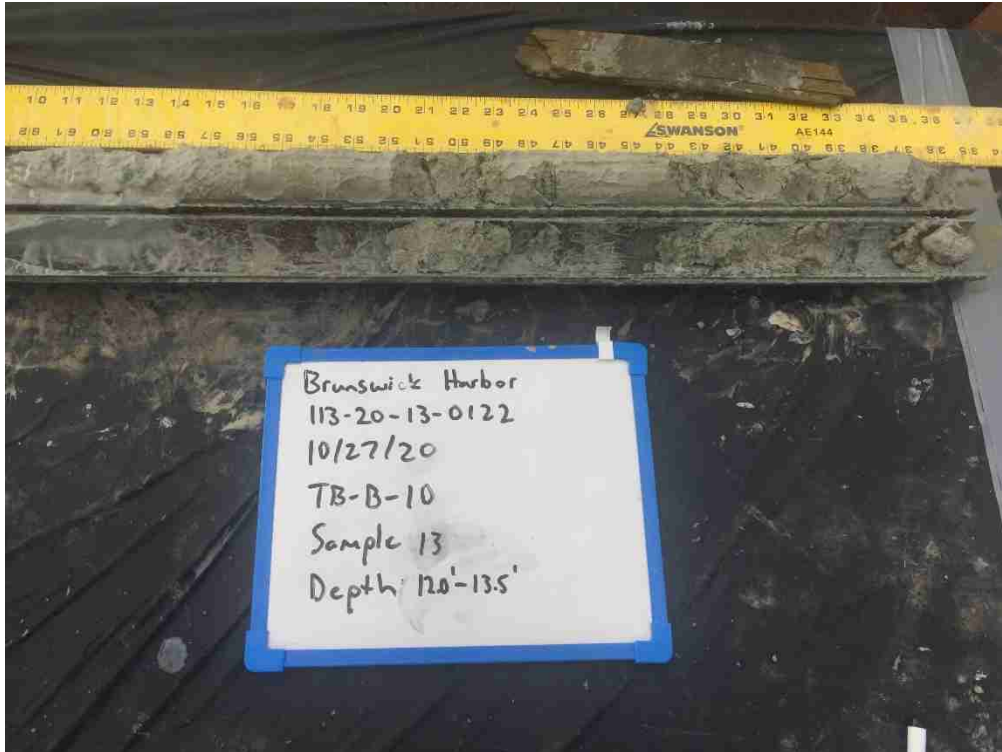
Depth: 7.5 – 9.0 feet; Approximate Elevation: -26.0 to -27.5 feet MLLW



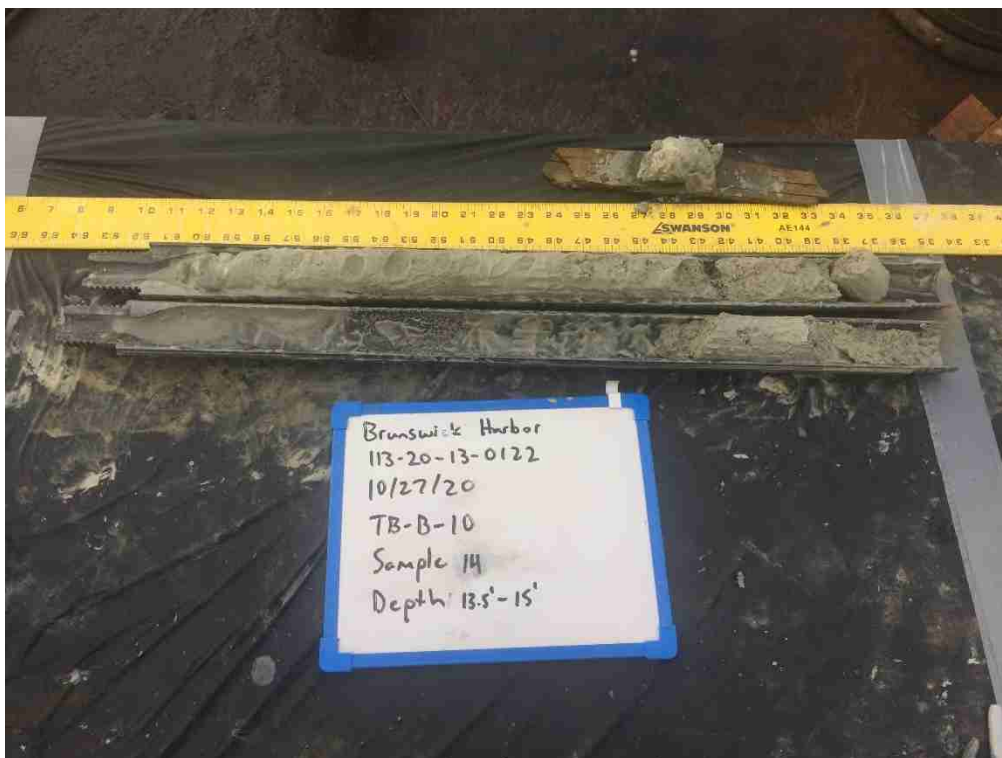
Depth: 9.0 – 10.5 feet; Approximate Elevation: -27.5 to -29.0 feet MLLW



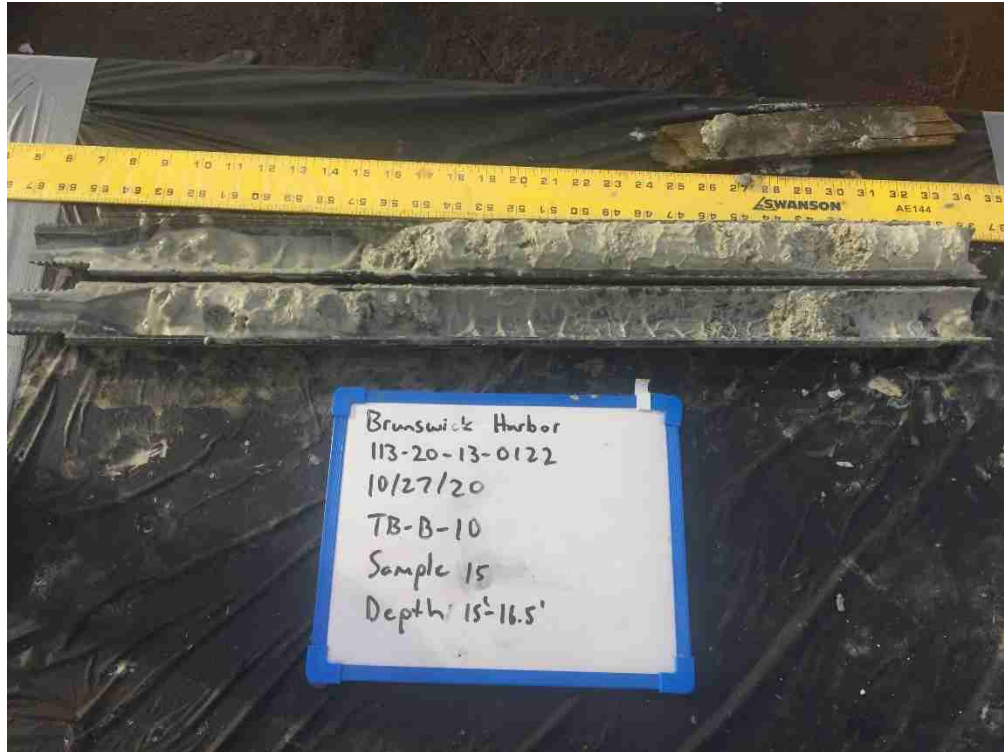
Depth: 10.5 – 12.0 feet; Approximate Elevation: -29.0 to -30.5 feet MLLW



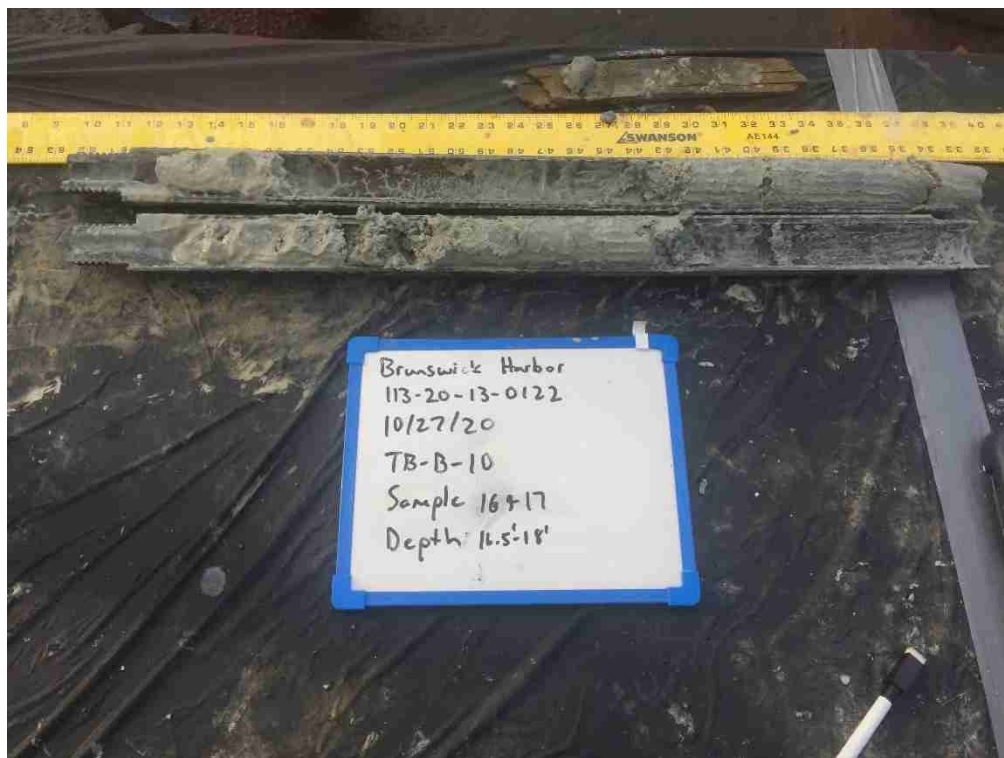
Depth: 12.0 – 13.5 feet; Approximate Elevation: -30.5 to -32.0 feet MLLW



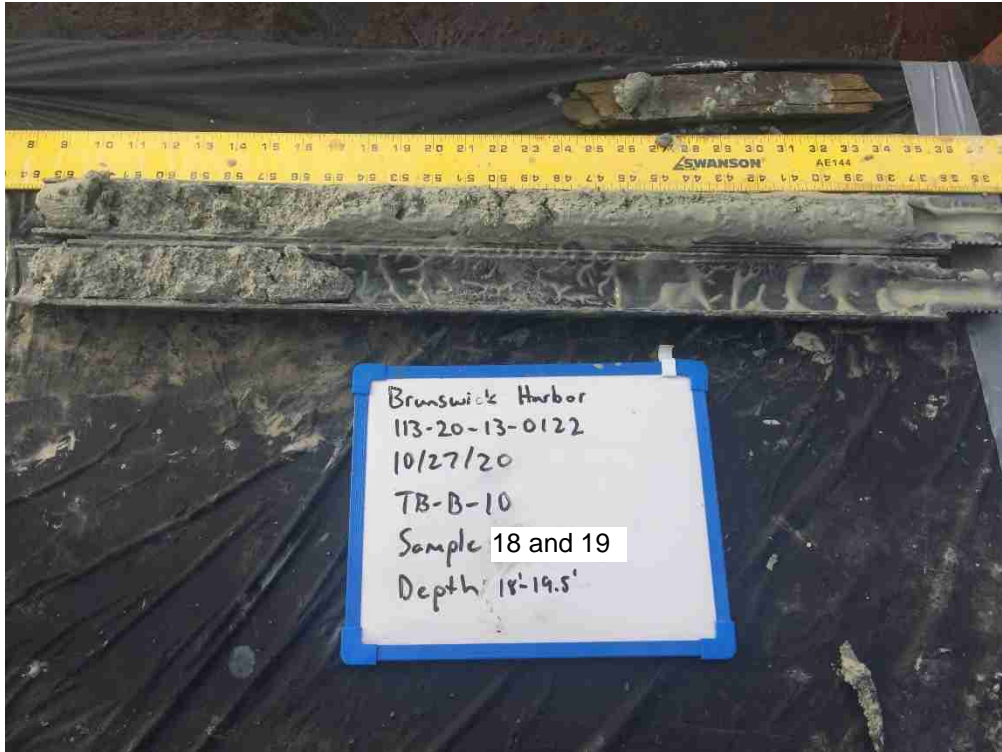
Depth: 13.5 – 15.0 feet; Approximate Elevation: -32.0 to -33.5 feet MLLW



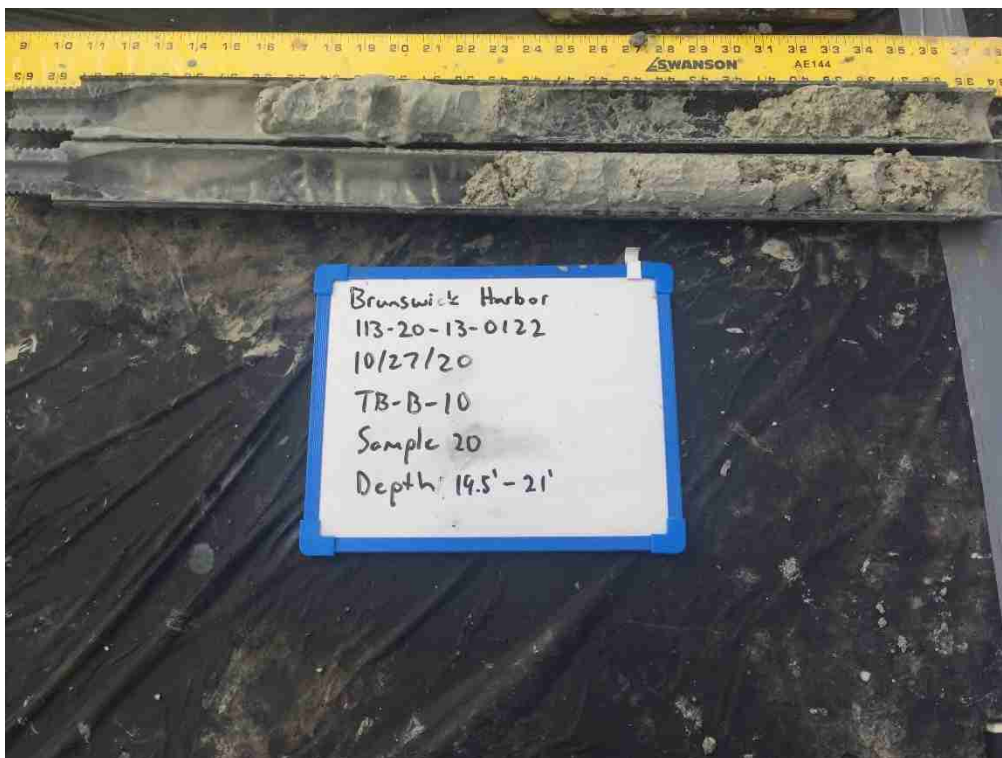
Depth: 15.0 – 16.5 feet; Approximate Elevation: -33.5 to -35.0 feet MLLW



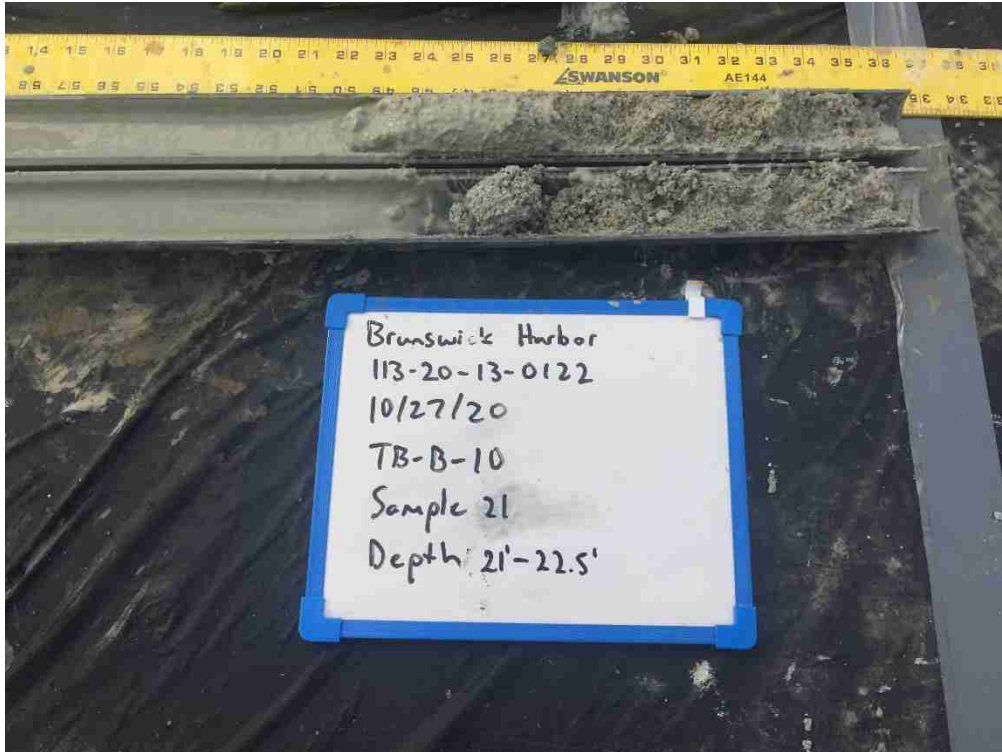
Depth: 16.5 – 18.0 feet; Approximate Elevation: -35.0 to -36.5 feet MLLW



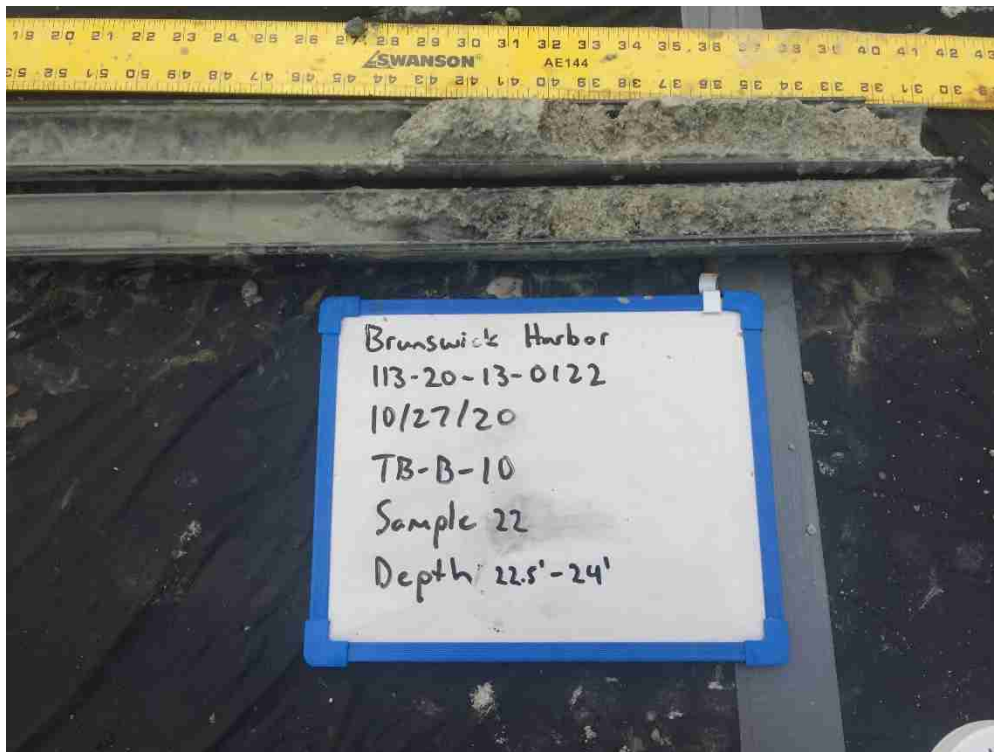
Depth: 18.0 – 19.5 feet; Approximate Elevation: -36.5 to -38.0 feet MLLW



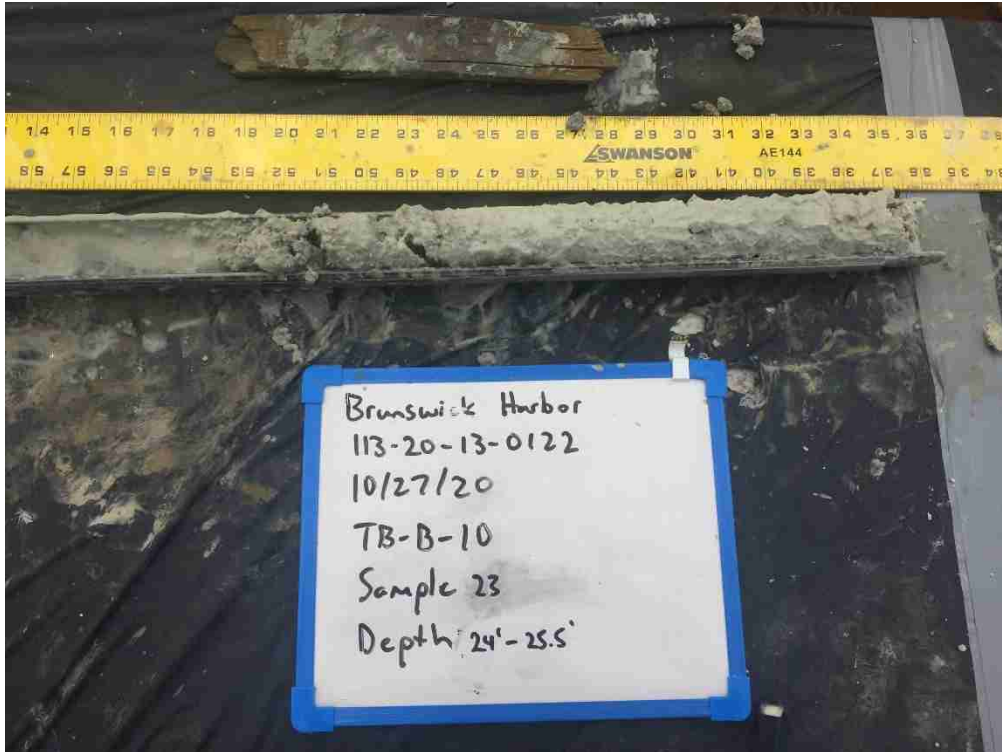
Depth: 19.5 – 21.0 feet; Approximate Elevation: -38.0 to -39.5 feet MLLW



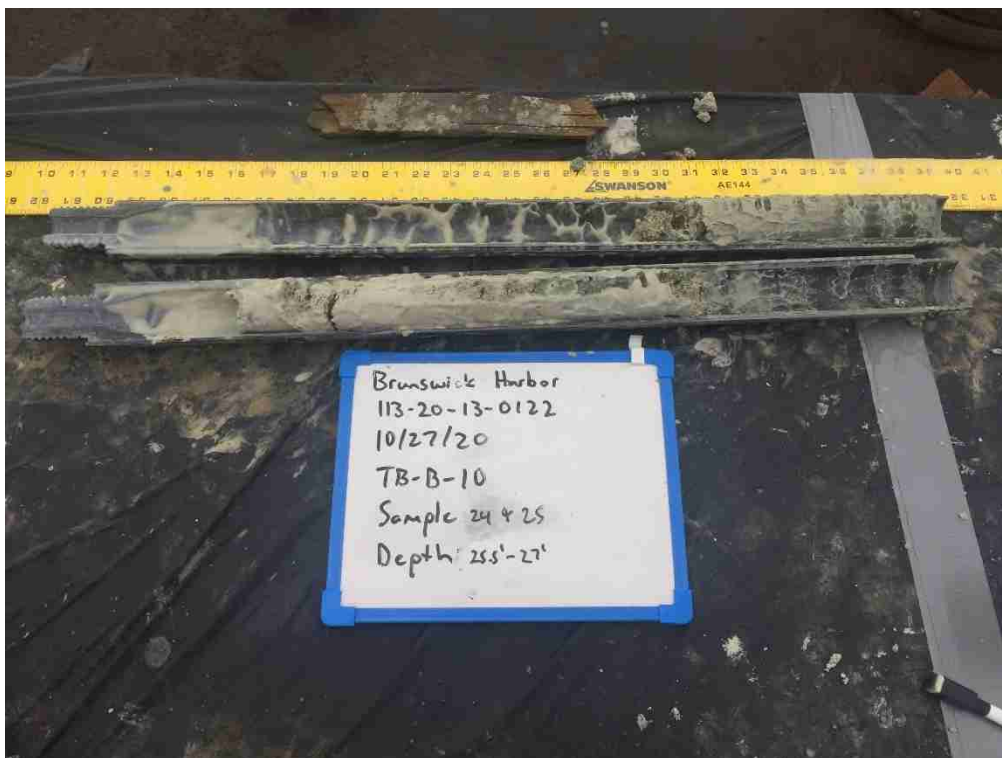
Depth: 21.0 – 22.5 feet; Approximate Elevation: -39.5 to -41.0 feet MLLW



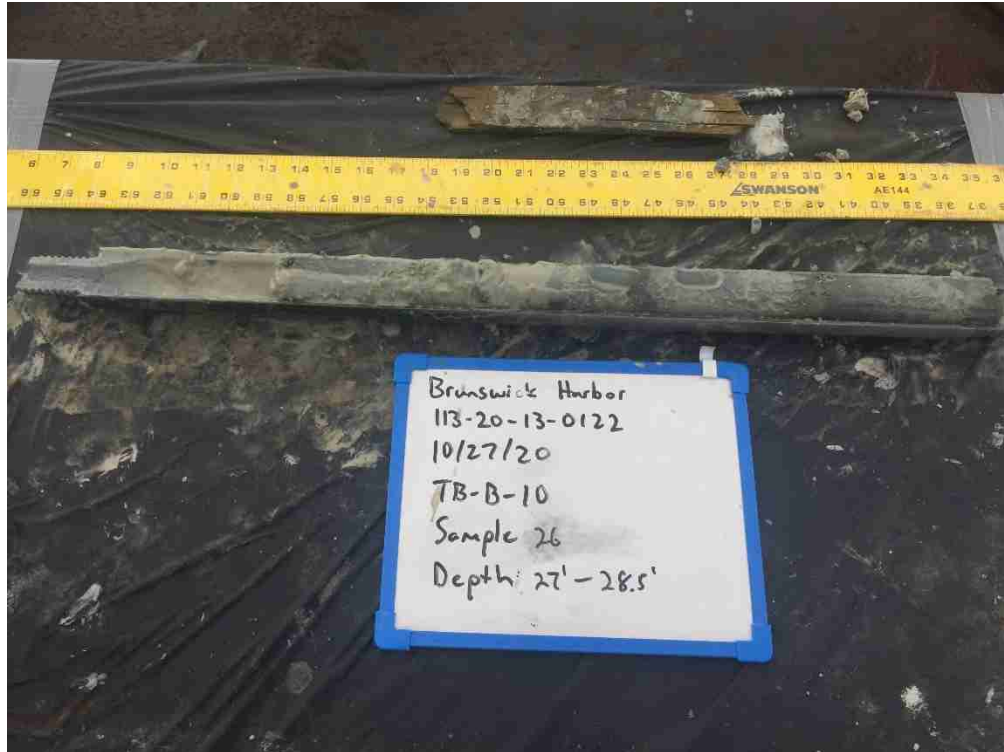
Depth: 22.5 – 24.0 feet; Approximate Elevation: -41.0 to -42.5 feet MLLW



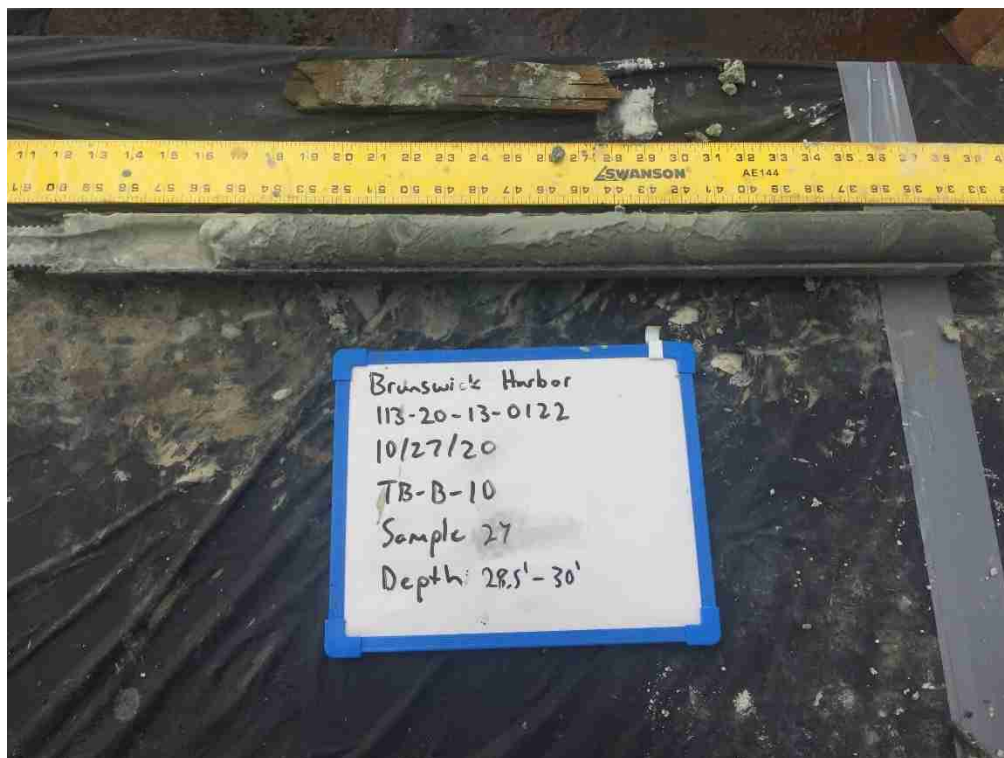
Depth: 24.0 – 25.5 feet; Approximate Elevation: -42.5 to -44.0 feet MLLW



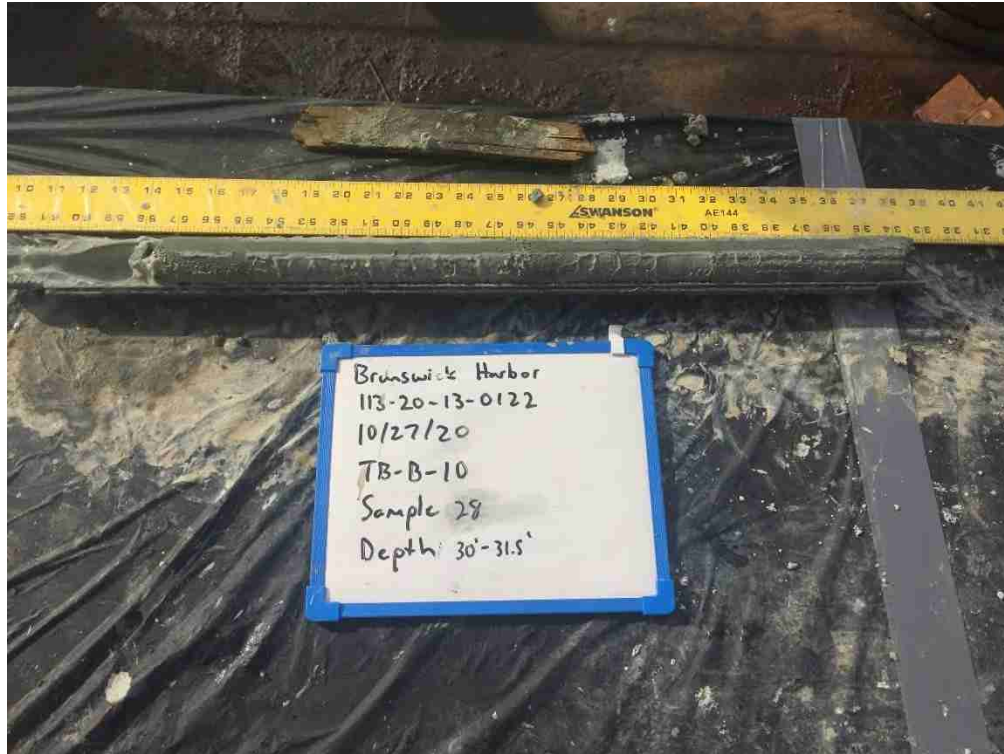
Depth: 25.5 – 27.0 feet; Approximate Elevation: -44.0 to -45.5 feet MLLW



Depth: 27.0 – 28.5 feet; Approximate Elevation: -45.5 to -47.0 feet MLLW

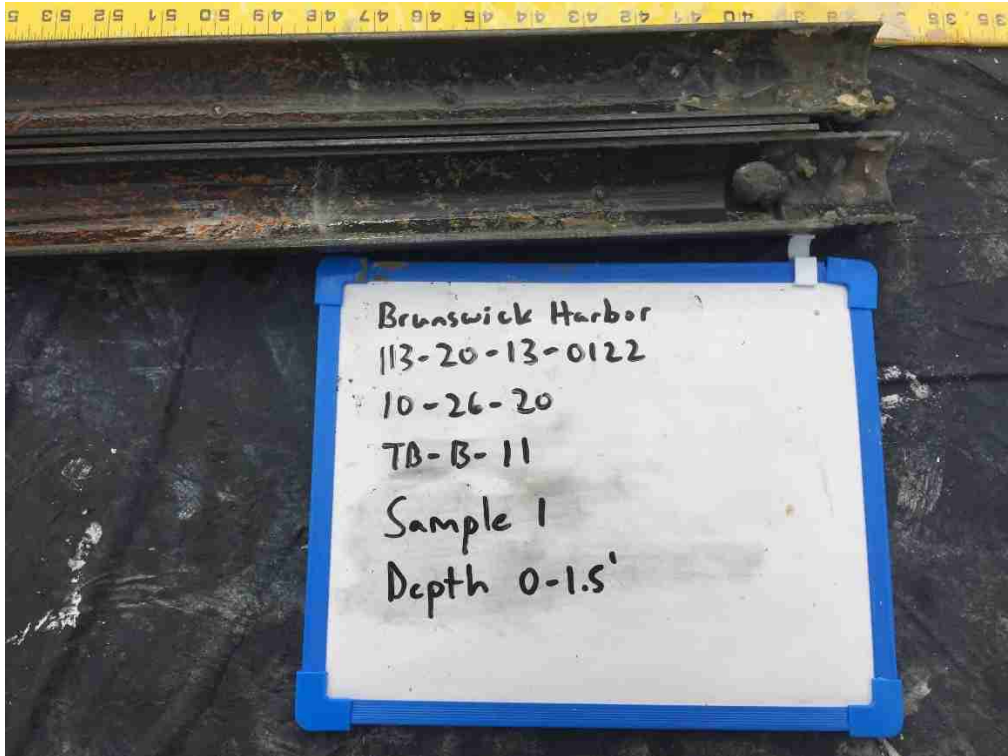


Depth: 28.5 – 30.0 feet; Approximate Elevation: -47.0 to -48.5 feet MLLW

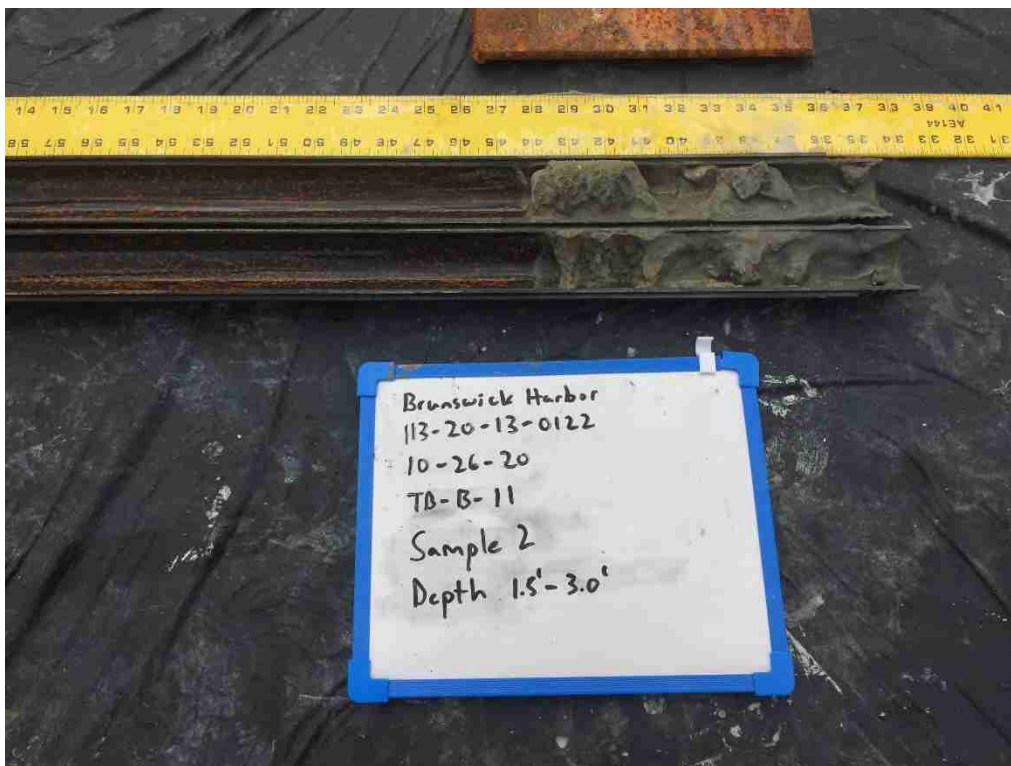


Depth: 30.0 – 31.5 feet; Approximate Elevation: -48.5 to -50.0 feet MLLW

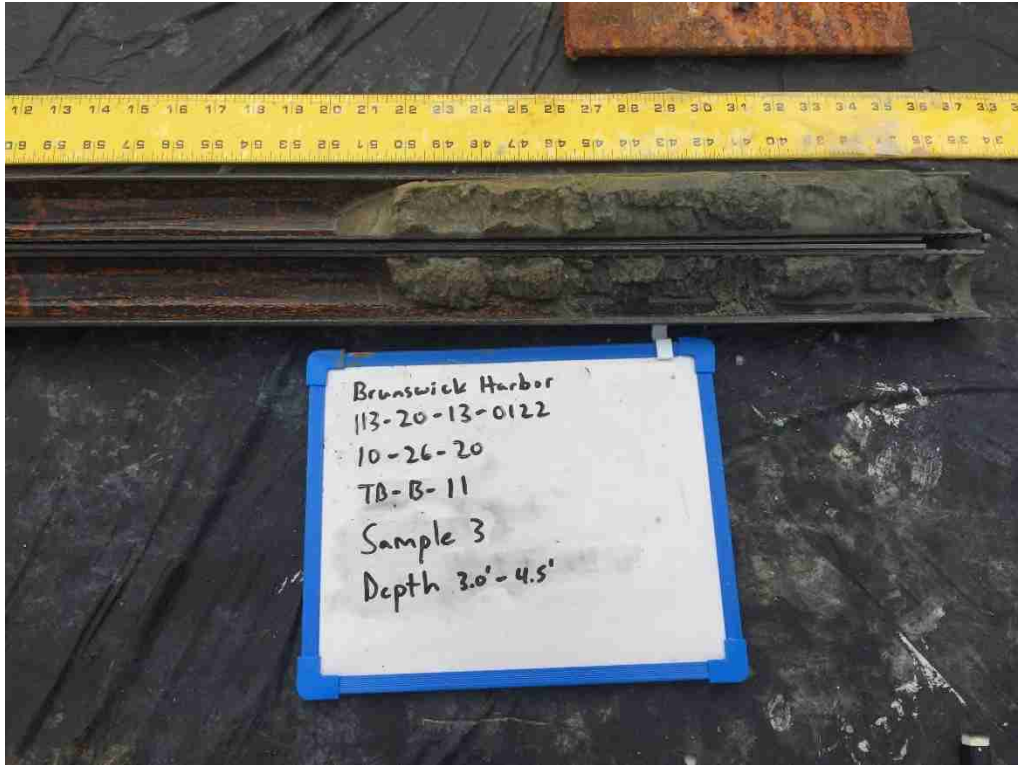
TB-B-11 Photographs



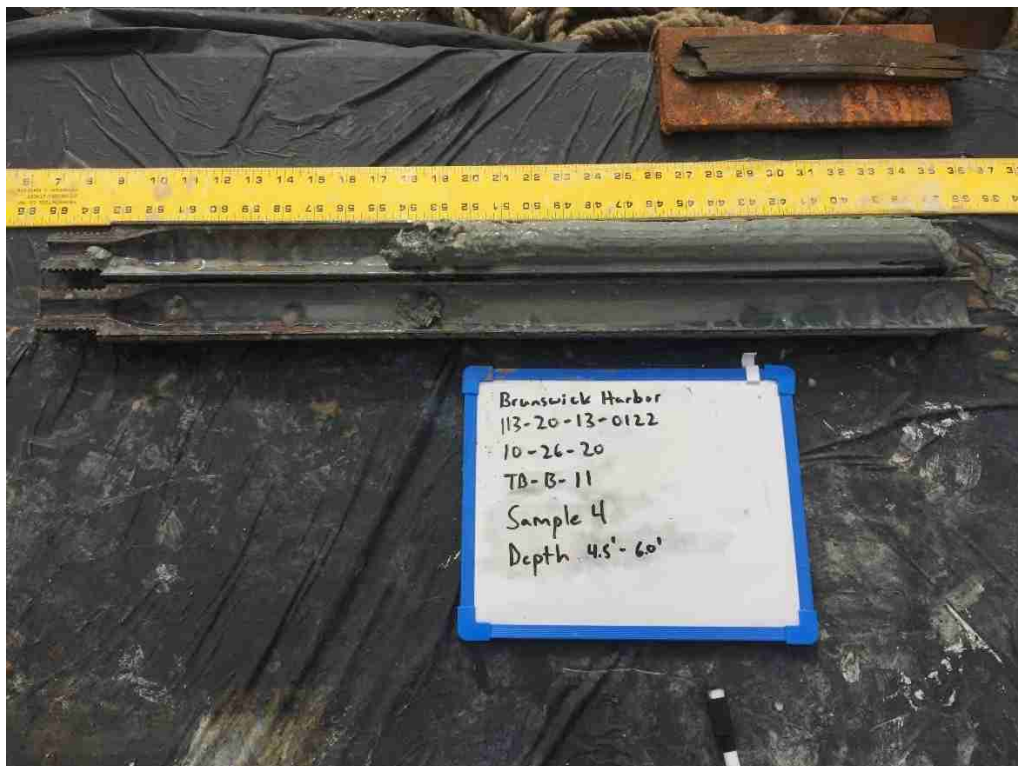
Depth: 0 – 1.5 feet; Approximate Elevation: -19.7 to -21.2 feet MLLW



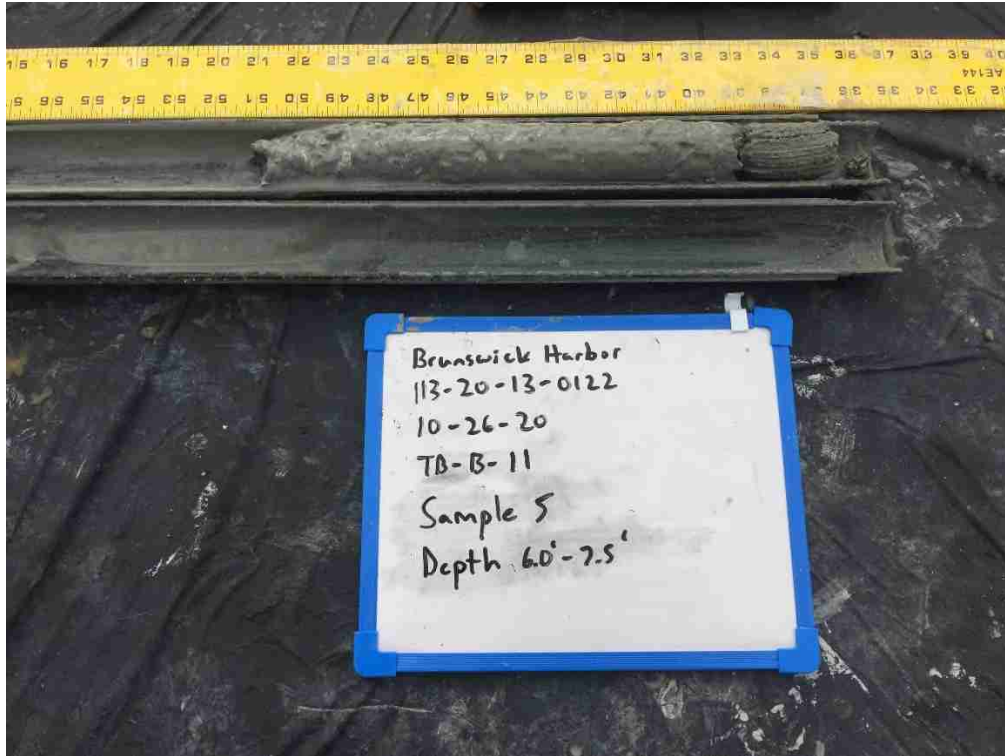
Depth: 1.5 – 3.0 feet; Approximate Elevation: -21.2 to -22.7 feet MLLW



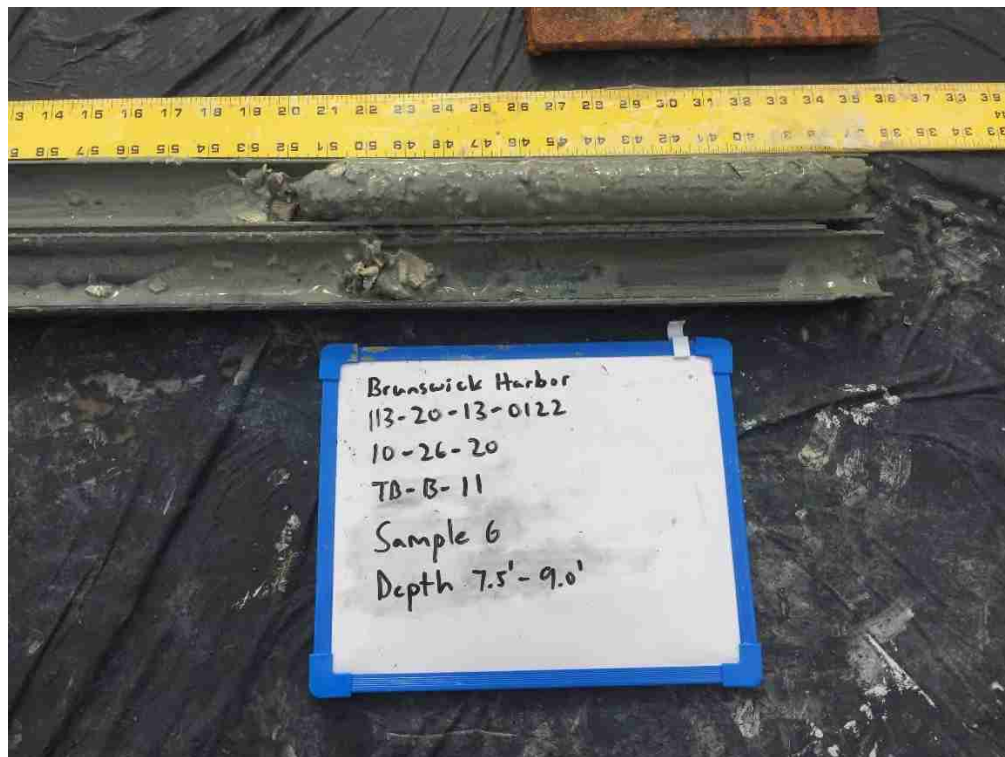
Depth: 3.0 – 4.5 feet Approximate Elevation: -22.7 to -24.2 feet MLLW



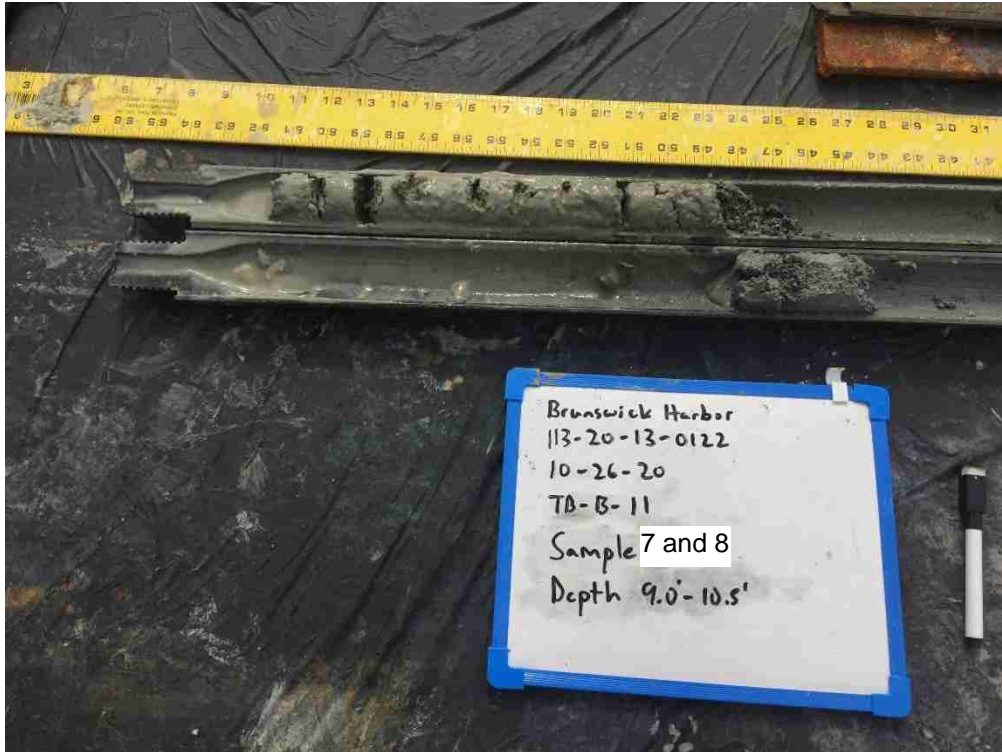
Depth: 4.5 – 6.0 feet; Approximate Elevation: -24.2 to -25.7 feet MLLW



Depth: 6.0 – 7.5 feet; Approximate Elevation: -25.7 to -27.2 feet MLLW



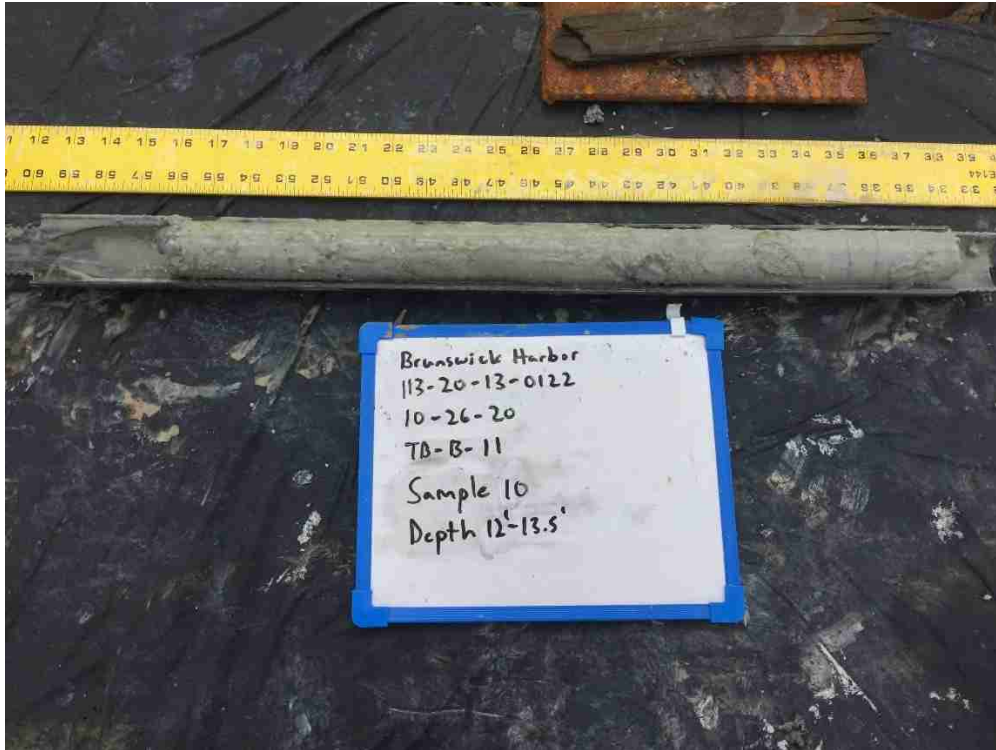
Depth: 7.5 – 9.0 feet; Approximate Elevation: -27.2 to -28.7 feet MLLW



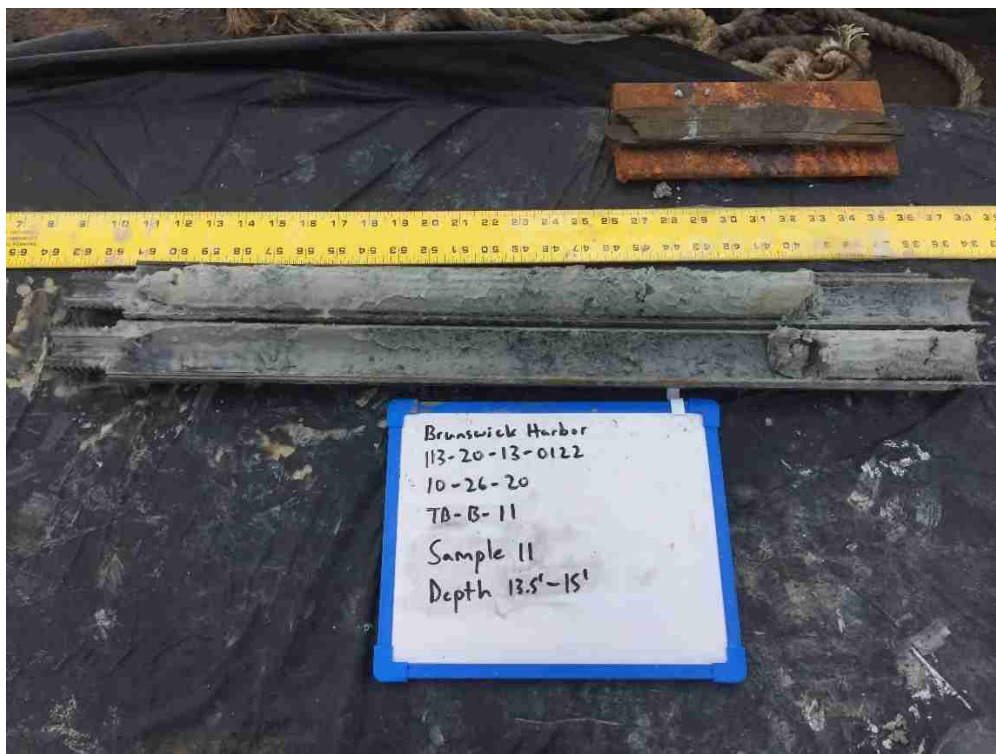
Depth: 9.0 – 10.5 feet; Approximate Elevation: -28.7 to -30.2 feet MLLW



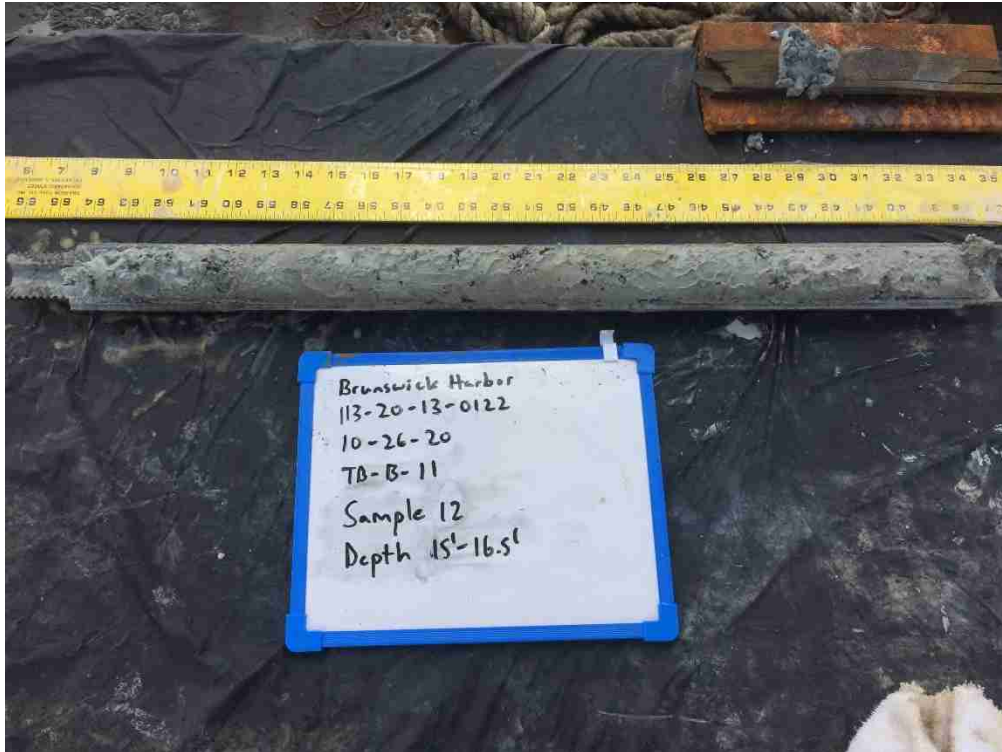
Depth: 10.5 – 12.0 feet; Approximate Elevation: -30.2 to -31.7 feet MLLW



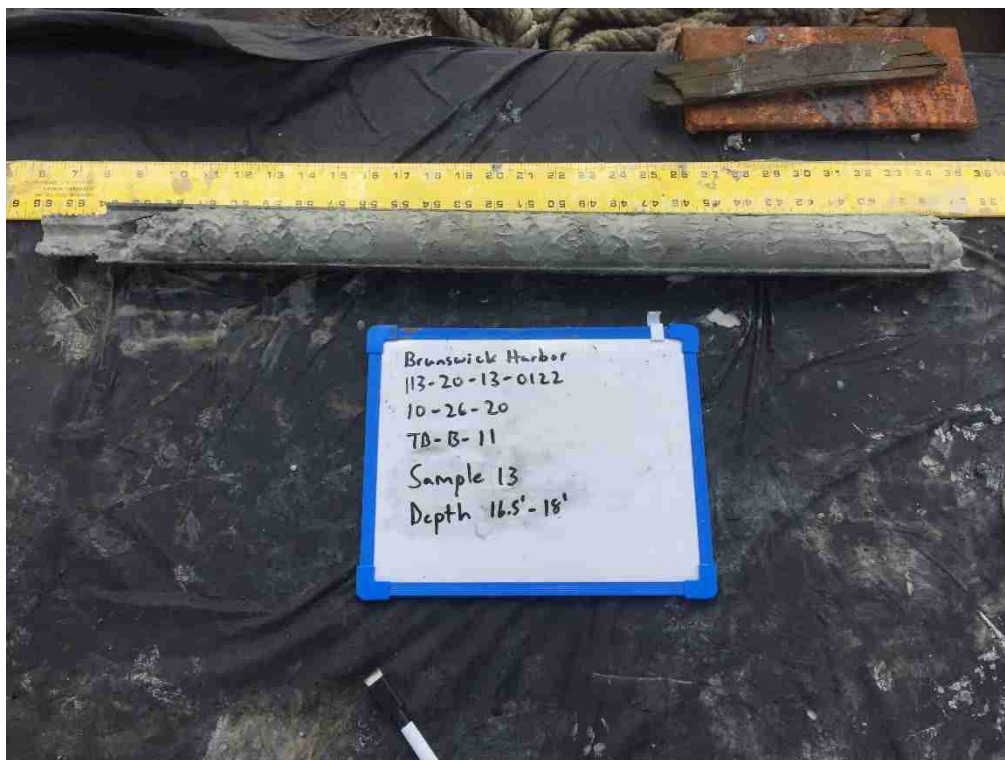
Depth: 12.0 – 13.5 feet; Approximate Elevation: -31.7 to -33.2 feet MLLW



