

Port Canaveral Section 203 Feasibility Study

Engineering Appendix

Attachment I

Geotechnical Report

Section 203 Study
Navigation Improvements
Entrance Channel, Access Channels,
and West Turning Basin
Geotechnical Data Report
Port Canaveral Harbor, Florida

Prepared by
Ardaman & Associates, Inc.

July 3, 2006

TABLE OF CONTENTS

| <u>Section</u> | <u>Title</u> | <u>Page</u> |
|----------------|---|-------------|
| 1 | INTRODUCTION AND SCOPE OF WORK | 1 |
| | 1.1 Introduction | 1 |
| | 1.2 Scope of Work | 1 |
| 2 | CHARACTER OF MATERIALS | 2 |
| | 2.1 Regional Geology | 2 |
| | 2.2 Material Encountered | 2 |
| | 2.2.1 Channel Cuts 1, 1A and 1B - Outer Reach | 3 |
| | 2.2.2 Channel Cut 2 and Widener - Middle Reach | 3 |
| | 2.2.3 Canaveral Pilot Channel Widener | 3 |
| | 2.2.4 Channel Cut 3 - Middle Turning Basin Channel and West Access Channel | 3 |
| | 2.2.5 West Turning Basin Channel | 3 |
| 3 | FIELD AND LABORATORY TESTING PROGRAM | 4 |
| | 3.1 Definitions | 4 |
| | 3.2 Boring Log Notes | 5 |
| | 3.3 Summary of Field Investigations | 5 |
| | 3.4 Summary of Index Testing Data | 5 |
| | 3.5 Recovered Materials | 10 |
| | 3.6 Summary of Past Marine Boring Programs | 10 |
| | 3.7 Summary of Past Landside Boring Programs | 41 |
| 4 | DESIGN SOIL PROFILES | 74 |
| | 4.1 West Turning Basin Corner Cut-off | 74 |
| | 4.1.1 Corner Cut-off - Northwest End | 74 |
| | 4.1.2 Corner Cut-off - Southeast End | 74 |
| | 4.1.3 Corner Cut-off - Bulkhead Wall Design | 75 |
| | 4.2 Inner Reach North Side Dike Relocation | 75 |

TABLE OF CONTENTS (continued)

| <u>Section</u> | <u>Title</u> | <u>Page</u> |
|-----------------|--|-------------|
| 5 | DIKE RELOCATION STABILITY ANALYSES | 75 |
| 5.1 | Slope Stability Analyses Methodology | 75 |
| 5.2 | Material Properties | 76 |
| 5.2.1 | Dike Fill | 76 |
| 5.2.2 | Dredge Material | 76 |
| 5.2.3 | Dense Sand | 76 |
| 5.2.4 | Marine Clay | 76 |
| 5.2.5 | Sandy Clay | 77 |
| 5.2.6 | Shallow Silty Sand | 77 |
| 5.2.7 | Sandy Clay | 77 |
| 5.2.8 | Deep Silty Sand | 77 |
| 5.3 | Existing Dike Slope Stability | 78 |
| 5.4 | Relocated Dike Slope Stability | 78 |
| 6 | BULKHEAD WALL EVALUATION AND RECOMMENDATION | 78 |
| 6.1 | General Soil Profile and Engineering Properties Used in Analyses | 78 |
| 6.1.1 | West End of South Side of the West Turning Basin Channel | 78 |
| 6.1.2 | East End of South Side of the West Turning Basin Channel | 79 |
| 6.1.3 | Comer Cut-off of the West Turning Basin | 80 |
| 6.2 | Anchored Bulkhead Evaluation | 81 |
| 7 | CLOSURE | 81 |
| <u>Appendix</u> | <u>Title</u> | |
| 1 | Sampling Procedures | |
| 2 | Recent Ardaman Test Boring Logs | |
| 3 | Historic Test Boring Logs - Non-Ardaman | |
| 4 | Historic Test Boring Logs - Ardaman | |

LIST OF TABLES

| <u>Table</u> | <u>Title</u> |
|--------------|--|
| 1 | Borings Drilled for this Project |
| 2 | Index Testing Conducted for this Project |
| 3 | Location, Elevations and Depths of Previous Marine Borings |
| 4 | Index Testing Data of Previous Marine Borings |
| 5 | Location, Elevations and Depths of Previous Landside Borings |
| 6 | Index Testing Data of Previous Landside Borings |

LIST OF FIGURES

| <u>Figure</u> | <u>Title</u> |
|---------------|--|
| 1 | Location of Field Investigations |
| 2 | Boring Location and Recovered Material Plan - 1 |
| 3 | Boring Location and Recovered Material Plan - 2 |
| 4 | Boring Location and Recovered Material Plan - 3 |
| 5 | Boring Location and Recovered Material Plan - 4 |
| 6 | Boring Location and Recovered Material Plan - 5 |
| 7 | Boring Location and Recovered Material Plan - 6 |
| 8 | Boring Location and Recovered Material Plan - 7 |
| 9 | Soil Profile of West Turning Basin Corner Cut-Off - North West End |
| 10 | Soil Profile of West Turning Basin Corner Cut-Off - South East End |
| 11 | Soil Profile of West Turning Basin Corner Cut-Off - Bulkhead Wall |
| 12 | Soil Profile of Middle Turning Basin Access Channel Dike Relocation |
| 13 | Stability Analyses Results for Existing Inner Reach North Side Dike |
| 14 | Typical Cross-Section for West End of South Side of the West Turning Basin Channel |
| 15 | Typical Cross-Section for East End of South Side of the West Turning Basin Channel |
| 16 | Typical Cross-Section for Corner Cut-Off of the West Turning Basin Channel |

1 INTRODUCTION AND SCOPE OF WORK

1.1 Introduction

The Canaveral Port Authority (CPA) is conducting a feasibility study of potential navigation improvements of the existing Federal Navigation Channel, widening the Seaward Turn, Middle and Inner Reach and the West Turning Basin Channel. The location of the prospective improvements is presented in Figure 1. The potential improvements include:

- Dredging the entrance to the Outer Reach of the Federal Navigation Channel to a depth of 44 feet, with a 2-foot allowable overdepth - Cuts 1, 1A and 1B.
- Dredging the Canaveral Pilots Widener Southwest of the Civil Widener at the Seaward Turn to a depth of 41 feet, with a 2-foot allowable overdepth - Cut CPW.
- Widening the Middle Reach of the Federal Navigation Channel by 100 feet to the north to a total width of 500 feet and dredge to a depth of 44 feet, with a 2-foot allowable overdepth - Cut 2.
- Widening the Inner Reach by up to 100 feet to the north to a total width of up to 500 feet and dredge to a depth of 41 feet, with a 2-foot allowable overdepth - Cut 3.
- Widening the West Access Channel by up to 100 feet to the south to a total width of up to 500 feet and dredge to a depth of 41 feet, with a 2-foot allowable overdepth.
- Widening the turning circle in the West Turning Basin to 1,725 feet, including removal of an approximately 400 foot wide section of the existing corner to the North of the entrance and dredging to a depth of 41 feet, with a 2-foot allowable overdepth - Cut WTB.

The objective of this study is to provide geotechnical data and an engineering assessment to enable the CPA to determine the feasibility of the potential navigation improvements from a geotechnical engineering point of view.

1.2 Scope

The scope of this study includes collecting, reviewing and summarizing geotechnical information from previous studies within the vicinity of the subject project, conducting landside and marine side field exploration program in locations with limited available geotechnical information, performing laboratory testing for soil classification and performing limited engineering analyses to evaluate the stability of slopes and existing bulkhead walls.

The information provided in this section encompasses the geotechnical field investigations relevant to this project. The investigations consist of borings with the associated boring logs and laboratory data presented in sections 3.2 and 3.3, respectively. A character of materials paragraph is included to provide a comprehensive description of the materials utilizing both recent and historical

knowledge of the project area. Also included in this section are definitions of terms and boring log notes, which provide additional explanation of the boring logs and drilling techniques.

Items discussed in the character of materials paragraph may not appear explicitly on the test boring logs. Based on historic knowledge of the project area, the character of materials paragraph includes items that supplement the data documented by the test boring logs. When reviewing test boring logs, use all data on the logs, including the materials description, legend, and blow counts. When evaluating the subsurface conditions, use all data, including the character of materials paragraph and test boring logs.

Any questions that pertain to the information provided in this section should be addressed to Mr. Mohamad Al-Hawaree, P.E., Ardaman & Associates, Inc. at (407) 855-3860.

2 CHARACTER OF MATERIALS

2.1 Regional Geology

Canaveral Harbor is located within the barrier islands between the Atlantic Ocean and the Banana River, in central Brevard County, in the Coastal Lowlands physiographic unit. The regional geology of Brevard County for the Quaternary and upper Tertiary Systems range in age from Recent to Pleistocene to Miocene Age sediments. The Recent to Pleistocene Age sediments are undifferentiated and cover the entire county and consist of unconsolidated quartz sands with beds of sandy coquina. These sediments occur at land surface and range in thickness from 20 feet in the St. Johns River valley to over 100 feet in the coastal ridge area. These deposits lie conformably with the sediments of the Upper Miocene/Pliocene sediments. The Miocene/Pliocene sediments are comprised of unconsolidated beds of quartz sands, shells, clay, and calcareous clay. These sediments vary in thickness (20-90 feet) throughout the county, and have an overall trend to thicken to the southeast.

The Hawthorn Formation of Miocene Age, lies unconformably below the Upper Miocene/Pliocene sediments that underlie all of Brevard County. The sediments of the Hawthorn Formation are composed of greenish gray, calcareous clay; sandy, phosphatic limestone; black and brown phosphorite; and light green to white phosphatic radiolarian clay. Its formational contact may occur at depths of approximately 50 to 100 feet below land surface and may be as thin as 10 feet in the north and thicken to approximately 220 feet in the south.

2.2 Materials Encountered

Historically, areas within Port Canaveral have been dredged several times and dredged material was used to form portions of what is today Port Canaveral. Some of the materials shown on the test boring logs may have been removed by previous dredging. New materials deposited at these locations are expected to be similar to the descriptions in the boring logs. Elevations of the newly deposited material are shown on the channel survey.

A cohesionless layer of clay and silt commonly found in this area is held in suspension at the bottom of the channels and basins. This layer varies in thickness and becomes denser with depth. In

addition, debris is commonly found in the channel and along loading docks, i.e., tires, ropes, cables, cement blocks, boulders, pilings, etc.

The location of the materials and areas of cuts are presented in Figures 1 through 8.

2.2.1 Channel Cuts 1, 1A and 1B - Outer Reach

The materials in Channel Cuts 1, 1A and 1B are shoal deposits that have formed since the areas were last dredged. Historically these shoals have consisted primarily of sandy-silt and clay, with occasional thin layers of silty/clayey fine quartz sands and trace of shell. The deposits are semi-cohesive and have a consistency that ranges from soft to firm and generally have high plasticity.

2.2.2 Channel Cut 2 and Widener - Middle Reach

The materials to be excavated in Cut 2 (up to the Trident Access Channel) and the widener are shoal deposits that have formed since the areas were last dredged. Historically, these shoals have consisted of silt, clay, poorly-graded fine quartz sand, and silty-sand with trace amounts of shell. The deposits are semi-cohesive, have a consistency that ranges from soft to firm and have high plasticity.

2.2.3 Canaveral Pilots Channel Widener

The materials to be excavated for the Canaveral Pilots Widener consist of soft to firm silts and clays with occasional fine poorly-graded quartz sand and silty-sand with trace amounts of shell. The deposits are semi-cohesive and have a consistency that ranges from soft to firm and have a high plasticity. Adjacent dredging for the Civil Works Widener may have removed some material shown in the test boring logs.

2.2.4 Channel Cut 3, Middle Turning Basin Channel and West Access Channel

The materials within Cut 3, the Middle Turning Basin Channel and the West Access Channel (WAC) consist primarily of soft to firm silts, clays, and fine to medium poorly-graded silty-quartz sands. The WAC has higher percentages of silt and sand than Cut 3. The sand, randomly dispersed in both channels, can be found in the form of thin layers, or mixed with silt and clays. In the WAC, the floor of the channel is occasionally lined with a sandstone layer. Gravel and cobbles may be found in this area. The dike material on the north side of Cut 3 consists of fine to medium poorly-graded quartz sands. Additional material that forms the foundation of the dike consists of dredged soft to firm silty sands, dense medium poorly-graded quartz sands, soft clay, soft sandy clays and natural firm silty sands, all with trace amounts of shell.

2.2.5 West Turning Basin Channel

The materials within the West Turning Basin Channel consist primarily of soft to firm silts, fine to medium poorly-graded silty quartz sands, occasional soft thin clay layers, and a trace of shell. The bottom of the excavated basin may have minor amounts of gravel-to-cobble sized rock fragments that were left from past dredging events. The materials behind the existing seawall in the southeast

corner of the West Turning Basin that are to be removed consist of soft to firm silty sands, clayey sands, sandy clays, fine poorly-graded quartz sand, soft clay layers and trace amounts of shell.

3 FIELD AND LABORATORY TESTING PROGRAM

3.1 Definitions

Terms commonly used in the boring logs shall be defined as:

Banded - Rock from 0.02 to 0.1-foot thick.

Carbonate - Soil component that reacts with HCl of an indeterminate origin (shell, rock, etc.).

Cavity - Voids greater than the diameter of the core.

Decomposed - Applicable to saprolitic rock; rock is essentially reduced to a soil with a relic rock texture; can be molded or crumbled by hand.

Dense - Equivalent to SPT N-value of 30 to 50.

Fill - Material that has been placed by man, described with all soil characteristics.

Firm - Thumb will indent soil about 1/4 inch (6 mm).

Hard - Soil that can be indented with difficulty by thumbnail or rock that is difficult to scratch with knife (cannot be pitted with a geology hammer but can be chipped with moderate blows of the hammer).

Highly Weathered - Entire rock section is discolored; alteration is greater than 50%; some areas of slightly weathered rock are present; some minerals are leached away; retains only a fraction of its original strength (wet strength usually lower than dry strength).

Incompetent - Rock that disintegrates while coring; weak.

Indurated - Rock or soil hardened or consolidated by pressure or cementation. Very difficult to break by hand.

Layer - Rock or soil with thickness of 6 inches or less.

Laminated - Alternating layers of varying material or color with layers less than 6 mm thick.

Lens - A geologic deposit of variable thickness, which disappears laterally in all directions and cannot be correlated to adjacent borings.

Massive Bedded - Rock over 3-foot thick.

Moderately Hard - Rock that can be scratched easily with a knife; cannot be scratched with fingernail (can be pitted with moderate blows of geology hammer).

Moderately Weathered - Discoloration is evident; rock surface is pitted and altered, with alterations penetrating well below rock surfaces; 10% to 50% of the rock is altered; strength is noticeably less than unweathered rock.

Pitted - Rock with voids 0.03 (1 mm) to 0.02-foot (6 mm) diameter.

Poorly-Indurated - See semi-indurated.

Rock - A naturally occurring substance composed of one or more minerals bound together. This geologic term includes a range of engineering properties: strength, hardness, permeability, weathering, and discontinuity. These properties are noted or can be inferred from the boring logs as blow counts, penetration rate, RQD, hardness, etc.

Seam - Rock or soil with average thickness of 2 to 3 inches.

Semi-Indurated - Rock or soil with a lesser degree of hardening or consolidation by pressure or cementation. Crumbles with little effort by hand.

Shell - Material composed of predominantly (>75%) coarse-grained sand to gravel-sized whole or broken shell.

Slightly Weathered - Rock with superficial discoloration, alteration and/or discoloration along discontinuities; less than 10% of the rock volume is altered; strength is essentially unaffected.

Soft - Thumb will penetrate soil about 1 inch (25 mm).

Thick Bedded - Rock from 1 to 3-foot thick.

Thin Bedded - Rock from 0.1 to 0.3-foot thick.

Unweathered - Rock with no evidence of any mechanical or chemical alteration.

Very Hard - Rock that cannot be scratched with a knife (chips can be broken off only with heavy blows of the geology hammer).

Vuggy - Rock with voids 0.02 foot (6 mm) to the diameter of the core.

3.2 Boring Log Notes

Borings TH-1 through TH-8 were driven using the Standard Penetration Test (SPT) procedure with a 140 lb. hammer with a 30-inch drop using a 2.0-foot split spoon (1 3/8-inch I.D. and 2-inch O.D.) until refusal was encountered. Refusal is defined as a total of 50 blows of the hammer within any 6-inch increment, a total of 100 blows of the hammer within any 1-foot increment, or no observed advance of the sampler after 10 successive blows of the hammer. When refusal was encountered, the borings were continued with a 4-inch x 5 1/2-inch diameter core barrel until the rate of penetration indicated softer material, at which point the SPT procedure was resumed. The procedures for conducting SPT borings and obtaining samples are presented in Appendix 1.

3.3 Summary of Field Investigations

The table below summarizes the field investigation conducted for this project. The individual SPT Boring Logs are presented in Appendix 2. The locations of these borings are presented in Figures 3 and 4.

Table 1. Borings Drilled for this Project

| Boring Reference No. | Boring Name | Boring Performed By: | State Plane NAD 83 | | Surface Elevation (feet, MLLW) | Total Depth (feet) | End of Boring Elevation (feet, MLLW) | Location | Date of Boring |
|----------------------|-------------|----------------------|--------------------|----------|--------------------------------|--------------------|--------------------------------------|----------|----------------|
| | | | Easting | Northing | | | | | |
| 1524 | TH-1 | AAI | 793859 | 1480514 | -32 | 21 | -53 | CPW | Sep-06 |
| 1525 | TH-2 | AAI | 791859 | 1482208 | -26 | 24 | -50 | CUT 2 | Sep-06 |
| 1526 | TH-3 | AAI | 788494 | 1482165 | -25.5 | 25.5 | -51 | CUT 2 | Sep-06 |
| 1527 | TH-4 | AAI | 792886 | 1481002 | -31 | 21 | -52 | CPW | Sep-06 |
| 1528 | TH-5 | AAI | 790820 | 1482198 | -33 | 18 | -51 | CUT 2 | Sep-06 |
| 1529 | TH-5 | AAI | 786895 | 1482196 | -34.2 | 18.5 | -50.7 | CUT 3 | Sep-06 |
| 1530 | TH-7 | AAI | 784870 | 1482595 | 20 | 80 | -60 | DIKE | Nov-06 |
| 1531 | TH-8 | AAI | 786305 | 1482510 | 40 | 100 | -60 | DIKE | Nov-06 |

ABBREVIATIONS: AAI Ardaman & Associates, Inc.
CPW Canaveral Pilots Widener

3.4 Summary of Index Testing Data

The table below summarizes the index testing conducted for this project. The laboratory test results are also summarized together with plots of particle size sieve analyses in Appendix 2.

Table 2. Index Testing Conducted for this Project

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 1524 | TH-1 | -32 | -41 | Clay, fat, medium plasticity, soft, mostly clay, little silt, trace shell, trace fine-gravel sized shell, moist, stratified, gray (CH). | 0 | 68 | 68 | 43 |
| | | -41 | -48 | Clay, fat, high plasticity, soft, mostly clay, trace shell, trace fine gravel-sized shell, moist, gray (CH). | 2 | 58 | 74 | 21 |
| 1525 | TH-2 | -26 | -34.5 | Sand, clayey, medium plasticity, very soft, mostly sand, some clay, little silt, homogeneous, organic odor, gray (SC). | 0 | 66 | 47 | 30 |
| | | -34.5 | -38 | Sand, silty, mostly fine-grained sand-sized sand, little silt, stratified, organic odor, gray (SM). | 0 | 57 | 49 | - |
| | | -38 | -40 | Clay, lean, medium plasticity, soft, mostly clay, little silt, thin layers of fine grained SM, gray (CL). | 2 | 74 | 91 | - |
| | | -40 | -50 | Clay, fat, high plasticity, soft, mostly clay, homogeneous, gray (CH). | 4 | 73 | 92 | - |
| 1528 | TH-3 | -25.5 | -32 | Sand, poorly-graded with silt, mostly subrounded fine to medium-grained sand-sized quartz, trace silt, trace fine to medium-grained sand-sized shell, moist, homogeneous, gray (SP-SM). | 24 | 23 | 7 | - |
| | | -32 | -39 | Sand, poorly-graded with silt, mostly rounded fine-grained sand-sized quartz, trace silt, moist, stratified, organic odor, dark gray (SP-SM). | 10 | 26 | 8 | - |

Table 2. Index Testing Conducted for this Project (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 1526 | TH-3 | -39 | -51 | Clay, fat, high plasticity, soft, mostly clay, moist, homogeneous, occasional thin layers of medium and coarse grained SP, gray (CH). | 4 | 78 | 95 | - |
| 1527 | TH-4 | -31 | -40 | Clay, lean, medium plasticity, very soft, mostly clay, little silt, trace fine-grained sand-sized sand, trace angular fine-grained sand-sized shell, trace fine gravel-sized shell, homogeneous, organic odor, gray (CL). | 0 | 68 | 64 | - |
| | | -40 | -52 | Clay, fat, high plasticity, very soft, mostly clay, homogeneous, organic odor, gray (CH). | 0 | 104 | 94 | 68 |
| 1528 | TH-5 | -33 | -41 | Sand, silty, mostly fine-grained sand-sized sand, little silt, trace shell, stratified, organic odor, gray (SM). | 0 | 48 | 21 | - |
| | | -41 | -44 | Clay, fat, high plasticity, very soft, mostly clay, homogeneous, organic odor, gray (CH). | 0 | 100 | 59 | - |
| | | -44 | -47 | Sand, silty, mostly fine-grained sand-sized quartz, little silt, trace shell, stratified, organic odor, gray (SM). | 0 | 67 | 53 | - |
| 1529 | TH-6 | -34.2 | -40.7 | Sand, silty, mostly rounded fine-grained sand-sized quartz, little silt, trace shell, moist, homogeneous, organic odor, gray (SM). | 5 | 32 | 14 | - |
| | | -40.7 | -50.7 | Clay, fat, high plasticity, soft, mostly clay, homogeneous, occasional thin layers of fine-grained SP, gray (CH). | 5 | 60 | 90 | 53 |

Table 2. Index Testing Conducted for this Project (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 1530 | TH-7 | 20 | 15 | Sand, poorly-graded, mostly rounded fine-grained sand-sized quartz, trace silt, dry, homogeneous, brown (SP). | 23 | 28 | - | - |
| | | 15 | 4 | Sand, poorly-graded with silt, mostly rounded fine-grained sand-sized quartz, trace silt, wet, homogeneous, gray (SP-SM). | 7 | 33 | 26 | - |
| | | 4 | 3.5 | Clay, fat, high plasticity, very soft, mostly clay, moist, homogeneous, gray (CH). | 5 | 41 | 44 | - |
| | | 3.5 | -2 | Sand, poorly-graded with silt, mostly subangular fine to coarse-grained sand-sized quartz, trace silt, trace shell, moist, homogeneous, gray (SP-SM). | 12 | 29 | - | - |
| | | -2 | -36 | Sand, poorly-graded, mostly subangular fine to coarse-grained sand-sized, quartz, little shell, trace silt, trace fine gravel-sized shell, moist, homogeneous, brown (SP). | 73 | 20 | - | - |
| | | -36 | -54 | Clay, fat, high plasticity, soft, mostly clay, moist, homogeneous, gray (CH). | 9 | 68 | 93 | 61 |
| | | -54 | -58 | Sand, clayey, low plasticity, soft, mostly rounded fine-grained sand-sized quartz, little clay, moist, homogeneous, gray (SC). | 13 | 30 | 52 | - |
| | | -58 | -60 | Clay, fat, high plasticity, soft, mostly clay, moist, homogeneous, gray (CH). | 13 | 33 | - | 67 |
| 1531 | TH-8 | 40 | 26 | Sand, poorly-graded, mostly subrounded fine to medium-grained sand-sized quartz, trace silt, dry, homogeneous, brown (SP). | 26 | 9 | - | - |
| | | 26 | 22 | Sand, poorly-graded, mostly subrounded fine to medium-grained sand-sized quartz, trace silt, moist, homogeneous, brown (SP-SM). | 18 | 19 | 7 | - |

Table 2. Index Testing Conducted for this Project (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 1531 | TH-8 | 22 | 14 | Sand, poorly-graded, mostly subrounded fine to medium-grained sand-sized quartz, trace silt, trace shell, trace fine gravel-sized shell, moist, homogeneous, brown (SP). | 67 | 15 | 8 | - |
| | | 14 | 12 | Sand, poorly-graded with silt, mostly rounded fine-grained sand-sized quartz, trace silt, trace shell, moist, homogeneous, brown (SP-SM). | 97 | 18 | 9 | - |
| | | 12 | 6 | Sand, poorly-graded with silt, mostly subangular fine to coarse-grained sand-sized shell, trace silt, trace gravel-sized shell, moist, homogeneous, brown (SP). | 39 | 17 | - | - |
| | | 6 | -2 | Sand, poorly-graded with silt, mostly rounded fine-grained sand-sized quartz, trace silt, moist, homogeneous, gray (SP-SM). | 50 | 24 | - | - |
| | | -2 | -6 | Sand, poorly-graded, mostly subrounded fine to medium-grained sand-sized quartz, trace silt, trace shell, trace phosphate, moist, homogeneous, gray (SP). | 78 | 21 | - | - |
| | | -6 | -8 | Sand, silty, poorly-graded, mostly subrounded fine to medium-grained sand-sized quartz, little silt, trace shell, moist, homogeneous, brown (SM). | - | 13 | 19 | - |
| | | -8 | -16 | Sand, poorly-graded with silt, mostly rounded fine-grained sand-sized quartz, trace silt, trace shell, moist, homogeneous, gray (SP-SM). | 91 | 21 | 11 | - |
| | | -16 | -54 | Sand, poorly-graded, mostly rounded fine-grained sand-sized quartz, trace shell, trace phosphate, moist, homogeneous, gray (SP). | 68 | 20 | - | - |
| | | -54 | -60 | Sand, silty, mostly rounded fine-grained sand-sized quartz, little silt, trace clay, moist, homogeneous, brown (SM). | 29 | 28 | - | - |

3.5 Recovered Materials

The material recovered from borings TH-1 through TH-8 were transported to the Ardaman & Associates Corporate Laboratory for inspection and additional index testing was carried out.

3.6 Summary of Past Marine Boring Programs

A total of 265 marine side borings have been conducted by Ardaman & Associates, Inc., United States Army Corps of Engineers, United States Army Engineering Division, Universal Engineering Testing Company, Pittsburgh Testing Laboratory, Law Engineering Testing Company and Warren George, Inc.. The tables below summarize the past field investigations conducted for similar dredging projects. The individual test boring logs are presented in Appendices 3 and 4. The locations of these boring are presented in Figures 2 through 8.

Table 3. Locations, Elevations and Depths of Previous Marine Borings

| Boring Reference No. | Boring Name | Boring Performed By: | State Plane NAD 83 | | Surface Elevation (feet, MLLW) | Total Depth (feet) | End of Boring Elevation (feet, MLLW) | Date of Boring |
|----------------------|-------------|----------------------|--------------------|----------|--------------------------------|--------------------|--------------------------------------|----------------|
| | | | Easting | Northing | | | | |
| 5 | CB-NLS-7 | USACE | 776785 | 1482195 | -2 | 33 | -35 | Jan-59 |
| 21 | CH-8-C | USACE | 777721 | 1481768 | 0.8 | 98 | -97.2 | - |
| 22 | CH-7-C | USACE | 777722 | 1481646 | 0.6 | 98 | -97.4 | - |
| 23 | CH-10-C | USACE | 777951 | 1481703 | 0.4 | 96 | -95.6 | - |
| 24 | CH-1-C | USACE | 778187 | 1481768 | 0.1 | 94.7 | -94.6 | - |
| 25 | CH-2-C | USACE | 778185 | 1481654 | 0.1 | 89.6 | -89.5 | - |
| 26 | P-1 | PTL | 778512 | 1482373 | - | 101 | - | Nov-56 |
| 28 | P-3 | PTL | 777516 | 1482426 | - | 101 | - | Dec-56 |
| 30 | B-3 | LAW | 782002 | 1481578 | - | 106 | - | - |
| 31 | B-4 | LAW | 782305 | 1481584 | - | 110 | - | - |
| 32 | B-5 | LAW | 782440 | 1481570 | - | 110 | - | - |
| 33 | CN-1 | USACE | 783652 | 1482599 | 12.9 | 95 | -82.1 | Apr-56 |
| 39 | CN-7 | USACE | 783404 | 1482191 | -26.5 | 35.5 | -62 | Apr-56 |
| 40 | CN-8 | USACE | 783227 | 1482328 | -27.3 | 53.3 | -80.6 | Apr-56 |
| 49 | H-3 | USACE | 786757 | 1481680 | -25.8 | 5 | -30.8 | Dec-55 |
| 50 | H-4 | USACE | 782240 | 1482313 | -24.5 | 8 | -32.5 | Dec-55 |
| 51 | H-5 | USACE | 781889 | 1481829 | -25.4 | 7.5 | -32.9 | Nov-55 |
| 52 | CH-18 | USACE | 783953 | 1481915 | 12.7 | 47 | -34.3 | Mar-51 |
| 53 | CH-19 | USACE | 785371 | 1481783 | 12 | 47 | -35 | Mar-51 |
| 54 | CH-20 | USACE | 786983 | 1481789 | 12 | 47 | -35 | Mar-51 |
| 56 | CHE-1 | USACE | 781107 | 1481787 | -36.9 | 4.5 | -41.4 | Nov-71 |
| 57 | CHE-2 | USACE | 780195 | 1482131 | 5 | 45 | -40 | Dec-71 |
| 58 | CHE-3 | USACE | 779197 | 1481776 | -22.8 | 18 | -40.8 | Nov-71 |
| 59 | CHE-4 | USACE | 778195 | 1482071 | 6.6 | 46.5 | -39.9 | Dec-71 |
| 60 | CHE-5 | USACE | 777197 | 1481765 | -13.2 | 27 | -40.2 | Nov-71 |
| 62 | CHE-7 | USACE | 777192 | 1482665 | -18.5 | 22.5 | -41 | Nov-71 |

Table 3. Locations, Elevations and Depths of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Boring Performed By: | State Plane NAD 83 | | Surface Elevation (feet, MLLW) | Total Depth (feet) | End of Boring Elevation (feet, MLLW) | Date of Boring |
|----------------------|-------------|----------------------|--------------------|----------|--------------------------------|--------------------|--------------------------------------|----------------|
| | | | Easting | Northing | | | | |
| 64 | CHE-9 | USACE | 776689 | 1483162 | -16 | 24 | -40 | Dec-71 |
| 72 | 1-N | UNI | 777728 | 1482498 | - | 100 | - | - |
| 145 | TB-7 | UNI | 784897 | 1481389 | 10 | 130 | -120 | Aug-76 |
| 146 | TB-8 | UNI | 784774 | 1481392 | 10 | 130 | -120 | Aug-76 |
| 147 | TB-9 | UNI | 784578 | 1481391 | 10 | 130 | -120 | Aug-76 |
| 152 | CB-W-5 | WGI | 776734 | 1482861 | - | 40 | - | Mar-82 |
| 157 | CB-E-10 | WGI | 778407 | 1482372 | - | 82 | - | Mar-82 |
| 192 | ER-3 | USACE | 777096 | 1483107 | -25.5 | 12 | -37.5 | Apr-82 |
| 193 | ER-4 | USACE | 777102 | 1482507 | -18 | 6 | -24 | Apr-82 |
| 194 | ER-5 | USACE | 778231 | 1481730 | -15 | 5 | -20 | Apr-82 |
| 195 | ER-6 | USACE | 779348 | 1481982 | -35.5 | 6 | -41.5 | Apr-82 |
| 203 | CHM84-8 | USACE | 777162 | 1483334 | -22.6 | 20 | -42.6 | Apr-84 |
| 206 | CHM84-11 | USACE | 776650 | 1482953 | -21.9 | 20 | -41.9 | Apr-84 |
| 207 | CHM84-12 | USACE | 777180 | 1482911 | -23 | 20 | -43 | Apr-84 |
| 208 | CHM84-13 | USACE | 776816 | 1482590 | -23.5 | 20 | -43.5 | Apr-84 |
| 209 | CHM84-14 | USACE | 777321 | 1482593 | -22.4 | 20 | -42.4 | Apr-84 |
| 210 | CHM84-15 | USACE | 777181 | 1482274 | -13.1 | 30 | -43.1 | Apr-84 |
| 211 | CHM84-16 | USACE | 777519 | 1482102 | -16 | 24.2 | -40.2 | Apr-84 |
| 212 | CHM84-17 | USACE | 778062 | 1481744 | -18.3 | 24 | -42.3 | Apr-84 |
| 213 | CHM84-18 | USACE | 778647 | 1481744 | -20.7 | 22 | -42.7 | Apr-84 |
| 214 | CHM84-19 | USACE | 779012 | 1481954 | -23.7 | 20 | -43.7 | Apr-84 |
| 215 | CHM84-20 | USACE | 779337 | 1481744 | -17.8 | 25 | -42.8 | Apr-84 |
| 216 | CHM84-21 | USACE | 779837 | 1481744 | -27.1 | 15 | -42.1 | Apr-84 |
| 217 | CHM84-22 | USACE | 780367 | 1481744 | -21.5 | 20 | -41.5 | Apr-84 |
| 218 | CHM84-23 | USACE | 780867 | 1481744 | -22.8 | 20 | -42.8 | Apr-84 |
| 219 | CHM84-24 | USACE | 778747 | 1481949 | -16.5 | 25.5 | -42 | Mar-84 |
| 220 | CHM84-25 | USACE | 778602 | 1481954 | -16 | 26 | -42 | Mar-84 |
| 221 | CHM84-26 | USACE | 778372 | 1482074 | 9.7 | 48 | -38.3 | Mar-84 |
| 222 | CHM84-27 | USACE | 777992 | 1481990 | 5 | 46.5 | -41.5 | Apr-84 |
| 223 | CHM84-28 | USACE | 777732 | 1481909 | -4.5 | 37.5 | -42 | Apr-84 |
| 224 | CHM84-29 | USACE | 776997 | 1482009 | -14.1 | 28.5 | -42.6 | Apr-84 |
| 225 | CHM84-30 | USACE | 776697 | 1481884 | -12.8 | 30 | -42.8 | Apr-84 |
| 226 | CHM84-31 | USACE | 776667 | 1482164 | -5 | 37.5 | -42.5 | Apr-84 |
| 230 | CHM84-35 | USACE | 787007 | 1481754 | -31 | 10 | -41 | Jul-84 |
| 231 | CHM84-36 | USACE | 786347 | 1481744 | -33.5 | 10 | -43.5 | Jul-84 |
| 232 | CHM84-37 | USACE | 786107 | 1481764 | -31 | 10 | -41 | Jul-84 |
| 233 | CHM84-38 | USACE | 785602 | 1481759 | -30.8 | 10 | -40.8 | Jul-84 |
| 234 | CHM84-39 | USACE | 790132 | 1482024 | -38.5 | 10 | -48.5 | Jul-84 |
| 235 | CHM84-40 | USACE | 789107 | 1481724 | -40 | 10 | -50 | Jul-84 |

Table 3. Locations, Elevations and Depths of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Boring Performed By: | State Plane NAD 83 | | Surface Elevation (feet, MLLW) | Total Depth (feet) | End of Boring Elevation (feet, MLLW) | Date of Boring |
|----------------------|-------------|----------------------|--------------------|----------|--------------------------------|--------------------|--------------------------------------|----------------|
| | | | Easting | Northing | | | | |
| 236 | CB-CH87-1 | USACE | 777557 | 1481993 | -22.5 | 15.6 | -38.1 | Feb-87 |
| 237 | CB-CH87-2 | USACE | 777453 | 1481977 | -25.5 | 13.1 | -38.6 | Feb-87 |
| 238 | CB-CH87-3 | USACE | 777404 | 1481922 | -25.4 | 13 | -38.4 | Feb-87 |
| 239 | CB-CH87-4 | USACE | 777468 | 1481898 | -26.5 | 12 | -38.5 | Feb-87 |
| 240 | CB-CH88-1 | USACE | 786799 | 1482049 | -22.3 | 25 | -47.3 | Aug-88 |
| 241 | CB-CH88-2 | USACE | 786279 | 1481690 | -41.7 | 7 | -48.7 | Aug-88 |
| 242 | CB-CH88-3 | USACE | 784785 | 1482029 | -35.5 | 10.8 | -46.3 | Aug-88 |
| 243 | CB-CH88-4 | USACE | 783791 | 1481768 | -40.9 | 5 | -45.9 | Aug-88 |
| 244 | CB-CH88-5 | USACE | 782944 | 1481680 | -38.1 | 10 | -48.1 | Aug-88 |
| 245 | CB-CH88-6 | USACE | 781962 | 1481834 | -40.6 | 6 | -46.6 | Aug-88 |
| 246 | CB-CH88-7 | USACE | 782472 | 1482392 | -38.4 | 10 | -48.4 | Sep-88 |
| 248 | CB-CH88-9 | USACE | 781479 | 1482374 | -37.1 | 11 | -48.1 | Sep-88 |
| 249 | CB-CH88-10 | USACE | 780614 | 1482167 | -39.1 | 6 | -45.1 | Sep-88 |
| 250 | CB-CH88-11 | USACE | 779645 | 1481779 | -35.4 | 11 | -46.4 | Sep-88 |
| 251 | CB-CH88-12 | USACE | 778652 | 1482117 | -23.4 | 22 | -45.4 | Sep-88 |
| 252 | CB-CH88-13 | USACE | 777732 | 1481867 | -39.4 | 6 | -45.4 | Sep-88 |
| 253 | CB-CH89-1 | USACE | 812033 | 1466107 | -45.1 | 7 | -52.1 | Feb-89 |
| 254 | CB-CH89-2 | USACE | 811778 | 1467242 | -44.3 | 10 | -54.3 | Feb-89 |
| 255 | CB-CH89-3 | USACE | 810747 | 1466903 | -45.6 | 10 | -55.6 | Feb-89 |
| 256 | CB-CH89-4 | USACE | 809784 | 1467374 | -43.9 | 7.5 | -51.4 | Mar-89 |
| 257 | CB-CH89-5 | USACE | 810257 | 1467969 | -43.4 | 10 | -53.4 | Mar-89 |
| 258 | CB-CH89-6 | USACE | 809264 | 1468304 | -45.4 | 10 | -55.4 | Feb-89 |
| 259 | CB-CH89-7 | USACE | 808226 | 1468667 | -43.6 | 10 | -53.6 | Feb-89 |
| 260 | CB-CH89-8 | USACE | 808742 | 1469247 | -42.5 | 10 | -52.5 | Feb-89 |
| 261 | CB-CH89-9 | USACE | 807875 | 1469603 | -45.3 | 8 | -53.3 | Feb-89 |
| 262 | CB-CH89-10 | USACE | 806673 | 1469933 | -42.3 | 10 | -52.3 | Feb-89 |
| 263 | CB-CH89-11 | USACE | 807150 | 1470554 | -41.8 | 10 | -51.8 | Feb-89 |
| 264 | CB-CH89-12 | USACE | 806164 | 1470891 | -45.7 | 8 | -53.7 | Feb-89 |
| 265 | CB-CH89-13 | USACE | 805162 | 1471208 | -42.2 | 10 | -52.2 | Feb-89 |
| 266 | CB-CH89-14 | USACE | 805655 | 1471808 | -42.6 | 10 | -52.6 | Feb-89 |
| 267 | CB-CH89-15 | USACE | 804655 | 1472134 | -45.2 | 11 | -56.2 | Feb-89 |
| 268 | CB-CH89-16 | USACE | 804128 | 1473072 | -41.8 | 11.4 | -53.2 | Feb-89 |
| 269 | CB-CH89-17 | USACE | 803620 | 1472453 | -42 | 10 | -52 | Feb-89 |
| 270 | CB-CH89-18 | USACE | 803109 | 1473383 | -45.1 | 7 | -52.1 | Feb-89 |
| 271 | CB-CH89-19 | USACE | 802096 | 1473711 | -40.1 | 11.6 | -51.7 | Feb-89 |
| 272 | CB-CH89-20 | USACE | 802618 | 1474573 | -46.1 | 10.5 | -56.6 | Feb-89 |
| 273 | CB-CH89-21 | USACE | 801622 | 1474632 | -48.2 | 5.2 | -53.4 | Feb-89 |
| 274 | CB-CH89-22 | USACE | 801084 | 1475585 | -39.8 | 13.4 | -53.2 | Feb-89 |
| 275 | CB-CH89-23 | USACE | 800594 | 1474947 | -40.9 | 12.4 | -53.3 | Feb-89 |
| 276 | CB-CH89-24 | USACE | 800105 | 1475934 | -47.3 | 5 | -52.3 | Feb-89 |
| 277 | CB-CH89-25 | USACE | 799115 | 1476269 | -39.5 | 13 | -52.5 | Feb-89 |

Table 3. Locations, Elevations and Depths of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Boring Performed By: | State Plane NAD 83 | | Surface Elevation (feet, MLLW) | Total Depth (feet) | End of Boring Elevation (feet, MLLW) | Date of Boring |
|----------------------|-------------|----------------------|--------------------|----------|--------------------------------|--------------------|--------------------------------------|----------------|
| | | | Easting | Northing | | | | |
| 278 | CB-CH89-26 | USACE | 799561 | 1476852 | -38.9 | 13 | -51.9 | Feb-89 |
| 279 | CB-CH89-27 | USACE | 798573 | 1477174 | -46.7 | 6 | -52.7 | Feb-89 |
| 280 | CB-CH89-28 | USACE | 798065 | 1478120 | -38.8 | 12.5 | -51.3 | Feb-89 |
| 281 | CB-CH89-29 | USACE | 797558 | 1477496 | -36.5 | 17 | -53.5 | Feb-89 |
| 282 | CB-CH89-30 | USACE | 797037 | 1478522 | -46.4 | 9.3 | -55.7 | Jan-89 |
| 283 | CB-CH89-31 | USACE | 796033 | 1478769 | -34.9 | 19 | -53.9 | Jan-89 |
| 284 | CB-CH89-32 | USACE | 796523 | 1479349 | -38.1 | 16 | -54.1 | Jan-89 |
| 285 | CB-CH89-33 | USACE | 795520 | 1479667 | -46.4 | 6.2 | -52.6 | Feb-89 |
| 286 | CB-CH89-34 | USACE | 794542 | 1480012 | -32 | 19.5 | -51.5 | Feb-89 |
| 287 | CB-CH89-35 | USACE | 795049 | 1480607 | -34.4 | 19.5 | -53.9 | Feb-89 |
| 288 | CB-CH89-36 | USACE | 794026 | 1480932 | -47.7 | 10 | -57.7 | Jan-89 |
| 289 | CB-CH89-37 | USACE | 793193 | 1481563 | -47.7 | 9.6 | -57.3 | Feb-89 |
| 290 | CB-CH89-38 | USACE | 792435 | 1481919 | -47.2 | 11.5 | -58.7 | Feb-89 |
| 291 | CB-CH89-39 | USACE | 790431 | 1481908 | -46.1 | 7.8 | -53.9 | Feb-89 |
| 292 | CB-CH89-40 | USACE | 790287 | 1481889 | -46.5 | 10 | -56.5 | Feb-89 |
| 293 | CB-CH89-41 | USACE | 789316 | 1481894 | -46.6 | 10.2 | -56.8 | Feb-89 |
| 294 | CB-CH89-42 | USACE | 788344 | 1481864 | -49.5 | 10.3 | -59.8 | Feb-89 |
| 295 | CB-CH89-43 | USACE | 787306 | 1481864 | -40.6 | 15 | -55.6 | Feb-89 |
| 296 | CB-CH89-44 | USACE | 786316 | 1481864 | -39.1 | 8.7 | -47.8 | Feb-89 |
| 297 | CB-CH89-45 | USACE | 785308 | 1481874 | -40.3 | 6.5 | -48.8 | Feb-89 |
| 298 | CB-CH89-46 | USACE | 784333 | 1481874 | -40.8 | 4.5 | -45.3 | Feb-89 |
| 299 | CB-CH89-47 | USACE | 783331 | 1481844 | -41.9 | 5 | -46.9 | Feb-89 |
| 300 | CB-CH89-48 | USACE | 782323 | 1481789 | -39.8 | 4.7 | -44.5 | Feb-89 |
| 301 | CB-CH89-49 | USACE | 781303 | 1481844 | -37.3 | 7.3 | -44.6 | Feb-89 |
| 304 | CB-CH89-52 | USACE | 781511 | 1482456 | -35 | 11 | -46 | Feb-89 |
| 305 | CB-CH89-53 | USACE | 780247 | 1481964 | -35.7 | 11 | -46.7 | Feb-89 |
| 306 | CB-CH89-54 | USACE | 779245 | 1481926 | -36.2 | 11.5 | -47.7 | Feb-89 |
| 307 | CB-CH89-55 | USACE | 778252 | 1481905 | -37 | 10 | -47 | Feb-89 |
| 313 | CB-CH91-6 | USACE | 781493 | 1481754 | -31.4 | 20 | -51.4 | May-91 |
| 314 | CB-CH91-7 | USACE | 782055 | 1483250 | -31.1 | 20 | -51.1 | May-91 |
| 315 | CB-CH91-8 | USACE | 783836 | 1481988 | -32.6 | 20 | -52.6 | May-91 |
| 316 | CB-CH91-9 | USACE | 784454 | 1481989 | -31.6 | 20 | -51.6 | May-91 |
| 317 | CB-CH91-10 | USACE | 785947 | 1481727 | -35.6 | 20.4 | -56 | May-91 |
| 318 | CB-CH91-11 | USACE | 787031 | 1481736 | -29 | 23 | -52 | May-91 |
| 319 | CB-CH91-12 | USACE | 787953 | 1482339 | -34.8 | 20 | -54.8 | May-91 |
| 321 | CB-CH92-1 | USACE | 786434 | 1482105 | -11 | 33 | -44 | Feb-92 |
| 322 | CB-CH92-1A | USACE | 787178 | 1481587 | -15 | 30 | -45 | Feb-92 |
| 323 | CB-CH92-2 | USACE | 785827 | 1482021 | -34 | 11 | -45 | Jan-92 |
| 324 | CB-CH92-3 | USACE | 785431 | 1482136 | -13.2 | 31.5 | -44.7 | Mar-92 |
| 325 | CB-CH92-4 | USACE | 785338 | 1481726 | -43.4 | 5 | -48.4 | Jan-92 |
| 326 | CB-CH92-5 | USACE | 784855 | 1481760 | -42.4 | 5 | -47.4 | Jan-92 |