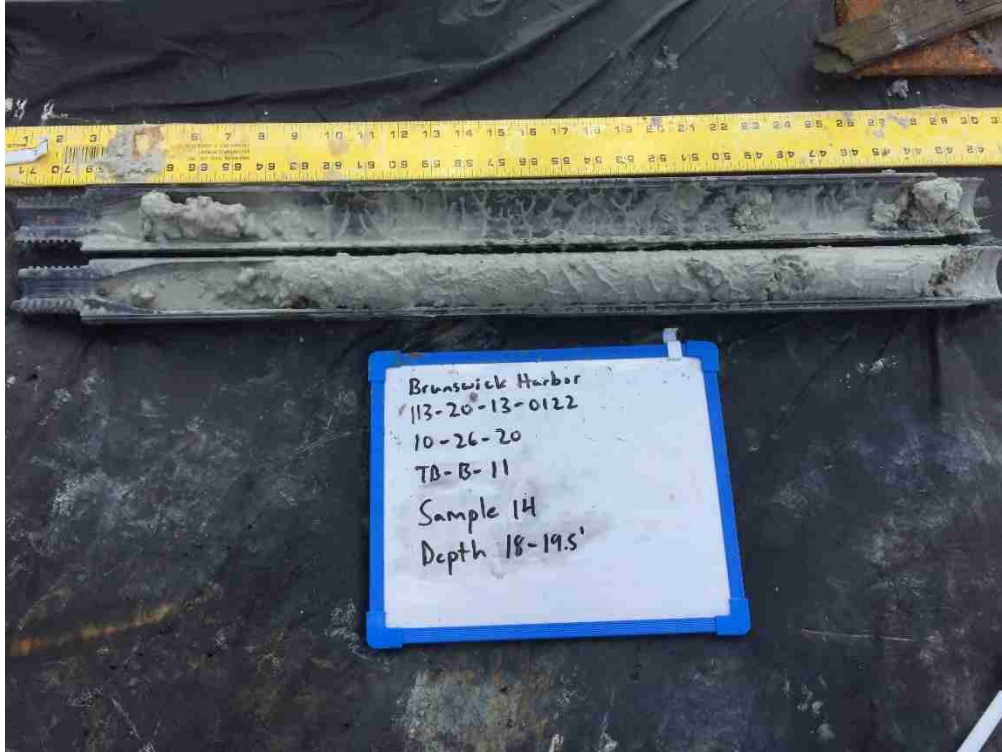
Depth: 13.5 – 15.0 feet; Approximate Elevation: -33.2 to -34.7 feet MLLW



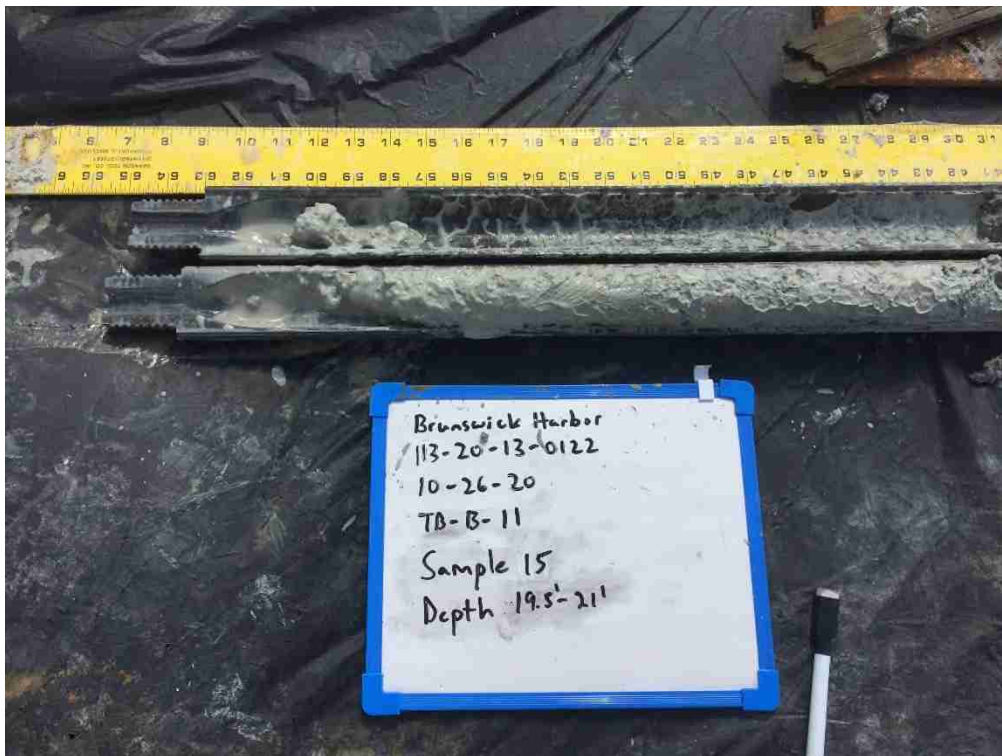
Depth: 15.0 – 16.5 feet; Approximate Elevation: -34.7 to -36.2 feet MLLW



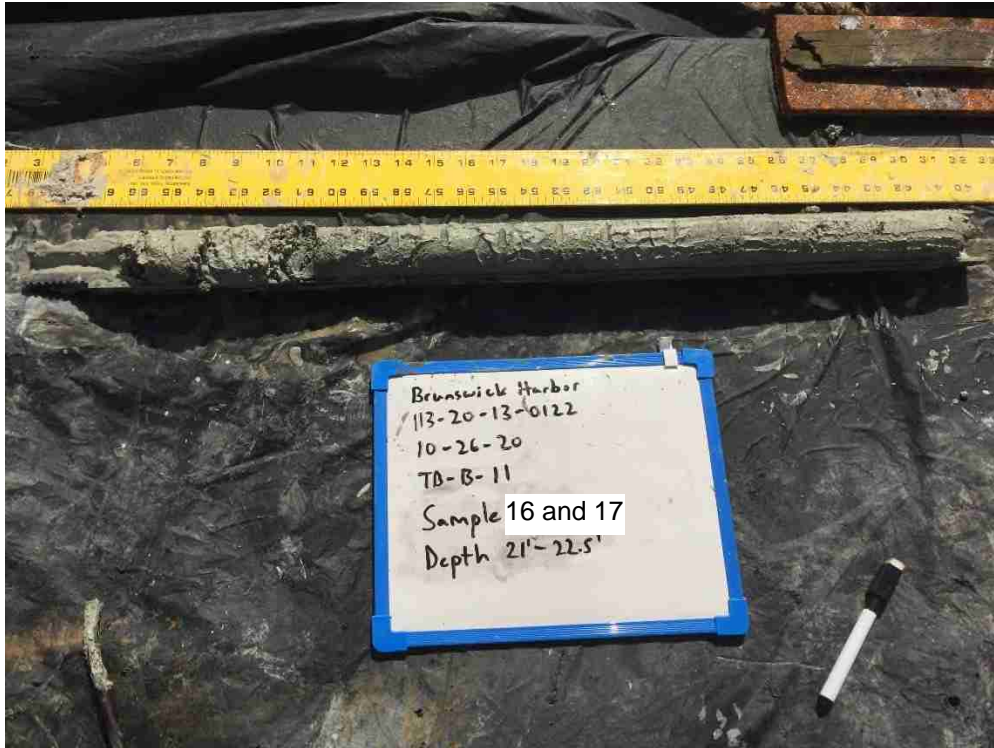
Depth: 16.5 – 18.0 feet; Approximate Elevation: -36.2 to -37.7 feet MLLW



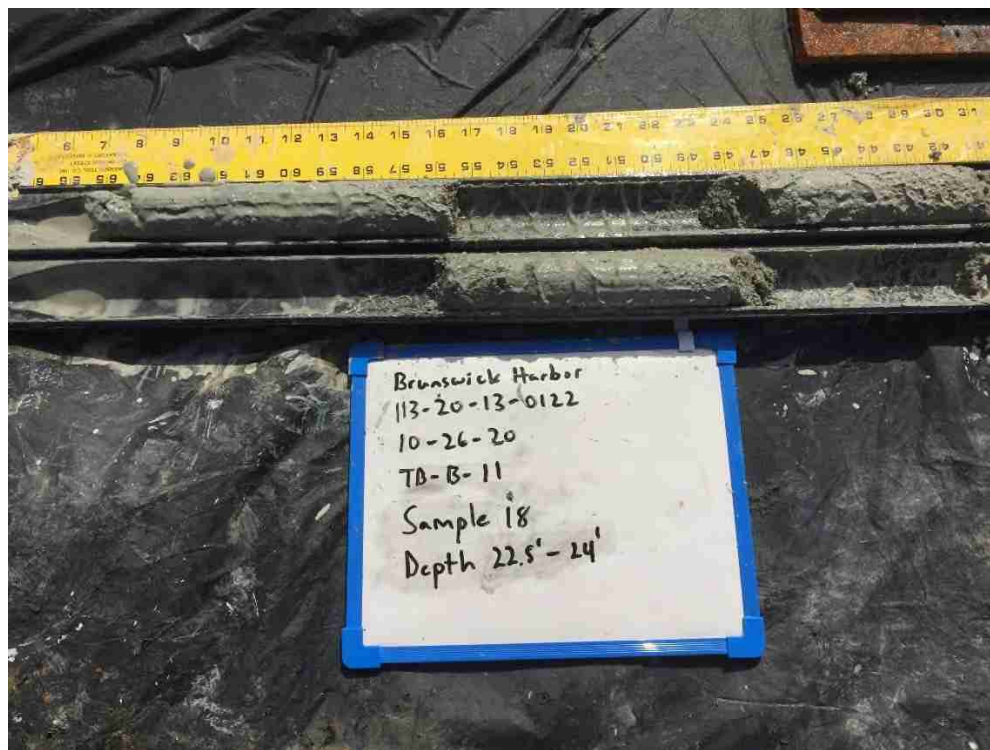
Depth: 18.0 – 19.5 feet; Approximate Elevation: -37.7 to -39.2 feet MLLW



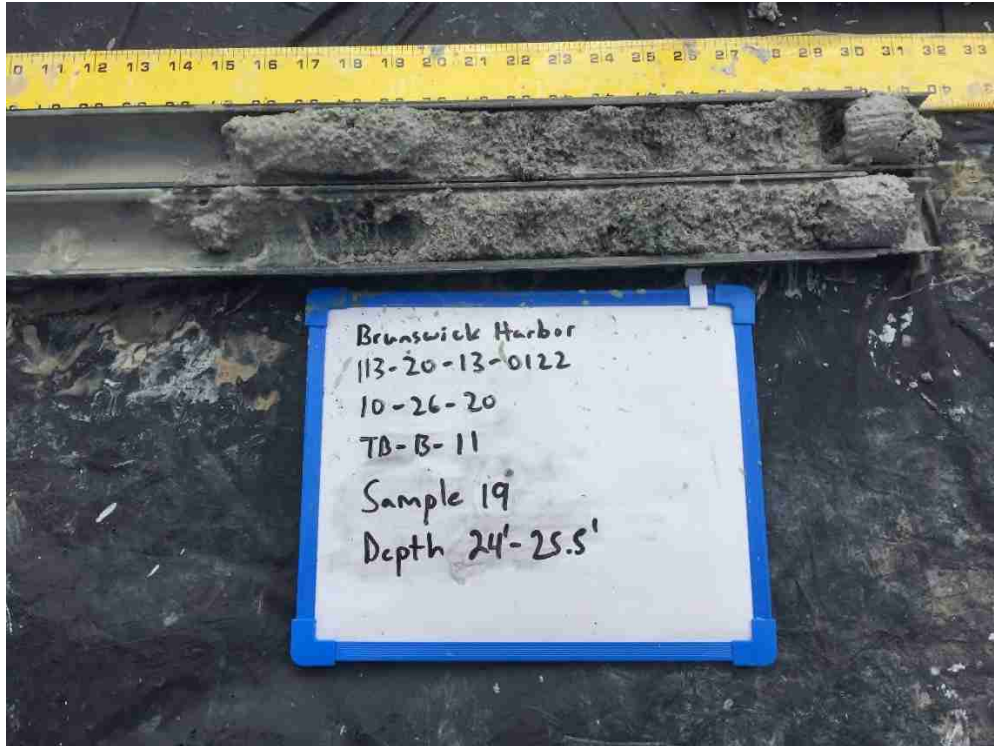
Depth: 19.5 – 21.0 feet; Approximate Elevation: -39.2 to -40.7 feet MLLW



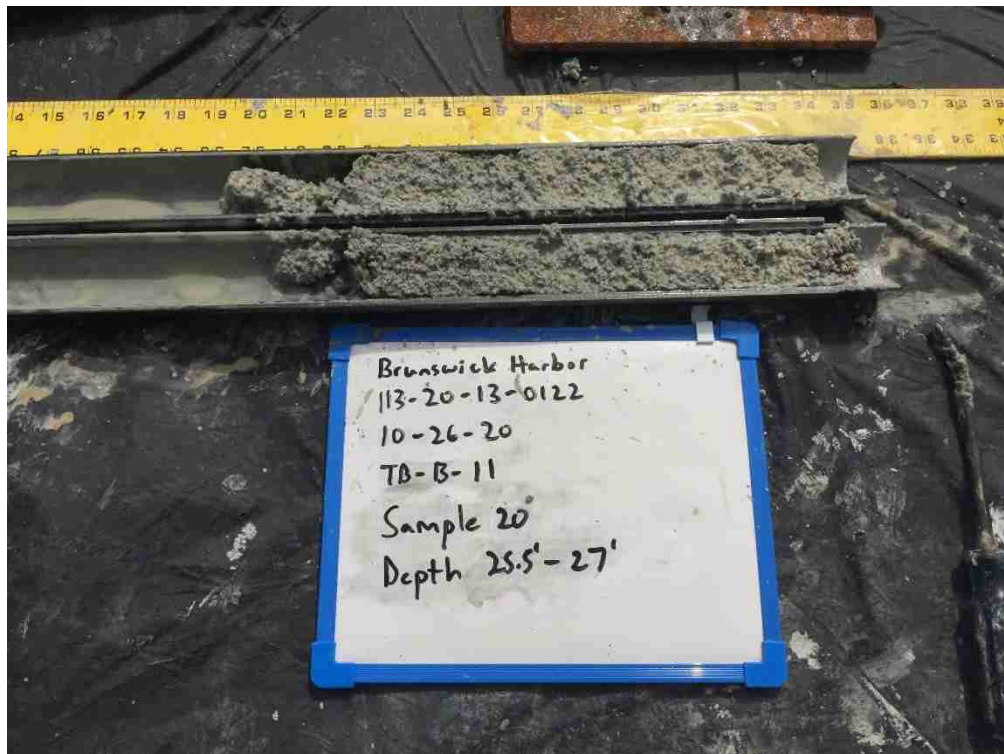
Depth: 21.0 – 22.5 feet; Approximate Elevation: -40.7 to -42.2 feet MLLW



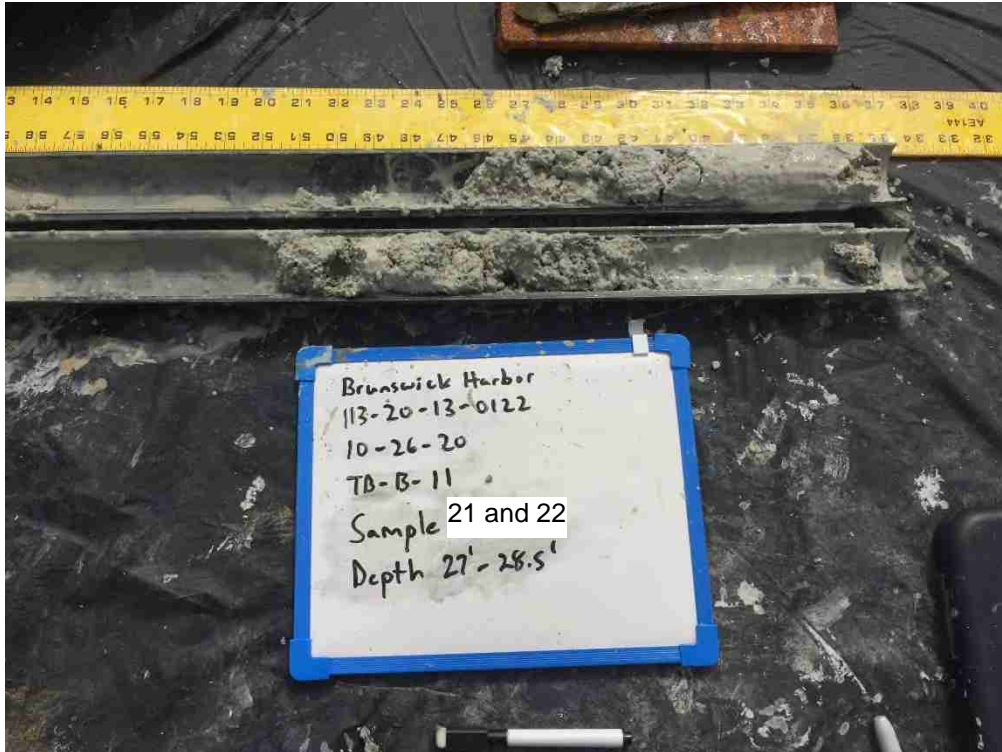
Depth: 22.5 – 24.0 feet; Approximate Elevation: -42.2 to -43.7 feet MLLW



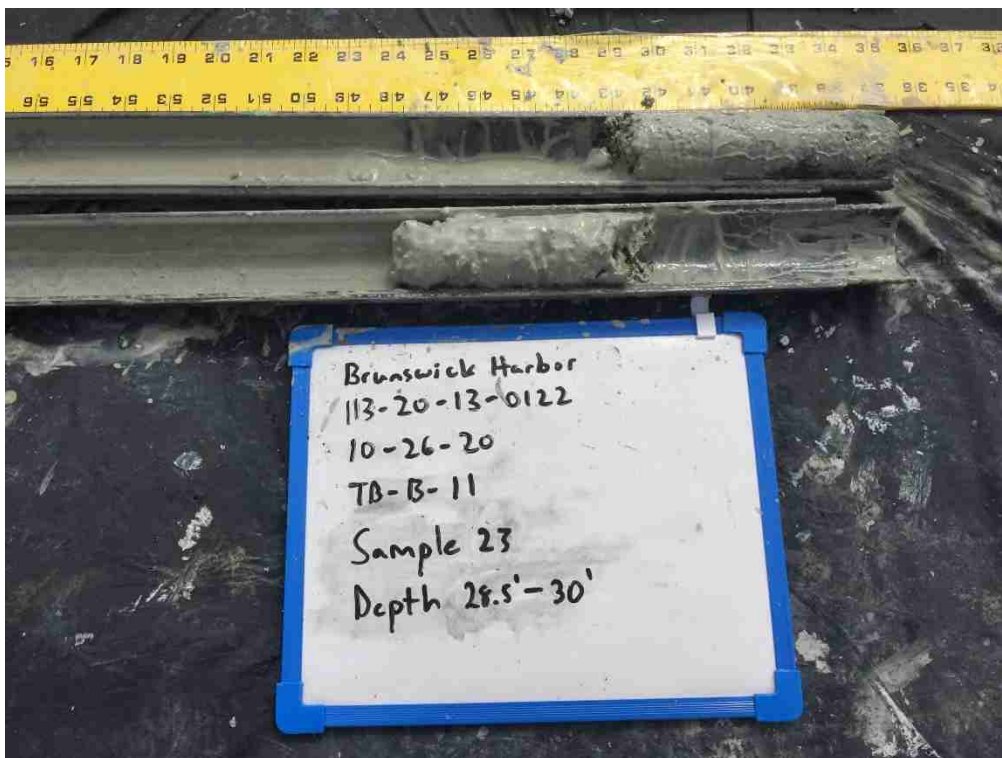
Depth: 24.0 – 25.5 feet; Approximate Elevation: -43.7 to -45.2 feet MLLW



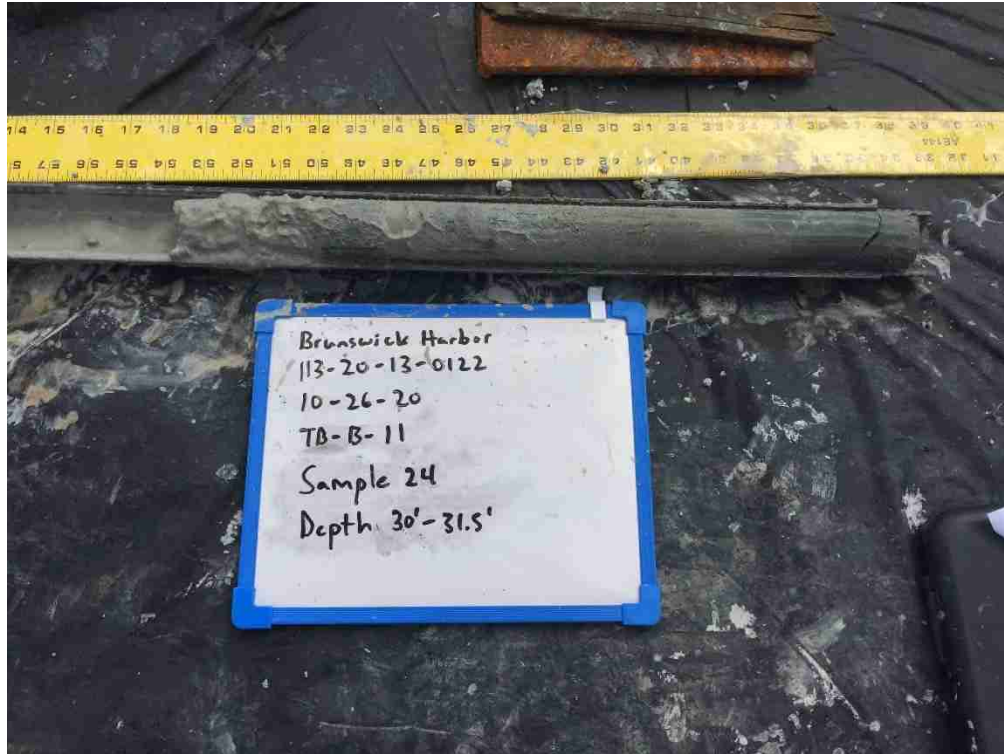
Depth: 25.5 – 27.0 feet; Approximate Elevation: -45.2 to -46.7 feet MLLW



Depth: 27.0 – 28.5 feet; Approximate Elevation: -46.7 to -48.2 feet MLLW

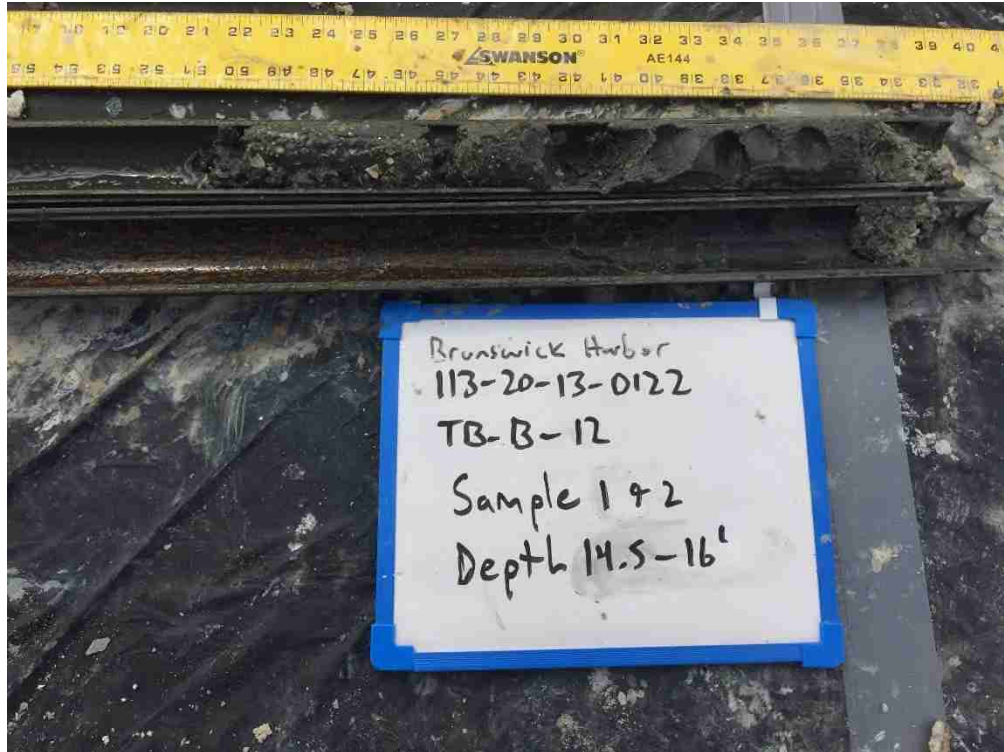


Depth: 28.5 – 30.0 feet; Approximate Elevation: -48.2 to -49.7 feet MLLW

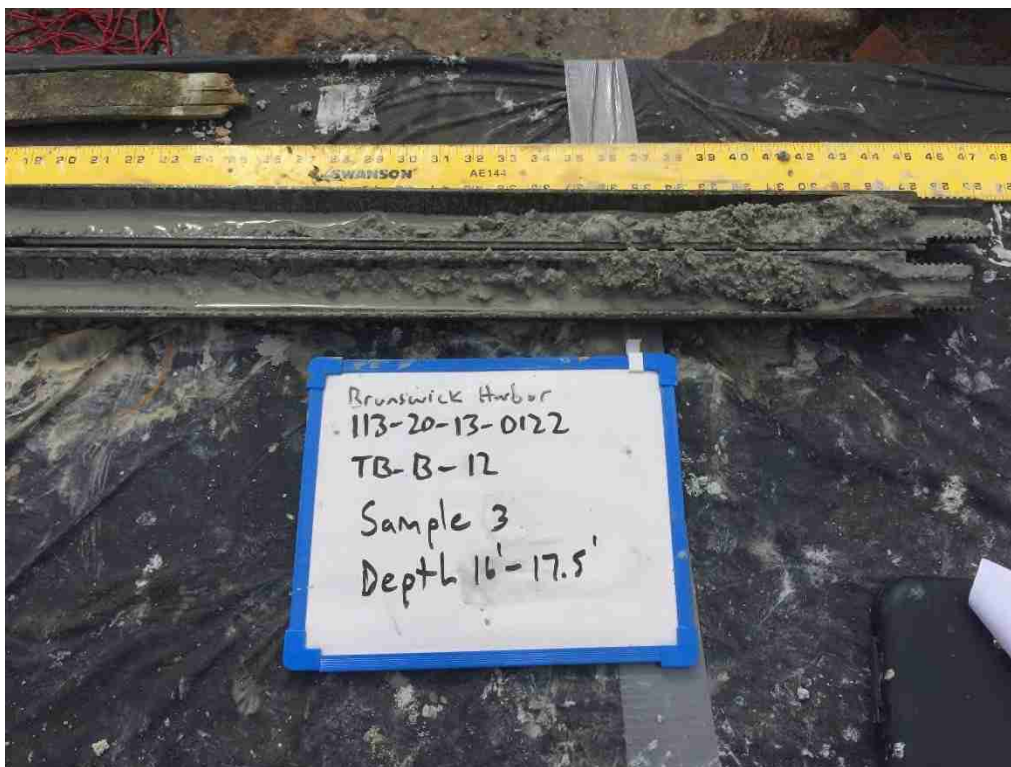


Depth: 30.0 – 31.5 feet; Approximate Elevation: -49.7 to -51.2 feet MLLW

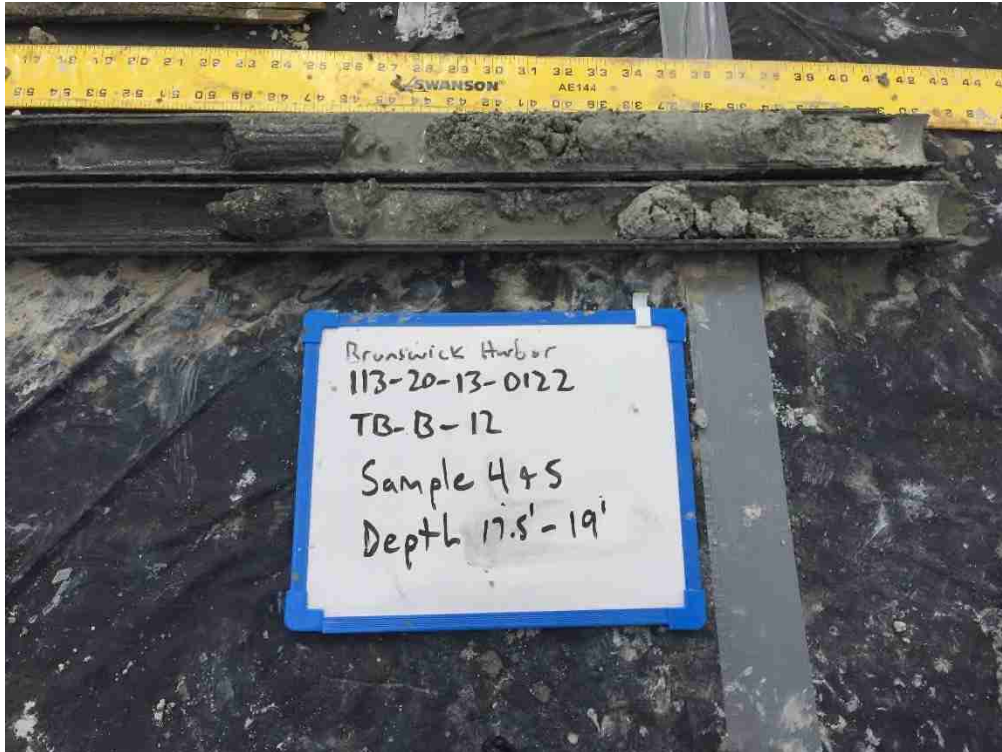
TB-B-12 Photographs



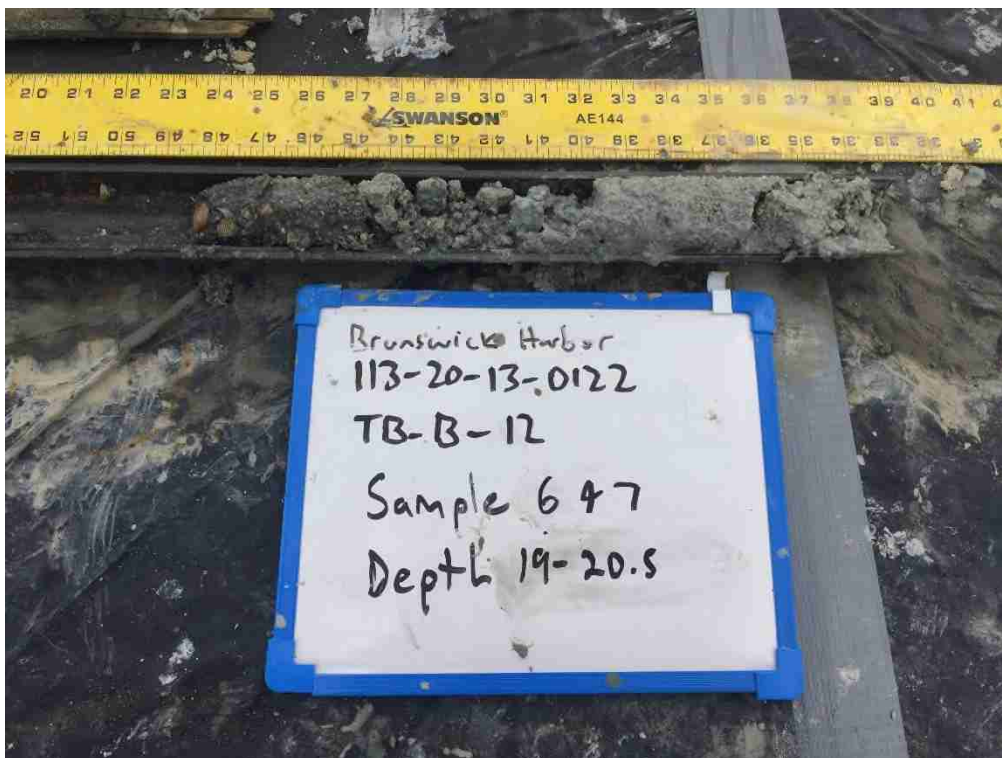
Depth: 14.5 – 16.0 feet; Approximate Elevation: -45.1 to -46.6 feet MLLW



Depth: 16.0 – 17.5 feet; Approximate Elevation: -46.6 to -48.1 feet MLLW

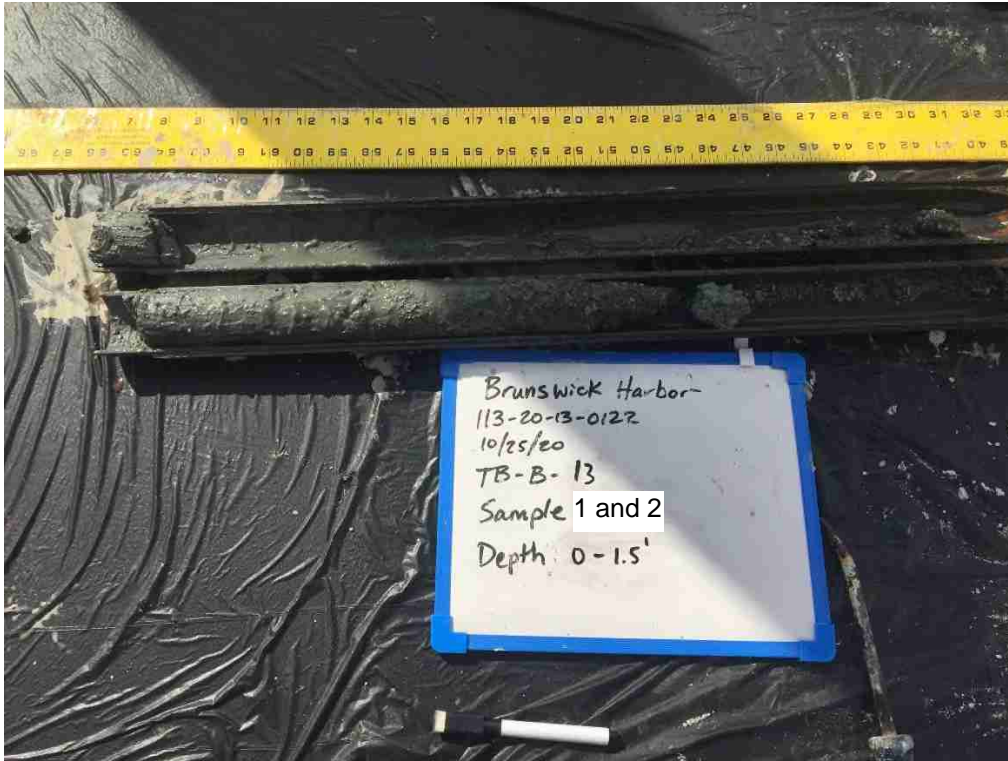


Depth: 17.5 – 19.0 feet; Approximate Elevation: -48.1 to -49.6 feet MLLW

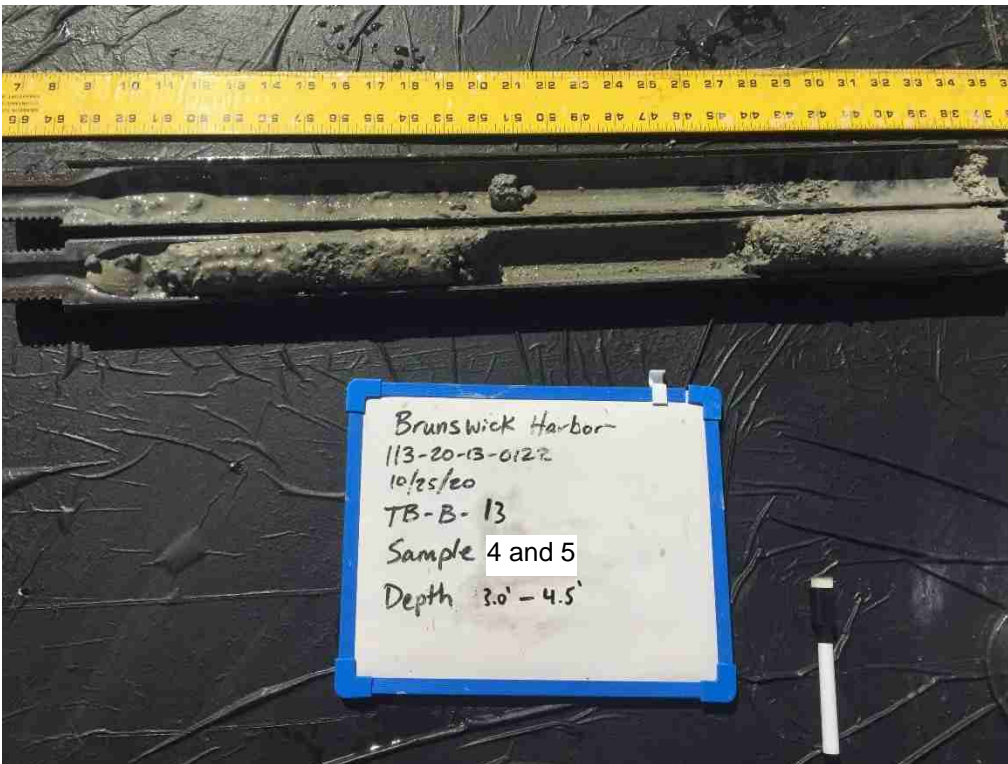


Depth: 19.0 – 20.5 feet; Approximate Elevation: -49.6 to -51.1 feet MLLW

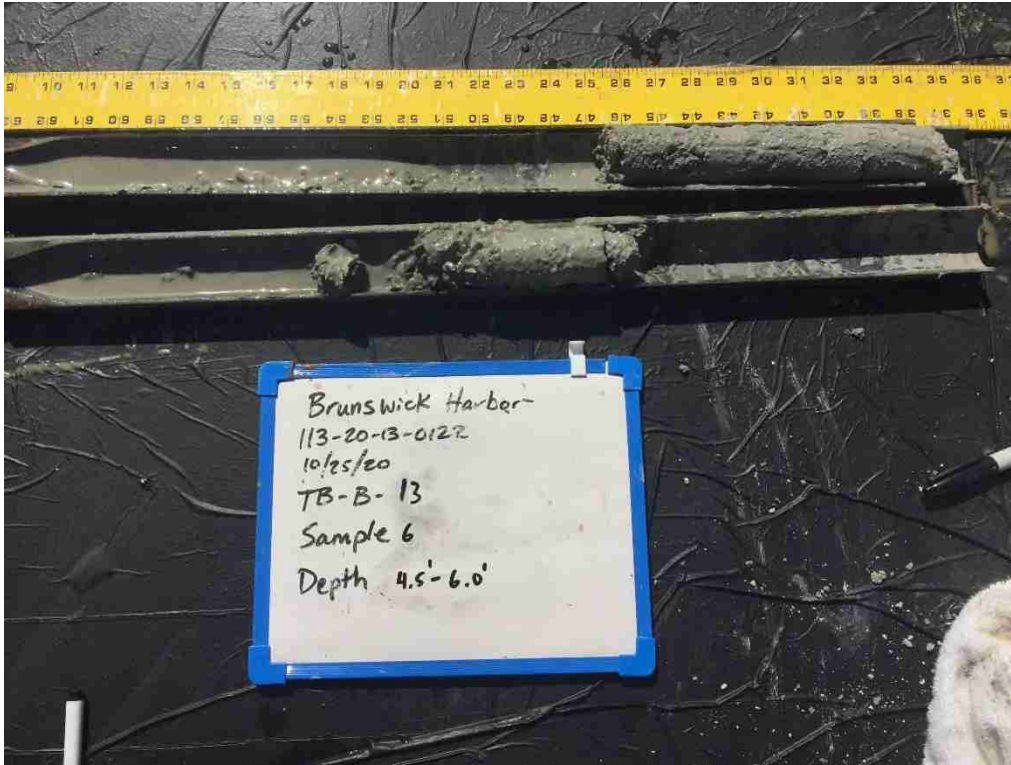
TB-B-13 Photographs



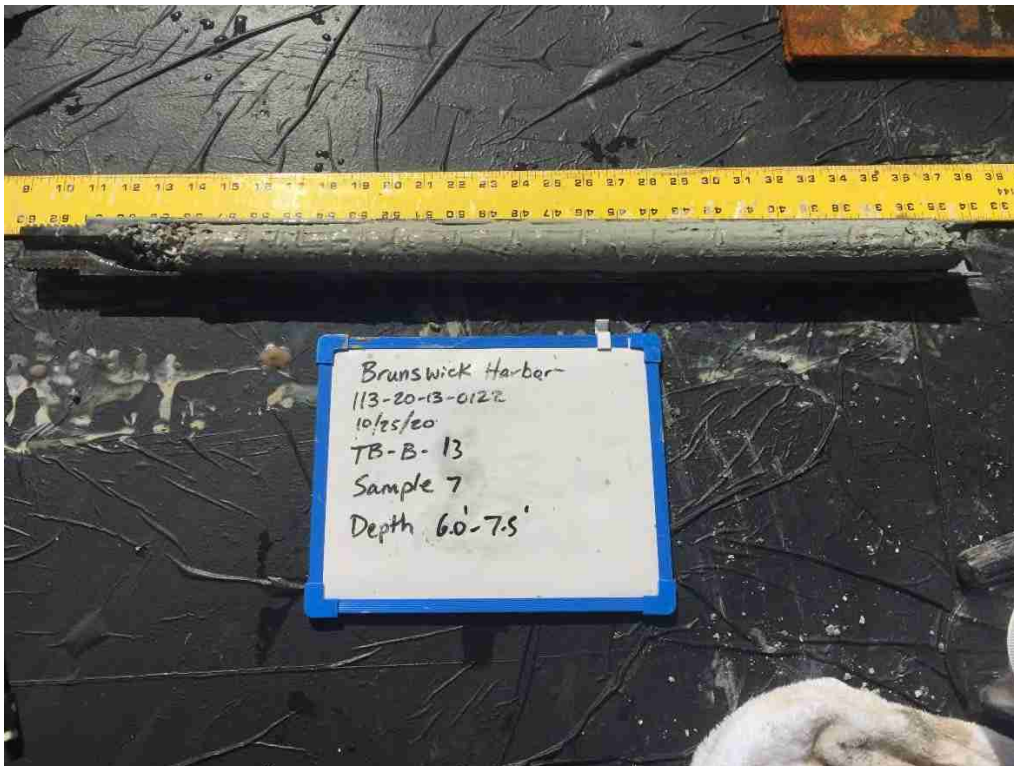
Depth: 0 – 1.5 feet; Approximate Elevation: -23.9 to -25.4 feet MLLW



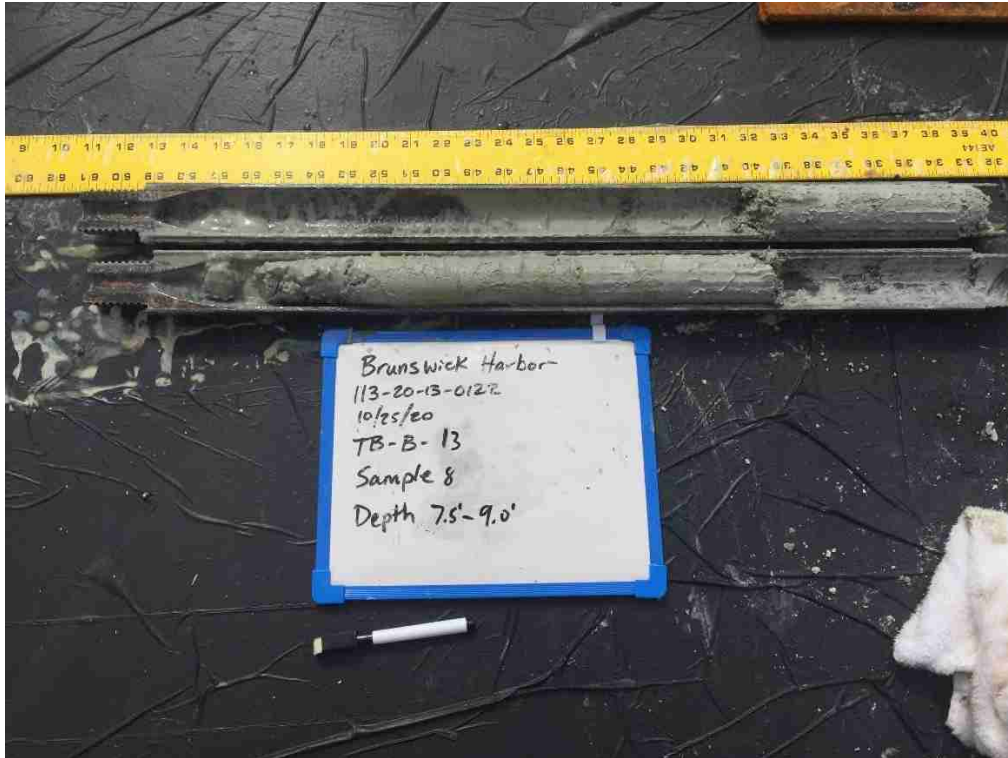
Depth: 3.0 – 4.5 feet; Approximate Elevation: -26.9 to -28.4 feet MLLW



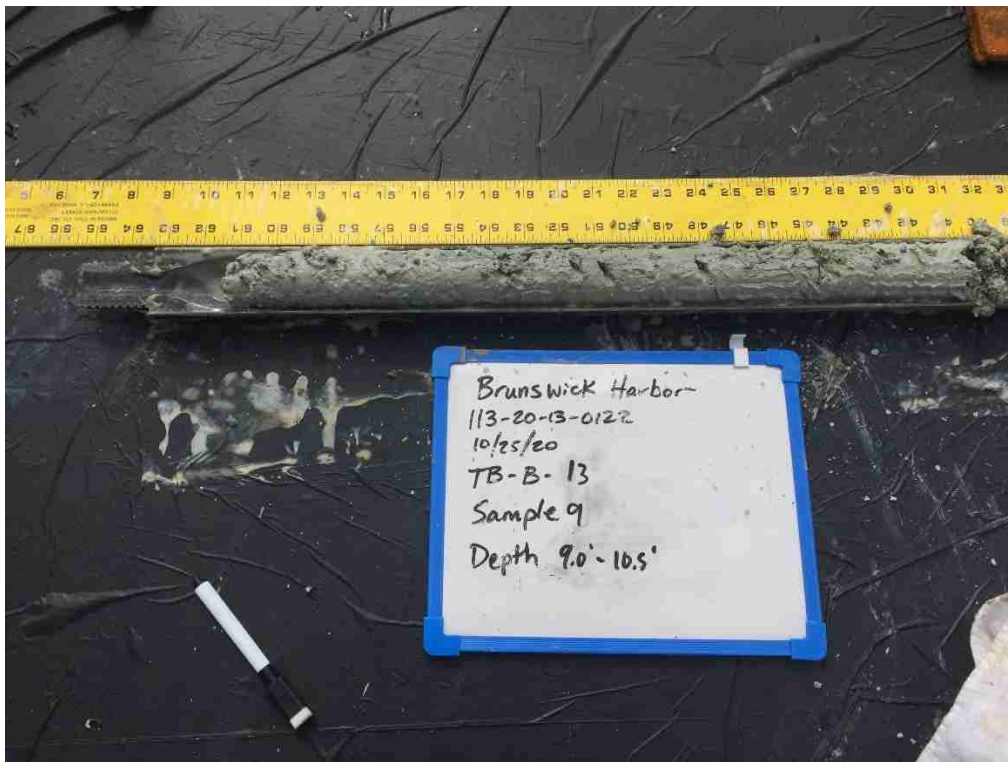
Depth: 4.5 – 6.0 feet; Approximate Elevation: -28.4 to -29.9 feet MLLW



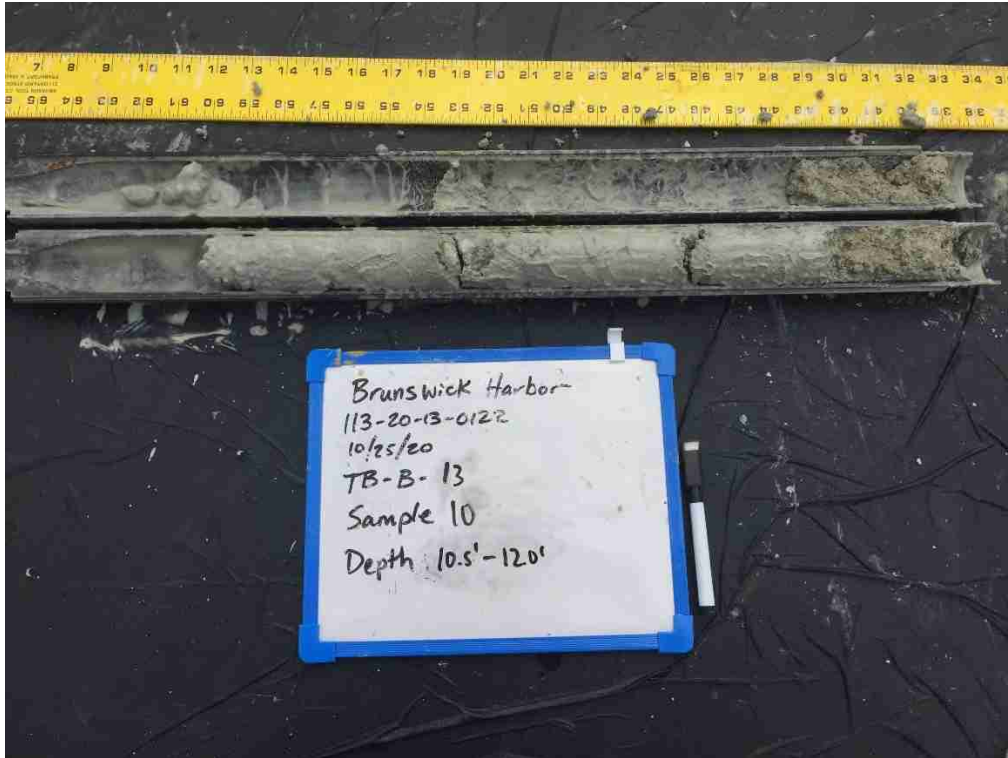
Depth: 6.0 – 7.5 feet; Approximate Elevation: -29.9 to -31.4 feet MLLW



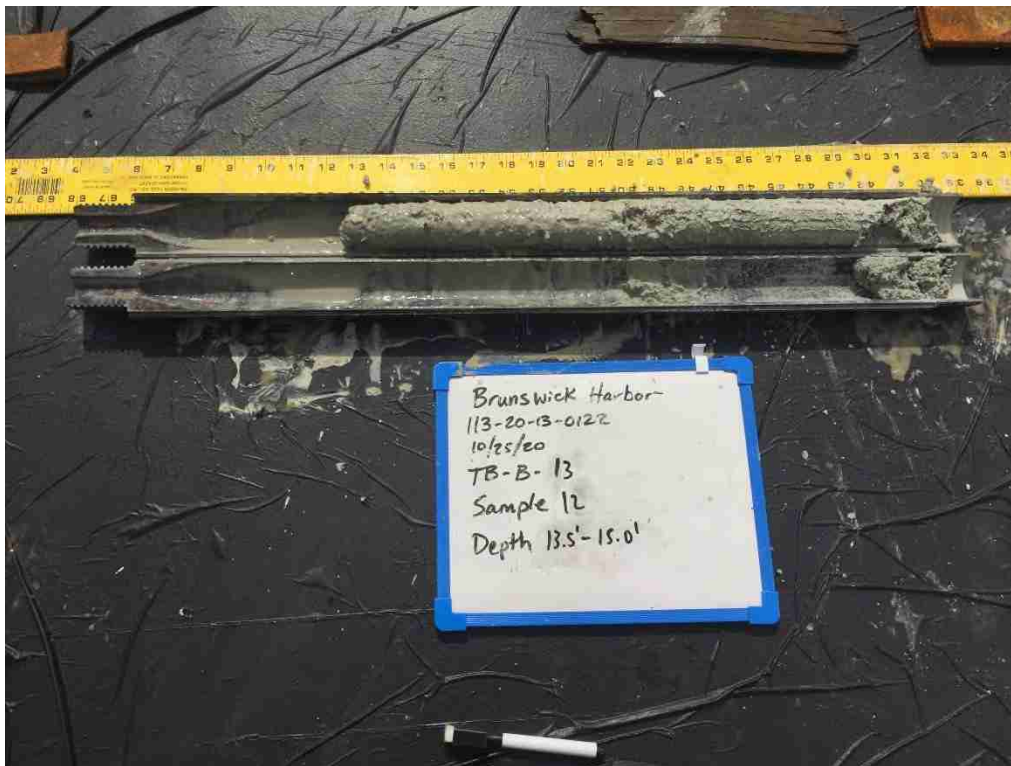
Depth: 7.5 – 9.0 feet; Approximate Elevation: -31.4 to -32.9 feet MLLW



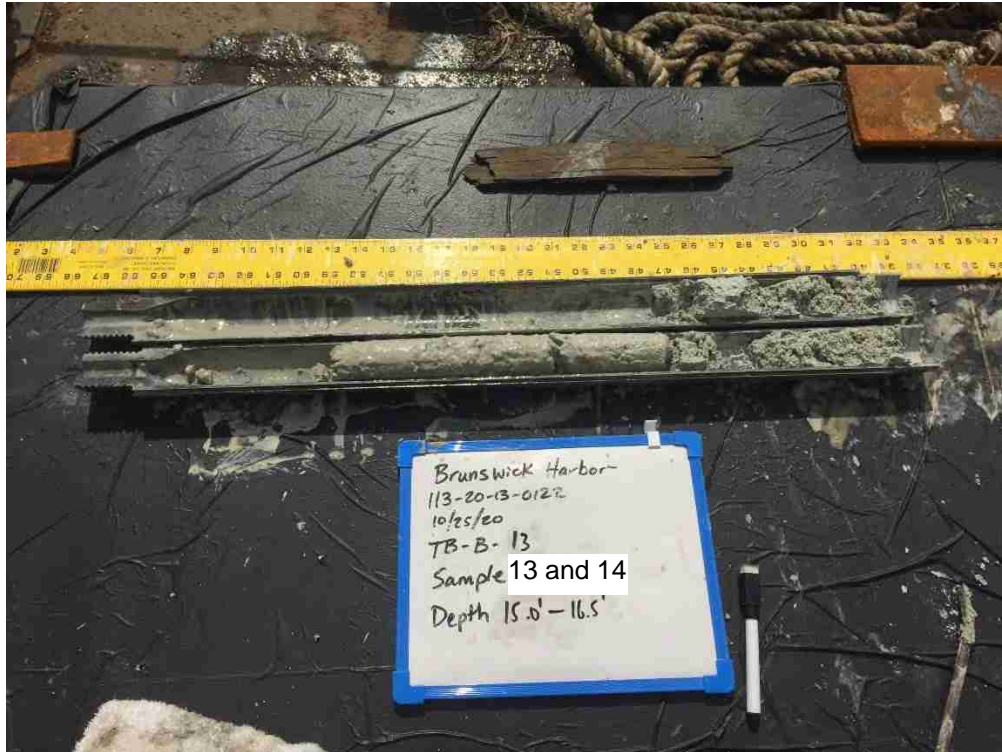
Depth: 9.0 – 10.5 feet; Approximate Elevation: -32.9 to -34.4 feet MLLW



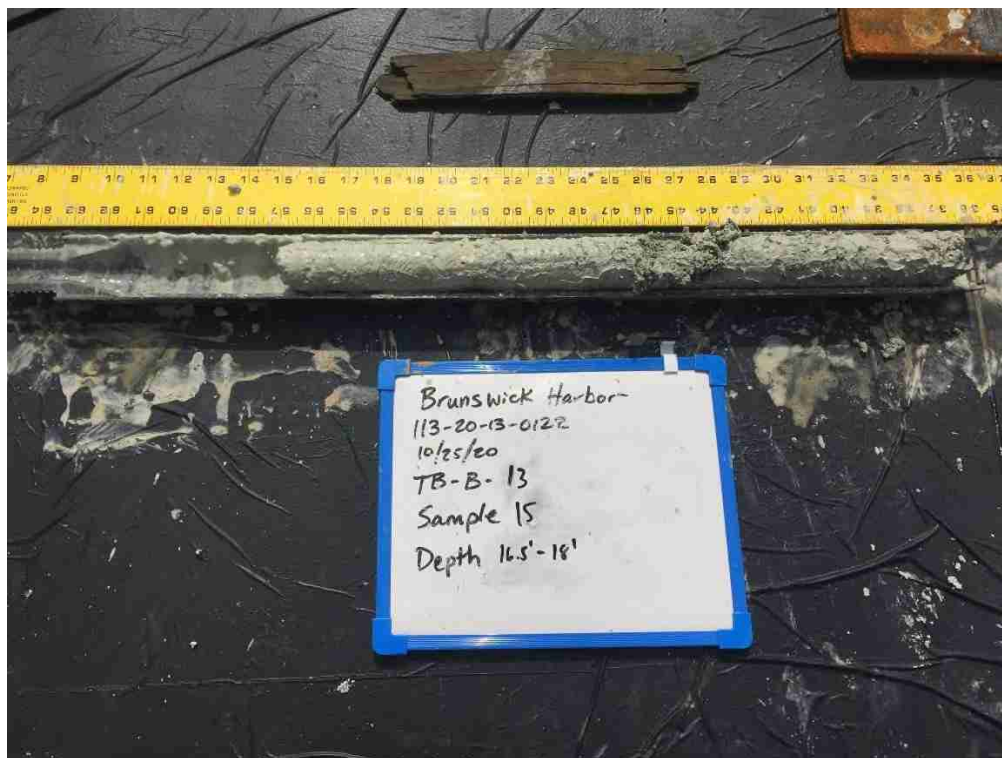
Depth: 10.5 – 12.0 feet; Approximate Elevation: -34.4 to -35.9 feet MLLW



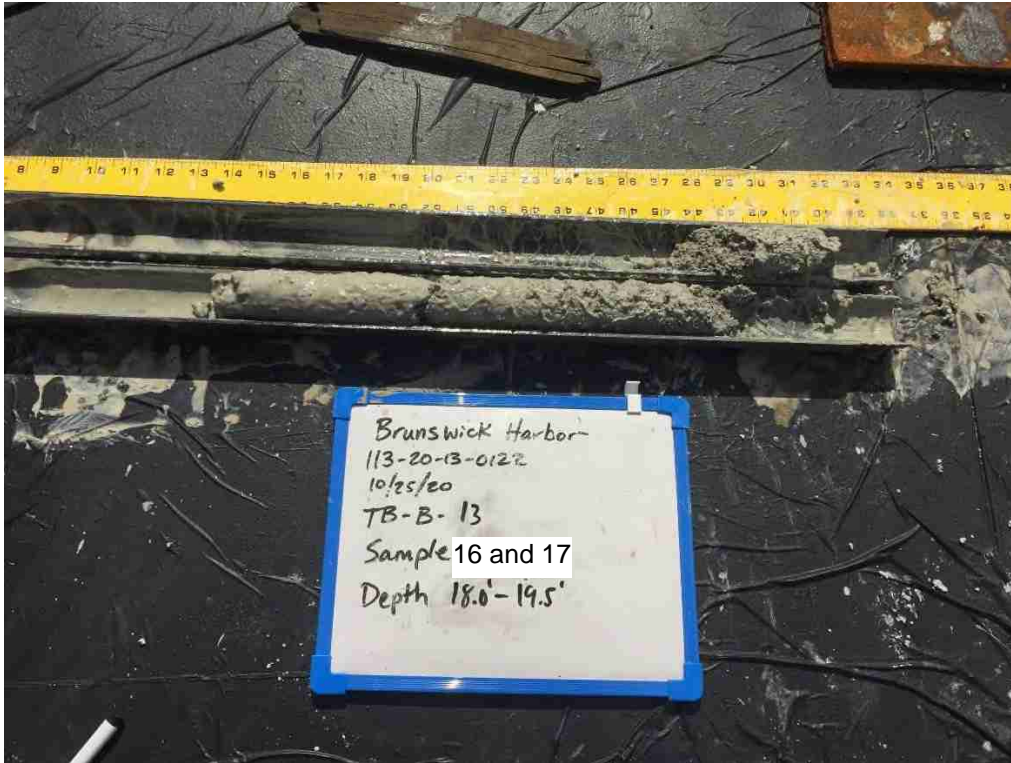
Depth: 13.5 – 15.0 feet; Approximate Elevation: -37.4 to -38.9 feet MLLW



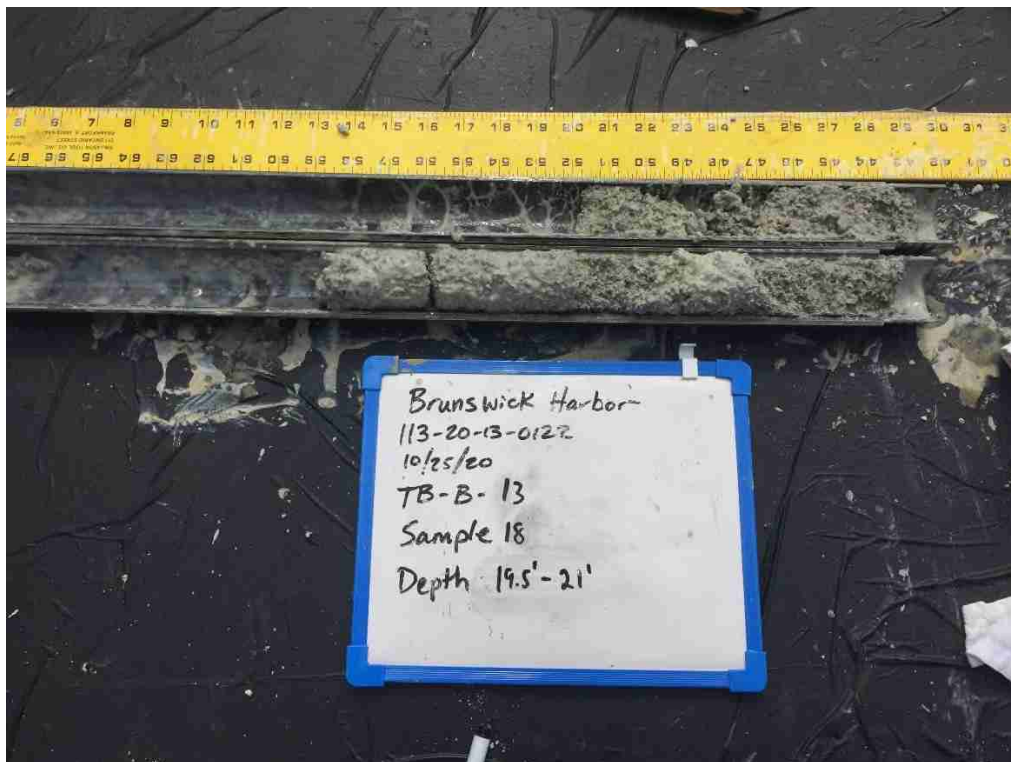
Depth: 15.0 – 16.5 feet; Approximate Elevation: -38.9 to -40.4 feet MLLW



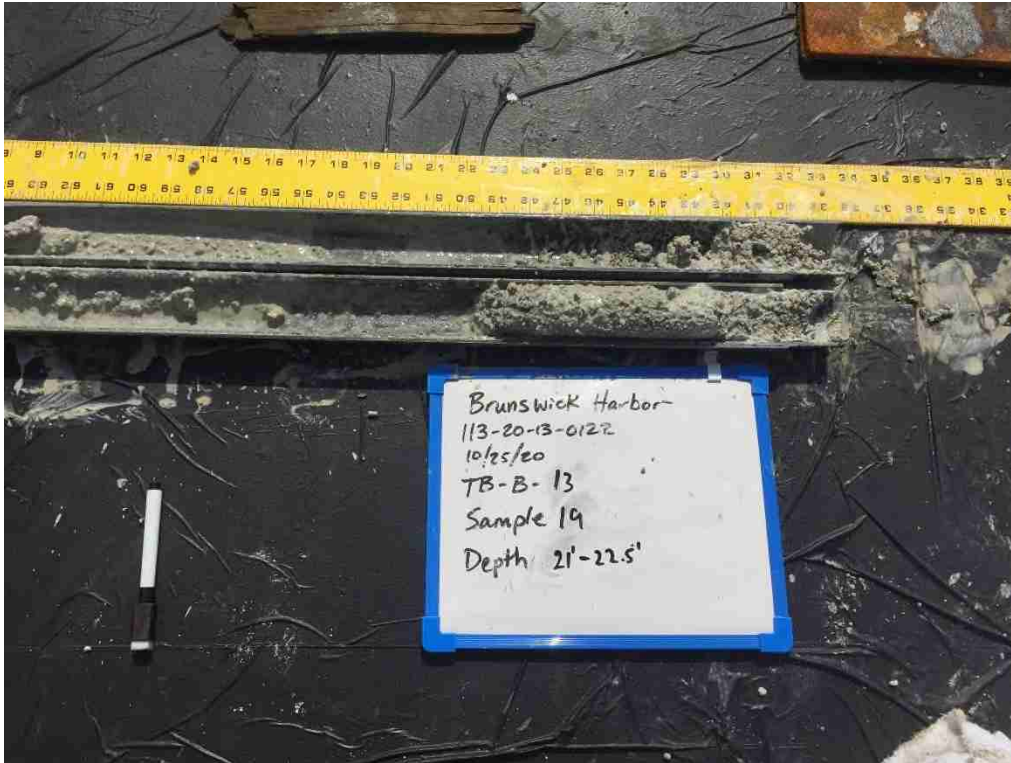
Depth: 16.5 – 18.0 feet; Approximate Elevation: -40.4 to -41.9 feet MLLW



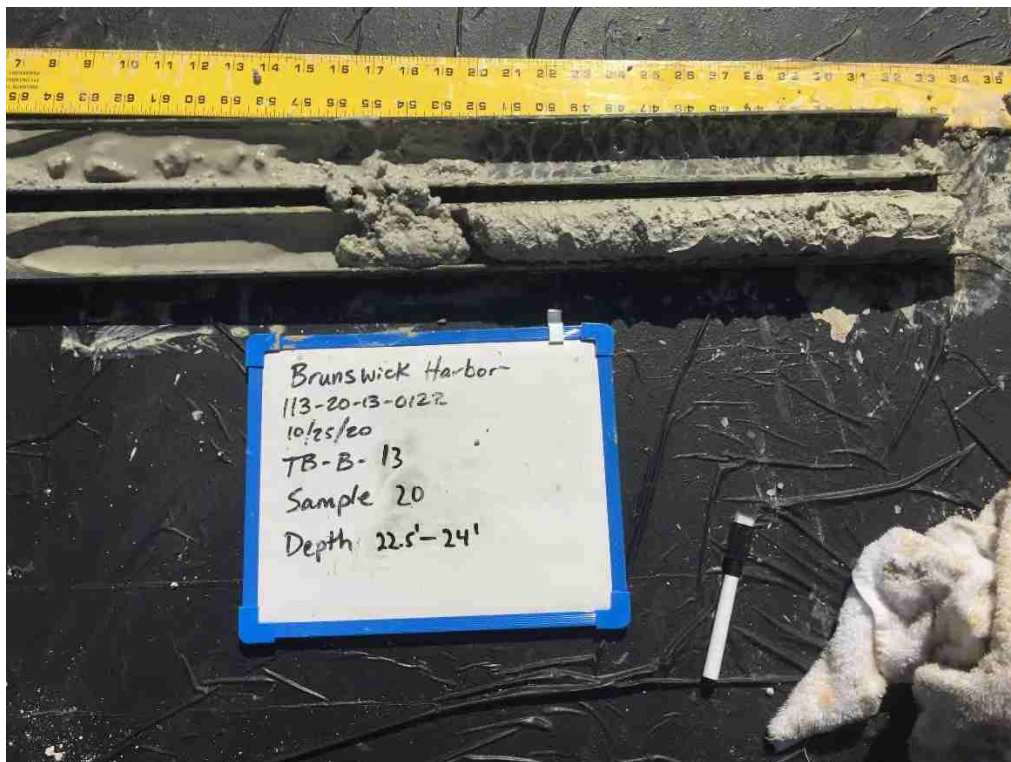
Depth: 18.0 – 19.5 feet; Approximate Elevation: -41.9 to -43.4 feet MLLW



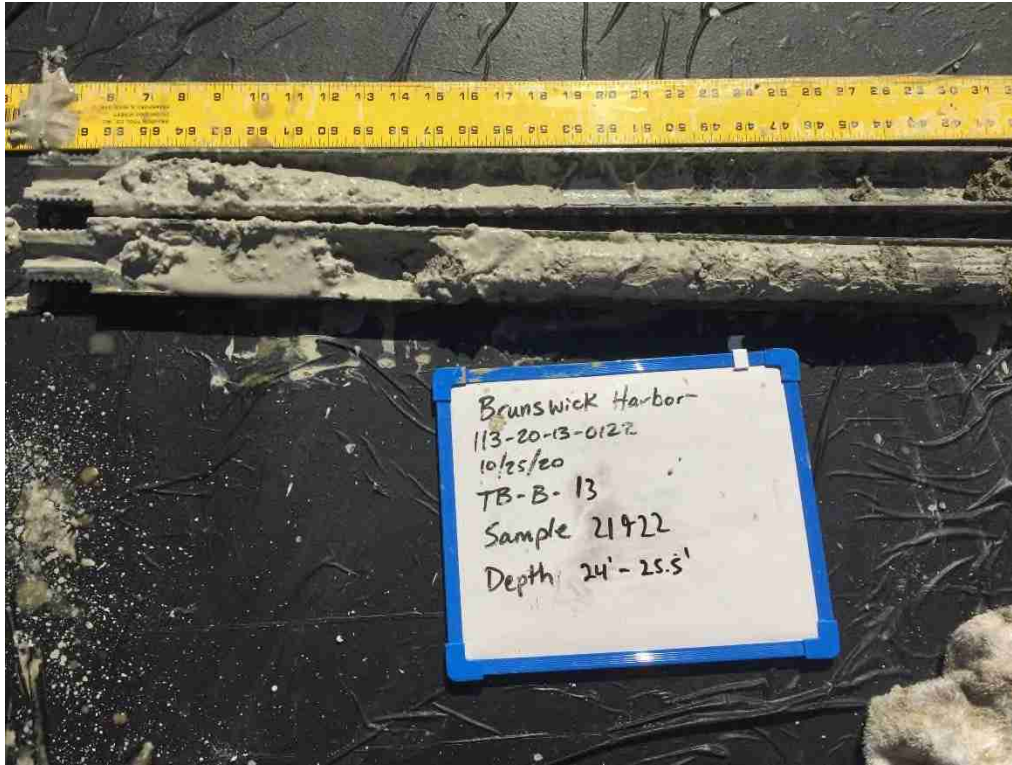
Depth: 19.5 – 21.0 feet; Approximate Elevation: -43.4 to -44.9 feet MLLW



Depth: 21.0 – 22.5 feet; Approximate Elevation: -44.9 to -46.4 feet MLLW

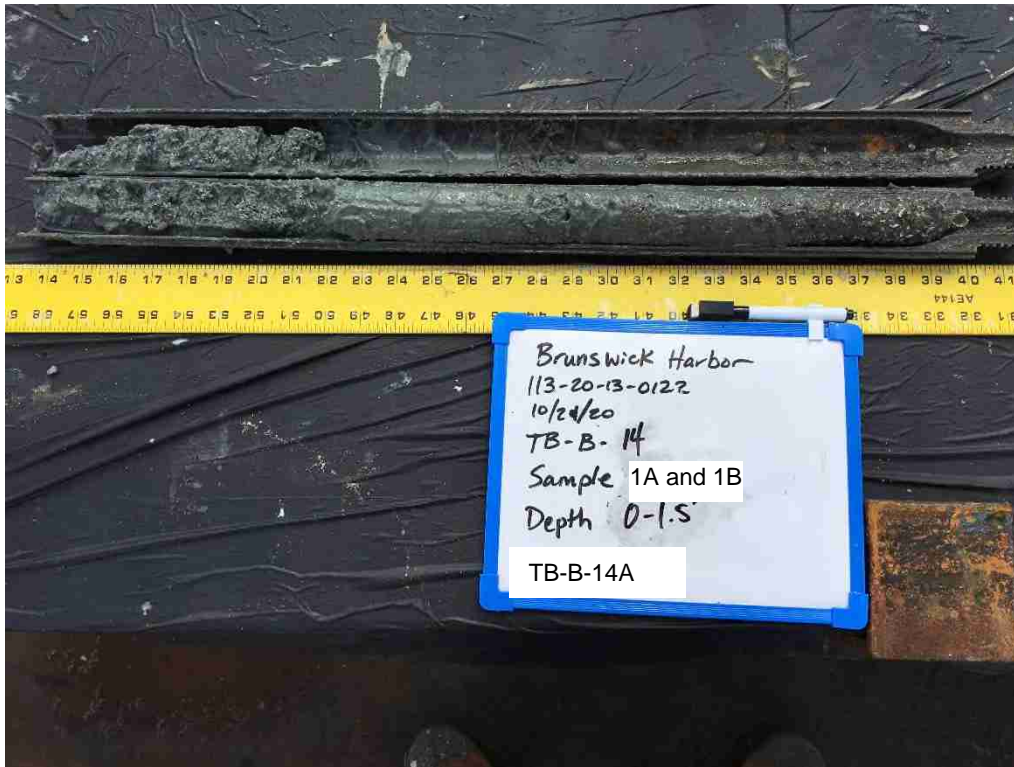


Depth: 22.5 – 24.0 feet; Approximate Elevation: -46.4 to -47.9 feet MLLW



Depth: 24.0 – 25.5 feet; Approximate Elevation: -47.9 to -49.4 feet MLLW

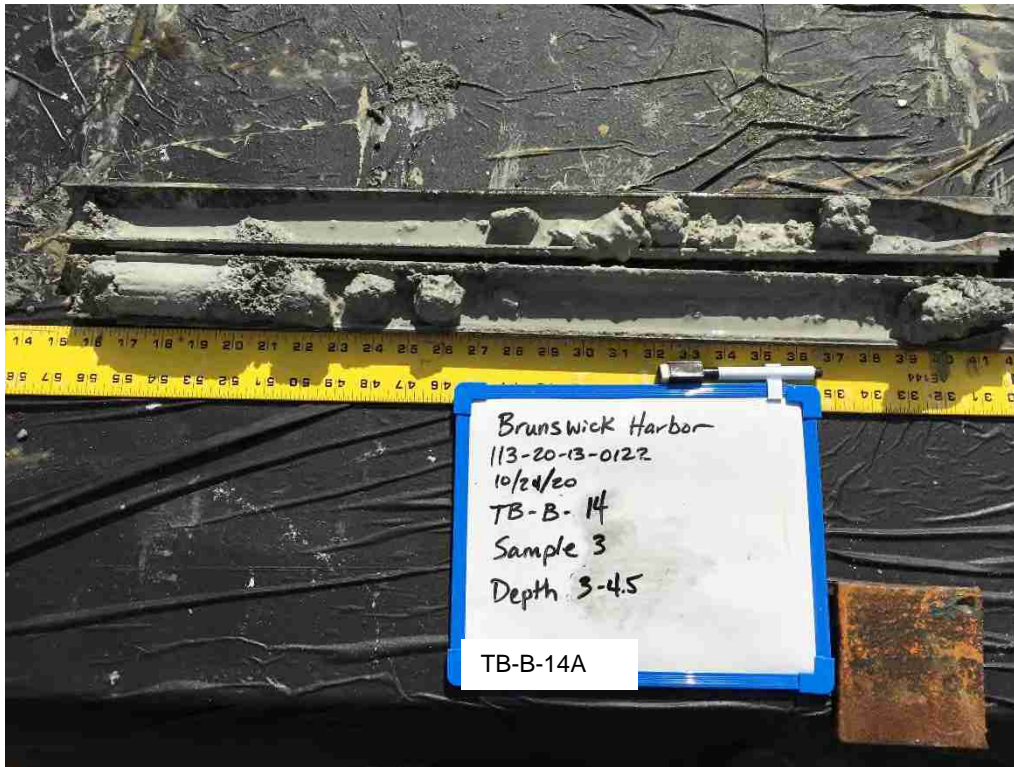
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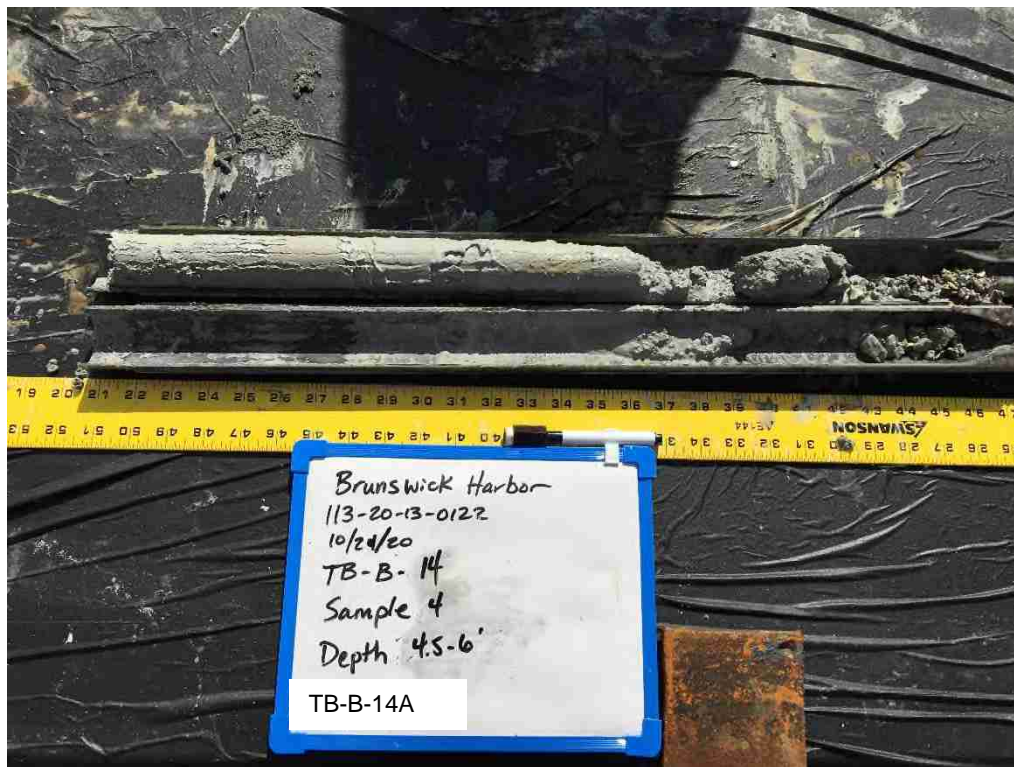
Depth: 0 – 1.5 feet; Approximate Elevation: -27.5 to -29.0 feet MLLW



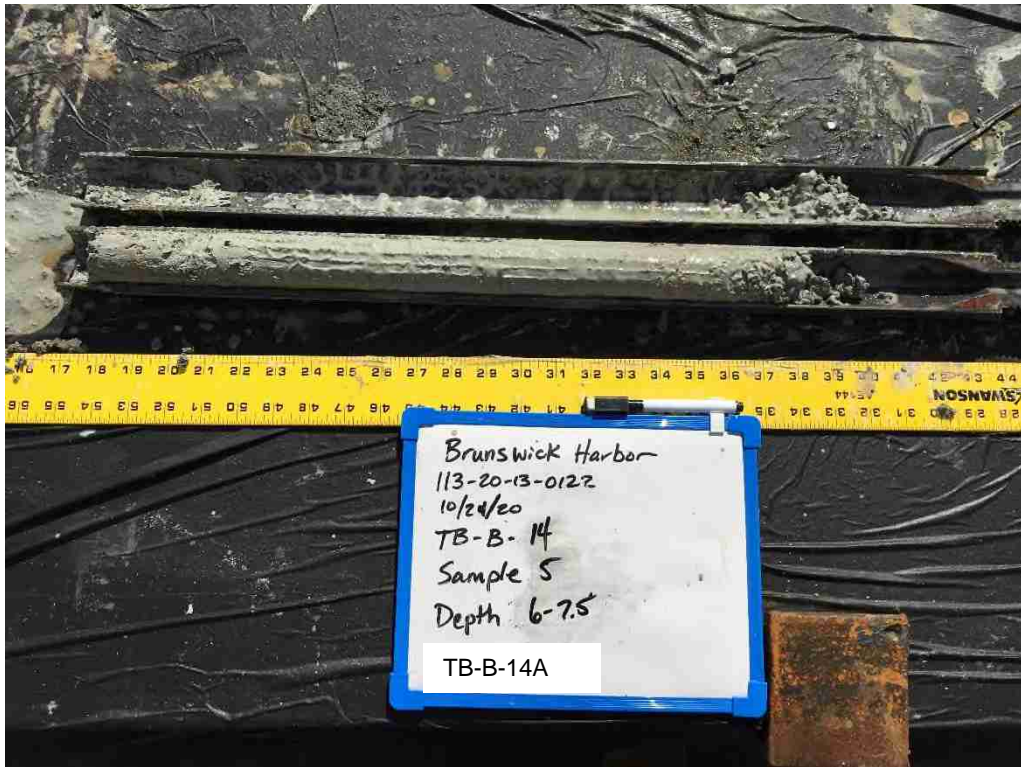
Depth: 1.5 – 3.0 feet; Approximate Elevation: -29.0 to -30.5 feet MLLW



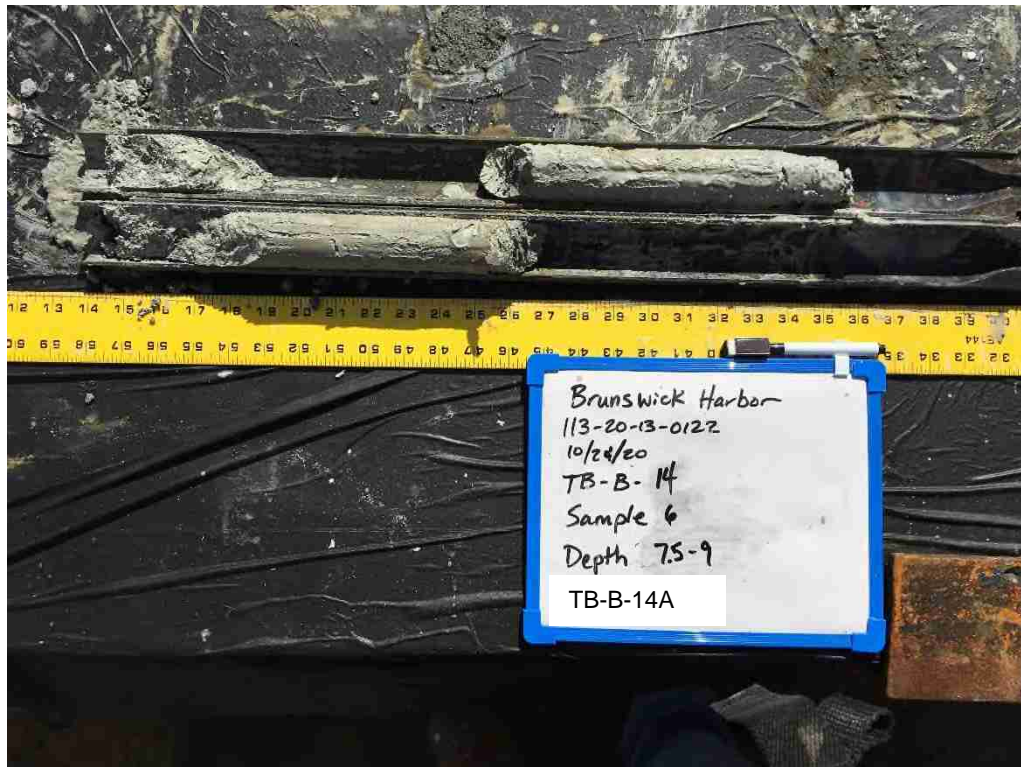
Depth: 3.0 – 4.5 feet; Approximate Elevation: -30.5 to -32.0 feet MLLW



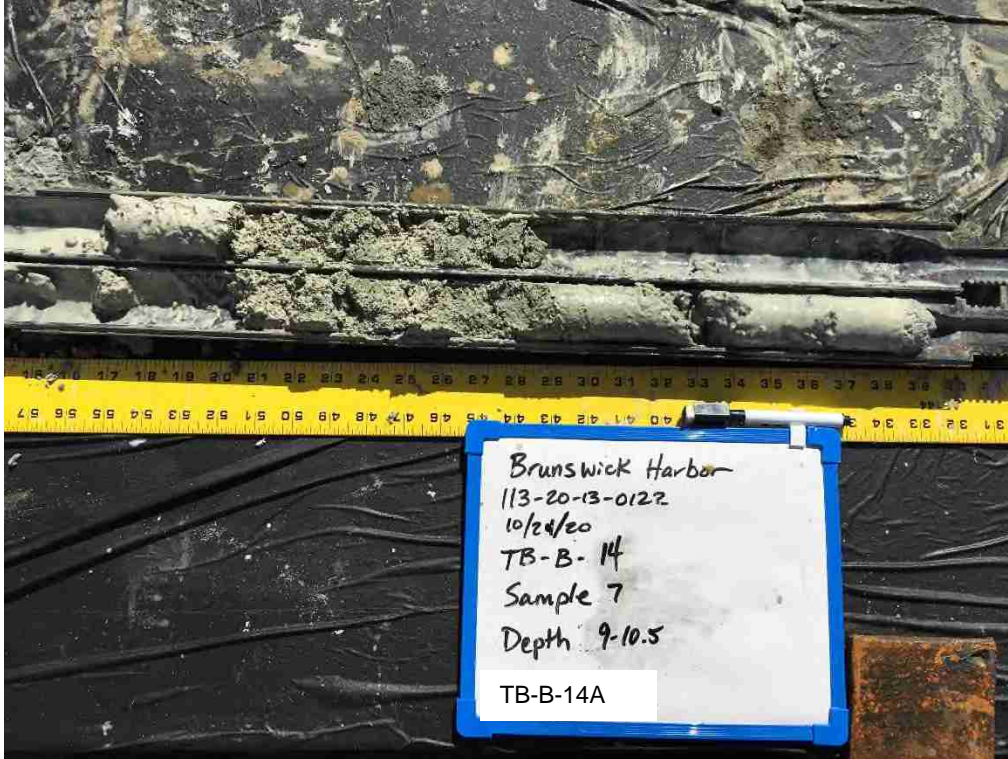
Depth: 4.5 – 6.0 feet; Approximate Elevation: -32.0 to -33.5 feet MLLW



Depth: 6.0 – 7.5 feet; Approximate Elevation: -33.5 to -35.0 feet MLLW



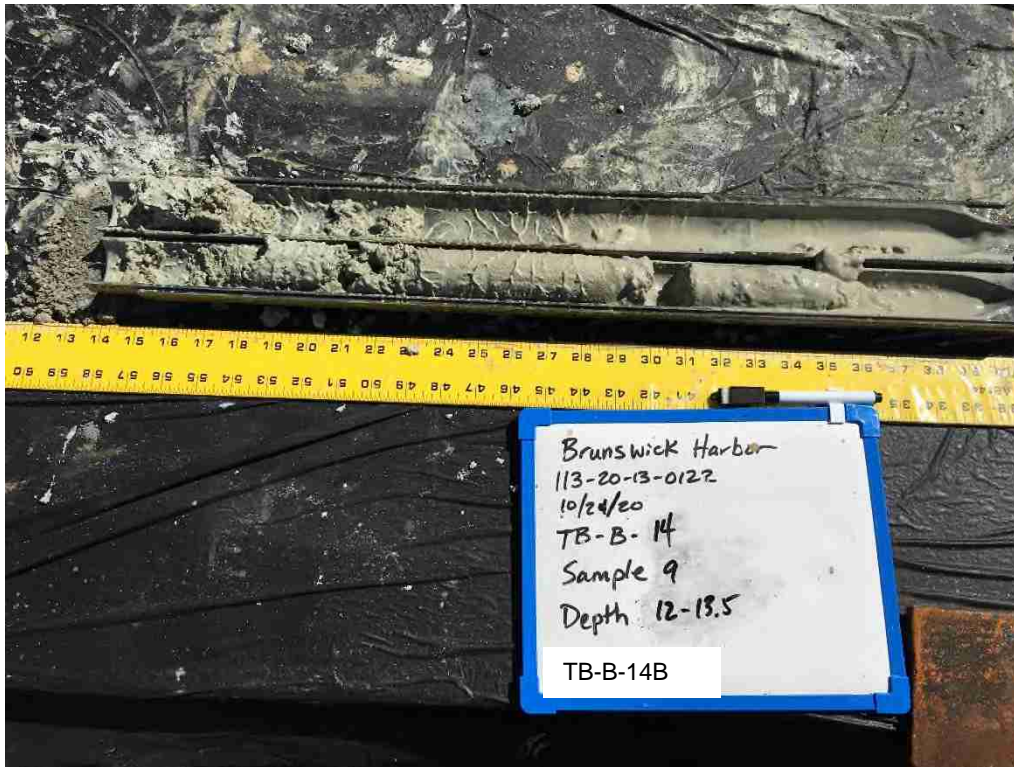
Depth: 7.5 – 9.0 feet; Approximate Elevation: -35.0 to -36.5 feet MLLW



Depth: 9.0 – 10.5 feet; Approximate Elevation: -36.5 to -38.0 feet MLLW



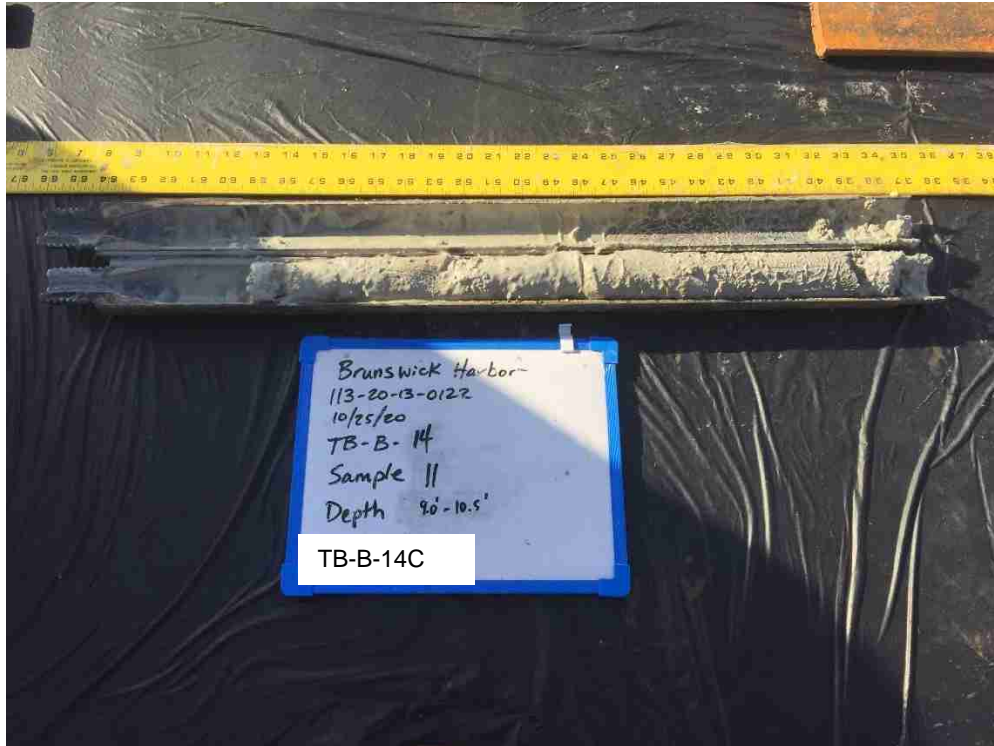
Depth: 10.5 – 12.0 feet; Approximate Elevation: -38.0 to -39.5 feet MLLW



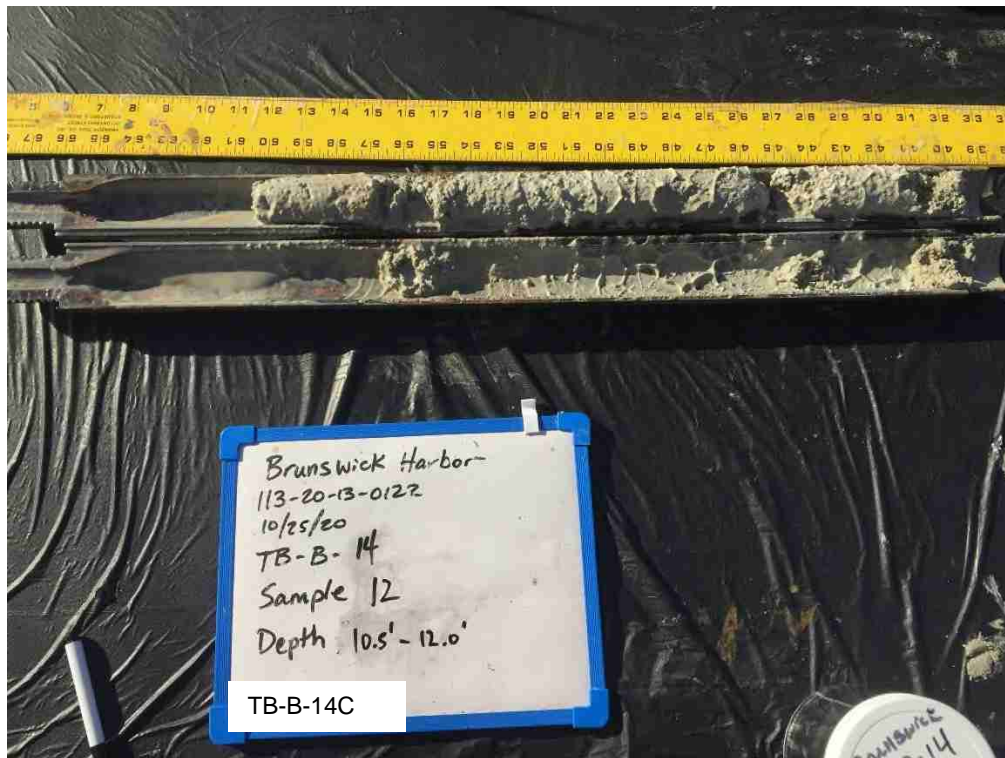
Depth: 12.0 – 13.5 feet; Approximate Elevation: -39.2 to -40.7 feet MLLW



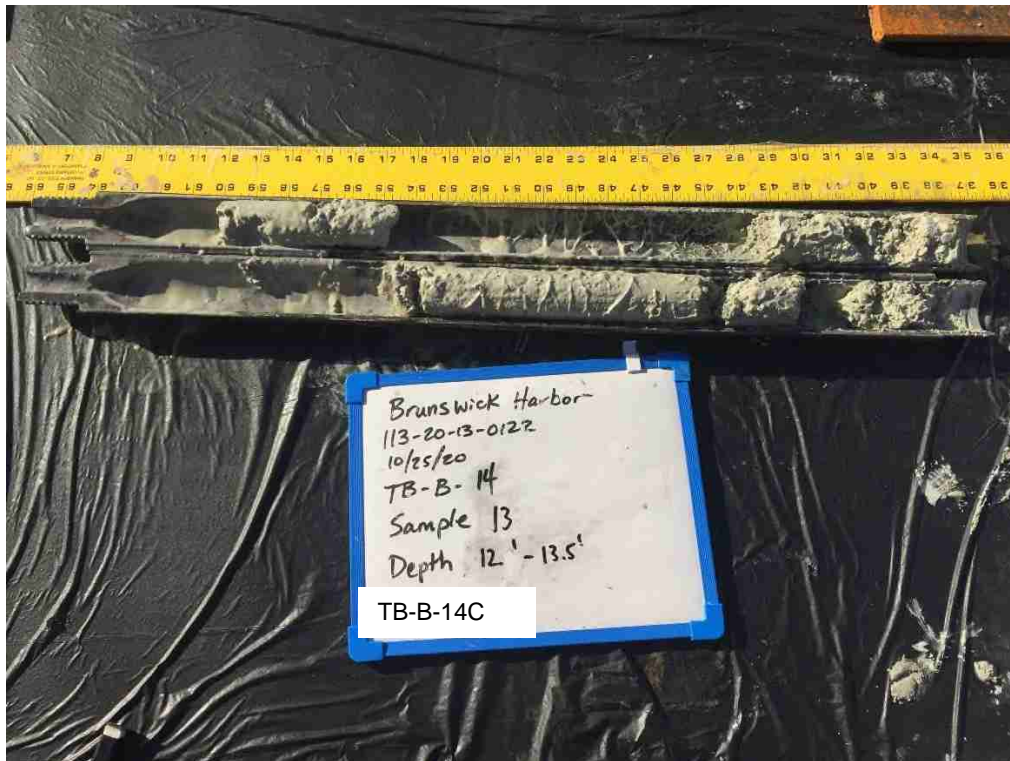
Depth: 13.5 – 15.0 feet; Approximate Elevation: -40.7 to -42.2 feet MLLW



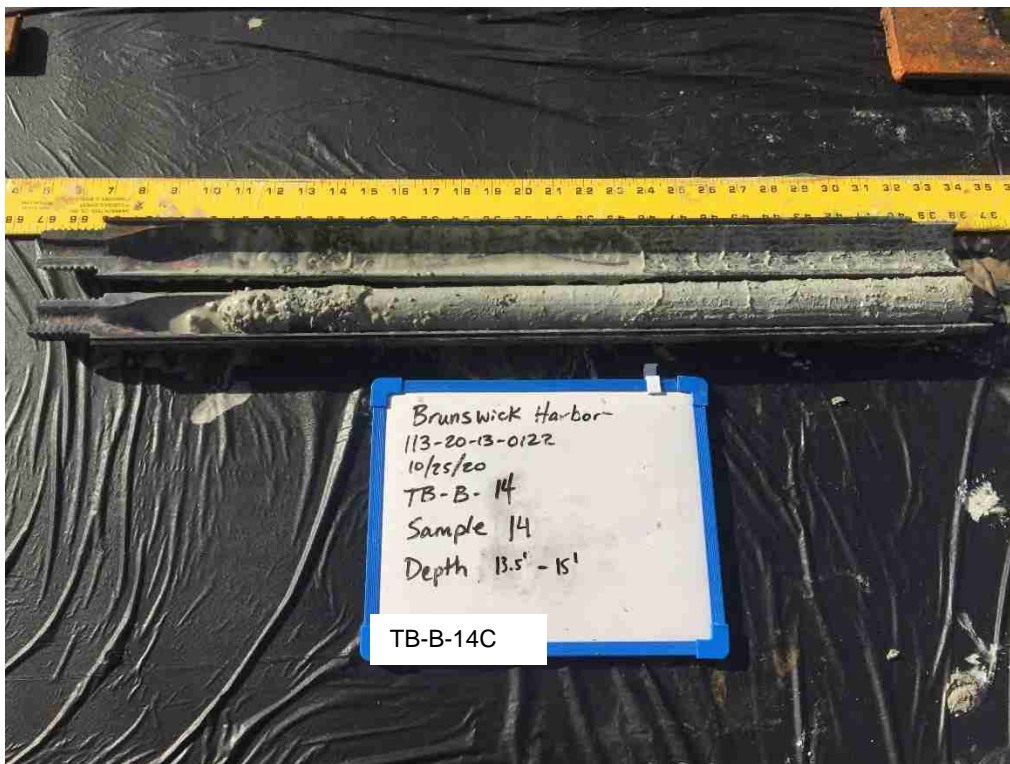
Depth: 9.0 – 10.5 feet, Approximate Elevation: -38.8 to -40.3 feet MLLW



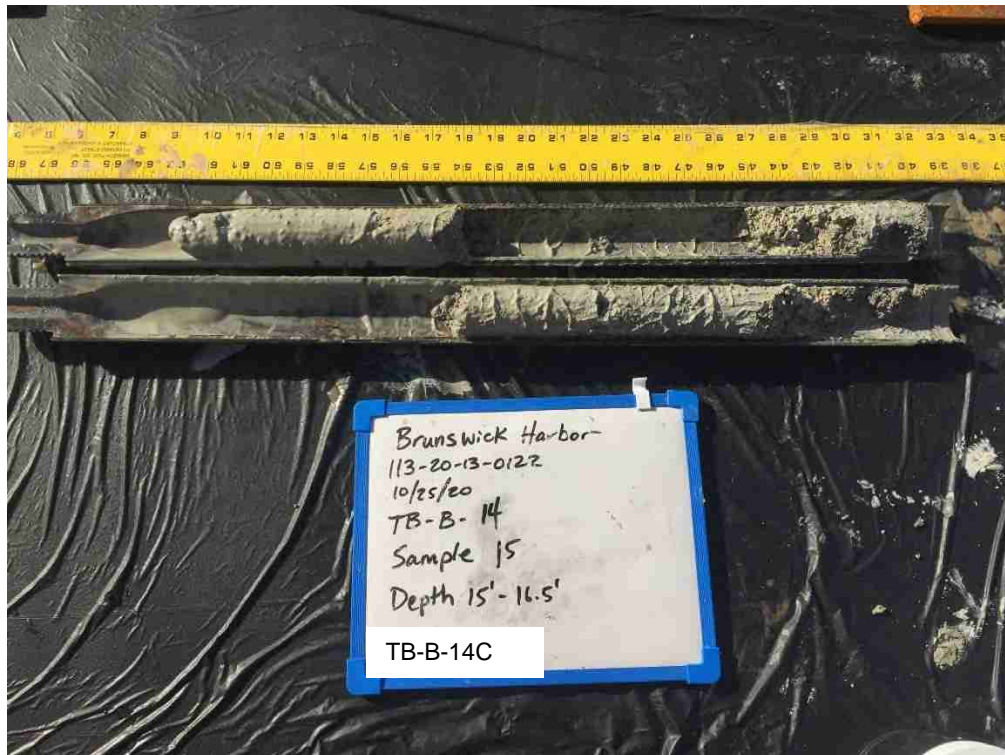
Depth: 10.5 – 12.0 feet, Approximate Elevation: -40.3 to -41.8 feet MLLW



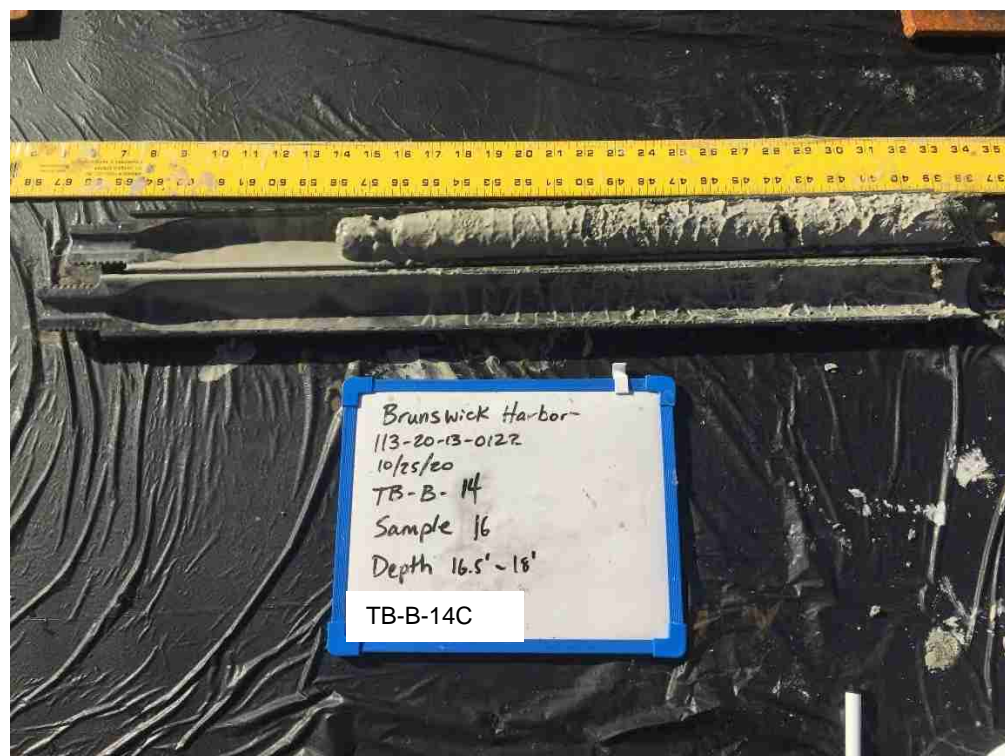
Depth: 12.0 – 13.5 feet, Approximate Elevation: -41.8 to -43.3 feet MLLW



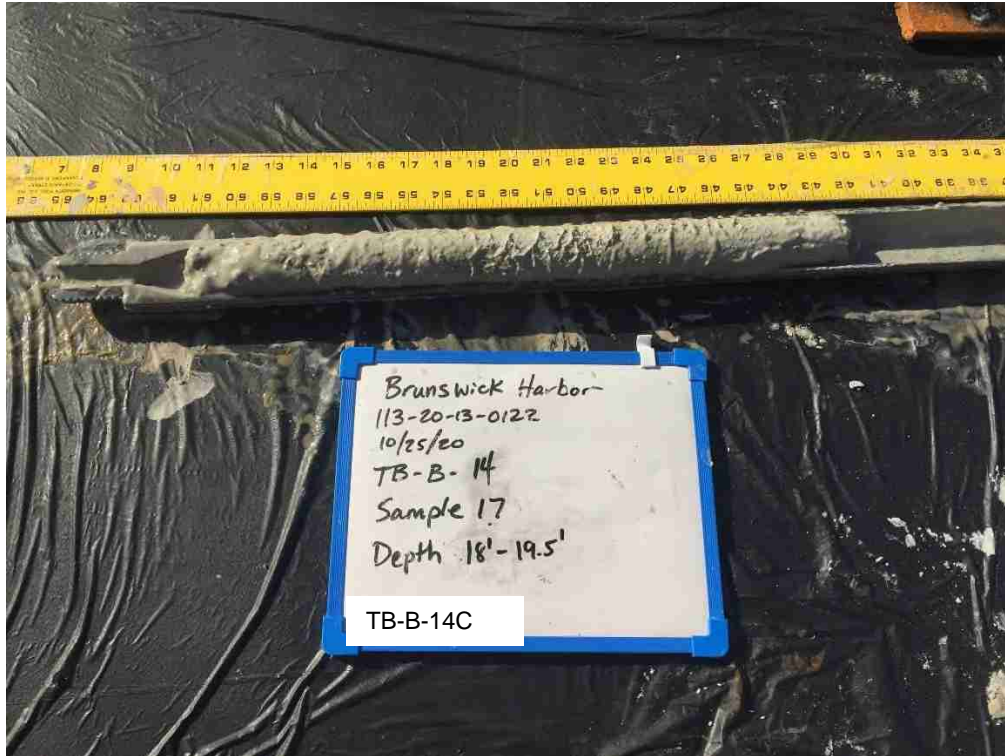
Depth: 13.5 – 15.0 feet, Approximate Elevation: -43.3 to -44.8 feet MLLW



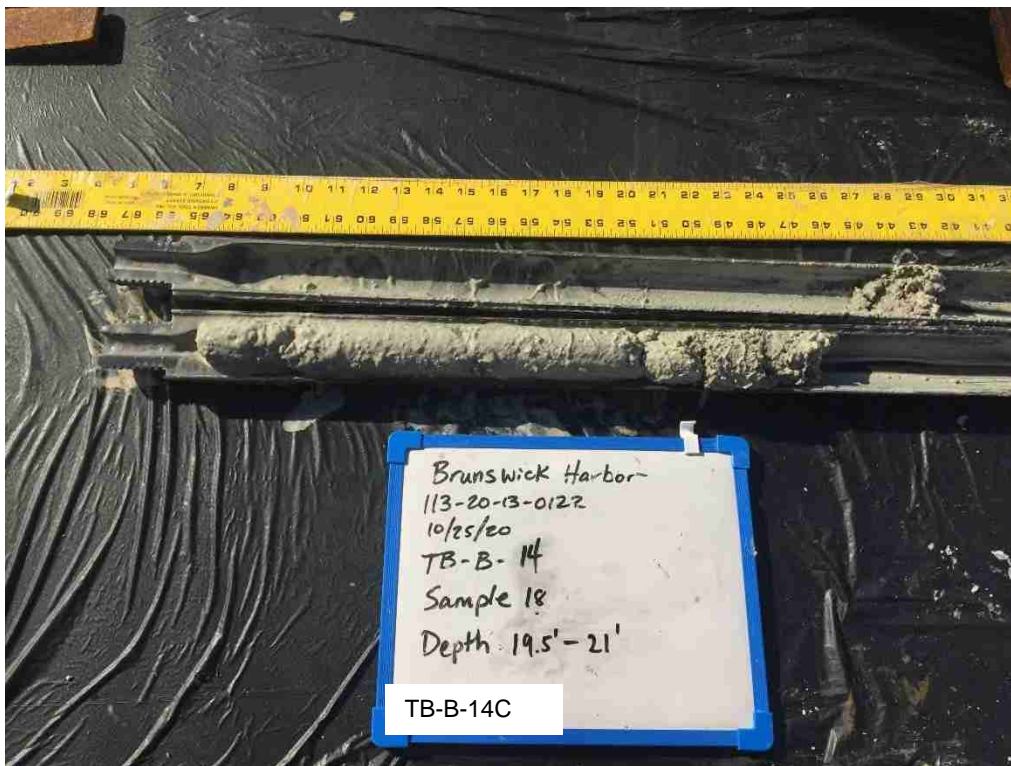
Depth: 15.0 – 16.5 feet, Approximate Elevation: -44.8 to -46.3 feet MLLW



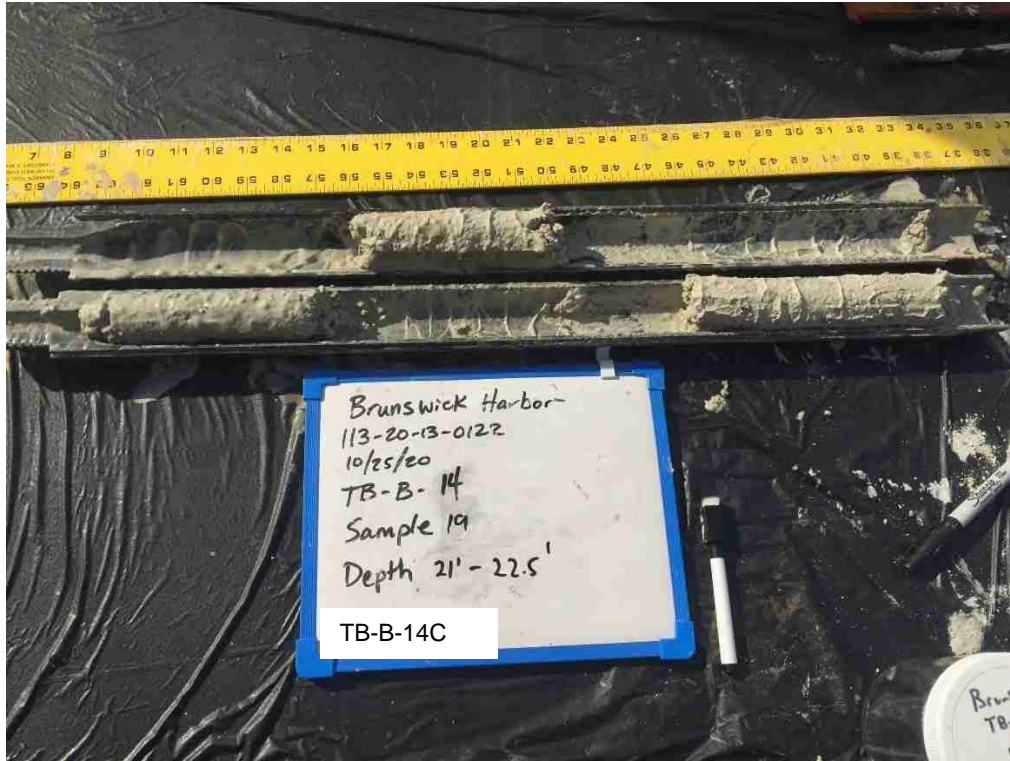
Depth: 16.5 – 18.0 feet, Approximate Elevation: -46.3 to -47.8 feet MLLW



Depth: 18.0 – 19.5 feet, Approximate Elevation: -47.8 to -49.3 feet MLLW



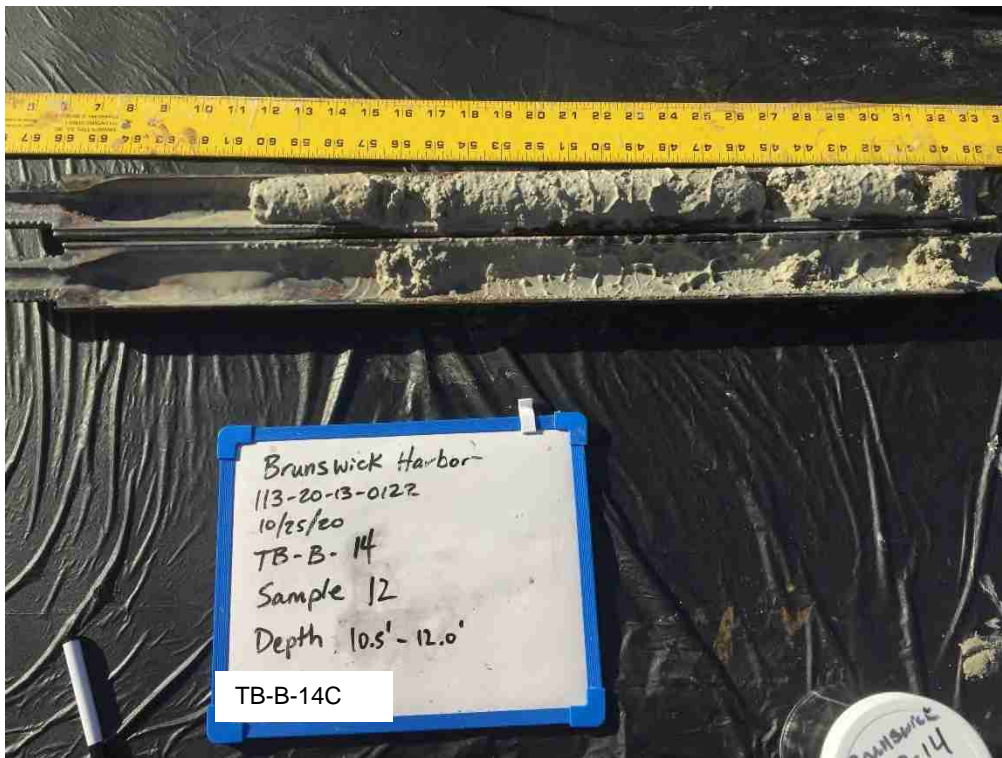
Depth: 19.5 – 21.0 feet, Approximate Elevation: -49.3 to -50.8 feet MLLW



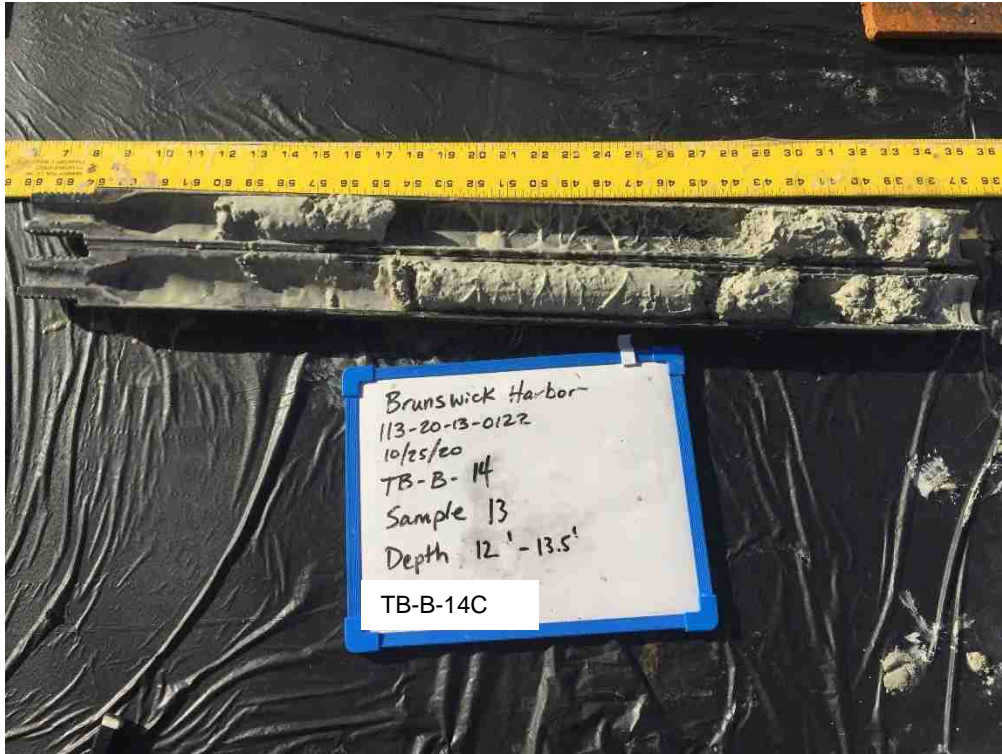
Depth: 21.0 – 22.5 feet, Approximate Elevation: -50.8 to -52.3 feet MLLW



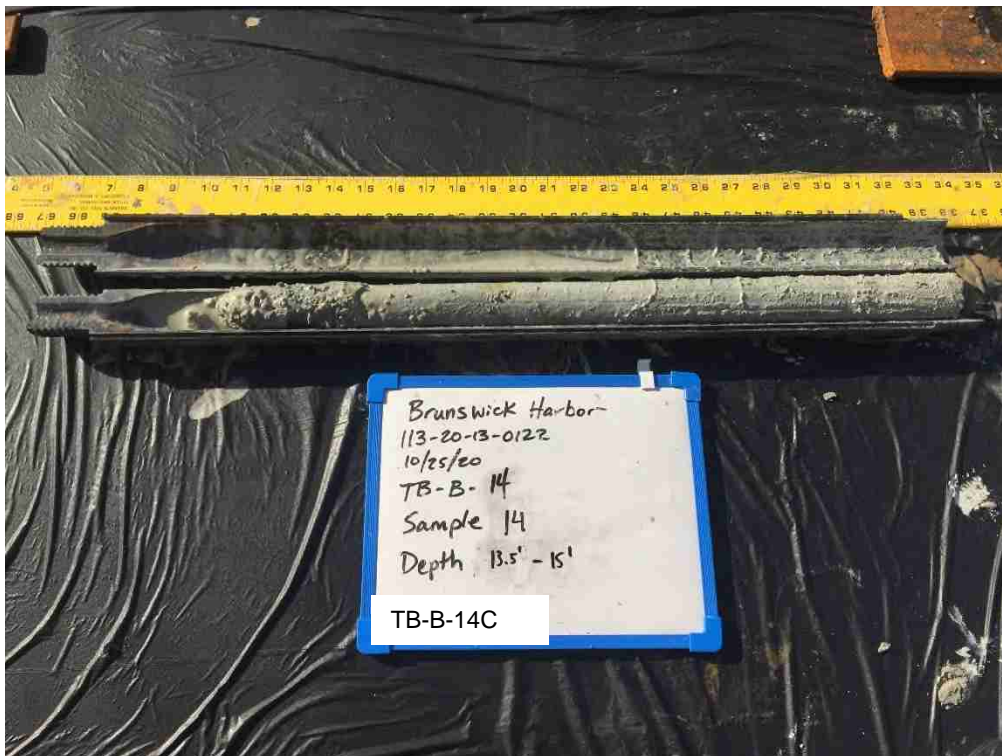
Depth: 9.0 – 10.5 feet; Approximate Elevation: -38.8 to -40.3 feet MLLW