Table 3. Locations, Elevations and Depths of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Boring Performed By: | State Plane NAD 83 | | Surface Elevation (feet, MLLW) | Total Depth (feet) | End of Boring Elevation (feet, MLLW) | Date of Boring |
|----------------------|-------------|----------------------|--------------------|----------|--------------------------------|--------------------|--------------------------------------|----------------|
| | | | Eastings | Northing | | | | |
| 327 | CB-CH92-6 | USACE | 784621 | 1481968 | -22.5 | 21 | -43.5 | Feb-92 |
| 328 | CB-CH92-7 | USACE | 784370 | 1481741 | -42.6 | 5 | -47.6 | Jan-92 |
| 329 | CB-CH92-8 | USACE | 783543 | 1481731 | -38.7 | 10 | -48.7 | Feb-92 |
| 330 | CB-CH92-9 | USACE | 783740 | 1482147 | -15 | 30 | -45 | Mar-92 |
| 331 | CB-CH92-10 | USACE | 783131 | 1482321 | -35.8 | 10 | -45.8 | Feb-92 |
| 332 | CB-CH92-11 | USACE | 782728 | 1482133 | -39.9 | 5 | -44.9 | Jan-92 |
| 333 | CB-CH92-12 | USACE | 781966 | 1481681 | -37.7 | 10 | -47.7 | Feb-92 |
| 337 | CB-CH92-16 | USACE | 780803 | 1481557 | -13.5 | 31.5 | -45 | Mar-92 |
| 338 | CB-CH92-17 | USACE | 780813 | 1481893 | -35.7 | 9 | -44.7 | Feb-92 |
| 339 | CB-CH92-18 | USACE | 780280 | 1481615 | -14.7 | 30 | -44.7 | Mar-92 |
| 340 | CB-CH92-19 | USACE | 779777 | 1481616 | -12 | 35 | -47 | Mar-92 |
| 341 | CB-CH92-20 | USACE | 779970 | 1481943 | -37.4 | 7.5 | -44.9 | Feb-92 |
| 342 | CB-CH92-21 | USACE | 779252 | 1481620 | -13 | 32 | -45 | Mar-92 |
| 343 | CB-CH92-22 | USACE | 778743 | 1481614 | -14.5 | 30 | -44.5 | Mar-92 |
| 344 | CB-CH92-23 | USACE | 778780 | 1481744 | -34.4 | 10 | -44.4 | Mar-92 |
| 345 | CB-CH92-24 | USACE | 778232 | 1481632 | -21 | 21 | -42 | Feb-92 |
| 346 | CB-CH92-25 | USACE | 777571 | 1481495 | -14.3 | 31.5 | -45.8 | Mar-92 |
| 347 | CB-CH-M2 | USACE | 792643 | 1482081 | -43 | 9 | -52 | Nov-82 |
| 348 | CB-CH-M3 | USACE | 791611 | 1481736 | -44 | 9 | -53 | Nov-82 |
| 349 | CB-CH-M4 | USACE | 791011 | 1481691 | -43 | 8 | -51 | Nov-82 |
| 350 | CB-CH-M5 | USACE | 790197 | 1481664 | -38 | 11 | -49 | Nov-82 |
| 351 | CB-CH-M9 | USACE | 789497 | 1482030 | -41.5 | 10 | -51.5 | Nov-82 |
| 352 | CB-CH-M10 | USACE | 789128 | 1481875 | -41.5 | 10 | -51.5 | Nov-82 |
| 353 | CB-CH-M11 | USACE | 788875 | 1481685 | -29 | 20 | -49 | Nov-82 |
| 354 | CB-CH-M12 | USACE | 788840 | 1482070 | -35.5 | 18 | -53.5 | Nov-82 |
| 355 | CB-CH-M13 | USACE | 788245 | 1482119 | -30.5 | 20 | -50.5 | Nov-82 |
| 356 | CB-CH-M14 | USACE | 787764 | 1482295 | -40 | 11 | -51 | Nov-82 |
| 358 | CB-CH-FY83- | USACE | 790910 | 1482073 | -43 | 11 | -54 | Nov-82 |
| 359 | CB-CH-FY83- | USACE | 790454 | 1482098 | -40.5 | 12 | -52.5 | Nov-82 |
| 360 | CB-CH-FY83- | USACE | 790047 | 1482074 | -23.5 | 25 | -48.5 | Nov-82 |
| 361 | CB-CH-M1 | USACE | 792933 | 1481998 | -44 | 8 | -52 | Nov-82 |
| 366 | CB-CH01-01 | USAED | 785210 | 1481885 | -44.4 | 8.3 | -52.7 | Jul-01 |
| 367 | CB-CH01-02 | USAED | 786203 | 1482061 | -38.3 | 3.8 | -42.1 | Jul-01 |
| 368 | CB-CH01-03B | USAED | 786207 | 1481887 | -42.6 | 9.9 | -52.5 | Jul-01 |
| 369 | CB-CH01-04 | USAED | 786219 | 1481675 | -43.3 | 5.4 | -48.7 | Jul-01 |
| 370 | CB-CH01-05 | USAED | 787223 | 1482086 | -42.4 | 4.3 | -46.7 | Jul-01 |
| 371 | CB-CH01-06 | USAED | 787209 | 1481879 | -47 | 4.1 | -51.1 | Jul-01 |
| 372 | CB-CH01-07 | USAED | 787223 | 1481673 | -45.8 | 4.2 | -50 | Jul-01 |
| 373 | CB-CH01-08 | USAED | 788211 | 1482094 | -46.6 | 8.5 | -55.1 | Jul-01 |
| 374 | CB-CH01-09 | USAED | 788213 | 1481879 | -46.8 | 6 | -52.8 | Jul-01 |
| 375 | CB-CH01-10 | USAED | 788207 | 1481680 | -45.1 | 5.7 | -50.8 | Jul-01 |

Table 3. Locations, Elevations and Depths of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Boring Performed By: | State Plane NAD 83 | | Surface Elevation (feet, MLLW) | Total Depth (feet) | End of Boring Elevation (feet, MLLW) | Date of Boring |
|----------------------|-------------|----------------------|--------------------|----------|--------------------------------|--------------------|--------------------------------------|----------------|
| | | | Easting | Northing | | | | |
| 376 | CB-CH01-11 | USAED | 789214 | 1482079 | -49 | 6.1 | -55.1 | Jul-01 |
| 377 | CB-CH01-12 | USAED | 789212 | 1481865 | -49.5 | 7.1 | -56.6 | Jul-01 |
| 378 | CB-CH01-13 | USAED | 789229 | 1481683 | -48.7 | 7.9 | -56.6 | Jul-01 |
| 379 | CB-CH01-14 | USAED | 790206 | 1482071 | -46.3 | 5.5 | -51.8 | Jul-01 |
| 380 | CB-CH01-15 | USAED | 790214 | 1481878 | -46.7 | 6.3 | -53 | Jul-01 |
| 381 | CB-CH01-16 | USAED | 790280 | 1481614 | -41.1 | 7.1 | -48.2 | Jul-01 |
| 382 | CB-CH01-17 | USAED | 791271 | 1482060 | -44.6 | 5.3 | -49.9 | Jul-01 |
| 383 | CB-CH01-18 | USAED | 791212 | 1481880 | -41.1 | 11.8 | -52.9 | Jul-01 |
| 384 | CB-CH01-19 | USAED | 791242 | 1481601 | -41.8 | 9.8 | -51.6 | Jul-01 |
| 385 | CB-CH01-20 | USAED | 792947 | 1482063 | -43.8 | 12.3 | -56.1 | Jul-01 |
| 386 | CB-CH01-21 | USAED | 792792 | 1481769 | -44.9 | 11 | -55.9 | Jul-01 |
| 387 | CB-CH01-22 | USAED | 792706 | 1481537 | -43.5 | 12.7 | -56.2 | Jul-01 |
| 388 | CB-CH01-23 | USAED | 793895 | 1481245 | -43.9 | 9 | -52.9 | Jul-01 |
| 389 | CB-CH01-24A | USAED | 793783 | 1481146 | -44.9 | 9.3 | -54.2 | Jul-01 |
| 390 | CB-CH01-25B | USAED | 793649 | 1481015 | -43.8 | 10.4 | -54.2 | Jul-01 |
| 391 | CB-CH01-26C | USAED | 794643 | 1480453 | -44.1 | 4.4 | -48.5 | Jul-01 |
| 397 | PC-1E | AAI | 785522 | 1481462 | 10 | 83 | -73 | Jul-84 |
| 398 | TH-1E | AAI | 785566 | 1481422 | 11 | 111 | -100 | Jul-84 |
| 399 | TH-4A | AAI | 785825 | 1481373 | 10 | 90 | -80 | Jul-84 |
| 400 | TH-4B | AAI | 786322 | 1481446 | 8 | 90 | -82 | Jul-84 |
| 414 | TH-20 | AAI | 778349 | 1481549 | 10 | 80 | -70 | Jul-84 |
| 415 | TH-21 | AAI | 777931 | 1482291 | 5 | 41 | -36 | Jul-84 |
| 416 | TH-22 | AAI | 778381 | 1482169 | 8 | 46 | -38 | Jul-84 |
| 421 | TH-30 | AAI | 776922 | 1481800 | -7 | 27 | -34 | Jul-84 |
| 448 | PC-10 | AAI | 777699 | 1482369 | 9 | 93 | -84 | Jul-84 |
| 457 | PC-19 | AAI | 778264 | 1482362 | 12 | 86 | -74 | Jul-84 |
| 458 | PC-20 | AAI | 778266 | 1481943 | 8 | 92 | -84 | Jul-84 |
| 639 | TH-37 | AAI | 777328 | 1482466 | -14.9 | 22 | -36.9 | Aug-85 |
| 640 | TH-38 | AAI | 777464 | 1482247 | -16.8 | 14 | -30.8 | Aug-85 |
| 641 | TH-39 | AAI | 777295 | 1482091 | -18 | 20 | -38 | Aug-85 |
| 642 | TH-40 | AAI | 777332 | 1481756 | -13.6 | 22 | -35.6 | Aug-85 |
| 643 | TH-41 | AAI | 776825 | 1482073 | -24.7 | 16 | -40.7 | Aug-85 |
| 644 | TH-42 | AAI | 776697 | 1481752 | -12.8 | 26 | -38.8 | Aug-85 |
| 652 | TH-50 | AAI | 777500 | 1482967 | -23.5 | 9 | -32.5 | Aug-85 |
| 677 | TH-70 | AAI | 777722 | 1482598 | 8.6 | 91 | -82.4 | Aug-85 |
| 743 | THR-1 | AAI | 786929 | 1481576 | -2.9 | 34 | -36.9 | Apr-86 |
| 744 | THR-2 | AAI | 787304 | 1481523 | 1.4 | 36.2 | -34.8 | Apr-86 |
| 751 | THW-1 | AAI | 777807 | 1482389 | 8.9 | 96 | -87.1 | Apr-86 |
| 752 | THW-2 | AAI | 778047 | 1482371 | 9 | 76 | -67 | Apr-86 |
| 753 | THW-3 | AAI | 778318 | 1482370 | 14.1 | 96 | -81.9 | Apr-86 |
| 756 | THW-6 | AAI | 777929 | 1482447 | 9.8 | 21 | -11.2 | Apr-86 |
| 757 | THW-7 | AAI | 778146 | 1482426 | 10 | 21 | -11 | Apr-86 |
| 848 | TH-1H | AAI | 777601 | 1482747 | -18 | 115 | -133 | Jul-88 |

Table 3. Locations, Elevations and Depths of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Boring Performed By: | State Plane NAD 83 | | Surface Elevation (feet, MLLW) | Total Depth (feet) | End of Boring Elevation (feet, MLLW) | Date of Boring |
|----------------------|-------------|----------------------|--------------------|----------|--------------------------------|--------------------|--------------------------------------|----------------|
| | | | Easting | Northing | | | | |
| 849 | TH-2H | AAI | 777599 | 1483247 | -19.8 | 116 | -135.8 | Jul-88 |
| 903 | B-1 | AAI | 780339 | 1481563 | -12 | 24.5 | -36.5 | Sep-89 |
| 938 | TH-1 | AAI | 781218 | 1481537 | -42.5 | 61.5 | -104 | Sep-89 |
| 939 | TH-2 | AAI | 781713 | 1481540 | -27.5 | 88.5 | -116 | Sep-89 |
| 978 | TH-13 | AAI | 781959 | 1481469 | 8.7 | 76 | -67.3 | May-90 |
| 982 | TH-3 | AAI | 783923 | 1481572 | -18 | 79.9 | -97.9 | Jul-90 |
| 983 | TH-4 | AAI | 784116 | 1481573 | -20.7 | 75.3 | -96 | Jul-90 |
| 1012 | TH-16 | AAI | 777771 | 1482768 | 8 | 112 | -104 | Jun-92 |
| 1013 | THW-8 | AAI | 777731 | 1482728 | 8.1 | 45 | -36.9 | Jun-92 |
| 1014 | THW-9 | AAI | 777891 | 1482729 | 10 | 45 | -35 | Jun-92 |
| 1015 | THW-10 | AAI | 777732 | 1482563 | 7.5 | 45 | -37.5 | Jun-92 |
| 1016 | THW-11 | AAI | 777892 | 1482564 | 10.7 | 45 | -34.3 | May-92 |
| 1017 | THW-12 | AAI | 778052 | 1482565 | 10.1 | 45 | -34.9 | May-92 |
| 1018 | THW-13 | AAI | 777733 | 1482398 | 7.6 | 45 | -37.4 | May-92 |
| 1019 | THW-14 | AAI | 777893 | 1482399 | 8.8 | 45 | -36.2 | May-92 |
| 1020 | THW-15 | AAI | 778053 | 1482400 | 8.8 | 45 | -36.2 | May-92 |
| 1021 | THW-16 | AAI | 778213 | 1482401 | 9.5 | 45 | -35.5 | May-92 |
| 1022 | THW-17 | AAI | 778373 | 1482401 | 13.3 | 45 | -31.7 | May-92 |
| 1040 | TH-N | AAI | 777803 | 1482518 | 8.5 | 31 | -22.5 | Sep-91 |
| 1041 | TH-O | AAI | 778303 | 1482521 | 11.2 | 31 | -19.8 | Sep-91 |
| 1051 | ND-1 | AAI | 783706 | 1482241 | 15.8 | 111 | -95.2 | Apr-92 |
| 1052 | CD-1 | AAI | 783882 | 1482231 | 17.2 | 91 | -73.8 | Apr-92 |
| 1053 | BT-1 | AAI | 784043 | 1482259 | 12.4 | 111 | -98.6 | Apr-92 |
| 1096 | TH-4D | AAI | 786510 | 1481501 | 8.8 | 51 | -42.2 | Feb-93 |
| 1204 | SJW-1 | AAI | 788609 | 1481337 | -6.14 | 60 | -66.14 | Aug-95 |
| 1205 | SJW-2 | AAI | 788859 | 1481333 | -7.83 | 60 | -67.83 | Aug-95 |
| 1206 | SJW-3 | AAI | 789110 | 1481260 | -12.43 | 70 | -82.43 | Aug-95 |
| 1207 | TH-1 | AAI | 789787 | 1482164 | -36 | 40 | -76 | Sep-95 |
| 1208 | TH-1A | AAI | 789787 | 1482264 | -7 | 40 | -47 | Aug-95 |
| 1209 | TH-2 | AAI | 790237 | 1482284 | -14 | 40 | -54 | Aug-95 |
| 1210 | TH-3 | AAI | 790637 | 1482284 | -17 | 40 | -57 | Aug-95 |
| 1211 | TH-5 | AAI | 790917 | 1482664 | -16.5 | 40 | -56.5 | Aug-95 |
| 1212 | TH-6 | AAI | 790827 | 1482989 | -21.5 | 40 | -61.5 | Aug-95 |
| 1213 | WH2-1 | AAI | 780730 | 1483004 | 10.28 | 61 | -50.72 | Nov-95 |
| 1319 | TH-A | AAI | 781848 | 1481532 | 0 | 123 | -123 | Jul-98 |
| 1320 | TH-B | AAI | 782076 | 1481571 | 0 | 123.5 | -123.5 | Jul-98 |
| 1345 | TH-3 | AAI | 780363 | 1481516 | 10.1 | 51 | -40.9 | Aug-00 |

| | | |
|----------------|-------|--|
| ABBREVIATIONS: | PTL | Pittsburgh Testing Laboratory |
| | UNI | Universal Engineering Testing Company |
| | WGI | Warren George Inc. |
| | USACE | United States Corps of Engineer |
| | USAED | United States Army Engineering Division - Wilmington |
| | LAW | Law Engineering Testing Company |
| | AAI | Ardaman & Associates, Inc. |

Table 4. Index Testing Data of Previous Marine Borings.

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 5 | CB-NLS-7 | -25.3 | -35.0 | Sand, fine/medium quartz and calcite, shelly, gray. | 63 | - | - | - |
| 21 | CH-8-C | -36.1 | -49.0 | Fine sand and shell, some clay light gray. | - | - | - | - |
| 22 | CH-7-C | -38.4 | -52.3 | Silty sand. | - | - | - | - |
| 23 | CH-10-C | -31.1 | -47.9 | Sand, shell, some clay, dark gray. | - | - | - | - |
| 24 | CH-1-C | -35.8 | -61.5 | Fine silty sand particles of shell, trace clay. | - | - | - | - |
| 25 | CH-2-C | -37.6 | -60.5 | Fine sand and shell some plastic gray to dark gray. | - | - | - | - |
| 26 | P-1 | -32.5 | -43.0 | Soft gray clay. | 2 | - | - | - |
| 28 | P-3 | -32.0 | -48.5 | Soft gray clay. | 3 | - | - | - |
| 30 | B-3 | -34.0 | -48.0 | Firm gray clay with some broken shell. | 6 | - | - | - |
| 31 | B-4 | -34.0 | -58.0 | Soft gray clay with some broken shell. | 9 | - | - | - |
| 32 | B-5 | -36.0 | -45.0 | Very soft gray silt. | 4 | - | - | - |
| 39 | CN-7 | -34.5 | -52.0 | Clay, green (CH). | 6 | - | - | - |
| 40 | CN-8 | -33.4 | -47.7 | Clay, green (CH). | - | - | - | - |
| 49 | H-3 | -26.6 | -30.8 | Sand, fine, gray/green (SP). | 0 | - | - | - |
| 50 | H-4 | -30.0 | -32.5 | Sand, fine, gray/green (SP). | 0 | - | - | - |
| 51 | H-5 | -25.4 | -32.9 | Clay, very slightly sandy gray/green (CH). | 0 | - | - | - |
| 52 | CH-18 | -30.2 | -39.5 | Clay, gray. | - | - | - | - |
| 53 | CH-19 | -32 | -34 | Clay and shell, gray. | - | - | - | - |
| 54 | CH-20 | -32.3 | -34 | Clay, gray with shells. | - | - | - | - |
| 56 | CHE-1 | -38.4 | -41.4 | Clay, soft, gray (CL). | 0 | - | - | - |
| 57 | CHE-2 | -22 | -40 | Clay, gray, slightly silty (CH). | 5 | - | - | - |
| 58 | CHE-3 | -28.8 | -40.8 | Clay, soft, gray (CH). | 0 | - | - | - |
| 59 | CHE-4 | -33.4 | -39.9 | Sand, fine to coarse, quartz and shell, light gray, clean, tight, very shelly (SP). | 58 | - | - | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 60 | CHE-5 | -32.7 | -40.2 | Sand, fine, quartz, slightly silty, very shelly, gray (SP). | 58 | - | - | - |
| 62 | CHE-7 | -38 | -41 | Clay, silty, slightly sandy, green (CL). | 9 | - | - | - |
| 64 | CHE-9 | -39 | -40 | Sand, clayey, gray (SC). | 9 | - | - | - |
| 72 | 1-N | -33 | -42 | Grey clayey silt. | 7 | - | - | - |
| 145 | TB-7 | -27 | -45 | Dark gray silty clay with trace of shell. | 4 | - | - | - |
| 146 | TB-8 | -27 | -42.5 | Dark gray silty clay with trace of shell. | 2 | - | - | - |
| 147 | TB-9 | -27 | -49 | Dark gray silty clay with trace of shell. | 4 | - | - | - |
| 152 | CB-W-5 | -28 | -42 | Gray fine silty sand, and silt, trace shell. | 3 | - | - | - |
| | | -42 | -53 | Gray compact fine to medium sand, shell. | 33 | - | - | - |
| 157 | CB-E-10 | -39 | -50 | Gray compact sand, shells, trace silt. | 38 | - | - | - |
| 192 | ER-3 | -25.5 | -37.5 | Silt, drk gray, very sandy, shelly, soft (ML). | - | - | - | - |
| 193 | ER-4 | -18 | -24 | Sand, dark gray, very silty, very clayey, slightly, shelly, soft (SC). | - | - | - | - |
| 194 | ER-5 | -15 | -20 | Sand, gray, fine to medium quartz, fine to coarse shell, slightly silty (SP). | - | - | - | - |
| 195 | ER-6 | -35.5 | -41.5 | Sand, dark gray, fine quartz, slightly shelly, silty (SM). | - | - | - | - |
| 203 | CHM84-8 | -34.6 | -42 | Sand, coarse to fine, shelly, silty, green (SM) | 8 | - | - | - |
| 206 | CHM84-11 | -31.9 | -41.9 | Silt, slightly sandy, trace of shells, green (ML). | 1 | - | - | - |
| 207 | CHM84-12 | -35 | -43 | Sand, coarse to fine, quartz, silty, green (SM). | 4 | - | - | - |
| 208 | CHM84-13 | -28.5 | -43.5 | Sand, fine, quart, shelly, slightly silty to silty, gray (SP-SM). | 15 | - | - | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 209 | CHM84-14 | -32.7 | -42.4 | Sand, coarse to fine quartz, shelly, silty, green (SM) | 7 | - | - | - |
| 210 | CHM84-15 | -38.1 | -43.1 | Silt, sandy, some shell (ML). | 2 | - | - | - |
| 211 | CHM84-16 | -39.7 | -40.2 | Sandstone, medium, hard. | 148 | - | - | - |
| 212 | CHM84-17 | -36.3 | -42.3 | Sand, medium to fine, quartz, gray (SM). | 57 | - | - | - |
| 213 | CHM84-18 | -38.7 | -42.7 | Sand, fine, calcareous, shelly, white (SP). | 22 | - | - | - |
| 214 | CHM84-19 | -33.7 | -41.7 | Clay, silty, traces of sand, shell and organic plant remains (CH). | 3 | - | - | - |
| | | -41.7 | -43 | Sand, medium quartz, silty, black (SM). | 3 | - | - | - |
| | | -43 | -43.7 | Sandstone. | 17 | - | - | - |
| 215 | CHM84-20 | -19.3 | -42 | Clay, silty, trace of sand and shell (CH). | 2 | - | - | - |
| | | -42 | -42.8 | Sandstone, medium hard, calcareous, shell fragments, brown. | 80 | - | - | - |
| 216 | CHM84-21 | -27.1 | -42.1 | Clay, silty, traces of sand, shell and organic plant remains, green (CH). | 2 | - | - | - |
| 217 | CHM84-22 | -21.5 | -41.5 | Clay, silty, trace of sand, trace of shell, trace of organic plant remains, green (CH). | 2 | - | - | - |
| 218 | CHM84-23 | -39 | -42.8 | Clay, silty, gray, trace of sand, and shell, slightly organic (CH). | 6 | - | - | - |
| 219 | CHM84-24 | -39.5 | -42 | Sand, fine, quartz, light gray, clayey (SC). | 16 | - | - | - |
| 220 | CHM84-25 | -39 | -40 | Sand, fine to medium quartz, shelly (45% shell), clayey (SC). | 30 | - | - | - |
| | | -40 | -42 | Sand, fine quartz, clayey, trace silt, trace shell, gray (SC). | 22 | - | - | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 221 | CHM84-26 | -34.8 | -38.3 | Sand fine to coarse, quartz, shelly, tan (SP) isolated limestone lenses, slightly limy, 80% sand size shell fragments from -36.8 to -38.3 | 50 | - | - | - |
| 222 | CHM84-27 | -38.5 | -41.5 | Sand, fine to medium quartz, shelly, slightly silty, gray (SP). | 40 | - | - | - |
| 223 | CHM84-28 | -37.5 | -42 | Sand, fine quartz, clayey, slightly shelly, with bed of sandy clay from -38.5 to -39.3, (SC). | 21 | - | - | - |
| 224 | CHM84-29 | -39.6 | -42.6 | Clay, soft, sandy, slightly silty, seams of shelly sand (CH). | 6 | - | - | - |
| 225 | CHM84-30 | -39.8 | -42.8 | Silt, sandy, clayey, slightly shelly, gray, riddled with seams of silty shelly sand (ML). | 9 | - | - | - |
| 226 | CHM84-31 | -40 | -42.5 | Clay, silty, gray, slightly compact, sandy, slightly shelly (CL). | 5 | - | - | - |
| 230 | CHM84-35 | -40 | -41 | Sand, gray, fine quartz, silty (SM). | - | - | - | - |
| 231 | CHM84-36 | -41.5 | -43.5 | Clay, gray, sandy (CL). | - | - | - | - |
| 232 | CHM84-37 | -36 | -41 | Sand, gra, fine quartz, silty with occasional clay layers below -36, SM. | - | - | - | - |
| 233 | CHM84-38 | -38.8 | -40.8 | Clay, gray (CH). | - | - | - | - |
| 234 | CHM84-39 | -38.5 | -45 | Sand, gray, fine quartz, silty (SM). | - | - | - | - |
| 235 | CHM84-40 | -40 | -50 | Sand, dark gray, fine quartz, silty (SM). | - | - | - | - |
| 236 | CB-CH87-1 | -36.1 | -38.1 | Sand, fine quartz, silty, gray (SM). | 2 | - | - | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 237 | CB-CH87-2 | -35.6 | -38.6 | Sand, fine quartz, little to some silt, shelly, gray (SM). | 11 | - | - | - |
| 238 | CB-CH87-3 | -36.9 | -38.4 | Silt, sandy, little shell, gray, trace clay (ML). | 2 | - | - | - |
| 239 | CB-CH87-4 | -35.5 | -38.5 | Sand, fine quartz, little shell, gray, little silt (SM). | 8 | - | - | - |
| 240 | CB-CH88-1 | -32.3 | -47.3 | Clay, gray, a few brown traces of leaves and stems (CH). | 6 | - | - | - |
| 241 | CB-CH88-2 | -41.7 | -45.4 | Silt with a little very fine quartz sand, gray (ML). | 0 | - | - | - |
| 242 | CB-CH88-3 | -38.5 | -46.3 | Clay, a trace of very fine quartz sand, gray (CH), trace of brown leaves and stems, a very few shells (CH). | 1 | - | - | - |
| 243 | CB-CH88-4 | -40.9 | -41.9 | Silt, a little very fine sand, gray (ML). | 0 | - | - | - |
| | | -41.9 | -45.9 | Clay, gray, a few brown traces of leaves and stems (CH). | 3 | - | - | - |
| 244 | CB-CH88-5 | -39.4 | -48.1 | Clay, gray, a few brown traces of leaves and stems (CH). | 6 | - | - | - |
| 245 | CB-CH88-6 | -40.6 | -43.1 | Silt, gray-green (MH). | 0 | - | - | - |
| | | -43.1 | -46.6 | Clay, a trace of very fine quartz sand, gray, a few brown traces of leaves and stems (CH). | 0 | - | - | - |
| 246 | CB-CH88-7 | -39.9 | -48.4 | Clay, gray (CH). | 6 | - | - | - |
| 248 | CB-CH88-9 | -39.6 | -45.1 | Clay, gray (CH). | 0 | - | - | - |
| 249 | CB-CH88-10 | | | No boring data. | 0 | - | - | - |
| 250 | CB-CH88-11 | -39.8 | -46.4 | Shell, medium sand size, silty, a trace of very fine quartz sand, white with gray. | 11 | - | - | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 251 | CB-CH88-12 | -36.4 | -44.4 | Shell, medium sand size, silty, a little very fine quartz sand, a trace of silt, gray. | 30 | - | - | - |
| 252 | CB-CH88-13 | -39.4 | -42.4 | Sand, fine to medium shell, very fine quartz, a little silt to silty layers of silt, gray (SM). | 7 | - | - | - |
| | | -42.4 | -45.4 | Silt, very sandy, some shell, green (ML) | 10 | - | - | - |
| 253 | CB-CH89-1 | -45.1 | -51.1 | Sand, very fine, quartz, very silty, little clay, gray, little shell, wet, soupy (SM). | 0 | - | - | - |
| 254 | CB-CH89-2 | -44.3 | -46.8 | Sand, fine, quartz, silty, wet, soupy, gray, little shell (SM). | 0 | - | - | - |
| 255 | CB-CH89-3 | -45.6 | -48.1 | Clay, plastic, gray, wet (CH). | 0 | - | - | - |
| 256 | CB-CH89-4 | -43.9 | -44.8 | Clay, dark gray, wet, soupy, trace shell (CL). | 1 | - | - | - |
| 257 | CB-CH89-5 | -43.4 | -45.1 | clay, slightly plastic, sandy, silty, wet, soupy, dark gray, trace shell (CL). | 2 | - | - | - |
| 258 | CB-CH89-6 | -45.4 | -46.9 | Silt, soft, soupy, sandy, dark gray (ML). | 0 | - | - | - |
| 259 | CB-CH89-7 | -43.6 | -45.1 | Clay, plastic, dark gray, trace sand, wet (CH). | 13 | - | - | - |
| 260 | CB-CH89-8 | -42.5 | -44 | Sand, fine to medium, quartz, clayey, little shell, gray (SC). | 11 | - | - | - |
| 261 | CB-CH89-9 | -45.3 | -49.3 | Clay, wet, soupy, sandy, dark gray, slightly plastic seams, clayey sand (CL). | 0 | - | - | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 262 | CB-CH89-10 | -42.3 | -44.5 | Clay, plastic, wet, dark gray, trace shell, gray, trace to little sand from -42.3 to -42.8, sandy, silty from -44.0 to -44.5 (CH). | 0 | - | - | - |
| 263 | CB-CH89-11 | -41.8 | -44.8 | Sand, very fine, quartz, very clayey little silt, gray (SC). | 3 | - | - | - |
| 264 | CB-CH89-12 | -45.7 | -53.7 | Clay, plastic, trace to little sand, gray, wet, soupy (CH). | 0 | - | - | - |
| 265 | CB-CH89-13 | -42.2 | -43 | Clay, plastic, dark gray (CH). | 0 | - | - | - |
| | | -43 | -45.9 | Sand, very fine quartz, clayey, gray, little shell (SC). | 4 | - | - | - |
| 266 | CB-CH89-14 | -42.6 | -47.6 | Sand, very fine, quartz, very clayey, soft, wet, many thin bed sandy clay, gray, little shell (SC). | 3 | - | - | - |
| 267 | CB-CH89-15 | -45.2 | -47.7 | Clay, plastic, dark gray, wet (CH). | 4 | - | - | - |
| 268 | CB-CH89-16 | -41.8 | -43.8 | Clay, slightly plastic, soupy, wet, little sand, some silt, gray (CL). | 0 | - | - | - |
| | | -43.8 | -53.2 | Sand, very fine, quartz, clayey, little silt, gray, trace shell (SC). | 0 | - | - | - |
| 269 | CB-CH89-17 | -42 | -49 | Clay, plastic, sandy, little silt, gray, wet, trace shell (CH). | 0 | - | - | - |
| 270 | CB-CH89-18 | -45.1 | -50.1 | Clay, plastic, gray-black, wet, trace shell (CH). | 0 | - | - | - |
| 271 | CB-CH89-19 | -40.1 | -51.7 | Clay, slightly plastic, sandy, silty, gray, wet, trace shell (CL). | 0 | - | - | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 272 | CB-CH89-20 | -41.6 | -49.1 | Clay, plastic, trace sand and silt, trace shell, gray (CH). | 0 | - | - | - |
| 273 | CB-CH89-21 | -48.2 | -51.2 | Clay, plastic, gray, wet to damp, trace shell (CH). | 0 | - | - | - |
| 274 | CB-CH89-22 | -39.8 | -48.2 | Clay, sandy, trace shell, gray, many seams clayey sand, slightly plastic (CL). | 0 | - | - | - |
| 275 | CB-CH89-23 | -40.9 | -53.3 | Clay, plastic, trace silt and sand, trace shell, gray, damp; clay, very plastic, fat from -48.3 to -53.3 (CH). | 3 | - | - | - |
| 276 | CB-CH89-24 | -47.3 | -51.3 | Clay, plastic, soupy, wet, gray, seams of clayey sand from -50.3 to -51.3 (CH) | 0 | - | - | - |
| 277 | CB-CH89-25 | -39.5 | -52.5 | Clay, plastic, wet, little sand, with seams clayey sand, gray; very plastic, fat, damp, wood fragments, gray from -43.5 to -52.5 (CH). | 0 | - | - | - |
| 278 | CB-CH89-26 | -38.9 | -50.9 | Clay, plastic, sandy, with seam clayey sand, gray, wet; very plastic, fat, damp, dark gray, organic stain (wood fragments) from -42.9 to -50.9 (CH). | 0 | - | - | - |
| 279 | CB-CH89-27 | -46.7 | -51.3 | Clay, plastic, wet, soupy, disturbed (CH). | 0 | - | - | - |
| 280 | CB-CH89-28 | -38.8 | -46.3 | Clay, slightly plastic, little to some sand with seams of clayey sand, wet, trace shell (CL). | 0 | - | - | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 281 | CB-CH89-29 | -36.5 | -53.5 | Clay, plastic, little silt and sand, trace shell, damp to wet, gray; fat, plastic, dark gray from -44.0 to -49.0 (CH). | 0 | - | - | - |
| 282 | CB-CH89-30 | -46.4 | -55.7 | Clay, plastic, gray, wet; very plastic, undisturbed gray from -52.7 to -55.7 (CH). | 0 | - | - | - |
| 283 | CB-CH89-31 | -36.9 | -53.9 | Clay, plastic, damp, trace shell, gray, undisturbed, seams of clay with little silt (CH). | 0 | - | - | - |
| 284 | CB-CH89-32 | -38.1 | -39.8 | Silt, plastic, little shell, gray (MH). | 0 | - | - | - |
| | | -39.8 | -51.1 | Clay plastic, gray, damp, little shell, trace organic stain below -44.1 (CH). | 0 | - | - | - |
| 285 | CB-CH89-33 | -46.4 | -47.4 | Clay, plastic, gray, damp, trace to little shell, wet, soupy from -46.4 to -47.4 (CH). | 0 | - | - | - |
| 286 | CB-CH89-34 | -32.0 | -48.5 | Clay, plastic, gray, damp, trace to little shell (CH). | 0 | - | - | - |
| 287 | CB-CH89-35 | -34.4 | -53.9 | Clay, plastic, gray, damp, trace shell (CH). | 0 | - | - | - |
| 288 | CB-CH89-36 | -47.7 | -57.7 | Clay, plastic, wet, dark gray (CH). | 0 | - | - | - |
| 289 | CB-CH89-37 | -47.7 | -56.8 | Clay, plastic, damp, trace shell, gray (CH). | 0 | - | - | - |
| 290 | CB-CH89-38 | -47.2 | -57.2 | Clay, black plastic, wet (CH). | 0 | - | - | - |
| 291 | CB-CH89-39 | -46.1 | -51.2 | Clay, plastic, dark gray, trace sand, wet to damp (CH). | 0 | - | - | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 292 | CB-CH89-40 | -46.5 | -49.8 | Sand, fine, quartz, clayey, little silt, dark gray, wet, soupy (SC). | 0 | - | - | - |
| 293 | CB-CH89-41 | -46.6 | -48.6 | Clay, black, wet, soupy, silty, littly sand (CL). | 0 | - | - | - |
| 294 | CB-CH89-42 | -49.5 | -50 | Sand, fine, quartz, clean, tan (SP). | 0 | - | - | - |
| 295 | CB-CH89-43 | -40.6 | -47.6 | Sand, fine quartz, clean, gray, wet (SP). | 7 | - | - | - |
| 296 | CB-CH89-44 | -39.1 | -41.1 | Clay, plastic, trace to little sand, gray, wet, soupy (CH). | 0 | - | - | - |
| | | -41.1 | -46.1 | Sand, fine, quartz, little clay to clayey, gray, loose, wet (SC). | 0 | - | - | - |
| 297 | CB-CH89-45 | -40.3 | -46.8 | Clay, plastic, gray, wet, undisturbed, fat from -44.8 to -46.8 (CH). | 0 | - | - | - |
| 298 | CB-CH89-46 | -40.8 | -45.3 | Clay, plastic, fat, stiff, gray (CH). | 0 | - | - | - |
| 299 | CB-CH89-47 | -41.9 | -46.9 | Clay, plastic, fat, damp, gray, stiff (CH). | 0 | - | - | - |
| 300 | CB-CH89-48 | -39.8 | -44.5 | Clay, plastic, gray, fat (CH). | 0 | - | - | - |
| 301 | CB-CH89-49 | -37.3 | -41.3 | Clay, slightly plastic, black, wet soft (CL). | 0 | - | - | - |
| | | -41.3 | -44.6 | Clay, plastic, stiff, fat, gray (CH). | 2 | - | - | - |
| 304 | CB-CH89-52 | -35 | -46 | Clay, plastic, wet, gray (CH). | 0 | - | - | - |
| 305 | CB-CH89-53 | -35.7 | -42.2 | Clay, plastic, fat, damp, undisturbed, gray (CH). | 0 | - | - | - |
| | | -42.2 | -44.7 | Silt, sandy, organic stain, dark brown, trace clay, slightly plastic (ML). | 3 | - | - | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 306 | CB-CH89-54 | -36.6 | -42.7 | Clay, plastic, wet, soupy, disturbed, gray, sandy with clayey sand seams (CH). | 0 | - | - | - |
| | | -42.7 | -47.7 | Sand, fine, quartz, clayey, wet, gray; very shelly from -42.7 to -43.7; some shell, gray, wet, fine quartz from -47.7 to -47.7 (SC). | 4 | - | - | - |
| 307 | CB-CH89-55 | -37 | -40 | Silt, sandy, gray, wet, soupy, seams silty sand, little shell (ML). | 0 | - | - | - |
| | | -42.5 | -47 | Sand size shell fragments, silty, wet gray. | 16 | - | - | - |
| | | -42.5 | -47 | Sand, fine quartz, some clay, little shell, light gray (SC). | 0 | - | - | - |
| | | -42.5 | -47 | Silt, undisturbed, trace shell, gray-green, damp (ML) | 2 | - | - | - |
| 313 | CB-CH91-6 | -37.9 | -41.9 | Clay, some sand, trace shell, soft, organic odor, dark gray (CL). | 1 | - | - | - |
| | | -41.9 | -45.4 | Clay, trace sand, trace shell, wood fragments, organic odor, stiff, dark gray (CH). | 3 | - | - | - |
| 314 | CB-CH91-7 | -38.6 | -43.1 | Clay, trace sand, trace shell, strong organic odor, wood fibers throughout, stiff, gray (CH). | 3 | - | - | - |
| | | -43.1 | -51.1 | Sand, fine grain quartz, silty, shelly, slight organic odor, light gray, (SM). | 8 | - | - | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 315 | CB-CH91-8 | -39.6 | -46.7 | Clay, trace sand, trace shell, stiff, slight organic, odor, wood fragments, dark gray (CH). | 8 | - | - | - |
| 316 | CB-CH91-9 | -31.6 | -41.6 | Clay, little sand, trace shell, organic, odor, soft, dark gray (CL). | 1 | - | - | - |
| | | -41.6 | -49.6 | Clay, trace sand, little shell, organic, odor, firm, dark gray (CH). | 6 | - | - | - |
| 317 | CB-CH91-10 | -39.8 | -43 | Sand, medium to fine grained quartz, some silt, little clay, trace shell, dark gray (SM). | 2 | - | - | - |
| | | -43 | -47.9 | Clay, trace sand, trace shell, organic odor, wood fragments, dark gray, stiff (CH). | 5 | - | - | - |
| 318 | CB-CH91-11 | -36 | -46 | Sand, fine to coarse grained quartz, trace shell, trace silt, gray (SP-SM). | 30 | - | - | - |
| 319 | CB-CH91-12A | -38.24 | -53.24 | Gray silt, trace wood (MH). | 4 | - | - | - |
| 321 | CB-CH92-1 | -31.7 | -44 | Clay, plastic, gray, damp, trace sand; shelly from -39.5 to -40.5; trace shell, dark gray, fat, isolated seams organic material from -40.5 to -42.5, shell bed, little silt from -42.5 to -43.0; fat clay from -43.0 to -44.0 (CH). | 4 | - | - | - |
| 322 | CB-CH92-1A | -37.5 | -45 | Clay, plastic, little silt, trace shell, damp, isolated seams organic material from -40.5 to -45.0 (CH). | 3 | - | - | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 323 | CB-CH92-2 | -40 | -45 | Sand, fine to medium, quartz, little silt, some shell, gray (SM). | 23 | - | - | - |
| 324 | CB-CH92-3 | -37.2 | -44.7 | Clay, plastic, trace shell, damp, slightly organic stain from -41.7 to -44.7 (CH). | 3 | - | - | - |
| 325 | CB-CH92-4 | -43.4 | -48.4 | Clay, plastic, gray, little sand with seams of sand from -43.4 to -44.9 (CH). | 0 | - | - | - |
| 326 | CB-CH92-5 | -42.4 | -47.4 | Clay, plastic, gray, trace shell wet from -42.0 to -43.9 (CH). | 0 | - | - | - |
| 327 | CB-CH92-6 | -31.5 | -43.5 | Clay, plastic, gray, trace shell, trace silt, damp, some seams of silt and fine sand (CH). | 3 | - | - | - |
| 328 | CB-CH92-7 | -42.8 | -47.6 | Clay, plastic, gray, trace shell, trace organic material, undisturbed, damp (CH). | 2 | - | - | - |
| 329 | CB-CH92-8 | -36.7 | -48.7 | Clay, plastic, wet, gray, trace shell. | 2 | - | - | - |
| 330 | CB-CH92-9 | -31.2 | -45 | Clay, plastic, trace shell, trace silt, damp, gray to light gray (CH). | 4 | - | - | - |
| 331 | CB-CH92-10 | -39.8 | -45.8 | Undisturbed damp plastic clay (CH). | 0 | - | - | - |
| 332 | CB-CH92-11 | -39.9 | -44.9 | Clay, plastic, damp, gray (CH). | 4 | - | - | - |
| 333 | CB-CH92-12 | -37.7 | -46.2 | Clay, plastic, wet, disturbed, gray (CH). | 0 | - | - | - |
| 337 | CB-CH92-16 | -24.3 | -43.7 | Clay, plastic, gray, damp, trace shell; isolated seams organic material from -40.5 to -45.0 (CH). | 2 | - | - | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 338 | CB-CH92-17 | -35.7 | -43.6 | Clay, plastic, very wet, soupy, dark gray, trace sand, little silt; isolated seams of silty sand from -38.7 to -40.2 (CH). | 0 | - | - | - |
| | | -43.6 | -44.7 | Sand, fine quartz, clayey, slight organic stain, dark brown (SC). | 3 | - | - | - |
| 339 | CB-CH92-18 | -23.3 | -43.7 | Clay, plastic, damp, little sand, trace shell, gray, trace sand and silt, trace organic material, damp from -24.7 to -43.7 (CH). | 0 | - | - | - |
| | | -43.7 | -44.7 | Sand, fine, quartz, clayey, some lenses medium hard, calcareous sandstone, trace shell, green/gray, damp (SC). | 14 | - | - | - |
| 340 | CB-CH92-19 | -19 | -44 | Clay, plastic, sandy, gray, damp, trace sand from -22.0 to -44.0, trace shell (CH). | 8 | - | - | - |
| | | -44 | -45 | Slightly plastic clay with thin lenses moderately hard sandstone (CL). | 7 | - | - | - |
| 341 | CB-CH92-20 | -37.4 | -44.4 | Clay, plastic, soupy, wet, little silt, dark gray, damp, trace shell, fat, gray from -38.9 to -44.4 (CH). | 0 | - | - | - |
| | | -44.4 | -44.9 | Sand, fine to medium quartz, little silt, some shell, many thin lenses, moderately hard calcareous sandstones (SM). | 10 | - | - | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 342 | CB-CH92-21 | -19.7 | -41 | Clay, plastic, gray, damp, trace shell, trace sand (CH). | 4 | - | - | - |
| | | -41 | -41.5 | Bed shelly sand with little silt (SM). | - | - | - | - |
| | | -41.5 | -43.5 | Limestone, soft weathered seams calcareous silt, tan, lenses medium hard (LS). | 43 | - | - | - |
| | | -43.5 | -45 | Sand, fine quartz, some silt, limy, some shell, light gray, damp (SM). | 27 | - | - | - |
| 343 | CB-CH92-22 | -37.5 | -44.5 | Sand, fine to medium, quartz, little silt, little shell, wet with lenses of moderately hard sandstone, shelly, light gray, some silt -42.0 to -44.5 (SM). | 49 | - | - | - |
| 344 | CB-CH92-23 | -36.9 | -44.4 | Sand, fine to medium quartz, shelly, little to some silt, light gray; shell bed from -39.9 to -40.9; silty, some shell, light gray from -40.0 to -44.4 (SM). | 14 | - | - | - |
| 345 | CB-CH92-24 | -37.5 | -43 | Sand, fine quartz, little to some shell, tan, little silt, dry (SM). | 68 | - | - | - |
| | | -43 | -46 | Silt, damp, trace shell, trace sand, slightly plastic, gray (ML). | 8 | - | - | - |
| 346 | CB-CH92-25 | -38.7 | -40.5 | Sand, fine to medium, quartz, little silt, isolated seams of clay, gray, shelly (SM). | 19 | - | - | - |
| | | -40.5 | -45.8 | Silt, slightly plastic, gray, trace sand, trace shell (ML). | 8 | - | - | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 347 | CB-CH-M2 | -43 | -52 | Clay, soft, soupy, slightly plastic, dark gray; slightly compacted, green, silty, plastic from -49.0 to -52.0 (CL). | 0 | - | - | - |
| 348 | CB-CH-M3 | -44 | -53 | Clay, soft, slightly plastic, dark gray, slightly silty (CL). | 0 | - | - | - |
| 349 | CB-CH-M4 | -43 | -51 | Clay, soft, soupy, dark gray to black, silty; -48.0 to -51.0 plastic, slightly sandy, dark gray (CL). | 0 | - | - | - |
| 350 | CB-CH-M5 | -38 | -49 | Clay, very plastic, fat, gray (CH). | 4 | - | - | - |
| 351 | CB-CH-M9 | -41.5 | -51.5 | Sand, dark gray, very silty, fine to medium quartz (SM); bed of sand from -42.5 to -43.5 (SP). | 4 | - | - | - |
| 352 | CB-CH-M10 | -41.5 | -42.5 | Sand, dark gray, loose, very silty (SM). | 0 | - | - | - |
| | | -42.5 | -49.5 | Sand, fine quartz, gray (SP). | 11 | - | - | - |
| 353 | CB-CH-M11 | -29 | -41 | Sand, fine quartz, slightly silty, gray; -37.0 to -41.0 fine to medium quartz, slightly shelly, slightly silty (SP). | 32 | - | - | - |
| | | -41 | -47 | Sand, fine to medium quartz, slightly silty to silty, gray (SM). | 107 | - | - | - |
| 354 | CB-CH-M12 | -37.5 | -41.5 | Sand, fine quartz, silty, slightly clayey, dark gray (SM). | 7 | - | - | - |
| | | -41.5 | -49 | Sand, fine quartz, clayey, slightly silty, seams (CL) clay, gray (SP-SC). | 7 | - | - | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|---------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 355 | CB-CH-M13 | -33.5 | -44.5 | Sand, fine to medium quartz, clean, dense, light gray (SP). | 27 | - | - | - |
| | | -44.5 | -47.5 | Sand, fine to medium quartz, clayey, slightly silty, slightly shelly, gray (SC). | 14 | - | - | - |
| 356 | CB-CH-M14 | -40 | -48 | Sand, fine to medium quartz, slightly silty to silty, gray (SP-SM). | 0 | - | - | - |
| 358 | CB-CH-FY83-M6 | -43 | -49 | Clay, dark gray, slightly plastic, silty, soft (CL). | 0 | - | - | - |
| 359 | CB-CH-FY83-M7 | -40.5 | -52.5 | Clay, drk gray to black, soupy, silty (CL). | 0 | - | - | - |
| 360 | CB-CH-FY83-M8 | -36.5 | -45.5 | Sand, fine to medium, quartz, gray, slightly silty (SP). | 65 | - | - | - |
| 361 | CB-CH-M1 | -44 | -52 | Clay, soft, soupy, slightly plastic, dark gray; -46.0 to -52.0 silty, plastic, green, lenses of soft weathered limestone (CL). | 0 | - | - | - |
| 366 | CB-CH01-01 | -44.4 | -45.2 | Silt, little fine quartz sand, gray (MH). | - | - | - | - |
| 367 | CB-CH01-02 | -38.3 | -40 | Sand, fine quartz, little silt, gray (SM). | - | - | - | - |
| | | -40 | -40.7 | Sand, fine quartz, some sand size shell fragments, gray (SP). | - | - | - | - |
| | | -40.7 | -42.1 | Clay, some fine quartz sand, gray (CH). | - | - | - | - |
| 368 | CB-CH01-03B | -42.6 | -44.9 | Silt, little fine quartz sand, gray (MH). | - | - | - | - |
| 369 | CB-CH01-04 | -43.3 | -46.3 | Silt, little fine quartz sand, gray (MH). | - | - | - | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 370 | CB-CH01-05 | -42.4 | -45.2 | Silt, some fine quartz sand, gray (MH). | - | - | - | - |
| 371 | CB-CH01-06 | -47 | -48 | Silt, trace fine quartz sand, dark gray (MH). | - | - | - | - |
| 372 | CB-CH01-07 | -45.8 | -48.1 | Silt, little fine quartz sand, dark gray (MH). | - | - | - | - |
| 373 | CB-CH01-08 | -46.6 | -47.9 | Sand, fine quartz, some silt, gray (SM). | - | - | - | - |
| 374 | CB-CH01-09 | -46.8 | -47.8 | Silt, some fine quartz sand, dark gray (MH). | - | - | - | - |
| 375 | CB-CH01-10 | -45.1 | -49.3 | Silt, some fine quartz sand, dark gray to gray (MH). | - | - | - | - |
| 376 | CB-CH01-11 | -49 | -52 | Silt, some fine quartz sand, dark gray (MH). | - | - | - | - |
| 377 | CB-CH01-12 | -49.5 | -51.2 | Silt, some fine quartz sand, dark gray (MH). | - | - | - | - |
| 378 | CB-CH01-13 | -48.7 | -49.5 | Silt, little fine quartz sand, dark gray (MH). | - | - | - | - |
| 379 | CB-CH01-14 | -46.3 | -50.3 | Sand, little quartz, gray (SP). | - | - | - | - |
| 380 | CB-CH01-15 | -46.7 | -53 | Sand, fine quartz, trace silt, gray (SP). | - | - | - | - |
| 381 | CB-CH01-16 | -41.1 | -44.4 | Clay, little fine quartz sand, gray (CH). | - | - | - | - |
| | | -44.4 | -46.1 | Sand, fine quartz, little silt, dark gray (SP-SM). | - | - | - | - |
| 382 | CB-CH01-17 | -44.6 | -49.9 | Silt, little fine quartz sand, dark gray to gray (MH). | - | - | - | - |
| 383 | CB-CH01-18 | -41.1 | -44.1 | Silt, little fine quartz sand, dark gray to gray (MH). | - | - | - | - |
| | | -44.1 | -48.6 | Clay, little fine quartz sand, gray (CH). | - | - | - | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 384 | CB-CH01-19 | -41.8 | -43.6 | Silt, dark gray (MH). | - | - | - | - |
| | | -43.6 | -51.6 | Clay, little fine quartz sand, gray (CH). | - | - | - | - |
| 385 | CB-CH01-20 | -43.8 | -47.3 | Silt, little fine quartz sand, dark gray (MH). | - | - | - | - |
| 386 | CB-CH01-21 | -44.9 | -47.6 | Silt, dark gray (MH). | - | - | - | - |
| 387 | CB-CH01-22 | -43.5 | -45.9 | Silt, some fine quartz sand, dark gray (MH). | - | - | - | - |
| 388 | CB-CH01-23 | -43.9 | -46.6 | Silt, little fine quartz sand, dark gray to gray (MH). | - | - | - | - |
| 389 | CB-CH01-24A | -44.9 | -48.7 | Silt, little fine quartz sand, dark gray to gray (MH). | - | - | - | - |
| 390 | CB-CH01-25B | -43.8 | -47.7 | Silt, little fine quartz sand, dark gray to gray (MH). | - | - | - | - |
| 391 | CB-CH01-26C | -44.1 | -47.9 | Silt, some fine quartz sand, gray (MH). | - | - | - | - |
| 397 | PC-1E | -33 | -51 | Gray to dark greenish gray sand clay to clay with occasional seams of fine sand, silt and shells. | - | - | - | - |
| 398 | TH-1E | -33 | -53 | Gray to dark greenish gray sand clay to clay with occasional seams of fine sand, silt and shells. | 0 | 52 | 92 | 45 |
| 399 | TH-4A | -33 | -51 | Gray to dark greenish gray sand clay to clay with occasional seams of fine sand, silt and shells. | 4 | 76 | 97 | 47 |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 400 | TH-4B | -30 | -53 | Gray to dark greenish gray sand clay to clay with occasional seams of fine sand, silt and shells. | 4 | 78 | 98 | 55 |
| 414 | TH-20 | -29 | -41 | Gray to dark greenish gray sandy clay to clay with occasional seams of fine sands, silt and shells. | 1 | 75 | 74 | 75 |
| | | -41 | -48 | Gray to dark gray or dark brown slightly silty to silty fine sand with shells, occasionally cemented. | 33 | - | - | - |
| 415 | TH-21 | -30 | -38 | Gray to dark gray or dark brown slightly silty to silty fine sand with shells, occasionally cemented. | 43 | - | - | - |
| 416 | TH-22 | -36 | -38 | Gray to dark greenish gray slightly clay to clayey fine sand with shell fragment and occasional trace of cemented sand. | 0 | - | - | - |
| 421 | TH-30 | -33 | -38 | Gray to dark greenish gray sandy clay to clay with occasional seams of fine sands, silt and shells. | 3 | - | + | - |
| 448 | PC-10 | -35 | -51 | Gray to dark greenish, gray sandy clay to clay with occasional seams of fine sands, silt and shells. | - | - | + | - |
| 457 | PC-19 | -39 | -72 | Gray to dark greenish gray very clayey fine sand to very sandy clay with shells. | - | - | + | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 458 | PC-20 | -38 | -46 | Gray to dark greenish gray or brown fine sand with shells, occasionally cemented. | - | - | - | - |
| 459 | PC-21 | -39 | -48 | Gray to dark greenish gray or brown fine sand with shells, occasionally cemented. | - | - | - | - |
| 639 | TH-37 | -32.9 | -36.9 | Dark gray silty clay with seams of fine sand and shell (CH). | 3 | - | - | - |
| 640 | TH-38 | -21.8 | -30.8 | Dark gray slightly silty fine sand with shell fragments (SP-SM). | 4 | - | - | - |
| 641 | TH-39 | -30 | -38 | Gray silty fine sand with shell (SM). | 24 | - | - | - |
| 642 | TH-40 | -33.1 | -35.6 | Light gray slightly silty fine sand with shell (SP-SM). | 14 | - | - | - |
| 643 | TH-41 | -36.7 | -40.7 | Gray sand clay (CH). | 5 | - | - | - |
| 644 | TH-42 | -36.3 | -38.8 | Dark gray slightly sandy clay (CH). | 3 | - | - | - |
| 652 | TH-50 | -30.5 | -32.5 | Dark greenish gray silty sand with shell fragments (SM). | 7 | - | - | - |
| 677 | TH-70 | 37 | 41 | Gray fine sand with shells (SP) | 45 | - | - | - |
| | | 41 | 47.5 | Gray sandy clay (CL) | 7 | - | - | - |
| 743 | THR-1 | -32.9 | -36.9 | Dark gray clay with shell (CH) | 3 | - | - | - |
| 744 | THR-2 | -32.6 | -35.1 | Dark gray clay with shell (CH) | 14 | - | - | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 751 | THW-1 | 37 | 42.5 | Dark gray slightly silty fine sand with shell (SP-SM). | 23 | 24 | - | - |
| | | 42.5 | 46.4 | Gray clay and clayey fine sand with shell (CH, SC) | 0 | - | - | - |
| 752 | THW-2 | 37.5 | 42.5 | Dark grayish brown clayey fine sand (SC). | 4 | - | - | - |
| | | 37.5 | 47.5 | Gray fine sand with shell (SP) | 39 | - | - | - |
| 753 | THW-3 | 39 | 48.5 | Gray clay with shell (CH) | 7 | 83 | 99 | - |
| 756 | THW-6 | 17.5 | 21 | Gray clayey fine sand (SC) | 3 | - | - | - |
| 757 | THW-7 | 17.5 | 21 | Gray slightly silty with shell (SP-SM) | 7 | - | - | - |
| 848 | TH-1H | -39.5 | -44.5 | Gray clayey fine sand (SC) | 2 | - | - | - |
| | | -44.5 | -54.5 | Gray sandy clay with shell (CL) | 2 | - | - | - |
| 849 | TH-2H | -40 | -45 | Gray clay with trace of shell (CH) | 3 | - | - | - |
| 903 | B-1 | -27.5 | -36.5 | Dark gray clay with traces of fine sand and shell fragments (CH). | 0 | 80 | - | - |
| 938 | TH-1 | -42.5 | -51 | Dark gray silty clay (CH) | 0 | - | - | - |
| 939 | TH-2 | -27.5 | -45.5 | Dark gray silty clay with traces of shells (CH) | 0 | 94 | 89 | - |
| 978 | TH-13 | -29 | -48 | Gray clay (CH) | 2 | 76 | 94 | - |
| 982 | TH-3 | -29.5 | -49.6 | Gray clay with shell (CH) | 2 | 70 | 97 | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 983 | TH-4 | -36.8 | -51.8 | Gray clay (CH) | 0 | 79 | 97 | - |
| 1012 | TH-16 | -38 | -61 | Gray to dark greenish gray sandy clay to clay with occasional seams of fine sands, silt and shells. | 6 | 40 | 69 | - |
| 1013 | THW-8 | -29.4 | -36.9 | Gray fine sand (SP). | 38 | - | - | - |
| 1014 | THW-9 | -34 | -35 | Brown fine sand with shell (SP). | 10 | - | - | - |
| 1015 | THW-10 | -36 | -37.5 | Light grayish-white fine sand with shell (SP). | 56 | - | - | - |
| 1016 | THW-11 | -34 | -34.3 | Gray fine sand with shell (SP). | 19 | - | - | - |
| 1017 | THW-12 | -31.9 | -34.9 | Dark greenish brown to gray fine sand (SP). | 16 | - | - | - |
| 1018 | THW-13 | -36 | -37.4 | Gray clayey fine sand with shell (SC). | 13 | - | - | - |
| 1019 | THW-14 | -33.2 | 36.2 | Light gry fine sand with shell (SP). | 33 | - | - | - |
| 1020 | THW-15 | -33.7 | -36.2 | Gray fine sand with shell (SP) | 22 | - | - | - |
| 1021 | THW-16 | -32.5 | -35.5 | Dark brown to gray fine sand (SP). | 19 | - | - | - |
| 1022 | THW-17 | -25.7 | -31.7 | Gray clay (CL). | 0 | - | - | - |
| 1040 | TH-N | -19.5 | -22.5 | Gray slightly silty fine sand (SP-SM) | 2 | - | - | - |
| 1041 | TH-O | -0.8 | -19.8 | Gray fine sand (SP). | 23 | - | - | - |
| 1051 | ND-1 | -27.2 | -46.2 | Gray soft clay (CL). | 0 | - | - | - |
| 1052 | CD-1 | -29.8 | -46.8 | Gray soft clay (CL). | 2 | - | - | - |