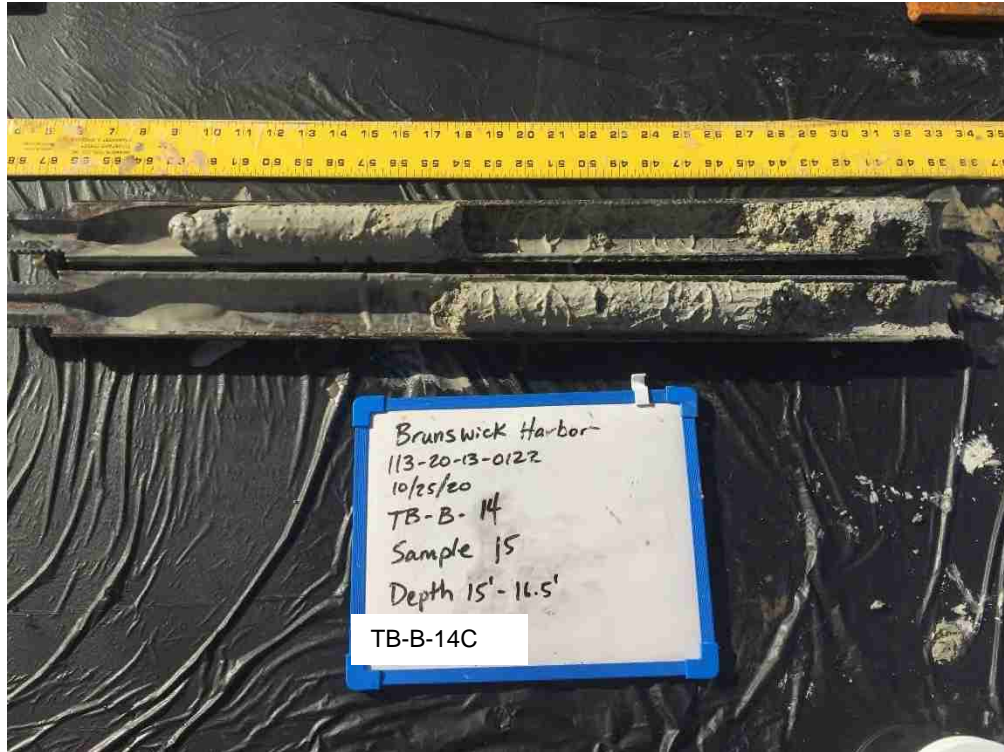
Depth: 10.5 – 12.0 feet; Approximate Elevation: -40.3 to -41.8 feet MLLW



Depth: 12.0 – 13.5 feet; Approximate Elevation: -41.8 to -43.3 feet MLLW



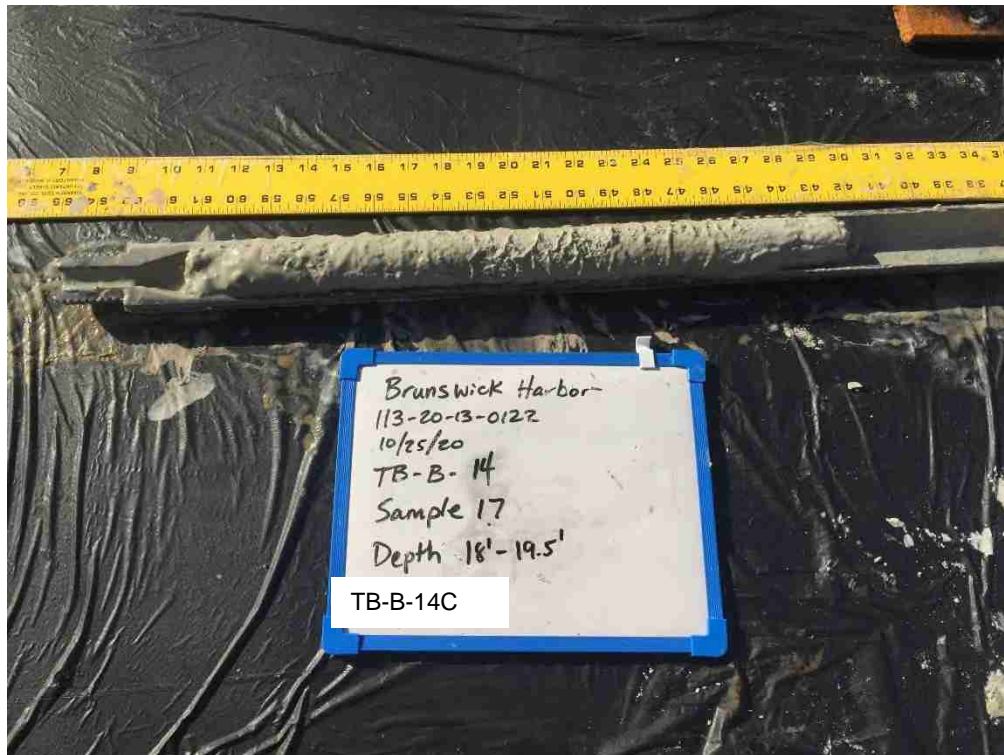
Depth: 13.5 – 15.0 feet; Approximate Elevation: -43.3 to -44.8 feet MLLW



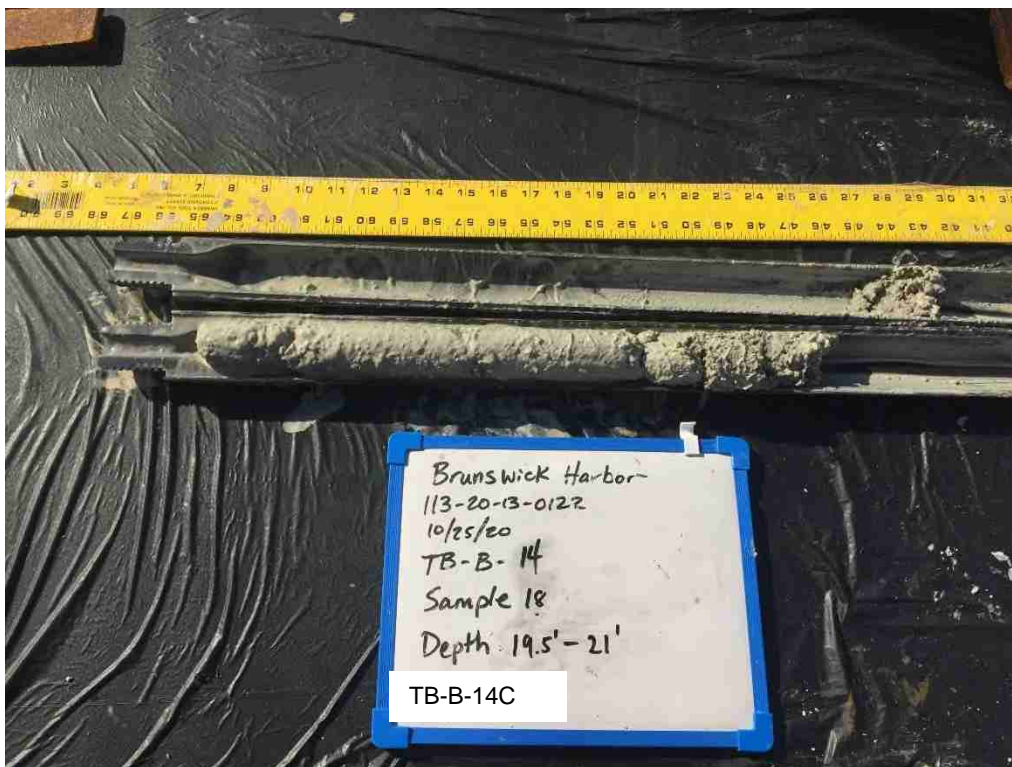
Depth: 15.0 – 16.5 feet; Approximate Elevation: -44.8 to -46.3 feet MLLW



Depth: 16.5 – 18.0 feet; Approximate Elevation: -46.3 to -47.8 feet MLLW



Depth: 18.0 – 19.5 feet; Approximate Elevation: -47.8 to -49.3 feet MLLW



Depth: 19.5 – 21.0 feet; Approximate Elevation: -49.3 to -50.8 feet MLLW



Depth: 21.0 – 22.5 feet; Approximate Elevation: -50.8 to -52.3 feet MLLW

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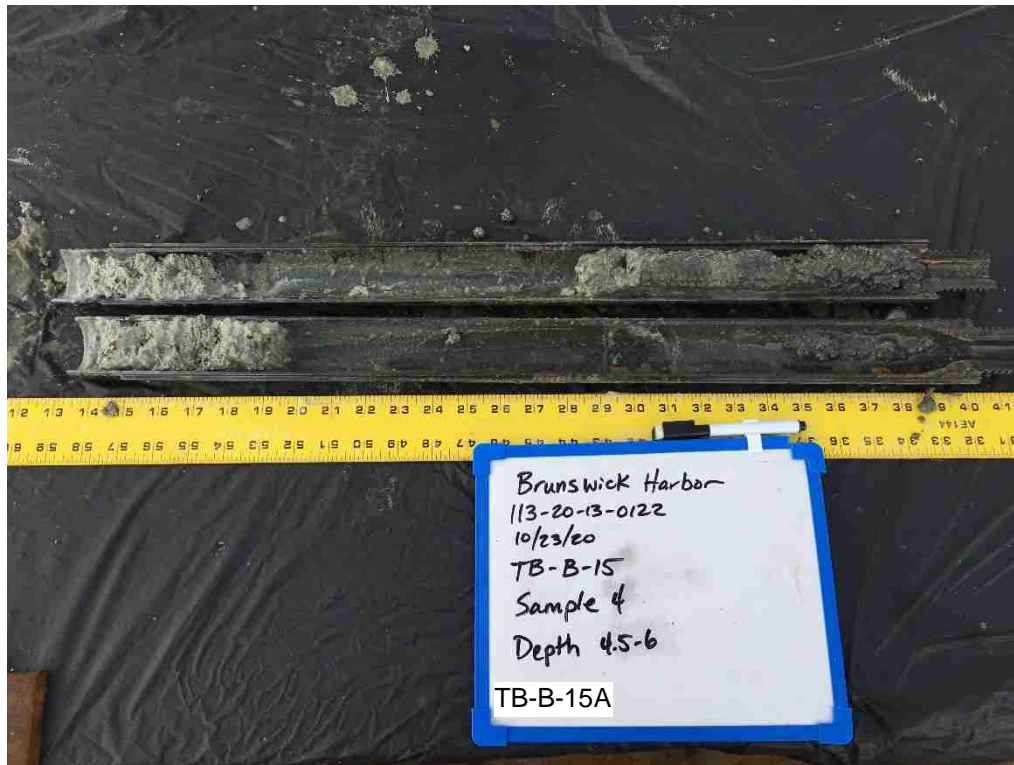
Depth: 0 – 1.5 feet; Approximate Elevation -39.0 to -40.5 feet MLLW



Depth: 1.5 – 3.0 feet; Approximate Elevation -40.5 to -42.0 feet MLLW



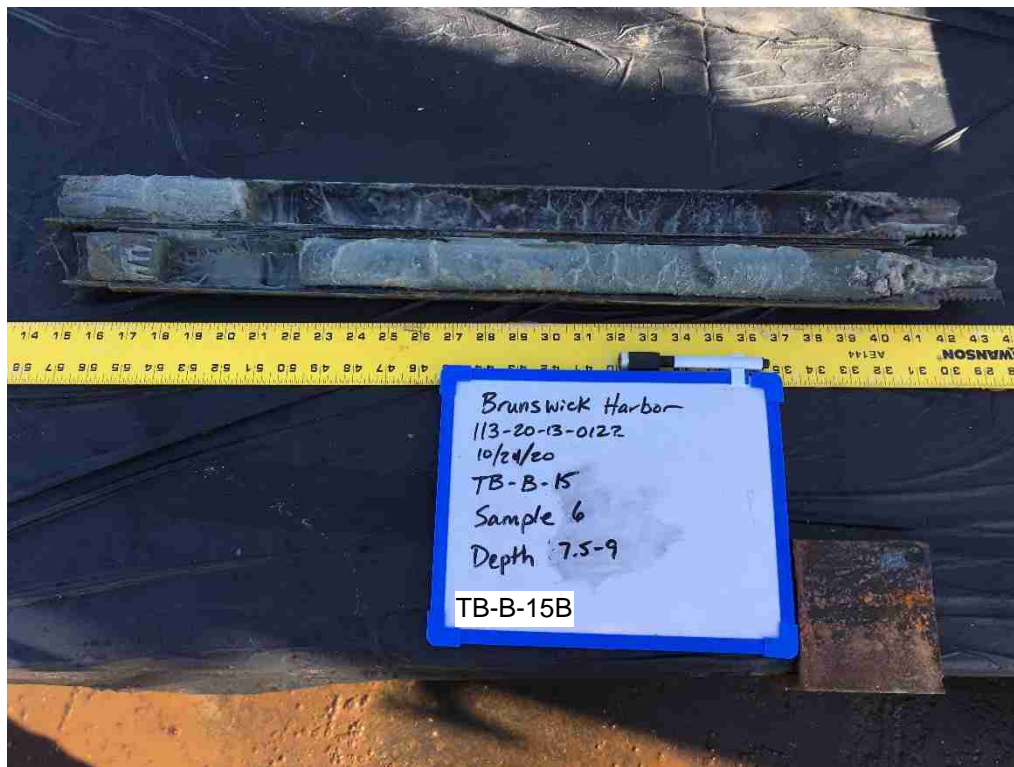
Depth: 3.0 – 4.5 feet; Approximate Elevation -42.0 to -43.5 feet MLLW



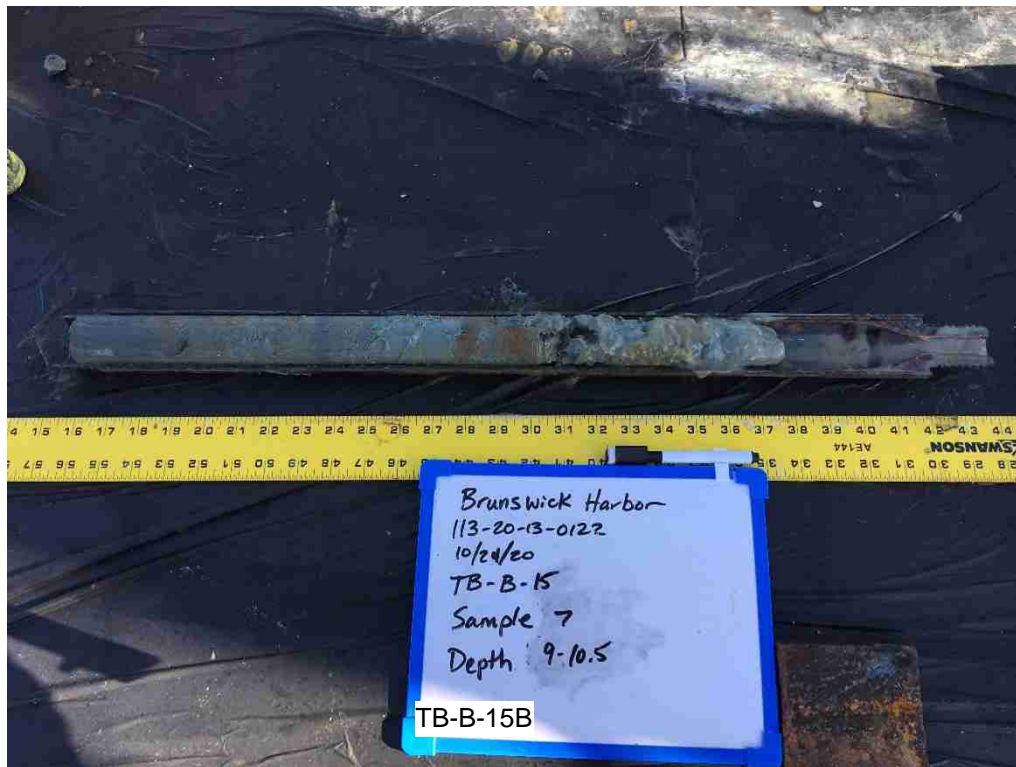
Depth: 4.5 – 6.0 feet; Approximate Elevation -43.5 to -45.0 feet MLLW



Depth: 6.0 – 7.5 feet; Approximate Elevation -45.0 to -46.5 feet MLLW

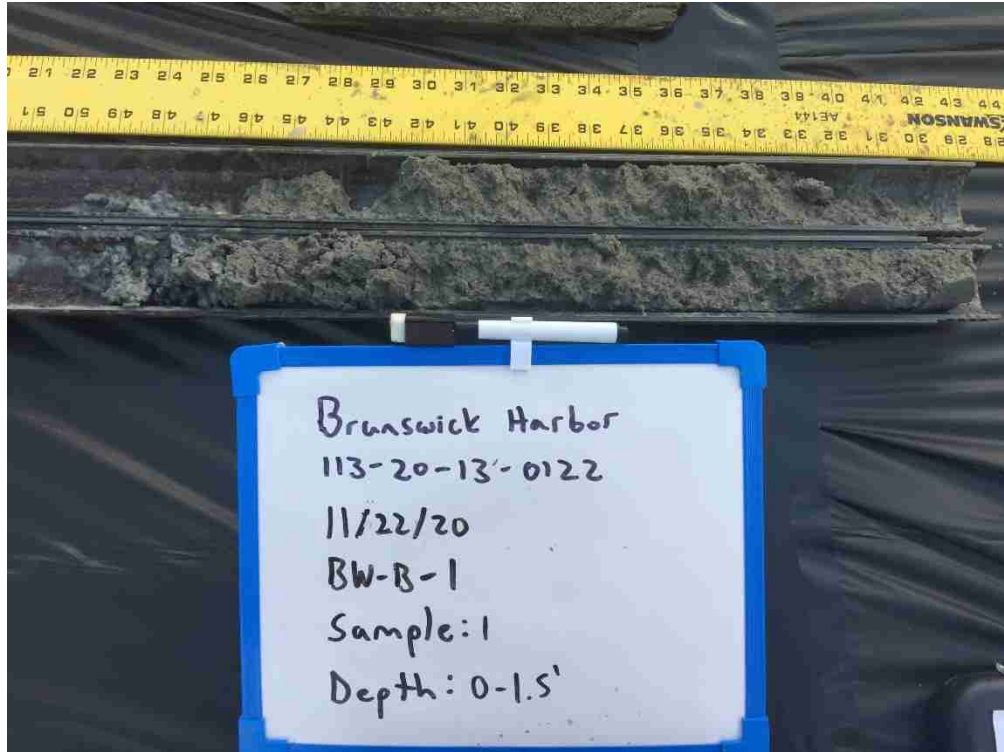


Depth: 7.5 – 9.0 feet; Approximate Elevation -45.9 to -47.4 feet MLLW

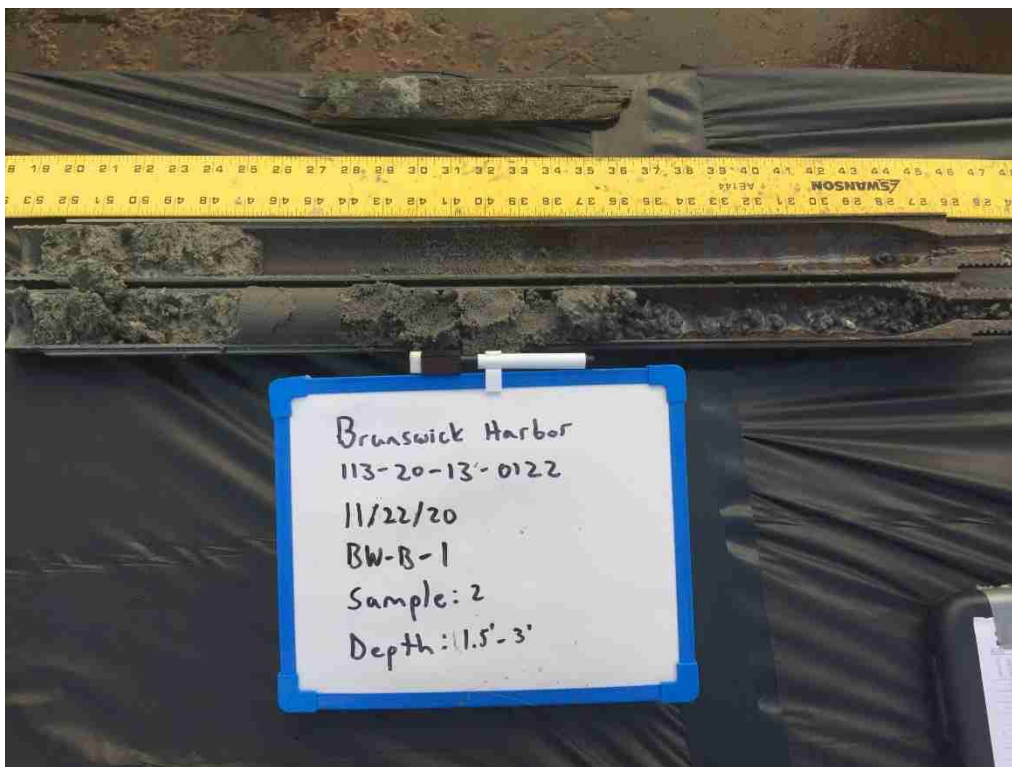


Depth: 9.0 – 10.5 feet; Approximate Elevation -47.4 to -48.9 feet MLLW

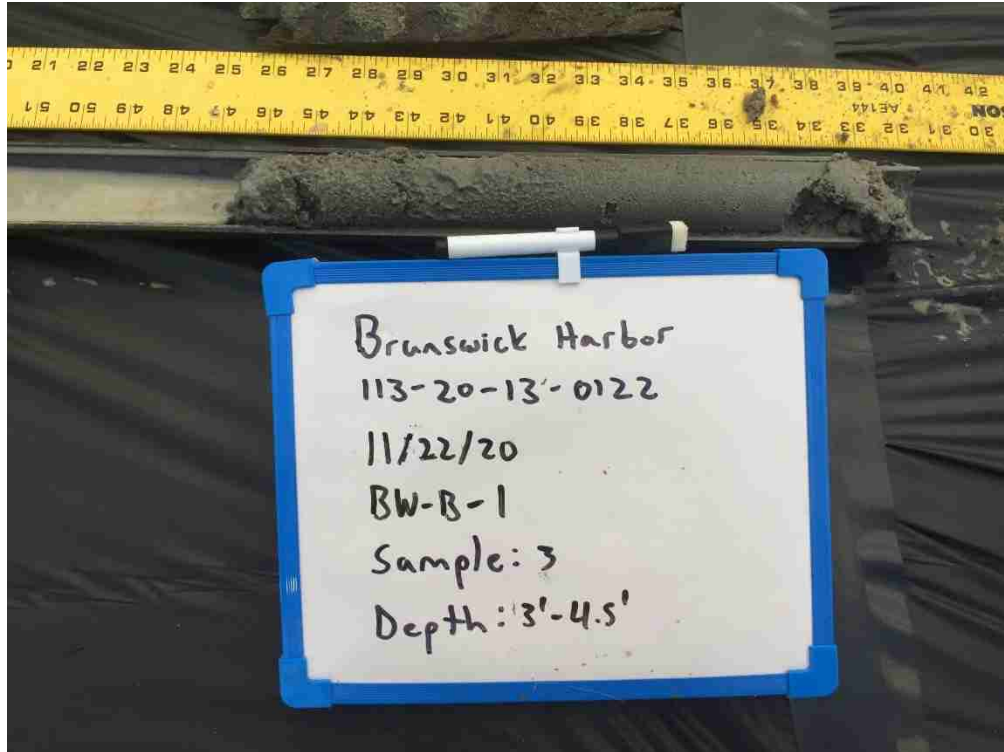
BW-B-01 Photographs



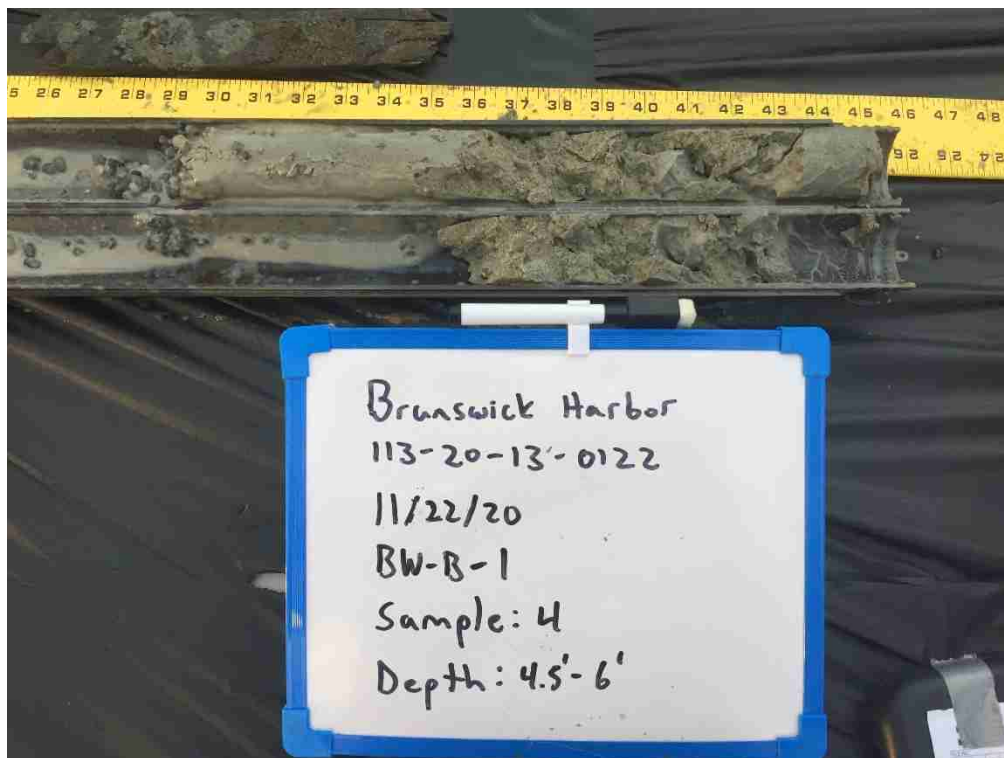
Depth: 0.0 – 1.5 feet; Approximate Elevation: -28.0 to -29.5 feet MLLW



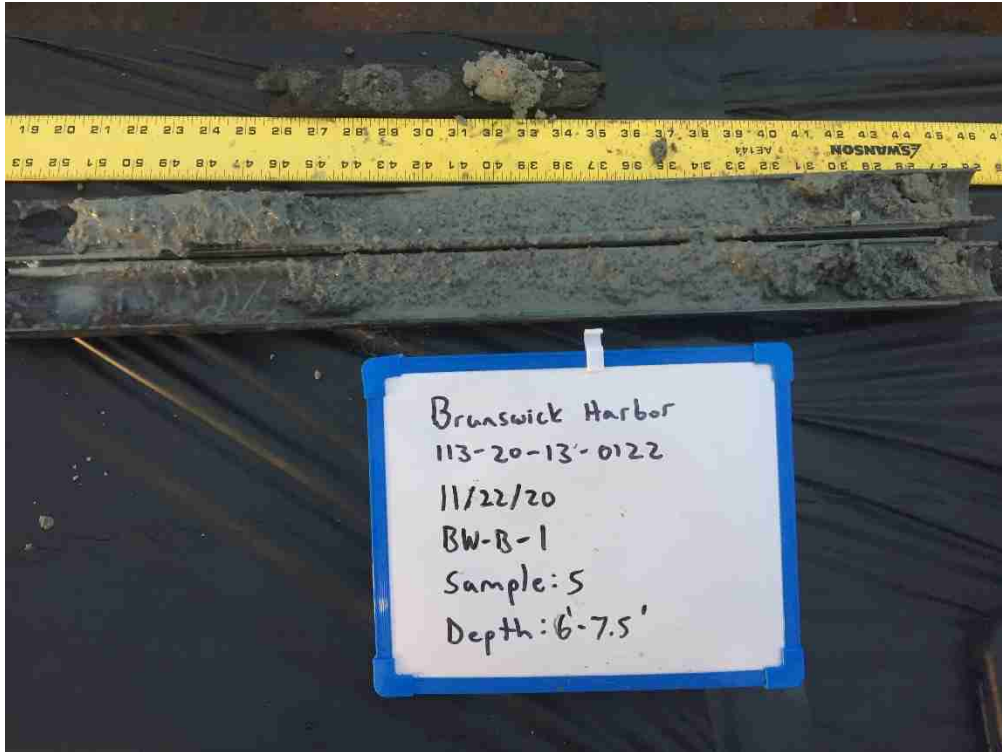
Depth: 1.5 – 3.0 feet; Approximate Elevation: -29.5 to -31.0 feet MLLW



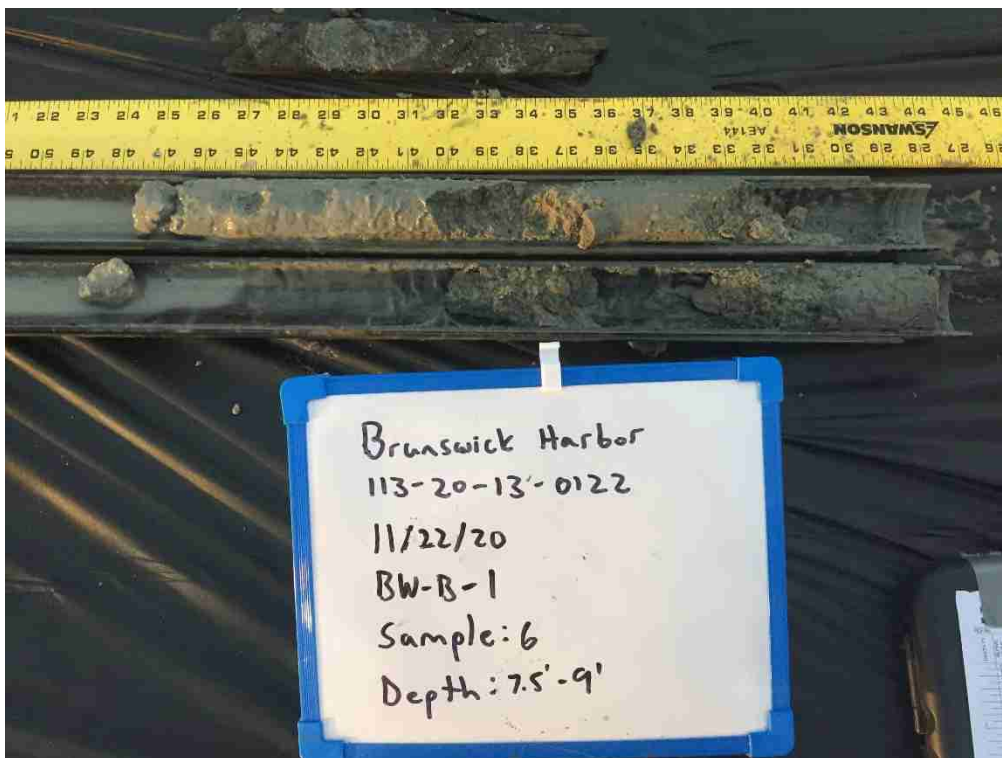
Depth: 3.0 – 4.5 feet; Approximate Elevation: -31.0 to -32.5 feet MLLW



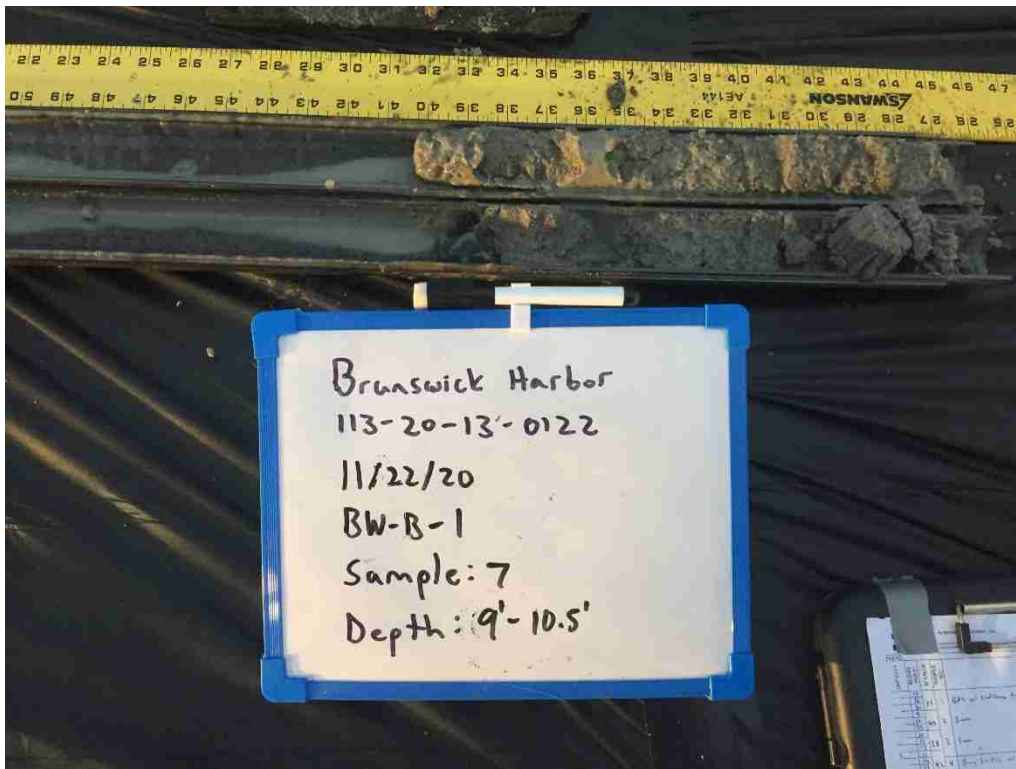
Depth: 4.5 – 6.0 feet; Approximate Elevation: -32.5 to -34.0 feet MLLW



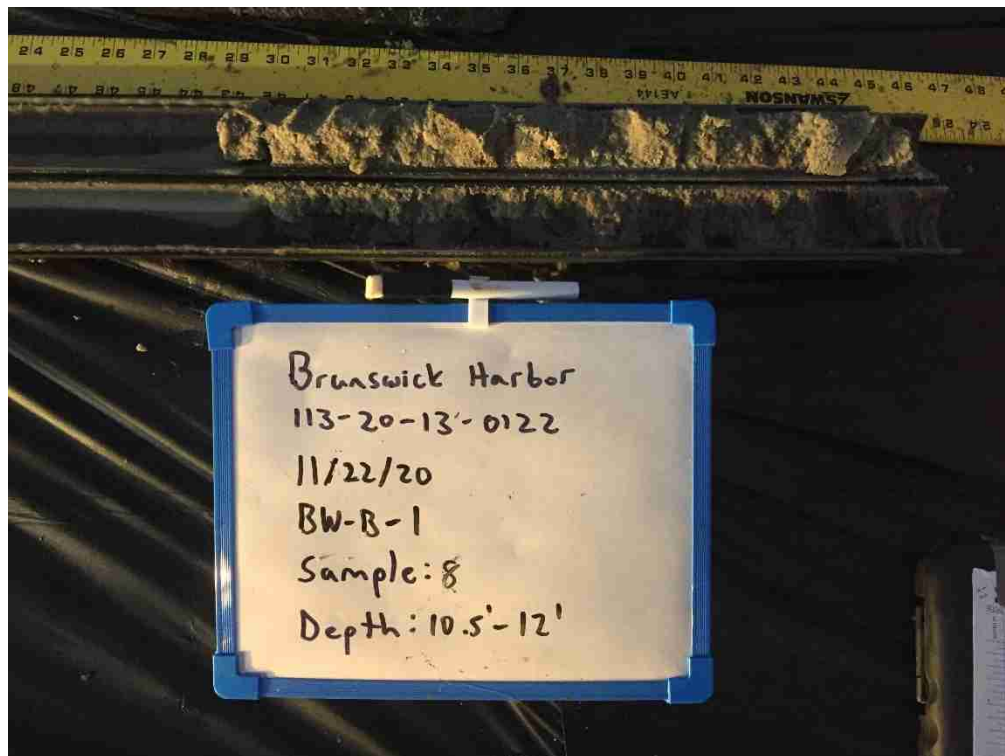
Depth: 6.0 – 7.5 feet; Approximate Elevation: -34.0 to -35.5 feet MLLW



Depth: 7.5 – 9.0 feet; Approximate Elevation: -35.5 to -37.0 feet MLLW



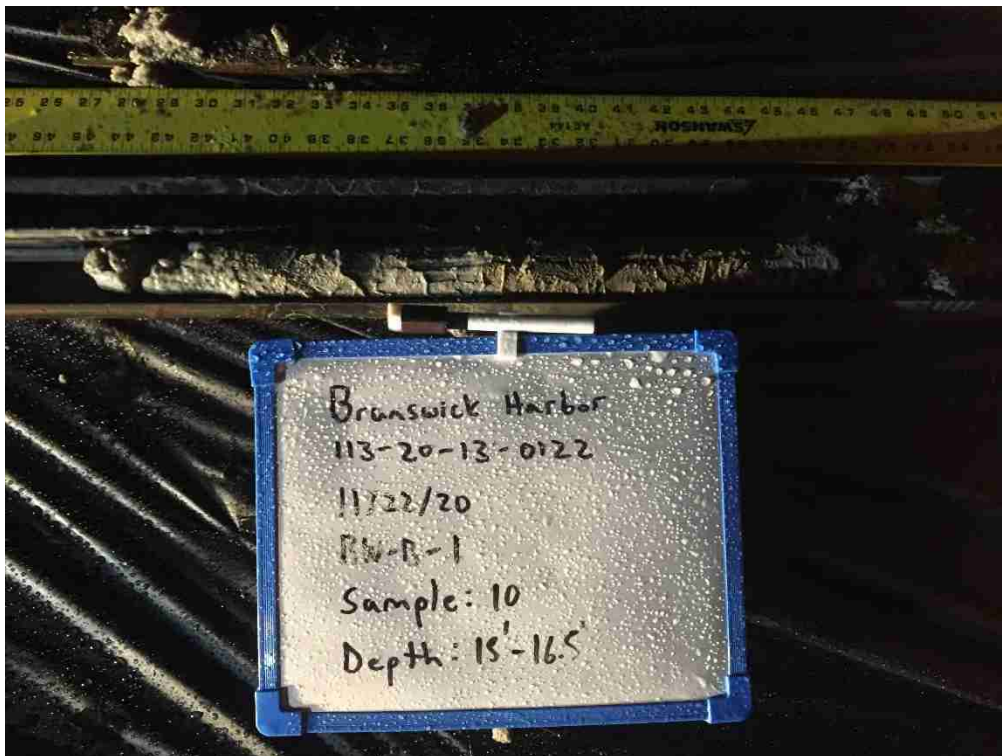
Depth: 9.0 – 10.5 feet; Approximate Elevation: -37.0 to -38.5 feet MLLW



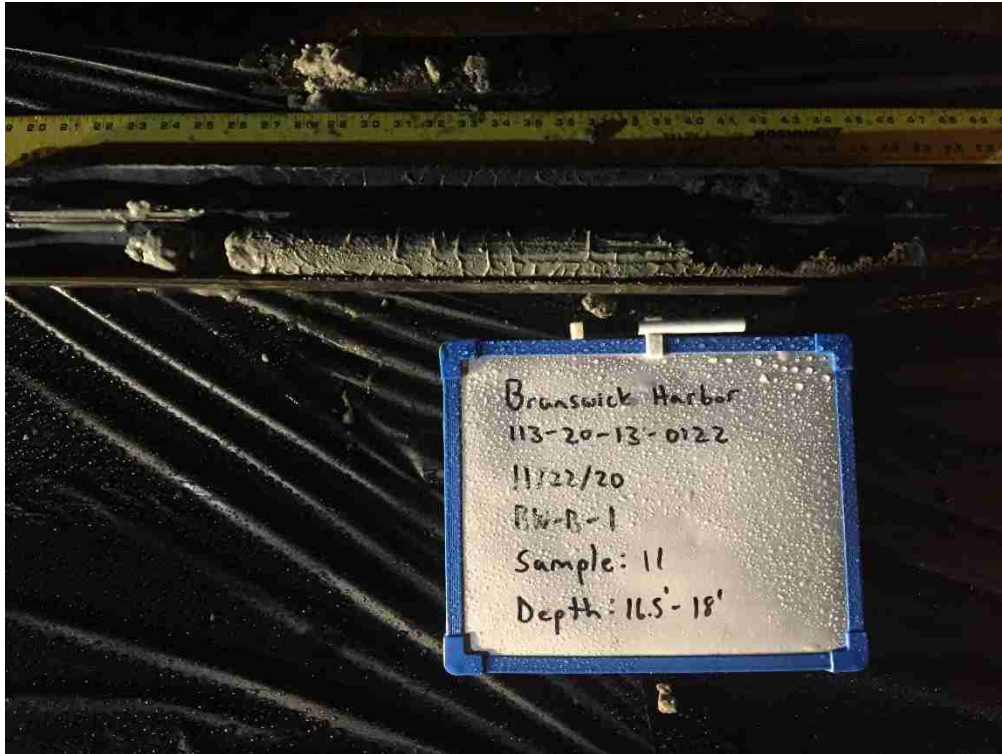
Depth: 10.5 – 12.0 feet; Approximate Elevation: -38.5 to -40.0 feet MLLW



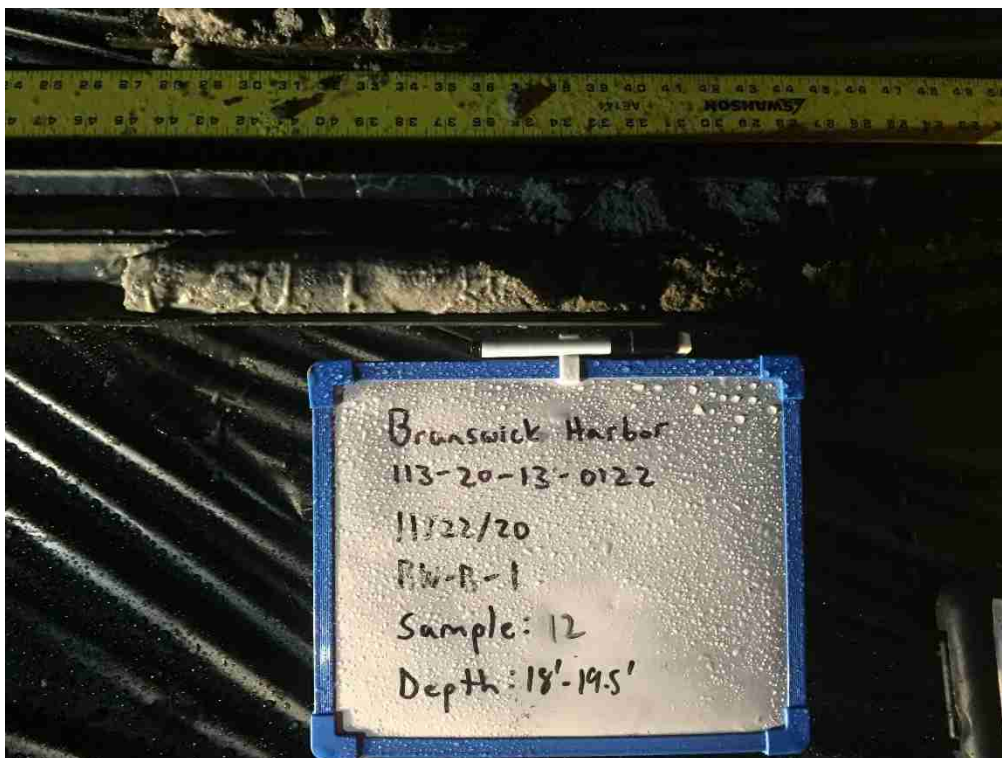
Depth: 13.5 – 15.0 feet; Approximate Elevation: -41.5 to -43.0 feet MLLW



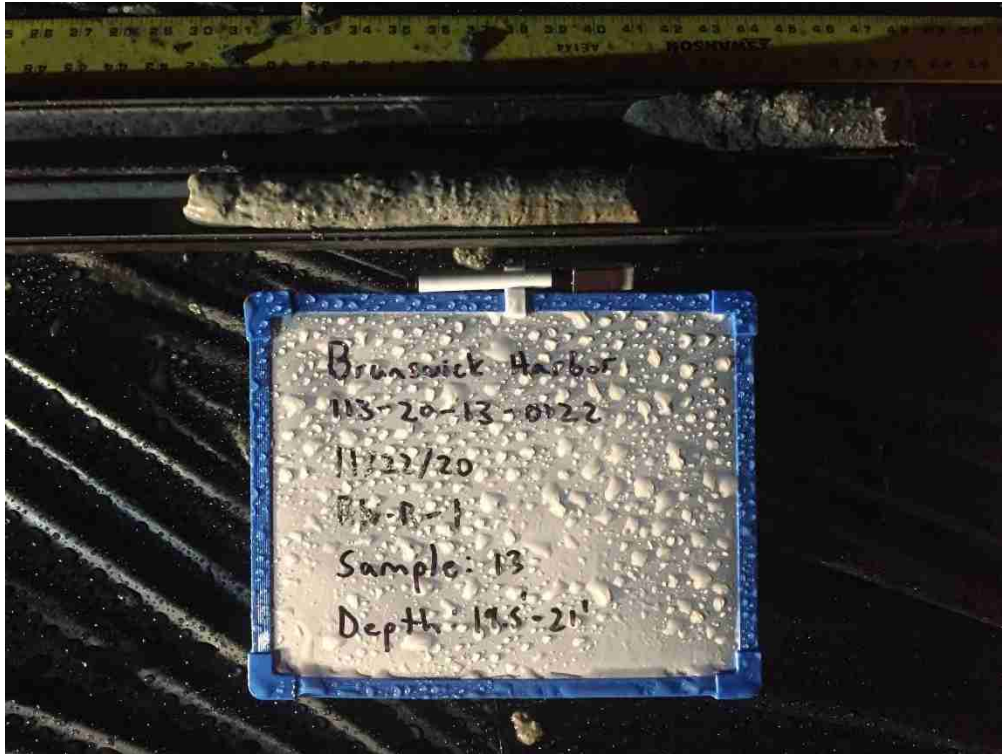
Depth: 15.0 – 16.5 feet; Approximate Elevation: -43.0 to -44.5 feet MLLW



Depth: 16.5 – 18.0 feet; Approximate Elevation: -44.5 to -46.0 feet MLLW

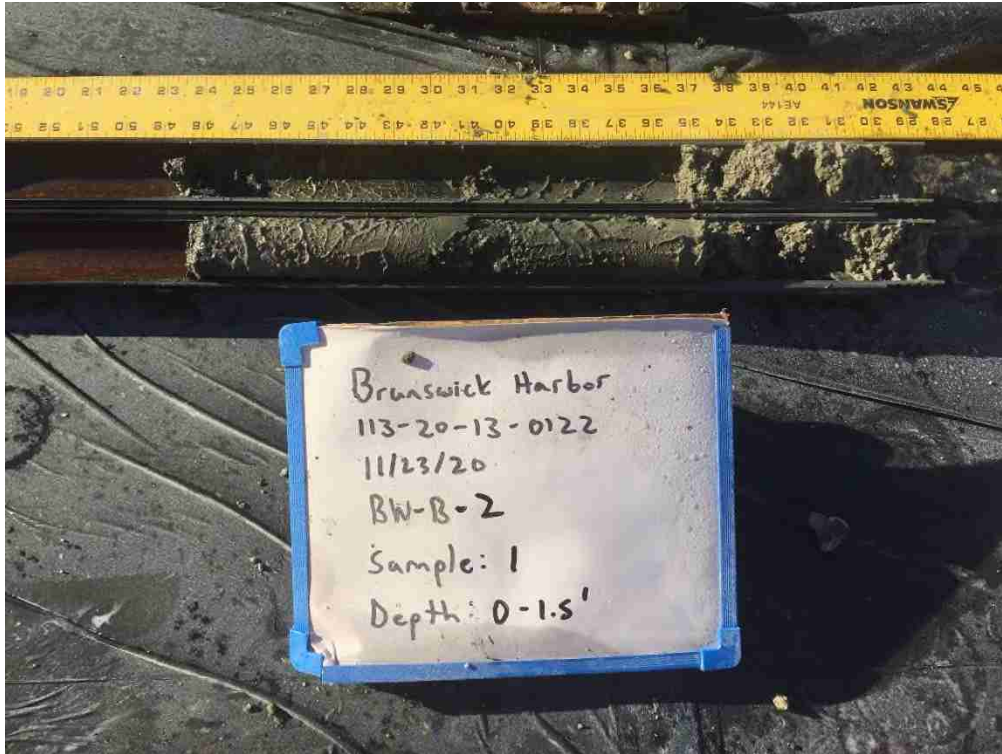


Depth: 18.0 – 19.5 feet; Approximate Elevation: -46.0 to -47.5 feet MLLW

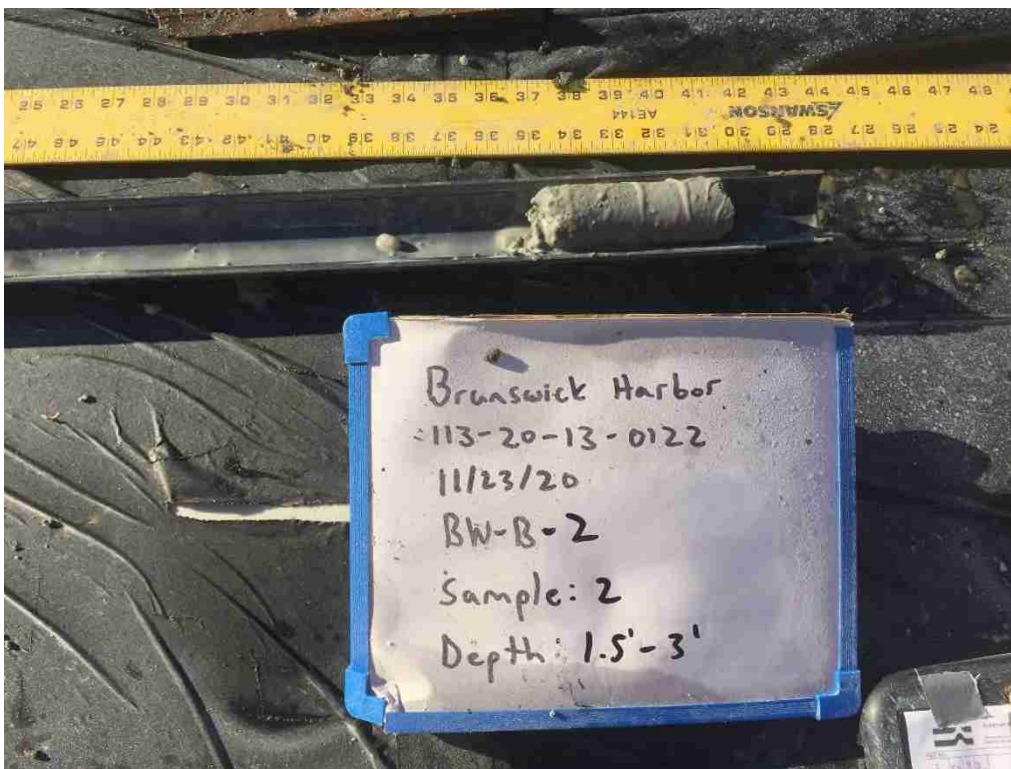


Depth: 19.5 – 21.0 feet; Approximate Elevation: -47.5 to -49.0 feet MLLW

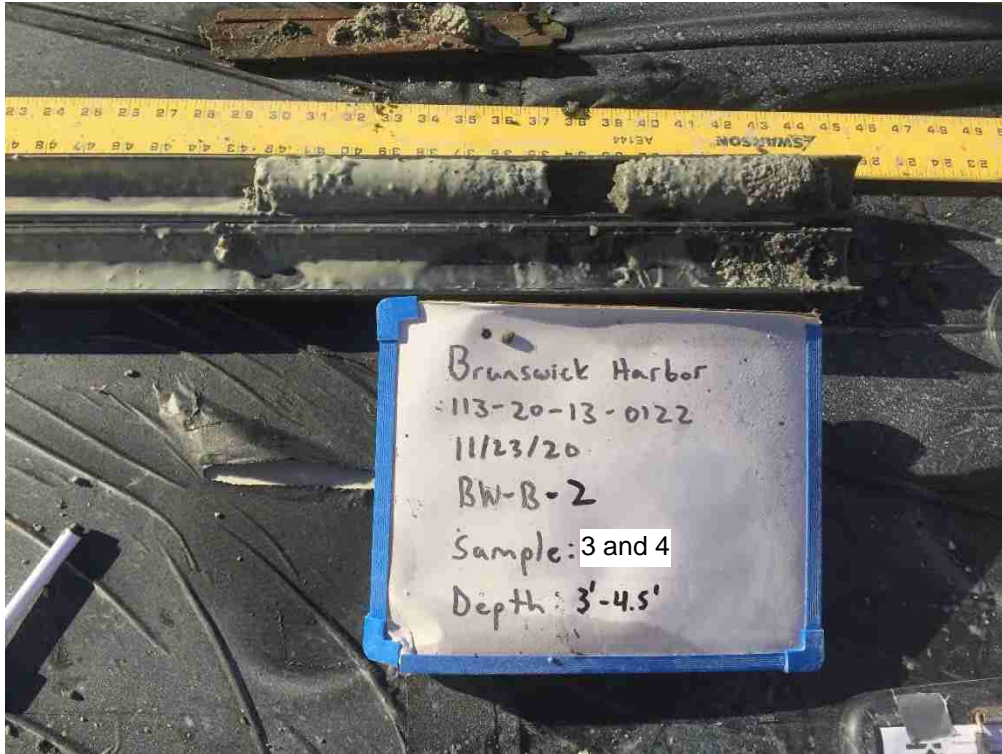
BW-B-02 Photographs



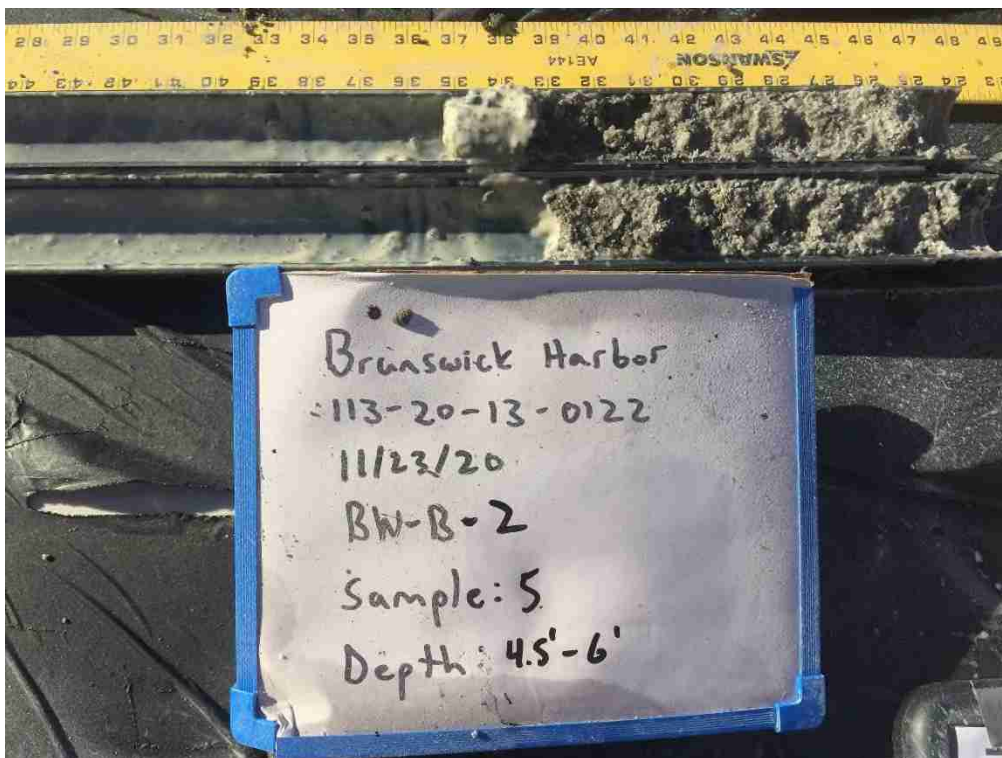
Depth: 0.0 – 1.5 feet; Approximate Elevation: -33.0 to -34.5 feet MLLW



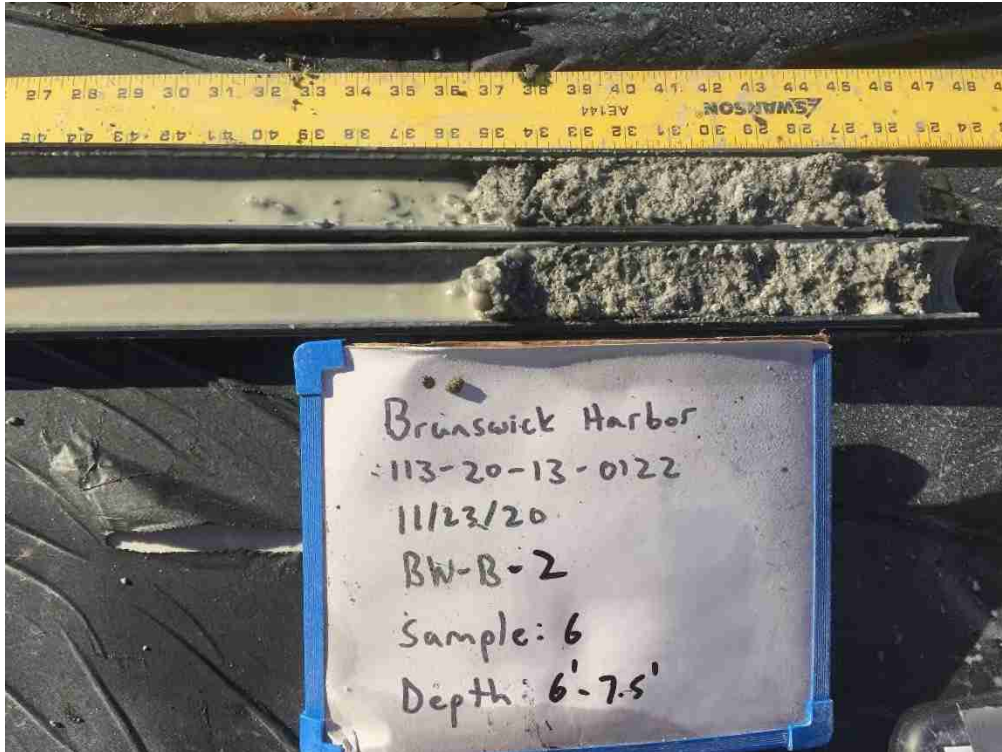
Depth: 1.5 – 3.0 feet; Approximate Elevation: -34.5 to -36.0 feet MLLW



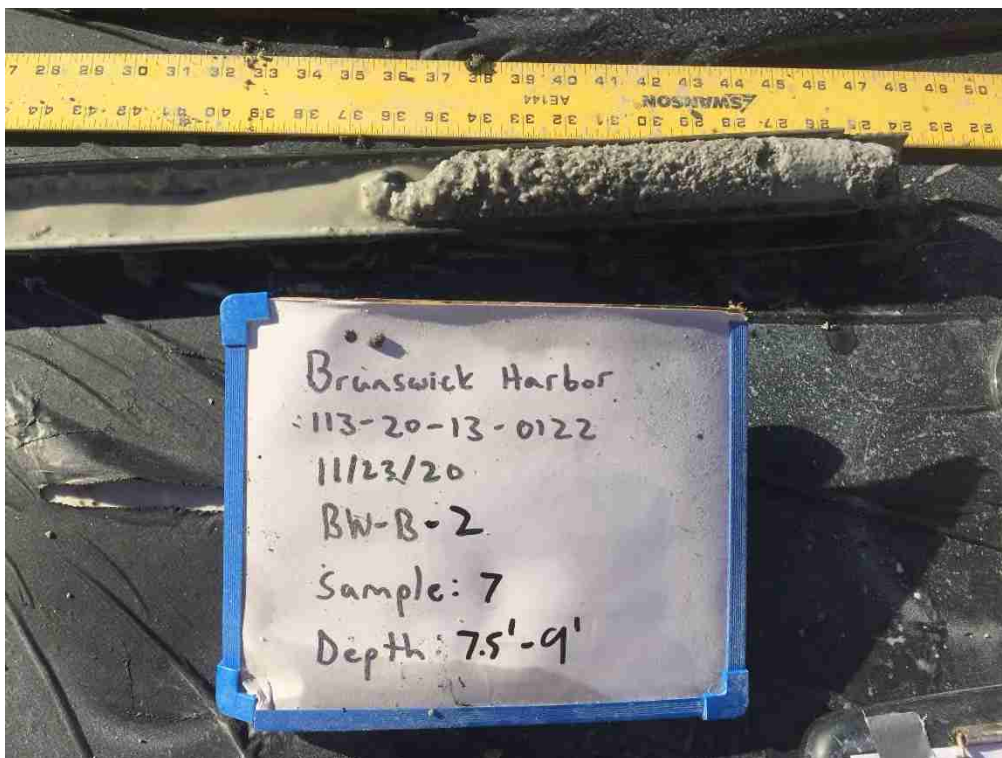
Depth: 3.0 – 4.5 feet; Approximate Elevation: -36.0 to -37.5 feet MLLW



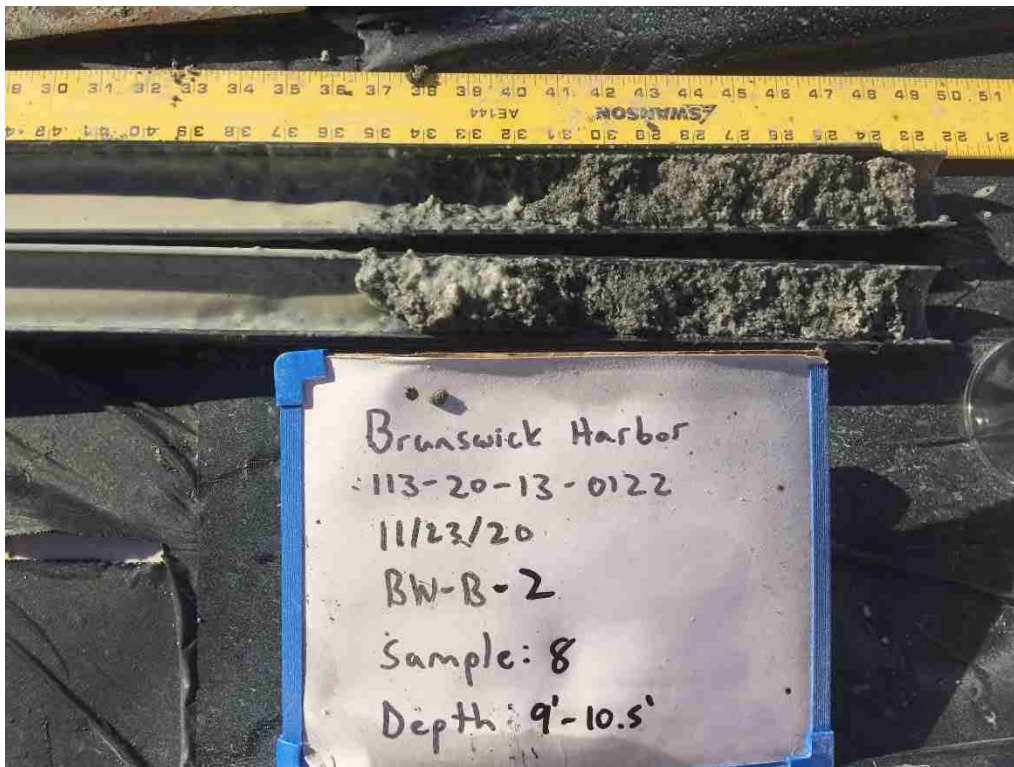
Depth: 4.5 – 6.0 feet; Approximate Elevation: -37.5 to -39.0 feet MLLW



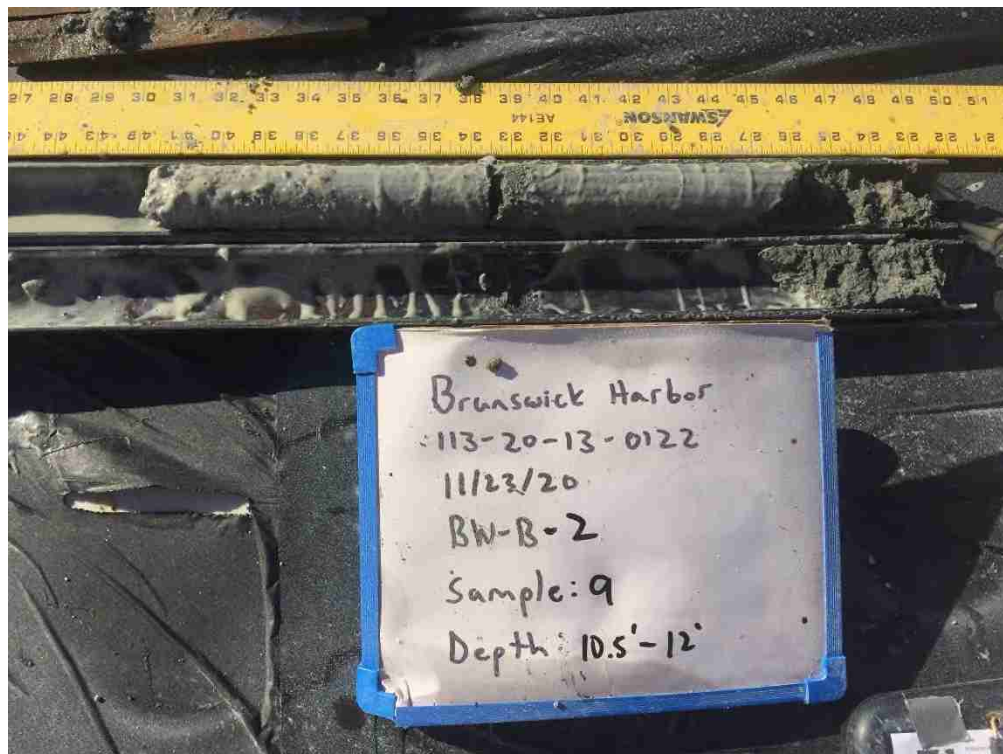
Depth: 6.0 – 7.5 feet; Approximate Elevation: -39.0 to -40.5 feet MLLW



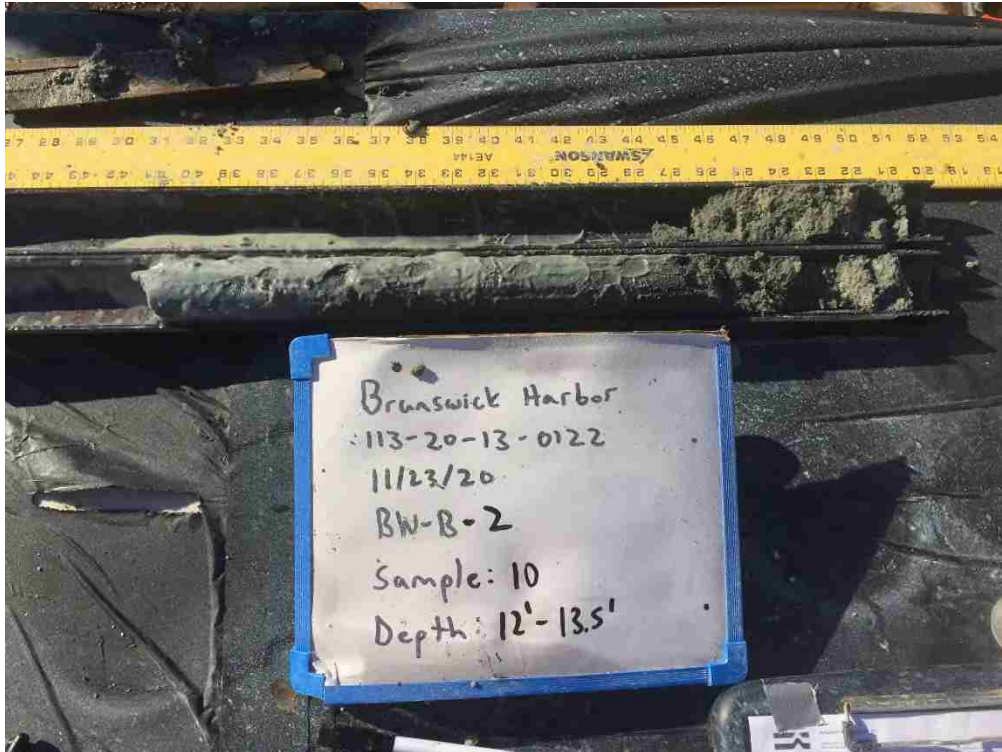
Depth: 7.5 – 9.0 feet; Approximate Elevation: -40.5 to -42.0 feet MLLW



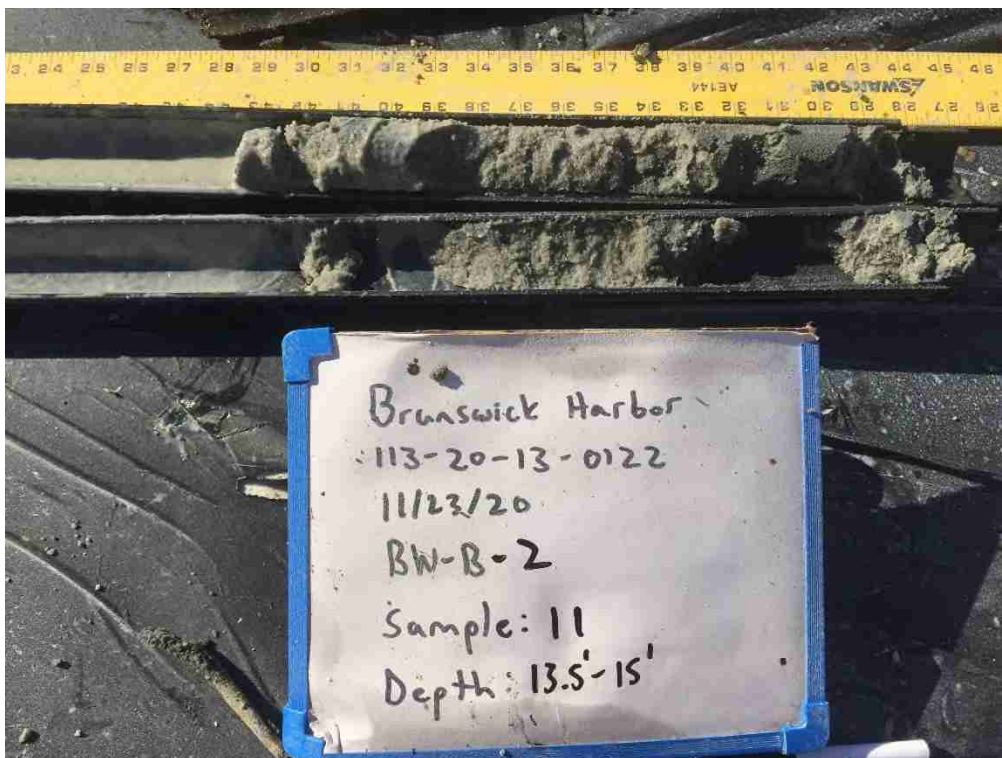
Depth: 9.0 – 10.5 feet; Approximate Elevation: -42.0 to -43.5 feet MLLW



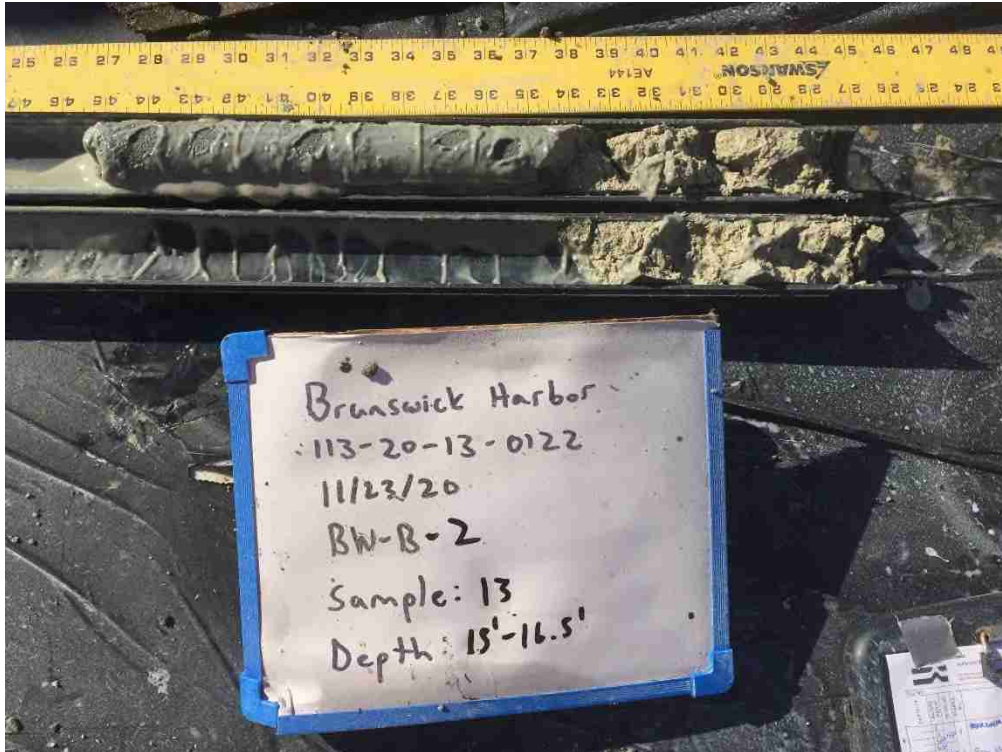
Depth: 10.5 – 12.0 feet; Approximate Elevation: -43.5 to -45.0 feet MLLW



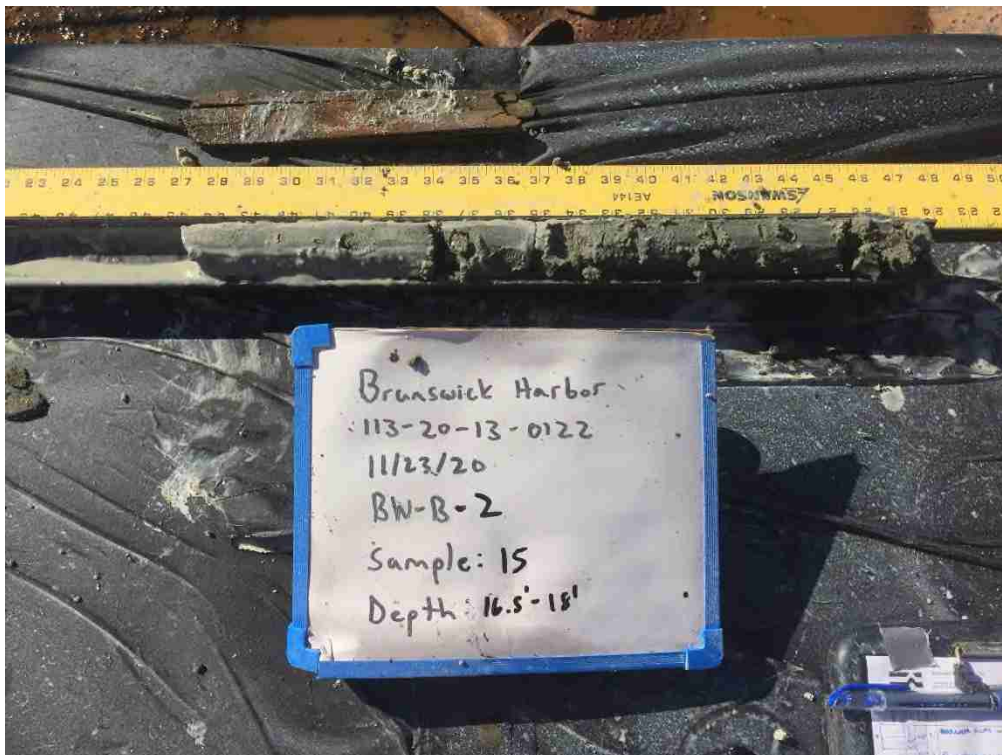
Depth: 12.0 – 13.5 feet; Approximate Elevation: -45.0 to -46.5 feet MLLW



Depth: 13.5 – 15.0 feet; Approximate Elevation: -46.5 to -48.0 feet MLLW

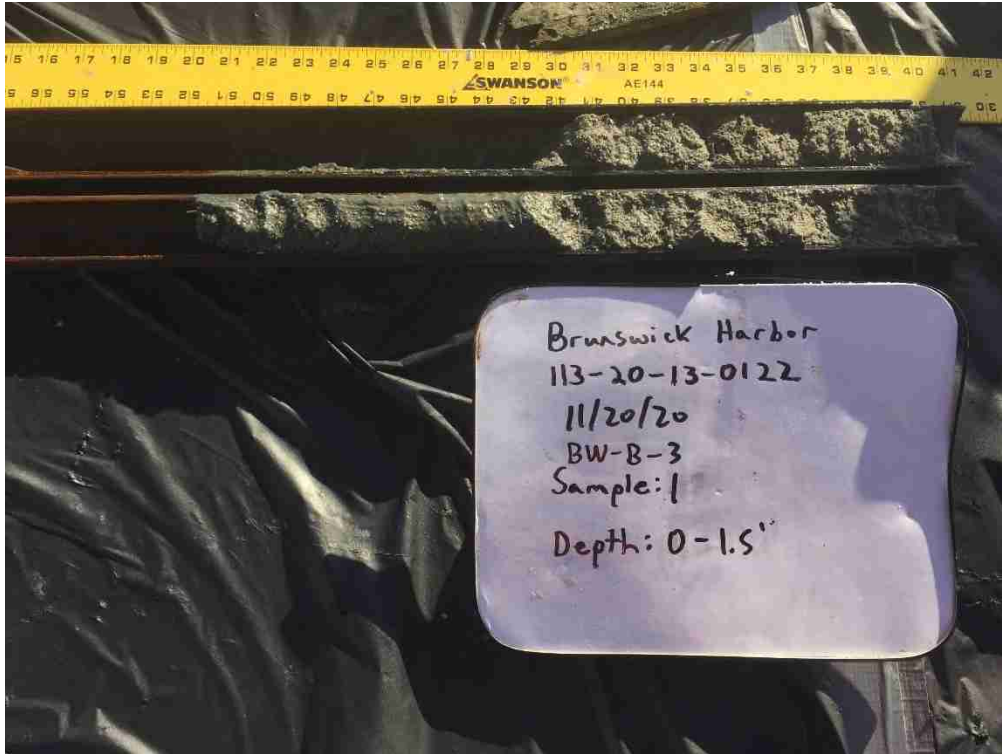


Depth: 15.0 – 16.5 feet; Approximate Elevation: -48.0 to -49.5 feet MLLW



Depth: 16.5 – 18.0 feet; Approximate Elevation: -49.5 to -51.0 feet MLLW

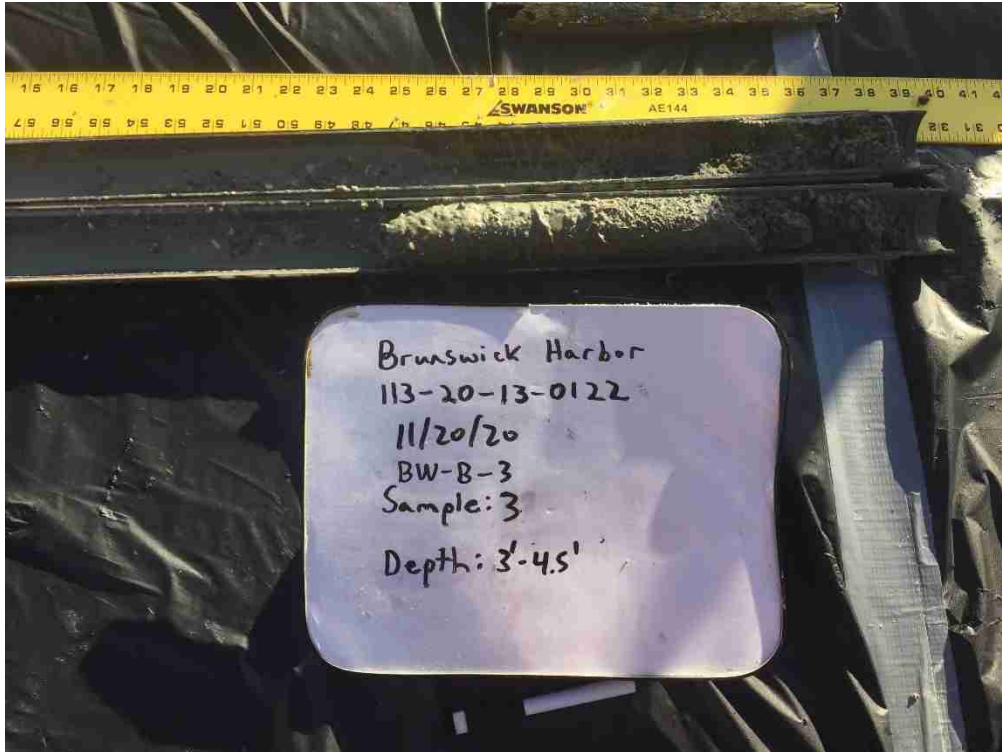
BW-B-03 Photographs



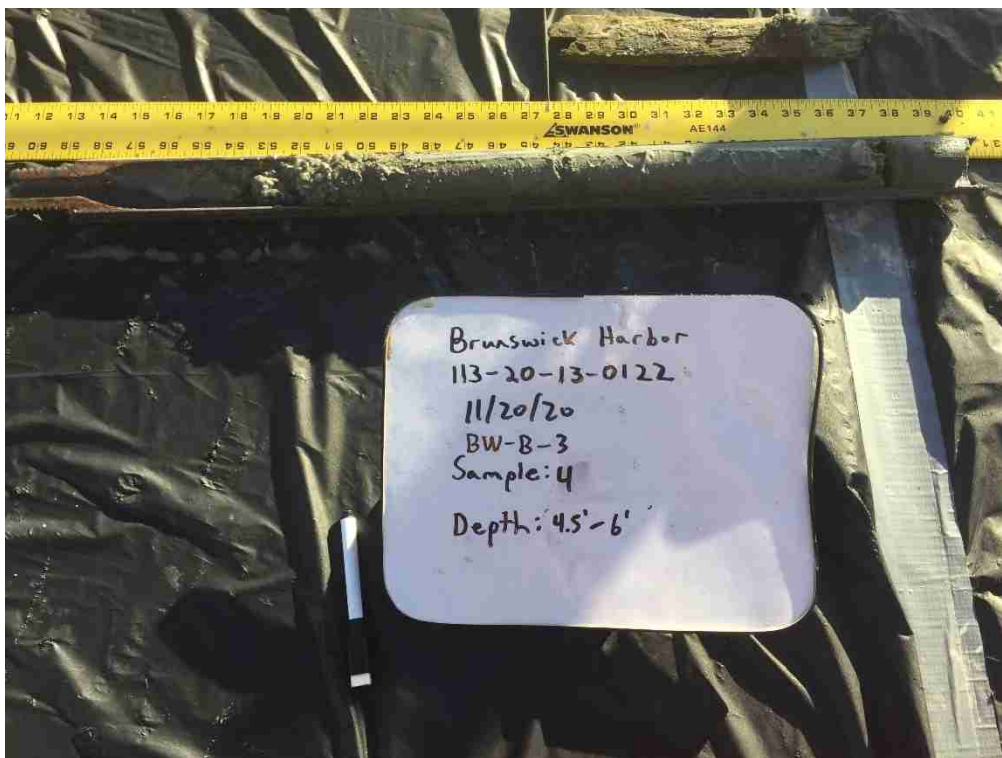
Depth: 0.0 – 1.5 feet; Approximate Elevation: -27.3 to -28.8 feet MLLW



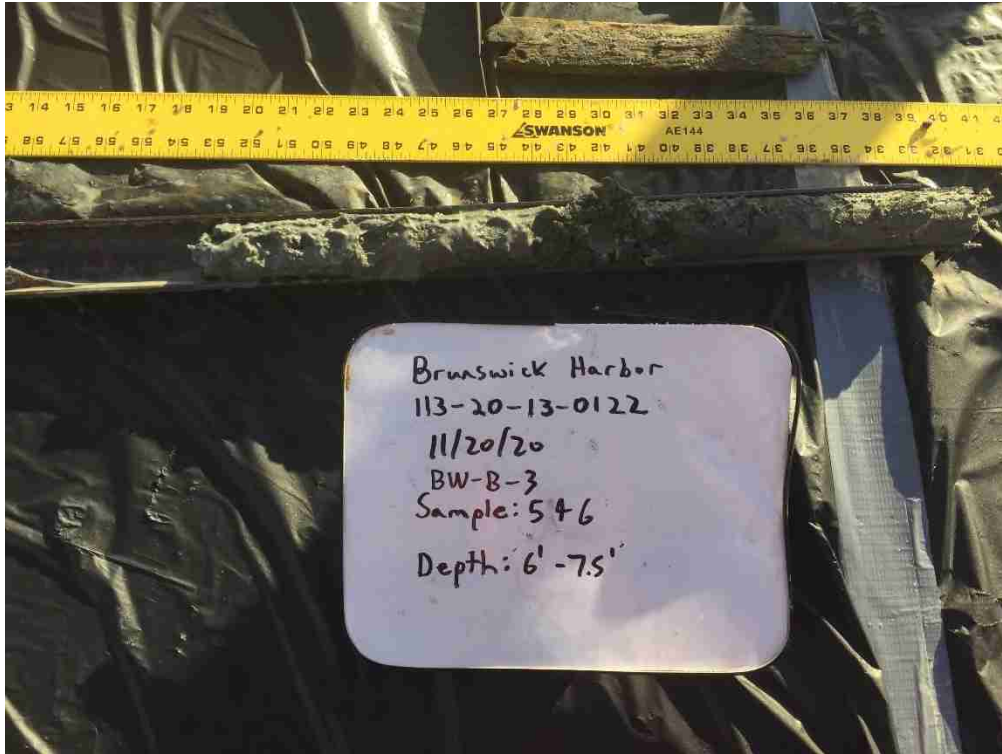
Depth: 1.5 – 3.0 feet; Approximate Elevation: -28.8 to -30.3 feet MLLW



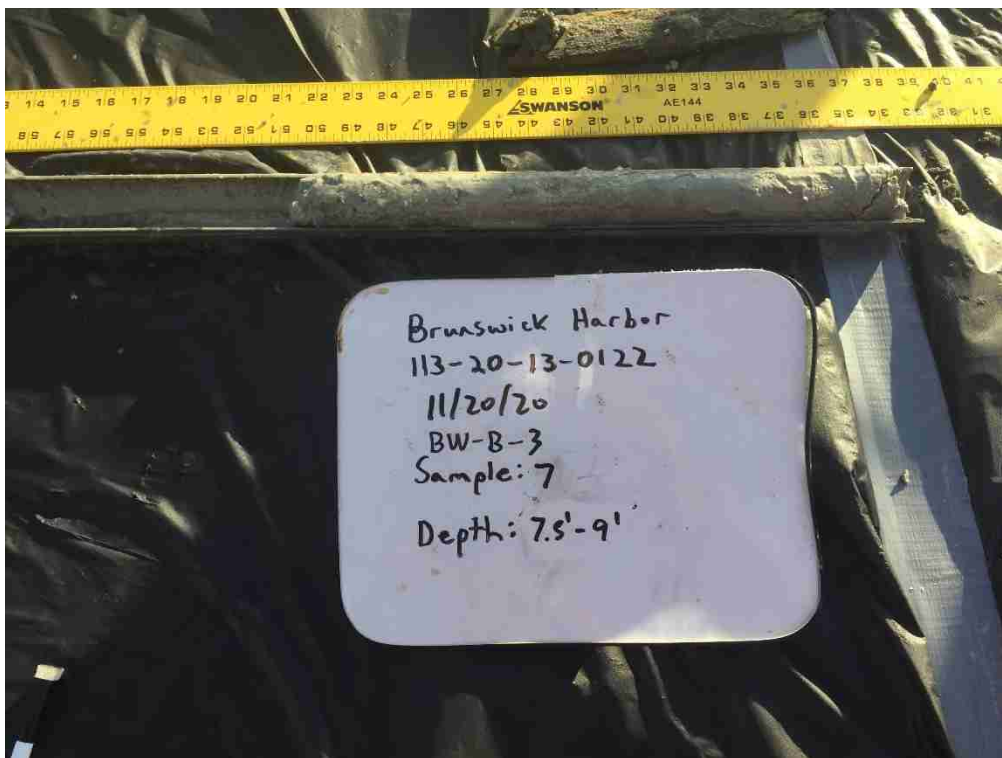
Depth: 3.0 – 4.5 feet; Approximate Elevation: -30.3 to -31.8 feet MLLW



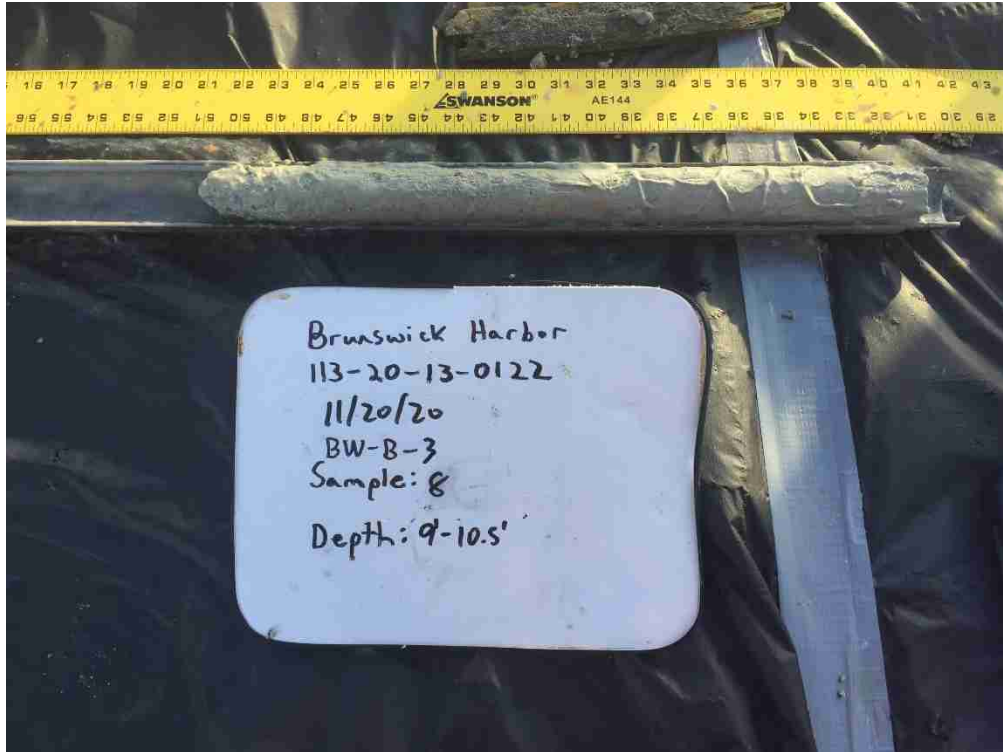
Depth: 4.5 – 6.0 feet; Approximate Elevation: -31.8 to -33.3 feet MLLW



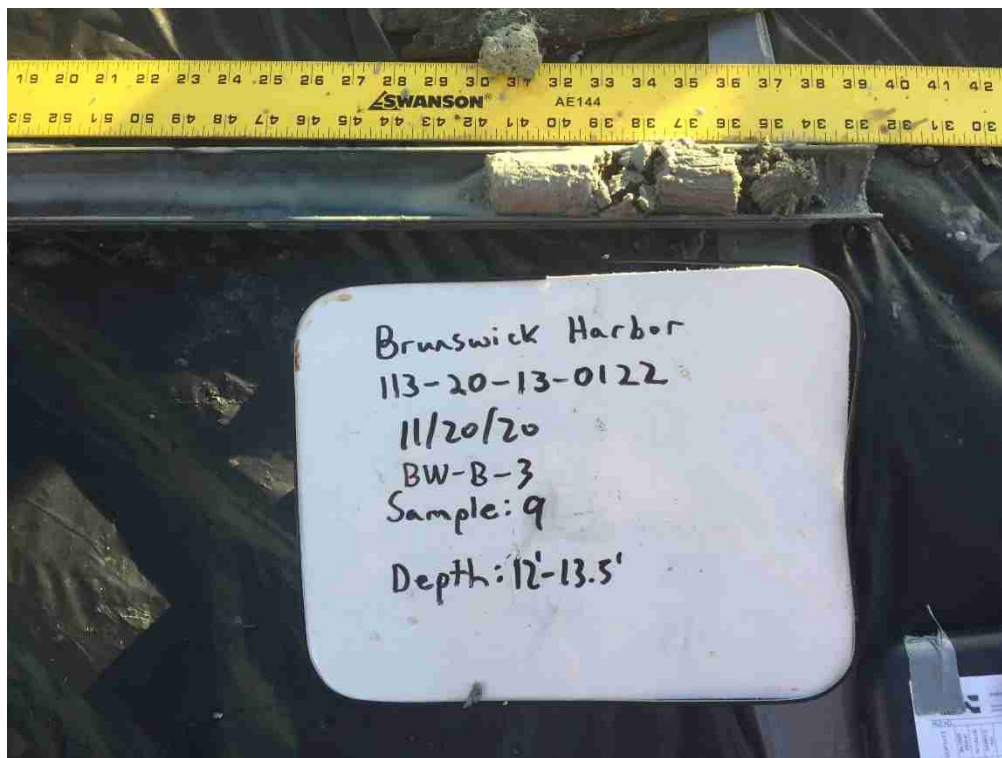
Depth: 6.0 – 7.5 feet; Approximate Elevation: -33.3 to -34.8 feet MLLW



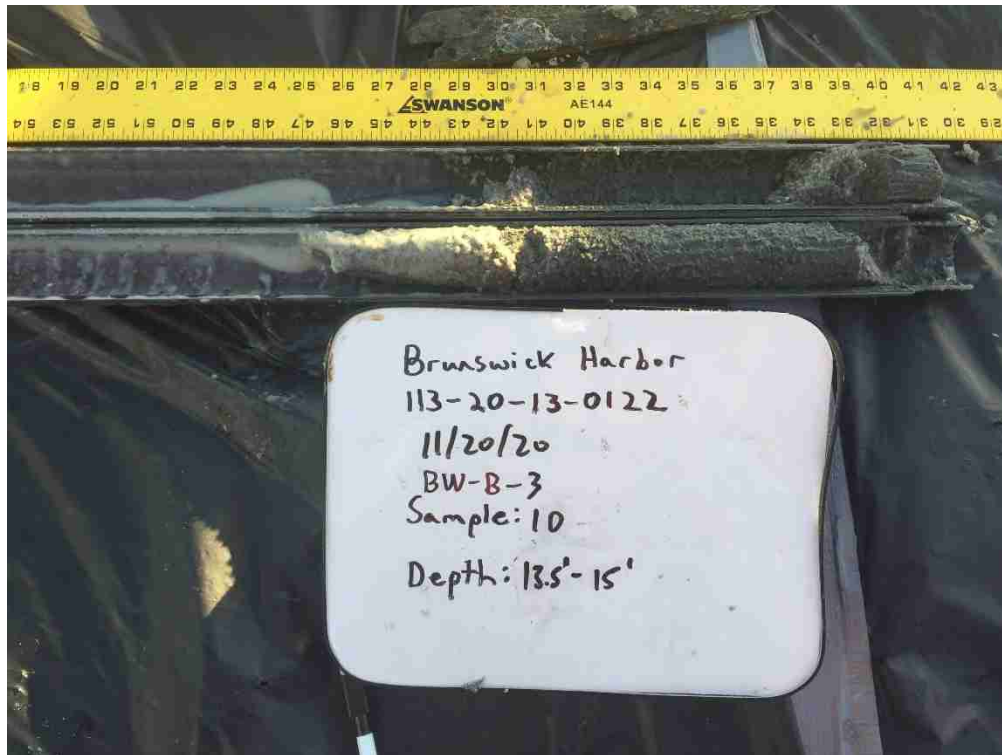
Depth: 7.5 – 9.0 feet; Approximate Elevation: -34.8 to -36.3 feet MLLW



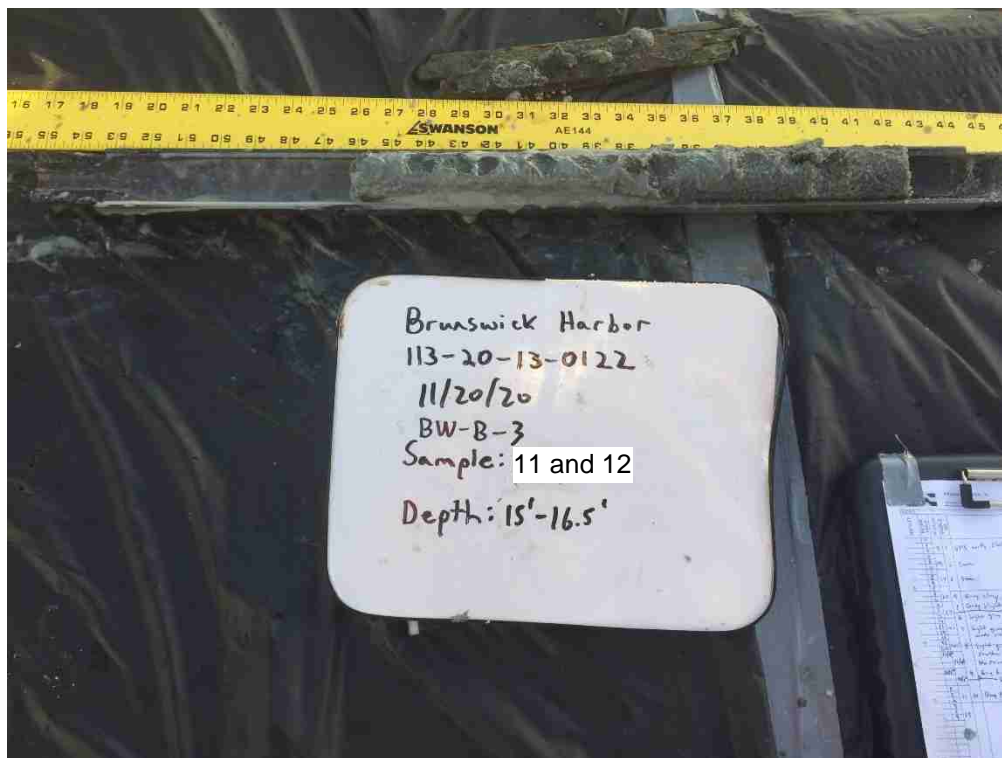
Depth: 9.0 – 10.5 feet; Approximate Elevation: -36.3 to -37.8 feet MLLW



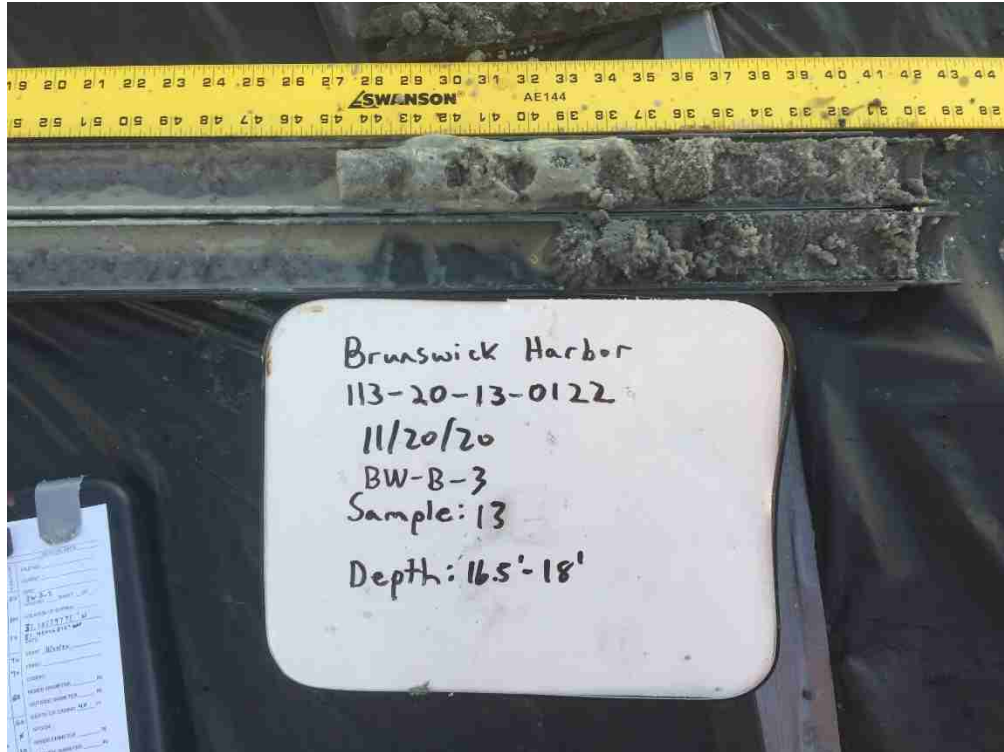
Depth: 12.0 – 13.5 feet; Approximate Elevation: -39.3 to -40.8 feet MLLW



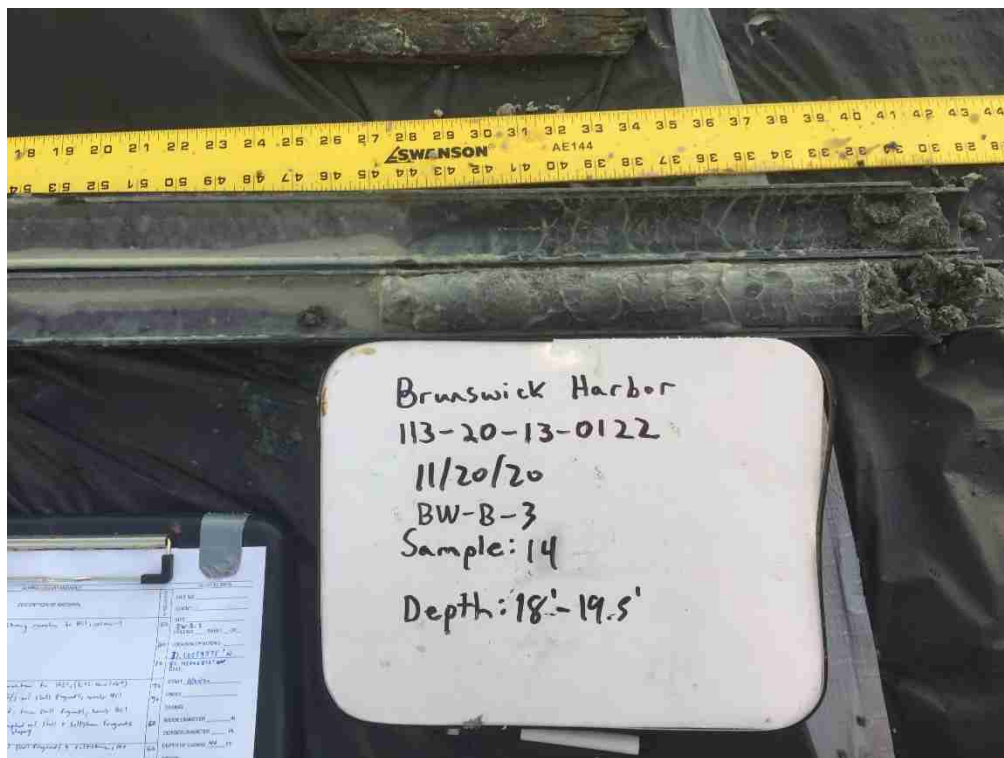
Depth: 13.5 – 15.0 feet; Approximate Elevation: -40.8 to -42.3 feet MLLW



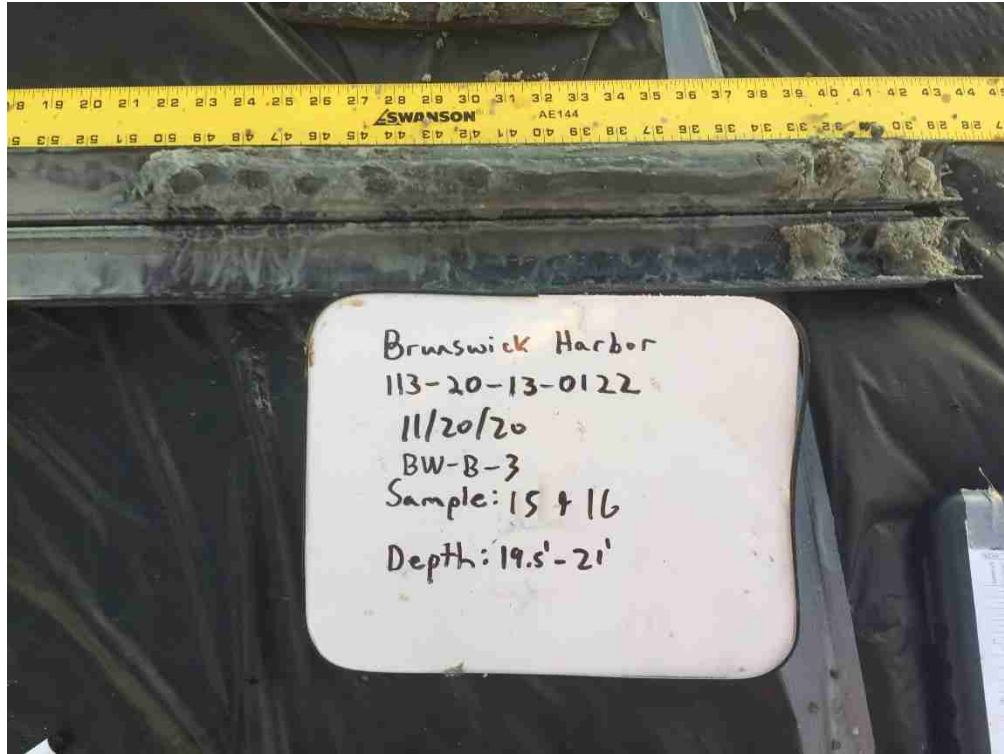
Depth: 15.0 – 16.5 feet; Approximate Elevation: -42.3 to -43.8 feet MLLW



Depth: 16.5 – 18.0 feet; Approximate Elevation: -43.8 to -45.3 feet MLLW

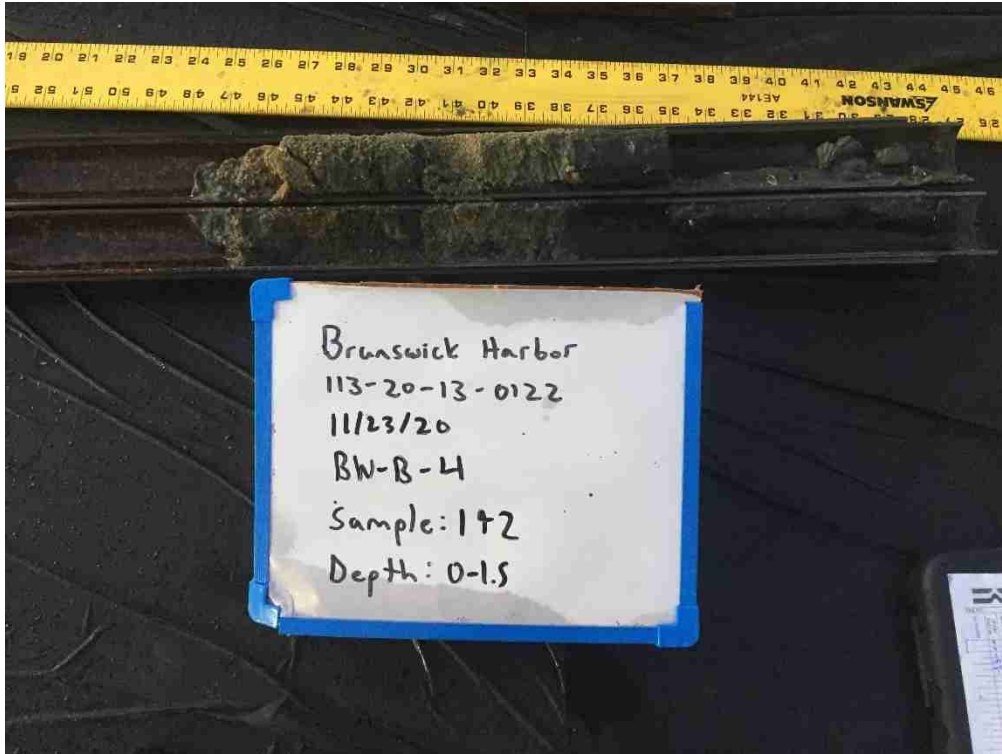


Depth: 18.0 – 19.5 feet; Approximate Elevation: -45.3 to -46.8 feet MLLW

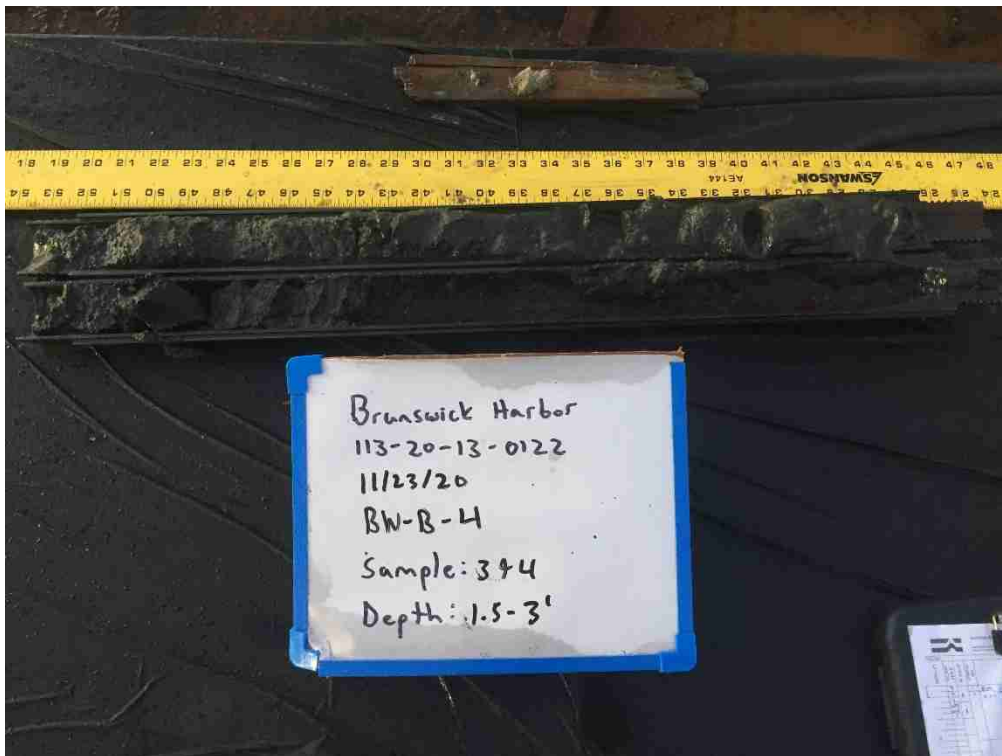


Depth: 19.5 – 21.0 feet; Approximate Elevation: -46.8 to -48.3 feet MLLW

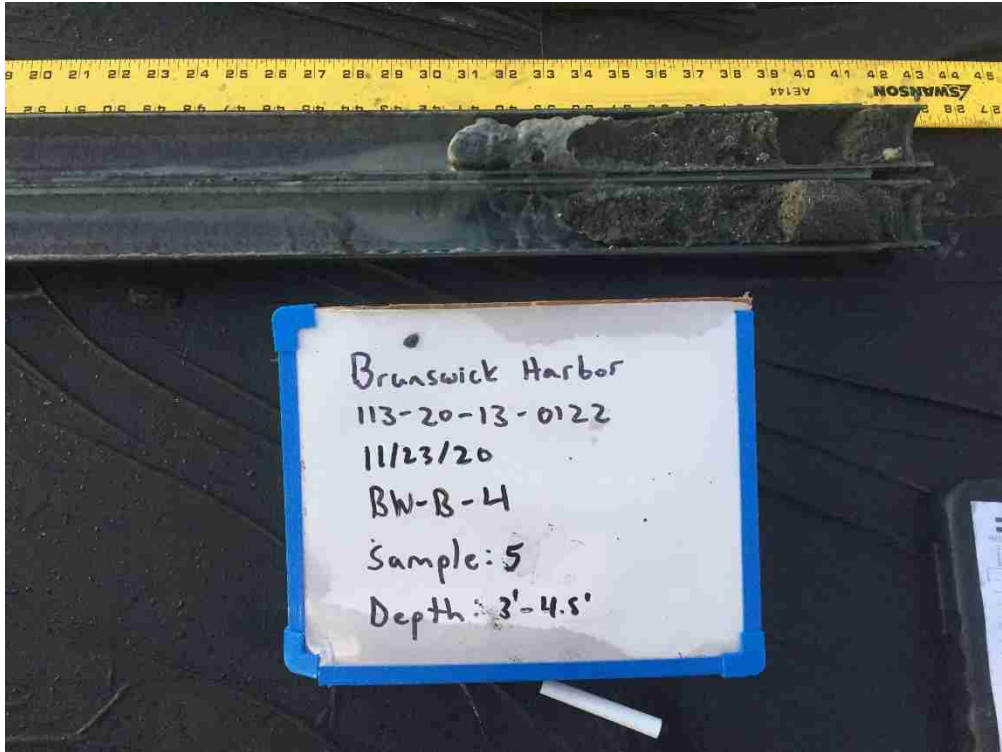
BW-B-04 Photographs



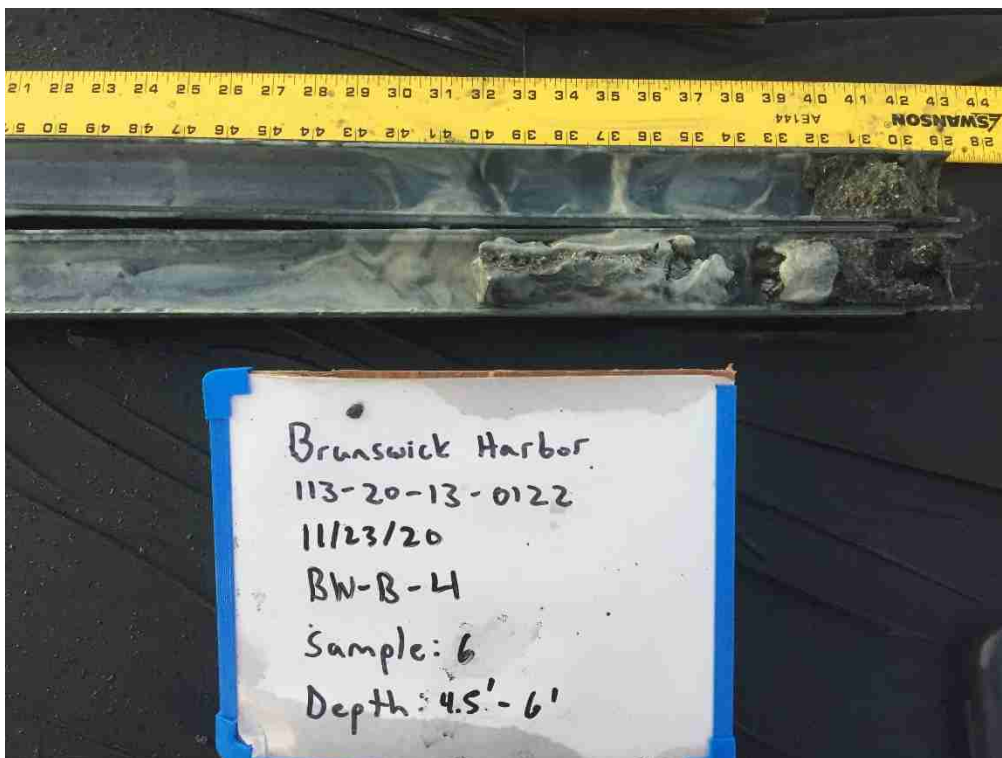
Depth: 0.0 – 1.5 feet; Approximate Elevation: -34.4 to 35.9 feet MLLW



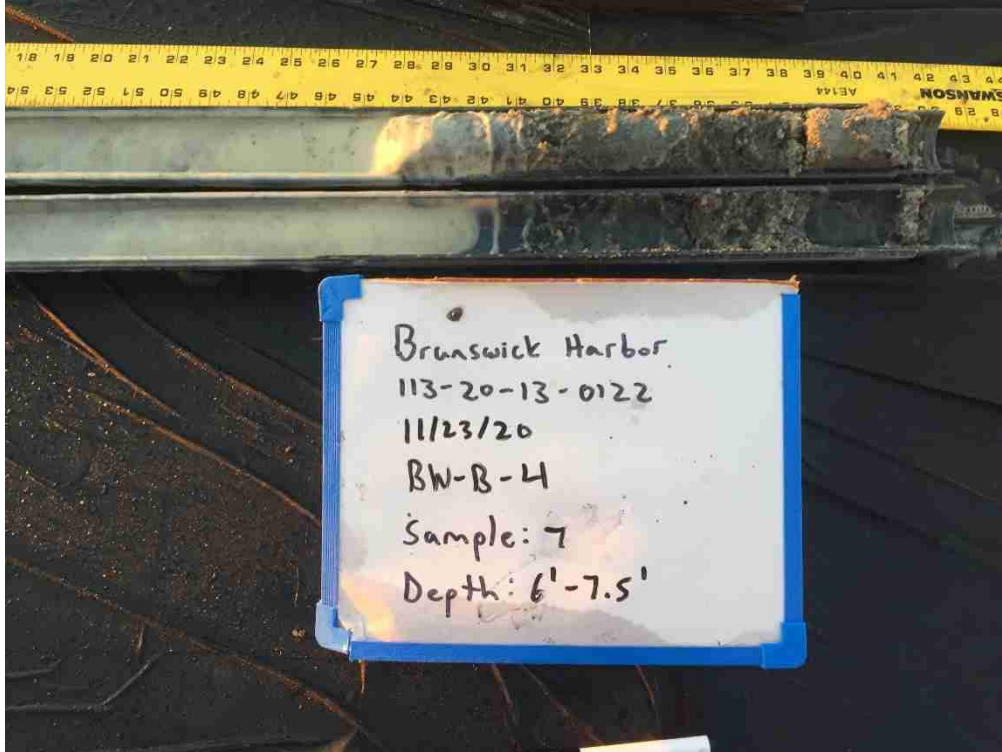
Depth: 1.5 – 3.0 feet; Approximate Elevation: -35.9 to -37.4 feet MLLW



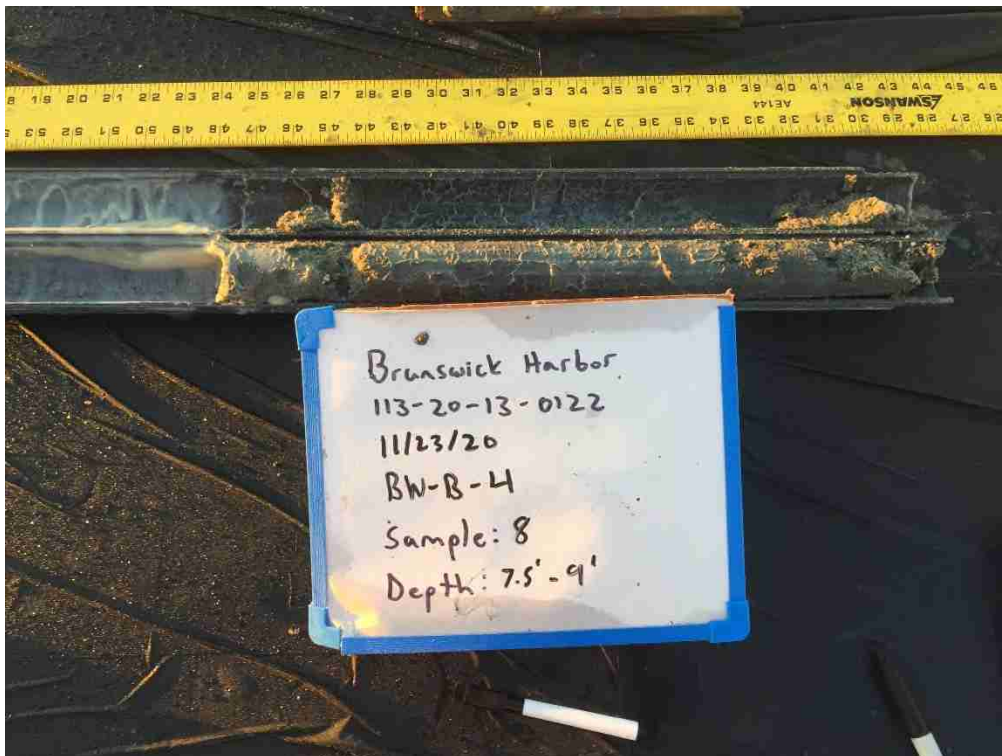
Depth: 3.0 – 4.5 feet; Approximate Elevation: -37.4 to 38.9 feet MLLW