Table 4. Index Testing Data of Previous Marine Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Soil Description | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 1053 | BT-1 | -30.6 | -50.1 | Gray soft clay (CL). | 1 | - | - | - |
| 1096 | TH-4D | -35.2 | -42.2 | Gray clay with traces of shell fragments and organics (CH) | 3 | - | - | - |
| 1204 | SJW-1 | -32 | -63 | Greenish gray silty clay (CH). | 2 | 74 | 99 | 52 |
| 1205 | SJW-2 | -32 | -63 | Greenish gray silty clay (CH). | 3 | 73 | 99 | 72 |
| 1206 | SJW-3 | -34 | -64.5 | Greenish gray sandy clay silty clay to silty clay (CL/CH). | 3 | 64 | 88 | 39 |
| 1207 | TH-1 | -40 | -76 | Fat clay (CH) | 3 | - | - | - |
| 1208 | TH-1A | -35 | -47 | Fat clay (CH) | 2 | - | - | - |
| 1209 | TH-2 | -37 | -54 | Fat clay (CH) | 3 | - | - | - |
| 1210 | TH-3 | -34 | -57 | Fat clay (CH) | 4 | - | - | - |
| 1211 | TH-5 | -38.5 | -56 | Fat clay (CH) | 2 | - | - | - |
| 1212 | TH-6 | -38 | -61 | Fat clay (CH) | 3 | - | - | - |
| 1319 | TH-A | -31.5 | -42.5 | Dark gray clay (CH) | 1 | 96 | 98 | - |
| | | -42.5 | -47 | Dark gray sandy clay (CL/CH) | 2 | - | - | - |
| 1320 | TH-B | -40 | -43 | Gray silty clay with traces of shells (CL/CH) | 0 | - | - | - |
| | | -43 | -47 | Gray sandy clay with clayey sand lenses (CL/CH) | 3 | 24 | 58 | - |
| 1345 | TH-3 | -38.9 | -41.9 | Shell fragments with gray clayey sand | 7 | - | - | - |

3.7 Summary of Past Landside Boring Programs

A total of 70 borings have been conducted by Ardaman & Associates, Inc., Law Engineering Testing Company and Universal Engineering Testing Company. The tables below summarize the past field investigations conducted for previous landside construction projects. The individual test boring logs are presented in Appendices 3 and 4. The locations of these borings are presented in Figures 2 and 3.

Table 5. Location, Elevation and Depths of Previous Landside Borings

| Boring Reference No. | Boring Name | Boring Performed By: | State Plane NAD 83 | | Surface Elevation (feet, MLLW) | Total Depth (feet) | End of Boring Elevation (feet, MLLW) | Date of Boring |
|----------------------|-------------|----------------------|--------------------|----------|--------------------------------|--------------------|--------------------------------------|----------------|
| | | | Eastings | Northing | | | | |
| 33 | CN-1 | USACE | 783652 | 1482599 | 12.9 | 95 | -82.1 | Apr-56 |
| 67 | 1S | UNI | 777478 | 1481422 | - | 30 | - | - |
| 75 | 4-N | UNI | 777730 | 1483122 | - | 49 | - | - |
| 163 | R-385 | LAW | 779001 | 1482419 | 10 | 20.5 | -10.5 | Jan-75 |
| 409 | TH-15 | AAI | 777749 | 1483666 | 8 | 110 | -102 | Jul-84 |
| 410 | TH-16 | AAI | 777753 | 1482869 | 7 | 110 | -103 | Jul-84 |
| 414 | TH-20 | AAI | 778349 | 1481549 | 10 | 80 | -70 | Jul-84 |
| 447 | PC-9 | AAI | 777729 | 1483064 | 9 | 93 | -84 | Jul-84 |
| 459 | PC-21 | AAI | 778271 | 1481553 | 11 | 104 | -93 | Jul-84 |
| 505 | TH-A | AAI | 778594 | 1483149 | 13.1 | 20 | -6.9 | Apr-85 |
| 506 | TH-B | AAI | 778561 | 1482689 | 9.2 | 20 | -10.8 | Apr-85 |
| 507 | TH-C | AAI | 778976 | 1483087 | 14.7 | 20 | -5.3 | Apr-85 |
| 508 | TH-D | AAI | 778982 | 1482679 | 9.8 | 21 | -11.2 | Apr-85 |
| 510 | TH-F | AAI | 779381 | 1482679 | 8.3 | 20 | -11.7 | Apr-85 |
| 512 | TH-H | AAI | 778776 | 1482886 | 10.3 | 50 | -39.7 | Apr-85 |
| 513 | TH-I | AAI | 779183 | 1482853 | 10.3 | 50 | -39.7 | Apr-85 |
| 578 | PF-1 | AAI | 778817 | 1479859 | 7 | 5.5 | 1.5 | - |
| 678 | TH-71 | AAI | 777720 | 1482998 | 7 | 91 | -84 | Aug-85 |
| 754 | THW-4 | AAI | 778566 | 1482423 | 9.8 | 21 | -11.2 | Apr-86 |
| 755 | THW-5 | AAI | 778871 | 1482389 | 9.9 | 96 | -86.1 | Apr-86 |
| 758 | THC-5 | AAI | 778830 | 1482600 | 8.1 | 91 | -82.9 | Apr-86 |
| 769 | THY-1 | AAI | 778418 | 1483319 | 12.8 | 12 | 0.8 | Sep-86 |
| 784 | TH-68 | AAI | 779228 | 1482396 | 8.3 | 66 | -57.7 | Nov-86 |
| 785 | TH-69 | AAI | 779040 | 1482383 | 8.4 | 91 | -82.6 | Nov-86 |
| 904 | B-2 | AAI | 780315 | 1481353 | 8.4 | 15 | -6.6 | Sep-89 |
| 905 | B-3 | AAI | 780531 | 1481385 | 9.2 | 15 | -5.8 | Sep-89 |
| 984 | THD-1 | AAI | 779292 | 1481543 | 7.8 | 71.5 | -63.7 | Feb-91 |
| 985 | THD-2 | AAI | 777369 | 1481422 | 7.5 | 76.5 | -69 | Feb-91 |
| 986 | THD-3 | AAI | 776614 | 1481422 | 8 | 71.5 | -63.5 | Feb-91 |
| 1036 | TH-J | AAI | 777797 | 1483518 | 9.3 | 31 | -21.7 | Sep-91 |
| 1036 | TH-L | AAI | 777850 | 1483019 | 9.4 | 31 | -21.6 | Sep-91 |
| 1039 | TH-M | AAI | 778300 | 1483021 | 11.8 | 31 | -19.2 | Sep-91 |
| 1042 | TH-1 | AAI | 778708 | 1482573 | 10.1 | 31 | -20.9 | Aug-92 |
| 1043 | TH-2 | AAI | 778441 | 1482761 | 9.9 | 10.5 | -0.8 | Aug-92 |
| 1044 | TH-3 | AAI | 778422 | 1482712 | 10.1 | 10.5 | -0.4 | Sep-92 |
| 1045 | TH-4 | AAI | 778487 | 1482672 | 9.5 | 10.5 | -1 | Sep-92 |
| 1046 | TH-5 | AAI | 778552 | 1482632 | 9.2 | 10.5 | -1.3 | Sep-92 |
| 1047 | TH-6 | AAI | 778617 | 1482593 | 10 | 10.5 | -0.5 | Sep-92 |
| 1048 | TH-7 | AAI | 778672 | 1482563 | 9.9 | 10.5 | -0.6 | Sep-92 |

Table 5. Location, Elevation and Depths of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Boring Performed By. | State Plane NAD 83 | | Surface Elevation (feet, MLLW) | Total Depth (feet) | End of Boring Elevation (feet, MLLW) | Date of Boring |
|----------------------|-------------|----------------------|--------------------|----------|--------------------------------|--------------------|--------------------------------------|----------------|
| | | | Eastings | Northing | | | | |
| 1049 | TH-8 | AAI | 778723 | 1482533 | 9.9 | 10.5 | -0.6 | Sep-92 |
| 1050 | TH-9 | AAI | 778773 | 1482504 | 10.3 | 10.5 | -0.2 | Sep-92 |
| 1067 | CR-9 | AAI | 778449 | 1483172 | 13.8 | 15 | -1.2 | Oct-92 |
| 1068 | CR-10 | AAI | 778649 | 1483173 | 14 | 15 | -1 | Oct-92 |
| 1072 | CR-14 | AAI | 778450 | 1482992 | 12.3 | 15 | -2.7 | Oct-92 |
| 1073 | CR-15 | AAI | 778650 | 1482993 | 13.8 | 15 | -1.2 | Oct-92 |
| 1074 | CR-16 | AAI | 778850 | 1482994 | 13.8 | 15 | -1.2 | Oct-92 |
| 1075 | CR-17 | AAI | 779050 | 1482995 | 14.3 | 15 | -0.7 | Oct-92 |
| 1076 | CR-18 | AAI | 779230 | 1482996 | 15.6 | 15 | 0.6 | Oct-92 |
| 1167 | B-3 | AAI | 778444 | 1481352 | 10.6 | 11 | -0.4 | May-93 |
| 1168 | B-4 | AAI | 778949 | 1481365 | 8.5 | 11 | -2.5 | May-93 |
| 1169 | B-5 | AAI | 779519 | 1481368 | 8.3 | 11 | -2.7 | May-93 |
| 1173 | B-9 | AAI | 779968 | 1481445 | 9.2 | 11 | -1.8 | May-93 |
| 1346 | TH-4 | AAI | 779536 | 1481512 | 9 | 51 | -4.2 | Aug-00 |
| 1347 | TH-5 | AAI | 779804 | 1481520 | 8.2 | 51 | -42.8 | Aug-00 |
| 1428 | GR-1 | AAI | 778321 | 1483316 | 13.5 | 10 | 3.5 | Jun-01 |
| 1464 | TH-1 | AAI | 778759 | 1481466 | 8.5 | 60 | -51.5 | Dec-02 |
| 1465 | TH-2 | AAI | 778830 | 1481470 | 8.5 | 60 | -51.5 | Dec-02 |
| 1471 | TH-1 | AAI | 776579 | 1481337 | 10 | 25 | -15 | Aug-03 |
| 1472 | TH-2 | AAI | 776909 | 1481354 | 10 | 105 | -95 | Aug-03 |
| 1473 | TH-3 | AAI | 777149 | 1481370 | 9.5 | 40 | -30.5 | Aug-03 |
| 1474 | TH-4 | AAI | 777549 | 1481317 | 9.5 | 25 | -15.5 | Aug-03 |

ABBREVIATIONS: UNI Universal Engineering Testing Company
LAW Law Engineering Testing Company
AAI Ardaman & Associates, Inc.

Table 6. Index Testing Data of Previous Landside Borings

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 33 | CN-1 | 12.9 | -10.1 | SP - Sand, fine/medium, quartz & shell, tan. | 43 | - | - | - |
| | | -10.1 | -13.4 | SP-SM- Sand, fine, slightly calcareous, quartz & shell, 5% consolidated. | - | - | - | - |
| | | -13.4 | -13.9 | Shell, sand. | - | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 33 | CN-1 | -13.9 | -15.7 | SP - Sand, fine/medium, quartz & shell. | 30 | - | - | - |
| | | -15.7 | -23.4 | SP-SM - Sand, fine, silty, calcareous, slightly shelly with thin beds of shell and medium sand. | 26 | - | - | - |
| | | -23.4 | -27.1 | SM - Sand, fine, silty, slightly shelly, gray, slightly calcareous. | 118 | - | - | - |
| | | -27.1 | -30.9 | ML - Silt, very slightly shelly, gray. | 3 | - | - | - |
| | | -30.9 | -49.8 | CL - Clay, silty, very slightly shelly, slightly organic. | 2 | - | - | - |
| | | -49.8 | -51.3 | SM - Sand, organic, very fine, silty. | 20 | - | - | - |
| | | -51.3 | -72.1 | SM - Sand, very fine, silty. Very silty, very shelly from -57.1 to -62.9. | 14 | - | - | - |
| | | -72.1 | -82.1 | ML - Silt, shelly. | 5 | - | - | - |
| 67 | 1S | 10 | 4 | Grey sand and shell. | 11 | - | - | - |
| | | 4 | -0.5 | Grey sand and shell with trace of silt. | 12 | - | - | - |
| | | -0.5 | -6.5 | Fine grey sand and shell. | 12 | - | - | - |
| | | -6.5 | -14.5 | Grey silt with trace of silt and shell. | 6 | - | - | - |
| | | -14.5 | -20 | Grey sand with trace of shell. | 14 | - | - | - |
| 75 | 4-N | 10 | 3 | Grey silty sand & shell | 8 | - | - | - |
| | | 3 | -2 | Grey silt & shell | 2 | - | - | - |
| | | -2 | -21 | Grey sand & shell | 7 | - | - | - |
| | | -21 | -28 | Grey silt | 4 | - | - | - |
| | | -28 | -34 | Coarse grey sand and shell | 14 | - | - | - |
| | | -34 | -40 | Grey clayey silt | 8 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 163 | R-385 | 10 | 9 | Gray fine to medium sand with shell | - | - | - | - |
| | | 9 | 7 | Loose gray fine to medium sand with clayey fine sand lenses and shell | 4 | - | - | - |
| | | 7 | 4.5 | Firm gray fine to medium sand with clayey fine sand lenses and shell | 13 | - | - | - |
| | | 4.5 | 2 | Very loose gray slightly silty fine to medium sand with shell and asphalt concrete fragments | 3 | - | - | - |
| | | 2 | -3 | Very loose gray slightly silty fine sand with some shell fragments. | 2 | - | - | - |
| | | -3 | -7 | Very loose gray silty clayey fine sand with trace of shell fragments. | 0 | - | - | - |
| | | -7 | -10.6 | Firm gray fine sand with trace of shell fragments. | 18 | - | - | - |
| 409 | TH-15 | 8.5 | -6 | Gray to dark gray or dark brown slightly silty to silty fine sand with shells. | 11 | - | - | - |
| | | -6 | -19 | Gray to dark greenish gray or brown fine sand with shells, occasionally cemented. | 14 | - | - | - |
| | | -19 | -40 | Gray to dark gray or dark brown slightly silty to silty fine sand with shells. | 14 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 409 | TH-15 | -40 | -59 | Gray to dark greenish gray sandy clay to clay with occasional seams of fine sands, silt and shells. | 6 | 37 | 44 | - |
| | | -59 | -64 | Gray to dark gray or dark brown slightly silty to silty fine sand with shells. | 8 | - | - | - |
| | | -64 | -79 | Gray to dark greenish gray very clayey fine sand to very sandy clay with shells. | 9 | 35 | 34 | - |
| | | -79 | -94 | Gray to dark gray or dark brown slightly silty to silty fine sand with shells. | 17 | - | - | - |
| | | -94 | -102.5 | Gray to dark greenish gray slightly clayey to clayey fine sand with shell fragments and occasional traces of cemented sand | 23 | - | - | - |
| 410 | TH-16 | 8.5 | -4.5 | Gray to dark gray or dark brown slightly silty to silty fine sand with shells. | 14 | - | - | - |
| | | -4.5 | -9.5 | Gray to dark greenish gray or brown fine sand with shells, occasionally cemented. | 7 | - | - | - |
| | | -9.5 | -15 | Gray to dark gray or dark brown slightly silty to silty fine sand with shells. | 1 | - | - | - |
| | | -15 | -20 | Gray to dark greenish gray slightly clayey to clayey fine sand with shell fragments and occasional traces of cemented sand | 7 | - | - | - |
| | | -20 | -37 | Gray to dark greenish gray or brown fine sand with shells, occasionally cemented. | 20 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 414 | TH-20 | -28 | -32 | Gray to dark gray or dark brown slightly silty to silty fine sand with shells. | 0 | - | - | - |
| | | -32 | -36 | Gray to dark greenish gray or brown fine sand with shells, occasionally cemented. | 43 | - | - | - |
| 447 | PC-9 | 8 | -7 | Gray to dark gray or dark brown slightly silty to silty fine sand with shells. | - | - | - | - |
| | | -7 | -40 | Gray to dark greenish gray or brown fine sand with shells, occasionally cemented. | - | - | - | - |
| | | -40 | -64 | Gray to dark greenish gray sandy clay to clay with occasional seams of fine sands, silt and shells. | - | - | - | - |
| | | -64 | -67 | Gray to dark gray or dark brown slightly silty to silty fine sand with shells. | - | - | - | - |
| | | -67 | -79 | Gray to dark greenish gray very clayey fine sand to very sandy clay with shells. | - | - | - | - |
| | | -79 | -84 | Gray to dark gray or dark brown slightly silty to silty fine sand with shells. | - | - | - | - |
| 459 | PC-21 | 11 | -18 | Gray to dark greenish gray or brown fine sand with shells, occasionally cemented. | - | - | - | - |
| | | -18 | -21 | Gray to dark greenish gray slightly clayey to clayey fine sand with shell fragments and occasional traces of fine sand. | - | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 459 | PC-21 | -21 | -27 | Gray to dark greenish gray or brown slightly silty to silty fine sand with shells. | - | - | - | - |
| | | -27 | -39 | Gray to dark greenish gray sand clay to clay with occasional seams of fine sand, silt and shells. | - | - | - | - |
| | | -39 | -47.5 | Gray to dark greenish gray or brown fine sand with shells, occasionally cemented. | - | - | - | - |
| | | -47.5 | -94 | Gray to dark greenish gray very clayey fine sand to very sand clay with shells. | - | - | - | - |
| 505 | TH-A | 13 | 9 | Light gray to brown fine sand with shells and traces of clay. | 3 | - | - | - |
| | | 9 | 7 | Light gray sandy clay to clay with seams of clayey fine sand. | 2 | 39 | 49 | - |
| | | 7 | 5.5 | Brown to grayish brown fine sand with traces of shells. | 7 | - | - | - |
| | | 5.5 | -7 | Gray slightly silty to silty fine sand with traces of shells. | 1 | - | - | - |
| 506 | TH-B | 9.5 | 7 | Light gray to brown fine sand with shells and traces of clay. | 7 | - | - | - |
| | | 7 | 4 | Gray to grayish brown slightly clayey to clayey fine sand with lenses of clay and shells. | 7 | 38 | 35 | - |
| | | 4 | 1 | Brown to grayish brown fine sand with traces of shells. | 7 | - | - | - |
| | | 1 | -12 | Gray slightly silty to silty fine sand with traces of shells. | 6 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 410 | TH-16 | -37 | -60 | Gray to dark greenish gray sandy clay to clay with occasional seams of fine sands, silt and shells. | 5 | 40 | 69 | - |
| | | -60 | -65 | Gray to dark greenish gray slightly clayey to clayey fine sand with shell fragments and occasional traces of cemented sand | 7 | - | - | - |
| | | -65 | -75 | Gray to dark greenish gray very clayey fine sand to very sandy clay with shells. | 6 | 35 | 41 | - |
| | | -75 | -80 | Gray to dark greenish gray slightly clayey to clayey fine sand with shell fragments and occasional traces of cemented sand | 22 | - | - | - |
| | | -80 | -95 | Gray to dark greenish gray or brown fine sand with shells, occasionally cemented. | 31 | - | - | - |
| | | -95 | -103 | Gray to dark greenish gray slightly clayey to clayey fine sand with shell fragments and occasional traces of cemented sand | 21 | - | - | - |
| 414 | TH-20 | 10 | -22 | Gray to dark gray or dark brown slightly silty to silty fine sand with shells. | 6 | - | - | - |
| | | -22 | -28 | Gray to dark greenish gray sandy clay to clay with occasional seams of fine sand, silt and shells. | 5 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 507 | TH-C | 14.5 | 13 | Light gray to brown fine sand with shells and traces of clay. | 2 | - | - | - |
| | | 13 | 11 | Gray to grayish brown slightly clayey to clayey fine sand with lenses of clay and shells. | 14 | - | - | - |
| | | 11 | 9 | Gray to grayish brown sandy clay to clay with traces of shells. | 1 | 32 | 72 | 61 |
| | | 9 | 7 | Grayish to brown slightly clayey to clayey fine sand with shells and occasional seams of clay. | 7 | - | - | - |
| | | 7 | 5 | Gray slightly silty to silty fine sand with traces of shells. | 0 | - | - | - |
| | | 5 | 4 | Grayish brown slightly silty to silty fine sand with shells and occasional pockets of clay. | 0 | - | - | - |
| | | 4 | 2.5 | Gray sandy silt with seams of clay and traces of shells. | 0 | - | - | - |
| | | 2.5 | -0.5 | Brown to grayish brown fine sand with traces of shells. | 11 | - | - | - |
| | | -0.5 | -3.5 | Gray slightly silty to silty fine sand with traces of shells. | 3 | - | - | - |
| | | -3.5 | -5.5 | Brown to grayish brown fine sand with traces of shells. | 14 | - | - | - |
| 508 | TH-D | 9.5 | 7 | Gray to grayish brown slightly clayey to clayey fine sand with lenses of clay and shells. | 8 | - | - | - |
| | | 7 | 5.5 | Grayish to brown slightly silty clayey to silty fine sand with shells and occasional pockets of clay. | 8 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 508 | TH-D | 5.5 | -5 | Gray slightly silty to silty fine sand with traces of shells. | 4 | - | - | - |
| | | -5 | -8 | Gray to grayish brown sandy clay to clay with traces of shells. | 6 | - | - | - |
| | | -8 | -9.5 | Gray slightly silty to silty fine sand with traces of shells. | 6 | - | - | - |
| | | -9.5 | -11 | Brown to grayish brown fine sand with traces of shells. | 18 | - | - | - |
| 510 | TH-F | 8.5 | 7 | Gray to grayish brown slightly clayey to clayey fine sand with lenses of clay and shells. | 9 | - | - | - |
| | | 7 | -0.5 | Brown to grayish brown fine sand with traces of shells. | 9 | - | - | - |
| | | -0.5 | -3.5 | Gray slightly silty to silty fine sand with traces of shells. | 7 | - | - | - |
| | | -3.5 | -5 | Brown to grayish brown fine sand with traces of shells. | 14 | - | - | - |
| | | -5 | -10.5 | Gray to brown slightly clayey to clayey fine sand with shells and occasional seams of clay. | 1 | 40 | 22 | - |
| | | -10.5 | -12 | Gray slightly silty to silty fine sand with traces of shells. | 3 | - | - | - |
| 512 | TH-G | 29 | 20 | Grayish brown slightly silty to silty fine sand with shells and occasional pockets of clay. | 5 | - | - | - |
| | | 20 | 18.5 | Gray slightly silty to silty fine sand with traces of shells. | 3 | - | - | - |
| | | 18.5 | 17.5 | Gray to grayish brown sandy clay to clay with traces of shells. | 3 | 67 | 94 | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 512 | TH-G | 17.5 | 10.5 | Gray slightly silty to silty fine sand with traces of shells. | 7 | - | - | - |
| | | 10.5 | 9 | Gray to grayish brown sandy clay to clay with traces of shells. | 2 | - | - | - |
| | | 9 | -15 | Gray slightly silty to silty fine sand with traces of shells. | 6 | - | - | - |
| | | -15 | -19 | Brown to grayish brown fine sand with traces of shells. | 61 | - | - | - |
| | | -19 | -33 | Gray to grayish brown sandy clay to clay with traces of shells. | 1 | 88 | 96 | - |
| | | -33 | -39.5 | Gray to brown slightly clayey to clayey fine sand with shells and occasional seams of clay. | 3 | - | - | - |
| | | -39.5 | -48.5 | Gray to grayish brown very clayey fine sand to very sandy clay with shells. | 9 | 24 | 21 | - |
| | | -48.5 | -56 | Gray sandy silt with seams of clay and traces of shells | 3 | - | - | - |
| | | -56 | -68 | Gray to grayish brown very clayey fine sand to very sandy clay with shells. | 6 | 32 | 19 | - |
| | | -68 | -87 | Gray slightly silty to silty fine sand with traces of shells. | 32 | - | - | - |
| 513 | TH-I | 10 | 7 | Grayish brown slightly silty to silty fine sand with shells and occasional pockets of clay. | 5 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 513 | TH-I | 7 | 4 | Brown to grayish brown fine sand with traces of shells. | 4 | - | - | - |
| | | 4 | -7 | Gray slightly silty to silty fine sand with traces of shells. | 6 | - | - | - |
| | | -7 | -12 | Gray to brown slightly clayey to clayey fine sand with shells and occasional seams of clay. | 2 | - | - | - |
| | | -12 | -18 | Gray slightly silty to silty fine sand with traces of shells. | 11 | - | - | - |
| | | -18 | -34 | Gray to grayish brown sandy clay to clay with traces of shells. | 1 | 90 | 99 | 66 |
| | | -34 | -39 | Gray slightly silty to silty fine sand with | 24 | - | - | - |
| 578 | PF-1 | 7.5 | 4.5 | Gray or brown fine sand. | - | - | - | - |
| | | 4.5 | 4 | Gray or brown slightly silty fine sand. | - | - | - | - |
| | | 4 | 3 | Gray or brown fine sand. | - | - | - | - |
| | | 3 | 1.5 | Gray or brown clay (CH). | - | - | - | - |
| 678 | TH-71 | 7.9 | 5.4 | Brown fine sand with shells (SP) | 32 | - | - | - |
| | | 5.4 | 0.4 | Gray clayey fine sand (SC) | 30 | - | - | - |
| | | 0.4 | -4.6 | Gray slightly clayey fine sand with shells (SM-SC) | 5 | - | - | - |
| | | -4.6 | -9.6 | Gray fine sand with shells (SP) | 5 | - | - | - |
| | | -9.6 | -14.6 | Gray silty fine sand (SM) | 6 | - | - | - |
| | | -14.6 | -19.6 | Gray clayey fine sand (SC) | 2 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 678 | TH-71 | -19.6 | -24.6 | Gray silty fine sand (SM) | 8 | - | - | - |
| | | -24.6 | -34.6 | Grayish brown fine sand (SP) | 42 | - | - | - |
| | | -34.6 | -52.1 | Gray clay with traces of shell (CH) | 5 | - | - | - |
| | | -52.1 | -69.6 | Gray sandy clay with shells (CL) | 9 | - | - | - |
| | | -69.6 | -77.1 | Gray clayey fine sand with shells (SC) | 7 | - | - | - |
| | | -77.1 | -83.1 | Gray sandy clay (CL) | 5 | - | - | - |
| 754 | THW-4 | 9.6 | 8.1 | Brown fine sand and shell with limestone (SP) | 10 | - | - | - |
| | | 8.1 | 5.1 | Light brown limestone | 52 | - | - | - |
| | | 5.1 | 3.6 | Brown fine sand with shells (SP) | 68 | - | - | - |
| | | 3.6 | 2.1 | Brown slightly silty fine sand with shell (SP-SM) | 44 | - | - | - |
| | | 2.1 | -2.9 | Gray slightly silty fine sand with shell (SP-SM) | 22 | - | - | - |
| | | -2.9 | -7.9 | Gray clayey fine sand with shells (SC) | 5 | - | - | - |
| | | -7.9 | -17.9 | Gray fine sand with shell (SP) | 36 | - | - | - |
| | | -17.9 | -22.9 | Gray slightly silty fine sand (SP-SM) | 9 | - | - | - |
| | | -22.9 | -32.9 | Gray clay with traces of clayey fine sand and shell (CH) | 0 | 77 | 99 | - |
| | | -32.9 | -37.9 | Gray fine sand with shells (SP) | 54 | - | - | - |
| | | -37.9 | -42.9 | Light gray slightly silty fine sand with shell (SP-SM) | 37 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|---|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 754 | THW-4 | -42.9 | -48.9 | Gray sandy clay with shells (CL) | 3 | 51 | - | - |
| | | -48.9 | -52.9 | Gray clayey fine sand with shells (SC) | 5 | - | - | - |
| | | -52.9 | -57.9 | Gray sandy clay with shells (CL) | 8 | - | - | - |
| | | -57.9 | -66.4 | Gray clayey fine sand with shells (SC) | 7 | - | - | - |
| 755 | THW-5 | 9.9 | 5.9 | Brown fine sand and shell with traces of clayey fine sand (SP) | 16 | - | - | - |
| | | 5.9 | 2.4 | Gray fine sand and shell (SP) | 14 | - | - | - |
| | | 2.4 | 0.9 | Gray silty fine sand and shell (SM) | 3 | - | - | - |
| | | 0.9 | -7.6 | Gray clayey fine sand with shells (SC) | 2 | - | - | - |
| | | -7.6 | -12.6 | Gray fine sand (SP) | 17 | - | - | - |
| | | -12.6 | -17.6 | Gray clay and shell (CH) | 2 | - | - | - |
| | | -17.6 | -22.6 | Gray sandy clay (CL) | 4 | - | - | - |
| | | -22.6 | -32.6 | Gray clay (CH) | 1 | 93 | 99 | - |
| | | -32.6 | -42.6 | Gray silty fine sand and shell (SM) | 29 | - | - | - |
| | | -42.6 | -48.6 | Gray clayey fine sand and shell (SC) with seams of gray clay | 0 | 40 | 44 | - |
| | | -48.6 | -82.6 | Gray clayey fine sand and shell (SC) | 8 | - | - | - |
| -82.6 | -91.1 | Gray silty fine sand with cemented fine sand and shell (SM) | 32 | - | - | - | | |
| 758 | THC-5 | 8.1 | 6.6 | Very light brown limestone (road base materials) | 44 | - | - | - |
| | | 6.6 | 3.6 | Grayish brown silty fine sand with shell (SP-SM) | 20 | 16 | 10 | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|--------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 758 | THC-5 | 3.6 | 0.6 | Gray slightly silty fine sand with shell (SP-SM) | 6 | 19 | 7 | - |
| | | 0.6 | -0.9 | Gray clayey fine sand with seams of clay (SC-CH) | 1 | - | - | - |
| | | -0.9 | -8.9 | Gray fine sand with shells (SP) | 10 | - | - | - |
| | | -6.9 | -8.9 | Gray silty fine sand with shell (SM) | 12 | - | - | - |
| | | -8.9 | -17.4 | Gray fine sand with shells (SP) | 17 | 17 | 3 | - |
| | | -17.4 | -19.4 | Gray clay with shell (CH) | 9 | - | - | - |
| | | -19.4 | -24.4 | Gray silty fine sand with seams of gray clay (SM-CH) | 3 | - | - | - |
| | | -24.4 | -38.9 | Gray clay (CH) | 1 | - | - | - |
| | | -38.9 | -44.4 | Gray silty fine sand with shell (SM) | 21 | - | - | - |
| | | -44.4 | -54.4 | Gray clayey fine sand with traces of clay (SC-CH) | 5 | - | - | - |
| | | -54.4 | -59.4 | Gray slightly silty fine sand with shell (SP-SM) | 28 | - | - | - |
| | | -59.4 | -79.4 | Gray clayey fine sand with shells (SC) | 14 | - | - | - |
| -79.4 | -82.9 | Gray silty fine sand with shell (SM) | 49 | - | - | - | | |
| 769 | THY-1 | 12.8 | 11.8 | Brown fine sand and scallop shell (SP) | 33 | - | - | - |
| | | 11.8 | 11.3 | Gray slightly clayey fine sand and scallop shell (SM-SC) | 33 | - | - | - |
| | | 11.3 | 9.8 | Brown fine sand with trace of shell (SP) | 32 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|--|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 769 | THY-1 | 9.8 | 7.8 | Brown slightly silty fine sand with trace of shell and clayey fine sand (SP-SM) | 34 | - | - | - |
| | | 7.8 | 4.8 | Grayish brown fine sand with trace of shell (SP) | 25 | - | - | - |
| | | 4.8 | 2.3 | Gray fine sand and shell (SP) | 25 | - | - | - |
| | | 2.3 | 0.8 | Gray slightly silty fine sand with shell (SP-SM) | 20 | - | - | - |
| 784 | TH-68 | 8.3 | 4.8 | Grayish brown slightly silty fine sand with shells (SP-SM) | 11 | - | - | - |
| | | 4.8 | 2.3 | Gray slightly silty fine sand with clayey fine sand (SP-SM) | 22 | - | - | - |
| | | 2.3 | 0.8 | Gray fine sand with shells (SP) | 6 | - | - | - |
| | | 0.8 | -5.2 | Gray silty fine sand with shells (SM) | 6 | - | - | - |
| | | -5.2 | -8.2 | Gray clayey fine sand with shells (SC) | 0 | - | - | - |
| | | -8.2 | -14.2 | Gray slightly silty fine sand with shell (SP-SM) | 23 | - | - | - |
| | | -14.2 | -17.2 | Gray slightly clayey fine sand (SM-SC) | 1 | - | - | - |
| | | -17.2 | -26.2 | Gray clay (CH) | 1 | 70 | 98 | 57 |
| | | -26.2 | -34.2 | Gray clayey fine sand with shells (SC) | 2 | - | - | - |
| | | -34.2 | -41.2 | Gray clay (CH) | 0 | 95 | 100 | - |
| | | -41.2 | -44.2 | Light gray slightly silty fine sand with shell (SP-SM) | 12 | - | - | - |
| | | -44.2 | -48.9 | Gray sandy clay with shells (CL) | 0 | - | - | - |
| -48.9 | -57.7 | Gray clayey fine sand with shells (SC) | 8 | - | - | - | | |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 785 | TH-69 | 8.4 | 4.9 | Light brown fine sand with shells (SP) | 17 | - | - | - |
| | | 4.9 | 2.4 | Grayish brown fine sand with shells (SP) | 35 | - | - | - |
| | | 2.4 | -4.1 | Gray silty fine sand with shells (SM) | 4 | - | - | - |
| | | -4.1 | -9.1 | Gray clayey fine sand with shells (SC) | 3 | - | - | - |
| | | -9.1 | -14.1 | Gray fine sand (SP) | 35 | - | - | - |
| | | -14.1 | -19.1 | Gray clayey fine sand with shells (SC) | 3 | - | - | - |
| | | -19.1 | -34.1 | Gray clay (CH) | 1 | 95 | 99 | - |
| | | -34.1 | -44.1 | Light gray slightly silty fine sand with traces of shells (SP-SM) | 22 | - | - | - |
| | | -44.1 | -49.1 | Gray sandy clay with shells (CL) | 3 | - | - | - |
| | | -49.1 | -82.6 | Gray clayey fine sand with shells (SC) | 7 | - | - | - |
| 904 | B-2 | 8.5 | 4 | Gray to brown fine sand with traces of shell (SP). | 17 | - | - | - |
| | | 4 | 0.5 | Gray to grayish-brown silty fine sand with occasional shell (SM). | 8 | - | - | - |
| | | 0.5 | -2 | Gray to brown fine sand with traces of shell (SP). | 12 | - | - | - |
| | | -2 | -4 | Gray to grayish-brown silty fine sand with occasional shell (SM). | 3 | - | - | - |
| | | -4 | -6.5 | Gray to brown fine sand with traces of shell (SP). | 28 | - | - | - |
| 905 | B-3 | 9 | 7.5 | Gray to brown fine sand with traces of shell (SP). | 7 | - | - | - |
| | | 7.5 | 4.5 | Gray to brown fine sand with seams of gray clay (SP-CH). | 9 | 27 | 23 | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 905 | B-3 | 4.5 | 3 | Gray clay and slightly sand clay (CH). | 7 | 49 | 55 | - |
| | | 3 | -1.5 | Gray to brown fine sand with traces of shell (SP). | 12 | - | - | - |
| | | -1.5 | -3.5 | Gray to grayish-brown silty fine sand with occasional shell (SM). | 1 | - | - | - |
| | | -3.5 | -5.5 | Gray to brown fine sand with traces of shell (SP). | 29 | - | - | - |
| 984 | THD-1 | 7.8 | 2.8 | Brown fine sand and shell (SP). | 6 | - | - | - |
| | | 2.8 | 1.3 | Brown slightly silty fine sand with traces of shell (SP-SM). | 1 | - | - | - |
| | | 1.3 | -0.7 | Grayish brown silty fine sand with traces of shell (SM). | 4 | - | - | - |
| | | -0.7 | -1.7 | Gray fine sand with traces of shell (SP). | 5 | - | - | - |
| | | -1.7 | -2.7 | Gray clayey fine sand with traces of shell (SC). | 5 | - | - | - |
| | | -2.7 | -18.7 | Gray fine sand with traces of shell (SP). | 19 | - | - | - |
| | | -18.7 | -41.2 | Gray clay with traces of shell (CH). | 1 | 90 | 100 | - |
| | | -41.2 | -44.7 | Gray fine sand and shell with traces of gray clay (SP). | 10 | 35 | - | - |
| | | -44.7 | -63.7 | Gray clayey fine sand with shell (SC). | 9 | - | - | - |
| 985 | THD-2 | 7.5 | 6 | Gray silty fine sand and shell (SM). | 16 | - | - | - |
| | | 6 | -2 | Gray fine sand and shell (SP). | 13 | - | - | - |
| | | -2 | -3.5 | Gray silty fine sand (SM). | 2 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 985 | THD-2 | -3.5 | -6 | Gray fine sand with traces of shell (SP). | 6 | - | - | - |
| | | -6 | -20 | Gray clayey fine sand with traces of shell (SC). | 3 | - | - | - |
| | | -20 | -27.5 | Gray organic clay (CH). | 0 | 92 | - | - |
| | | -27.5 | -35.5 | Gray fine sand with organic fine sand (SP). | 12 | - | - | - |
| | | -35.5 | -45 | Gray clayey fine sand (SC). | 2 | - | - | - |
| | | -45 | -50 | Gray slightly sandy clay with shell (CL). | 1 | - | - | - |
| | | -50 | -55 | Gray clayey fine sand with shell (SC). | 1 | - | - | - |
| | | -55 | -60 | Gray sandy clay with traces of shell (CL). | 2 | - | - | - |
| | | -60 | -69 | Gray clayey fine sand with shell (SC). | 7 | - | - | - |
| 986 | THD-3 | 8 | 5 | Light brown fine sand and shell (SP). | - | - | - | - |
| | | 5 | 1.5 | Gray fine sand with traces of shell (SP). | 18 | - | - | - |
| | | 1.5 | 0 | Gray fine sand and shell with traces of clay (SP). | 14 | - | - | - |
| | | 0 | -2.5 | Gray fine sand with traces of shell (SP). | 10 | - | - | - |
| | | -2.5 | -4.5 | Gray clayey fine sand with traces of shell (SC). | 0 | - | - | - |
| | | -4.5 | -9.5 | Gray fine sand with traces of shell (SP). | 15 | - | - | - |
| | | -9.5 | -14.5 | Gray silty fine sand with traces of shell (SM). | 3 | - | - | - |
| | | -14.5 | -19.5 | Gray clay (CH). | 0 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 986 | THD-3 | -19.5 | -32 | Grayish brown fine sand (SP). | 18 | - | - | - |
| | | -32 | -34.5 | Gray fine sand and shell (SP). | 41 | - | - | - |
| | | -34.5 | -39.5 | Gray fine sand and shell with traces of clay (SP). | 11 | - | - | - |
| | | -39.5 | -44.5 | Gray sandy clay and shell (CL). | 2 | - | - | - |
| | | -44.5 | -49.5 | Gray sandy clay with traces of shell (CL). | 2 | - | - | - |
| | | -49.5 | -59.5 | Gray sandy clay and shell (CL). | 3 | - | - | - |
| | | -59.5 | -63.5 | Gray clayey fine sand and shell (SC). | 5 | - | - | - |
| 1036 | TH-J | 9.3 | 4.8 | Gray slightly clayey fine sand with traces of shell (SP-SC) | 26 | - | - | - |
| | | 4.8 | 3.3 | Gray fine sand with traces of shell and clay (SP-CH) | 28 | - | - | - |
| | | 3.3 | -3.2 | Gray fine sand with traces of shell (SP) | 12 | - | - | - |
| | | -3.2 | -4.7 | Gray slightly silty fine sand (SP-SM) | 14 | - | - | - |
| | | -4.7 | -7.9 | Gray fine sand with traces of shell (SP) | 22 | - | - | - |
| | | -7.9 | -13.6 | Gray slightly clayey fine sand with shells (SM-SC) | 10 | - | - | - |
| | | -13.6 | -18.6 | Gray clayey fine sand with shells (SC) | 6 | - | - | - |
| | | -18.6 | -21.7 | Gray fine sand with shells (SP) | 22 | - | - | - |
| 1038 | TH-L | 9.4 | 7.4 | Light brown fine sand with traces of shells (SP) | 15 | - | - | - |
| | | 7.4 | 4.9 | Gray clayey fine sand with traces of shells (SC) | 22 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (R, MLLW) | Stratum Lower Elevation (R, MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|-----------------------------------|-----------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 1038 | TH-L | 4.9 | 1.4 | Gray fine sand with traces of shells (SP) | 12 | - | - | - |
| | | 1.4 | -1.1 | Gray slightly clayey fine sand with shells (SP-SC) | 8 | - | - | - |
| | | -1.1 | -7.7 | Gray fine sand with traces of shell (SP) | 18 | - | - | - |
| | | -7.7 | -18.5 | Gray silty fine sand with traces of shell (SM) | 2 | - | - | - |
| | | -18.5 | -21.6 | Gray silty fine sand (SM) | 3 | - | - | - |
| 1039 | TH-M | 11.8 | 10.3 | Brown fine sand with shells and clay seams (SP-CH) | 13 | - | - | - |
| | | 10.3 | 6.3 | Brown fine sand with shells and traces of clay (SP) | 18 | - | - | - |
| | | 6.3 | 1.3 | Gray fine sand with shells (SP) | 6 | - | - | - |
| | | 1.3 | -0.7 | Gray silty fine sand with shells (SM) | 0 | - | - | - |
| | | -0.7 | -19.7 | Gray fine sand (SP) | 19 | - | - | - |
| 1042 | TH-1 | 10.1 | 7.1 | Gray fine sand and shell fragments (SP) with traces of clayey silt (ML) | 9 | - | - | - |
| | | 7.1 | 5.6 | Gray fine sand and shell fragments (SP) with clay (CH) | 3 | - | - | - |
| | | 5.6 | 3.1 | Gray sandy clay to clay (CH) with shell fragments | 6 | 79 | - | - |
| | | 3.1 | -0.4 | Gray slightly silty fine sand and shell fragments (SP) with very slight traces of clay (CH) | 8 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 1043 | TH-2 | 9.9 | 5.4 | Light gray fine sand with shell fragments (SP) | 11 | - | - | - |
| | | 5.4 | 3.4 | Gray fine sand with shell fragments (SP) | 5 | - | - | - |
| | | 3.4 | 2.4 | Gray fine sand and shell fragments (SP) with traces of gray clay (CH) | 3 | - | - | - |
| | | 2.4 | -0.6 | Gray fine sand with shell fragments (SP) | 4 | - | - | - |
| 1044 | TH-3 | 10.1 | 4.1 | Gray fine sand with shell fragments (SP) | 22 | - | - | - |
| | | 4.1 | 3.1 | Dark gray fine sand with shell fragments (SP) | 13 | - | - | - |
| | | 3.1 | 2.1 | Dark gray fine sand and shell fragments (SP) with slight traces of gray clay (CH) | 14 | - | - | - |
| | | 2.1 | -0.4 | Dark gray fine sand with shell fragments (SP) | 15 | - | - | - |
| 1045 | TH-4 | 9.5 | 6.5 | Light gray fine sand with shell fragments (SP) | 16 | - | - | - |
| | | 6.5 | 4.5 | Dark gray slightly silty fine sand (SP-SM) | 14 | - | - | - |
| | | 4.5 | 3.5 | Dark gray silty fine sand (SP-SM) | 3 | - | - | - |
| | | 3.5 | 2 | Gray sandy clay with shell fragments (CL) | 4 | - | - | - |
| | | 2 | -1 | Gray fine sand and shell fragments (SP) with traces of gray clay (CH) | 10 | - | - | - |
| 1046 | TH-5 | 9.2 | 7.7 | Light gray fine sand with shell fragments (SP) | 4 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 1046 | TH-5 | 7.7 | 4.7 | Gray fine sand and shell fragments (SP) with layers of gray clay (CH) (50% sand, 50% clay) | 6 | - | - | - |
| | | 4.7 | -1.3 | Gray fine sand with shell fragments (SP) | 8 | - | - | - |
| 1047 | TH-6 | 10 | 8.5 | Light gray fine sand with shell fragments (SP) | 6 | - | - | - |
| | | 8.5 | 7 | Light grayish brown fine sand and shell fragments (SP) with traces of clay (CH) | 10 | - | - | - |
| | | 7 | 5.5 | Gray fine sand with shell fragments (SP) | 5 | - | - | - |
| | | 5.5 | 3.5 | Gray clay with shell fragments (CH) | 5 | - | - | - |
| | | 3.5 | -0.5 | Gray fine sand with shell fragments (SP) | 11 | - | - | - |
| 1048 | TH-7 | 9.9 | 8.4 | Light gray fine sand with shell fragments (SP) | 9 | - | - | - |
| | | 8.4 | 6.4 | Light gray fine sand with shell fragments (SP) with gray clay (CH) (50% sand, 50% clay) | 10 | - | - | - |
| | | 6.4 | 5.4 | Light gray fine sand with shell fragments (SP) | 11 | - | - | - |
| | | 5.4 | 3.9 | Dark gray fine sand and shell fragments (SP) with slight traces of gray clay (CH) | 5 | - | - | - |
| | | 3.9 | 2.9 | Gray clay with shell fragments (CH) | 8 | - | - | - |
| | | 2.9 | -0.6 | Gray fine sand and shell fragments (SP) with traces of gray clay (CH) | 12 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 1049 | TH-8 | 9.9 | 7.9 | Light gray fine sand with shell fragments (SP) | 10 | - | - | - |
| | | 7.9 | 6.9 | Light gray fine sand and shell fragments (SP) with gray clay (CH) (50% sand, 50% clay) | 4 | - | - | - |
| | | 6.9 | 5.4 | Gray fine sand with shell fragments (SP) | 11 | - | - | - |
| | | 5.4 | 3.9 | Gray slightly silty fine sand with shell fragments (SP-SM) | 7 | - | - | - |
| | | 3.9 | 2.4 | Gray silty fine sand with shell fragments (SM) | 12 | - | - | - |
| | | 2.4 | -0.6 | Gray fine sand with shell fragments (SP) | 16 | - | - | - |
| 1050 | TH-9 | 10.3 | 6.8 | Light gray fine sand with shell fragments (SP) | 17 | - | - | - |
| | | 6.8 | 5.3 | Dark gray slightly silty fine sand (SP-SM) with traces of clay (CH) | 10 | - | - | - |
| | | 5.3 | -0.2 | Dark gray fine sand and shell fragments (SP) with slight traces of gray clay (CH) (50% sand, 50% clay) | 7 | - | - | - |
| 1067 | CR-9 | 13.8 | 9.3 | Gray fine sand with shell fragments (SP) | 6 | 2 | - | - |
| | | 9.3 | 6.3 | Gray slightly sandy clay (CL) | 3 | - | - | - |
| | | 6.3 | 4.3 | Gray silty fine sand with shell fragments (SP-SM) | 6 | 6 | - | - |
| | | 4.3 | 1.8 | Gray fine sand with traces of shell fragments (SP) | 9 | - | - | - |
| | | 1.8 | -1.2 | Gray medium to fine sand with shell fragments (SP, SP-SM) | 18 | 5 | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 1068 | CR-10 | 14 | 9 | Gray fine sand with shell fragments (SP, SP-SM) | 8 | 5 | - | - |
| | | 9 | 7.5 | Gray silty, clayey fine sand (SM-SC) | 4 | 24 | - | - |
| | | 7.5 | 6 | Gray sandy clay (CL) | 7 | - | - | - |
| | | 6 | 5 | Gray silty fine sand with traces of shell fragments (SP-SM) | 10 | - | - | - |
| | | 5 | 2 | Gray fine sand with traces of shell fragments (SP) | 13 | - | - | - |
| | | 2 | -1 | Gray medium to fine sand with shell fragments (SP) | 18 | - | - | - |
| 1072 | CR-14 | | 11.1 | Grayish brown fine sand with shell fragments (SP) | 11 | - | - | - |
| | | | 6.1 | Grayish-brown fine sand with traces of shell fragments (SP, SM) | 17 | 8 | - | - |
| | | | 3.6 | Gray fine sand with traces of shell fragments (SP) | 8 | - | - | - |
| | | | 0.6 | Gray fine sand with shell and traces of gray clay (SP, SP-SM) | 15 | 8 | - | - |
| | | | -1.4 | Gray fine sand with traces of shell (SP) | 18 | - | - | - |
| | | | -2.4 | Brown sandy, organic clay with shell fragments (CL) | 12 | - | - | - |
| 1073 | CR-15 | 12.3 | 9.3 | Grayish-brown fine sand with traces of shell fragments (SP, SP-SM) | 4 | 4 | - | - |
| | | 9.3 | 7.3 | Gray fine sand with clay (SP-SC) | 2 | 51 | - | - |
| | | 7.3 | 6.3 | Gray fine sand with traces of shell fragments (SP) | 3 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 1073 | CR-15 | 6.3 | 3.3 | Gray sandy clay (CL) | 4 | - | - | - |
| | | 3.3 | 0.3 | Gray silty fine sand with traces of shell fragments (SP-SM) | 8 | - | - | - |
| | | 0.3 | -1.2 | Gray sandy clay (CL) | 7 | - | - | - |
| | | -1.2 | -2.7 | Brown sandy clay with shell fragments (CL) | 13 | - | - | - |
| 1074 | CR-16 | 13.8 | 11.8 | Brown fine sand with shell fragments (SP) | 6 | 3 | - | - |
| | | 11.8 | 9.3 | Gray clay (CH) | 4 | - | - | - |
| | | 9.3 | 8.3 | Gray clay with seams of gray fine sand with shell fragments (CL) | 6 | - | - | - |
| | | 8.3 | 7.3 | Gray sandy clay with shell fragments (CL) | 5 | - | - | - |
| | | 7.3 | 6.3 | Gray clayey fine sand with shell fragments (SC) | 3 | - | - | - |
| | | 6.3 | 4.3 | Gray sandy clay (CL) | 4 | - | - | - |
| | | 4.3 | 3.3 | Gray silty fine sand with traces of shell fragments (SM) | 5 | - | - | - |
| | | 3.3 | 1.3 | Gray sandy clay (CL) | 8 | - | - | - |
| | | 1.3 | -1.2 | Gray silty fine sand with traces of shell fragments (SM) | 8 | - | - | - |
| 1075 | CR-17 | 14.3 | 11.8 | Brown fine sand with shell fragments (SP, SP-SM) | 4 | 6 | - | - |
| | | 11.8 | 8.3 | Gray clay (CH) | 3 | - | - | - |
| | | 8.3 | 6.3 | Gray sandy clay with shell fragments (CL) | 1 | - | - | - |
| | | 6.3 | 3.3 | Gray silty fine sand with traces of shell (SM) | 4 | - | - | - |
| | | 3.3 | 1.8 | Gray silty fine sand with traces of shell and gray clay (SM) | 3 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 1075 | CR-17 | 1.8 | 0.8 | Gray sandy clay with traces of shell fragments (CL) | 5 | - | - | - |
| | | 0.8 | -0.7 | Gray clayey fine sand with shell fragments (SC) | 10 | - | - | - |
| 1076 | CR-18 | 15.6 | 10.6 | Grayish-brown fine sand with shell fragments (SP) | 9 | 2 | - | - |
| | | 10.6 | 9.1 | Gray fine sand with shell fragments and gray clay (SP, SC) | 4 | 33 | - | - |
| | | 9.1 | 6.6 | Gray sandy clay (CL) | 5 | - | - | - |
| | | 6.6 | 5.1 | Dark gray sandy clay (CL) | 2 | - | - | - |
| | | 5.1 | 2.1 | Gray silty fine sand (SM) | 6 | - | - | - |
| | | 2.1 | 0.6 | Gray silty, sandy clay (CL) | 4 | - | - | - |
| 1167 | B-3 | -10.57 | 9.07 | Light brown to gray fine sand with shell fragments (SP). | 24 | - | - | - |
| | | 9.07 | 5.57 | Light brown to gray fine sand with traces of shell fragments (SP). | 29 | - | - | - |
| | | 5.57 | 4.57 | Light brown to gray, slightly silty fine sand with shell fragments (SP-SM). | 22 | - | - | - |
| | | 4.57 | 2.57 | Brownish gray medium to fine sand with shell fragments (SP). | - | 18 | 2 | - |
| | | 2.57 | 1.07 | Gray slightly silty fine sand with shell fragments (SP-SM). | 8 | - | - | - |
| | | 1.07 | 0.07 | Gray fine sand with shell fragments (SP). | 8 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 1168 | B-4 | 8.48 | 4.48 | Light brown fine sand with shell fragments (SP). | 15 | - | - | - |
| | | 4.48 | 3.98 | Gray silty fine sand (SM). | 17 | - | - | - |
| | | 3.98 | -1.02 | Gray fine sand with shell fragments (SP). | 22 | 22 | 2 | - |
| | | -1.02 | -2.52 | Gray fine sand (SP). | 9 | - | - | - |
| 1169 | B-5 | 8.32 | 5.82 | Light brown to gray clayey fine sand with traces of shell fragments and roots (SC). | 8 | - | - | - |
| | | 5.82 | 4.82 | Gray silty fine sand with traces of shell fragments (SM). | 7 | - | - | - |
| | | 4.82 | 2.32 | Gray clayey fine sand with traces of shell fragments (SC). | 6 | - | - | - |
| | | 2.32 | 0.32 | Gray sandy clay (CL). | - | 32 | 58 | - |
| | | 0.32 | -1.18 | Gray fine sand (SP). | 4 | - | - | - |
| | | -1.18 | -2.68 | Gray medium to fine sand with shell fragments (SP). | 6 | - | - | - |
| 1173 | B-9 | 9.24 | 5.74 | Gray to light brown fine sand with shell fragments (SP). | 21 | - | - | - |
| | | 5.74 | 4.24 | Gray medium to fine sand with clay pockets and shell fragments (SP, CH). | 9 | - | - | - |
| | | 4.24 | 1.24 | Gray clay (CH). | 4 | - | - | - |
| | | 1.24 | -1.76 | Gray medium to fine sand with shell fragments (SP). | 12 | - | - | - |
| 1346 | TH-4 | 9 | 7.5 | Brown silty fine sand with shells. | 12 | - | - | - |
| | | 7.5 | 6 | Light brown silty fine sand with shell. | 8 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|---|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 1346 | TH-4 | 6 | 4.5 | Brown slightly silty fine sand with clay lenses and shell. | 13 | - | - | - |
| | | 4.5 | 3 | Gray fine and medium sand with trace shell. | 10 | - | - | - |
| | | 3 | -3 | Gray silty fine sand with shell. | 10 | - | - | - |
| | | -3 | -4.5 | Gray fine sand with shell and trace clay. | 3 | - | - | - |
| | | -4.5 | -8 | Gray sandy clay with shell. | 2 | - | - | - |
| | | -8 | -10 | Gray silty fine sand with trace shell. | 4 | - | - | - |
| | | -10 | -17 | Gray fine sand with shell. | 20 | - | - | - |
| | | -17 | -18 | Gray slightly clayey fine sand with shell. | 8 | - | - | - |
| | | -18 | -19.5 | Gray sandy clay with traces shell. | 2 | - | - | - |
| | | -19.5 | -21 | Gray sandy clay to clayey sand. | 2 | - | - | - |
| | | -21 | -22.5 | Gray clay with trace shell. | 2 | - | - | - |
| | | -22.5 | -27 | Gray slightly sandy clay with trace shell. | 2 | - | - | - |
| | | -27 | -28.5 | Gray clay with trace organics and trace shell. | 2 | - | - | - |
| | | -28.5 | -30 | Gray clay | 1 | - | - | - |
| | | -30 | -31.5 | Gray clay with trace shell. | 2 | - | - | - |
| | | -31.5 | -37.5 | Gray clay. | 2 | - | - | - |
| | | -37.5 | -39 | Gray clay with trace organics and trace shell. | 3 | - | - | - |
| -39 | -40.5 | Gray clay with trace shell. | 2 | - | - | - | | |
| -40.5 | -42 | Light gray sandy clay with trace shell and trace cemented sand. | 8 | - | - | - | | |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|--|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 1347 | TH-5 | 8.2 | 6.7 | Light brown fine sand with shell. | - | - | - | - |
| | | 6.7 | 5.2 | Brown sandy clay with shell. | - | - | - | - |
| | | 5.2 | 3.7 | Light brown fine sand with shell and trace clay. | - | - | - | - |
| | | 3.7 | 2.2 | Gray fine sand with shell and trace clay. | 9 | - | - | - |
| | | 2.2 | 0.7 | Gray fine to medium sand with shell. | 16 | - | - | - |
| | | 0.7 | -0.8 | Gray fine sand. | 8 | - | - | - |
| | | -0.8 | -3.8 | Gray fine sand with trace shell. | 3 | - | - | - |
| | | -3.8 | -5.3 | Gray fine sand with shell. | 16 | - | - | - |
| | | -5.3 | -6.8 | Gray slightly silty fine sand. | 12 | - | - | - |
| | | -6.8 | -8.3 | Gray fine sand with shell. | 17 | - | - | - |
| | | -8.3 | -9.8 | Dark gray clayey fine sand to sandy clay with trace shell. | 6 | - | - | - |
| | | -9.8 | -11.3 | Gray silty fine sand with trace clay and shell. | 3 | - | - | - |
| | | -11.3 | -12.8 | Gray clayey fine sand with shell. | 14 | - | - | - |
| | | -12.8 | -15.8 | Gray fine sand with shell. | 33 | - | - | - |
| | | -15.8 | -18.8 | Gray fine sand. | 24 | - | - | - |
| | | -18.8 | -20.3 | Gray clayey silty fine sand with trace shell. | 5 | - | - | - |
| -20.3 | -21.8 | Gray slightly sandy clay with trace shell. | 4 | - | - | - | | |
| -21.8 | -38.3 | Gray clay with trace shell. | 2 | - | - | - | | |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 1347 | TH-5 | -38.3 | -39.8 | Gray clay with trace shell and trace organics. | 2 | - | - | - |
| | | -39.8 | -41.3 | Light gray sandy clay with trace shell and trace cemented sand. | 2 | - | - | - |
| | | -41.3 | -42.8 | Light greenish-gray silty fine sand with shell. | 13 | - | - | - |
| 1428 | GR-1 | 13.5 | 13 | Light gray limerock base material with traces of shell fragments. | - | 14 | 8 | - |
| | | 13 | 11 | Gray silty fine sand with traces of shell fragments. | - | - | - | - |
| | | 11 | 7 | Light gray slightly silty fine sand with traces of shell fragments. | - | - | - | - |
| | | 7 | 3.5 | Gray fine sand with shell fragments. | - | - | - | - |
| 1464 | TH-1 | 8.5 | -9.5 | Gray fine sand with trace shell. | 23 | - | - | - |
| | | -9.5 | -14.5 | Gray sand and shell. | 22 | - | - | - |
| | | -14.5 | -18.5 | Gray clayey fine sand with trace shell. | 7 | - | - | - |
| | | -18.5 | -23.5 | Gray fine sand with trace shell. | 7 | - | - | - |
| | | -23.5 | -35 | Gray clay with trace shell. | 4 | - | - | - |
| | | -35 | -43.5 | Gray sand and shell. | 30 | - | - | - |
| | | -43.5 | -51.5 | Gray fine sand with trace shell. | 15 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 1465 | TH-2 | 8.5 | -4.5 | Gray fine sand with trace shell. | 11 | - | - | - |
| | | -4.5 | -13.5 | Gray sand and shell. | 25 | - | - | - |
| | | -13.5 | -19 | Gray fine sand with trace shell and clay. | 16 | - | - | - |
| | | -19 | -34.5 | Gray clay. | 5 | - | - | - |
| | | -34.5 | -51.5 | Light gray sand and shell. | 27 | - | - | - |
| 1471 | TH-1 | 10 | 8.5 | Light brown fine sand with trace shell fragments and clay. | 14 | - | - | - |
| | | 8.5 | 7 | Light brown fine sand few clay and shell. | 22 | - | - | - |
| | | 7 | 4.5 | Gray fine sand with silt trace clay and shell fragments. | 20 | - | - | - |
| | | 4.5 | 3.5 | Gray fine sand with clay and shell. | 22 | - | - | - |
| | | 3.5 | 1 | Gray fine sand few shell and silt | 22 | - | - | - |
| | | 1 | -9 | Gray fine sand with silt few shell. | 7 | - | - | - |
| | | -9 | -15 | Gray clayey fine sand few shell fragments. | - | 39 | 48 | - |
| 1472 | TH-2 | 10 | 8.5 | Light brown fine sand with trace silt. | - | - | - | - |
| | | 8.5 | 5.5 | Gray fine sand with trace silt and shell fragments. | - | - | - | - |
| | | 5.5 | 4 | Gray to light brown silty fine sand with trace shell fragments and clay. | 24 | - | - | - |
| | | 4 | -2 | Light gray fine sand with trace silt and shell fragments. | 15 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft. MLLW) | Stratum Lower Elevation (ft. MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|---|-------------|----------------------|------------------------------------|----------------------|
| 1472 | TH-2 | -2 | -8.5 | Gray clayey fine sand with shell. | 3 | - | - | - |
| | | -8.5 | -12.5 | Gray fine sand few clay and shell. | 2 | - | - | - |
| | | -12.5 | -23 | Gray clay with trace shell fragments and fine sand. | 2 | 58 | 99 | - |
| | | -23 | -27.5 | Gray fine sand and silt with shell fragments. | 14 | - | - | - |
| | | -27.5 | -38 | Gray fine sand with shell and trace silt. | 23 | - | - | - |
| | | -38 | -57.5 | Bluish-gray sandy clay with trace shell fragments. | 4 | 45 | 62 | - |
| | | -57.5 | -67 | Greenish-gray sandy clay few shell fragments. | 12 | 30 | 57 | - |
| | | -67 | -73.5 | Greenish-gray fine sand few silt with trace shell fragments. | 10 | - | - | - |
| | | -73.5 | -95 | Light gray calcareous cemented sand with trace silt and fine sand. | 54 | - | - | - |
| 1473 | TH-3 | 9.5 | 6.5 | Light brown fine sand with shell and trace silt and clay. | - | - | - | - |
| | | 6.5 | 3.5 | Gray fine sand few shell fragments with trace silt and clay. | 14 | - | - | - |
| | | 3.5 | 0.5 | Gray fine sand with trace silt and shell fragments. | 10 | - | - | - |
| | | 0.5 | -2.5 | Light brown fine sand to clayey fine sand with few clay and shell fragments and trace silt. | 4 | - | - | - |
| | | -2.5 | -12.5 | Greenish-gray silty fine sand. | 7 | - | - | - |
| | | -12.5 | -22.5 | Gray clay with fine sand with trace shell fragments. | 3 | - | - | - |