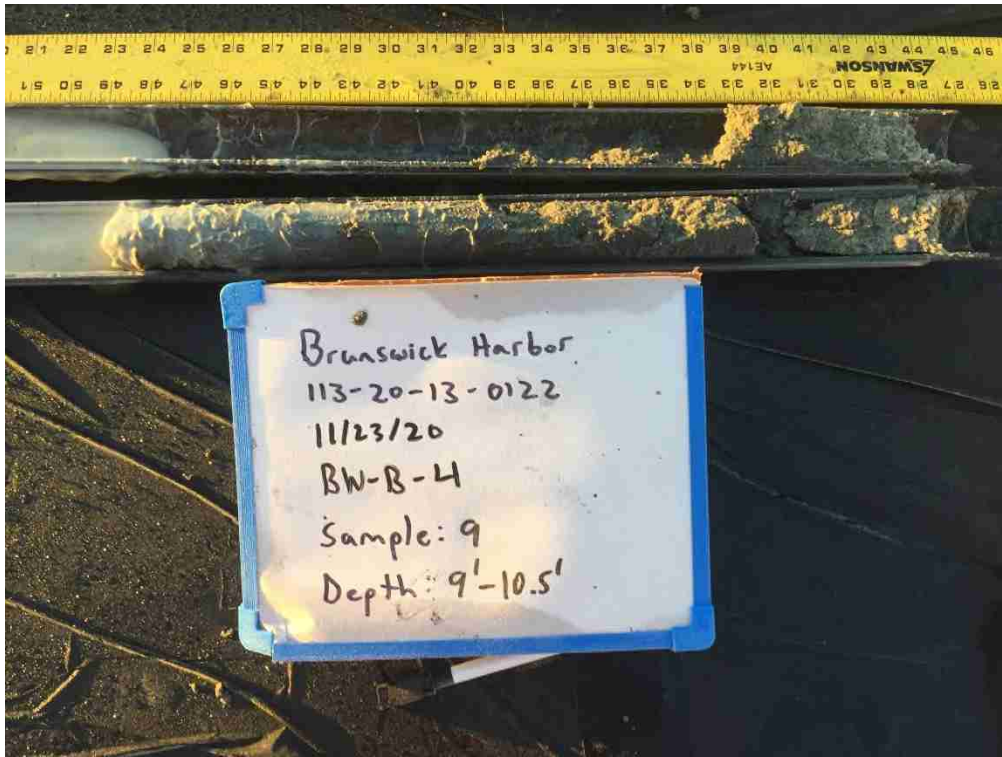
Depth: 4.5 – 6.0 feet; Approximate Elevation: -38.9 to -40.4 feet MLLW



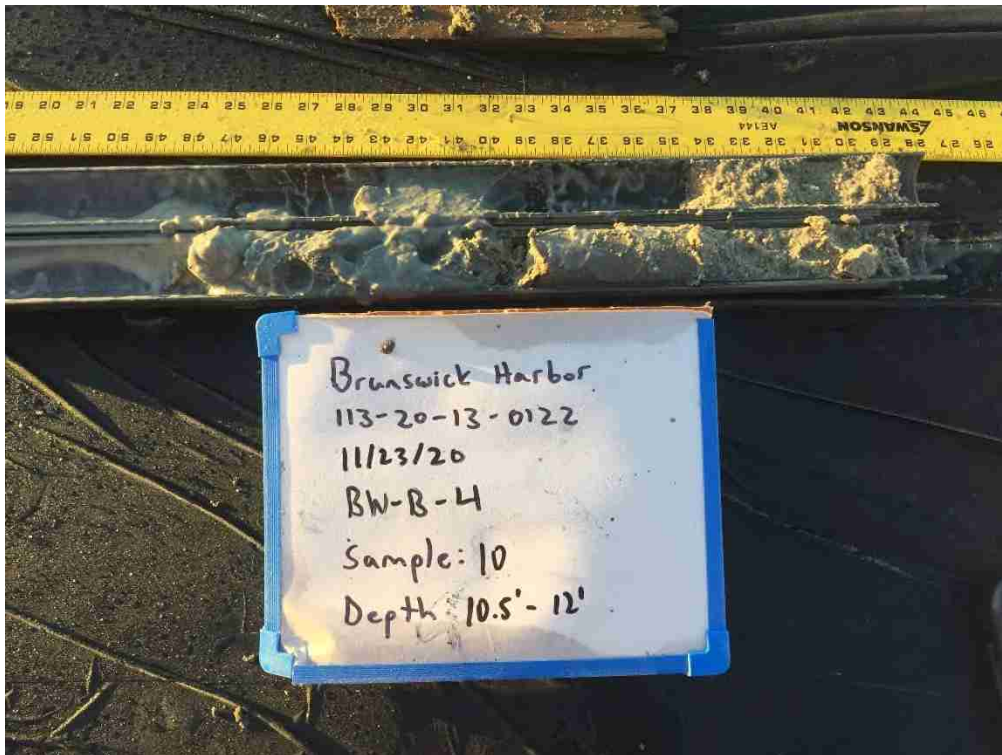
Depth: 6.0 – 7.5 feet; Approximate Elevation: -40.4 to -41.9 feet MLLW



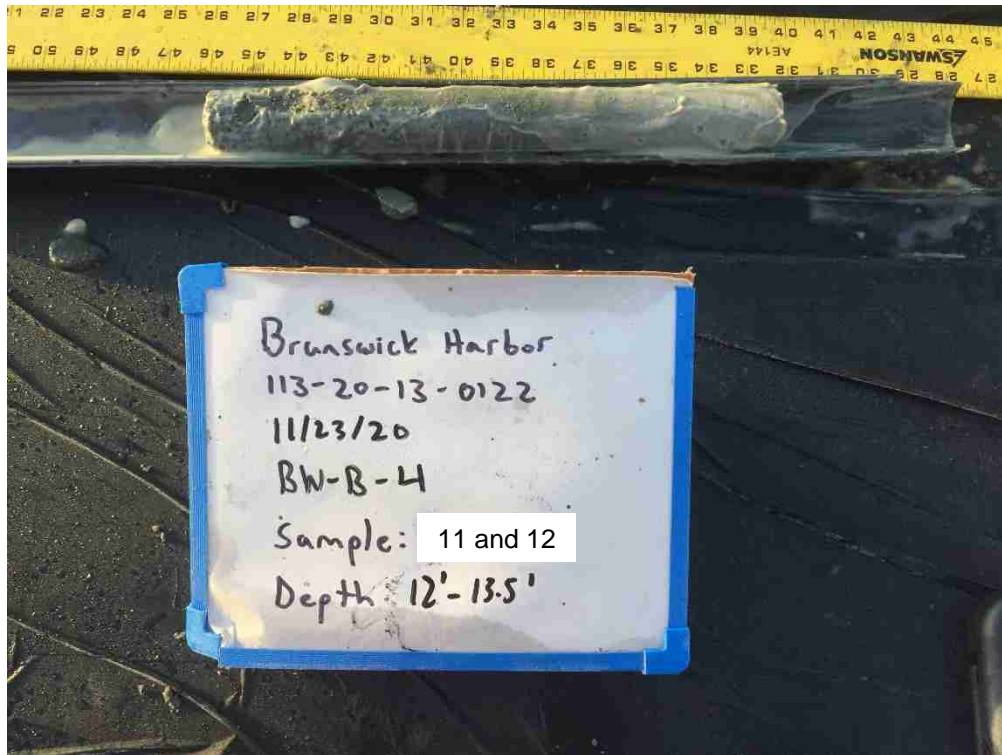
Depth: 7.5 – 9.0 feet; Approximate Elevation: -41.9 to 43.4 feet MLLW



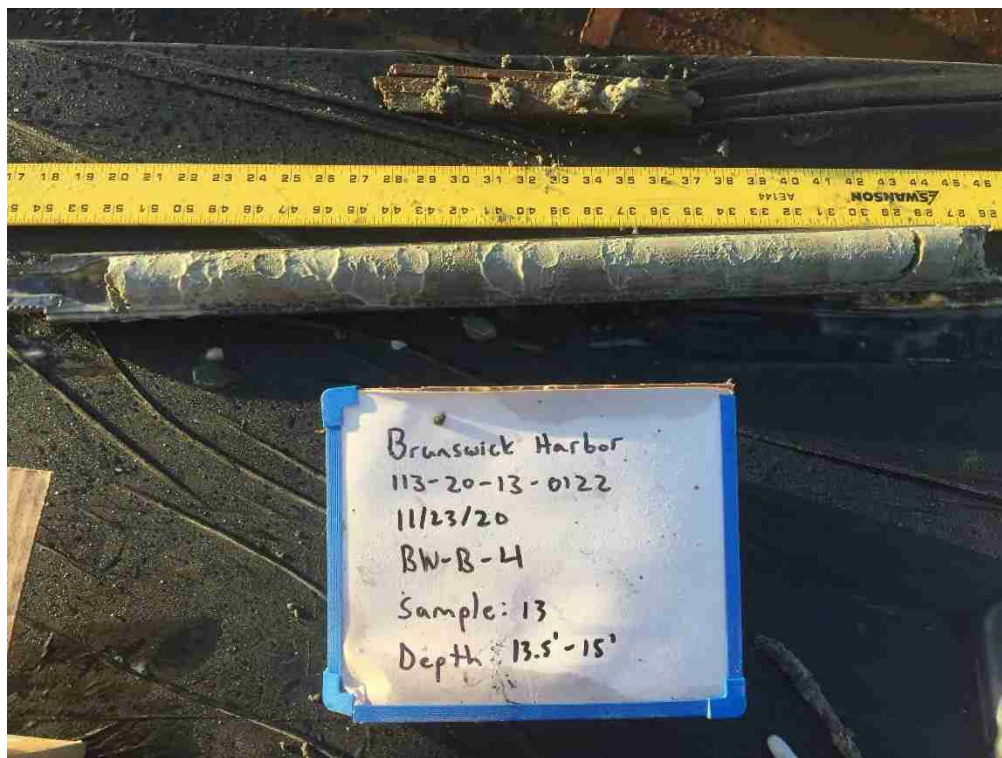
Depth: 9.0 – 10.5 feet; Approximate Elevation: -43.4 to 44.9 feet MLLW



Depth: 10.5 – 12.0 feet; Approximate Elevation: -44.9 to -46.4 feet MLLW

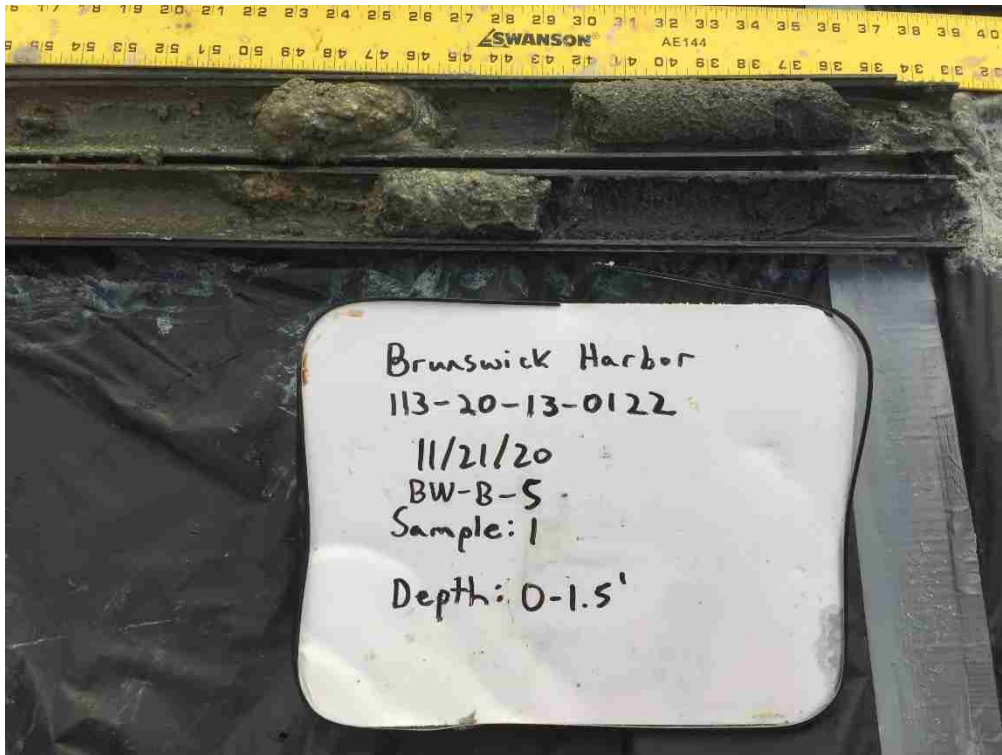


Depth: 12.0 – 13.5 feet; Approximate Elevation: -46.4 to -47.9 feet MLLW

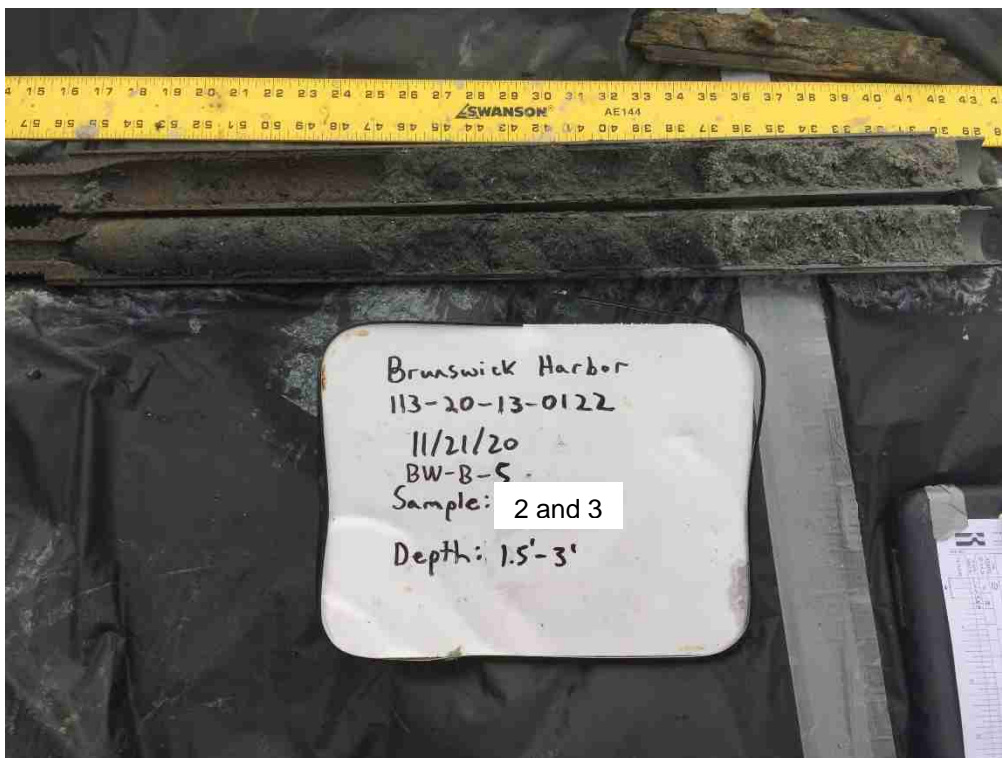


Depth: 13.5 – 15.0 feet; Approximate Elevation: -47.9 to -49.4 feet MLLW

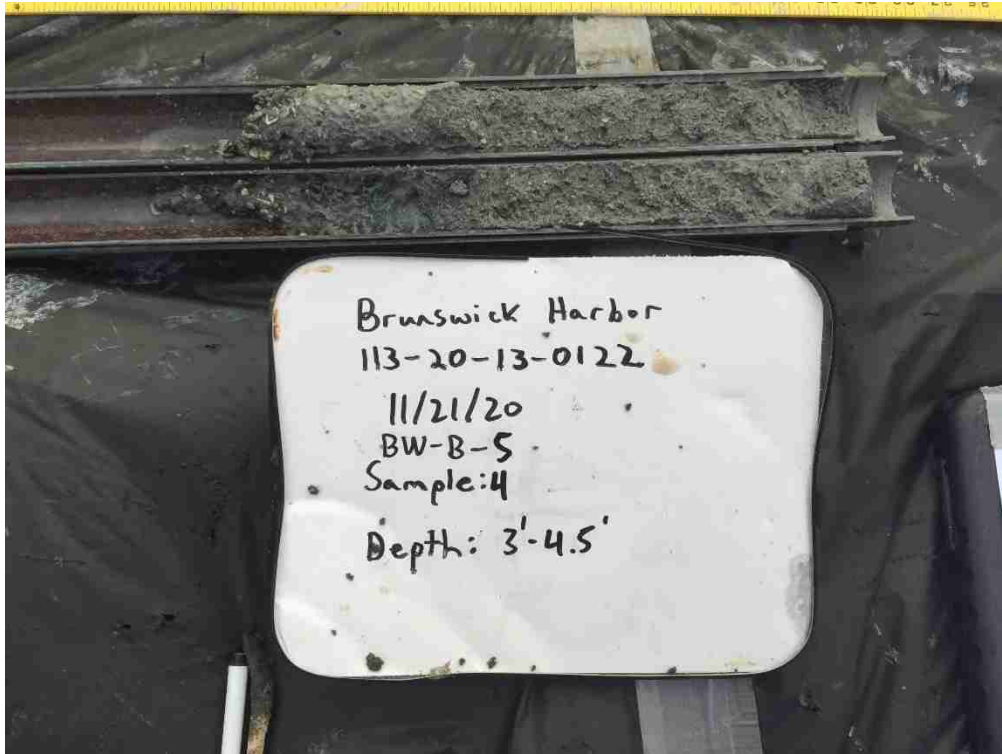
BW-B-05 Photographs



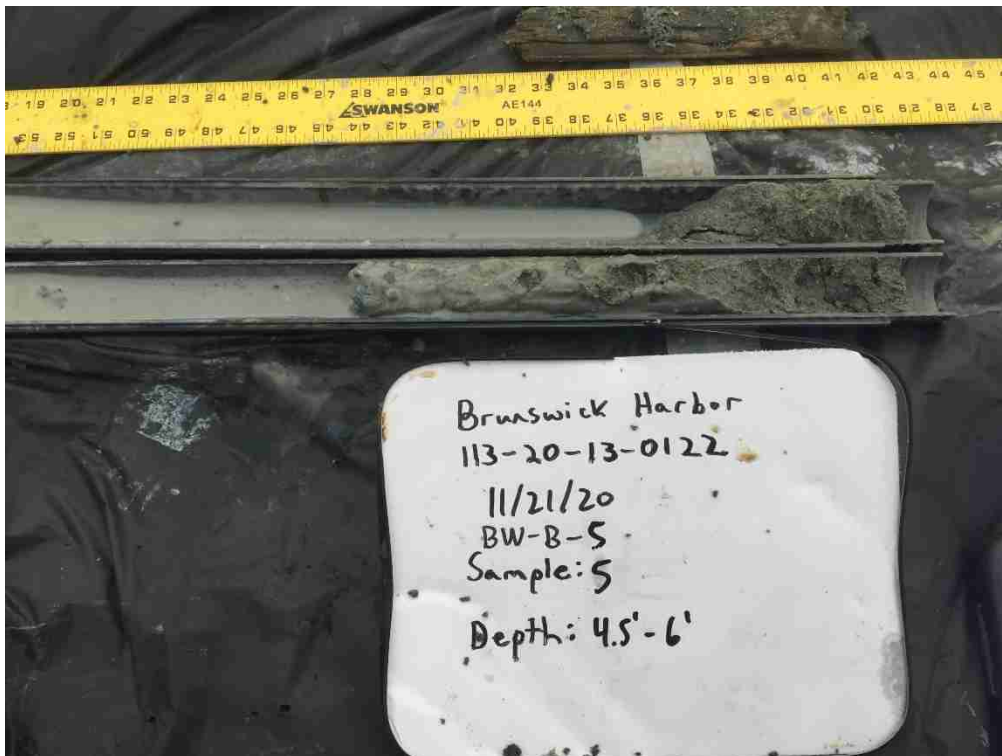
Depth: 0.0 – 1.5 feet; Approximate Elevation: -25.2 to -26.7 feet MLLW



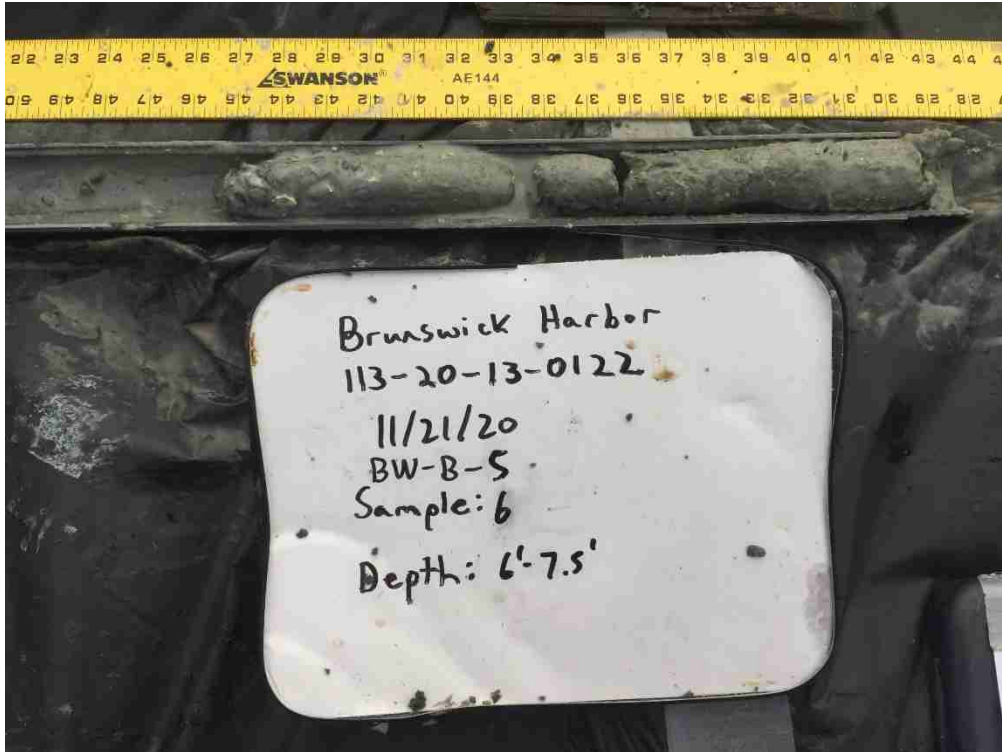
Depth: 1.5 – 3.0 feet; Approximate Elevation: -26.7 to -28.2 feet MLLW



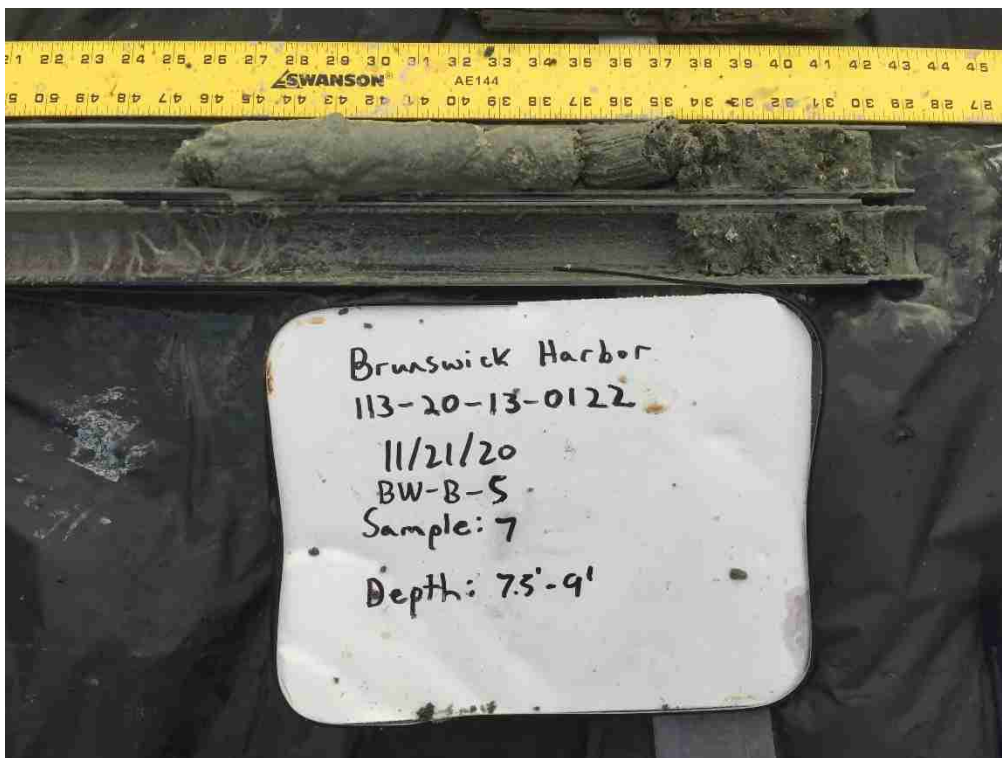
Depth: 3.0 – 4.5 feet; Approximate Elevation: -28.2 to -29.7 feet MLLW



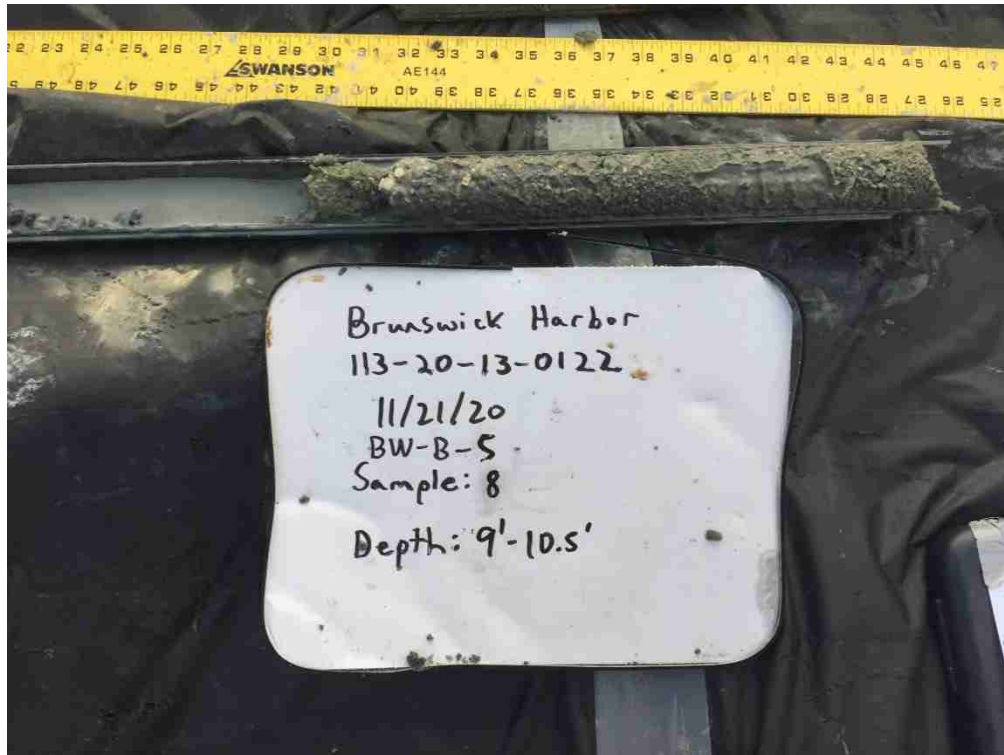
Depth: 4.5 – 6.0 feet; Approximate Elevation: -29.7 to -31.2 feet MLLW



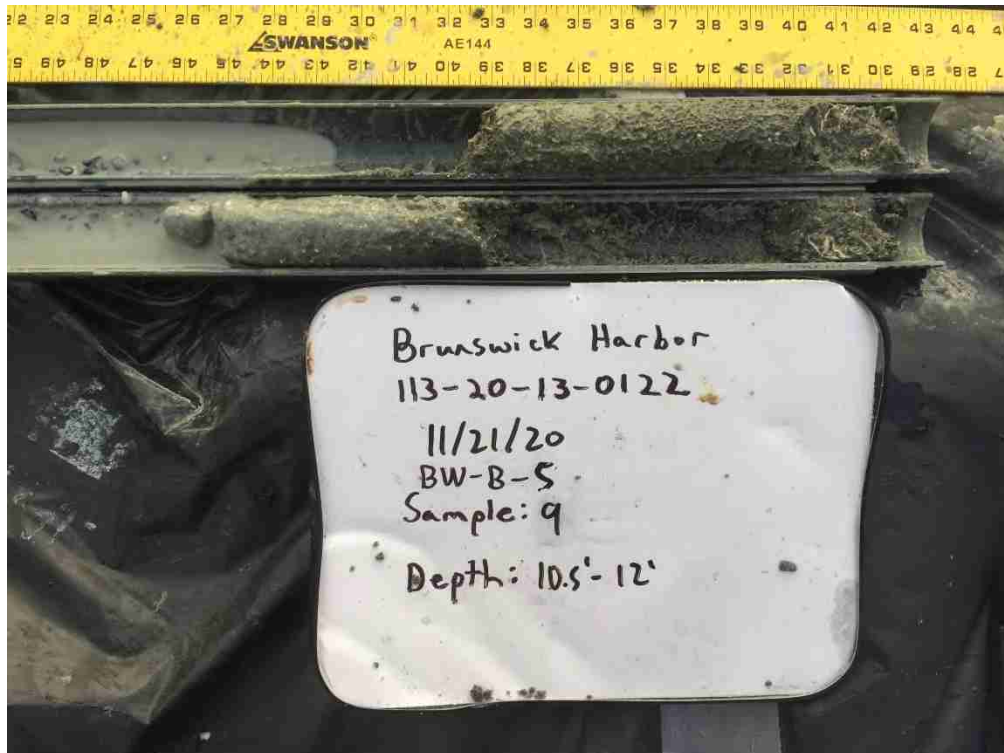
Depth: 6.0 – 7.5 feet; Approximate Elevation: -31.2 to -32.7 feet MLLW



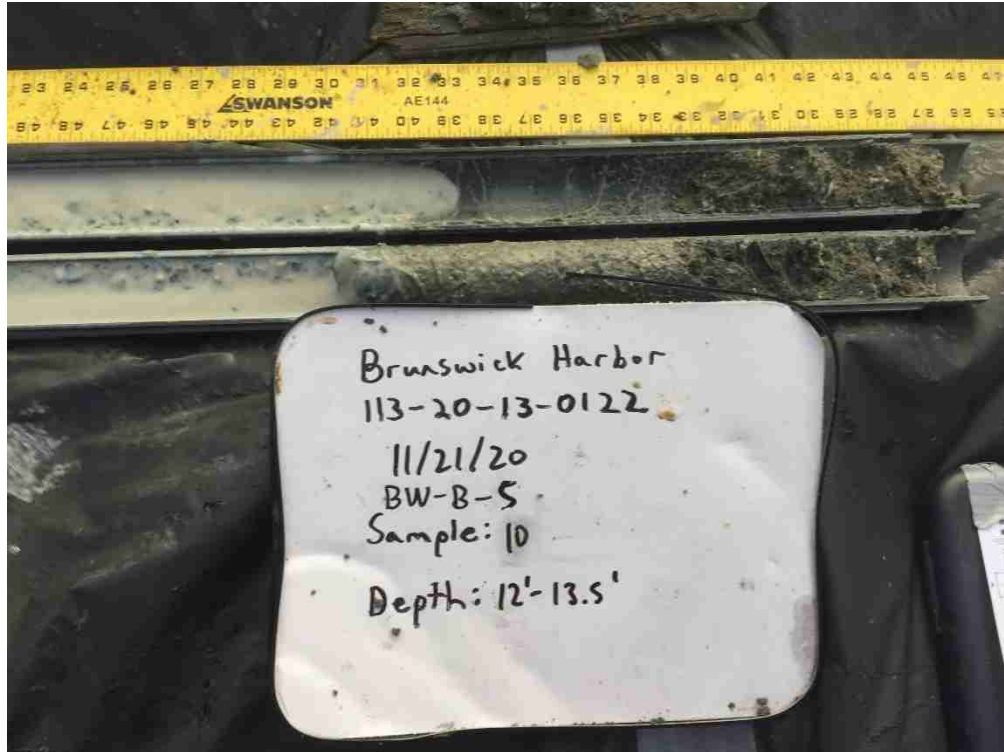
Depth: 7.5 – 9.0 feet; Approximate Elevation: -32.7 to -34.2 feet MLLW



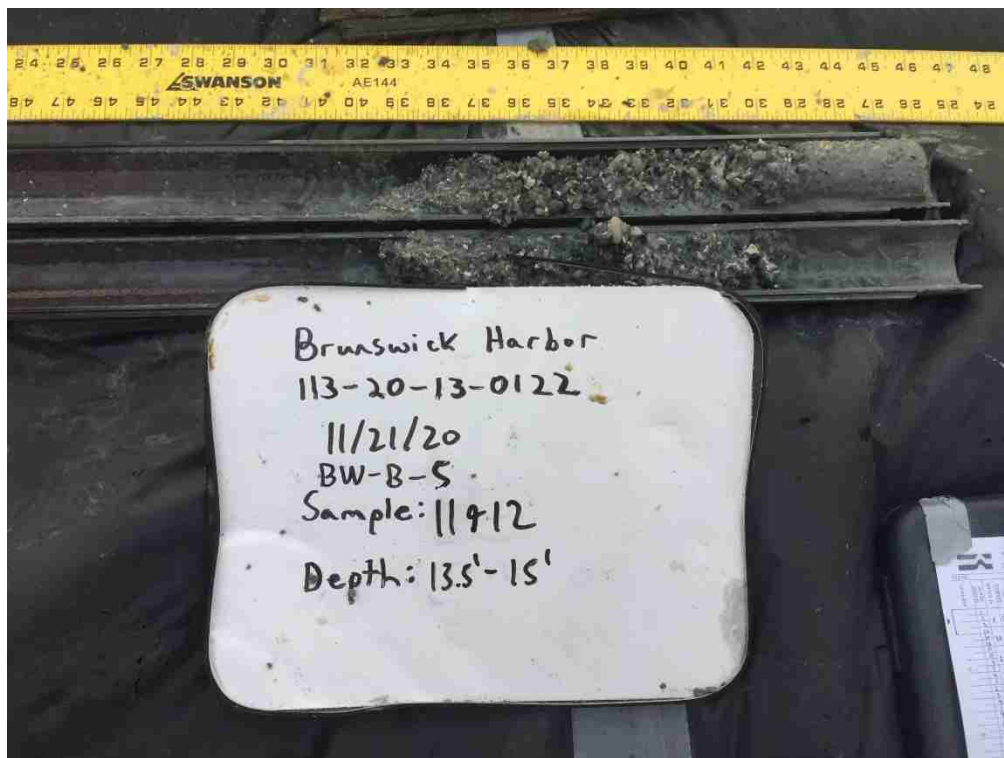
Depth: 9.0 – 10.5 feet; Approximate Elevation: -34.2 to -35.7 feet MLLW



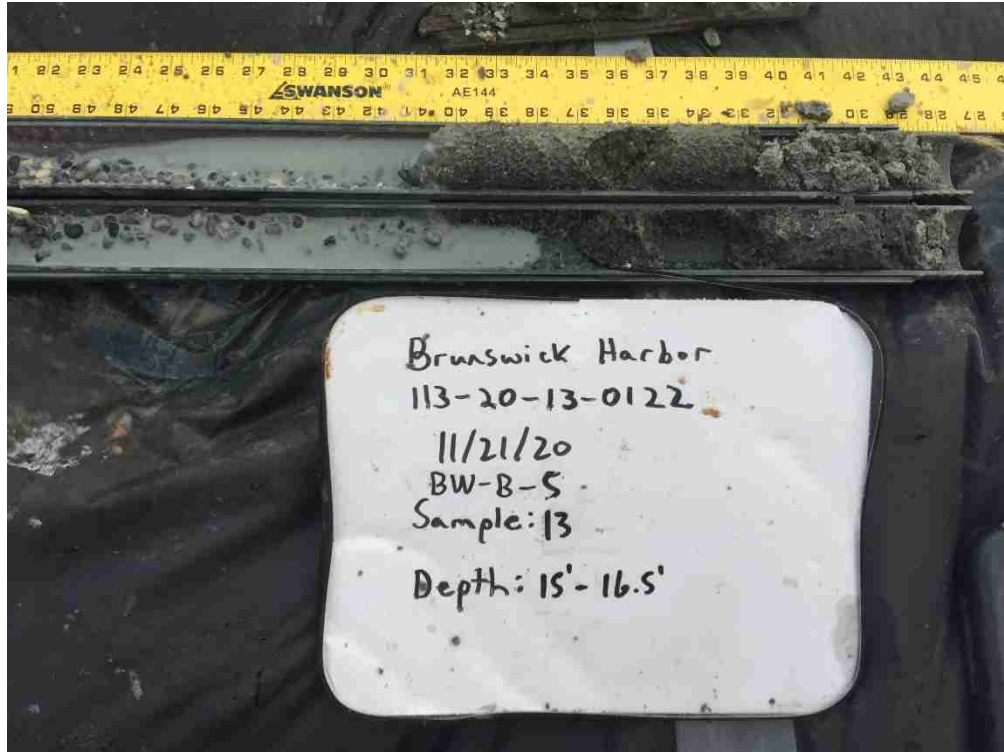
Depth: 10.5 – 12.0 feet; Approximate Elevation: -35.7 to -37.2 feet MLLW



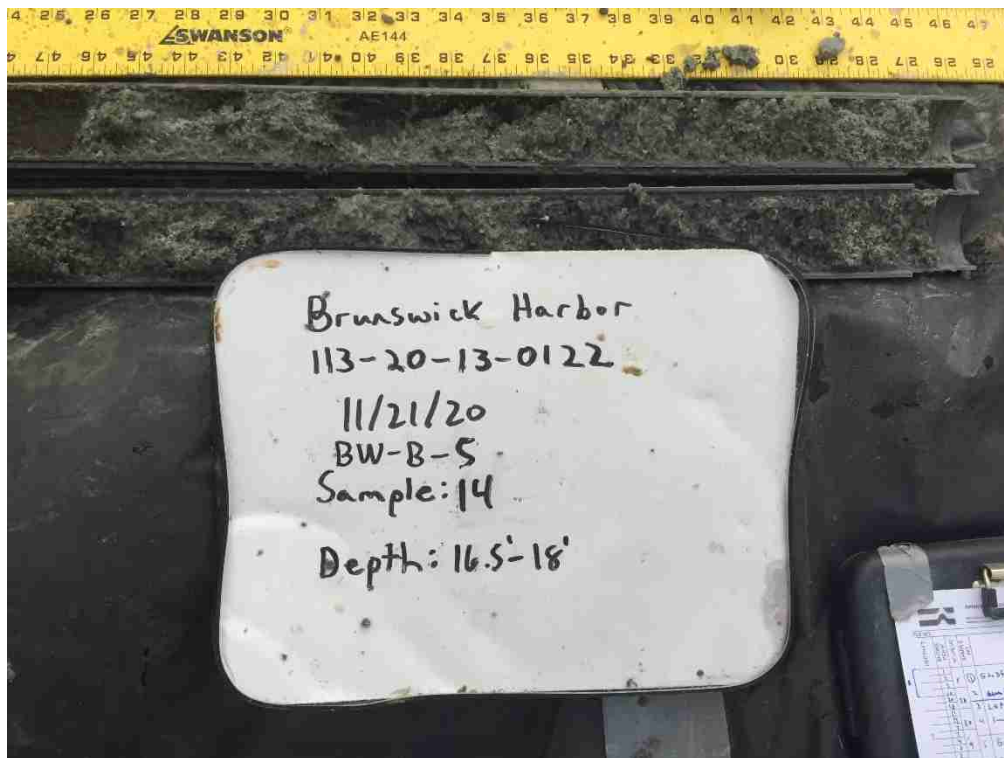
Depth: 12.0 – 13.5 feet; Approximate Elevation: -37.2 to -38.7 feet MLLW



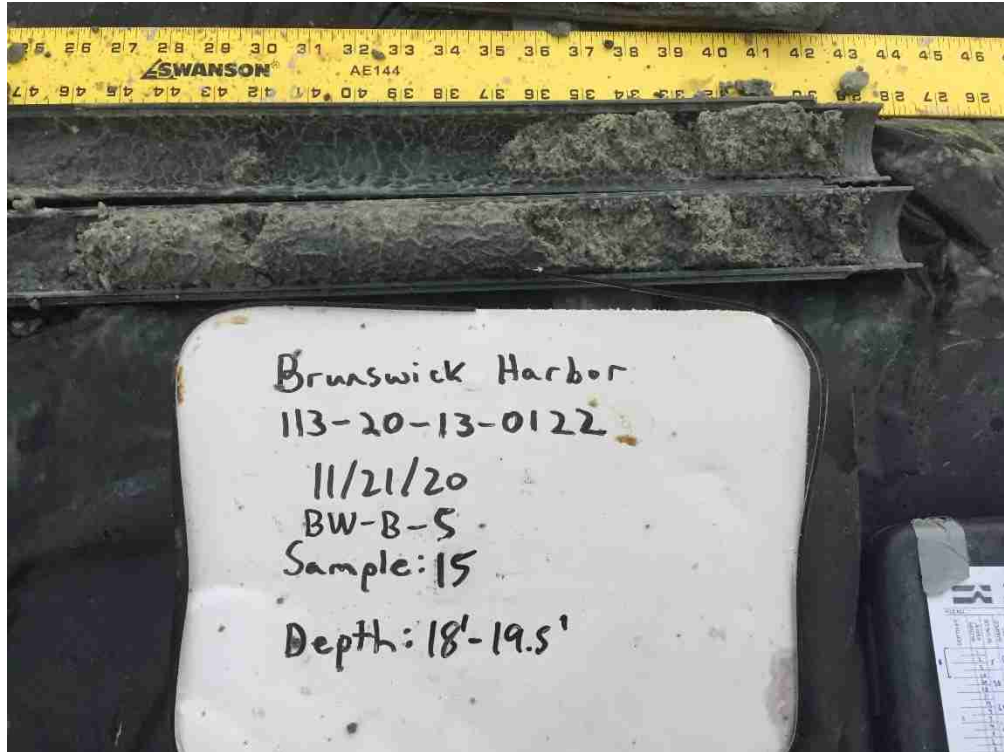
Depth: 13.5 – 15.0 feet; Approximate Elevation: -38.7 to -40.2 feet MLLW



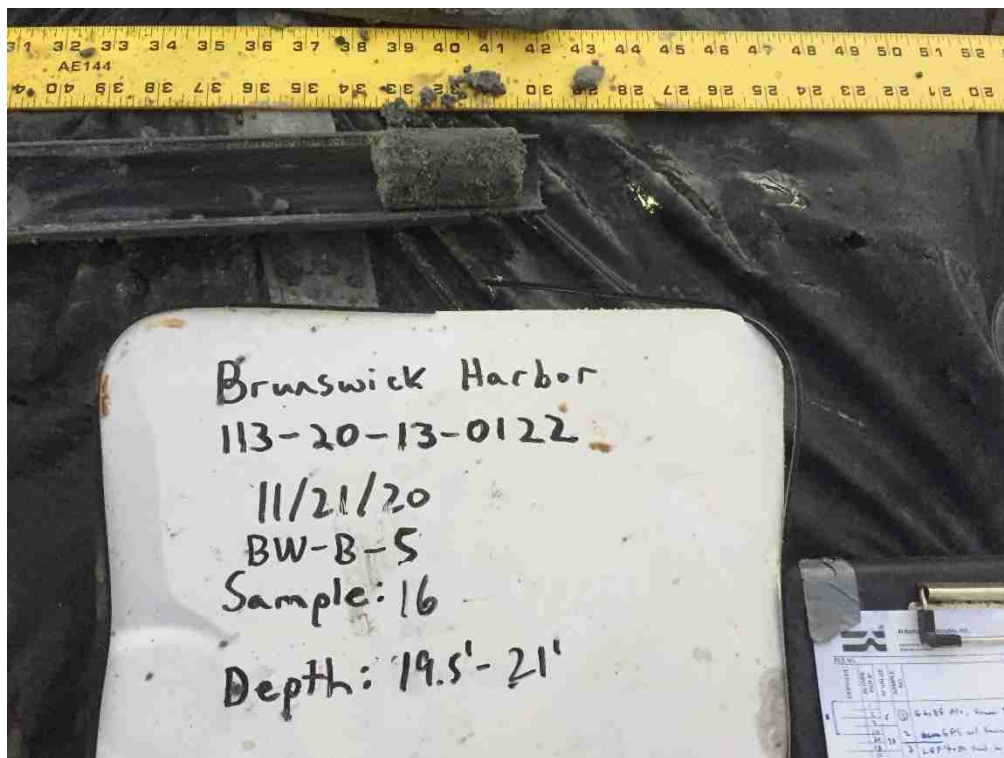
Depth: 15.0 – 16.5 feet; Approximate Elevation: -40.2 to -41.7 feet MLLW



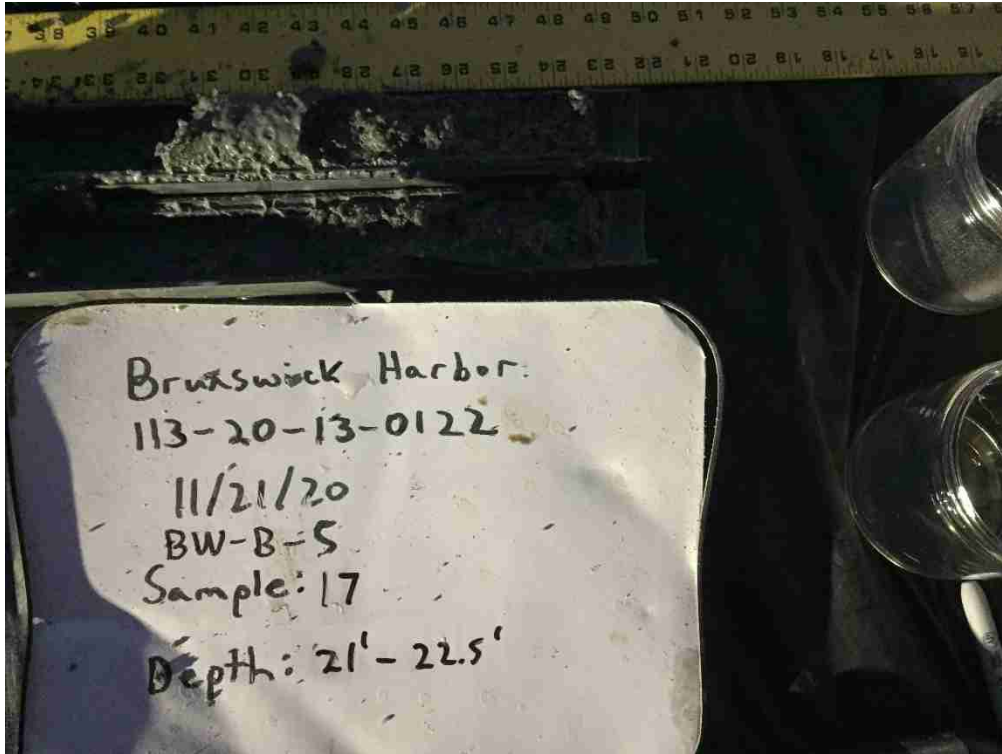
Depth: 16.5 – 18.0 feet; Approximate Elevation: -41.7 to -43.2 feet MLLW



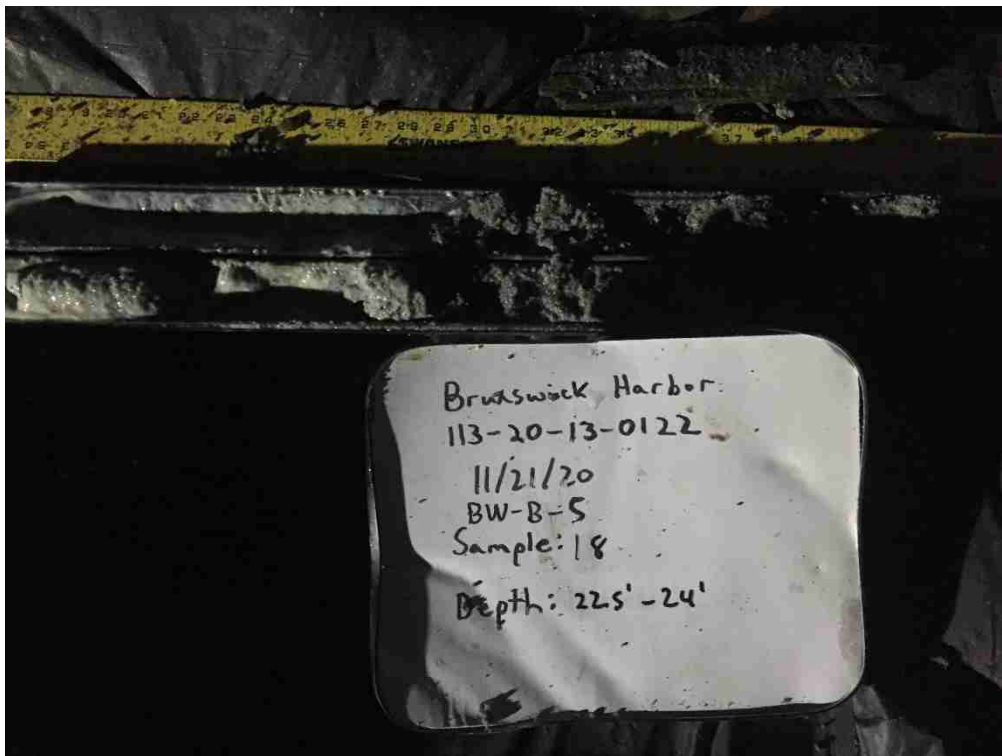
Depth: 18.0 – 19.5 feet; Approximate Elevation: -43.2 to -44.7 feet MLLW



Depth: 19.5 – 21.0 feet; Approximate Elevation: -44.7 to -46.2 feet MLLW

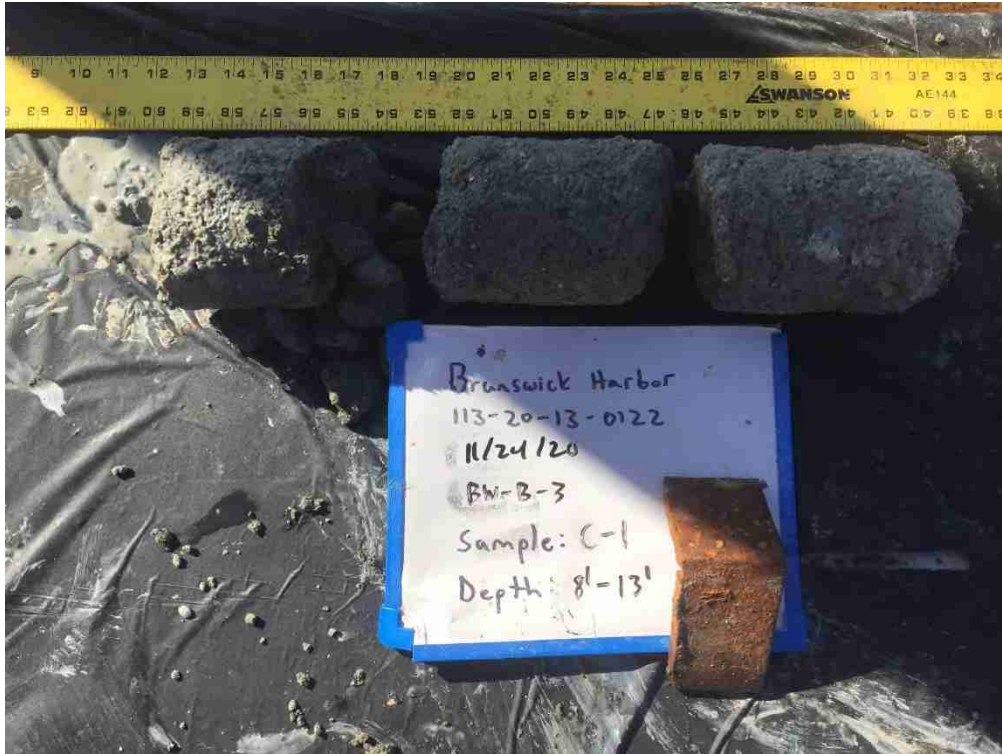


Depth: 21.0 – 22.5 feet; Approximate Elevation: -46.2 to -47.7 feet MLLW



Depth: 22.5 – 24.0 feet; Approximate Elevation: -47.7 to -49.2 feet MLLW

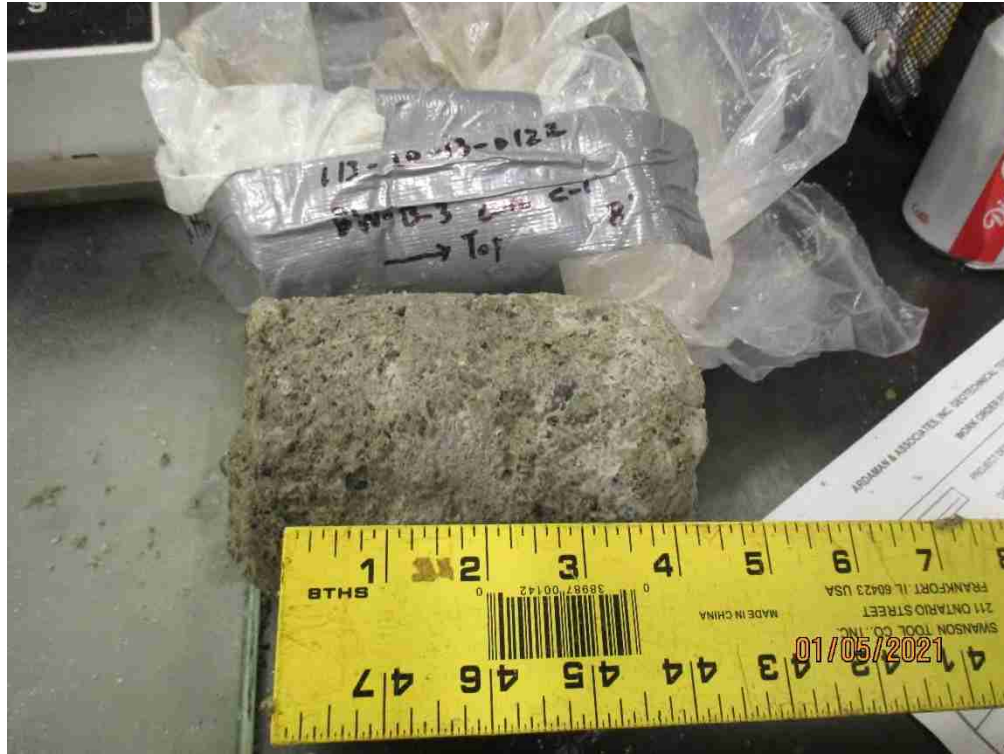
APPENDIX D
PHOTOGRAPHS OF CORE SAMPLES



Depth: 8.0 – 13.0 feet; Approximate Elevation: -35.8 to -40.8 feet MLLW



Depth: 8.0 – 13.0 feet; Approximate Elevation: -35.8 to -40.8 feet MLLW



Top Core



Top Core - Top



Top Core - Bottom



Middle Core



Middle Core - Top



Middle Core - Bottom



Bottom Core



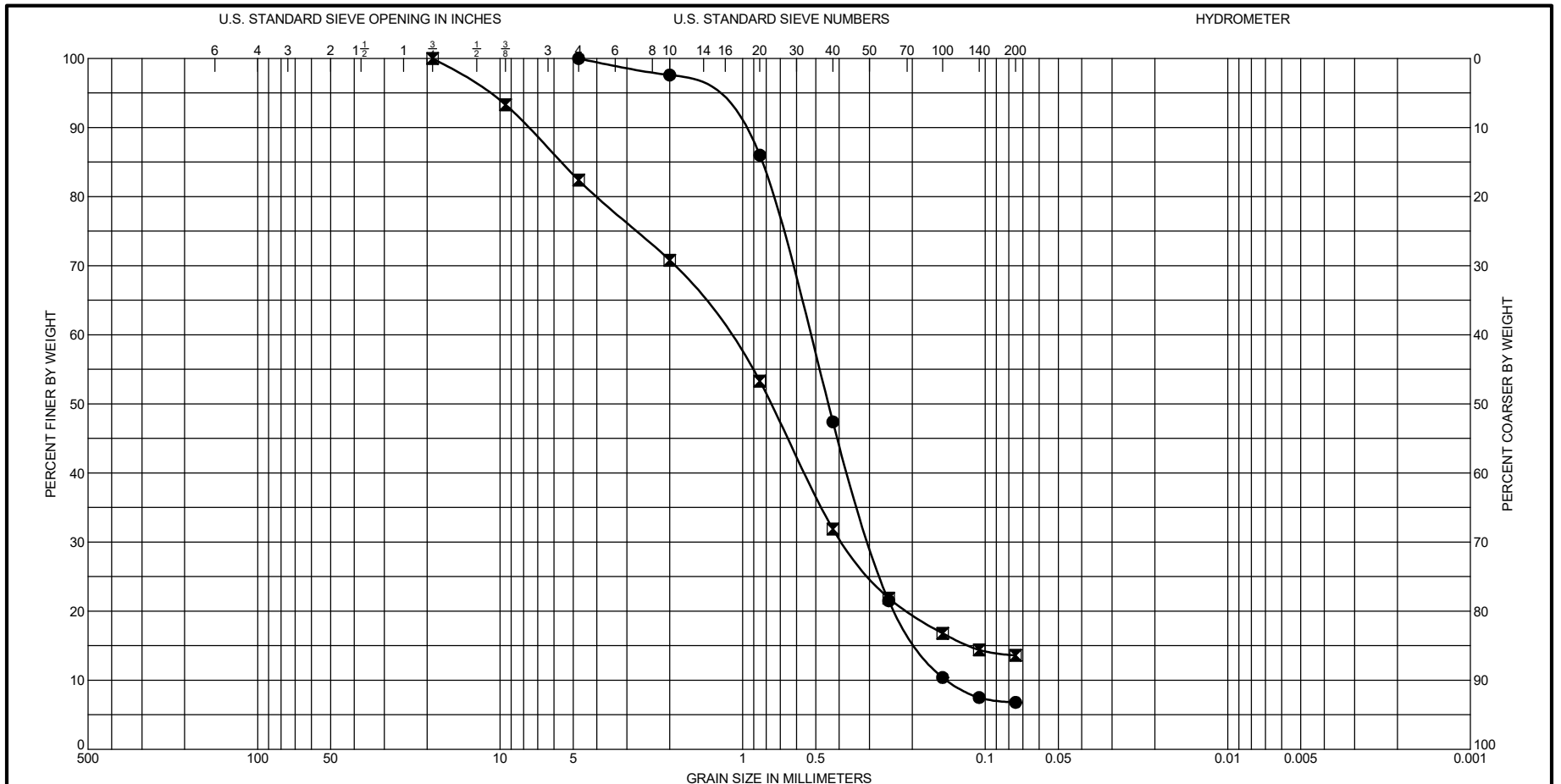
Bottom Core - Top



Bottom Core - Bottom

APPENDIX E

PARTICLE SIZE ANALYSIS CURVES AND INDEX TEST RESULTS

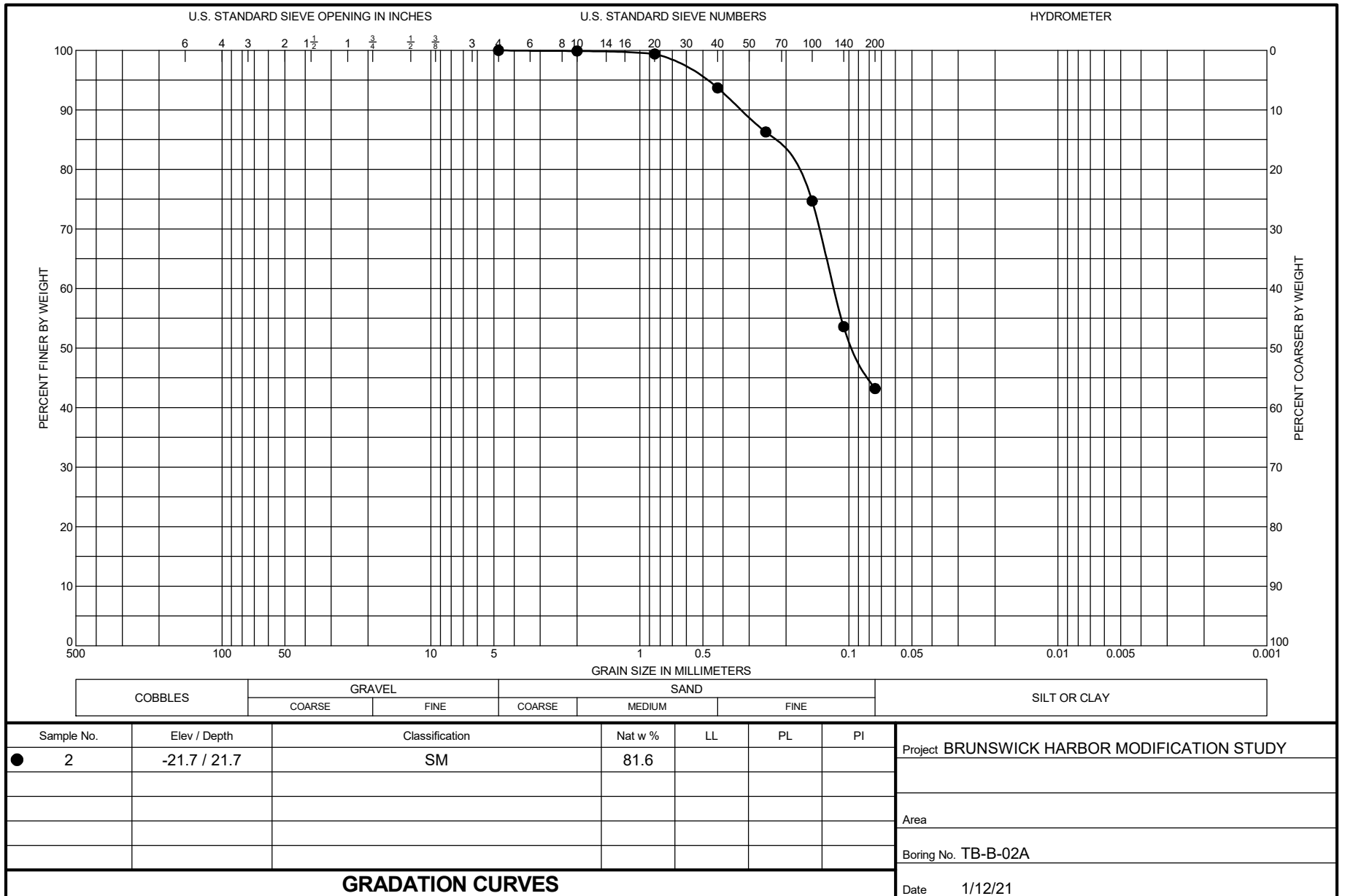


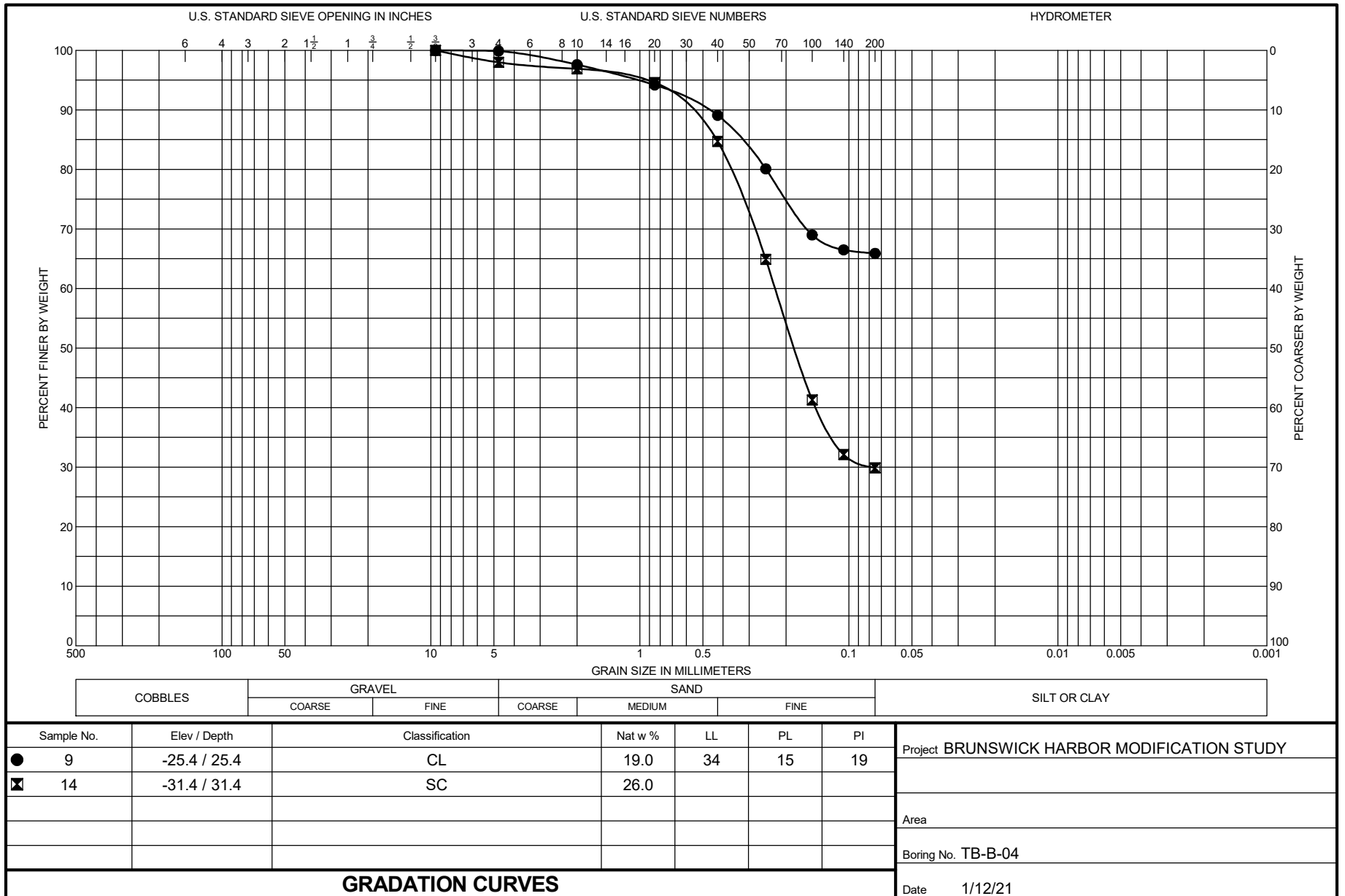
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