Table 6. Index Testing Data of Previous Landside Borings (continued)

| Boring Reference No. | Boring Name | Stratum Upper Elevation (ft, MLLW) | Stratum Lower Elevation (ft, MLLW) | Principal Soil Type | SPT N-value | Moisture Content (%) | Percent Passing U.S. 200 Sieve (%) | Plasticity Index (%) |
|----------------------|-------------|------------------------------------|------------------------------------|--|-------------|----------------------|------------------------------------|----------------------|
| 1473 | TH-3 | -22.5 | -31.5 | Gray fine sand few silt with trace clay and shell fragments. | 5 | - | - | - |
| 1474 | TH-4 | 9.5 | -13 | Gray fine sand with trace silt and shell fragments. | 13 | - | - | - |
| | | -13 | -15.5 | Gray clayey fine sand with trace shell fragments. | 2 | 37 | 44 | - |

4 DESIGN SOIL PROFILES

4.1 West Turning Basin Corner Cut-off

As a result of widening the West Turning Basin approximately 13.5 acres of land located at the south east corner of the West Turning Basin will have to be excavated below water surface to the new desired elevation. Twenty-one borings within the vicinity of the subject area have been drilled for previous field investigations and can be found in Appendices 3 and 4. The field and lab results of these borings indicate that the material to be excavated from the site can be summarized into two general soil profiles. The first general soil profile represents soils at the northwest end, while the second general soil profile represents soils at the southeast end.

4.1.1 Corner Cut-off - Northwest End

The materials to be excavated from the northwest end of the West Turning Basin Corner Cut-off consist of silty sands with occasional lenses of fine poorly-graded quartz sand and clayey sand/sandy clay with trace amounts of shell to elevation -20 feet, MLLW. There is a higher percentage of clayey materials present in the borings furthest from the bulkhead walls. The upper portion of the silty sand to approximate elevation -5 feet, MLLW was firmer than that below. The material between approximate elevations -20 and -37 feet, MLLW, consisted of fine poorly-graded quartz sand with trace amounts of shell and occasional lenses of silty-sand. Below elevation -37 feet, MLLW, the materials to be excavated consisted of soft sandy clays to clayey sands with occasional lenses of soft clay. The general soil profile of the northwest end of the Corner Cut-off is presented in Figure 9.

4.1.2 Corner Cut-off - Southeast End

The materials to be excavated from the southeast end of the West Turning Basin Cut-off consist of fine poorly-graded quartz sand with occasional clayey sand layers and trace amounts of shell from the ground surface to elevation 6 feet, MLLW. Below this clayey fine sands and sandy clays with trace amounts of shell, hard lenses of fine to medium poorly-graded quartz sand with an increasing percentage of sandy

clay and soft clay towards the center of the considered area, and silty sand to the southeast end are typically found down to elevation -8 feet, MLLW. Below this to an elevation -12 feet, MLLW is a layer of fine to medium poorly-graded quartz sand. From elevation -12 feet, MLLW to elevation -20 feet, MLLW is a layer of clayey fine sand to sandy clay with occasional fine poorly-graded quartz sand and soft clay lenses. A layer of very soft clay is found between elevation -20 to -32 feet, MLLW and below this is a silty-sand layer with occasional fine poorly-graded quartz sand. The general soil profile of the southeast end of the Corner Cut-off is presented in Figure 10.

4.1.3 Corner Cut-off - Bulkhead Wall Design

Widening the West Turning Basin and excavation of the Corner Cut-Off will also result in relocation of the existing beach with a bulkhead wall being installed at a later date. The soil profile of the area of the bulkhead wall consists of silty sands with occasional lenses of clayey fine sand, sandy clay and soft clay from the ground surface to elevation -2.5 feet, MLLW. A layer of silty sands and clayey fine sands is found from elevation -2.5 feet, MLLW to elevation -24 feet, MLLW. Soft clays and sandy clays are found from elevation -24 feet, MLLW to elevation -42.5 feet, MLLW with sandy clay below that to elevation -55 feet, MLLW and silty to clayey sands below that. The general soil profile behind a future bulkhead wall in this location is presented in Figure 11.

4.2 Inner Reach North Side Dike Relocation

The materials to be excavated or relocated from the dike at the north side of the Inner Reach between the Middle Turning Basin and the Trident Turning Basin consist of fine to medium poorly-graded quartz sand dike fill, silty sand dredge material, soft clay and sandy clay. Silty sands and soft sandy clay layers below the proposed dredge line were included in the stability analyses, but are not to be excavated. The general soil profile is detailed further in Section 5.2 and presented on Figure 12.

5 DIKE RELOCATION STABILITY ANALYSES

5.1 Slope Stability Analyses Methodology

Stability analyses were conducted on a typical design cross section for the existing and proposed relocation dike to the north of the Inner Reach. The stability analyses determined the factors of safety against failure of the foundation soils and circular arc failure through the upstream and downstream slopes.

The computer model SLOPE/W was used to analyze the various stability considerations. SLOPE/W, developed by Geo-Slope International Ltd. of Calgary, Alberta, Canada, is a fully integrated slope stability analysis program. The computer program determines the critical failure surface for each failure mode by converging on the failure surface through an iterative procedure. Final stability analyses on the most critical failure surfaces identified in the search routine were completed using Spencer's method, which satisfies total force and moment equilibrium. The stability analyses were performed using an estimated pore pressure distribution assuming ponding of water to elevation 20 feet, MLLW behind the dike, along with the shear strength parameters and unit weights selected in Section 5.2.

The relevant material properties used in the slope stability and bearing capacity analyses, along with the critical failure surfaces, for the existing and proposed design cross sections are presented on Figure 12.

5.2 Material Properties

5.2.1 Dike Fill

The dike fill material consists of fine to medium poorly-graded quartz sand. This fill is placed above elevation 14 feet, MLLW. For stability analyses, the following engineering properties were selected for this soil:

5.2.2 Dredge Material

The dredge material found in our recent boring TH-7 (1530) is typical of the disposed dredge materials deposited inside the dike footprint. The dredge materials consist mainly of soft silty sands with occasional clay seams. Potential slope failure surfaces of the existing dike location do not pass through this dredged material, however, once the dike is relocated, potential failure surfaces will pass through the dredged material. Directly under the existing dike footprint is a layer of loose fine poorly-graded quartz sand. These soil types are typically found between elevations 1 feet, MLLW and 14 feet, MLLW and based upon our limited field exploration and laboratory testing program, the two soils exhibit nearly identical properties. For stability analyses, the following engineering properties were selected for these soils:

5.2.3 Dense Sand

This stratum is a dense layer of fine to medium poorly-graded quartz sand with occasional lenses of firm silty sand. The layer is typically found between elevation 1 feet, MLLW and -24 feet, MLLW. For stability analyses, the following engineering properties were selected for this soil:

5.2.4 Marine Clay

Soft marine clay is typically found across Port Canaveral, at this location the stratum ranges from elevation -22 to -50 feet, MLLW within lenses of sandy clay above. In the design cross-section, the marine clay is expected to occur between elevations -24 feet, MLLW and -44 feet, MLLW. For stability analyses, the following engineering properties were selected for this soil:

- Standard Penetration Test "N" Value 3
- Saturated Unit Weight, γ_s 105 psf
- Effective Friction Angle, $\bar{\phi}$ 0
- Undrained Shear Strength, S_u 500 psf

5.2.5 Clayey Sand to Sandy Clay

Soft sandy clay to occasionally clayey fine sand underlies the marine clay between elevations -44 feet, MLLW to -60 feet, MLLW. For stability analyses, the following engineering properties were selected for this soil:

- Standard Penetration Test "N" Value 5
- Saturated Unit Weight, γ_s 110 psf
- Effective Friction Angle, $\bar{\phi}$ 30°
- Effective Cohesion, \bar{c} 0 psf

5.2.6 Shallow Silty Sand

The shallower layer of silty sand is found between elevations -60 and -65 feet, MLLW, but can be as shallow as -55 feet, MLLW. For stability analyses, the following engineering properties were selected for this soil:

- Standard Penetration Test "N" Value 20
- Saturated Unit Weight, γ_s 115 psf
- Effective Friction Angle, $\bar{\phi}$ 33°
- Effective Cohesion, \bar{c} 0 psf

5.2.7 Clayey Sand to Sandy Clay

A layer of soft sandy clay is typically found between the two silty sand layers in the range of elevation -65 to -75 feet, MLLW. For stability analyses, the following engineering properties were selected for this soil:

- Standard Penetration Test "N" Value 2
- Saturated Unit Weight, γ_s 105 psf
- Effective Friction Angle, $\bar{\phi}$ 28°
- Effective Cohesion, \bar{c} 0 psf

5.2.8 Deep Silty Sand

The soft sandy clay is underlain by silty sands. For stability analyses, the following engineering properties were selected for this soil:

- Standard Penetration Test "N" Value 20
- Saturated Unit Weight, γ_s 115 psf
- Effective Friction Angle, $\bar{\phi}$ 33°
- Effective Cohesion, \bar{c} 0 psf

5.3 Existing Dike Slope Stability

The computed factor of safety for the slope stability analyses of the existing dike geometry is approximately 1.57 for failure in the foundation soils, 1.69 for the lower slope by the shoreline and 2.29 on the dike slopes, all of which exceed the minimum recommended safety factor of 1.5. The analyses of the existing dike included the sandier dredge deposits as the dike foundation. The slope stability analyses results are presented in Figure 13.

5.4 Relocated Dike Slope Stability

The geometry of the relocated dike is proposed to be identical to the existing geometry. From the results of recent field and laboratory testing program it is not evident that there is any difference between the soil properties of the silty sand in the pond bottom and loose sand found in the foundation of the existing dike. The remainder of the soil profile is generally similar to the profile of the existing dike, and thus the factor of safety obtained from slope stability analyses would also be similar to the factor of safety at the existing slope.

6 BULKHEAD WALL EVALUATION AND RECOMMENDATIONS

6.1 General Soil Profile and Engineering Properties Used in the Analyses

The results of the past field explorations and laboratory testing programs are graphically summarized on the soil boring profiles presented in Appendices 3 and 4. The stratification of the boring profiles represents our interpretation of the field boring logs and the results of laboratory examinations of the recovered samples. The stratification lines represent the approximate boundary between soil types. The actual transition may be more gradual than implied.

The below soil profiles are outlined in general terms only. Please refer to the individual boring logs for soil profile details at the test boring locations. The selected engineering properties for each layer are based upon our interpretation of the soil type and our experience with similar subsurface conditions in the site vicinity.

6.1.1 West End of the South Side of the West Turning Basin Channel

The following soil properties are recommended for use in the analyses and design of the bulkhead at the west end of the south side of the West Turning Basin Channel for the bulkhead stability analysis shown on Figure 14.

- Loose to medium dense fine sand with shells (ground surface to Elevation -18 feet (MLLW)).

| | |
|--|---------|
| Saturated Unit Weight, γ_s | 120 pcf |
| Effective Cohesion, \bar{c} | 0 psf |
| Effective Friction Angle, $\bar{\phi}$ | 33° |

- Very loose fine sand from Elevation -18 feet (MLLW) to Elevation -20 feet (MLLW).

| | |
|--|---------|
| Saturated Unit Weight, γ_s | 115 pcf |
| Effective Cohesion, \bar{c} | 0 psf |
| Effective Friction Angle, $\bar{\phi}$ | 30° |

- Soft Clay in the general depth range of -20 feet (MLLW) to -41 feet (MLLW).

| | |
|--|---------|
| Saturated Unit Weight, γ_s | 100 pcf |
| Undrained Shear Strength, S_u | 800 psf |
| Effective Friction Angle, $\bar{\phi}$ | 0° |

- Loose clayey fine sand below Elevation -41 feet (MLLW).

| | |
|--|---------|
| Saturated Unit Weight, γ_s | 115 pcf |
| Effective Cohesion, \bar{c} | 0 psf |
| Effective Friction Angle, $\bar{\phi}$ | 32° |

6.1.2 East End of South Side of the West Turning Basin Channel

The following soil properties are recommended for use in the analyses and design of the bulkhead at the east end of the south side of the West Turning Basin Channel for bulkhead wall stability analyses shown on Figure 15.

- Medium dense fine sand to silty fine sand with shells (ground surface to Elevation -11 feet (MLLW)).

| | |
|--|---------|
| Saturated Unit Weight, γ_s | 115 pcf |
| Effective Cohesion, \bar{c} | 0 psf |
| Effective Friction Angle, $\bar{\phi}$ | 32° |

- Clayey sand to sandy clay in the general depth range of -11 feet (MLLW) to -27 feet (MLLW).

| | |
|--|---------|
| Saturated Unit Weight, γ_s | 100 pcf |
| Undrained Shear Strength, S_u | 800 psf |
| Effective Friction Angle, $\bar{\phi}$ | 0° |

- Medium dense silty to clayey fine sand from Elevation -27 feet (MLLW) to Elevation -39 feet (MLLW).

| | |
|--|---------|
| Saturated Unit Weight, γ_s | 115 pcf |
| Effective Cohesion, \bar{c} | 0 psf |
| Effective Friction Angle, $\bar{\phi}$ | 32° |

- Sandy clay below Elevation -39 feet (MLLW).

| | |
|--|-----------|
| Saturated Unit Weight, γ_s | 100 pcf |
| Undrained Shear Strength, \bar{c} | 1,500 psf |
| Effective Friction Angle, $\bar{\phi}$ | 0° |

6.1.3 Corner Cut-off of the West Turning Basin Channel

The following soil properties are recommended for use in the analyses and design of the bulkhead at the corner cut-off of the West Turning Basin Channel. These parameters are also presented in Figure 11 for the bulkhead wall stability analysis shown on Figure 16.

- Medium dense silty fine sand with shells (ground surface to Elevation -2.5 feet (MLLW)).

| | |
|--|---------|
| Saturated Unit Weight, γ_s | 115 pcf |
| Effective Cohesion, \bar{c} | 0 psf |
| Effective Friction Angle, $\bar{\phi}$ | 31° |

- Medium dense silty to clayey fine sand from Elevation -2.5 feet (MLLW) to Elevation -24 feet (MLLW).

| | |
|--|---------|
| Saturated Unit Weight, γ_s | 115 pcf |
| Effective Cohesion, \bar{c} | 0 psf |
| Effective Friction Angle, $\bar{\phi}$ | 31° |

- Soft clay to sandy clay in the general range from Elevation -24 feet (MLLW) to Elevation -42.5 feet (MLLW).

| | |
|--|---------|
| Saturated Unit Weight, γ_s | 105 pcf |
| Undrained Shear Strength, S_u | 800 psf |
| Effective Friction Angle, $\bar{\phi}$ | 0° |

- Clayey fine sand to sandy clay from Elevation -42.5 feet (MLLW) to Elevation -55 feet (MLLW).

| | |
|--|-----------|
| Saturated Unit Weight, γ_s | 120 pcf |
| Undrained Shear Strength, S_u | 1,500 psf |
| Effective Friction Angle, $\bar{\phi}$ | 0° |

- Loose silty to clayey fine sand below Elevation -55 feet (MLLW).

| | |
|--|---------|
| Saturated Unit Weight, γ_s | 110 pcf |
| Effective Cohesion, \bar{c} | 0 psf |
| Effective Friction Angle, $\bar{\phi}$ | 30° |

6.2 Anchored Bulkhead Evaluation

A typical bulkhead section was evaluated for stability for three different cross sections, as shown in Figures 14 through 16 using U.S. Army Corps of Engineers program CWALSHT. The anchored bulkhead was checked for structural stability using the fixed earth, free earth and equivalent beam support method.

Some of the criteria and assumptions which were used in the analyses are listed below:

- Final ground surface behind wall will be +10.0 feet (MLLW).
- The water table is at Elevation +6.0 feet (MLLW) behind the wall.
- The water level in the West Turning Basin is at Elevation 0.0 feet (MLLW).
- A factor of safety greater than or equal to 1.5.

Figure 14 shows the original design condition with a depth of -13 feet (MLLW) at the bulkhead and a slope of 2.4 (H) to 1.0 (V) to the dredge line at a depth of -33 feet (MLLW) in the channel. Figure 15 shows a depth of -18 feet (MLLW) at the bulkhead with a slope of 2.4 (H) to 1.0 (V) to the dredge line at a depth of -35 feet (MLLW) in the channel. Figure 16 shows the existing ground surface and shoreline without a bulkhead with a slope of 2.3 (H) to 1.0 (V) to the dredge line at a depth of -34 feet (MLLW). Also shown on Figures 15 through 16 are the projected limits of the proposed dredging to a depth of -40 feet (MLLW) with a slope of 3.0 (H) to 1.0 (V) on the south side of the channel and on the slope for the northeast corner cut-off. These cross-sections were used in the bulkhead stability analyses.

The estimated depths of embedment and anchor loads that resulted from this evaluation were similar, for the two bulkhead cases considered on the south side of the West Turning Basin, to the existing geometry. A new bulkhead wall will be required for the Corner Cut-off of the West Turning Basin and should be investigated and designed at a later date.

7 CLOSURE

The analyses and recommendations submitted herein are based upon the data obtained from the soil borings presented in Appendix B. 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. If variations then appear evident, it will be necessary to re-evaluate the recommendations presented in this report after performing onsite observations during the construction period and noting the characteristics of the variations.

This report has been prepared in accordance with generally accepted soil and foundation engineering practices. In the event any changes occur in the design, nature or location of the proposed facility, we should review the applicability of conclusions and recommendations in this report. We also recommend a general review of final design and specifications by our office to make sure that earthwork and foundation recommendations are properly interpreted and implemented in the design specifications.

Canaveral Port Authority
File Number 05-100

-82-

We appreciate the opportunity to be of service to you on this phase of the project. If you have any questions or comments regarding this report, or if we may be of further assistance, please feel free to contact us.

Very truly yours,
ARDAMAN & ASSOCIATES, INC.

Mohamad Al-hawaree, P.E.
Project Manager

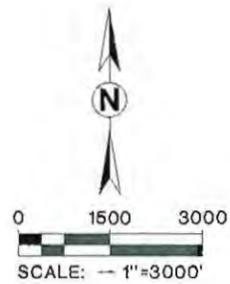
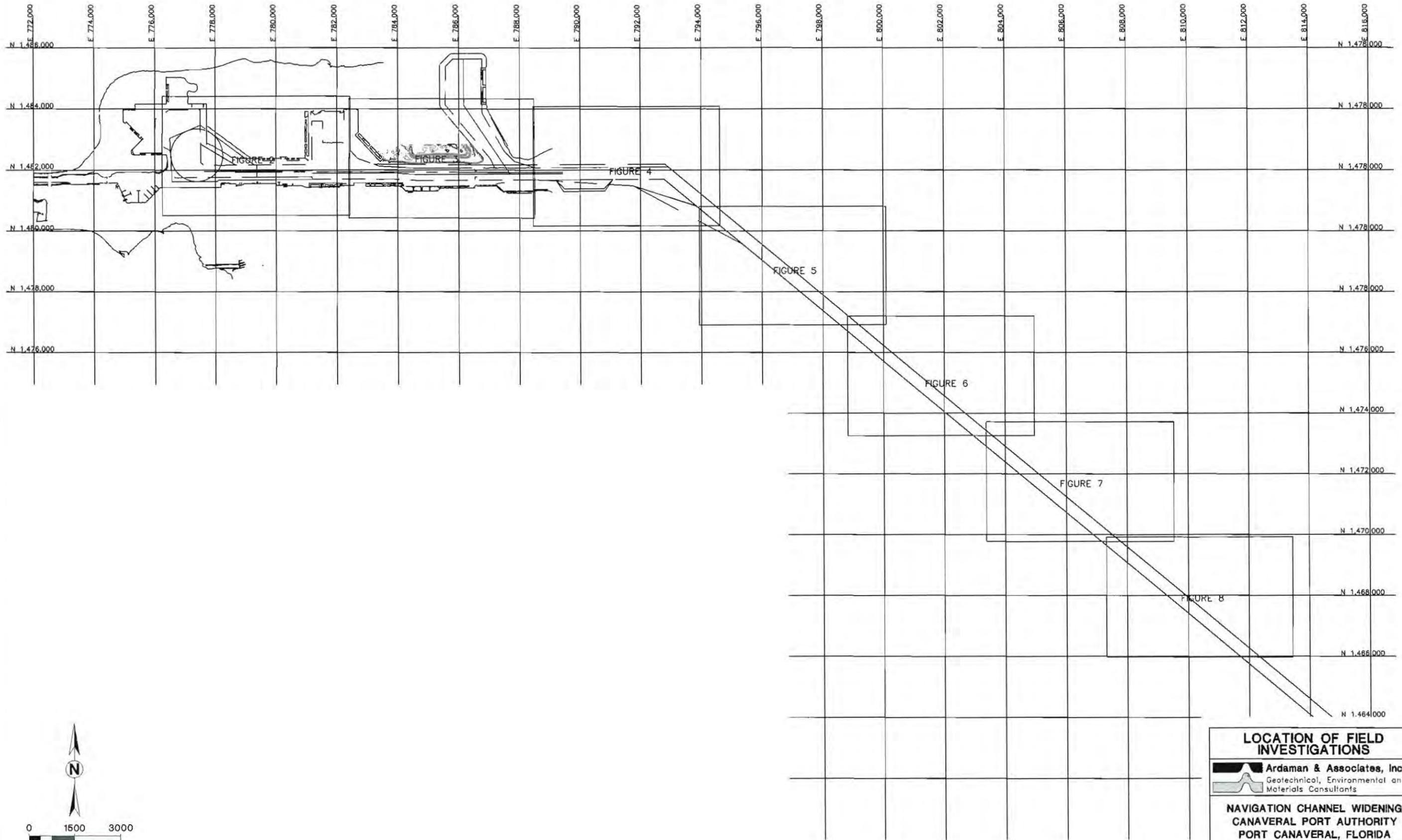
Simon J. Brooks, P.E.
Project Engineer

John E. Garlanger, Ph.D., P.E.
Principal Engineer
Florida Registration No. 19782

MH/SJB/JEG/bh

T:\Projects\2005\05-100\05-100 Section 203 Study.wpd

CADD FILE: SIMON\PROJECTS\JOBS\2005\05-100 FIGURES\FIGURES.DWG DATE: 05/24/06 REVISED BY: SJB



| | | |
|---|--------------|----------------------|
| LOCATION OF FIELD INVESTIGATIONS | | |
|  Ardaman & Associates, Inc. Geotechnical, Environmental and Materials Consultants | | |
| NAVIGATION CHANNEL WIDENING CANAVERAL PORT AUTHORITY PORT CANAVERAL, FLORIDA | | |
| DRAWN BY: SJB | CHECKED BY: | DATE: 5/17/06 |
| FILE NO. 05-100 | APPROVED BY: | FIGURE: 1 |

CADD FILE: SIMON\PROJECTS\JOBS\2005\05-100 FIGURES\FIGURES.DWG DATE 05/24/06 REVISED BY: SJB

N 1,484,000

N 1,484,000

E 778,000

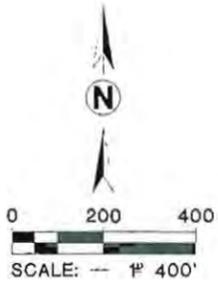
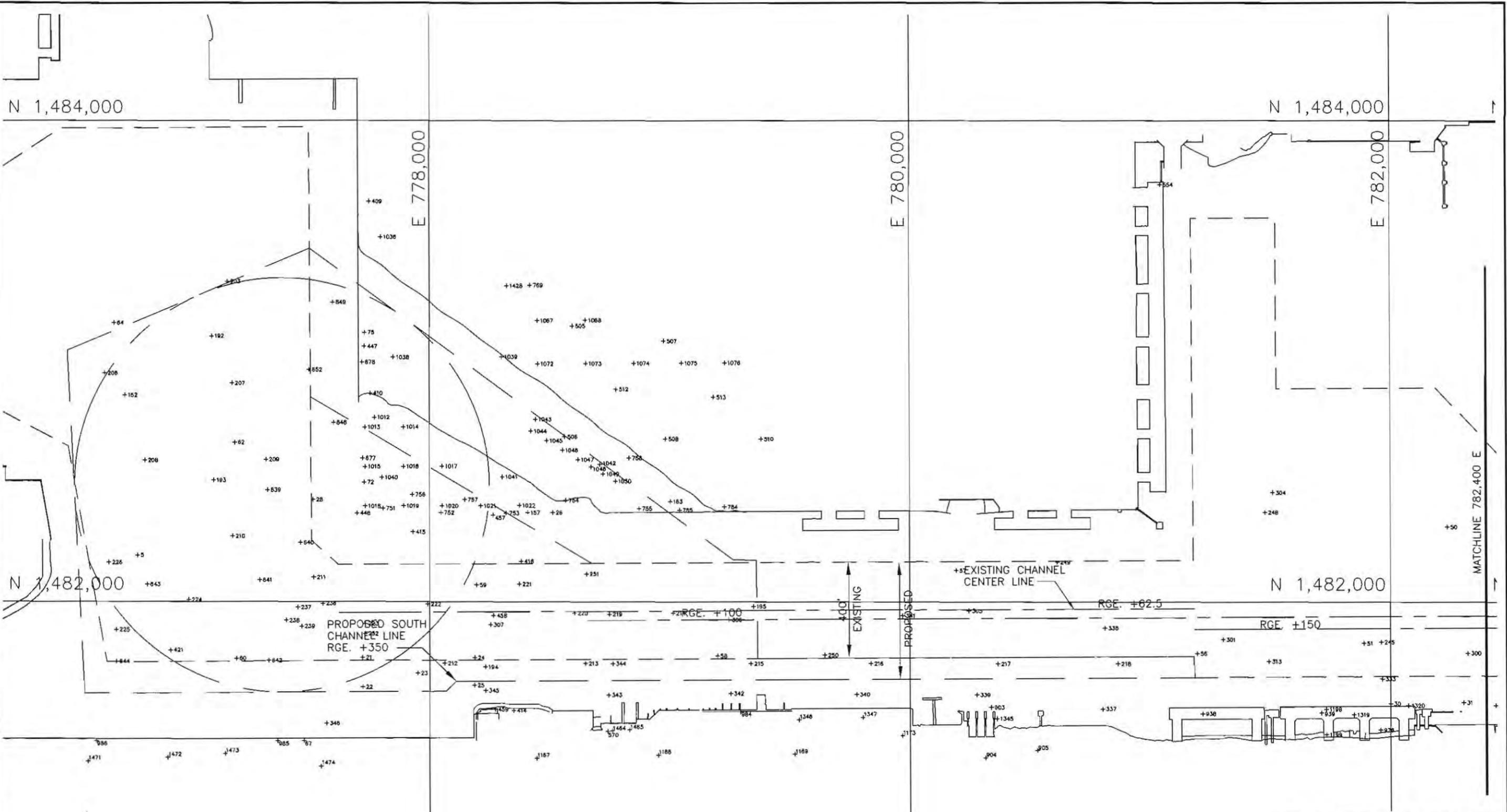
E 780,000

E 782,000

N 1,482,000

N 1,482,000

MATCHLINE 782,400 E



BORING LOCATION AND RECOVERED MATERIAL PLAN - 1

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

**NAVIGATION CHANNEL WIDENING
CANAVERAL PORT AUTHORITY
PORT CANAVERAL, FLORIDA**

| | | |
|-----------------|--------------|---------------|
| DRAWN BY: SJB | CHECKED BY: | DATE: 5/17/06 |
| FILE NO. 05-100 | APPROVED BY: | FIGURE: 2 |

CADD FILE: SIMON\PROJECTS\JOBS\2005\05-100 FIGURES\FIGURES DWG DATE: 05/24/06 REVISED BY: SJB

N 1,484,000

N 1,484,000

E 784,000

E 786,000

E 788,000

MATCHLINE 782,400 E

MATCHLINE 788,500 E

STA. 224+65
RGE. +100

N 1,482,000

N 1,482,000

DREDGE LIMIT
FOR 1:3.5 SLOPE

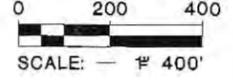
EXISTING NORTH
CHANNEL LINE

EXISTING CHANNEL
CENTER LINE

EXISTING SOUTH
CHANNEL LINE

APPROX. TOE OF
ROCK REVETMENT

400'
EXISTING
500'
PROPOSED



**BORING LOCATION AND
RECOVERED MATERIAL PLAN - 2**

Ardaman & Associates, Inc.
Geotechnical, Environmental and
Materials Consultants

**NAVIGATION CHANNEL WIDENING
CANAVERAL PORT AUTHORITY
PORT CANAVERAL, FLORIDA**

DRAWN BY: **SJB** CHECKED BY: DATE: **5/17/06**
FILE NO. **05-100** APPROVED BY: FIGURE: **3**

CADD FILE: SIMON\PROJECTS\JOBS\2005\05-100 FIGURES\FIGURES.DWG DATE: 05/24/06 REVISED BY: SJB

N 1,484,000

N 1,484,000

E 790,000

E 792,000

E 794,000

MATCHLINE 2-3

MATCHLINE 3-4

N 1,482,000

N 1,482,000

RGE. -100

RGE. +150

RGE. +400

+1212

+1211

+1208

+1209

+1210

+1225

+1207

+354

+376

+351

+360

+379

+358

+358

+382

+347

+365

+352

+377

+293

+380

+292

+291

+383

+290

+361

+353

+378

+378

+350

+381

+349

+384

+348

+386

+1204

+1205

+1206

+387

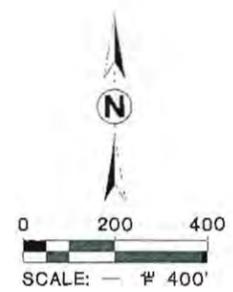
+289

+388

+389

+390

+288



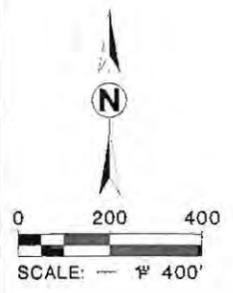
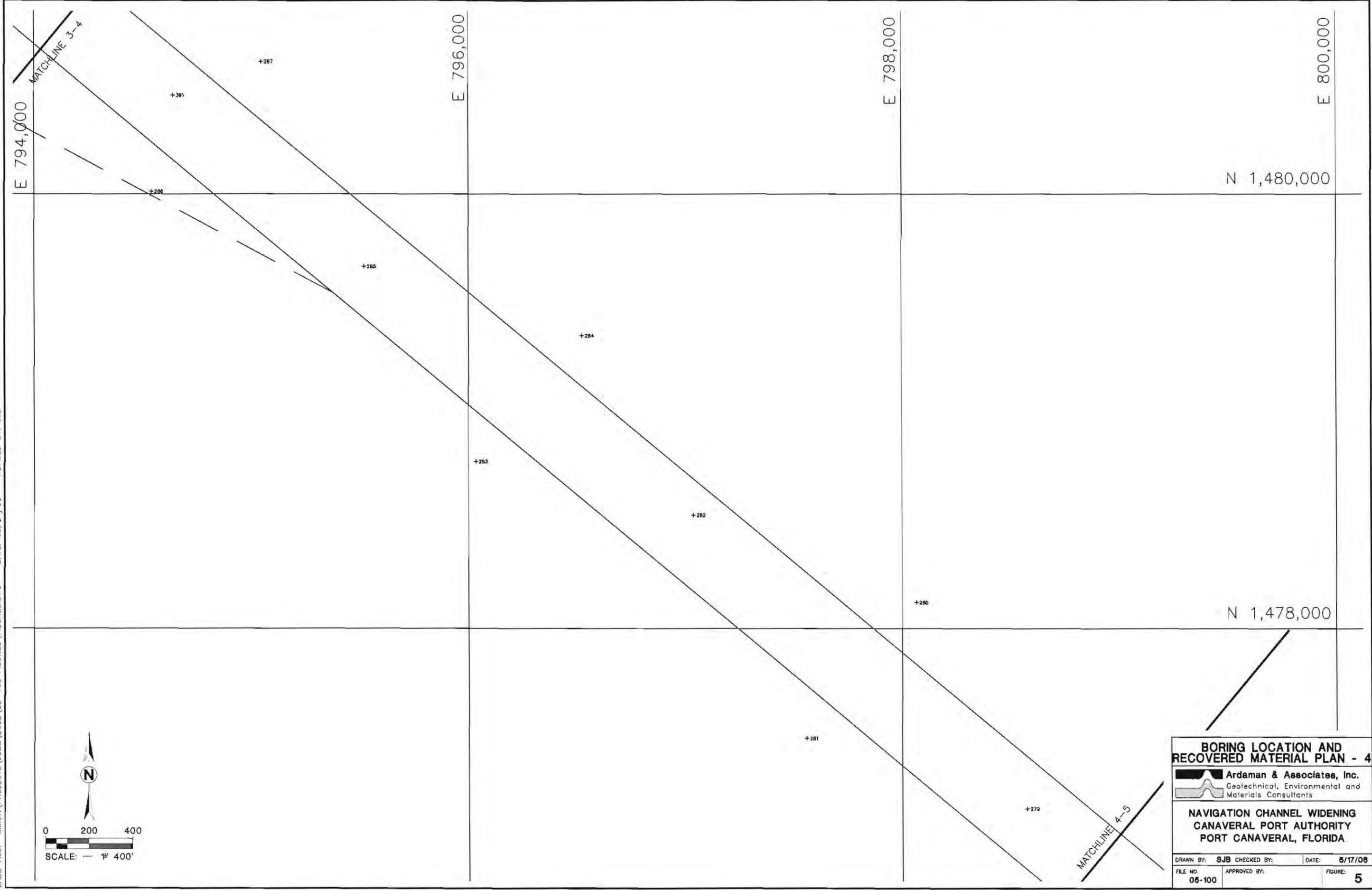
BORING LOCATION AND RECOVERED MATERIAL PLAN - 3

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

**NAVIGATION CHANNEL WIDENING
CANAVERAL PORT AUTHORITY
PORT CANAVERAL, FLORIDA**

| | | |
|-----------------|--------------|---------------|
| DRAWN BY: SJB | CHECKED BY: | DATE: 5/17/06 |
| FILE NO. 05-100 | APPROVED BY: | FIGURE: 4 |

CADD FILE: SIMON\PROJECTS\JOBS\2005\05-100-FIGURES\FIGURES.DWG DATE: 05/24/06 REVISED BY: SJB



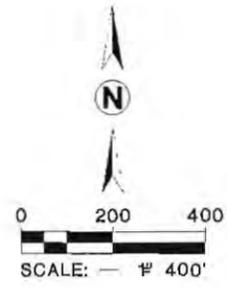
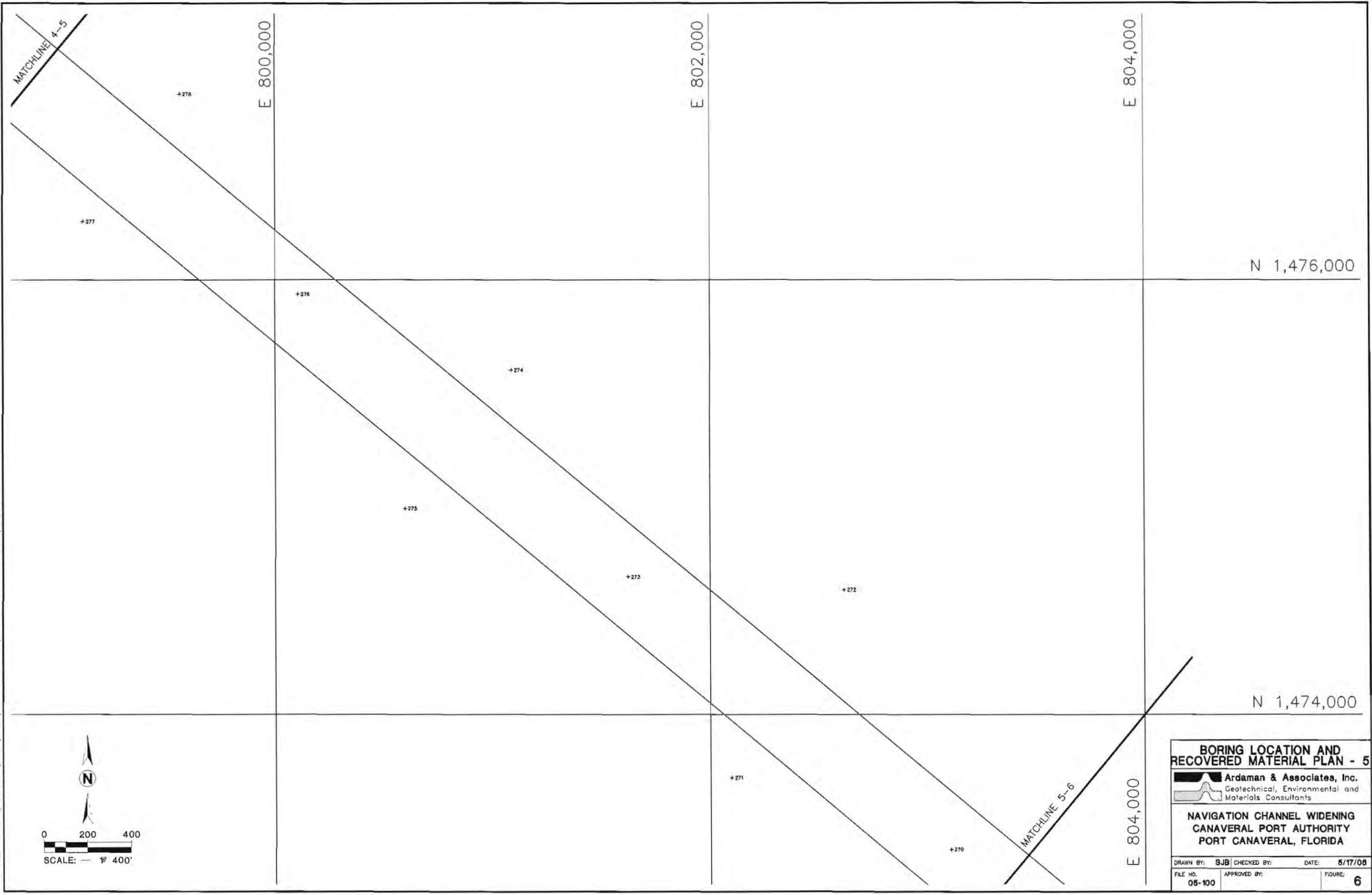
BORING LOCATION AND RECOVERED MATERIAL PLAN - 4

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

**NAVIGATION CHANNEL WIDENING
CANAVERAL PORT AUTHORITY
PORT CANAVERAL, FLORIDA**

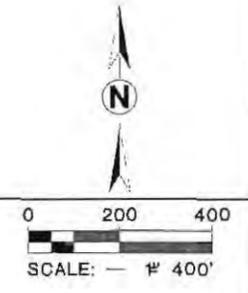
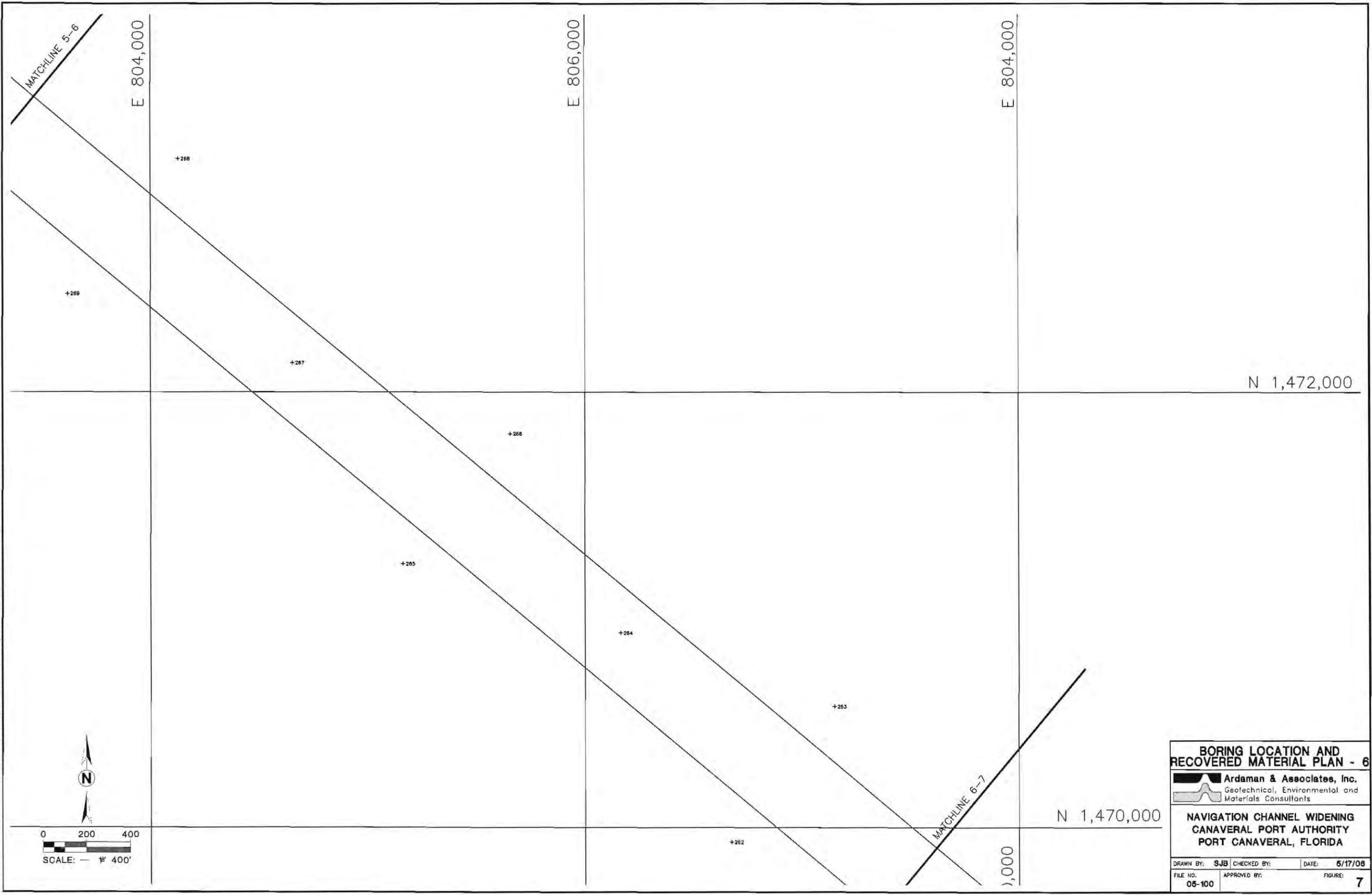
| | | |
|-----------------|--------------|---------------|
| DRAWN BY: SJB | CHECKED BY: | DATE: 5/17/06 |
| FILE NO. 06-100 | APPROVED BY: | FIGURE: 5 |

CADD FILE: SIMON\PROJECTS\JOBS\2005\05-100 FIGURES\FIGURES.DWG DATE: 05/24/06 REVISED BY: SJB



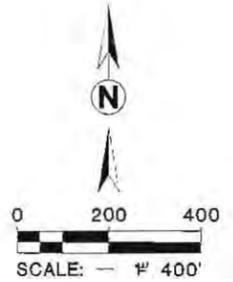
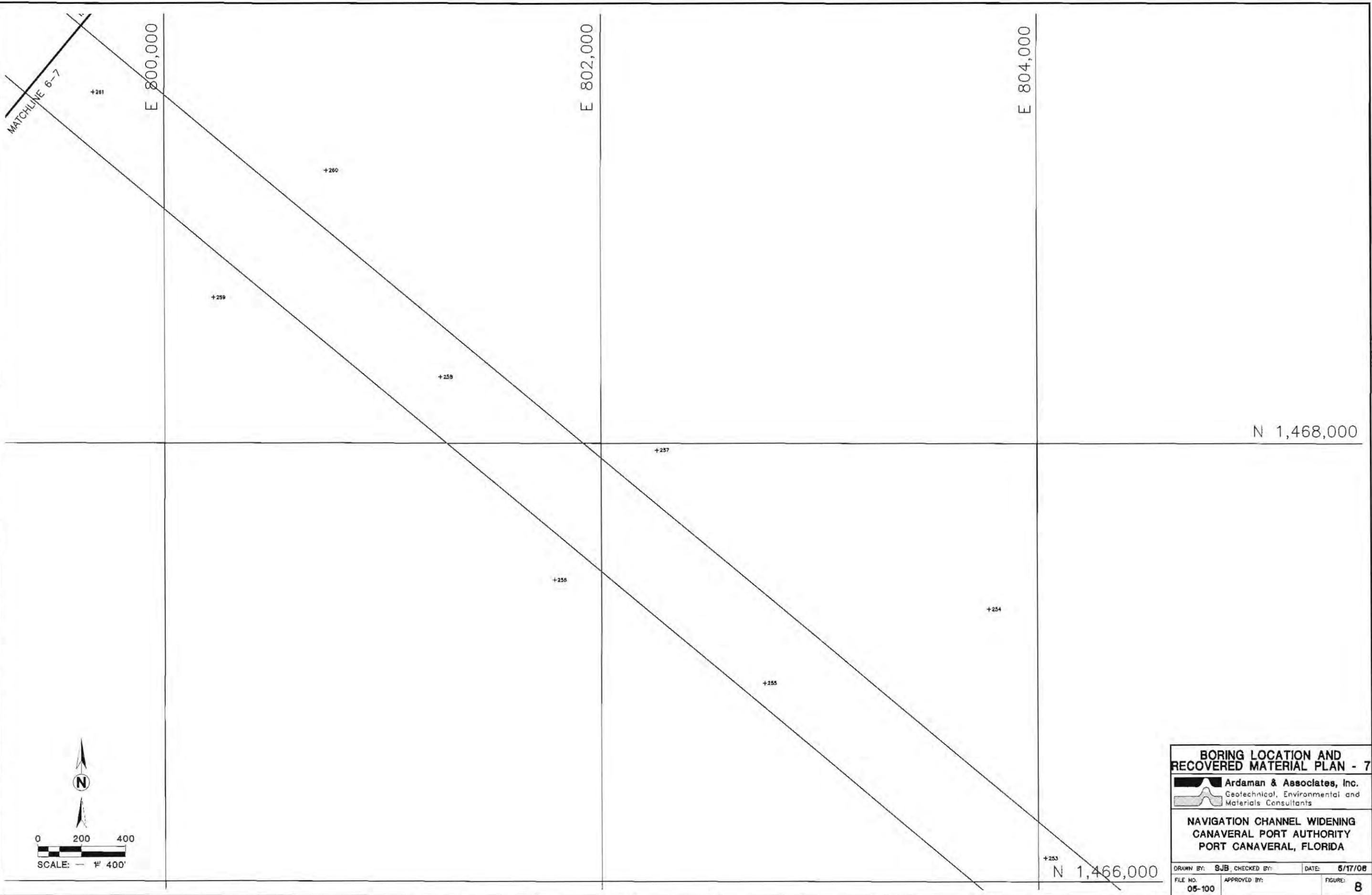
| | | |
|---|--------------|----------------------|
| BORING LOCATION AND RECOVERED MATERIAL PLAN - 5 | | |
|  Ardaman & Associates, Inc. Geotechnical, Environmental and Materials Consultants | | |
| NAVIGATION CHANNEL WIDENING CANAVERAL PORT AUTHORITY PORT CANAVERAL, FLORIDA | | |
| DRAWN BY: SJB | CHECKED BY: | DATE: 5/17/06 |
| FILE NO. 05-100 | APPROVED BY: | FIGURE: 6 |

CADD FILE: SIMON\PROJECTS\JOBS\2005\05-100 FIGURES\FIGURES.DWG DATE: 05/24/06 REVISED BY: SJB



| | | |
|--|--------------|----------------------|
| BORING LOCATION AND RECOVERED MATERIAL PLAN - 6 | | |
|  Ardaman & Associates, Inc. Geotechnical, Environmental and Materials Consultants | | |
| NAVIGATION CHANNEL WIDENING CANAVERAL PORT AUTHORITY PORT CANAVERAL, FLORIDA | | |
| DRAWN BY: SJB | CHECKED BY: | DATE: 5/17/08 |
| FILE NO. 05-100 | APPROVED BY: | FIGURE: 7 |

CADD FILE: SIMON\PROJECTS\JOBS\2005\05-100 FIGURES\FIGURES.DWG DATE: 05/24/06 REVISED BY: SJB



| | | |
|---|--------------|----------------------|
| BORING LOCATION AND RECOVERED MATERIAL PLAN - 7 | | |
| Ardaman & Associates, Inc. Geotechnical, Environmental and Materials Consultants | | |
| NAVIGATION CHANNEL WIDENING CANAVERAL PORT AUTHORITY PORT CANAVERAL, FLORIDA | | |
| DRAWN BY: SJB | CHECKED BY: | DATE: 5/17/06 |
| FILE NO. 05-100 | APPROVED BY: | FIGURE: 8 |

CADD FILE: SIMON\PROJECTS\JOBS\2005\05-100 FIGURES\NW PROFILE.DWG DATE: 05/23/06 REVISED BY: SJB

| ELEVATION FEET, NGVD | SOIL DESCRIPTION | SOIL CHARACTERISTICS | | | |
|-------------------------|---|----------------------|-------------------|-----------------------|--------------------|
| | | SPT "N" VALUE | γ (PCF) | $\bar{\phi}$ (PSF) | \bar{c} (PSF) |
| 10 5 0 | SILTY FINE SAND, OCCASIONAL CLAYEY FINE SAND TO SANDY CLAY AND SAND LENSES, TRACE SHELL | 15 | 115 | 32 | 0 |
| -5 -10 -15 | SILTY FINE SAND, SOME SANDY LENSES, TRACE SHELL | 6 | 110 | 30 | 0 |
| -20 -25 -30 | FINE SAND, WITH SILTY FINE SAND LENSES AND TRACE SHELL | 15 | 115 | 32 | 0 |
| -35 -40 -45 | SANDY CLAY TO CLAYEY FINE SAND WITH LENSES OF SOFT CLAY | 5 | 110 | 0 | 800 |

**SOIL PROFILE OF WEST
TURNING BASIN CORNER
CUT-OFF - NORTHWEST END**

 **Ardaman & Associates, Inc.**
Geotechnical, Environmental and
Materials Consultants

**NAVIGATION CHANNEL WIDENING
CANAVERAL PORT AUTHORITY
PORT CANAVERAL, FLORIDA**

| | | |
|-------------------------|---------------------|----------------------|
| DRAWN BY: SJB | CHECKED BY: | DATE: 5/23/06 |
| FILE NO.: 05-100 | APPROVED BY: | FIGURE: 9 |

| ELEVATION FEET, NGVD | SOIL DESCRIPTION | SOIL CHARACTERISTICS | | |
|-------------------------|--|----------------------|-------------------|---------------------------------|
| | | SPT "N" VALUE | γ (PCF) | $\bar{\phi}$ \bar{c} (PSF) |
| 10 | FINE SAND, OCCASIONAL CLAYEY FINE SAND LENSES, TRACE SHELL | 12 | 115 | 32 0 |
| 5 | | | | |
| 0 | CLAYEY FINE SAND TO SANDY CLAY WITH FINE TO MEDIUM SAND AND SOFT CLAY LENSES | 10 | 115 | 31 0 |
| -5 | | | | |
| -10 | FINE SAND WITH TRACE SHELL | 20 | 120 | 33 0 |
| -15 | CLAYEY FINE SAND TO SANDY CLAY WITH FINE SAND AND SOFT CLAY LENSES | 3 | 105 | 29 0 |
| -20 | | | | |
| -25 | SOFT CLAY | 1 | 105 | 0 800 |
| -30 | | | | |
| -35 | SILTY FINE SAND, OCCASIONAL FINE SAND | 25 | 120 | 34 0 |
| -40 | | | | |
| -45 | | | | |

SOIL PROFILE OF WEST TURNING BASIN CORNER CUT-OFF - SOUTHEAST END



NAVIGATION CHANNEL WIDENING
CANAVERAL PORT AUTHORITY
PORT CANAVERAL, FLORIDA

| | | |
|-----------------|--------------|---------------|
| DRAWN BY: SJB | CHECKED BY: | DATE: 5/23/06 |
| FILE NO. 05-100 | APPROVED BY: | FIGURE: 10 |

CADD FILE: SIMON\PROJECTS\JOBS\2005\05-100 FIGURES\BH PROFILE.DWG DATE: 05/23/06 REVISED BY: SJB

| ELEVATION FEET, NGVD | SOIL DESCRIPTION | SOIL CHARACTERISTICS | | | |
|--------------------------|---|----------------------|-------------------|-----------------------|--------------------|
| | | SPT "N" VALUE | γ (PCF) | $\bar{\phi}$ (PSF) | \bar{c} (PSF) |
| 10 5 0 | SILTY FINE SAND, OCCASIONAL CLAYEY FINE SAND, SANDY CLAY AND SOFT CLAY LENSES | 10 | 115 | 31 | 0 |
| -5 -10 -15 -20 | SILTY FINE SAND AND CLAYEY FINE SAND | 10 | 115 | 31 | 0 |
| -25 -30 -35 -40 | SOFT CLAY AND SANDY CLAY | 1 | 105 | 0 | 800 |
| -45 -50 | SANDY CLAY | 8 | 120 | 0 | 1500 |
| -55 -60 | SILTY FINE SAND AND CLAYEY FINE SAND | 8 | 110 | 30 | 0 |

SOIL PROFILE OF WEST
TURNING BASIN CORNER
CUT-OFF - BULKHEAD WALL

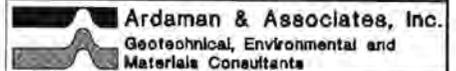


NAVIGATION CHANNEL WIDENING
CANAVERAL PORT AUTHORITY
PORT CANAVERAL, FLORIDA

| | | |
|--------------------|--------------|---------------|
| DRAWN BY: SJB | CHECKED BY: | DATE: 5/23/06 |
| FILE NO. 05-100 | APPROVED BY: | FIGURE: 11 |

| ELEVATION FEET, NGVD | SOIL DESCRIPTION | SOIL CHARACTERISTICS | | |
|--------------------------|---|----------------------|-------------------|------------------------------------|
| | | SPT 'N' VALUE | γ (PCF) | $\bar{\phi}$ \bar{c} (PSF) |
| 40 35 30 25 | FINE TO MEDIUM SAND - DIKE FILL | 25 | 120 | 35 0 |
| 10 5 | SOFT SILTY SAND WITH OCCASIONAL CLAY BEAMS AND LOOSE FINE SAND - DREDGE MATERIALS | 8 | 110 | 30 0 |
| 0 -5 -10 -15 | DENSE FINE TO MEDIUM SAND WITH OCCASIONAL LENSES OF FIRM SILTY SAND | 50 | 125 | 38 0 |
| -25 -30 -35 -40 | SOFT CLAY | 3 | 105 | 0 500 |
| -45 -50 -55 -60 | SOFT SANDY CLAY TO OCCASIONALLY CLAYEY FINE SAND | 5 | 110 | 30 0 |

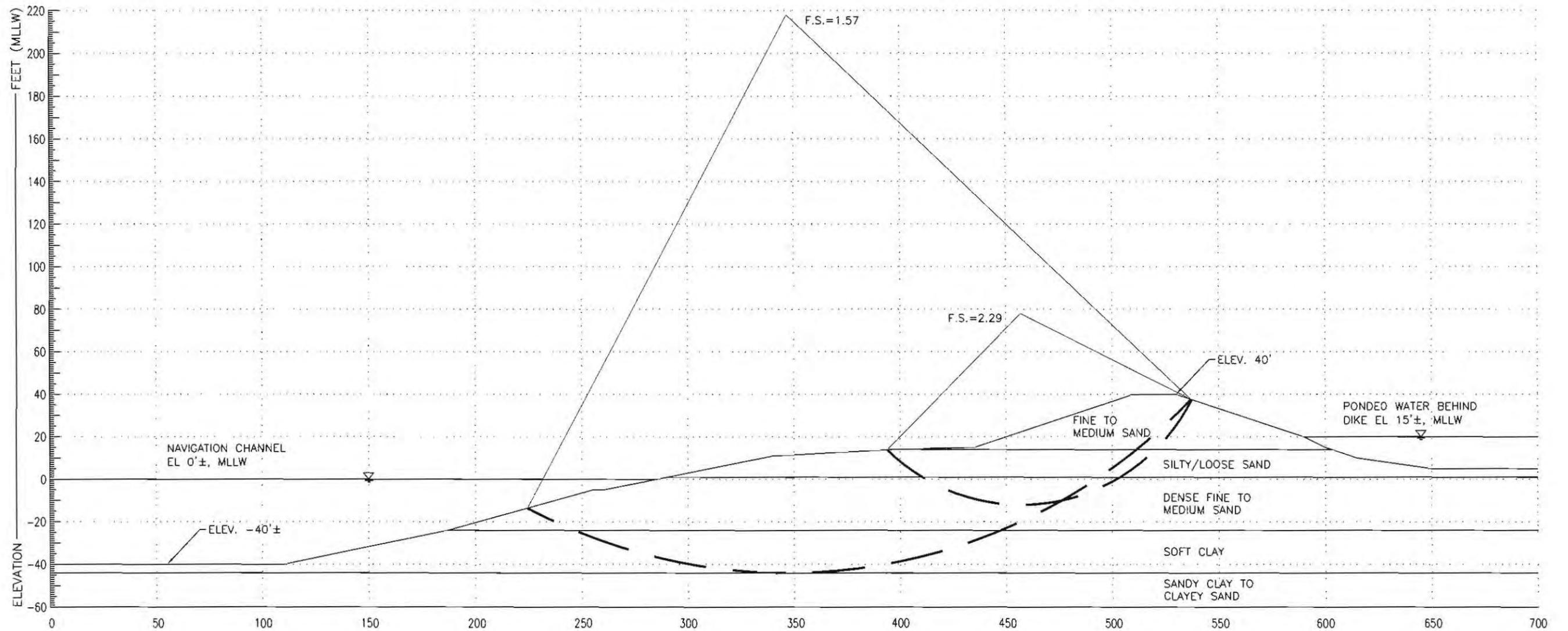
SOIL PROFILE OF MIDDLE TURNING BASIN ACCESS CHANNEL DIKE RELOCATION



NAVIGATION CHANNEL WIDENING
CANAVERAL PORT AUTHORITY
PORT CANAVERAL, FLORIDA

| | | |
|-----------------|--------------|---------------|
| DRAWN BY: SJB | CHECKED BY: | DATE: 5/24/08 |
| FILE NO. 05-100 | APPROVED BY: | FIGURE 12 |

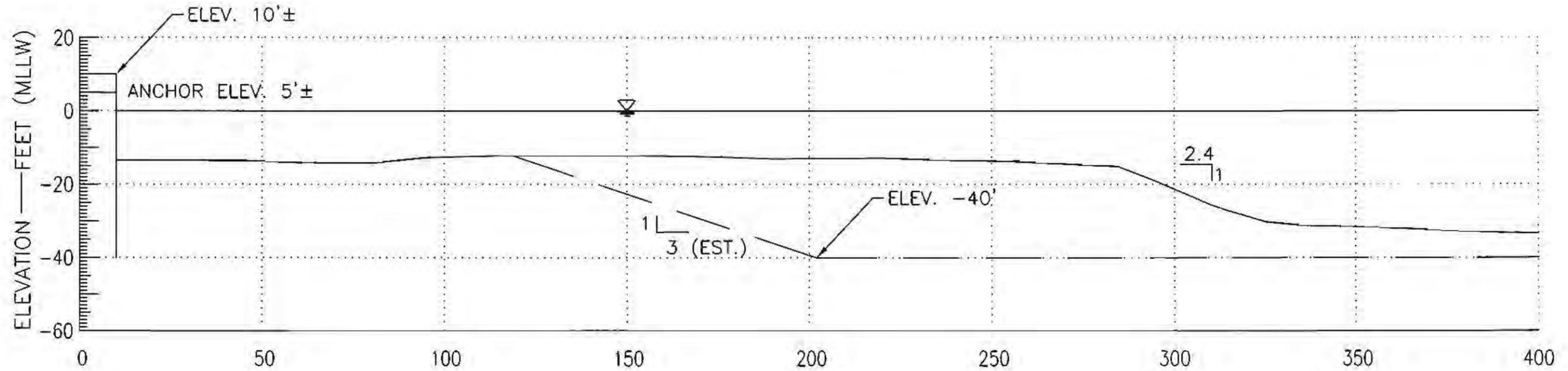
STABILITY RESULTS FOR DIKE RELOCATION



CADD FILE: SIMON\PROJECTS\JOBS\2005\05-100\STABILITY_RESULTS.DWG DATE: 05/24/06 REVISED BY: SJB

| | | |
|---|--------------|----------------------|
| STABILITY ANALYSES RESULTS FOR EXISTING MIDDLE TURNING BASIN ACCESS CHANNEL DIKE RELOCATION | | |
|  Ardaman & Associates, Inc. Geotechnical, Environmental and Materials Consultants | | |
| NAVIGATION CHANNEL WIDENING CANAVERAL PORT AUTHORITY PORT CANAVERAL, FLORIDA | | |
| DRAWN BY: SJB | CHECKED BY: | DATE: 5/17/06 |
| FILE NO. 05-100 | APPROVED BY: | FIGURE: 13 |

CONCEPTUAL CROSS-SECTION FOR BARGE CANAL ENTRANCE



CADD FILE: SIMON\PROJECTS\JOBS\2005\05-100\BULKHEAD CROSS-SECTIONS\CS-1.DWG DATE: 12/18/07 REVISED BY: SUB

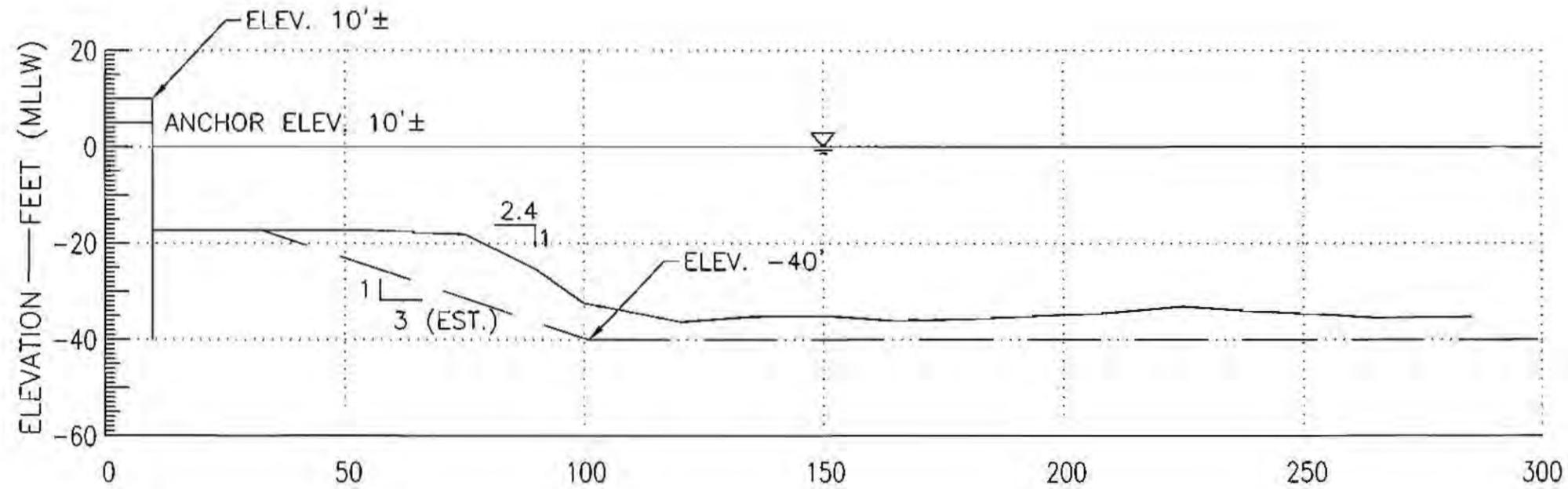
CONCEPTUAL CROSS-SECTION BARGE CANAL ENTRANCE

 **Ardaman & Associates, Inc.**
Geotechnical, Environmental and
Materials Consultants

**NAVIGATION CHANNEL WIDENING
CANAVERAL PORT AUTHORITY
PORT CANAVERAL, FLORIDA**

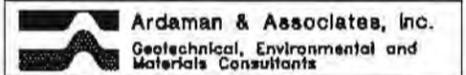
| | | |
|---------------------------|--------------|----------------------|
| DRAWN BY: SJS | CHECKED BY: | DATE: 8/17/08 |
| FILE NO. 05-100 | APPROVED BY: | FIGURE: 14 |

**CONCEPTUAL CROSS-SECTION
FOR WEST TURNING BASIN ENTRANCE**



CADD FILE: SIMON\PROJECTS\JOBS\2005\05-100\BULKHEAD CROSS-SECTIONS\CS-2.DWG DATE: 12/18/07 REVISED BY: SJB

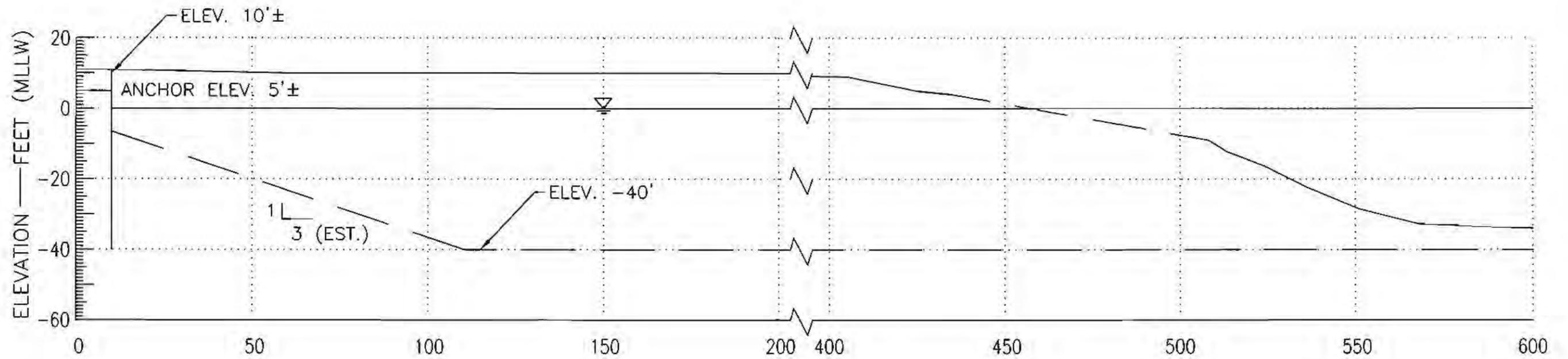
**CONCEPTUAL CROSS-SECTION
WEST TURNING BASIN ENTRANCE**



**NAVIGATION CHANNEL WIDENING
CANAVERAL PORT AUTHORITY
PORT CANAVERAL, FLORIDA**

| | | |
|--------------------|--------------|---------------|
| DRAWN BY: SJB | CHECKED BY: | DATE: 8/17/08 |
| FILE NO: 08-100 | APPROVED BY: | FIGURE: 15 |

**CONCEPTUAL CROSS-SECTION
WEST TURNING CIRCLE CORNER CUT-OFF**



CAD00 FILE: SIMON\PROJECTS\JOBS\2005\05-100\BULKHEAD CROSS-SECTIONS\CS-3.DWG DATE: 12/18/07 REVISED BY: SUB

| | | |
|---|--------------|----------------------|
| CONCEPTUAL CROSS-SECTION WEST TURNING CIRCLE CORNER CUT-OFF | | |
|  Ardaman & Associates, Inc. Geotechnical, Environmental and Materials Consultants | | |
| NAVIGATION CHANNEL WIDENING CANAVERAL PORT AUTHORITY PORT CANAVERAL, FLORIDA | | |
| DRAWN BY: BJB | CHECKED BY: | DATE: 5/17/08 |
| FILE NO. 06-100 | APPROVED BY: | FIGURE: 16 |

Appendix 1

Sampling Procedures

STANDARD PENETRATION TEST

The standard penetration test is a widely accepted test method of *in situ* testing of foundation soils (ASTM D 1586). 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 to 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 a least six months 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 2