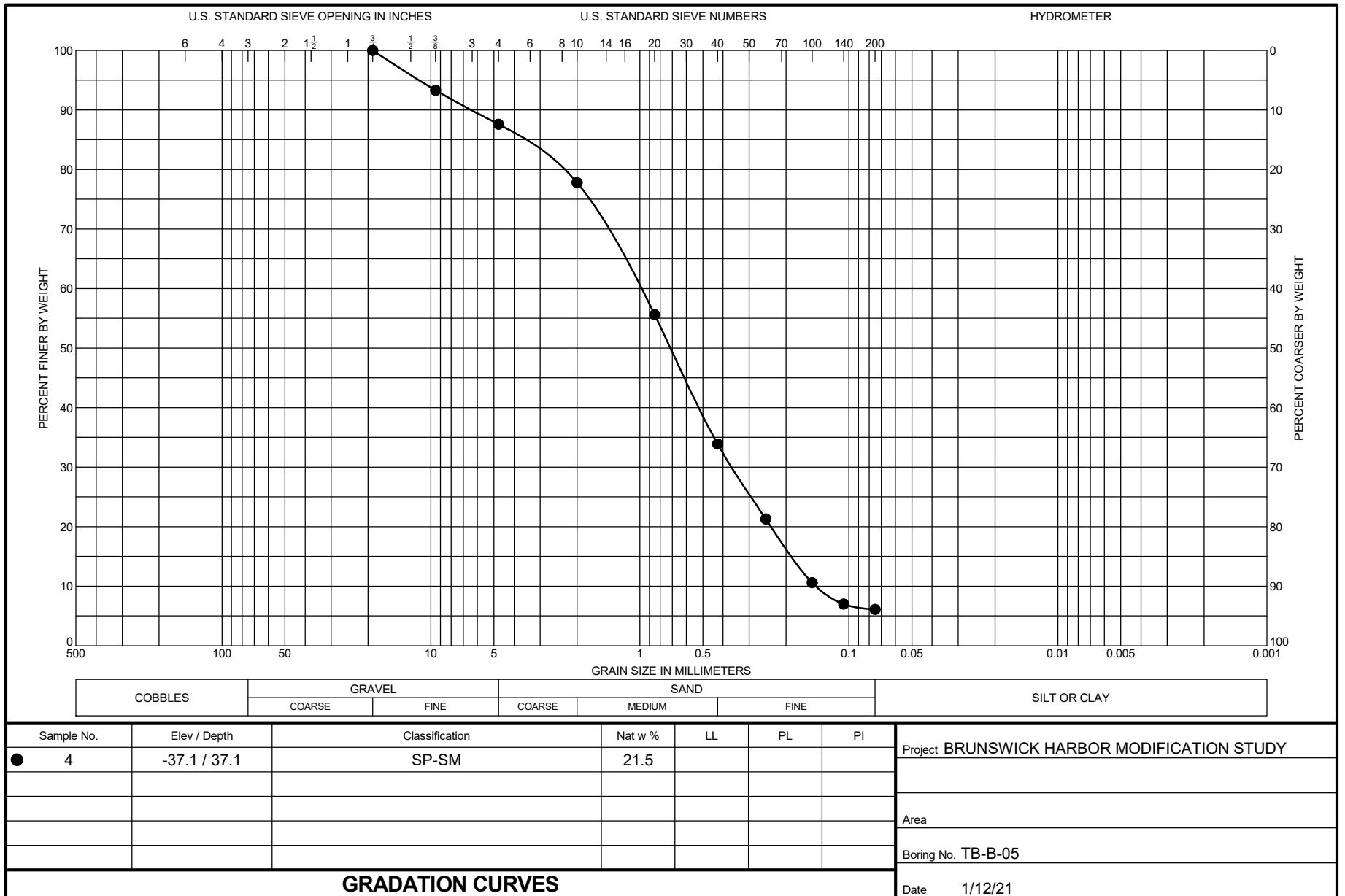
Sample No.	Elev / Depth	Classification	Nat w %	LL	PL	PI
● 5	-36.0 / 36.0	SP-SM	29.4			
☒ 6	-37.5 / 37.5	SM	18.2			

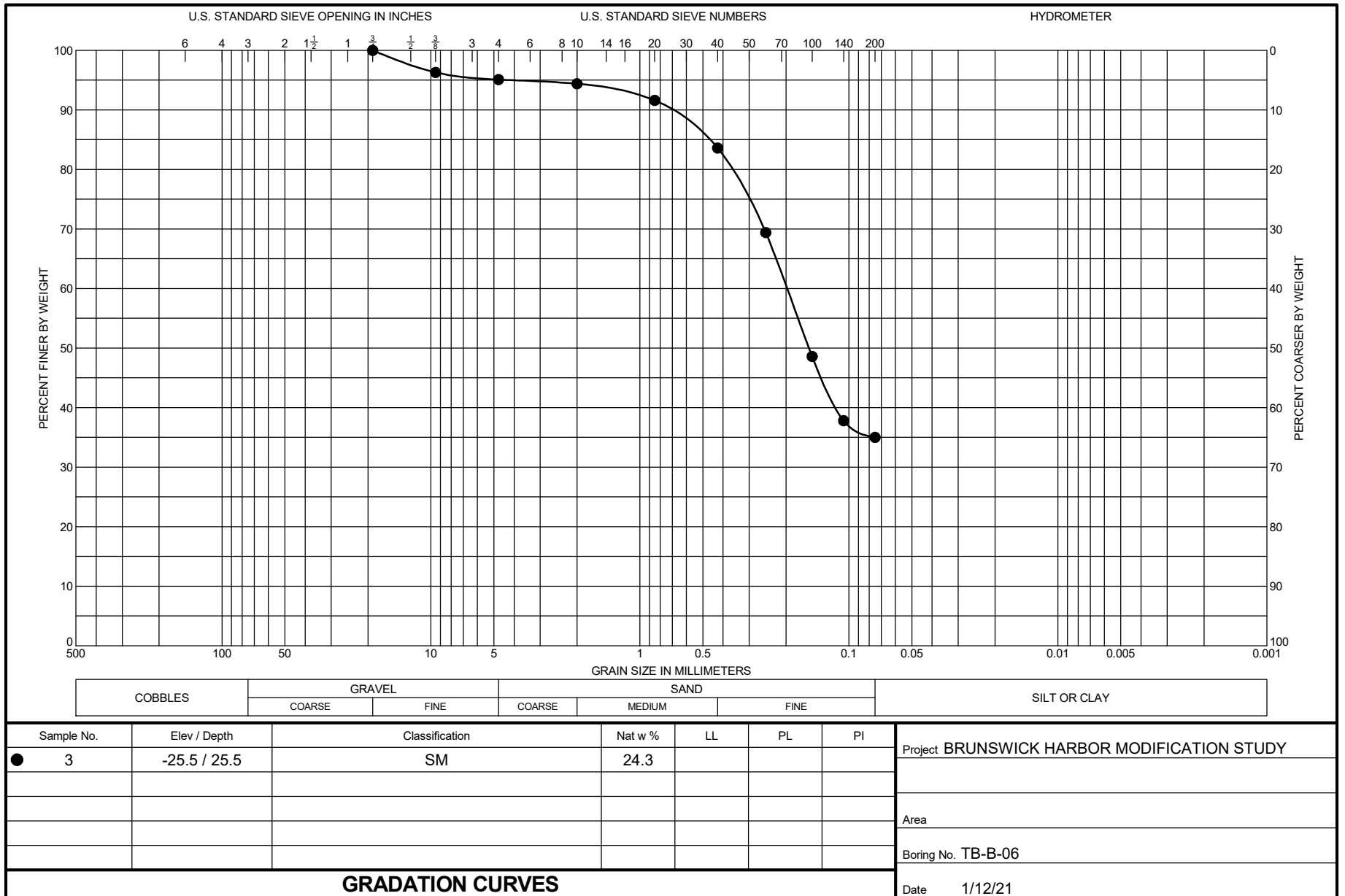
Project	BRUNSWICK HARBOR MODIFICATION STUDY
Area	
Boring No.	TB-B-01
Date	1/12/21

GRADATION CURVES







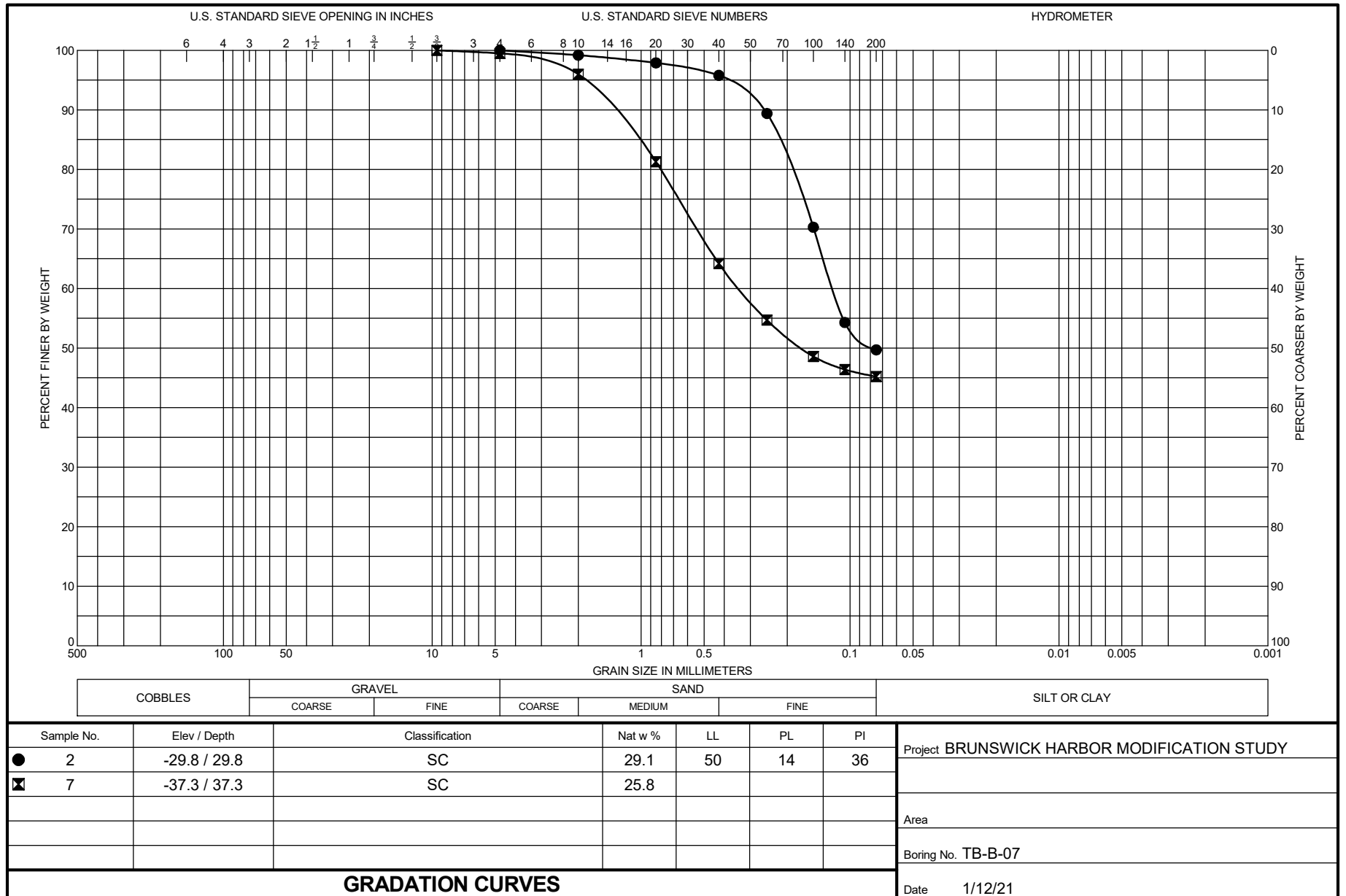


COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Elev / Depth	Classification	Nat w %	LL	PL	PI	Project
● 3	-25.5 / 25.5	SM	24.3				BRUNSWICK HARBOR MODIFICATION STUDY
							Area
							Boring No. TB-B-06

GRADATION CURVES

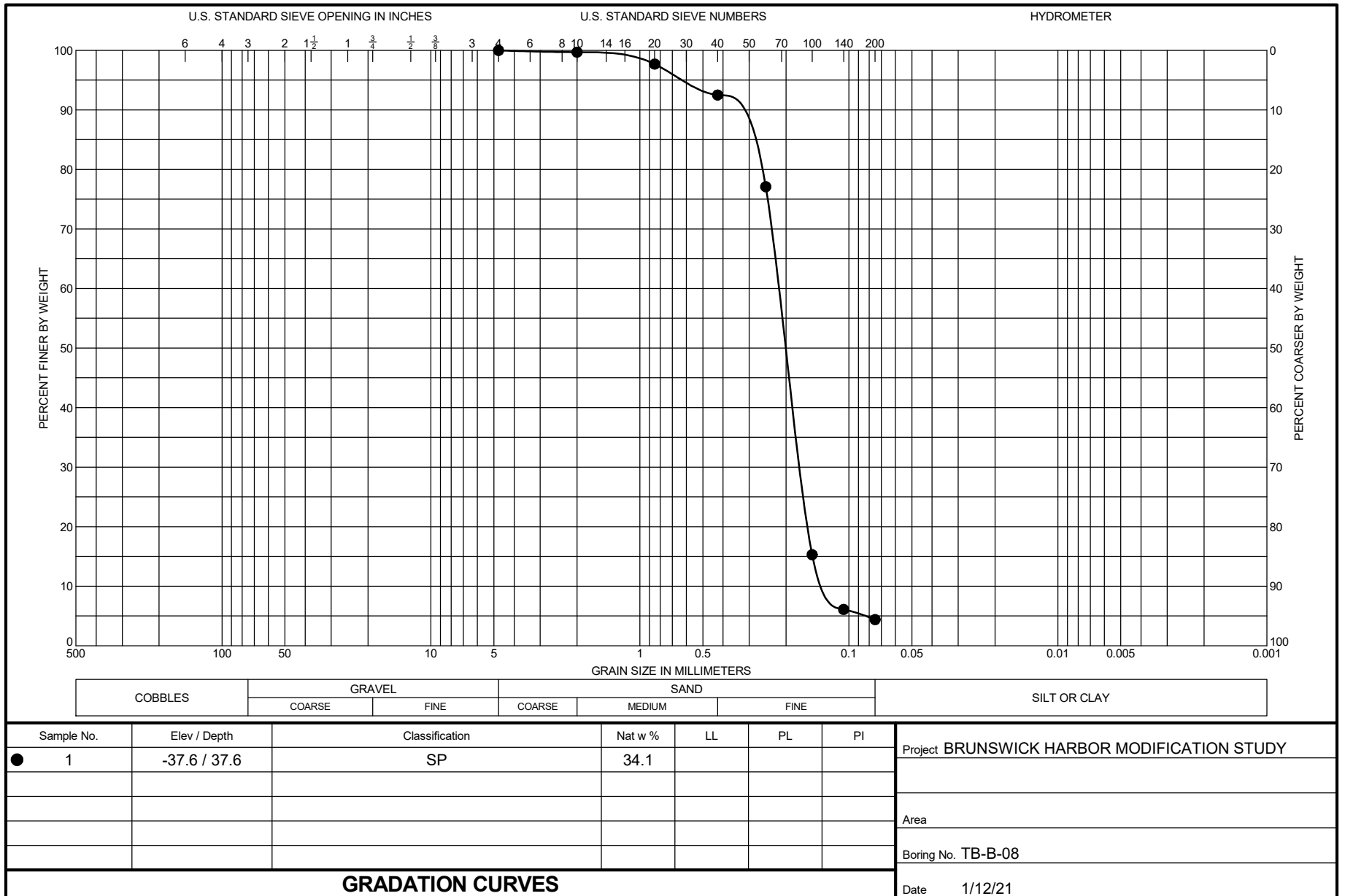
Date 1/12/21

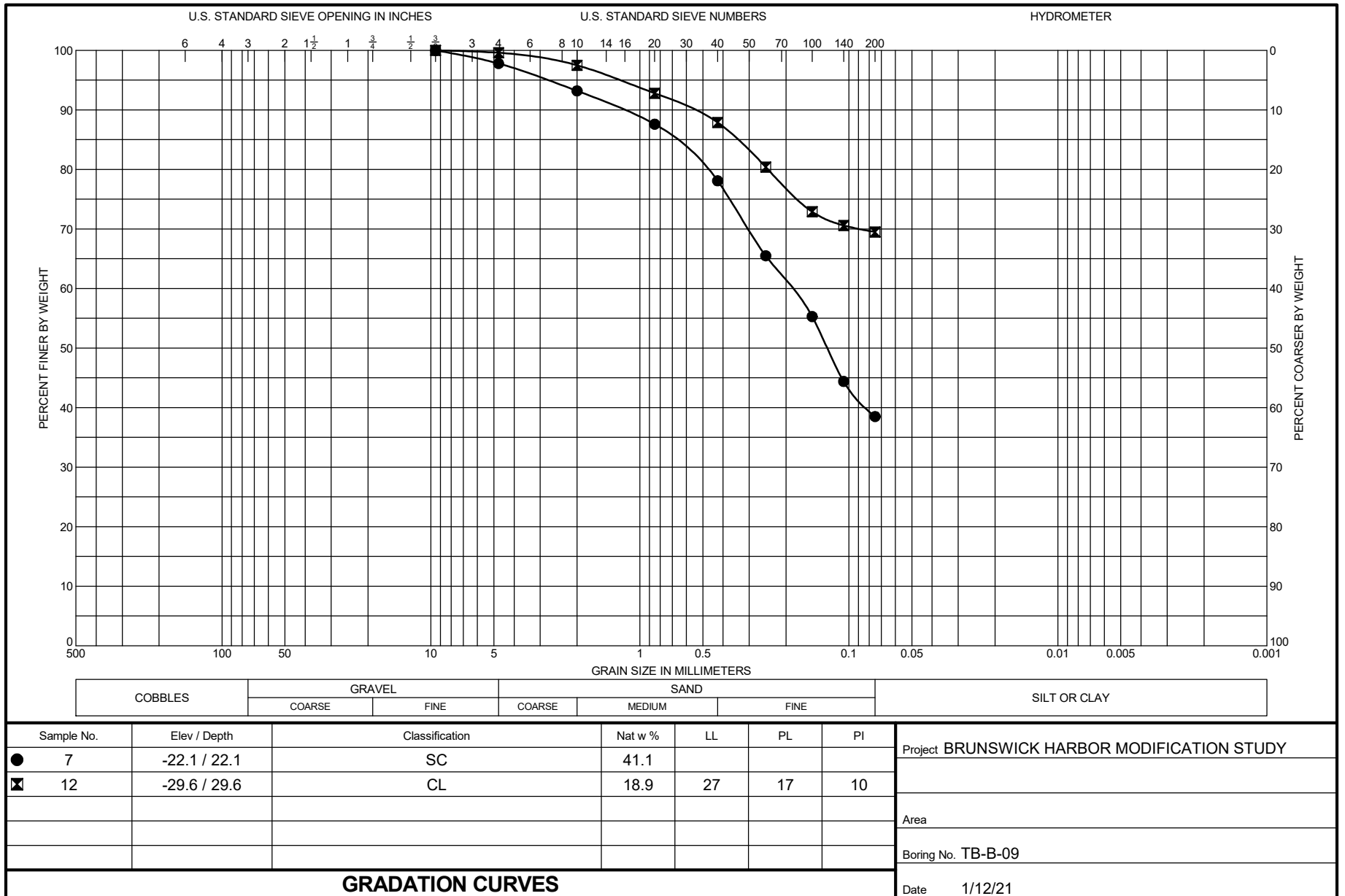


COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Elev / Depth	Classification	Nat w %	LL	PL	PI	Project
● 2	-29.8 / 29.8	SC	29.1	50	14	36	BRUNSWICK HARBOR MODIFICATION STUDY
☒ 7	-37.3 / 37.3	SC	25.8				
							Area
							Boring No. TB-B-07
							Date 1/12/21

GRADATION CURVES



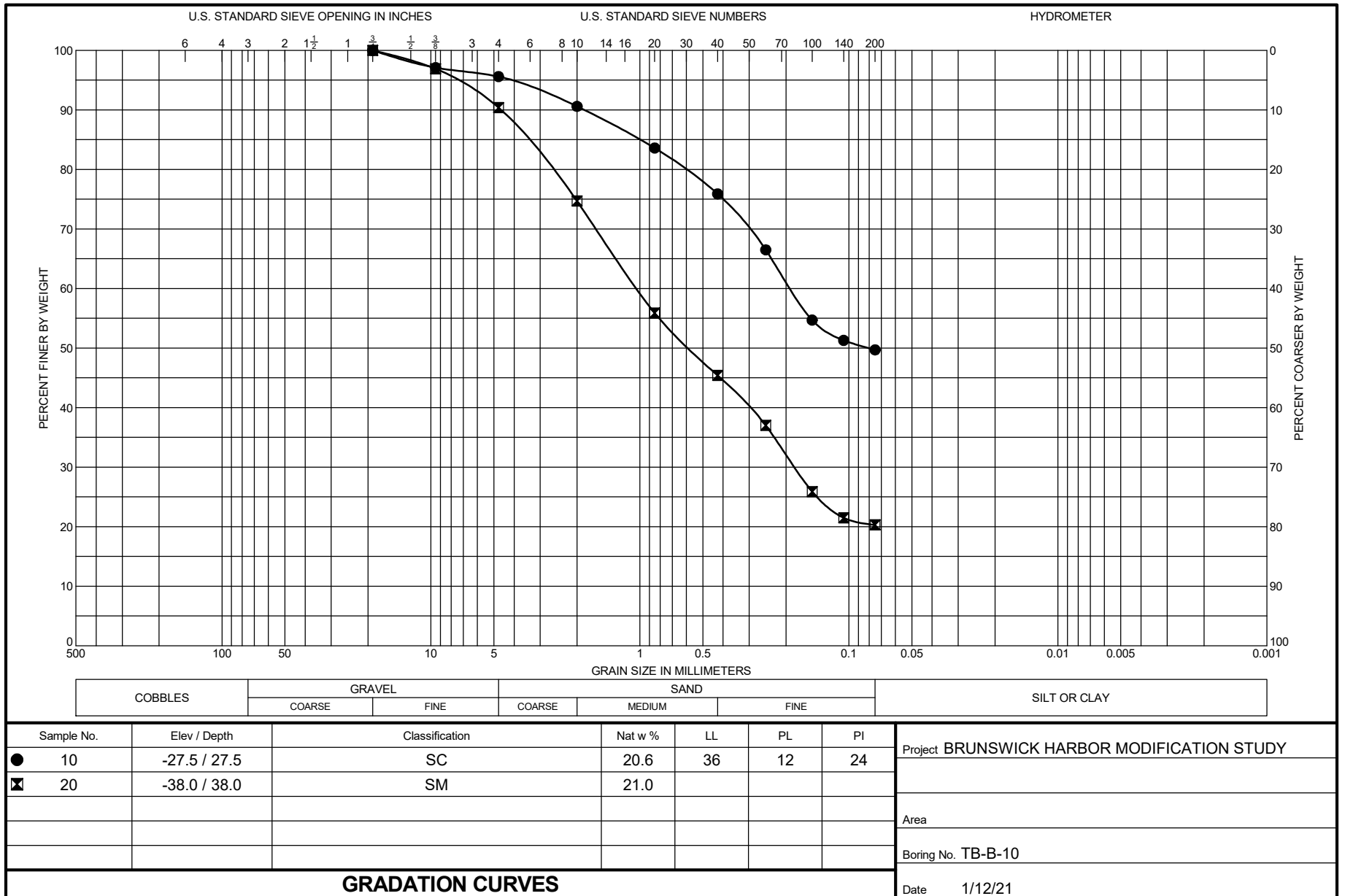


COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Elev / Depth	Classification	Nat w %	LL	PL	PI
● 7	-22.1 / 22.1	SC	41.1			
☒ 12	-29.6 / 29.6	CL	18.9	27	17	10

Project	BRUNSWICK HARBOR MODIFICATION STUDY
Area	
Boring No.	TB-B-09
Date	1/12/21

GRADATION CURVES

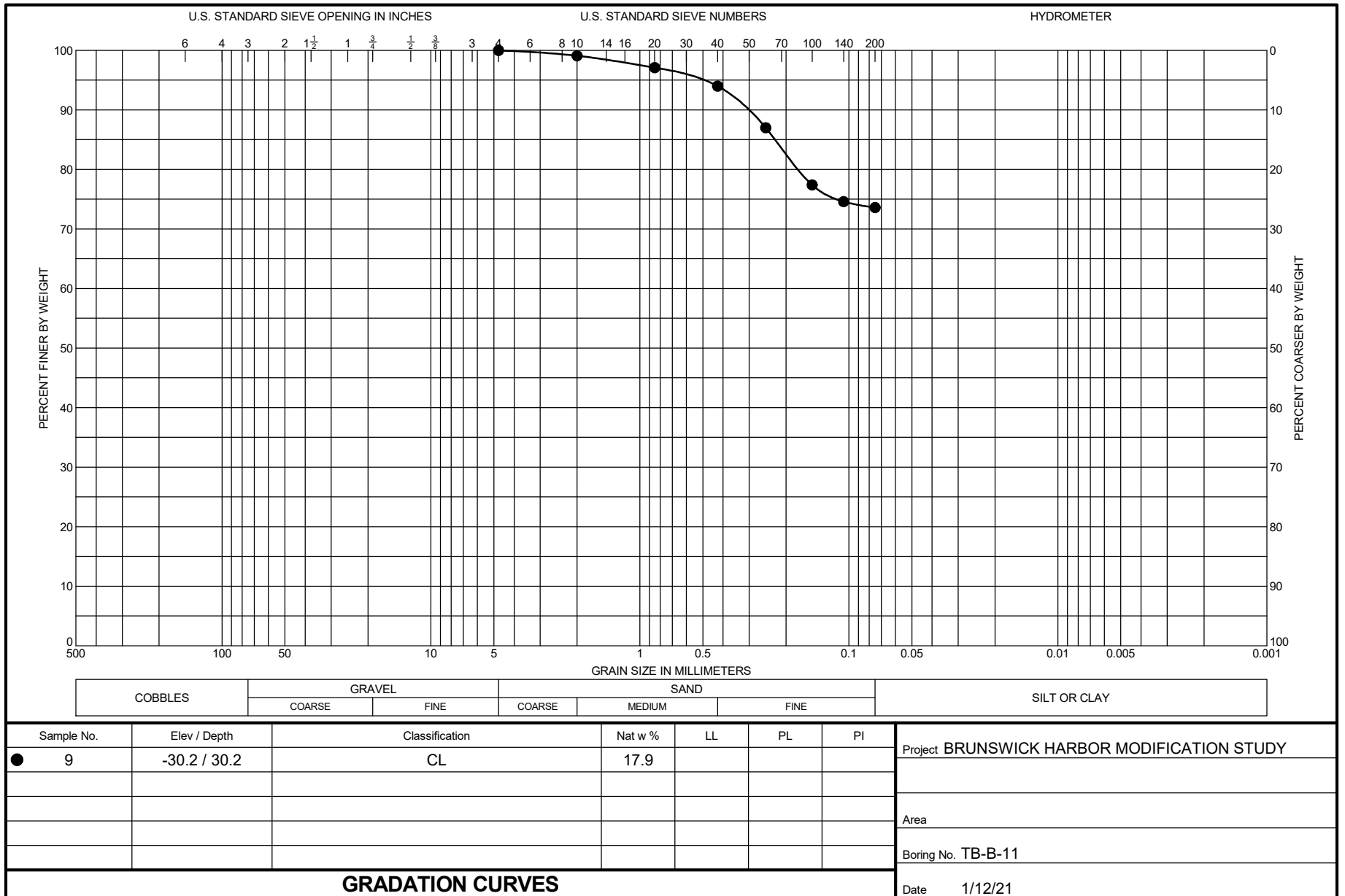


COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Elev / Depth	Classification	Nat w %	LL	PL	PI
● 10	-27.5 / 27.5	SC	20.6	36	12	24
◻ 20	-38.0 / 38.0	SM	21.0			

Project	BRUNSWICK HARBOR MODIFICATION STUDY
Area	
Boring No.	TB-B-10
Date	1/12/21

GRADATION CURVES

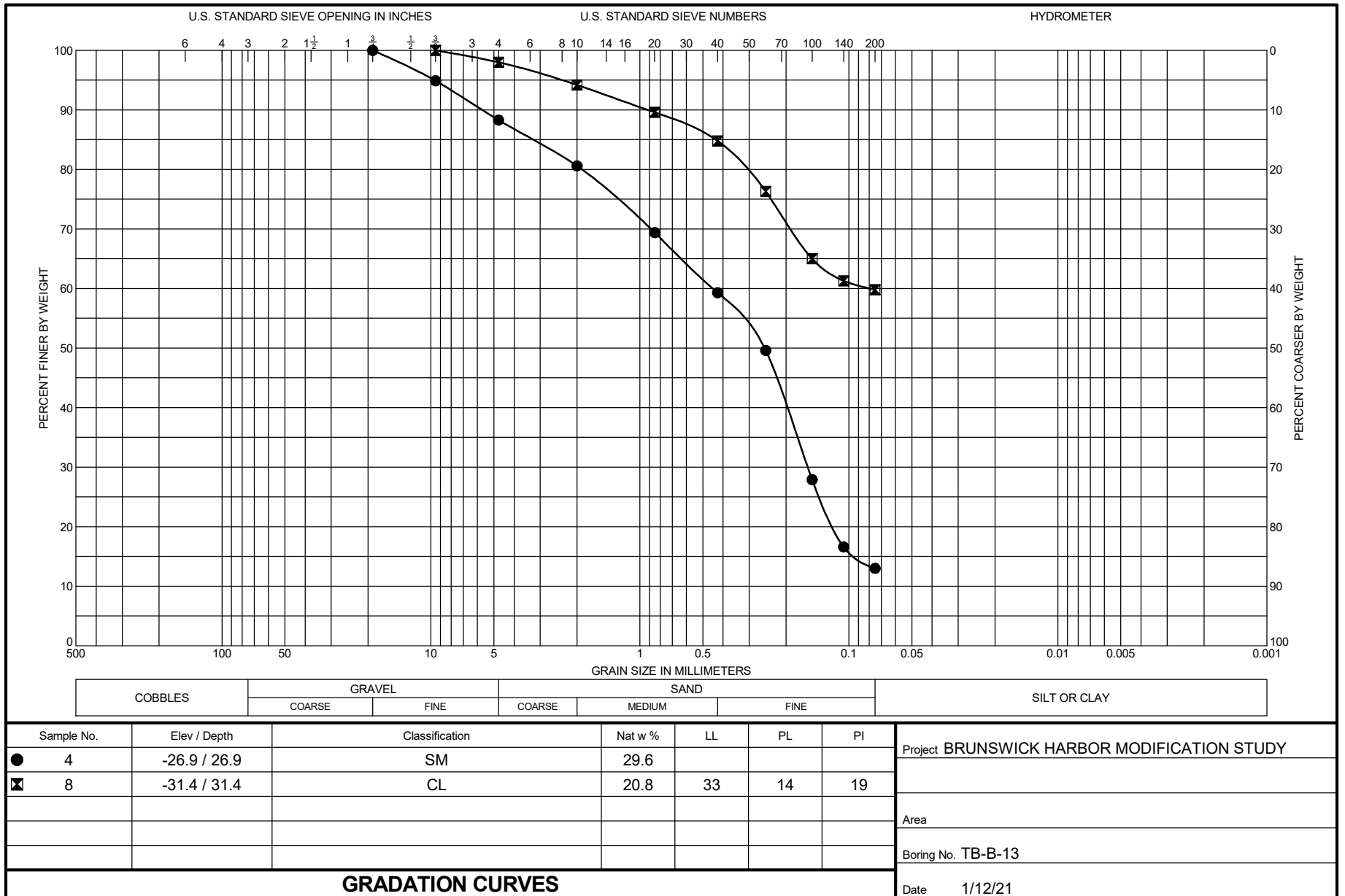


COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Elev / Depth	Classification	Nat w %	LL	PL	PI
● 9	-30.2 / 30.2	CL	17.9			

Project	BRUNSWICK HARBOR MODIFICATION STUDY
Area	
Boring No.	TB-B-11
Date	1/12/21

GRADATION CURVES

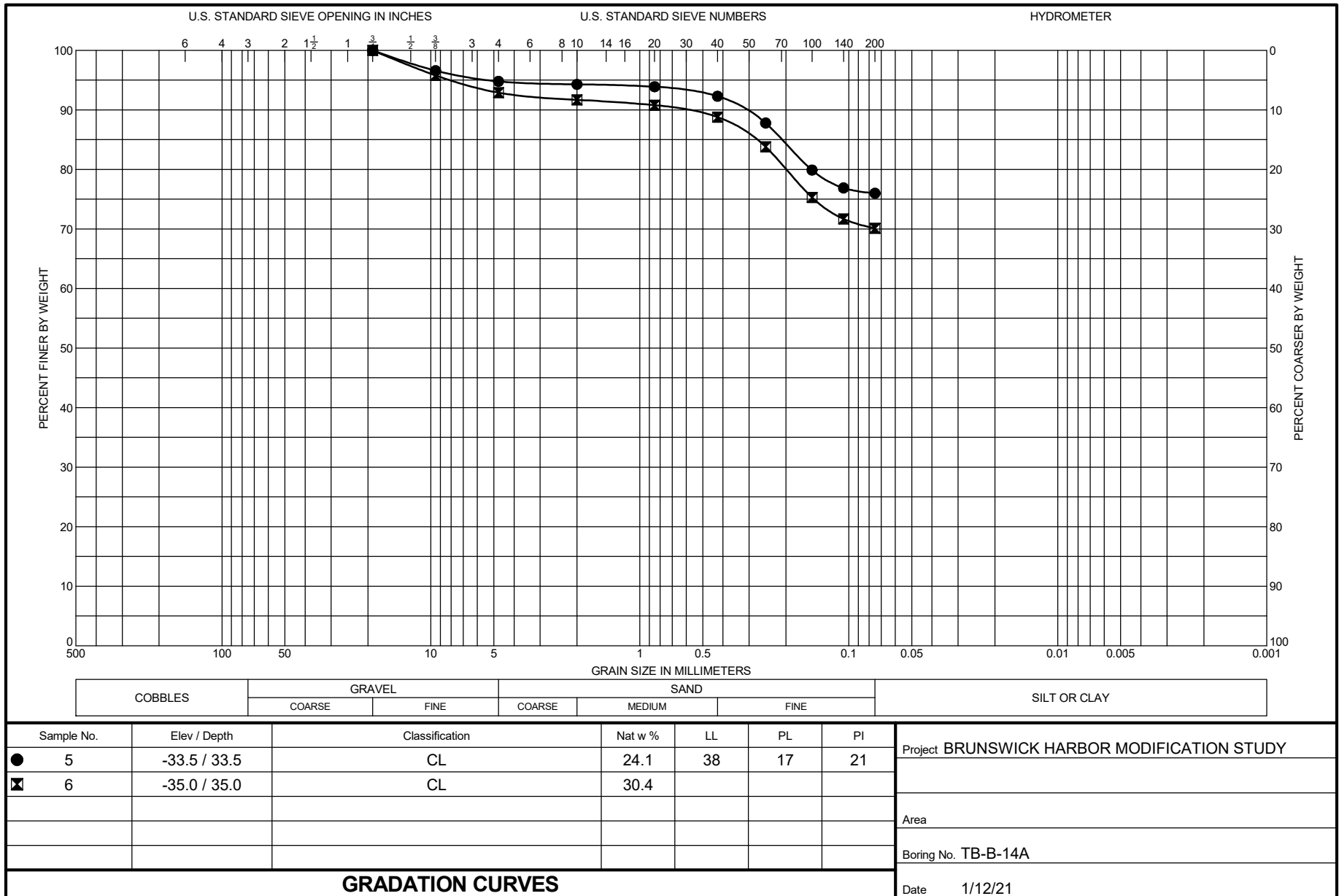


COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Elev / Depth	Classification	Nat w %	LL	PL	PI
● 4	-26.9 / 26.9	SM	29.6			
⊠ 8	-31.4 / 31.4	CL	20.8	33	14	19

Project	BRUNSWICK HARBOR MODIFICATION STUDY
Area	
Boring No.	TB-B-13
Date	1/12/21

GRADATION CURVES

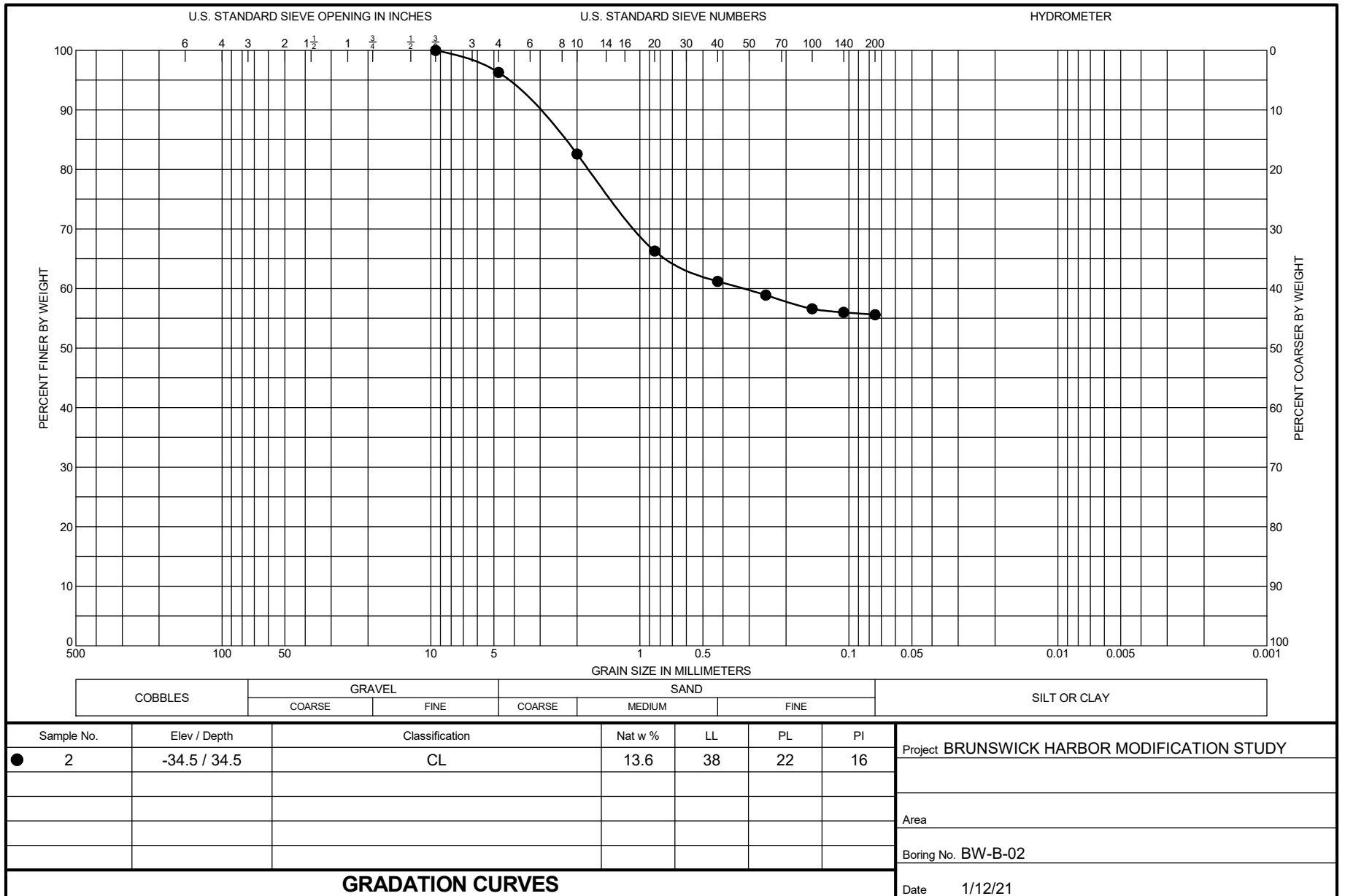


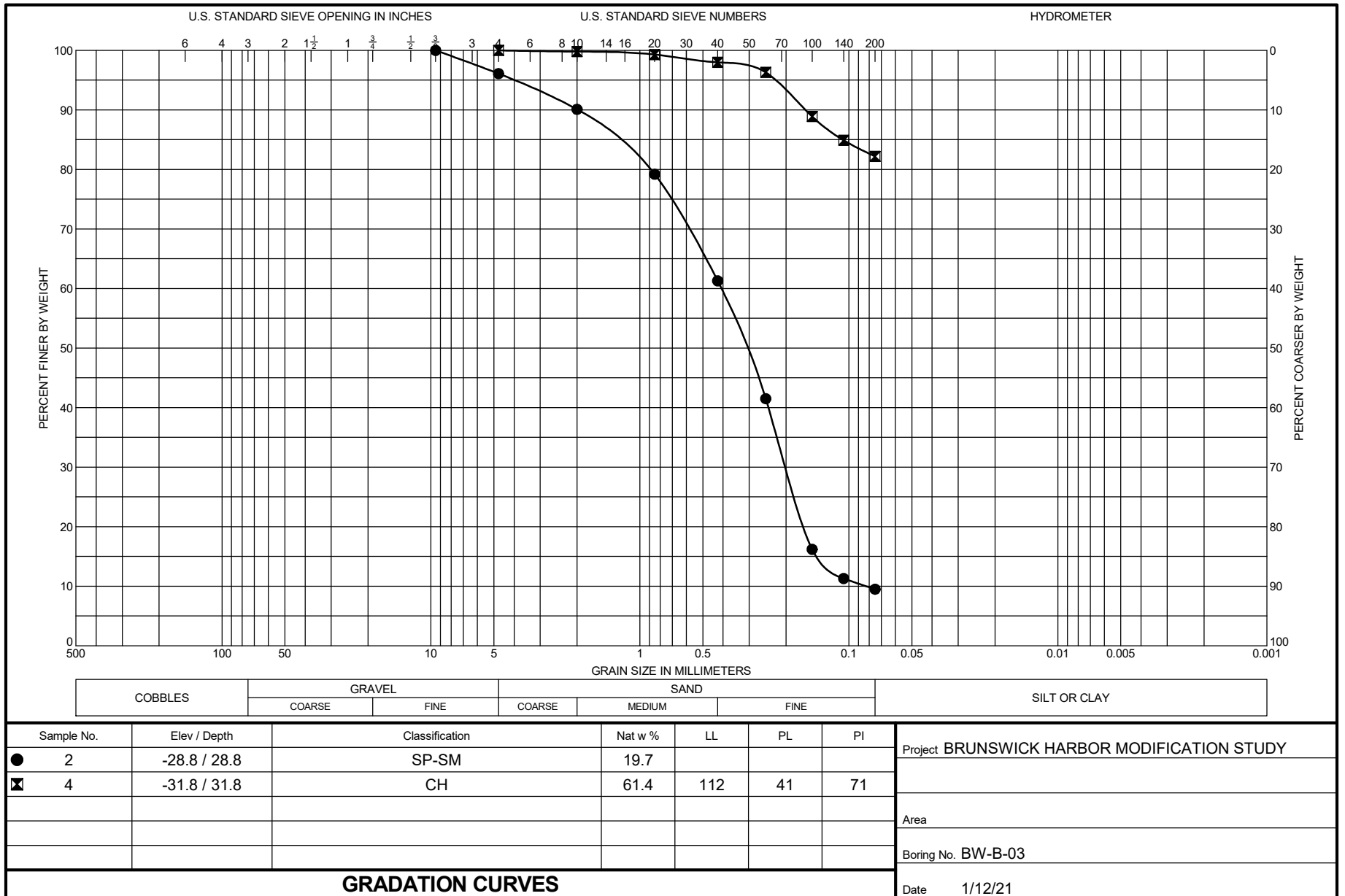
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

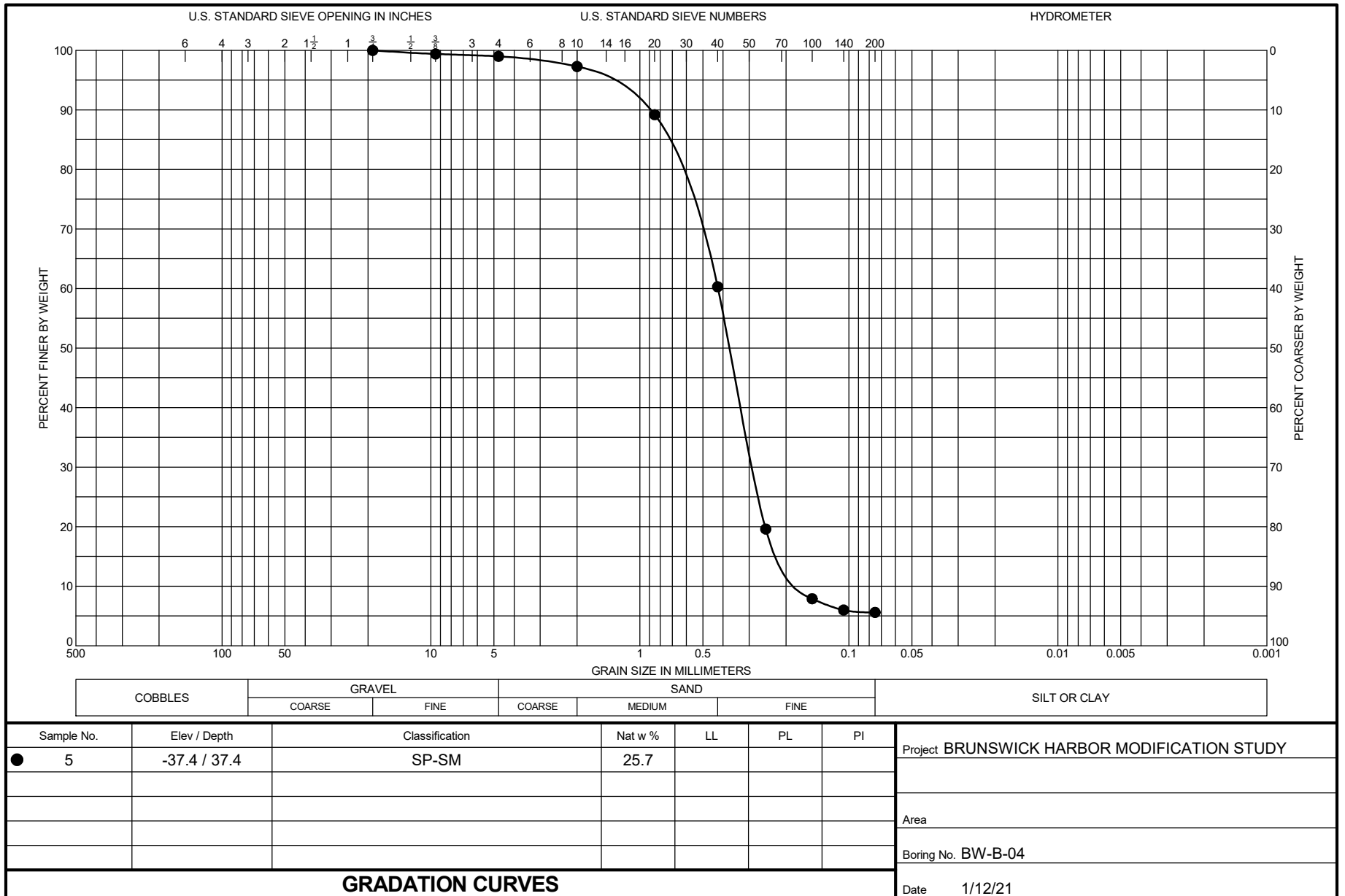
Sample No.	Elev / Depth	Classification	Nat w %	LL	PL	PI
● 5	-33.5 / 33.5	CL	24.1	38	17	21
⊠ 6	-35.0 / 35.0	CL	30.4			

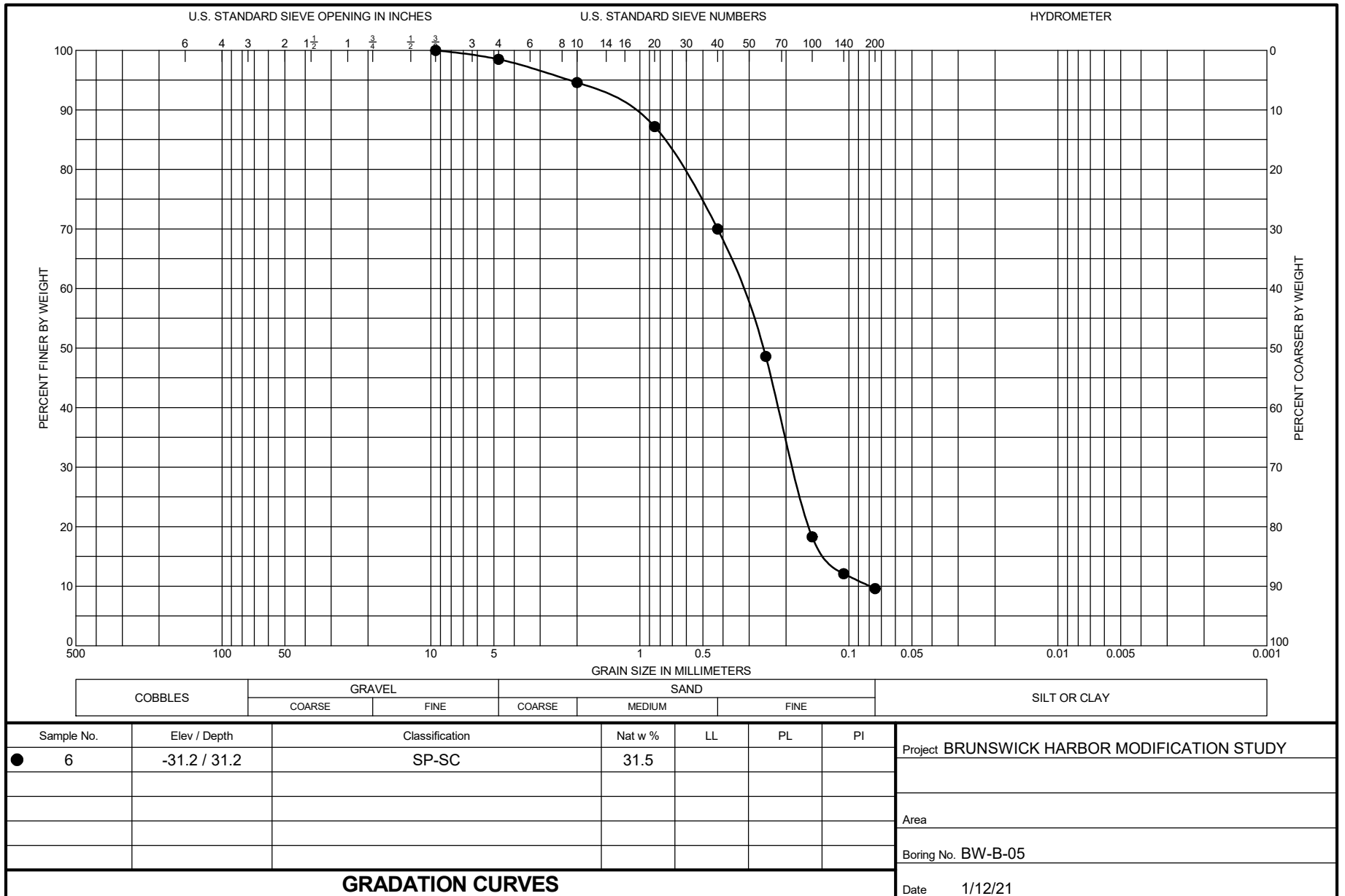
Project	BRUNSWICK HARBOR MODIFICATION STUDY
Area	
Boring No.	TB-B-14A
Date	1/12/21

GRADATION CURVES









APPENDIX F

SETTLING TEST RESULTS AND PROCEDURE

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY SETTLING TEST REPORT

CLIENT: U.S. Army Corps of Engineers
 PROJECT: Brunswick Harbor Modification Study
 FILE NO.: 20-13-0122

DATE SAMPLE DRILLED: 11/22/20
 DATE TEST SET-UP: 12/30/20
 DATE REPORTED: 02/09/21

INCOMING SAMPLE NO.: -----
 BORING: **BW-B-01** SAMPLE: 2, 3
 ELEVATION: -29.5 to -32.5 (MLLW) feet; meters
 LABORATORY IDENTIFICATION: 200122/BWB01
 SAMPLE DESCRIPTION: Silty sand (SM), gray
(Sample scalped on U.S. Standard No. 4 sieve)
 Water Content Fraction Passing No. 4 Sieve = 16.3 %

	Settling Column Diameter: <u>2.54</u> cm Initial Slurry Height: <u>100</u> cm Initial Concentration: <u>50 grams/liter (wet mass basis)</u> Initial Concentration: <u>43 grams/liter (dry mass basis)</u> Final Settled Height: <u>3.50</u> cm Test Duration: <u>1</u> day Final Concentration: <u>1,429 grams/liter (wet mass basis)</u> Final Concentration: <u>1,228 grams/liter (dry mass basis)</u> Final Settled Dry Density: <u>75.8 lb/ft³</u>			
	Time (minutes)	Top Down (cm)	Time (minutes)	Bottom Up (cm)
	0	100	0	0.0
		Sample was sandy and settled immediately. Suspension did not develop an interface	0.25	1.8
			0.5	2.2
			1	2.3
			2	2.5
			4	2.95
			8	3.75
			15	3.95
			30	3.8
			60	3.7
			120	3.6
			240	3.6
			360	3.5
			460	3.5
			1,440	3.5
Initial Settling Velocity				
V _s : <u>Not applicable</u> cm/minute				
Time Interval: <u>-----</u> minutes				