Recent Ardaman Test Boring Logs

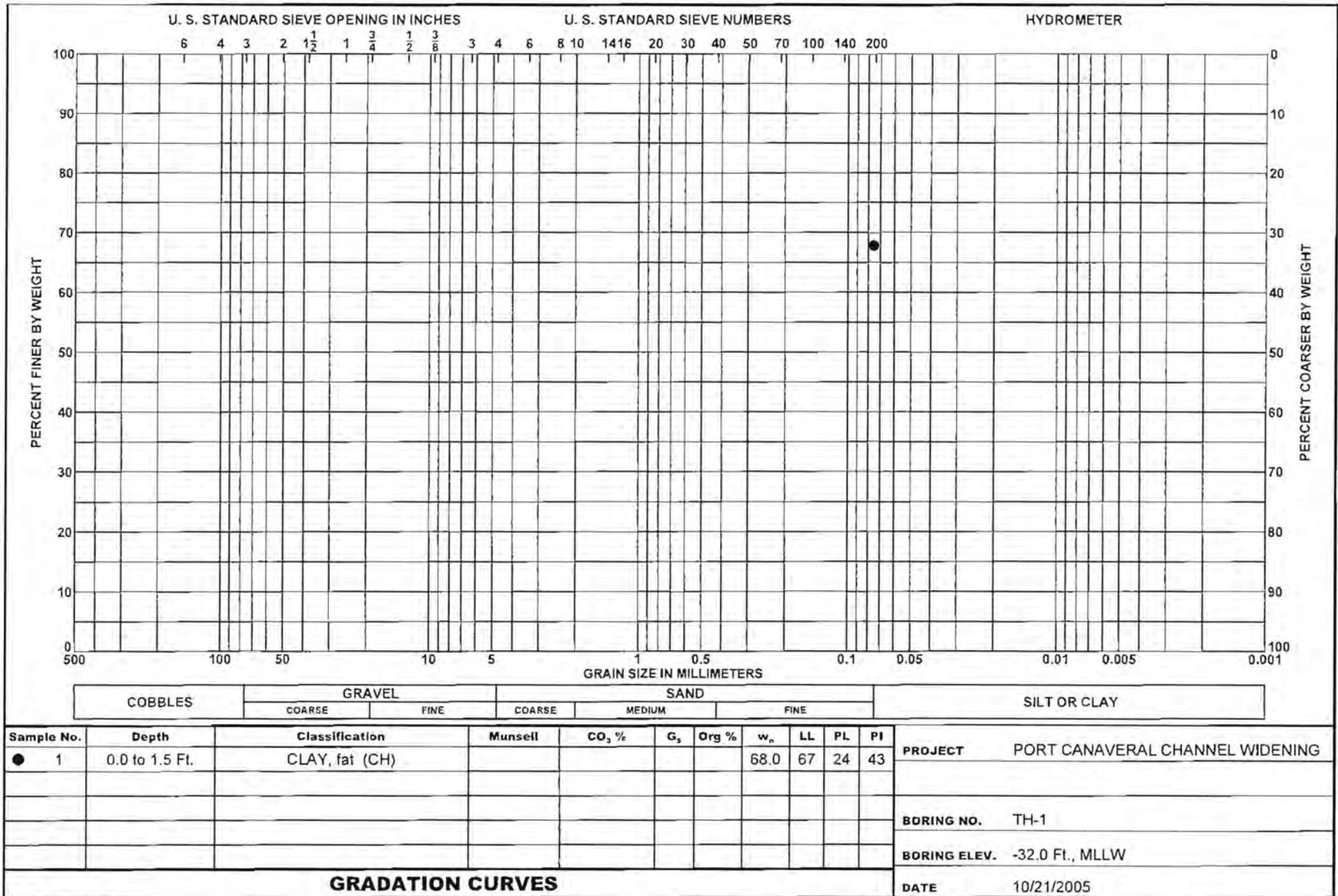
Boring Designation TH-1

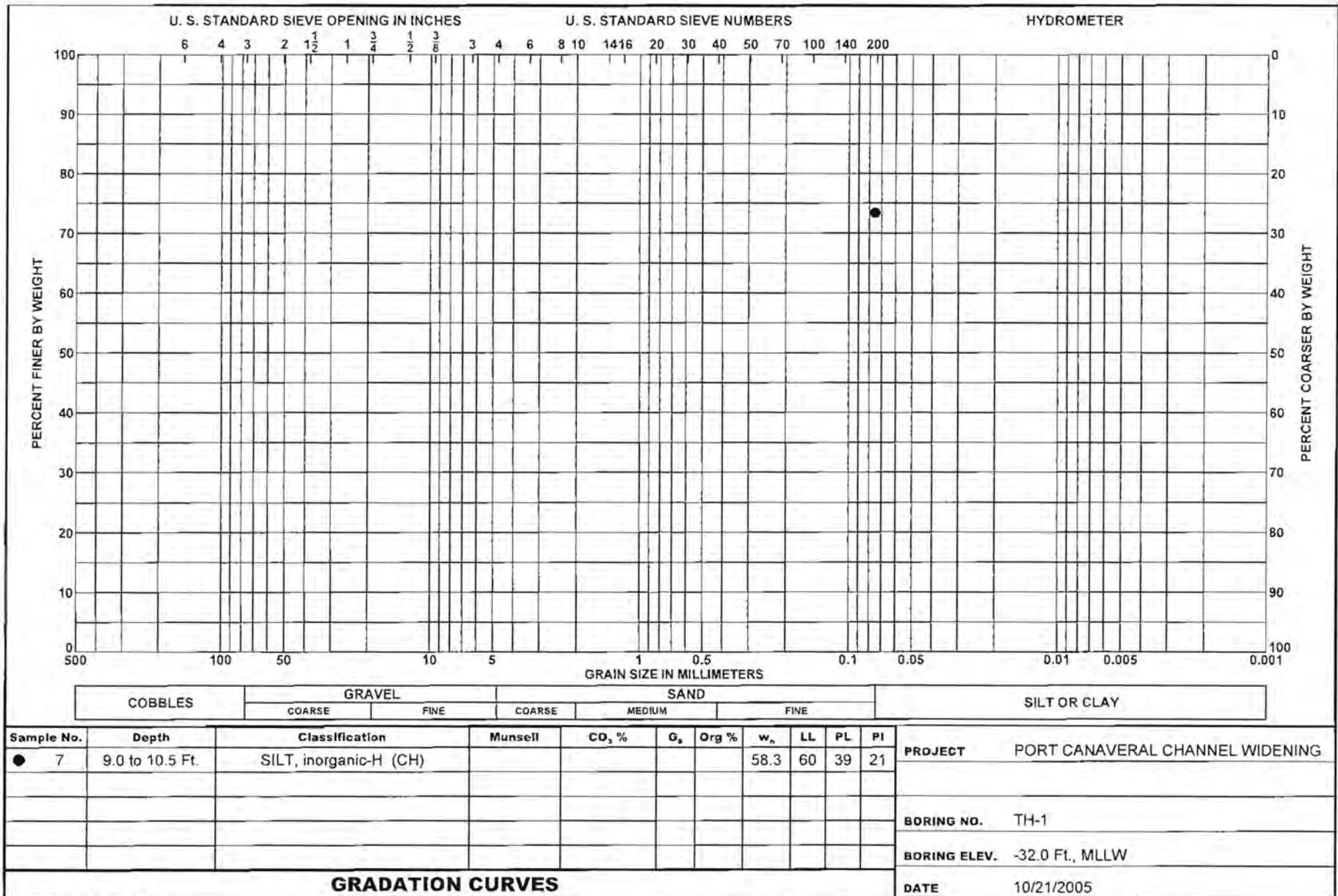
| | | | | | | | |
|---|--|---|--|---|--|---|--|
| DRILLING LOG | | DIVISION Corporate Engineering | | INSTALLATION | | SHEET 1 OF 2 SHEETS | |
| 1. PROJECT PORT CANAVERAL CHANNEL WIDENING | | | | 9. SIZE AND TYPE OF BIT 3" Tricone | | | |
| 2. BORING DESIGNATION TH-1 | | LOCATION COORDINATES X = 793,859 Y = 1,480,514 | | 10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) | | HORIZONTAL NAD83 | |
| 3. DRILLING AGENCY AMDRILL, Inc. | | CONTRACTOR FILE NO. 05-100 | | 11. MANUFACTURER'S DESIGNATION OF DRILL CME-45 (barge-mounted) | | <input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER | |
| 4. NAME OF DRILLER T. Clarkson | | | | 12. TOTAL SAMPLES | | DISTURBED 14 UNDISTURBED (UD) 0 | |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | DEG. FROM VERTICAL | | BEARING | | 13. TOTAL NUMBER CORE BOXES 0 | |
| 6. THICKNESS OF OVERBURDEN N/A | | | | 14. ELEVATION GROUND WATER Not Determined | | | |
| 7. DEPTH DRILLED INTO ROCK N/A | | | | 15. DATE BORING | | STARTED 09-23-05 COMPLETED 09-23-05 | |
| 8. TOTAL DEPTH OF BORING 21.0 Ft. | | | | 16. ELEVATION TOP OF BORING -32.0 Ft. | | | |
| | | | | 17. TOTAL RECOVERY FOR BORING 62 % | | | |
| | | | | 18. SIGNATURE AND TITLE OF INSPECTOR R. Burr, Geologist | | | |

| ELEV. | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % REC. | BOX OR SAMPLE | ROD OR UD | REMARKS | BLOWS/ 0.5 FT. | N-VALUE |
|-------|-------|-------------------|--|--------|---------------|-----------|-------------|----------------|---------|
| -32.0 | 0.0 | | | | | | -32.0 | | 0 |
| | | [Hatched Pattern] | CLAY, fat, medium plasticity, soft, mostly clay, little silt, trace shell, trace fine gravel-sized shell, moist, stratified, gray (CH) | 67 | 1 | | SPT Sampler | WR | 0 |
| | | | | 67 | 2 | | SPT Sampler | WR | 0 |
| | | | | 67 | 3 | | SPT Sampler | WR | 0 |
| | | | | 67 | 4 | | SPT Sampler | WR | 0 |
| | | | | 67 | 5 | | SPT Sampler | WR | 0 |
| | | | | 67 | 6 | | SPT Sampler | WR | 0 |
| | | | | 67 | 7 | | SPT Sampler | 2 1 3 | 4 |
| | | | | 67 | 8 | | SPT Sampler | WH | 0 |
| | | | | 67 | 9 | | SPT Sampler | WH | 2 |
| | | | | 0 | 10 | | SPT Sampler | WR | 0 |
| -41.0 | 9.0 | | CLAY, fat, high plasticity, soft, mostly clay, trace shell, trace fine gravel-sized shell, moist, gray (CH) | | | | | | 15 |
| | | | | | | | -47.0 | | |

| DRILLING LOG (Cont. Sheet) | | | INSTALLATION | | | SHEET 2 OF 2 SHEETS | | | | | | | | | | | | |
|---|--------------|---|--|--------------|---------------------------|------------------------|-------------|-------------------|---------|----------|----|--|--|--|--|--|--|--|
| PROJECT | | | COORDINATE SYSTEM/DATUM | | HORIZONTAL | VERTICAL | | | | | | | | | | | | |
| PORT CANAVERAL CHANNEL WIDENING | | | State Plane, FLE (U.S. Ft.) | | NAD83 | MLLW | | | | | | | | | | | | |
| LOCATION COORDINATES | | | ELEVATION TOP OF BORING | | | | | | | | | | | | | | | |
| X = 793,859 Y = 1,480,514 | | | -32.0 Ft. | | | | | | | | | | | | | | | |
| ELEV. | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % REC. | BOX OR SAMPLE | RQD OR D | REMARKS | BLOWS/ 0.5 FT. | N-VALUE | | | | | | | | | |
| -48.0 | 16.0 |  | SAND, clayey, low plasticity, soft, mostly fine-grained sand-sized sand, little silt, trace clay, moist, dark brown (SC) | 67 | 11 | | SPT Sampler | 5 4 | 9 | | | | | | | | | |
| | |  | | 67 | 12 | | SPT Sampler | 5 1 3 | | | | | | | | | | |
| -51.0 | 19.0 |  | SAND, silty, mostly fine-grained sand-sized sand, little silt, trace clay, dry, green (SM) | 67 | 13 | | SPT Sampler | 4 3 | 11 | | | | | | | | | |
| | |  | | 67 | 14 | | SPT Sampler | 8 2 3 | | | | | | | | | | |
| -53.0 | 21.0 |  | | | | | | 12 | 15 | | | | | | | | | |
| NOTES: | | | 140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.). | | | | | | | | | | | | | | | |
| 1. Soils are field visually classified in accordance with the Unified Soils Classification System. | | | | | | | | | | | | | | | | | | |
| 2. Laboratory Testing Results | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.0/1.5</td> <td>CH</td> </tr> <tr> <td>7</td> <td>9.0/10.5</td> <td>CH</td> </tr> </tbody> </table> | | | SAMPLE ID | SAMPLE DEPTH | LABORATORY CLASSIFICATION | 1 | 0.0/1.5 | CH | 7 | 9.0/10.5 | CH | | | | | | | |
| SAMPLE ID | SAMPLE DEPTH | LABORATORY CLASSIFICATION | | | | | | | | | | | | | | | | |
| 1 | 0.0/1.5 | CH | | | | | | | | | | | | | | | | |
| 7 | 9.0/10.5 | CH | | | | | | | | | | | | | | | | |
| 3. Additional Laboratory Testing | | | | | | | | | | | | | | | | | | |
| 1 Moisture Content | | | | | | | | | | | | | | | | | | |
| 7 Moisture Content | | | | | | | | | | | | | | | | | | |
| 12,13 Moisture Content | | | | | | | | | | | | | | | | | | |
| 14 Moisture Content | | | | | | | | | | | | | | | | | | |

15
20
25
30
35





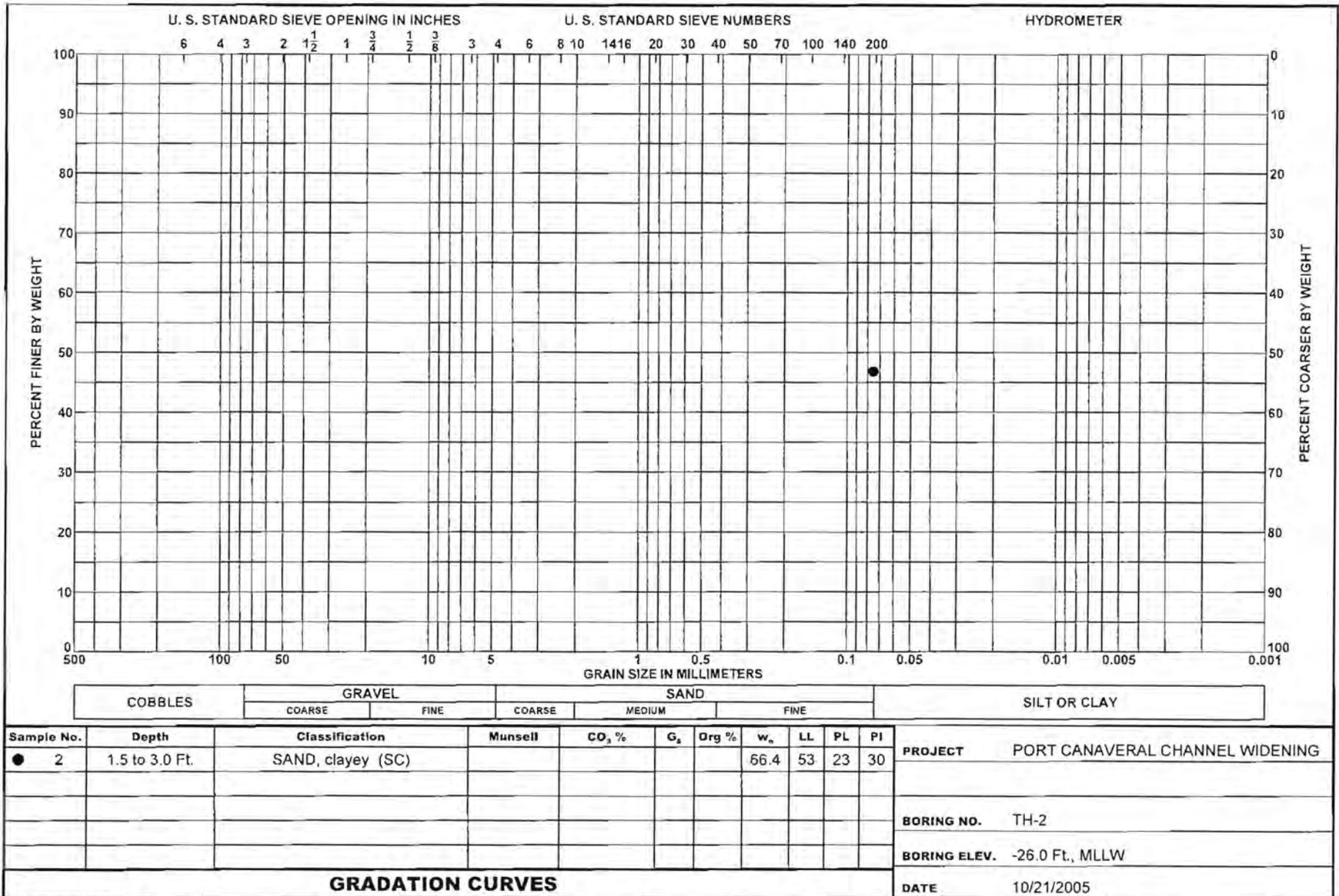
Boring Designation TH-2

| | | | | |
|---|--|---|--------------|------------------------|
| DRILLING LOG | | DIVISION Corporate Engineering | INSTALLATION | SHEET 1 OF 2 SHEETS |
| 1. PROJECT PORT CANAVERAL CHANNEL WIDENING | | 9. SIZE AND TYPE OF BIT 3" Tricone | | |
| 2. BORING DESIGNATION TH-2 | | 10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) | | |
| 3. DRILLING AGENCY AMDRILL, Inc. | | 11. MANUFACTURER'S DESIGNATION OF DRILL CME-45 (barge-mounted) | | |
| 4. NAME OF DRILLER T. Clarkson | | 12. TOTAL SAMPLES 16 | | |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | 13. TOTAL NUMBER CORE BOXES 0 | | |
| 6. THICKNESS OF OVERBURDEN N/A | | 14. ELEVATION GROUND WATER Not Determined | | |
| 7. DEPTH DRILLED INTO ROCK N/A | | 15. DATE BORING 09-24-05 | | |
| 8. TOTAL DEPTH OF BORING 24.0 Ft. | | 16. ELEVATION TOP OF BORING -26.0 Ft. | | |
| | | 17. TOTAL RECOVERY FOR BORING 71 % | | |
| | | 18. SIGNATURE AND TITLE OF INSPECTOR R. Burr, Geologist | | |

| ELEV. | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % REC. | BOX OR SAMPLE | ROD OR UD | REMARKS | BLOWS/0.5 FT. | N-VALUE |
|-------|-------|--------|---|--------|---------------|-----------|-------------|---------------|---------|
| -26.0 | 0.0 | | SAND, clayey, medium plasticity, very soft, mostly sand, some clay, little silt, homogeneous, organic odor, gray (SC) | 0 | 1 | | -26.0 | WR | 0 |
| | | | | | | | SPT Sampler | WR | 0 |
| | | | | 67 | 2 | | -27.5 | WR | 0 |
| | | | | | | | SPT Sampler | WR | 0 |
| | | | | 67 | 3 | | -29.0 | WR | 0 |
| | | | At El. -30.0 Ft., thin layer of fine grained SM | | | | SPT Sampler | WR | 0 |
| | | | | 67 | 4 | | -30.5 | WR | 0 |
| | | | At El. -31.5 Ft., 3" layer of fine grained SM | | | | SPT Sampler | WR | 0 |
| | | | | 67 | 5 | | -32.0 | WR | 0 |
| | | | | | | | SPT Sampler | WR | 0 |
| | | | | 67 | 6 | | -33.5 | WR | 0 |
| | | | | | | | SPT Sampler | WR | 0 |
| -34.5 | 8.5 | | SAND, silty, mostly fine-grained sand-sized sand, little silt, stratified, organic odor, gray (SM) | 67 | 7 | | -35.0 | WR | 0 |
| | | | | | | | SPT Sampler | WR | 0 |
| | | | | 67 | 8 | | -36.5 | WR | 0 |
| | | | | | | | SPT Sampler | WR | 0 |
| -38.0 | 12.0 | | CLAY, lean, medium plasticity, soft, mostly clay, little silt, thin layers of fine grained SM, gray (CL) | 67 | 9 | | -38.0 | 1 | 2 |
| | | | | | | | SPT Sampler | 1 | 2 |
| | | | | 67 | 10 | | -39.5 | 1 | 4 |
| -40.0 | 14.0 | | CLAY, fat, high plasticity, soft, mostly clay, homogeneous, gray (CH) | | | | SPT Sampler | 1 | 4 |
| | | | | | | | | 3 | 15 |
| | | | | | | | -41.0 | | |

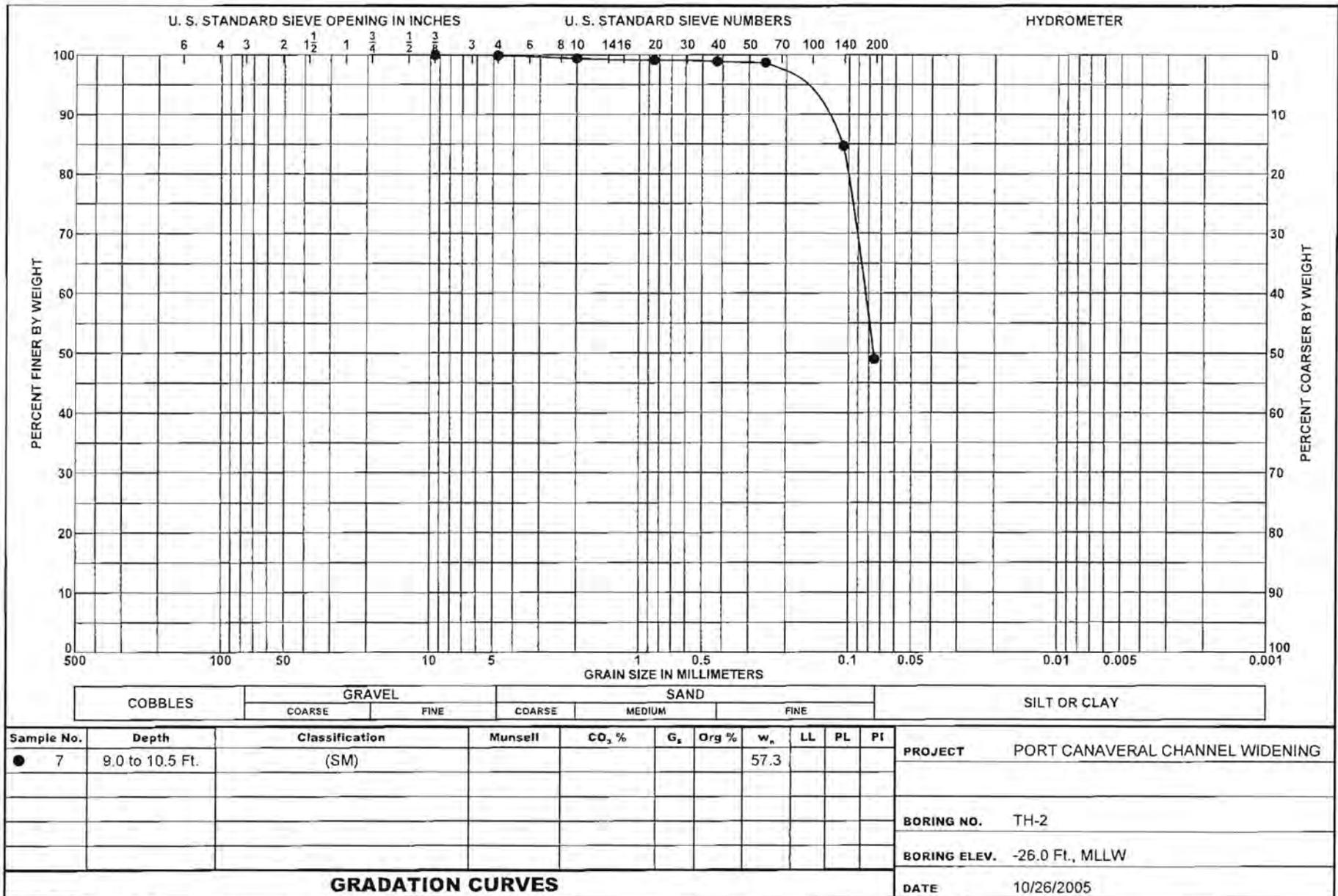
| DRILLING LOG (Cont. Sheet) | | | INSTALLATION | | | SHEET 2 OF 2 SHEETS | | | | | | | | | | | | | | | | | | |
|---|--------------|--|--|---------------------------------|---------------------------|--|-------------|-------------------|---------|----------|-----|---|-----------|-----|----|-----------|-----|--|--|--|--|--|--|--|
| PROJECT PORT CANAVERAL CHANNEL WIDENING | | | COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) | | HORIZONTAL NAD83 | VERTICAL MLLW | | | | | | | | | | | | | | | | | | |
| LOCATION COORDINATES X = 791,859 Y = 1,482,208 | | | ELEVATION TOP OF BORING -26.0 Ft. | | | | | | | | | | | | | | | | | | | | | |
| ELEV. | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % REC. | BOX OR SAMPLE | RQD OR UD | REMARKS | BLOWS/ 0.5 FT. | N-VALUE | | | | | | | | | | | | | | | |
| -50.0 | 24.0 |  | | 67 | 11 | | SPT Sampler | 1 1 | 2 | | | | | | | | | | | | | | | |
| | | | | | | | | -42.5 | 1 | | | | | | | | | | | | | | | |
| | | | | | 67 | 12 | | SPT Sampler | 2 3 | 6 | | | | | | | | | | | | | | |
| | | | | | | | | | -44.0 | 3 | | | | | | | | | | | | | | |
| | | | | | 100 | 13 | | SPT Sampler | 2 2 | 5 | | | | | | | | | | | | | | |
| | | | | At El. -45.0 Ft., trace of wood | | | | | -45.5 | 3 | | | | | | | | | | | | | | |
| | | | | | 100 | 14 | | SPT Sampler | 1 1 | 2 | | | | | | | | | | | | | | |
| | | | | | | | | -47.0 | 3 | | | | | | | | | | | | | | | |
| | | | | 100 | 15 | | SPT Sampler | 3 2 | 4 | | | | | | | | | | | | | | | |
| | | | | | | | | -48.5 | 2 | | | | | | | | | | | | | | | |
| | | | | 100 | 16 | | SPT Sampler | 1 2 | 5 | | | | | | | | | | | | | | | |
| | | | | | | | | -50.0 | 3 | | | | | | | | | | | | | | | |
| NOTES: | | | | | | 140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.). | | | | | | | | | | | | | | | | | | |
| 1. Soils are field visually classified in accordance with the Unified Soils Classification System. | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. Laboratory Testing Results | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>1.5/3.0</td> <td>SC</td> </tr> <tr> <td>7</td> <td>9.0/10.5</td> <td>SM*</td> </tr> <tr> <td>9</td> <td>12.0/13.5</td> <td>CL*</td> </tr> <tr> <td>10</td> <td>13.5/15.0</td> <td>CH*</td> </tr> </tbody> </table> | | | SAMPLE ID | SAMPLE DEPTH | LABORATORY CLASSIFICATION | 2 | 1.5/3.0 | SC | 7 | 9.0/10.5 | SM* | 9 | 12.0/13.5 | CL* | 10 | 13.5/15.0 | CH* | | | | | | | |
| SAMPLE ID | SAMPLE DEPTH | LABORATORY CLASSIFICATION | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 1.5/3.0 | SC | | | | | | | | | | | | | | | | | | | | | | |
| 7 | 9.0/10.5 | SM* | | | | | | | | | | | | | | | | | | | | | | |
| 9 | 12.0/13.5 | CL* | | | | | | | | | | | | | | | | | | | | | | |
| 10 | 13.5/15.0 | CH* | | | | | | | | | | | | | | | | | | | | | | |
| *Lab visual classification based on gradation curve. No Atterberg limits. | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. Additional Laboratory Testing | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 Moisture Content | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 Moisture Content | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 Moisture Content | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 Moisture Content | | | | | | | | | | | | | | | | | | | | | | | | |

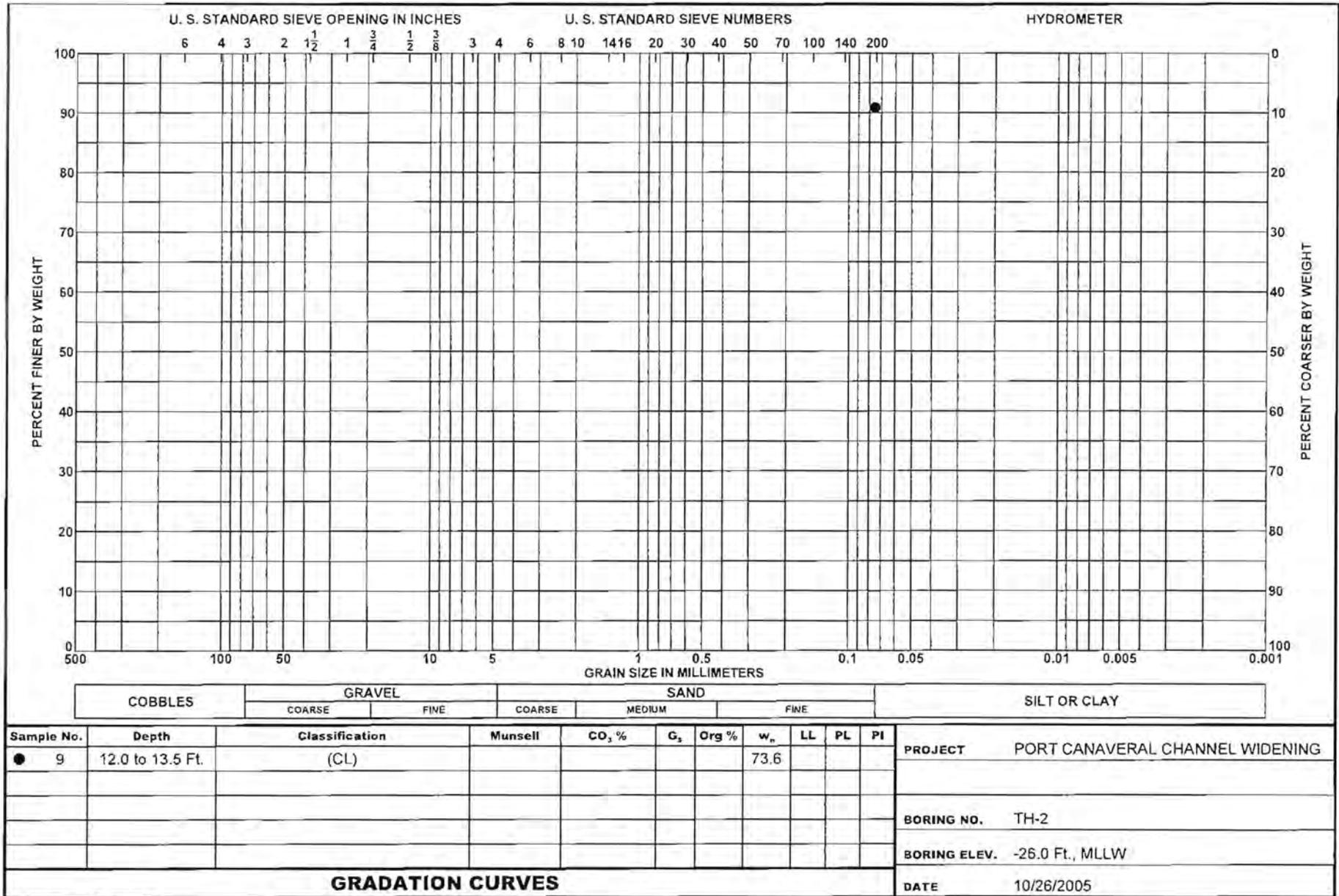
15
20
25
30
35



| | | | | | | |
|---------|--------|------|--------|--------|------|--------------|
| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
| | COARSE | FINE | COARSE | MEDIUM | FINE | |

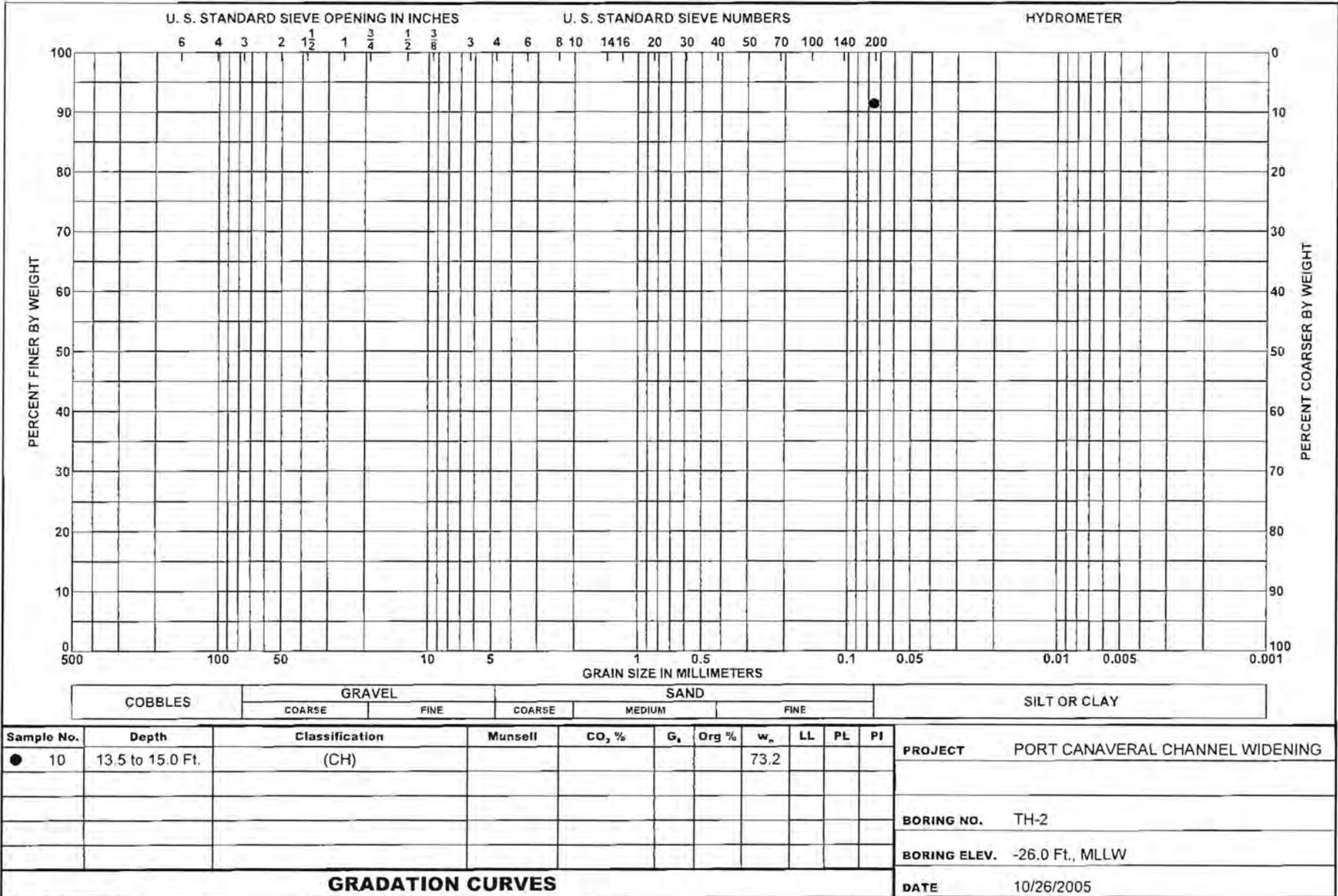
| Sample No. | Depth | Classification | Munsell | CO ₂ % | G _s | Org % | w _n | LL | PL | PI | PROJECT |
|-------------------------|----------------|-------------------|---------|-------------------|----------------|-------|----------------|----|----|----|---------------------------------|
| ● 2 | 1.5 to 3.0 Ft. | SAND, clayey (SC) | | | | | 66.4 | 53 | 23 | 30 | PORT CANAVERAL CHANNEL WIDENING |
| | | | | | | | | | | | BORING NO. TH-2 |
| | | | | | | | | | | | BORING ELEV. -26.0 Ft., MLLW |
| GRADATION CURVES | | | | | | | | | | | DATE 10/21/2005 |





| | | | | | | |
|---------|--------|------|--------|--------|------|--------------|
| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
| | COARSE | FINE | COARSE | MEDIUM | FINE | |

| Sample No. | Depth | Classification | Munsell | CO ₂ % | G _s | Org % | w _n | LL | PL | PI | PROJECT |
|-------------------------|------------------|----------------|---------|-------------------|----------------|-------|----------------|----|----|----|---------------------------------|
| ● 9 | 12.0 to 13.5 Ft. | (CL) | | | | | 73.6 | | | | PORT CANAVERAL CHANNEL WIDENING |
| | | | | | | | | | | | BORING NO. TH-2 |
| | | | | | | | | | | | BORING ELEV. -26.0 Ft., MLLW |
| GRADATION CURVES | | | | | | | | | | | DATE 10/26/2005 |



Boring Designation TH-3

| | | | | | | | |
|---|--|---|--|---|--|--|--|
| DRILLING LOG | | DIVISION Corporate Engineering | | INSTALLATION | | SHEET 1 OF 2 SHEETS | |
| 1. PROJECT PORT CANAVERAL CHANNEL WIDENING | | | | 9. SIZE AND TYPE OF BIT 3" Tricone | | | |
| 2. BORING DESIGNATION TH-3 | | LOCATION COORDINATES X = 788,494 Y = 1,482,165 | | 10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) | | HORIZONTAL: NAD83 VERTICAL: MLLW | |
| 3. DRILLING AGENCY AMDRILL, Inc. | | CONTRACTOR FILE NO. 05-100 | | 11. MANUFACTURER'S DESIGNATION OF DRILL CME-45 (barge-mounted) | | | |
| 4. NAME OF DRILLER T. Clarkson | | | | 12. TOTAL SAMPLES | | DISTURBED: 17 UNDISTURBED (UD): 0 | |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | DEG. FROM VERTICAL | | 13. TOTAL NUMBER CORE BOXES 0 | | 14. ELEVATION GROUND WATER Not Determined | |
| 6. THICKNESS OF OVERBURDEN N/A | | | | 15. DATE BORING STARTED: 09-21-05 COMPLETED: 09-21-05 | | | |
| 7. DEPTH DRILLED INTO ROCK N/A | | | | 16. ELEVATION TOP OF BORING -25.5 Fl. | | | |
| 8. TOTAL DEPTH OF BORING 25.5 Fl. | | | | 17. TOTAL RECOVERY FOR BORING 80 % | | | |
| 18. SIGNATURE AND TITLE OF INSPECTOR R. Burr, Geologist | | | | | | | |

| ELEV. | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % REC. | BOX OR SAMPLE | RQD OR UD | REMARKS | BLOWS/ 0.5 FT. | N-VALUE |
|-------|-------|--------|--|--------|---------------|-----------|-------------|-------------------|---------|
| -25.5 | 0.0 | | | | | | -25.5 | | |
| | | | SAND, poorly-graded with silt, mostly subrounded fine to medium-grained sand-sized quartz, trace silt, trace fine to medium-grained sand-sized shell, moist, homogeneous, gray (SP-SM) | 33 | 1 | | SPT Sampler | 0 3 | 6 |
| | | | | 100 | 2 | | SPT Sampler | 3 25 40 | 57 |
| | | | | 67 | 3 | | SPT Sampler | 17 5 7 | 15 |
| | | | | 67 | 4 | | SPT Sampler | 8 7 10 | 19 |
| | | | | 67 | 5 | | SPT Sampler | 9 3 2 | 7 |
| | | | | 67 | 6 | | SPT Sampler | 5 3 7 | 15 |
| | | | | 67 | 7 | | SPT Sampler | 8 3 5 | 11 |
| | | | | 67 | 8 | | SPT Sampler | 6 4 6 | 12 |
| | | | | 67 | 9 | | SPT Sampler | 6 7 3 | 7 |
| | | | | 67 | 10 | | SPT Sampler | 4 1 1 | 3 |
| -39.0 | 13.5 | | CLAY, fat, high plasticity, soft, mostly clay, moist, homogeneous, occasional thin layers of medium and coarse grained SP, gray (CH) | | | | | | |
| | | | | | | | -40.5 | 2 | |

| DRILLING LOG (Cont. Sheet) | | | INSTALLATION | | | SHEET 2 OF 2 SHEETS | | | | | | | | | | | | | | | |
|---|--------------|---------------------------|--|--------------|---------------------------|------------------------|-------------|-------------------|---------|---------|--------|----|-----------|-----|--|--|--|--|--|--|--|
| PROJECT PORT CANAVERAL CHANNEL WIDENING | | | COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft) | | HORIZONTAL NAD83 | VERTICAL MLLW | | | | | | | | | | | | | | | |
| LOCATION COORDINATES X = 788,494 Y = 1,482,165 | | | ELEVATION TOP OF BORING -25.5 Ft. | | | | | | | | | | | | | | | | | | |
| ELEV. | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % REG. | BOX OR SAMPLE | RQD OR COR D | REMARKS | BLOWS/ 0.5 FT. | N-VALUE | | | | | | | | | | | | |
| | | | | 100 | 11 | | SPT Sampler | 3 2 | 5 | | | | | | | | | | | | |
| | | | | | | | -42.0 | 3 | | | | | | | | | | | | | |
| | | | | | 100 | 12 | | SPT Sampler | 2 3 | 6 | | | | | | | | | | | |
| | | | | | | | -43.5 | 3 | | | | | | | | | | | | | |
| | | | | | 100 | 13 | | SPT Sampler | 2 2 | 4 | | | | | | | | | | | |
| | | | | | | | -45.0 | 2 | | | | | | | | | | | | | |
| | | | | | 100 | 14 | | SPT Sampler | 2 2 | 4 | | | | | | | | | | | |
| | | | | | | | -46.5 | 2 | | | | | | | | | | | | | |
| | | | | 100 | 15 | | SPT Sampler | 1 2 | 5 | | | | | | | | | | | | |
| | | | | | | -48.0 | 3 | | | | | | | | | | | | | | |
| | | | | 100 | 16 | | SPT Sampler | 2 2 | 5 | | | | | | | | | | | | |
| | | | | | | -49.5 | 3 | | | | | | | | | | | | | | |
| -51.0 | 25.5 | | | 100 | 17 | | SPT Sampler | 2 1 | 3 | | | | | | | | | | | | |
| | | | | | | -51.0 | 2 | | | | | | | | | | | | | | |
| NOTES: | | | 140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D). | | | | | | | | | | | | | | | | | | |
| 1. Soils are field visually classified in accordance with the Unified Soils Classification System. | | | | | | | | | | | | | | | | | | | | | |
| 2. Laboratory Testing Results | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.0/1.5</td> <td>SP-SM*</td> </tr> <tr> <td>5</td> <td>6.0/7.5</td> <td>SP-SM*</td> </tr> <tr> <td>10</td> <td>13.5/15.0</td> <td>CH*</td> </tr> </tbody> </table> | | | SAMPLE ID | SAMPLE DEPTH | LABORATORY CLASSIFICATION | 1 | 0.0/1.5 | SP-SM* | 5 | 6.0/7.5 | SP-SM* | 10 | 13.5/15.0 | CH* | | | | | | | |
| SAMPLE ID | SAMPLE DEPTH | LABORATORY CLASSIFICATION | | | | | | | | | | | | | | | | | | | |
| 1 | 0.0/1.5 | SP-SM* | | | | | | | | | | | | | | | | | | | |
| 5 | 6.0/7.5 | SP-SM* | | | | | | | | | | | | | | | | | | | |
| 10 | 13.5/15.0 | CH* | | | | | | | | | | | | | | | | | | | |
| *Lab visual classification based on gradation curve. No Atterberg limits. | | | | | | | | | | | | | | | | | | | | | |
| 3. Additional Laboratory Testing | | | | | | | | | | | | | | | | | | | | | |
| 1 Moisture Content | | | | | | | | | | | | | | | | | | | | | |
| 5 Moisture Content | | | | | | | | | | | | | | | | | | | | | |
| 10 Moisture Content | | | | | | | | | | | | | | | | | | | | | |

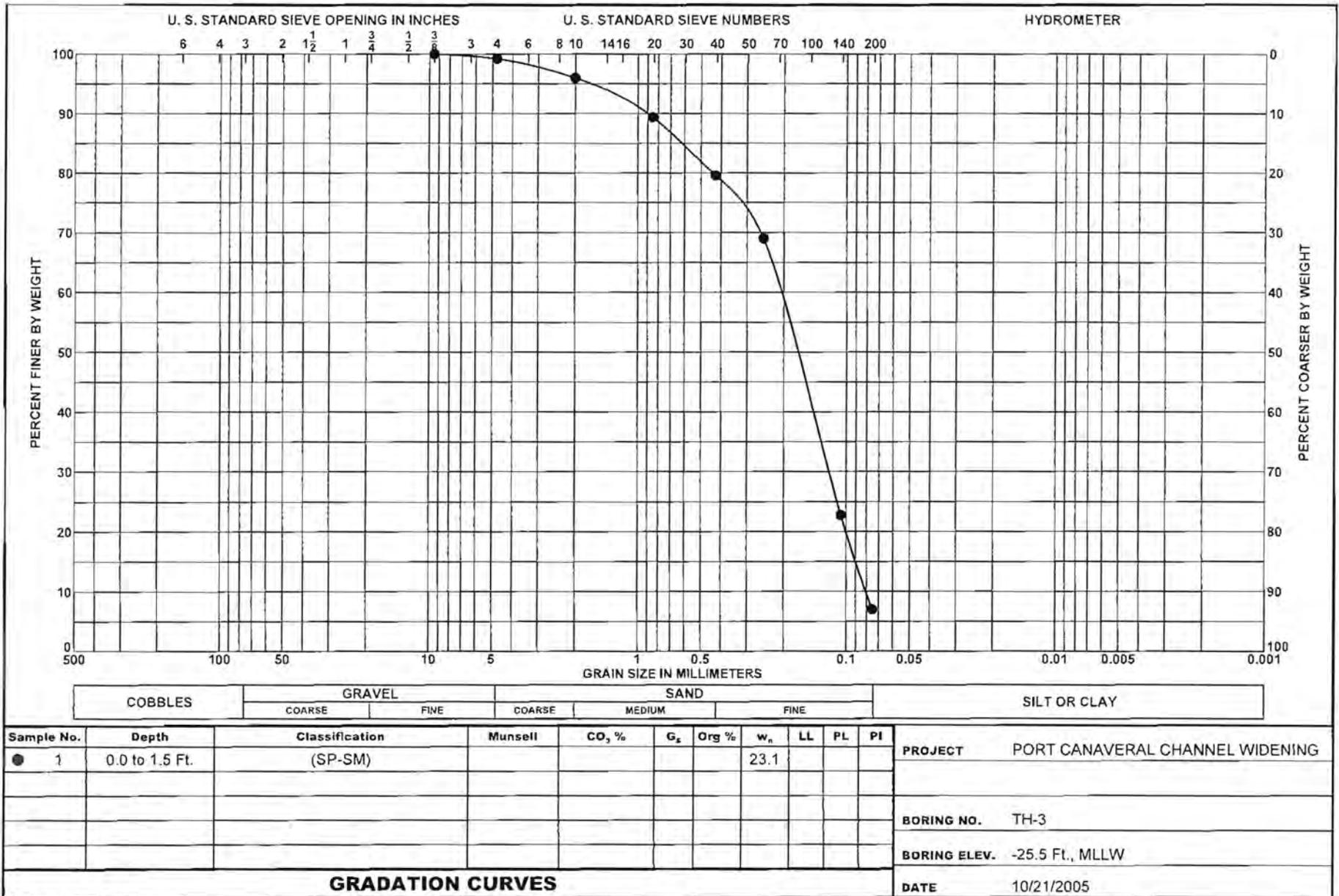
15

20

25

30

35

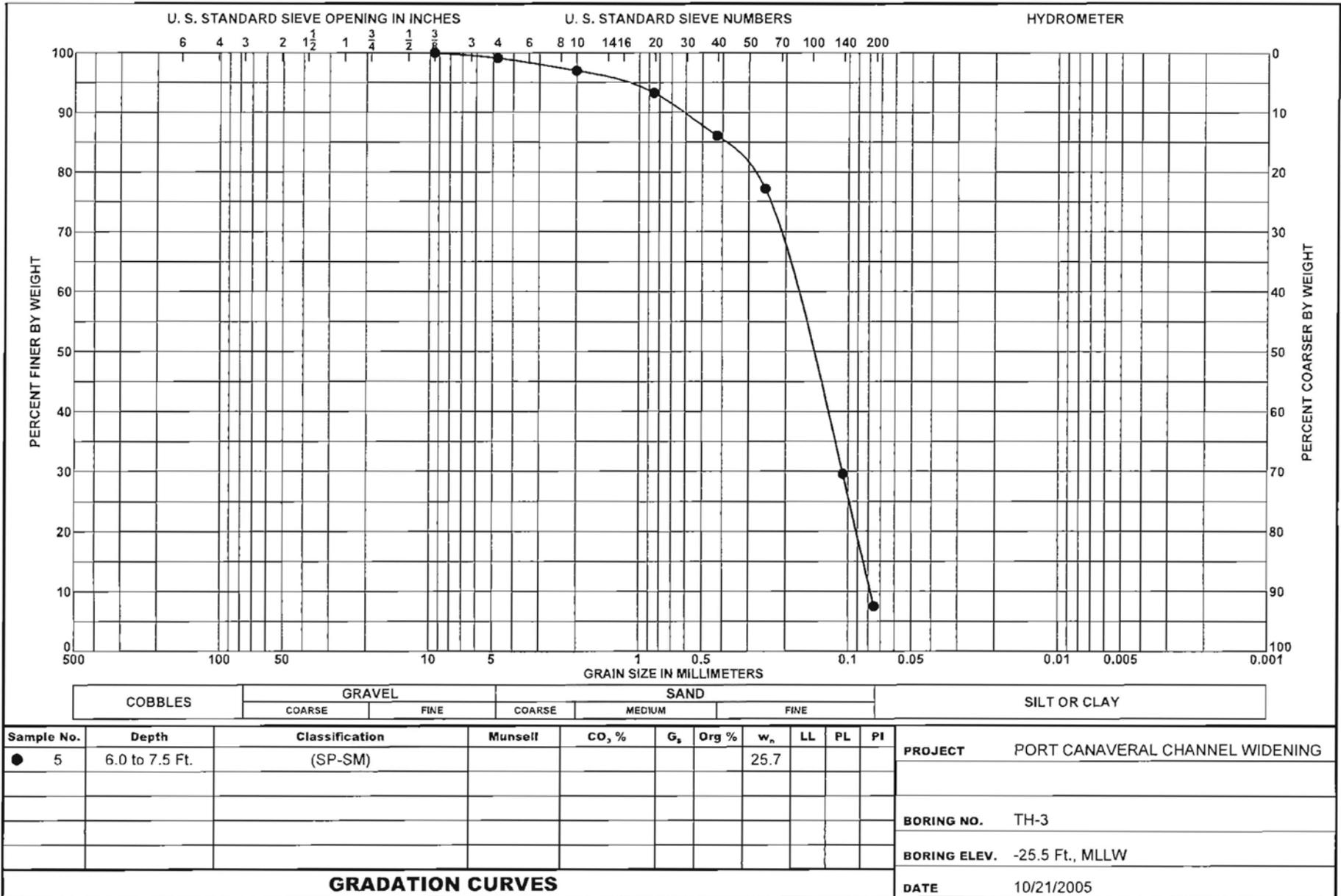


| | | | | | | |
|---------|--------|------|--------|--------|------|--------------|
| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
| | COARSE | FINE | COARSE | MEDIUM | FINE | |