Comments: Wet Mass Retained on U.S. Std. No. 4 Sieve Fraction (grams) = 194.92
Wet Mass Passing U.S. Std. No. 4 Sieve Fraction (grams) = 1,231.3
Total Composite Sample Wet Mass (grams) = 1,426.2

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Checked By: _____ Date: _____

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY SETTLING TEST REPORT

CLIENT: U.S. Army Corps of Engineers
 PROJECT: Brunswick Harbor Modification Study
 FILE NO.: 20-13-0122

DATE SAMPLE DRILLED: 11/22/20
 DATE TEST SET-UP: 12/30/20
 DATE REPORTED: 02/09/21

INCOMING SAMPLE NO.: -----
 BORING: **BW-B-01** SAMPLE: 2, 3
 ELEVATION: -29.5 to -32.5 (MLLW) feet; meters
 LABORATORY IDENTIFICATION: 200122/BWB01
 SAMPLE DESCRIPTION: Silty sand (SM), gray
(Sample scalped on U.S. Standard No. 4 sieve)
 Water Content Fraction Passing No. 4 Sieve = 16.3 %

	Settling Column Diameter: <u>2.54</u> cm Initial Slurry Height: <u>100</u> cm Initial Concentration: <u>100 grams/liter (wet mass basis)</u> Initial Concentration: <u>86 grams/liter (dry mass basis)</u> Final Settled Height: <u>3.50</u> cm Test Duration: <u>1 day</u> Final Concentration: <u>1,449 grams/liter (wet mass basis)</u> Final Concentration: <u>1,246 grams/liter (dry mass basis)</u> Final Settled Dry Density: <u>76.9 lb/ft³</u>			
	Time (minutes)	Top Down (cm)	Time (minutes)	Bottom Up (cm)
	0	100	0	0.0
		Sample was sandy and settled immediately. Suspension did not develop an interface	0.25	4.3
			0.5	4.8
			1	5.0
			2	5.4
			4	6.5
			8	9.0
			15	8.9
			30	8.15
			60	7.45
			120	7.2
			240	7.0
			360	6.9
			460	6.9
		1,440	6.9	
	Initial Settling Velocity			
	V _s : <u>Not applicable</u> cm/minute			
	Time Interval: <u>-----</u> minutes			

Comments: Wet Mass Retained on U.S. Std. No. 4 Sieve Fraction (grams) = 194.92
Wet Mass Passing U.S. Std. No. 4 Sieve Fraction (grams) = 1,231.3
Total Composite Sample Wet Mass (grams) = 1,426.2

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

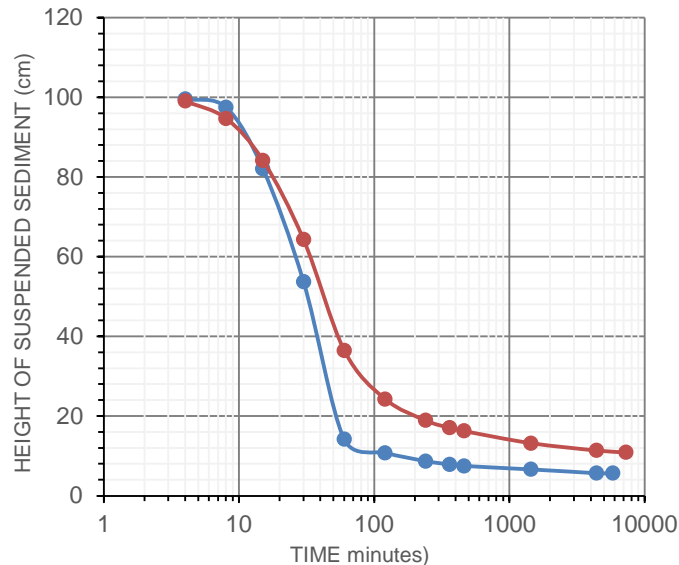
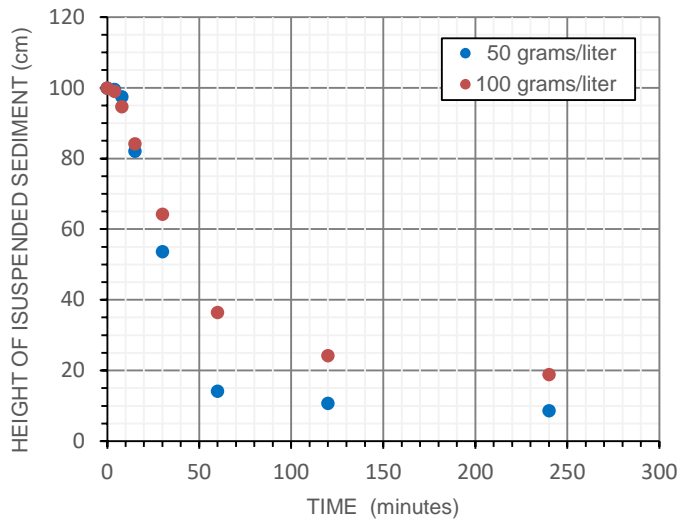
Checked By: _____ Date: _____

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY SETTLING TEST REPORT

CLIENT: U.S. Army Corps of Engineers
 PROJECT: Brunswick Harbor Modification Study
 FILE NO.: 20-13-0122

DATE SAMPLE DRILLED: 10/21/20
 DATE TEST SET-UP: 12/30/20
 DATE REPORTED: 02/09/21

INCOMING SAMPLE NO.: -----
 BORING: **TB-B-02A** SAMPLE: 5A, 5B, 6A, 6B
 ELEVATION: -26.2 to -29.2 (MLLW) feet; meters
 LABORATORY IDENTIFICATION: 200122/TBB02A
 SAMPLE DESCRIPTION: Sand with clay (SP-SC), with shell, greenish-gray
 Sample scalped on U.S. Standard No. 4 sieve
 Water Content Fraction Passing No. 4 Sieve = 29.9 %



Settling Column Diameter: 2.54 cm
 Initial Slurry Height: 100 cm
Initial Concentration: 100 grams/liter (wet mass basis)
 Initial Concentration: 77 grams/liter (dry mass basis)
 Final Settled Height: 10.9 cm
 Test Duration: 5 days
 Final Concentration: 917 grams/liter (wet mass basis)
 Final Concentration: 706 grams/liter (dry mass basis)
 Final Settled Dry Density: 43.6 lb/ft³

Time (minutes)	Top Down (cm)	Time (minutes)	Bottom Up (cm)
0	100	0	0.0
4	99.1	0.25	4.5
8	94.7	0.5	4.7
15	84.2	1	4.8
30	64.3	2	4.8
60	36.5	4	4.8
120	24.3		
240	18.9		
360	17.1		
460	16.3		
1,440	13.2		
4,358	11.4		
7,200	10.9		

Initial Settling Velocity

V_s: 1.1 cm/minute
 Time Interval: 0 - 60 minutes

Comments: Wet Mass Retained on U.S. Std. No. 4 Sieve Fraction (grams) = 189.18
Wet Mass Passing U.S. Std. No. 4 Sieve Fraction (grams) = 1,216.2
Total Composite Sample Wet Mass (grams) = 1,405.4

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

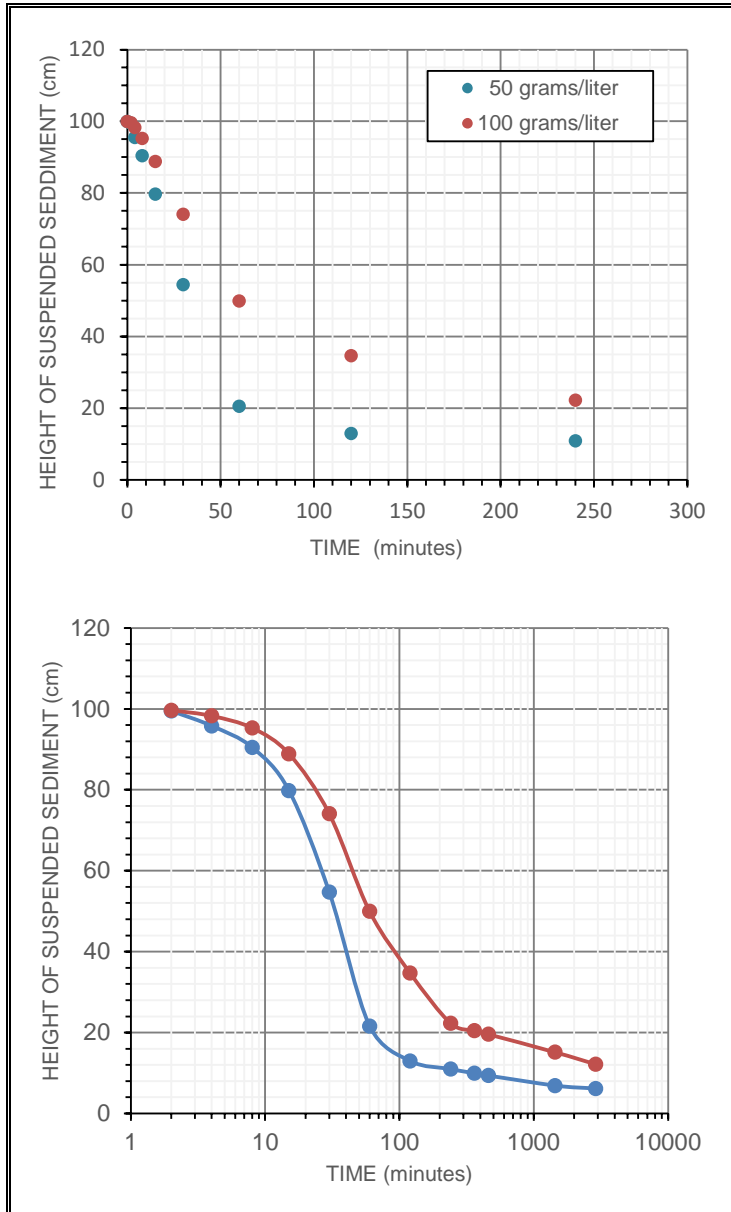
Checked By: _____ Date: _____

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY SETTLING TEST REPORT

CLIENT: U.S. Army Corps of Engineers
 PROJECT: Brunswick Harbor Modification Study
 FILE NO.: 20-13-0122

DATE SAMPLE DRILLED: 11/01/20
 DATE TEST SET-UP: 01/04/21
 DATE REPORTED: 02/09/21

INCOMING SAMPLE NO.: -----
 BORING: TB-B-07 SAMPLE: 3A, 3B, 4A, 4B
 ELEVATION: -31.3 to -34.3 (MLLW) feet; meters
 LABORATORY IDENTIFICATION: 200122/TBB07
 SAMPLE DESCRIPTION: Clayey sand with gravel (SC), with trace shell, gray
Sample scalped on U.S. Standard No. 4 sieve
Water Content Fraction Passing No. 4 Sieve = 27.8 %



Settling Column Diameter: 2.54 cm
 Initial Slurry Height: 100 cm
Initial Concentration: 50 grams/liter (wet mass basis)
 Initial Concentration: 39 grams/liter (dry mass basis)
 Final Settled Height: 6.2 cm
 Test Duration: 3 days
 Final Concentration: 806 grams/liter (wet mass basis)
 Final Concentration: 631 grams/liter (dry mass basis)
 Final Settled Dry Density: 38.9 lb/ft³

Time (minutes)	Top Down (cm)	Time (minutes)	Bottom Up (cm)
0	100	0	0.0
2	99.5	0.25	0.7
4	95.8	0.5	1.1
8	90.5	1	1.4
15	79.8	2	1.5
30	54.7	4	1.5
60	20.6	8	1.5
120	13.0	15	1.5
240	11.0	30	1.4
360	10.0		
460	9.4		
1,440	6.9		
3,370	6.2		

Initial Settling Velocity

V_s: 1.3 cm/minute
 Time Interval: 0 - 60 minutes

Comments: Wet Mass Retained on U.S. Std. No. 4 Sieve Fraction (grams) = 530.0
Wet Mass Passing U.S. Std. No. 4 Sieve Fraction (grams) = 1,554.0
Total Composite Sample Wet Mass (grams) = 2,084.0

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Checked By: _____ Date: _____

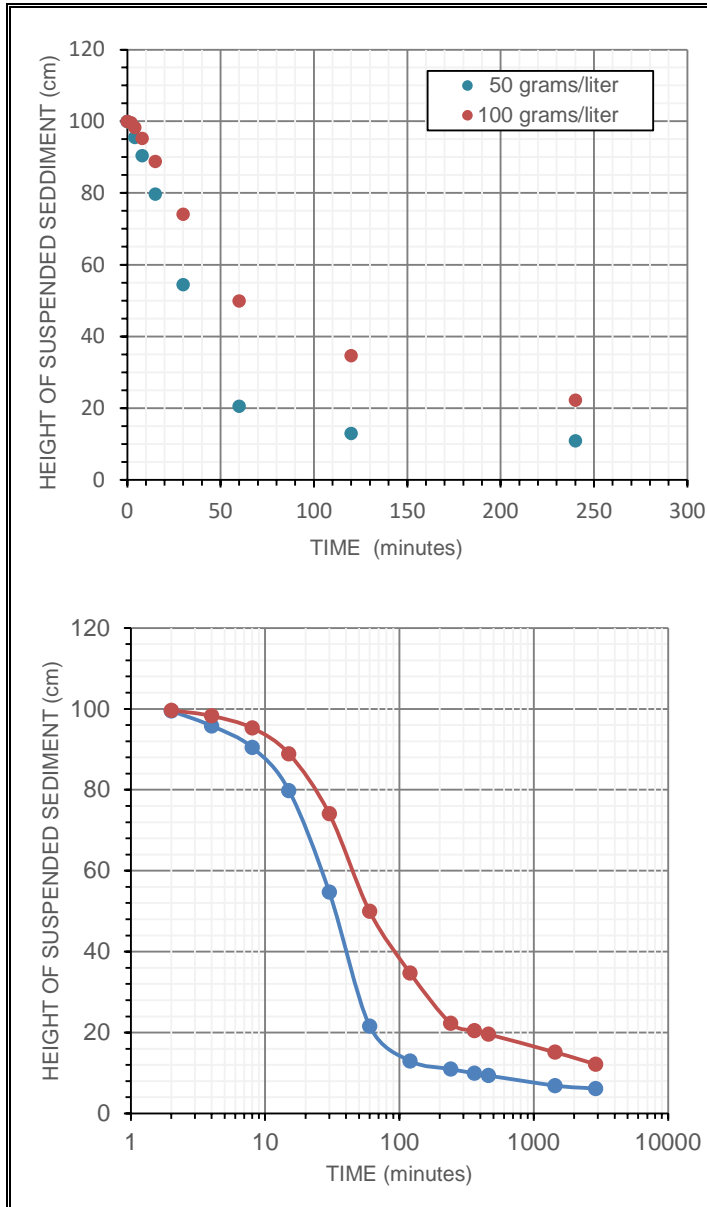
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY

SETTLING TEST REPORT

CLIENT: U.S. Army Corps of Engineers
 PROJECT: Brunswick Harbor Modification Study
 FILE NO.: 20-13-0122

DATE SAMPLE DRILLED: 11/01/20
 DATE TEST SET-UP: 01/04/21
 DATE REPORTED: 02/09/21

INCOMING SAMPLE NO.: -----
 BORING: TB-B-07 SAMPLE: 3A, 3B, 4A, 4B
 ELEVATION: -31.3 to -34.3 (MLLW) feet; meters
 LABORATORY IDENTIFICATION: 200122/TBB07
 SAMPLE DESCRIPTION: Clayey sand with gravel (SC), with trace shell, gray
 Sample scalped on U.S. Standard No. 4 sieve)
 Water Content Fraction Passing No. 4 Sieve = 27.8 %



Settling Column Diameter: 2.54 cm
 Initial Slurry Height: 100 cm
Initial Concentration: 100 grams/liter (wet mass basis)
 Initial Concentration: 78 grams/liter (dry mass basis)
 Final Settled Height: 12.2 cm
 Test Duration: 3 days
 Final Concentration: 820 grams/liter (wet mass basis)
 Final Concentration: 641 grams/liter (dry mass basis)
 Final Settled Dry Density: 39.6 lb/ft³

Time (minutes)	Top Down (cm)	Time (minutes)	Bottom Up (cm)
0	100	0	0.0
2	99.6	0.25	2.0
4	98.3	0.5	2.7
8	95.3	1	3.2
15	88.9	2	3.5
30	74.1	4	3.7
60	49.9	8	3.9
120	34.7	15	3.9
240	22.3		
360	20.5		
460	19.6		
1,440	15.2		
3,370	12.2		

Initial Settling Velocity

V_s: 0.8 cm/minute
 Time Interval: 0 - 60 minutes

Comments: Wet Mass Retained on U.S. Std. No. 4 Sieve Fraction (grams) = 530.0
Wet Mass Passing U.S. Std. No. 4 Sieve Fraction (grams) = 1,554.0
Total Composite Sample Wet Mass (grams) = 2,084.0

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Checked By: _____ Date: _____

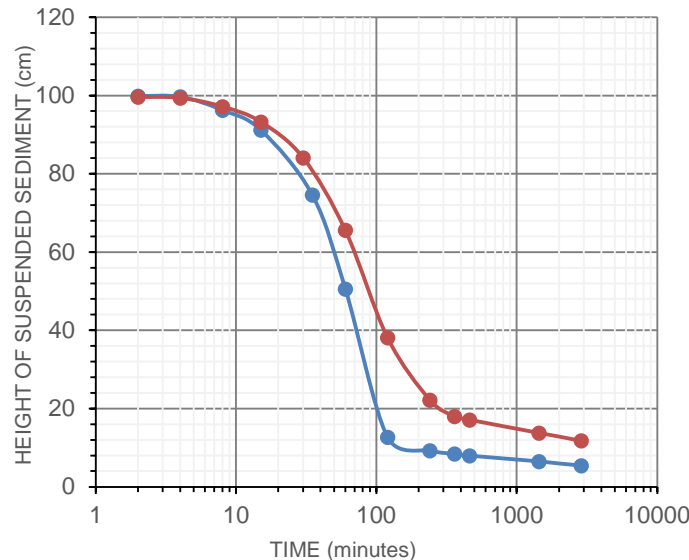
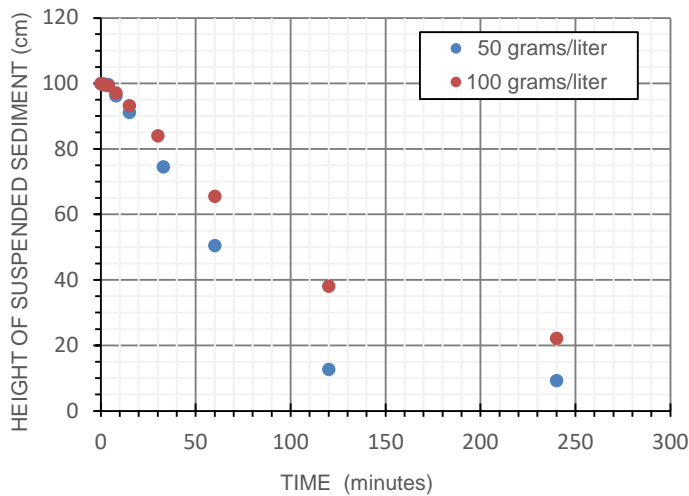
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY

SETTLING TEST REPORT

CLIENT: U.S. Army Corps of Engineers
 PROJECT: Brunswick Harbor Modification Study
 FILE NO.: 20-13-0122

DATE SAMPLE DRILLED: 10/24/20
 DATE TEST SET-UP: 12/30/20
 DATE REPORTED: 02/09/21

INCOMING SAMPLE NO.: -----
 BORING: TB-B-14A SAMPLE: 2A, 2B, 3A, 3B
 ELEVATION: -29.0 to -32.0 (MLLW) feet; meters
 LABORATORY IDENTIFICATION: 200122/TBB14A
 SAMPLE DESCRIPTION: Clayey sand with gravel (SC)
greenish-gray
 (Sample scalped on U.S. Standard No. 4 sieve)
 Water Content Fraction Passing No. 4 Sieve = 27.0 %



Settling Column Diameter: 2.54 cm
 Initial Slurry Height: 100 cm
Initial Concentration: 50 grams/liter (wet mass basis)
 Initial Concentration: 39 grams/liter (dry mass basis)
 Final Settled Height: 5.45 cm
 Test Duration: 2 days
 Final Concentration: 917 grams/liter (wet mass basis)
 Final Concentration: 722 grams/liter (dry mass basis)
 Final Settled Dry Density: 44.6 lb/ft³

Time (minutes)	Top Down (cm)	Time (minutes)	Bottom Up (cm)
0	100	0	0.0
2	99.9	0.25	1.5
4	99.7	0.5	1.7
8	96.3	1	1.8
15	91.2	2	1.8
35	74.6	4	1.8
60	50.6	8	1.8
120	12.7	15	1.8
240	9.3		
360	8.4		
460	8.0		
1,440	6.5		
2,880	5.45		

Initial Settling Velocity

V_s: 0.8 cm/minute
 Time Interval: 0 - 60 minutes

Comments: Wet Mass Retained on U.S. Std. No. 4 Sieve Fraction (grams) = 344.23
Wet Mass Passing U.S. Std. No. 4 Sieve Fraction (grams) = 1,284.6
Total Composite Sample Wet Mass (grams) = 1,628.8

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Checked By: _____ Date: _____

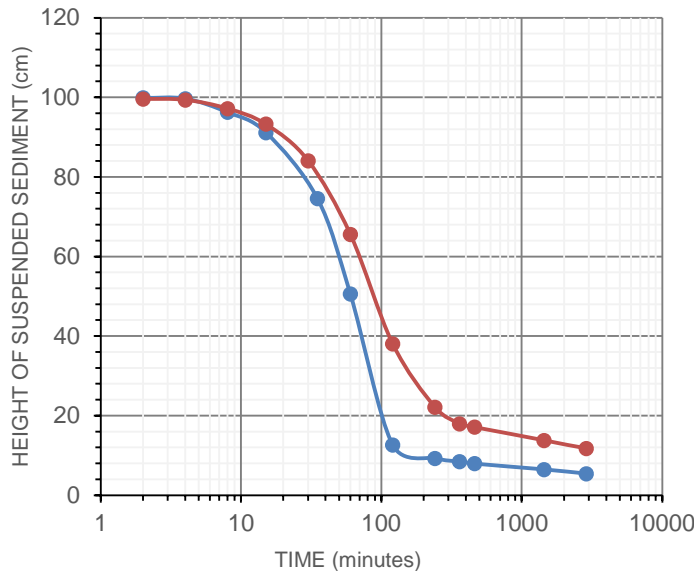
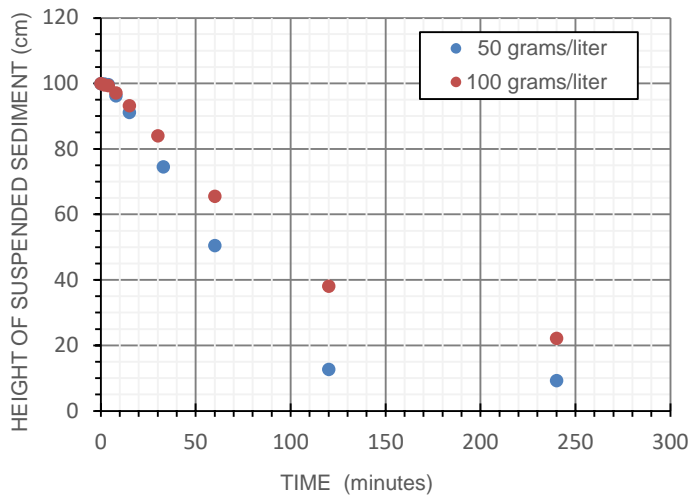
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY

SETTLING TEST REPORT

CLIENT: U.S. Army Corps of Engineers
 PROJECT: Brunswick Harbor Modification Study
 FILE NO.: 20-13-0122

DATE SAMPLE DRILLED: 10/24/20
 DATE TEST SET-UP: 12/30/20
 DATE REPORTED: 02/09/21

INCOMING SAMPLE NO.: -----
 BORING: **TB-B-14A** SAMPLE: 2A, 2B, 3A, 3B
 ELEVATION: -29.0 to -32.0 (MLLW) feet; meters
 LABORATORY IDENTIFICATION: 200122/TBB14A
 SAMPLE DESCRIPTION: Clayey sand with gravel (SP), greenish-gray
(Sample scalped on U.S. Standard No. 4 sieve)
Water Content Fraction Passing No. 4 Sieve = 27.0 %



Settling Column Diameter: 2.54 cm
 Initial Slurry Height: 100 cm
Initial Concentration: 100 grams/liter (wet mass basis)
 Initial Concentration: 79 grams/liter (dry mass basis)
 Final Settled Height: 11.8 cm
 Test Duration: 2 days
 Final Concentration: 847 grams/liter (wet mass basis)
 Final Concentration: 667 grams/liter (dry mass basis)
 Final Settled Dry Density: 41.2 lb/ft³

Time (minutes)	Top Down (cm)	Time (minutes)	Bottom Up (cm)
0	100	0	0.0
2	99.6	0.25	3.5
4	99.4	0.5	3.9
8	97.2	1	4.1
15	93.3	2	4.2
30	84.1	4	4.2
60	65.6	8	4.2
120	38.1		
240	22.2		
363	18.0		
463	17.2		
1,440	13.8		
2,880	11.8		

Initial Settling Velocity

V_s: 0.6 cm/minute
 Time Interval: 0 - 60 minutes

Comments: Wet Mass Retained on U.S. Std. No. 4 Sieve Fraction (grams) = 344.23
Wet Mass Passing U.S. Std. No. 4 Sieve Fraction (grams) = 1,284.6
Total Composite Sample Wet Mass (grams) = 1,628.8

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Checked By: _____ Date: _____

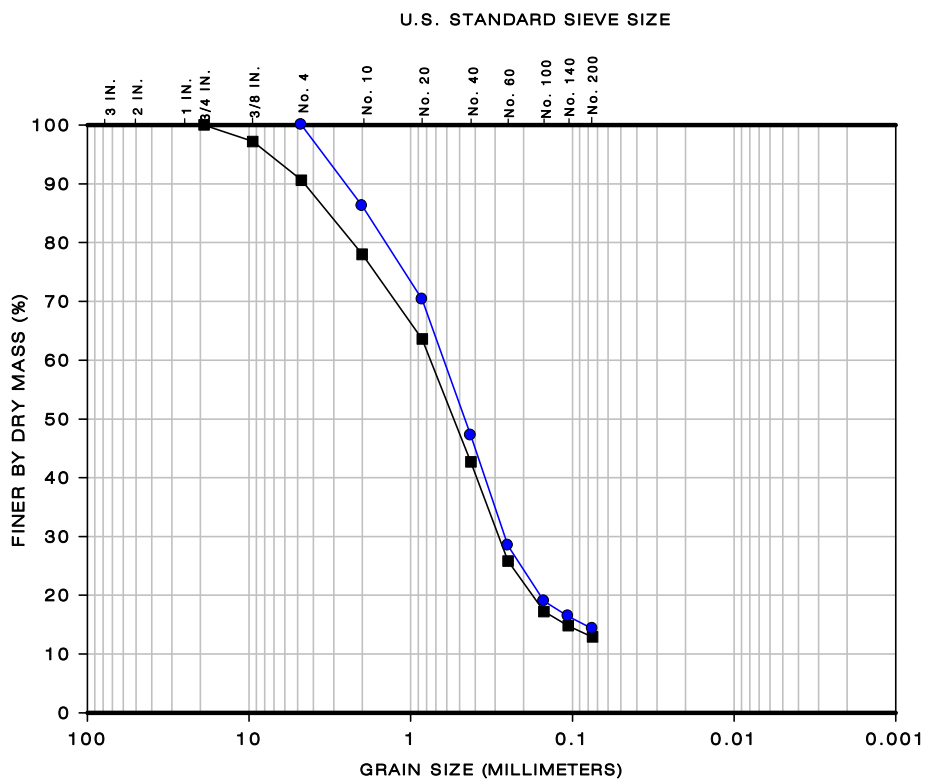
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY

PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: <u>U.S. Army Corps of Engineers</u> PROJECT: <u>Brunswick Harbor Modification Study</u> FILE NO.: <u>20-13-0122</u> DATE SAMPLE RECEIVED: <u>11/24/20</u> DATE TEST SET-UP: <u>01/15/21</u> DATE REPORTED: <u>02/09/21</u>	INCOMING SAMPLE NO.: _____ BORING: <u>BW-B-01</u> SAMPLE: <u>2, 3 Composite</u> ELEVATION: <u>-29.5 to -32.5 (MLLW)</u> <input checked="" type="checkbox"/> ft; <input type="checkbox"/> m LABORATORY IDENTIFICATION: _____ SAMPLE DESCRIPTION: <u>Silty sand (SM), gray</u>
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TEST PROCEDURES

<input checked="" type="checkbox"/> ASTM Standard D6913 <input type="checkbox"/> Other: _____	Water Content (%): <u>8.6 [coarse], 15.6 [fine]</u> Mass Dry Solids (grams): <u>177.50 [coarse], 297.71 [fine]</u>
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TOTAL GRADATION AS RECEIVED
 GRADATION FOR SEDIMENTATION RATE TESTS (SCALPED)

Soil Passing U.S. Standard Sieve (% dry mass basis)

U.S. Sieve Size	Gravel		Coarse Sand	Medium Sand		Fine Sand				
	3/4"	3/8"	No. 4	No. 10	No. 20	No. 40	No. 60	No. 100	No. 140	No. 200
As Received	100	97.2	90.6	78.0	63.6	42.7	25.8	17.2	14.8	12.9
Scalped	-	-	100	86.2	70.3	47.2	28.5	19.0	16.4	14.3

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Checked By: _____ Date: _____

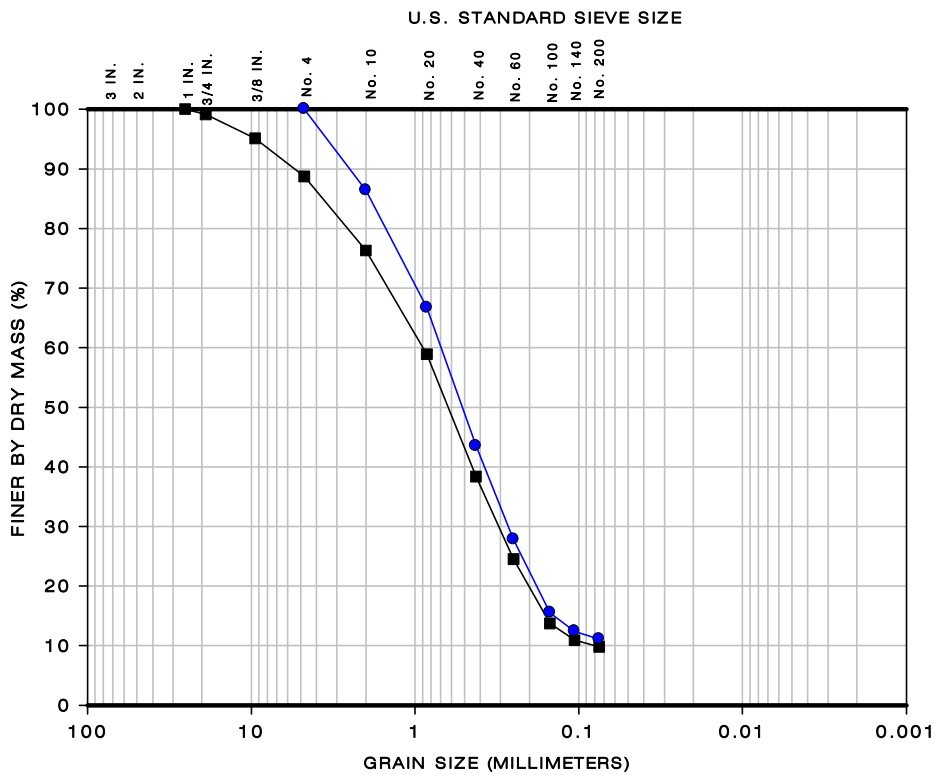
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY

PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: <u>U.S. Army Corps of Engineers</u> PROJECT: <u>Brunswick Harbor Modification Study</u> FILE NO.: <u>20-13-0122</u> DATE SAMPLE RECEIVED: <u>11/24/20</u> DATE TEST SET-UP: <u>01/15/21</u> DATE REPORTED: <u>02/09/21</u>	INCOMING SAMPLE NO.: _____ BORING: <u>TB-B-02A</u> SAMPLE: <u>5A, 5B, 6A, 6B Composite</u> ELEVATION: <u>-26.2 to -29.2 (MLLW)</u> <input checked="" type="checkbox"/> ft; <input type="checkbox"/> m LABORATORY IDENTIFICATION: _____ SAMPLE DESCRIPTION: <u>Sand with clay (SP- SC),</u> <u>with shell, greenish-gray</u>
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TEST PROCEDURES

<input checked="" type="checkbox"/> ASTM Standard D6913 <input type="checkbox"/> Other: _____	Water Content (%): <u>11.5 [coarse], 29.3 [fine]</u> Mass Dry Solids (grams): <u>168.55 [coarse], 271.03 [fine]</u>
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TOTAL GRADATION AS RECEIVED
 GRADATION FOR SEDIMENTATION RATE TESTS (SCALPED)

Soil Passing U.S. Standard Sieve (% dry mass basis)

U.S. Sieve Size	Gravel				Coarse Sand	Medium Sand		Fine Sand			
	1"	3/4"	3/8"	No. 4	No. 10	No. 20	No. 40	No. 60	No. 100	No. 140	No. 200
As Received	100	99.1	95.1	88.7	76.3	58.9	38.4	24.5	13.7	10.9	9.8
Scalped	-	-	-	100	86.4	66.7	43.5	27.8	15.5	12.4	11.1

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Checked By: _____ Date: _____

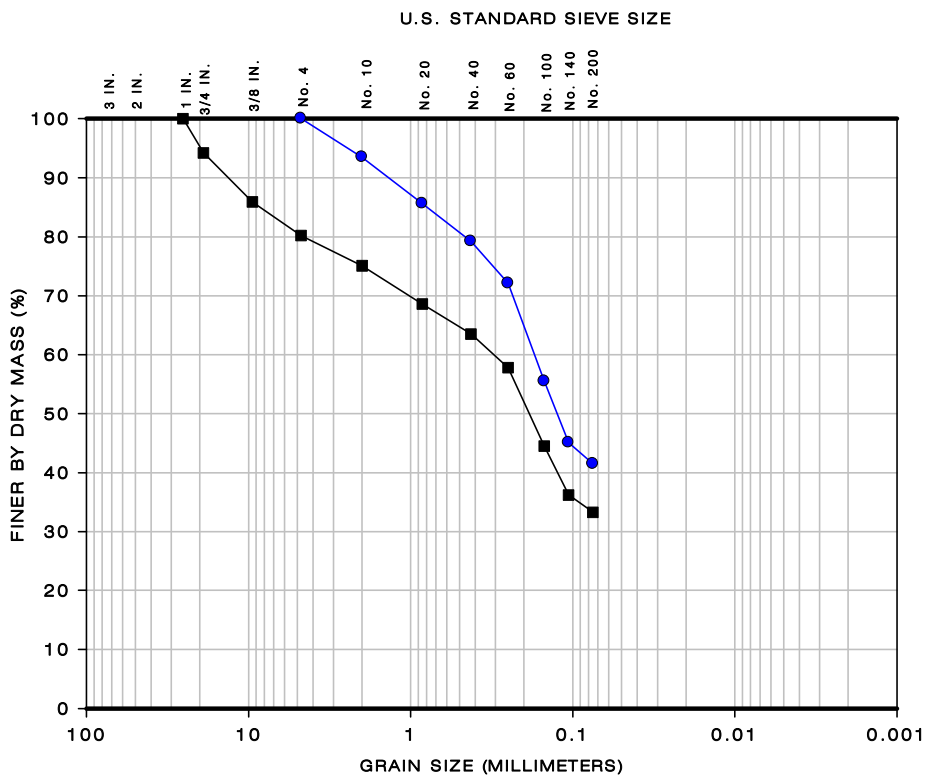
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY

PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: <u>U.S. Army Corps of Engineers</u> PROJECT: <u>Brunswick Harbor Modification Study</u> FILE NO.: <u>20-13-0122</u> DATE SAMPLE RECEIVED: <u>11/24/20</u> DATE TEST SET-UP: <u>01/15/21</u> DATE REPORTED: <u>02/09/21</u>	INCOMING SAMPLE NO.: _____ BORING: <u>TB-B-07</u> SAMPLE: <u>3A, 3B, 4A, 4B Composite</u> ELEVATION: <u>-31.3 to -34.3 (MLLW)</u> <input checked="" type="checkbox"/> ft; <input type="checkbox"/> m LABORATORY IDENTIFICATION: _____ SAMPLE DESCRIPTION: <u>Clayey sand with gravel (SC), with trace shell, gray</u>
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TEST PROCEDURES

<input checked="" type="checkbox"/> ASTM Standard D6913 <input type="checkbox"/> Other: _____	Water Content (%): <u>12.2 [coarse], 27.5 [fine]</u> Mass Dry Solids (grams): <u>470.49 [coarse], 269.22 [fine]</u>
---	--



■ TOTAL GRADATION AS RECEIVED	● GRADATION FOR SEDIMENTATION RATE TESTS (SCALPED)
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Soil Passing U.S. Standard Sieve (% dry mass basis)

U.S. Sieve Size	Gravel				Coarse Sand		Medium Sand		Fine Sand			
	1"	3/4"	3/8"	No. 4	No. 10	No. 20	No. 40	No. 60	No. 100	No. 140	No. 200	
As Received	100	94.2	85.9	80.2	75.1	68.6	63.5	57.8	44.5	36.2	33.3	
Scalped	-	-	-	100	93.5	85.6	79.2	72.1	55.5	45.1	41.5	

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Checked By: _____ Date: _____

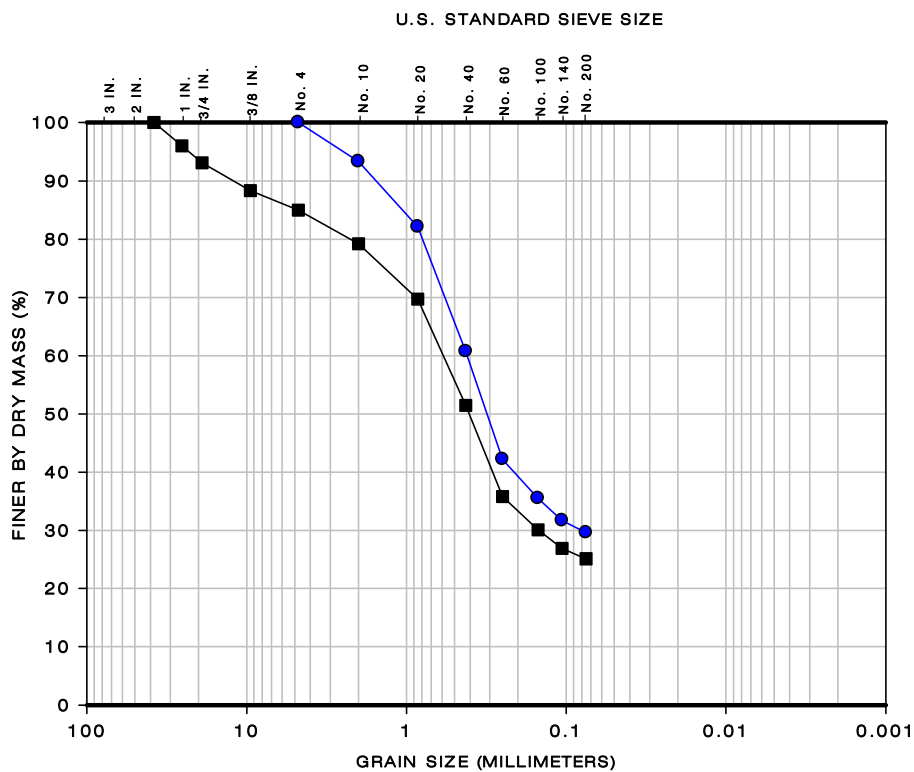
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY

PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: <u>U.S. Army Corps of Engineers</u> PROJECT: <u>Brunswick Harbor Modification Study</u> FILE NO.: <u>20-13-0122</u> DATE SAMPLE RECEIVED: <u>11/24/20</u> DATE TEST SET-UP: <u>01/15/21</u> DATE REPORTED: <u>02/09/21</u>	INCOMING SAMPLE NO.: _____ BORING: <u>TB-B-14A</u> SAMPLE: <u>2A, 2B, 3A, 3B Composite</u> ELEVATION: <u>-29.0 to -32.0 (MLLW)</u> <input checked="" type="checkbox"/> ft; <input type="checkbox"/> m LABORATORY IDENTIFICATION: _____ SAMPLE DESCRIPTION: <u>Clayey sand with gravel (SC), greenish-gray</u>
---	--

TEST PROCEDURES

<input checked="" type="checkbox"/> ASTM Standard D6913 <input type="checkbox"/> Other: _____	Water Content (%): <u>16.5 [coarse], 27.1 [fine]</u> Mass Dry Solids (grams): <u>293.13 [coarse], 289.97 [fine]</u>
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<input checked="" type="checkbox"/> TOTAL GRADATION AS RECEIVED	<input checked="" type="checkbox"/> GRADATION FOR SEDIMENTATION RATE TESTS (SCALPED)
---	--

Soil Passing U.S. Standard Sieve (% dry mass basis)

U.S. Sieve Size	Gravel					Coarse Sand	Medium Sand		Fine Sand			
	1.5"	1"	3/4"	3/8"	No. 4	No. 10	No. 20	No. 40	No. 60	No. 100	No. 140	No. 200
As Received	100	96.0	93.1	88.3	85.0	79.2	69.7	51.5	35.8	30.1	26.9	25.1
Scalped	-	-	-	-	100	93.3	82.1	60.7	42.2	35.5	31.7	29.6

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OUTLINE OF SEDIMENTATION-RATE TESTS AND PROCEDURES
South Atlantic Division Laboratory

1. DEFINITION. The Sedimentation-Rate test is an empirical test that indicates the settleability of soil when dispersed in water simulating the field conditions.

2. APPARATUS.

- a. Balances, sensitive to 0.1 gram.
- b. Glass bottom withdrawal sedimentation tubes having a volume of 500 ml and calibrated in centimeters (see attached sketch).
- c. Glass beakers with ml capacity.
- d. Clock with second hand.
- e. Backs to hold the bottom withdrawal tubes in upright position while tests are in progress, preferably against a wall in well lighted area.
- f. Other apparatus required for water content determinations (see Appendix I of EM 1110-2-1906).

3. PROCEDURES.

- a. Thoroughly mix the moist sample as received in the laboratory and separate approximately 100 grams of representative material for moisture content determination. This same specimen can also be used for Specific Gravity determination if desired.
- b. If laboratory classification tests, e.g. grain size analysis and Atterberg limits, are desired, approximately 100 grams and 300 grams respectively, of representative material should be separated for those tests.
- c. Prepare two specimens for the sedimentation-rate tests by placing 25 grams and 50 grams, respectively, of moist material into 100 ml beakers. Add sea water, or other water representative of the field environment, to completely submerge the specimens.
- d. After the specimens have slaked in the sea water, preferably overnight, wash each specimen into a bottom-withdrawal tube.
- e. Fill each tube to the 100 cm mark with sea water or other water representative of the field environment. The tube containing 25 gms of moist material will therefore have an initial density of 50 grams/liter when it is uniformly dispersed. The tube containing 50 grams of material will likewise have an initial concentration of 100 grams/liter.

f. Seal the open end of the tube with the palm of the hand and shake the suspended material about 2 minutes (depending on type of material) to evenly disperse material throughout the tube.

g. Place the tube containing the dispersed material in an upright position in a rack. This is time zero for the start of observations.

h. Observe and record the height of the suspended sediment in the tube at elapsed time intervals following a logarithmic pattern (i.e. 1/4, 1/2, 1, 2, 4, 8, 16 min., etc.). This height of the suspended sediment is interpreted to be the line of demarcation between the sediment settling in the tube and "clear" water on top. Since this is a subjective observation in many instances, it is important that the same technician make the observations for all tests.

i. Continue to read and record the observations until a semi-log plot of the "height of suspended sediment" versus log of time indicates the slope of the sediment curve approaches the horizontal. This usually occurs within 24 hours elapsed time.

j. When observations are completed, the tube may be emptied and cleaned for future tests.

4. COMPUTATIONS.

Compute the "final" concentration of the sedimented material in each tube based on its final height as follows:

Final
Concentration = $\frac{100 \text{ cm}}{\text{Final height}}$ X the initial dispersed concentration.
gms/liter in cm

Note this concentration is based on the initial moist weight of the specimen. Thus, to determine the concentration of the dry solids, it must be corrected for the initial moisture content of the material, determined on a companion specimen as indicated in paragraph 3a above.

4. REPORTS.

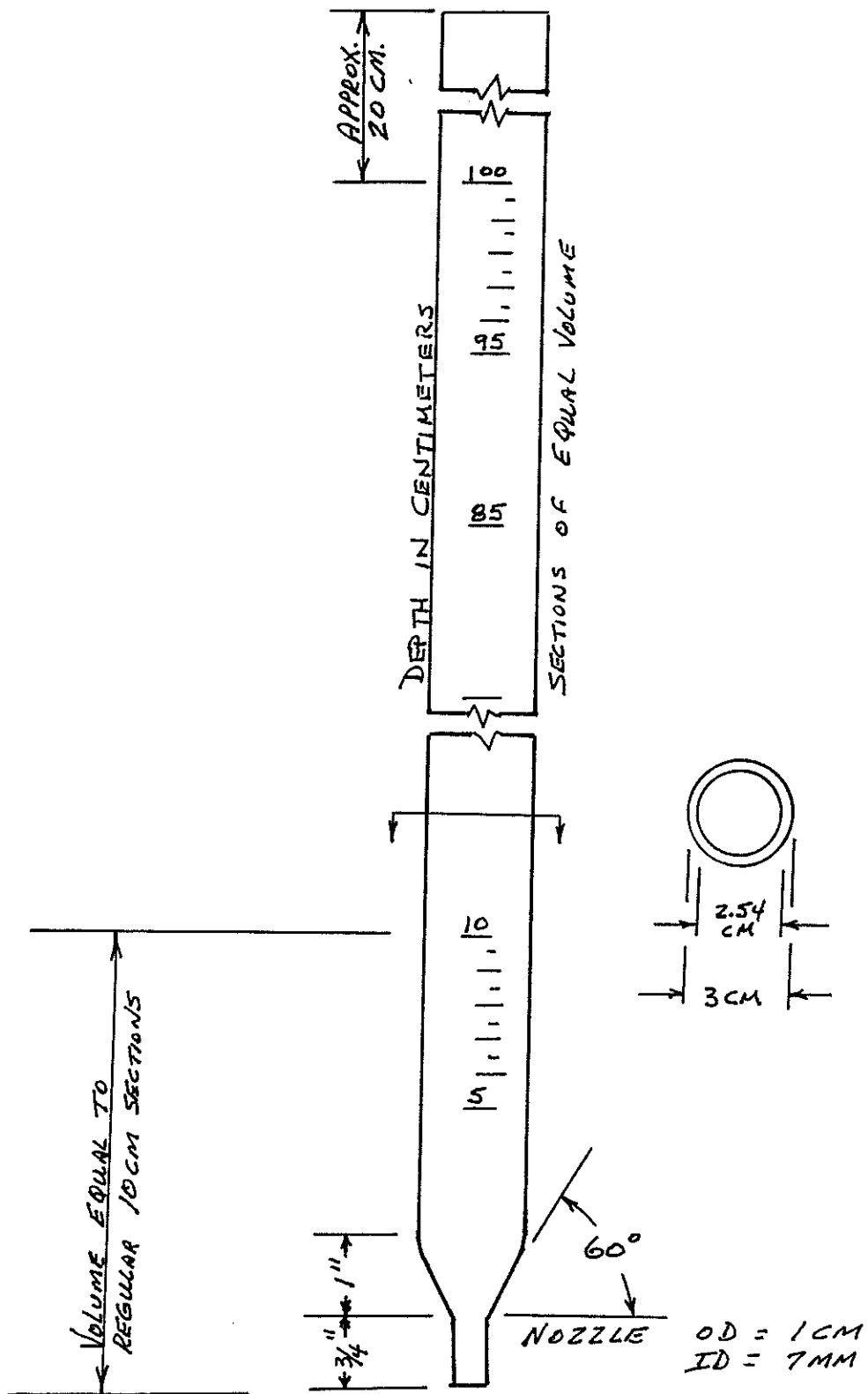
a. Semi-log graphs of the observations for both the 50 and the 100 gram/liter initial concentrations are shown on the same graph for comparison. See examples attached.

b. Where applicable, separate companion reports of laboratory classification tests should be prepared. See example attached.

Encls

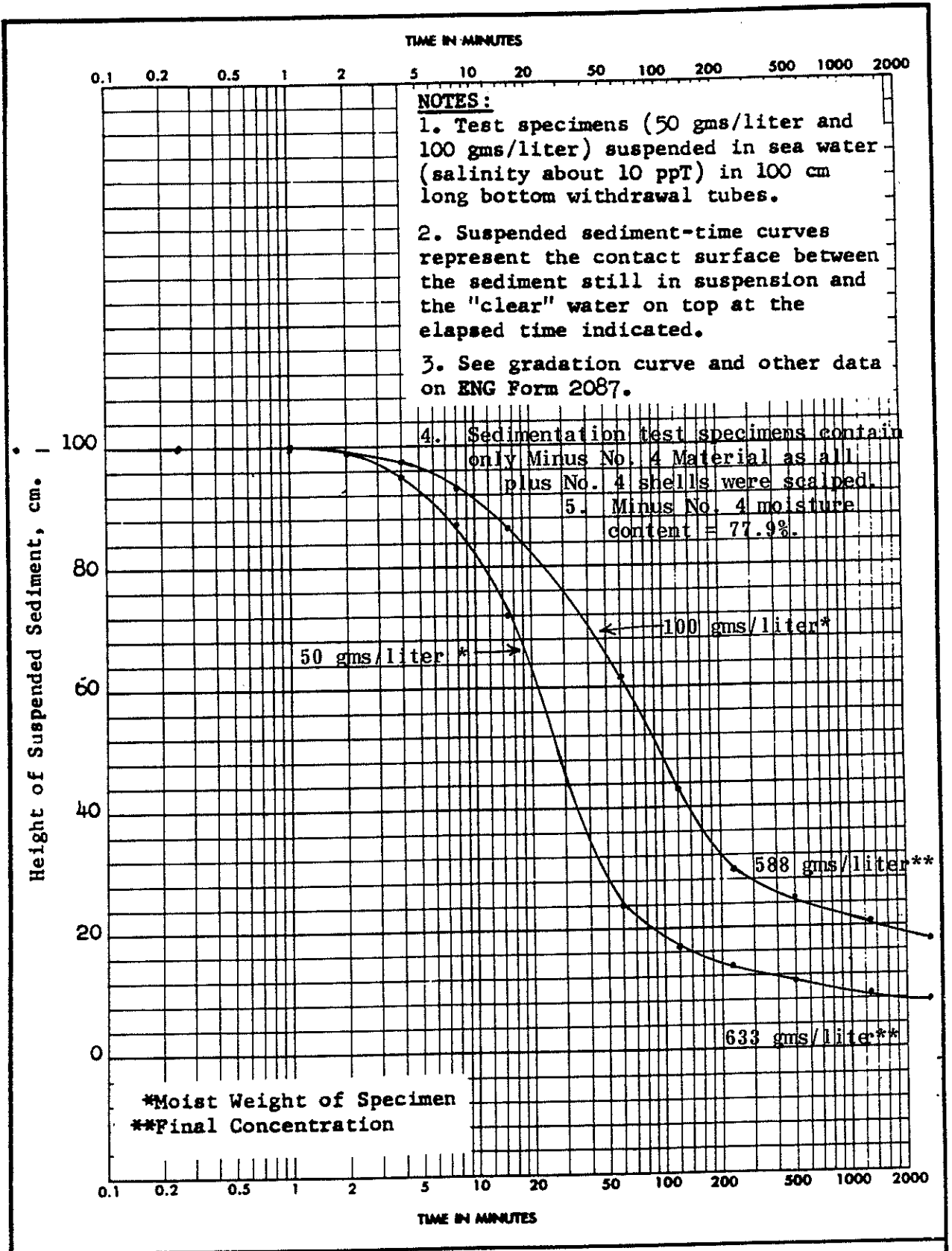
1. Sketch

2 -3. Example Reports



BOTTOM WITHDRAWAL
SEDIMENTATION TUBE

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY,
 CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GEORGIA 30060
 Reqn. No. _____
 Work Order No. _____



PROJECT Panama City Harbor, Mobile District			
AREA Lab. No. 57/4663 (3M-114)			
BORING NO.	SAMPLE NO. 3-B	DEPTH EL. -	DATE
SUSPENDED SEDIMENT-TIME CURVES			

APPENDIX G
UNCONFINED COMPRESSION TEST RESULTS

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY

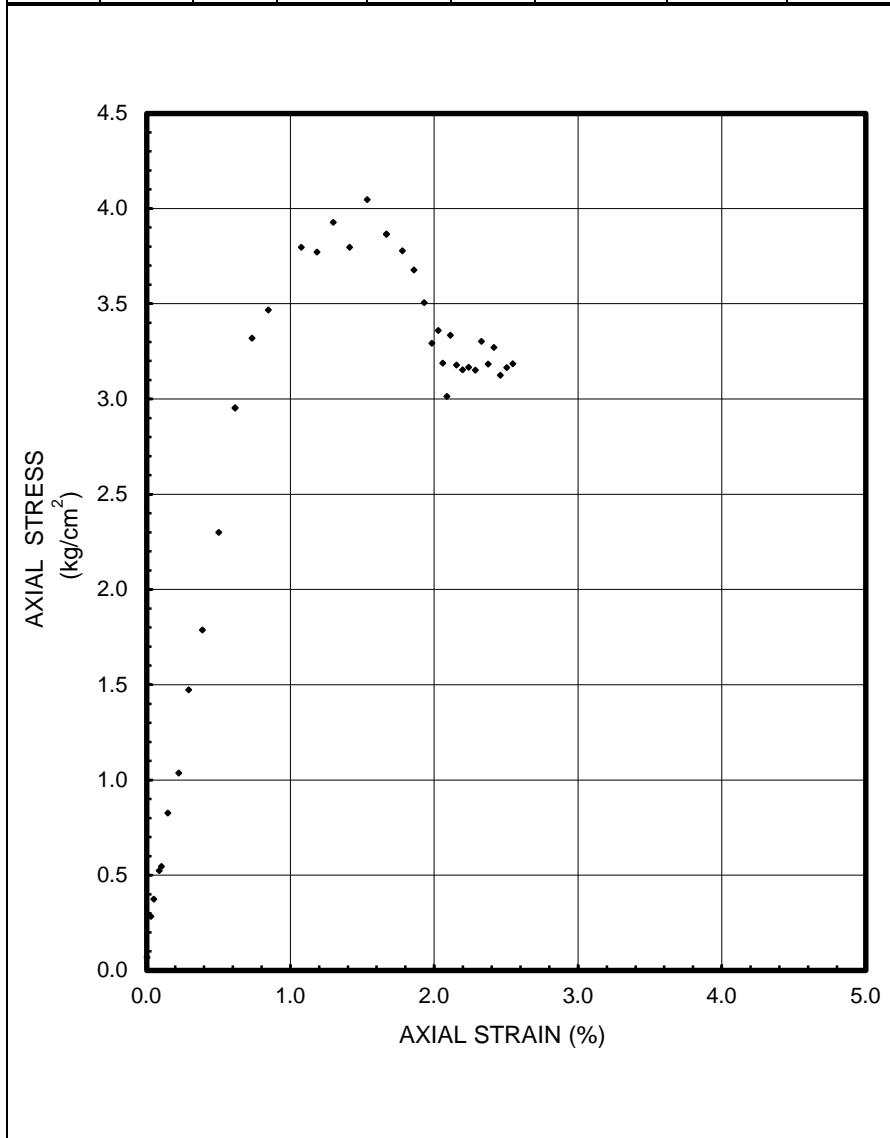
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: U.S. Army Corps of Engineers
 PROJECT: Brunswick Harbor Modification Study
 FILE NO.: 20-13-0122

DATE SAMPLE RECEIVED: 11/24/20
 DATE TEST SET-UP: 01/09/21
 DATE REPORTED: 02/09/21

INCOMING SAMPLE NO.: _____
 BORING: BW-B-03 SAMPLE: Core C1 - TOP
 ELEVATION: -37.8 to -39.3 (MLLW) feet; meters
 LABORATORY IDENTIFICATION NO.: _____
 SAMPLE DESCRIPTION: Gray sandy limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a (ult) (lb/in ²)	Young's Tangent Modulus, E_{50} (lb/in ²)	Modulus Ratio [E_{50} / σ_a (ult)]
H (cm)	D (cm)	H/D	w _c (%)	γ_d (lb/ft ³)	S (%)	$\dot{\epsilon}$ (cm/minute)	$\dot{\epsilon}$ (%/minute)					
11.74	9.80	1.2	10.9	123.3	82	0.1501	1.278	1.2	1.53	56	6.8E03	121

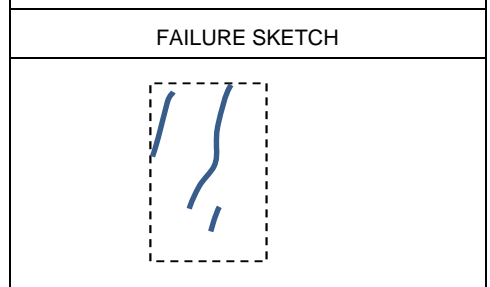


TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation
 Air Temperature (°C): 21.0
 Capping Material: None Lab-Stone
 Comments: _____

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
 Specimen Sub-Cored for Testing: Yes No
 Specimen Side Straightness (Procedure S1) Satisfies Criterion of ≤ 0.020 inches Does Not Satisfy Criterion: _____
 Specimen Side Parallelism (Procedure P2) Satisfies Criterion of $\leq 0.43\%$ Does Not Satisfy Criterion: _____
 Specimen End Flatness (Procedure FP2) Specimen Capped – Not Applicable Satisfies Criterion of ≤ 0.001 inches Does Not Satisfy Criterion
 G_s: 2.68 Assumed Measured



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Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\epsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50% of unconfined compressive strength unless indicated otherwise.

APPENDIX H

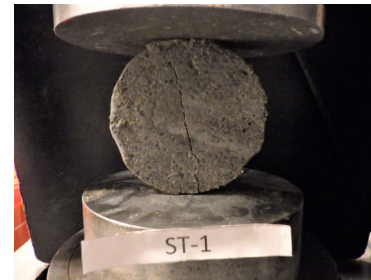
SPLIT TENSILE STRENGTH TEST RESULTS



Client: Ardaman & Associates, Inc.	Project No: GTX-313041	
Project: Brunswick Harbor	Tested By: tlm	
Location:	Sample Type: cylinder	Checked By: smd
Boring ID: BW-B-03	Test Date: 01/12/21	
Sample ID: Cores-2	Test Id: 607843	
Depth : 37.8-39.3 ft		
Test Comment: ---		
Visual Description: ---		
Sample Comment: ---		

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
37.8-39.3 ft	ST-1	1.63	3.9	0.42	519	52	1



Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.



Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure
(See attached photographs)

APPENDIX I
POINT LOAD TEST RESULTS

Client: Ardaman & Associates, Inc.	Project No: GTX-313041	
Project: Brunswick Harbor	Tested By: tlm	
Location:	Sample Type: cylinder	Checked By: smd
Boring ID: BW-B-03	Test Date: 01/11/21	
Sample ID: Cores-2	Test Id: 607842	
Depth : 37.8-39.3 ft		
Test Comment: ---		
Visual Description: ---		
Sample Comment: ---		

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-1	37.8-39.3 ft	3.9	1.67	171	8.27	2.88	21	1.186	25	21	434

 <p>Before</p>	 <p>After</p>	<p>Intact Material Failure</p>
--	--	--------------------------------

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.
 The reported thickness (L) is the average of three measurements.
 The reported diameter(D) is the average of three measurements.
 De = the equivalent core diameter
 Is = the uncorrected point load strength index
 F = the size correction factor
 Is(50) = the size corrected point load strength index