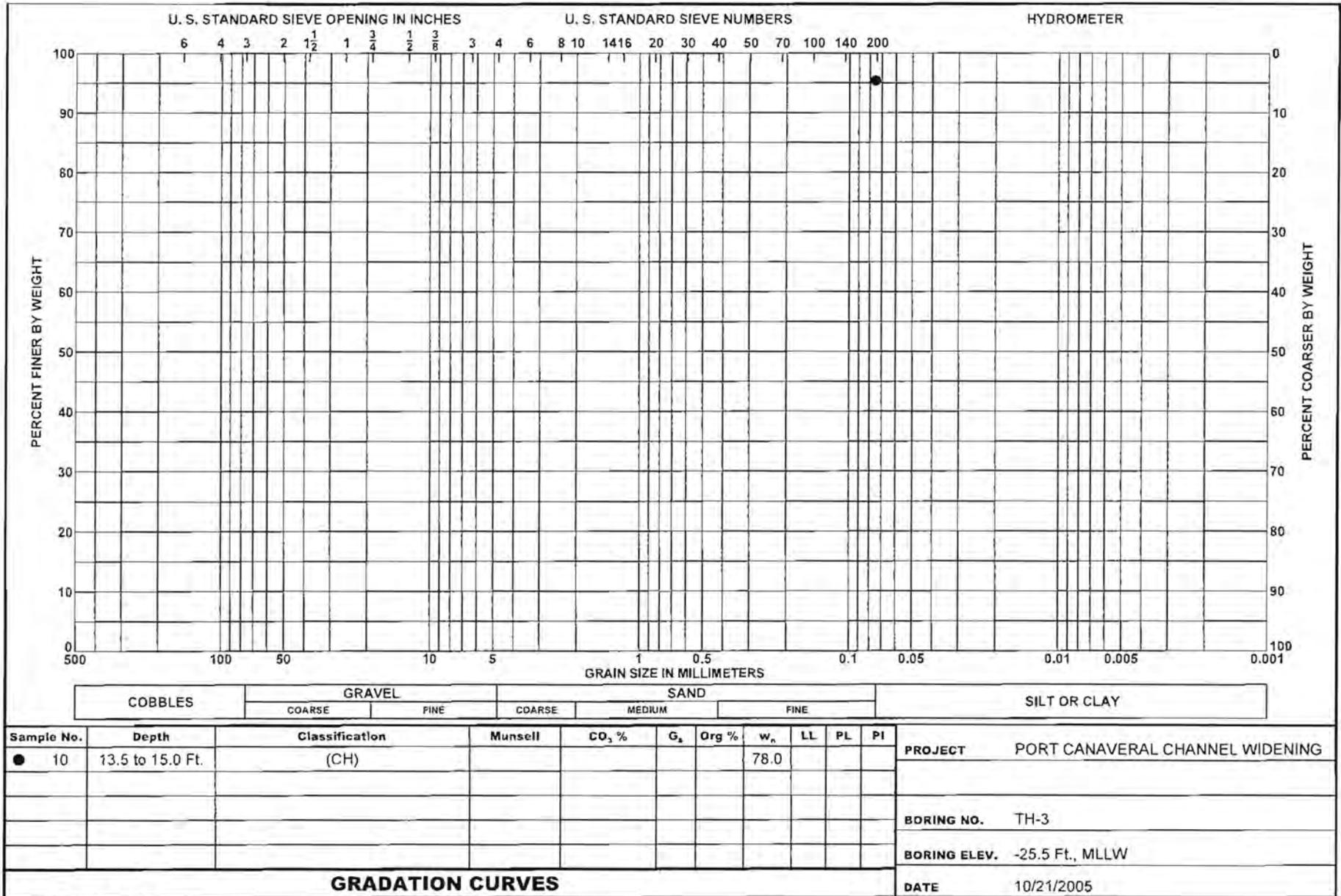
| Sample No. | Depth | Classification | Munsell | CO ₂ % | G _s | Org % | w _n | LL | PL | PI |
|------------|----------------|----------------|---------|-------------------|----------------|-------|----------------|----|----|----|
| 1 | 0.0 to 1.5 Ft. | (SP-SM) | | | | | 23.1 | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

| | |
|--------------|---------------------------------|
| PROJECT | PORT CANAVERAL CHANNEL WIDENING |
| BORING NO. | TH-3 |
| BORING ELEV. | -25.5 Ft., MLLW |
| DATE | 10/21/2005 |

GRADATION CURVES



| Sample No. | Depth | Classification | Munsell | CO ₂ % | G _s | Org % | w _n | LL | PL | PI | SOIL CLASSIFICATION | | |
|-------------------------|----------------|----------------|---------|-------------------|----------------|-------|----------------|----|----|----|---------------------|---|---------------------------------|
| | | | | | | | | | | | COARSE | FINE | |
| ● 5 | 6.0 to 7.5 Ft. | (SP-SM) | | | | | 25.7 | | | | COBBLES | GRAVEL COARSE FINE SAND COARSE MEDIUM FINE SILT OR CLAY | |
| GRADATION CURVES | | | | | | | | | | | | PROJECT | PORT CANAVERAL CHANNEL WIDENING |
| | | | | | | | | | | | | BORING NO. | TH-3 |
| | | | | | | | | | | | | BORING ELEV. | -25.5 Ft., MLLW |
| | | | | | | | | | | | | DATE | 10/21/2005 |



| COBBLES | | GRAVEL | | SAND | | | SILT OR CLAY | | | | | | |
|-------------------------|------------------|----------------|------|---------|-------------------|----------------|--------------|----------------|----|----|----|--------------|---------------------------------|
| | | COARSE | FINE | COARSE | MEDIUM | FINE | | | | | | | |
| Sample No. | Depth | Classification | | Munsell | CO ₂ % | G _s | Org % | w _n | LL | PL | PI | PROJECT | PORT CANAVERAL CHANNEL WIDENING |
| ● 10 | 13.5 to 15.0 Ft. | (CH) | | | | | | 78.0 | | | | BORING NO. | TH-3 |
| | | | | | | | | | | | | BORING ELEV. | -25.5 Ft., MLLW |
| GRADATION CURVES | | | | | | | | | | | | DATE | 10/21/2005 |

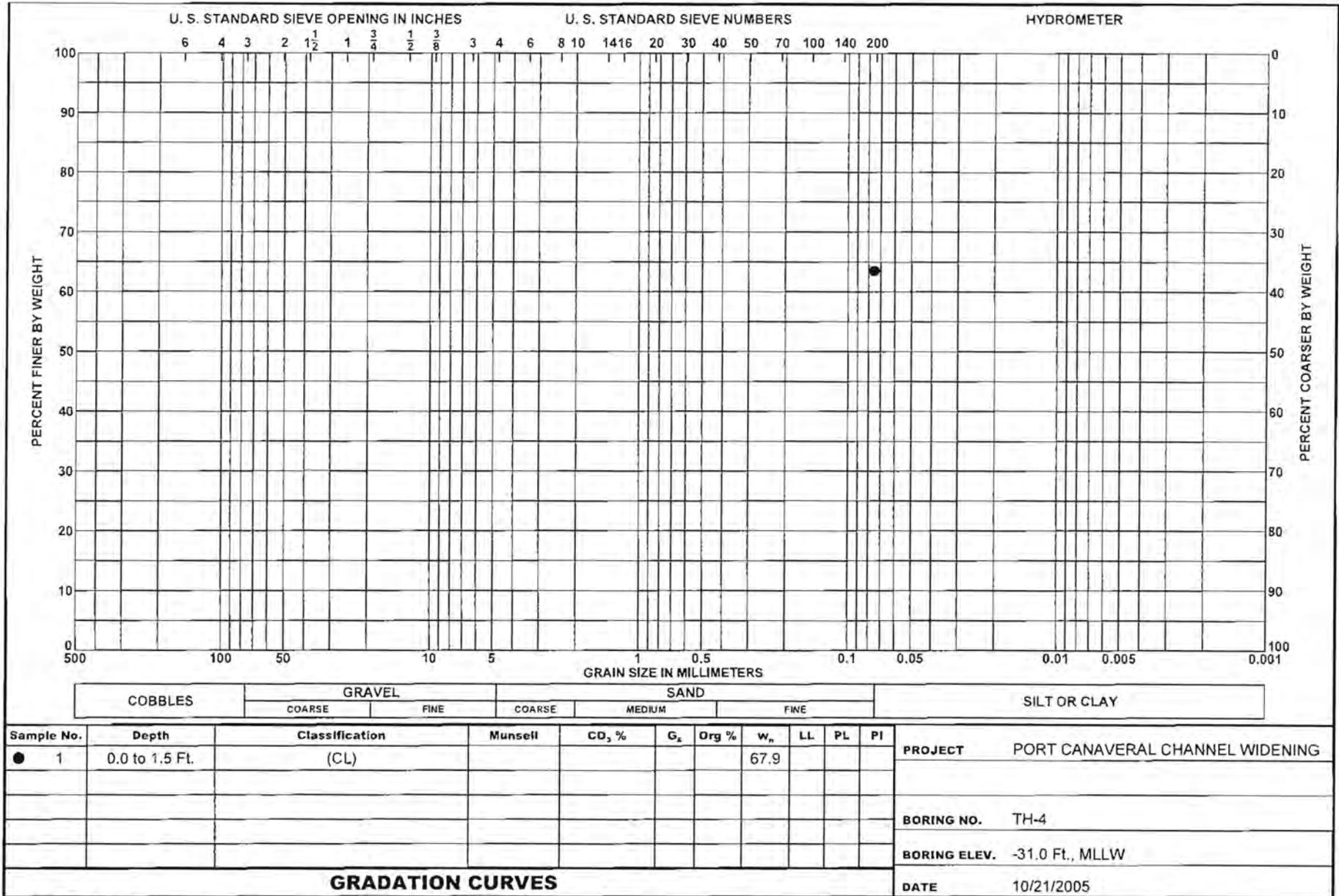
Boring Designation TH-4

| | | | | | | | |
|---|--|-----------------------------------|--|---|--|--|--|
| DRILLING LOG | | DIVISION Corporate Engineering | | INSTALLATION | | SHEET 1 OF 2 SHEETS | |
| 1. PROJECT PORT CAVERAL CHANNEL WIDENING | | | | 9. SIZE AND TYPE OF BIT 3" Tricone | | | |
| 2. BORING DESIGNATION TH-4 | | | | LOCATION COORDINATES X = 792,886 Y = 1,481,002 | | 10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. FL.) | |
| 3. DRILLING AGENCY AMDRILL, Inc. | | | | CONTRACTOR FILE NO. 05-100 | | HORIZONTAL NAD83 | |
| 4. NAME OF DRILLER T. Clarkson | | | | 11. MANUFACTURER'S DESIGNATION OF DRILL CME-45 (barge-mounted) | | VERTICAL MLLW | |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | | | DEG. FROM VERTICAL | | BEARING | |
| 6. THICKNESS OF OVERBURDEN N/A | | | | 12. TOTAL SAMPLES 14 | | DISTURBED 0 | |
| 7. DEPTH DRILLED INTO ROCK N/A | | | | 13. TOTAL NUMBER CORE BOXES 0 | | 14. ELEVATION GROUND WATER Not Determined | |
| 8. TOTAL DEPTH OF BORING 21.0 Ft. | | | | 15. DATE BORING | | STARTED 09-23-05 | |
| | | | | 16. ELEVATION TOP OF BORING -31.0 Ft. | | COMPLETED 09-23-05 | |
| | | | | 17. TOTAL RECOVERY FOR BORING 76 % | | 18. SIGNATURE AND TITLE OF INSPECTOR R. Burr, Geologist | |

| ELEV. | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % REC. | BOX OR SAMPLE | ROD OR UD | REMARKS | BLOWS/ 0.5 FT. | N-VALUE |
|-------|-------|---------------------|--|--------|---------------|-----------|-------------|----------------|---------|
| -31.0 | 0.0 | | | | | | -31.0 | | 0 |
| | | [Diagonal Hatching] | CLAY, lean, medium plasticity, very soft, mostly clay, little silt, trace fine-grained sand-sized sand, trace angular fine-grained sand-sized shell, trace fine gravel-sized shell, homogeneous, organic odor, gray (CL) | 33 | 1 | | SPT Sampler | WR | 0 |
| | | | | 100 | 2 | | SPT Sampler | WR | 0 |
| | | | | 67 | 3 | | SPT Sampler | WR | 0 |
| | | | | 67 | 4 | | SPT Sampler | WR | 0 |
| | | | | 0 | 5 | | SPT Sampler | WR | 0 |
| | | | | 67 | 6 | | SPT Sampler | WR | 0 |
| -40.0 | 9.0 | | | | | | -40.0 | | 0 |
| | | [Diagonal Hatching] | CLAY, fat, high plasticity, very soft, mostly clay, homogeneous, organic odor, gray (CH) | 100 | 7 | | SPT Sampler | WR | 0 |
| | | | | 67 | 8 | | SPT Sampler | WH | 0 |
| | | | | 67 | 9 | | SPT Sampler | WH | 0 |
| | | | | 100 | 10 | | SPT Sampler | WR | 0 |
| | | | | | | | -46.0 | | 0 |

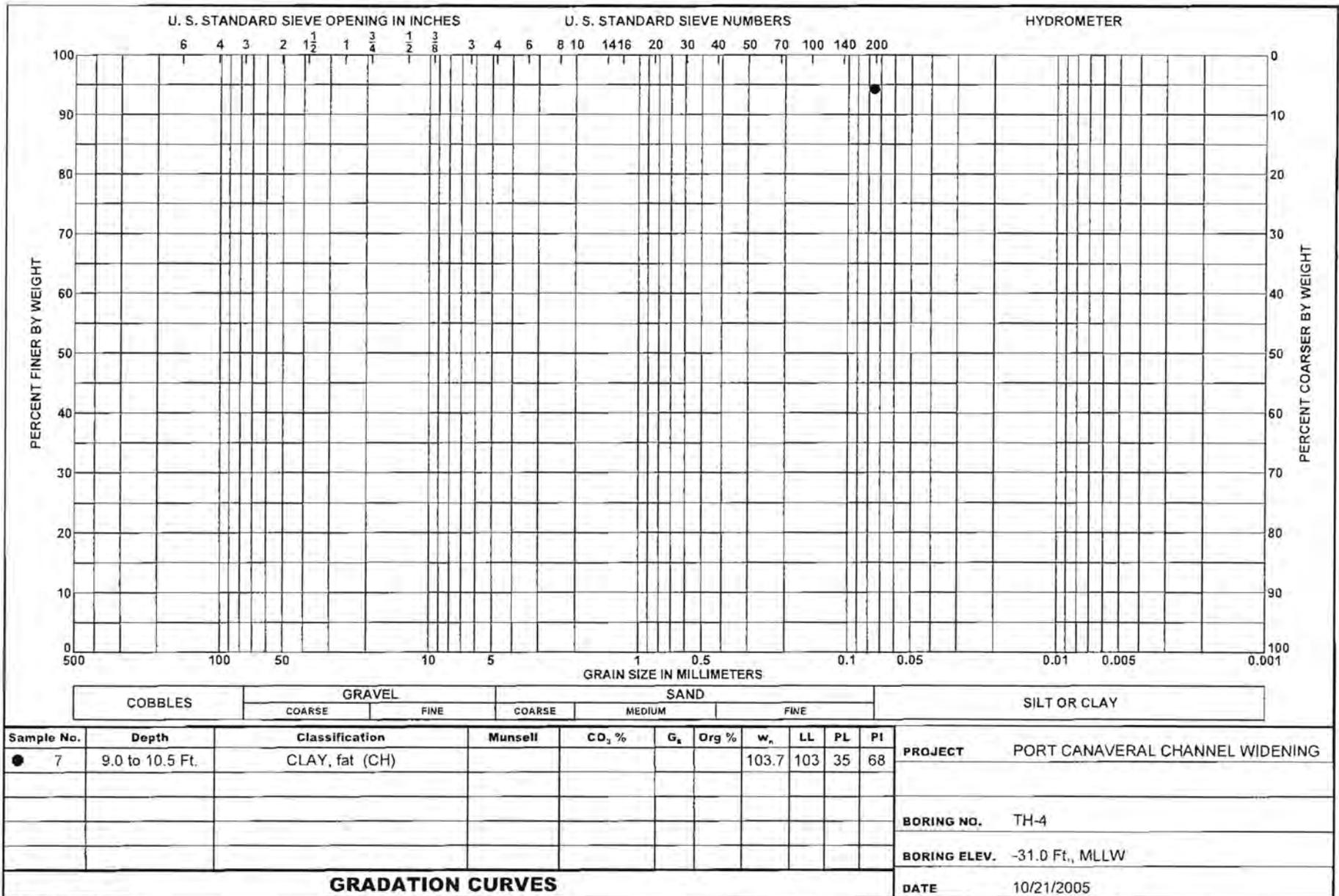
| DRILLING LOG (Cont. Sheet) | | | INSTALLATION | | | SHEET 2 OF 2 SHEETS | | | | | | | | | | | | |
|---|--------------|---------------------------|---|-----------|---------------------|---------------------------|-------------|-------------------|---------|----|----------|----|--|--|--|--|--|--|
| PROJECT PORT CANAVERAL CHANNEL WIDENING | | | COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) | | HORIZONTAL NAD83 | VERTICAL MLLW | | | | | | | | | | | | |
| LOCATION COORDINATES X = 792,886 Y = 1,481,002 | | | ELEVATION TOP OF BORING -31.0 Ft. | | | | | | | | | | | | | | | |
| ELEV. | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % REC. | BOX OR SAMPLE | RQD OR UD | REMARKS | BLOWS/ 0.5 FT. | N-VALUE | | | | | | | | | |
| | | | At El. -46.5 Ft., trace of wood | 100 | 11 | | SPT Sampler | WR | 0 | | | | | | | | | |
| | | | | | | | | | | WR | | | | | | | | |
| | | | | | | | | | | WR | | | | | | | | |
| | | | | | | | | | | WR | | | | | | | | |
| | | | | 100 | 12 | | SPT Sampler | WR | 0 | | | | | | | | | |
| | | | | | | | | WR | | | | | | | | | | |
| | | | | | | | | WR | | | | | | | | | | |
| | | | | 100 | 13 | | SPT Sampler | WR | 0 | | | | | | | | | |
| | | | | | | | | WR | | | | | | | | | | |
| | | | | 100 | 14 | | SPT Sampler | WR | 0 | | | | | | | | | |
| | | | | | | | | WR | | | | | | | | | | |
| -52.0 | 21.0 | | | | | | | WR | | | | | | | | | | |
| | | | NOTES: 1. Soils are field visually classified in accordance with the Unified Soils Classification System. 2. Laboratory Testing Results <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.0/1.5</td> <td>CL*</td> </tr> <tr> <td>7</td> <td>9.0/10.5</td> <td>CH</td> </tr> </tbody> </table> *Lab visual classification based on gradation curve. No Atterberg limits. 3. Additional Laboratory Testing 1 Moisture Content 7 Moisture Content | SAMPLE ID | SAMPLE DEPTH | LABORATORY CLASSIFICATION | 1 | 0.0/1.5 | CL* | 7 | 9.0/10.5 | CH | | | | 140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.). | | |
| SAMPLE ID | SAMPLE DEPTH | LABORATORY CLASSIFICATION | | | | | | | | | | | | | | | | |
| 1 | 0.0/1.5 | CL* | | | | | | | | | | | | | | | | |
| 7 | 9.0/10.5 | CH | | | | | | | | | | | | | | | | |

15
20
25
30
35



| | | | | | | |
|---------|--------|------|--------|--------|------|--------------|
| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
| | COARSE | FINE | COARSE | MEDIUM | FINE | |

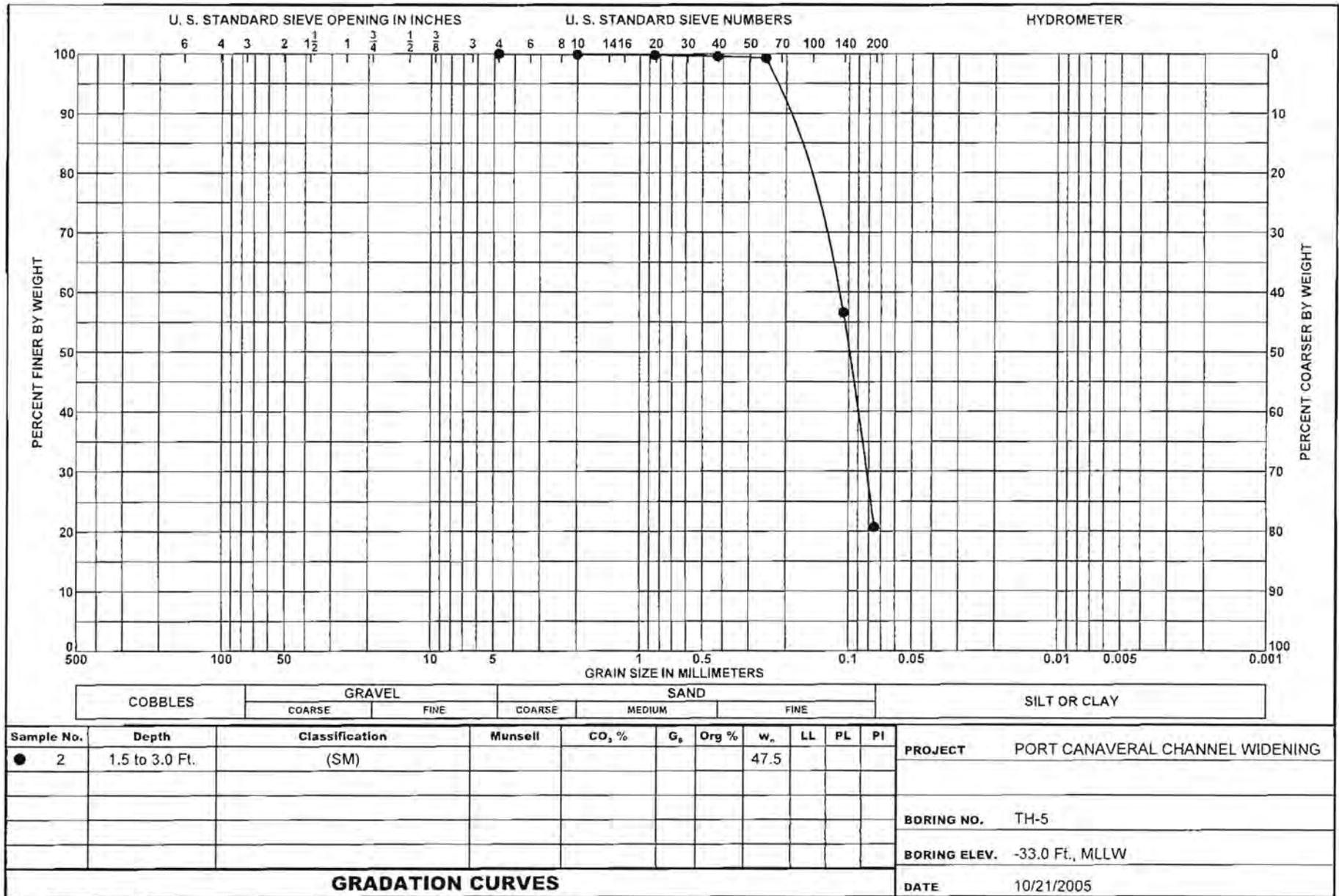
| Sample No. | Depth | Classification | Munsell | CD, % | G _s | Org % | w _n | LL | PL | PI | PROJECT |
|-------------------------|----------------|----------------|---------|-------|----------------|-------|----------------|----|----|----|---------------------------------|
| ● 1 | 0.0 to 1.5 Ft. | (CL) | | | | | 67.9 | | | | PORT CANAVERAL CHANNEL WIDENING |
| | | | | | | | | | | | BORING NO. TH-4 |
| | | | | | | | | | | | BORING ELEV. -31.0 Ft., MLLW |
| GRADATION CURVES | | | | | | | | | | | DATE 10/21/2005 |



| COBBLES | | GRAVEL | | SAND | | | SILT OR CLAY | | | | | | |
|-------------------------|-----------------|----------------|------|---------|-------------------|----------------|--------------|----------------|-----|----|----|--------------|---------------------------------|
| | | COARSE | FINE | COARSE | MEDIUM | FINE | | | | | | | |
| Sample No. | Depth | Classification | | Munsell | CO ₂ % | G _s | Org % | w _n | LL | PL | PI | PROJECT | PORT CANAVERAL CHANNEL WIDENING |
| ● 7 | 9.0 to 10.5 Ft. | CLAY, fat (CH) | | | | | | 103.7 | 103 | 35 | 68 | | |
| | | | | | | | | | | | | BORING NO. | TH-4 |
| | | | | | | | | | | | | BORING ELEV. | -31.0 Ft., MLLW |
| GRADATION CURVES | | | | | | | | | | | | DATE | 10/21/2005 |

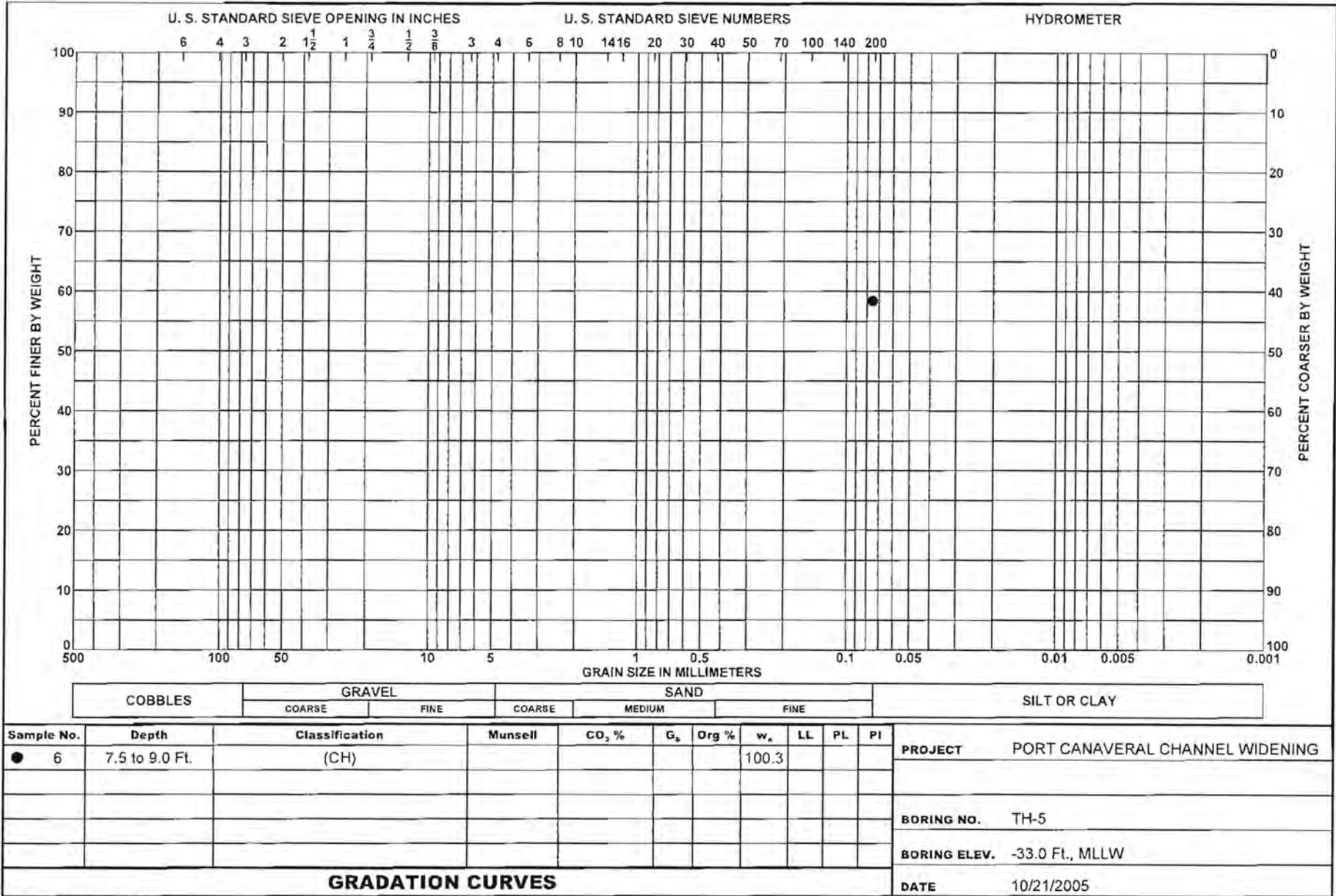
| DRILLING LOG (Cont. Sheet) | | | INSTALLATION | | | SHEET 2 OF 2 SHEETS | | | | | | | | | | | | | | | | | | |
|---|--------------|---|--|--------------|---------------------------|------------------------|-------------|-------------------|---------|---------|-----|---|-----------|-----|----|-----------|-----|--|--|--|--|--|--|--|
| PROJECT PORT CANAVERAL CHANNEL WIDENING | | | COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) | | HORIZONTAL NAD83 | VERTICAL MLLW | | | | | | | | | | | | | | | | | | |
| LOCATION COORDINATES X = 790,820 Y = 1,482,198 | | | ELEVATION TOP OF BORING -33.0 Ft. | | | | | | | | | | | | | | | | | | | | | |
| ELEV. | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % REC. | BOX OF SAMPLE | RQD OR UD | REMARKS | BLOWS/ 0.5 FT. | N-VALUE | | | | | | | | | | | | | | | |
| -51.0 | 18.0 |  | | 67 | 11 | | SPT Sampler | WR | 0 | | | | | | | | | | | | | | | |
| | | | | | | | -49.5 | WR | | | | | | | | | | | | | | | | |
| | | | | | | | | WR | | | | | | | | | | | | | | | | |
| | | | | 67 | 12 | | SPT Sampler | 1 | 3 | | | | | | | | | | | | | | | |
| | | | | | | | -51.0 | 2 | | | | | | | | | | | | | | | | |
| NOTES: | | | 140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.). | | | | | | | | | | | | | | | | | | | | | |
| 1. Soils are field visually classified in accordance with the Unified Soils Classification System. | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. Laboratory Testing Results | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>1.5/3.0</td> <td>SM*</td> </tr> <tr> <td>6</td> <td>7.5/9.0</td> <td>CH*</td> </tr> <tr> <td>8</td> <td>10.5/12.0</td> <td>SM*</td> </tr> <tr> <td>10</td> <td>13.5/15.0</td> <td>CH*</td> </tr> </tbody> </table> | | | SAMPLE ID | SAMPLE DEPTH | LABORATORY CLASSIFICATION | 2 | 1.5/3.0 | SM* | 6 | 7.5/9.0 | CH* | 8 | 10.5/12.0 | SM* | 10 | 13.5/15.0 | CH* | | | | | | | |
| SAMPLE ID | SAMPLE DEPTH | LABORATORY CLASSIFICATION | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 1.5/3.0 | SM* | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 7.5/9.0 | CH* | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 10.5/12.0 | SM* | | | | | | | | | | | | | | | | | | | | | | |
| 10 | 13.5/15.0 | CH* | | | | | | | | | | | | | | | | | | | | | | |
| *Lab visual classification based on gradation curve. No Atterberg limits. | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. Additional Laboratory Testing | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 Moisture Content | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 Moisture Content | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 Moisture Content | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 Moisture Content | | | | | | | | | | | | | | | | | | | | | | | | |

15
0
3
20
25
30
35



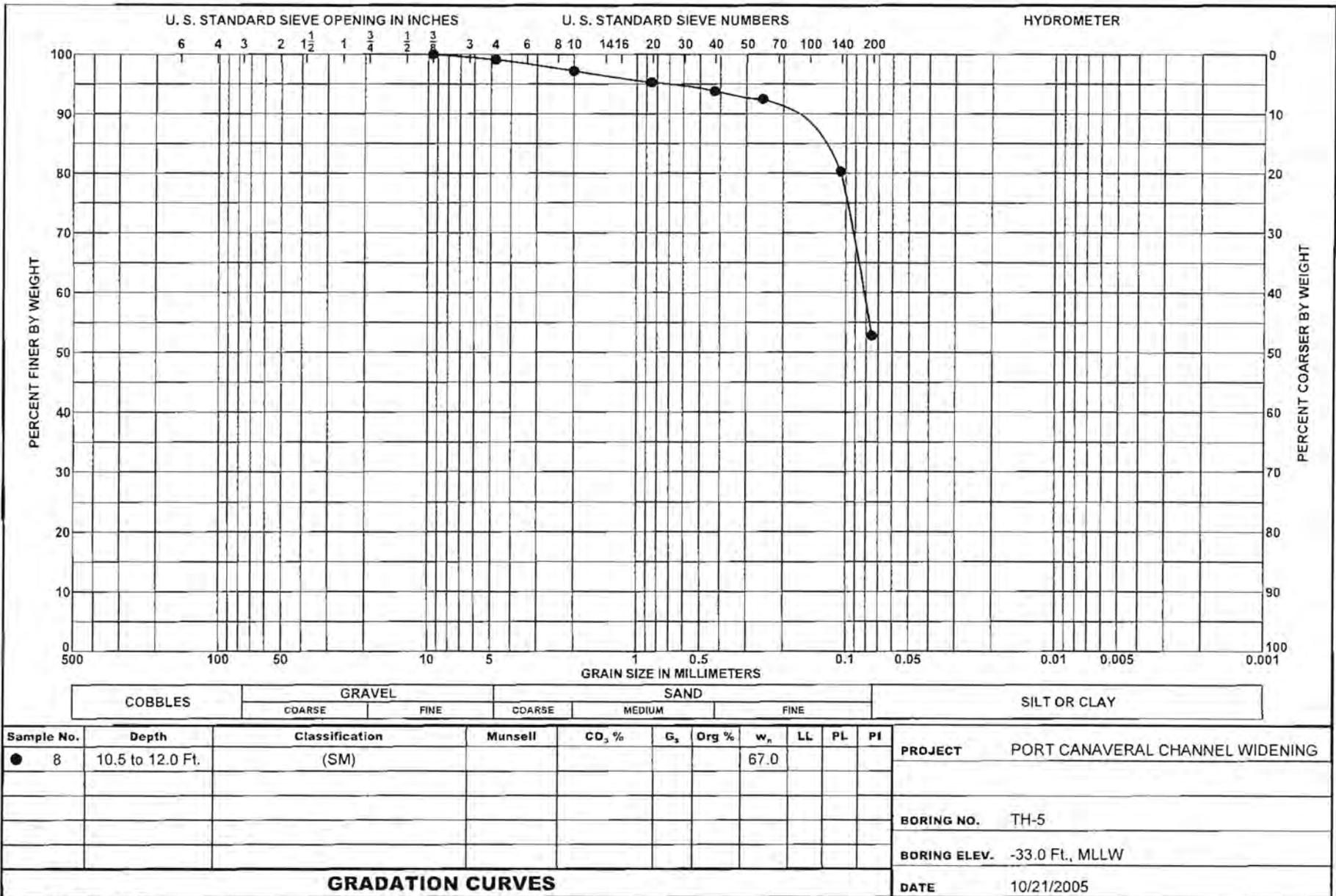
| | | | | | | | |
|---------|--------|------|--------|--------|------|--|--------------|
| COBBLES | GRAVEL | | SAND | | | | SILT OR CLAY |
| | COARSE | FINE | COARSE | MEDIUM | FINE | | |

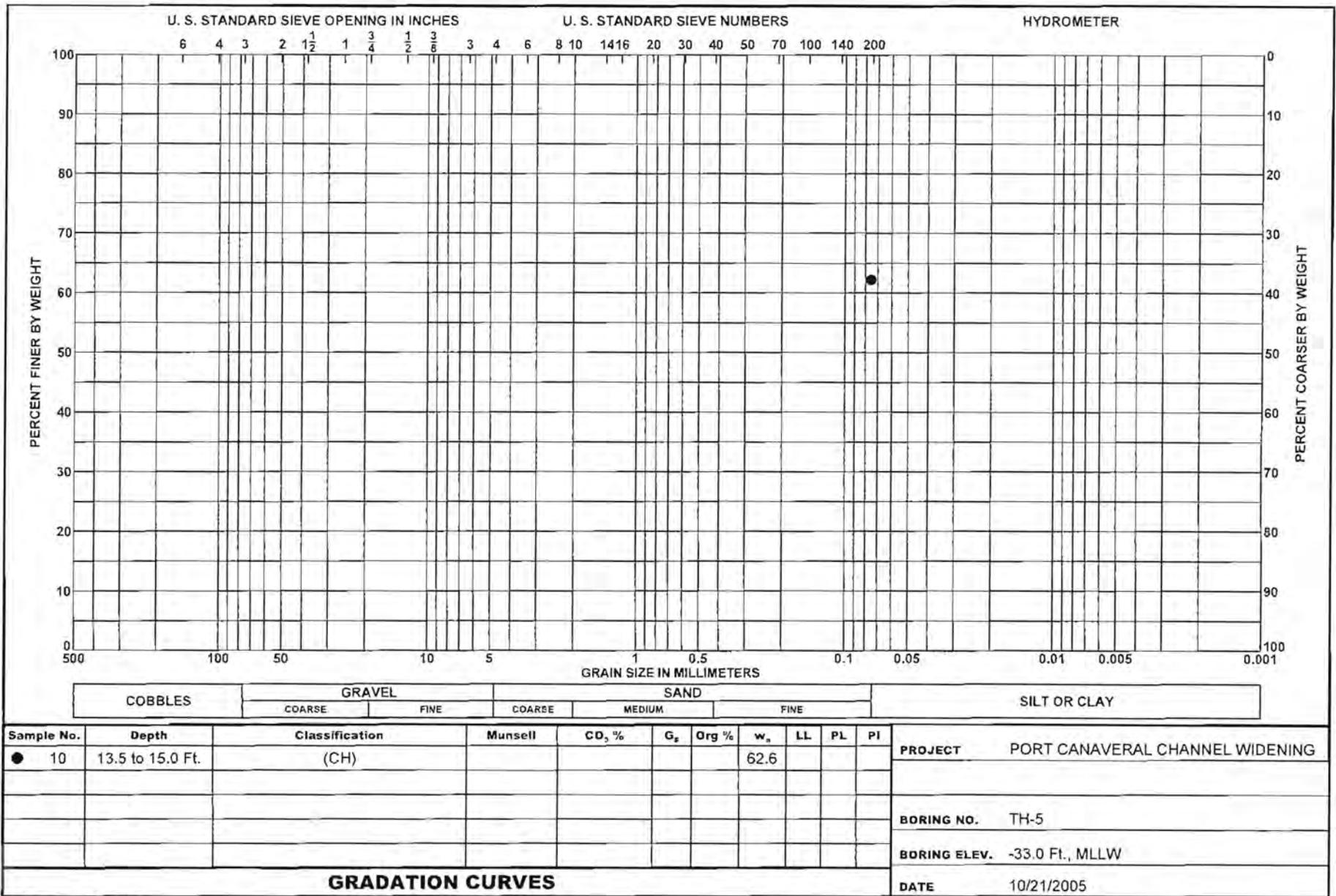
| Sample No. | Depth | Classification | Munsell | CO ₂ % | G _s | Org % | w _n | LL | PL | PI | PROJECT |
|-------------------------|----------------|----------------|---------|-------------------|----------------|-------|----------------|----|----|----|---------------------------------|
| ● 2 | 1.5 to 3.0 Ft. | (SM) | | | | | 47.5 | | | | PORT CANAVERAL CHANNEL WIDENING |
| | | | | | | | | | | | BORING NO. TH-5 |
| | | | | | | | | | | | BORING ELEV. -33.0 Ft., MLLW |
| GRADATION CURVES | | | | | | | | | | | DATE 10/21/2005 |



| | | | | | | |
|---------|--------|------|--------|--------|------|--------------|
| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
| | COARSE | FINE | COARSE | MEDIUM | FINE | |

| Sample No. | Depth | Classification | Munsell | CO ₂ % | G _s | Org % | w _p | LL | PL | PI | PROJECT |
|-------------------------|----------------|----------------|---------|-------------------|----------------|-------|----------------|----|----|----|---------------------------------|
| ● 6 | 7.5 to 9.0 Ft. | (CH) | | | | | 100.3 | | | | PORT CANAVERAL CHANNEL WIDENING |
| | | | | | | | | | | | BORING NO. TH-5 |
| | | | | | | | | | | | BORING ELEV. -33.0 Ft., MLLW |
| GRADATION CURVES | | | | | | | | | | | DATE 10/21/2005 |





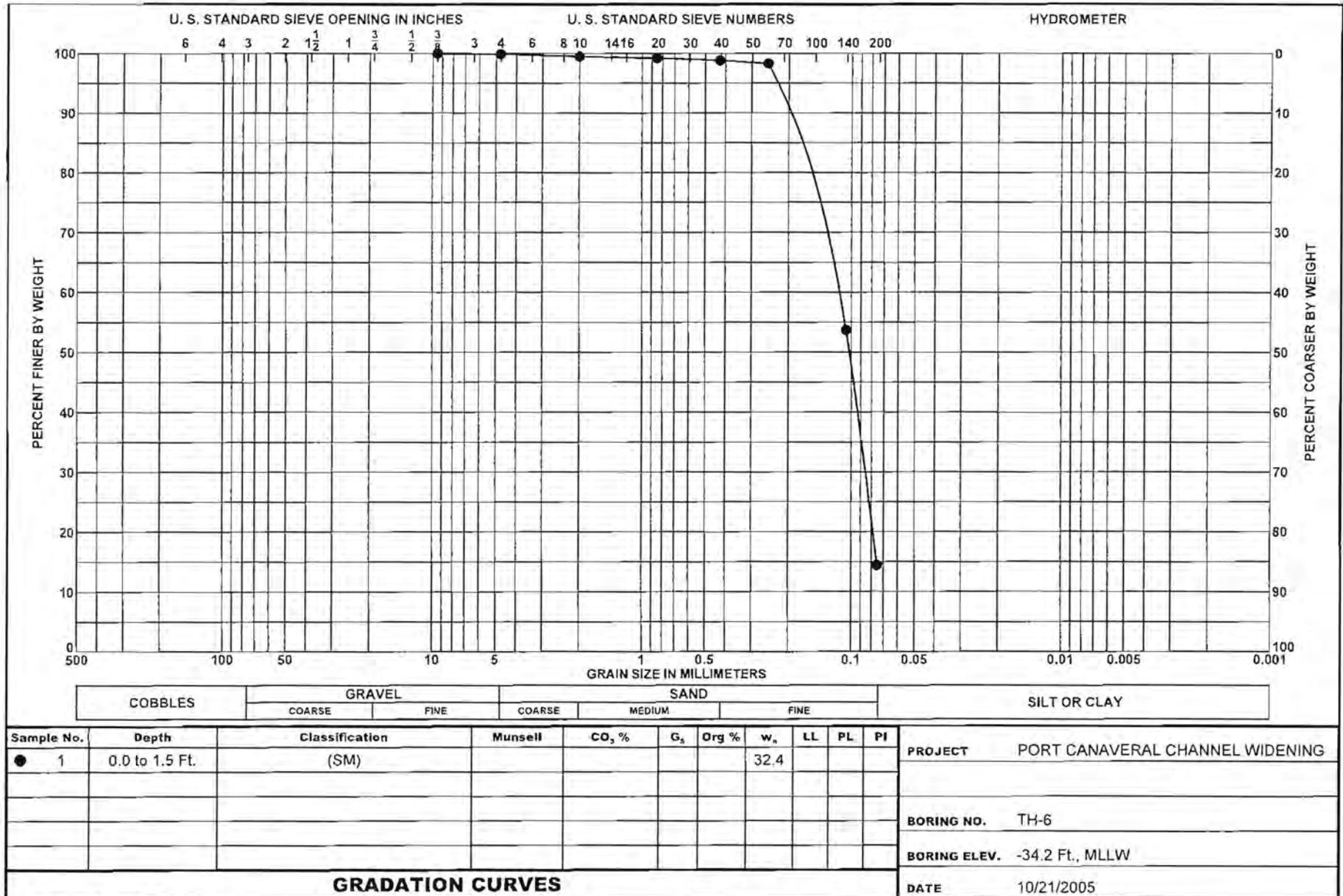
Boring Designation TH-6

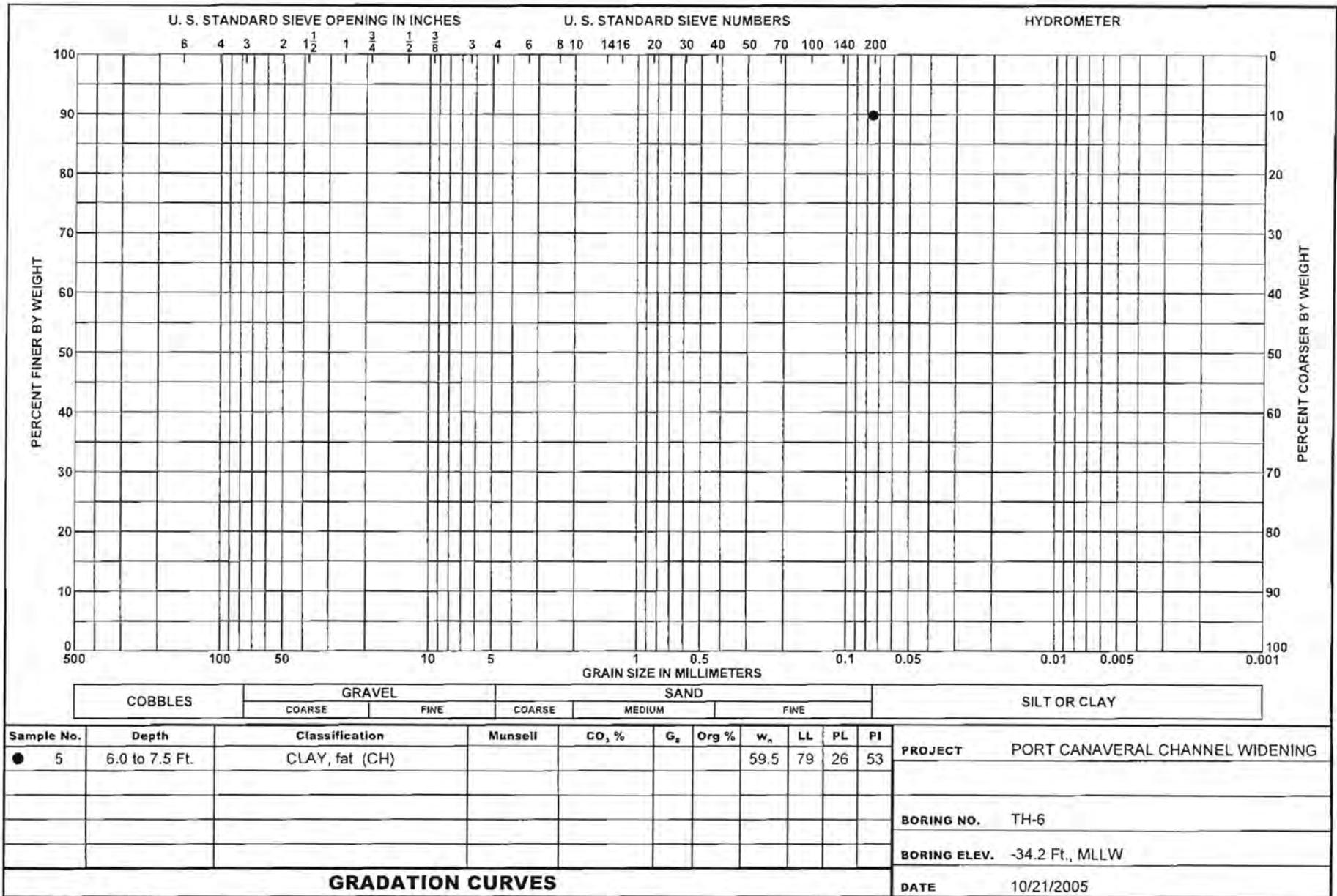
| | | | | | | | |
|---|--|---|--|---|--|---|--|
| DRILLING LOG | | DIVISION Corporate Engineering | | INSTALLATION | | SHEET 1 OF 2 SHEETS | |
| 1. PROJECT PORT CANAVERAL CHANNEL WIDENING | | | | 9. SIZE AND TYPE OF BIT 3" Tricone | | | |
| 2. BORING DESIGNATION TH-6 | | LOCATION COORDINATES X = 786,895 Y = 1,482,196 | | 10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) | | HORIZONTAL NAD83 | |
| 3. DRILLING AGENCY AMDRILL, Inc. | | CONTRACTOR FILE NO. 05-100 | | 11. MANUFACTURER'S DESIGNATION OF DRILL CME-45 (barge-mounted) | | <input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER | |
| 4. NAME OF DRILLER T. Clarkson | | | | 12. TOTAL SAMPLES 11 | | DISTURBED 0 | |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | | | 13. TOTAL NUMBER CORE BOXES 0 | | 14. ELEVATION GROUND WATER Not Determined | |
| 6. THICKNESS OF OVERBURDEN N/A | | 7. DEPTH DRILLED INTO ROCK N/A | | 15. DATE BORING 09-21-05 | | STARTED 09-21-05 | |
| 8. TOTAL DEPTH OF BORING 16.5 Ft. | | | | 16. ELEVATION TOP OF BORING -34.2 Ft. | | 17. TOTAL RECOVERY FOR BORING 79 % | |
| | | | | 18. SIGNATURE AND TITLE OF INSPECTOR R. Burr, Geologist | | | |

| ELEV. | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % REC. | BOX OF SAMPLE | RQD OR UD | REMARKS | BLOWS/ 0.5 FT. | N-VALUE |
|-------|-------|--------|---|--------|---------------|-------------|-------------|-------------------|---------|
| -34.2 | 0.0 | | SAND, silty, mostly rounded fine-grained sand-sized quartz, little silt, trace shell, moist, homogeneous, organic odor, gray (SM) | | | | -34.2 | | |
| | | | | 33 | 1 | | SPT Sampler | 0 | 2 |
| | | | | | | | | 0 | |
| | | | | 67 | 2 | | SPT Sampler | 10 | 13 |
| | | | | | | | | 2 | |
| | | | | 33 | 3 | | SPT Sampler | 2 | 4 |
| | | | | | | | | 4 | |
| | | | | 33 | 4 | | SPT Sampler | 2 | 5 |
| | | | | | | | | 0 | |
| | | | | | | | | 2 | |
| -40.7 | 6.5 | | CLAY, fat, high plasticity, soft, mostly clay, homogeneous, occasional thin layers of finer grained SP, gray (CH) | | | | -40.2 | | |
| | | | | 100 | 5 | | SPT Sampler | 1 | 2 |
| | | | | | | | | 1 | |
| | | | | 100 | 6 | | SPT Sampler | 2 | 4 |
| | | | | | | | | 2 | |
| | | | | 100 | 7 | | SPT Sampler | 1 | 5 |
| | | | | | | | | 4 | |
| | | | | 100 | 8 | | SPT Sampler | 3 | 8 |
| | | | | | | | | 3 | |
| | | | | 100 | 9 | | SPT Sampler | 2 | 4 |
| | | | | | | | 2 | | |
| | | | 100 | 10 | | SPT Sampler | 3 | 6 | |
| | | | | | | | 2 | | |
| | | | | | | | 4 | | |
| | | | | | | | 4 | | |
| | | | | | | | 4 | | |

| DRILLING LOG (Cont. Sheet) | | | INSTALLATION | | | SHEET 2 OF 2 SHEETS | | | | | | | | | | | | |
|---------------------------------|--------------|---|--|-----------|------------------|---------------------------|-------------|-------------------|---------|---|---------|----|--|--|--|---|--|--|
| PROJECT | | | COORDINATE SYSTEM/DATUM | | HORIZONTAL | VERTICAL | | | | | | | | | | | | |
| PORT CANAVERAL CHANNEL WIDENING | | | State Plane, FLE (U.S. Ft.) | | NAD83 | MLLW | | | | | | | | | | | | |
| LOCATION COORDINATES | | | ELEVATION TOP OF BORING | | | | | | | | | | | | | | | |
| X = 786,895 Y = 1,482,196 | | | -34.2 Ft. | | | | | | | | | | | | | | | |
| ELEV. | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % REC. | BOX OR SAMPLE | ROD OR UD | REMARKS | BLOWS/ 0.5 FT. | N-VALUE | | | | | | | | | |
| -50.7 | 16.5 |  | | 100 | 11 | | SPT Sampler | 1 3 5 | 8 | | | | | | | | | |
| | | | <p>NOTES:</p> <p>1. Soils are field visually classified in accordance with the Unified Soils Classification System.</p> <p>2. Laboratory Testing Results</p> <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.0/1.5</td> <td>SM*</td> </tr> <tr> <td>5</td> <td>6.0/7.5</td> <td>CH</td> </tr> </tbody> </table> <p>*Lab visual classification based on gradation curve. No Atterberg limits.</p> <p>3. Additional Laboratory Testing</p> <p>1 Moisture Content 5 Moisture Content</p> | SAMPLE ID | SAMPLE DEPTH | LABORATORY CLASSIFICATION | 1 | 0.0/1.5 | SM* | 5 | 6.0/7.5 | CH | | | | 140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.) | | |
| SAMPLE ID | SAMPLE DEPTH | LABORATORY CLASSIFICATION | | | | | | | | | | | | | | | | |
| 1 | 0.0/1.5 | SM* | | | | | | | | | | | | | | | | |
| 5 | 6.0/7.5 | CH | | | | | | | | | | | | | | | | |

15
20
25
30
35





Boring Designation TH-7

| | | | | | | | |
|---|--|---|--|---|--|---|--|
| DRILLING LOG | | DIVISION Corporate Engineering | | INSTALLATION | | SHEET 1 OF 5 SHEETS | |
| 1. PROJECT PORT CANAVERAL CHANNEL WIDENING | | | | 9. SIZE AND TYPE OF BIT 3" Tricone | | | |
| 2. BORING DESIGNATION TH-7 | | LOCATION COORDINATES X = 784,870 Y = 1,482,595 | | 10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Fl.) | | HORIZONTAL NAD83 | |
| 3. DRILLING AGENCY ARDAMAN & ASSOCIATES, INC. | | CONTRACTOR FILE NO. 05-100 | | 11. MANUFACTURER'S DESIGNATION OF DRILL CME-55 Truck Mount | | <input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER | |
| 4. NAME OF DRILLER | | | | 12. TOTAL SAMPLES 40 | | DISTURBED 0 | |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | | | 13. TOTAL NUMBER CORE BOXES 0 | | 14. ELEVATION GROUND WATER Not Determined | |
| 6. THICKNESS OF OVERBURDEN N/A | | 7. DEPTH DRILLED INTO ROCK N/A | | 15. DATE BORING 11-03-05 | | STARTED 11-03-05 | |
| 8. TOTAL DEPTH OF BORING 80.0 Ft. | | | | 16. ELEVATION TOP OF BORING 20.0 Ft. | | COMPLETED 11-03-05 | |
| | | | | 17. TOTAL RECOVERY FOR BORING Not Recorded | | 18. SIGNATURE AND TITLE OF INSPECTOR | |

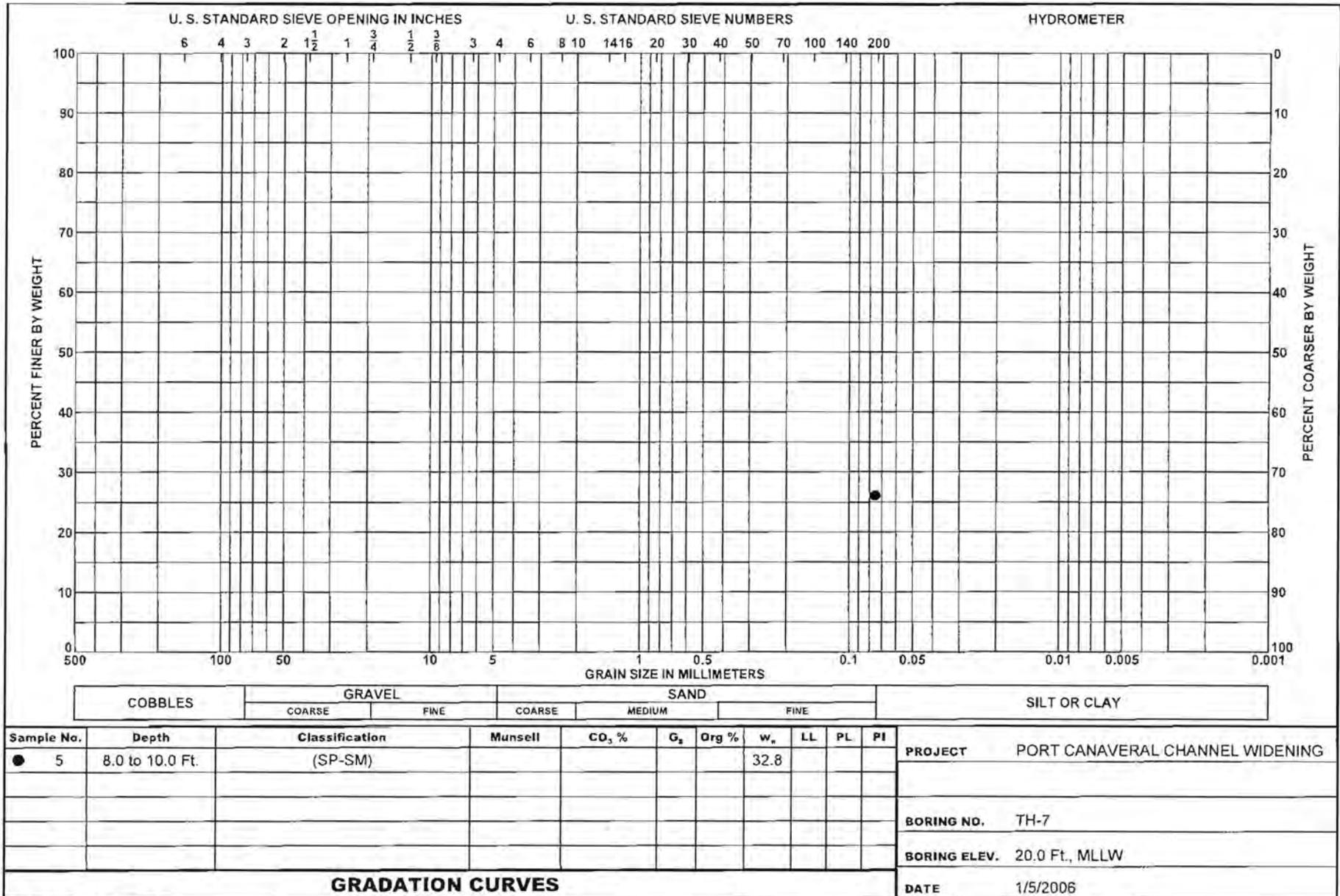
| ELEV. | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % REC. | BOX OR SAMPLE | RQD OR UD | REMARKS | BLOWS/ 0.5 FT. | N-VALUE |
|-------|-------|--------------------------|---|--------|---------------|-----------|-------------|-------------------|---------|
| 20.0 | 0.0 | | | | | | 20.0 | | |
| | | [Dotted pattern] | SAND, poorly-graded, mostly rounded fine-grained sand-sized quartz, trace silt, dry, homogeneous, brown (SP) At El. 17.0 Ft., moist below 3' | NR | 1 | | SPT Sampler | 12 16 10 | 26 |
| | | | | NR | 2 | | SPT Sampler | 11 6 8 | 19 |
| 15.0 | 5.0 | [Vertical lines pattern] | SAND, poorly-graded with silt, mostly rounded fine-grained sand-sized quartz, trace silt, wet, homogeneous, gray (SP-SM) | NR | 3 | | SPT Sampler | 5 2 | 4 |
| | | | | NR | 4 | | SPT Sampler | 4 9 8 | 17 |
| | | | | NR | 5 | | SPT Sampler | 5 4 3 | 7 |
| | | | | NR | 6 | | SPT Sampler | 4 4 3 | 7 |
| | | | | NR | 7 | | SPT Sampler | 4 3 1 | 4 |
| | | | | NR | 8 | | SPT Sampler | 4 3 1 | |
| | | | | | | | | 3 | |
| | | | | | | | | 1 | |

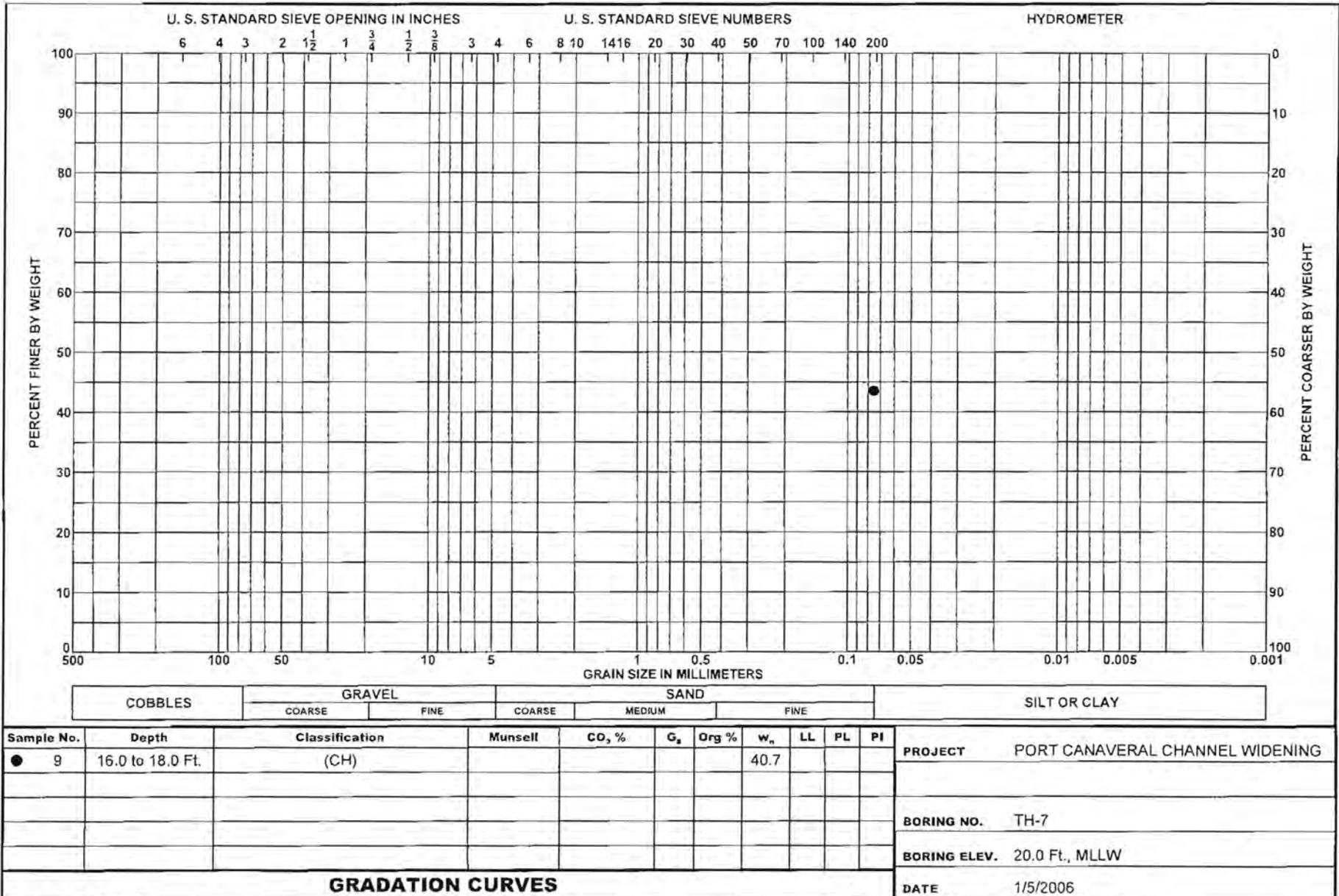
| DRILLING LOG (Cont. Sheet) | | | INSTALLATION | | | SHEET 2 OF 5 SHEETS | | | |
|---|-------|--------|--|--------|---------------------|------------------------|-------------|-------------------|---------|
| PROJECT PORT CANAVERAL CHANNEL WIDENING | | | COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) | | HORIZONTAL NAD83 | VERTICAL MLLW | | | |
| LOCATION COORDINATES X = 784,870 Y = 1,482,595 | | | ELEVATION TOP OF BORING 20.0 Ft. | | | | | | |
| ELEV. | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % REC. | BOX OR SAMPLE | RQD OR UD | REMARKS | BLOWS/ 0.5 FT. | N-VALUE |
| 4.0 | 16.0 | | | NR | 8 | | SPT Sampler | 1 | 15 |
| 3.5 | 16.5 | | CLAY, fat, high plasticity, very soft, mostly clay, moist, homogeneous, gray (CH) | | | | | 1 | |
| | | | SAND, poorly-graded with silt, mostly subangular fine to coarse-grained sand-sized quartz, trace silt, trace shell, moist, homogeneous, gray (SP-SM) | NR | 9 | | SPT Sampler | 2 | 5 |
| | | | | | | | | 3 | |
| | | | | | | | | 6 | |
| | | | | NR | 10 | | SPT Sampler | 7 | 14 |
| | | | | | | | | 8 | |
| | | | | | | | | 5 | |
| | | | | NR | 11 | | SPT Sampler | 7 | 20 |
| | | | | | | | | 6 | |
| | | | | | | | | 5 | |
| -2.0 | 22.0 | | SAND, poorly-graded, mostly subangular fine to coarse-grained sand-sized quartz, little shell, trace silt, trace fine gravel-sized shell, moist, homogeneous, brown (SP) | NR | 12 | | SPT Sampler | 11 | 11 |
| | | | | | | | | 17 | |
| | | | | | | | | 44 | 93 |
| | | | | | | | | 49 | |
| | | | | | | | | 50/0.3' | |
| | | | | | | | | -3.8 | |
| | | | | | | | | -4.0 | |
| | | | | NR | 13 | | SPT Sampler | 34 | 25 |
| | | | | | | | | 47 | |
| | | | | | | | | 50 | |
| | | | | | | | | 50/0.2' | |
| | | | | | | | | -5.7 | |
| | | | | | | | | -6.0 | |
| | | | | NR | 14 | | SPT Sampler | 31 | 89 |
| | | | | | | | | 40 | |
| | | | | | | | | 49 | |
| | | | | | | | | 49 | |
| | | | | NR | 15 | | SPT Sampler | 31 | 92 |
| | | | | | | | | 47 | |
| | | | | | | | | 45 | |
| | | | | | | | | 48 | |
| | | | | NR | 16 | | SPT Sampler | 36 | 30 |
| | | | | | | | | 44 | |
| | | | | | | | | 49 | |
| | | | | | | | | 50 | |
| | | | | NR | 17 | | SPT Sampler | 41 | 93 |
| | | | | | | | | 47 | |
| | | | | | | | | 48 | |
| | | | | | | | | 50/0.3' | |
| | | | | | | | | -13.8 | |
| | | | | | | | | -14.0 | |
| | | | | NR | 18 | | SPT Sampler | 36 | 95 |
| | | | | | | | | 43 | |

| DRILLING LOG (Cont. Sheet) | | | INSTALLATION | | | SHEET 3 OF 5 SHEETS | | | | |
|---|-------|--------|---|---|---------------------|------------------------|-------------------|----------------------------|----------------------------|----|
| PROJECT PORT CANAVERAL CHANNEL WIDENING | | | COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) | | HORIZONTAL NAD83 | VERTICAL MLLW | | | | |
| LOCATION COORDINATES X = 784,870 Y = 1,482,595 | | | ELEVATION TOP OF BORING 20.0 Ft. | | | | | | | |
| ELEV. | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % REC. | BOX OR SAMPLE | RQD OR UD | REMARKS | BLOWS/0.5 FT. | N-VALUE | |
| | | | From El. -16.0 to -24.0 Ft., mostly subangular fine to coarse-grained sand-sized quartz, little shell, trace silt, trace fine gravel-sized shell, trace phosphate, moist, homogeneous, gray | NR | 18 | | -16.0 SPT Sampler | 46 37 | 89 | |
| | | | | NR | 19 | | -18.0 SPT Sampler | 28 28 26 | 54 | |
| | | | | NR | 20 | | -20.0 SPT Sampler | 19 13 18 18 21 | 36 | |
| | | | | NR | 21 | | -22.0 SPT Sampler | 15 17 19 | 36 | |
| | | | | NR | 22 | | -24.0 SPT Sampler | 17 21 26 27 | 53 | |
| | | | | From El. -24.0 to -32.0 Ft., mostly rounded fine-grained sand-sized quartz, trace silt, moist, homogeneous, gray | NR | 23 | | -26.0 SPT Sampler | 45 33 37 29 32 | 66 |
| | | | | | NR | 24 | | -28.0 SPT Sampler | 22 28 41 37 | 69 |
| | | | | From El. -32.0 to -36.0 Ft., mostly subangular fine to coarse-grained sand-sized quartz, little shell, trace silt, moist, homogeneous, gray | NR | 25 | | -30.0 SPT Sampler | 30 28 28 34 | 56 |
| | | | | | NR | 26 | | -30.9 SPT Sampler | 34 | 50 |
| | | | | | NR | | | -31.0 Advanced Boring | 50/0.4' | |
| | | | | | NR | | | SPT Sampler | 29 | |
| | | | | | NR | 27 | | -32.0 SPT Sampler | 13 23 28 27 | 55 |
| | | | | | NR | 28 | | -34.0 SPT Sampler | 33 31 | |
| | | | | | | | | | 36 | 55 |

| DRILLING LOG (Cont. Sheet) | | | INSTALLATION | | | SHEET 4 OF 5 SHEETS | | | | | |
|---|-------|---|---|--------|---------------------|------------------------|-------------|-------------------|-------------|---|----|
| PROJECT PORT CANAVERAL CHANNEL WIDENING | | | COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) | | HORIZONTAL NAD83 | VERTICAL MLLW | | | | | |
| LOCATION COORDINATES X = 784,870 Y = 1,482,595 | | | ELEVATION TOP OF BORING 20.0 Ft. | | | | | | | | |
| ELEV. | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % REC. | BOX OR SAMPLE | RQD OR UP | REMARKS | BLOWS/ 0.5 FT. | N-VALUE | | |
| -36.0 | 56.0 |  | | NR | 28 | | SPT Sampler | 19 | 55 | | |
| | |  | CLAY, fat, high plasticity, soft, mostly clay, moist, homogeneous, gray (CH) | | | | | 11 | | | |
| | | | | NR | 29 | | | SPT Sampler | 5 | 7 | |
| | | | | | | | | | 4 | | |
| | | | | | | | | | 3 | | |
| | | | | | | | | | 4 | | |
| | | | | | | NR | 30 | | SPT Sampler | 3 | 8 |
| | | | | | | | | | 5 | | |
| | | | | | | | | | 3 | | |
| | | | | | | | | | 4 | | |
| | | | | | | NR | 31 | | SPT Sampler | 9 | 60 |
| | | | | | | | | | 4 | | |
| | | | | | | | | | 3 | | |
| | | | | | | | | | 6 | | |
| | | | | NR | 32 | | SPT Sampler | 3 | 11 | | |
| | | | | | | | 6 | | | | |
| | | | | | | | 5 | | | | |
| | | | | | | | 5 | | | | |
| | | | | NR | 33 | | SPT Sampler | 4 | 65 | | |
| | | | | | | | 5 | | | | |
| | | | | | | | 6 | | | | |
| | | | | | | | 5 | | | | |
| | | | | NR | 34 | | SPT Sampler | 4 | 8 | | |
| | | | | | | | 4 | | | | |
| | | | | | | | 4 | | | | |
| | | | | | | | 5 | | | | |
| | | | | NR | 35 | | SPT Sampler | 3 | 7 | | |
| | | | | | | | 4 | | | | |
| | | | | | | | 4 | | | | |
| | | | | | | | 5 | | | | |
| | | | | NR | 36 | | SPT Sampler | 10 | 70 | | |
| | | | | | | | 6 | | | | |
| | | | | | | | 5 | | | | |
| | | | | | | | 6 | | | | |
| | | | | NR | 37 | | SPT Sampler | 7 | 10 | | |
| | | | | | | | 5 | | | | |
| | | | | | | | 5 | | | | |
| | | | | | | | 6 | | | | |
| -54.0 | 74.0 |  | SAND, clayey, low plasticity, soft, mostly rounded fine-grained sand-sized quartz, little clay, moist, homogeneous, gray (SC) | NR | 38 | | SPT Sampler | 6 | 75 | | |
| | | | | | | | | 7 | | | |

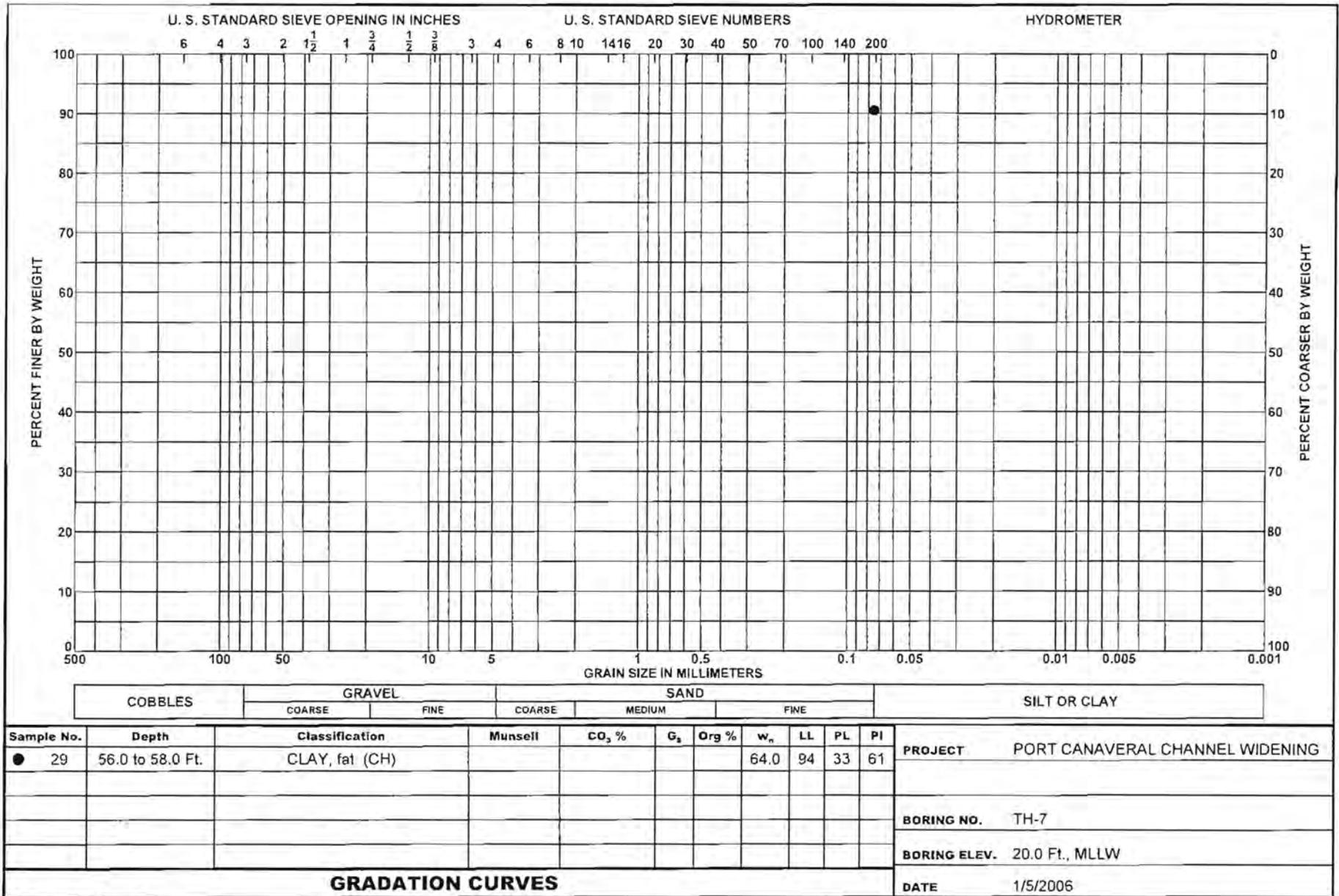
At El. -43.0 Ft., trace of wood





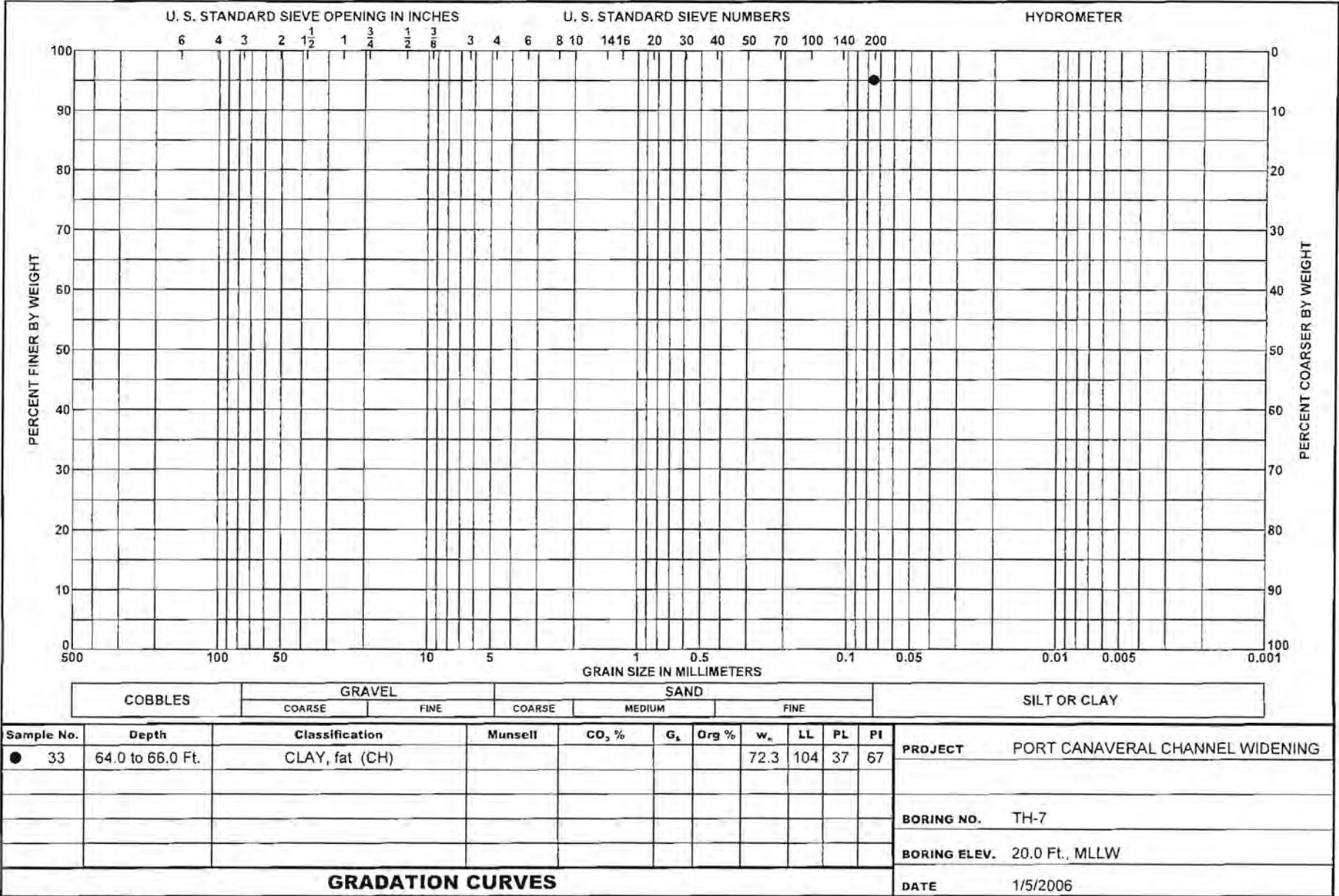
| | | | | | | |
|---------|--------|------|--------|--------|------|--------------|
| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
| | COARSE | FINE | COARSE | MEDIUM | FINE | |

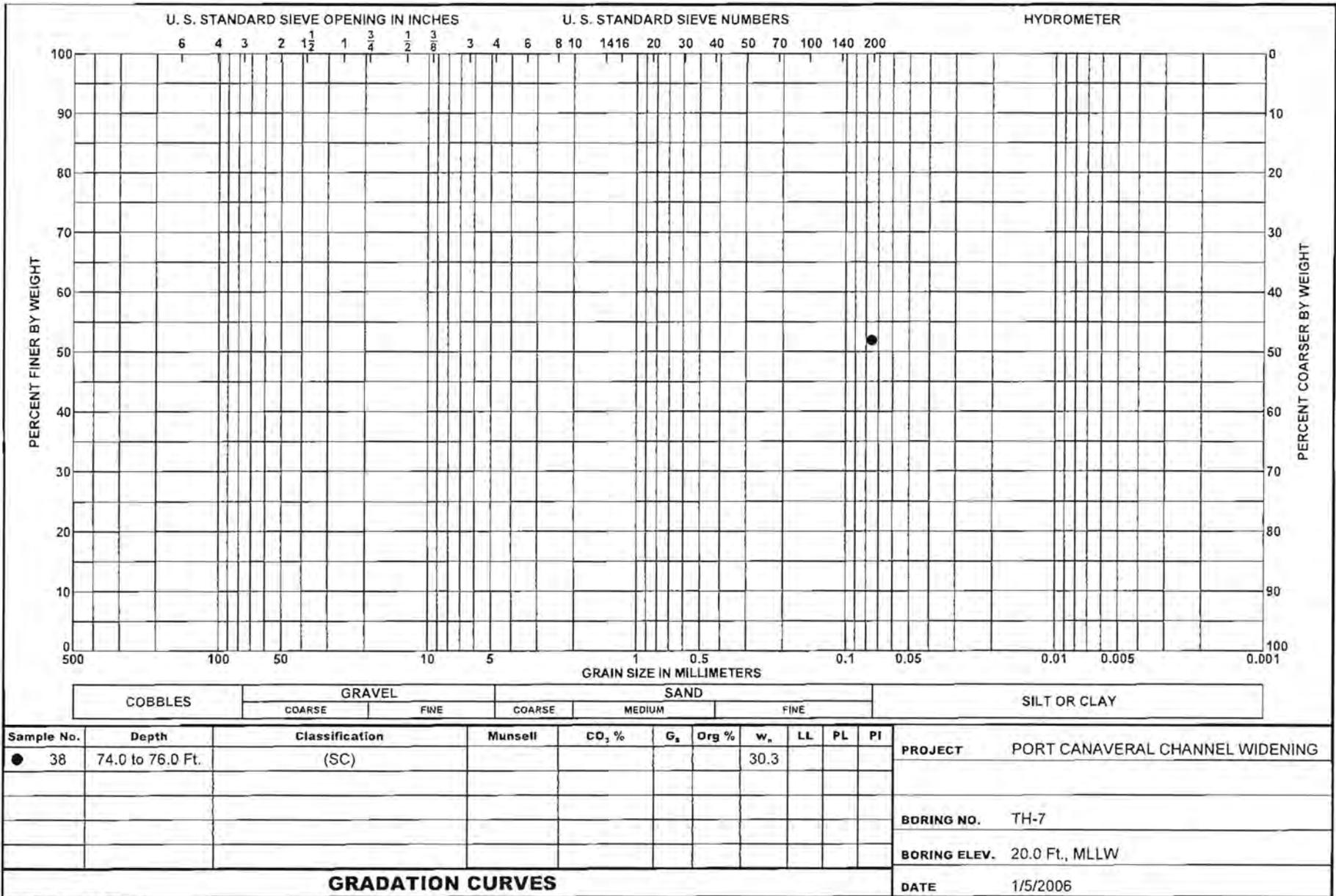
| Sample No. | Depth | Classification | Munsell | CO ₂ % | G _s | Org % | w _n | LL | PL | PI | PROJECT |
|-------------------------|------------------|----------------|---------|-------------------|----------------|-------|----------------|----|----|----|---------------------------------|
| ● 9 | 16.0 to 18.0 Ft. | (CH) | | | | | 40.7 | | | | PORT CANAVERAL CHANNEL WIDENING |
| | | | | | | | | | | | BORING NO. TH-7 |
| | | | | | | | | | | | BORING ELEV. 20.0 Ft., MLLW |
| GRADATION CURVES | | | | | | | | | | | DATE 1/5/2006 |



| | | | | | | |
|---------|--------|------|--------|--------|------|--------------|
| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
| | COARSE | FINE | COARSE | MEDIUM | FINE | |

| Sample No. | Depth | Classification | Munsell | CO ₂ % | G _s | Org % | w _n | LL | PL | PI | PROJECT |
|-------------------------|------------------|----------------|---------|-------------------|----------------|-------|----------------|----|----|----|---------------------------------|
| ● 29 | 56.0 to 58.0 Ft. | CLAY, fat (CH) | | | | | 64.0 | 94 | 33 | 61 | PORT CANAVERAL CHANNEL WIDENING |
| | | | | | | | | | | | BORING NO. TH-7 |
| | | | | | | | | | | | BORING ELEV. 20.0 Ft., MLLW |
| GRADATION CURVES | | | | | | | | | | | DATE 1/5/2006 |





| | | | | | | |
|---------|--------|------|--------|--------|------|--------------|
| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
| | COARSE | FINE | COARSE | MEDIUM | FINE | |

| Sample No. | Depth | Classification | Munsell | CO ₂ % | G _s | Org % | w _s | LL | PL | PI | PROJECT |
|-------------------------|------------------|----------------|---------|-------------------|----------------|-------|----------------|----|----|----|---------------------------------|
| ● 38 | 74.0 to 76.0 Ft. | (SC) | | | | | 30.3 | | | | PORT CANAVERAL CHANNEL WIDENING |
| | | | | | | | | | | | BORING NO. TH-7 |
| | | | | | | | | | | | BORING ELEV. 20.0 Ft., MLLW |
| GRADATION CURVES | | | | | | | | | | | DATE 1/5/2006 |

Boring Designation TH-8

| | | | | | | | |
|---|--|---|--|---|--|---|--|
| DRILLING LOG | | DIVISION Corporate Engineering | | INSTALLATION | | SHEET 1 OF 6 SHEETS | |
| 1. PROJECT PORT CANAVERAL CHANNEL WIDENING | | | | 9. SIZE AND TYPE OF BIT 3" Tricone | | | |
| 2. BORING DESIGNATION TH-8 | | LOCATION COORDINATES X = 786,305 Y = 1,482,510 | | 10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) | | HORIZONTAL NAD83 | |
| 3. DRILLING AGENCY ARDAMAN & ASSOCIATES, INC. | | CONTRACTOR FILE NO. 05-100 | | 11. MANUFACTURER'S DESIGNATION OF DRILL CME-55 Truck Mount | | <input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER | |
| 4. NAME OF DRILLER | | | | 12. TOTAL SAMPLES | | DISTURBED 50 | |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | | | DEG. FROM VERTICAL | | BEARING | |
| 6. THICKNESS OF OVERBURDEN N/A | | | | 13. TOTAL NUMBER CORE BOXES 0 | | | |
| 7. DEPTH DRILLED INTO ROCK N/A | | | | 14. ELEVATION GROUND WATER Not Determined | | | |
| 8. TOTAL DEPTH OF BORING 100.0 Ft. | | | | 15. DATE BORING | | STARTED 11-03-05 | |
| | | | | 16. ELEVATION TOP OF BORING 40.0 Ft. | | COMPLETED 11-03-05 | |
| | | | | 17. TOTAL RECOVERY FOR BORING Not Recorded | | | |
| | | | | 18. SIGNATURE AND TITLE OF INSPECTOR | | | |

| ELEV. | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % REC. | BOX OR SAMPLE | RQD OR UD | REMARKS | BLOWS/ 0.5 FT. | N-VALUE |
|-------|-------|--------|---|--------|---------------|-----------|-------------|---------------------------|---------|
| 40.0 | 0.0 | | | | | | 40.0 | | |
| | | | FILL, mostly subrounded fine to medium-grained sand-sized sand, trace silt, dry, homogeneous, brown | NR | 1 | | SPT Sampler | 3 4 6 | 10 |
| | | | | NR | 2 | | SPT Sampler | 4 7 8 8 | 16 |
| | | | | NR | 3 | | SPT Sampler | 3 4 2 5 | 6 |
| | | | | NR | 4 | | SPT Sampler | 7 10 9 13 | 19 |
| | | | | NR | 5 | | SPT Sampler | 3 11 15 15 27 | 30 |
| | | | | NR | 6 | | SPT Sampler | 11 20 25 34 | 45 |
| | | | | NR | 7 | | SPT Sampler | 20 22 32 37 | 54 |
| | | | | NR | 8 | | SPT Sampler | 17 14 | |

| DRILLING LOG (Cont. Sheet) | | | INSTALLATION | | | SHEET 2 OF 6 SHEETS | | | |
|---|-------|--------|---|--------|---------------------|------------------------|----------------------|----------------------|---------|
| PROJECT PORT CANAVERAL CHANNEL WIDENING | | | COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) | | HORIZONTAL NAD83 | VERTICAL MLLW | | | |
| LOCATION COORDINATES X = 786,305 Y = 1,482,510 | | | ELEVATION TOP OF BORING 40.0 Ft. | | | | | | |
| ELEV. | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % REC. | BOX OR SAMPLE | ROD OR UD | REMARKS | BLOWS/0.5 FT. | N-VALUE |
| 22.0 | 18.0 | | | NR | 8 | | 24.0 SPT Sampler | 11 7 | 25 |
| | | | | NR | 9 | | 22.0 SPT Sampler | 3 2 9 16 | 11 |
| 14.0 | 26.0 | | SAND, poorly-graded, mostly subrounded fine to medium-grained sand-sized quartz, trace silt, trace shell, trace fine gravel-sized shell, moist, homogeneous, brown (SP) | NR | 10 | | 20.0 SPT Sampler | 14 23 27 33 | 50 |
| | | | | NR | 11 | | 18.0 SPT Sampler | 24 28 31 41 | 59 |
| | | | | NR | 12 | | 16.0 SPT Sampler | 29 33 35 36 | 68 |
| | | | | NR | 13 | | 14.6 SPT Sampler | 30 40 | 90+ |
| | | | | NR | | | 14.5 Advanced Boring | | |
| | | | | NR | | | 14.0 SPT Sampler | 37 | |
| 12.0 | 28.0 | | SAND, poorly-graded with silt, mostly rounded fine-grained sand-sized quartz, trace silt, trace shell, moist, homogeneous, brown (SP-SM) | NR | 14 | | SPT Sampler | 35 47 | 97+ |
| | | | | NR | | | 12.6 Advanced Boring | 50/0.4' | |
| | | | | NR | | | 12.5 Advanced Boring | | |
| 6.0 | 34.0 | | SAND, poorly-graded, mostly subangular fine to coarse-grained sand-sized shell, trace silt, trace fine gravel-sized shell, moist, homogeneous, brown (SP) | NR | 15 | | 12.1 SPT Sampler | 50/0.4' | |
| | | | | NR | 16 | | 12.0 Advanced Boring | 36 | |
| | | | | NR | 17 | | SPT Sampler | 21 20 20 | 41 |
| | | | | NR | 18 | | 10.0 SPT Sampler | 18 24 14 20 | 38 |
| | | | | NR | 19 | | 8.0 SPT Sampler | 19 17 22 | 39 |
| | | | | NR | 20 | | 6.0 SPT Sampler | 12 7 8 | |

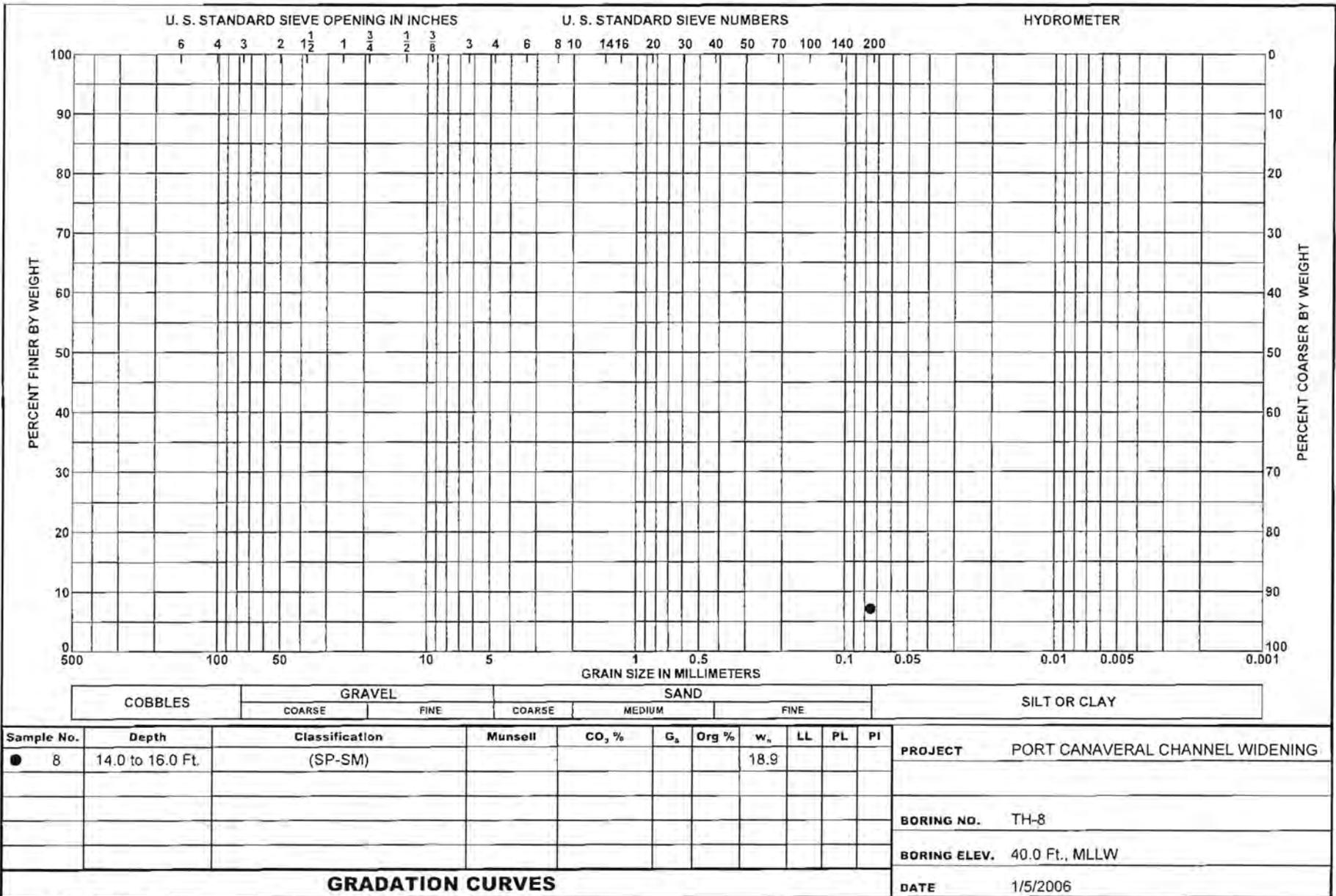
Boring Designation TH-8

| DRILLING LOG (Cont. Sheet) | | | INSTALLATION | | | SHEET 3 OF 6 SHEETS | | | |
|---|-------|--------|--|--------|---------------------|------------------------|-----------------------|----------------------|---------|
| PROJECT PORT CANAVERAL CHANNEL WIDENING | | | COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) | | HORIZONTAL NAD83 | VERTICAL MLLW | | | |
| LOCATION COORDINATES X = 786,305 Y = 1,482,510 | | | ELEVATION TOP OF BORING 40.0 Ft. | | | | | | |
| ELEV. | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % REC. | BOX OF SAMPLE | RQD OR UD | REMARKS | BLOWS/ 0.5 FT. | N-VALUE |
| | | | (SP-SM) | NR | 18 | | 4.0 SPT Sampler | 9 12 | 17 |
| | | | | NR | 19 | | 2.0 SPT Sampler | 13 10 11 16 | 21 |
| | | | | NR | 20 | | 0.6 SPT Sampler | 26 44 | 94+ |
| | | | | NR | | | 0.5 Advanced Boring | 50/0.4' | |
| | | | | NR | | | 0.0 SPT Sampler | 48 | 40 |
| | | | | NR | 21 | | SPT Sampler | 28 29 37 | 66 |
| -2.0 | 42.0 | | | | | | -2.0 | 46 | |
| | | | SAND, poorly-graded, mostly subrounded fine to medium-grained sand-sized quartz, trace silt, trace shell, trace phosphate, moist, homogeneous, gray (SP) | NR | 22 | | SPT Sampler | 33 34 44 | 78 |
| | | | | NR | 23 | | -3.8 Advanced Boring | 50/0.3' | |
| | | | | NR | | | -4.0 SPT Sampler | 43 | 45 |
| | | | | NR | | | -4.9 Advanced Boring | 50/0.4' | |
| | | | | NR | | | -5.0 SPT Sampler | 46 | |
| -6.0 | 46.0 | | | | | | -5.9 Advanced Boring | 50/0.4' | |
| | | | SAND, silty, mostly subrounded fine to medium-grained sand-sized quartz, little silt, trace shell, moist, homogeneous, brown (SM) | NR | 24 | | -6.0 SPT Sampler | 49 | |
| | | | | NR | | | -6.9 Advanced Boring | 50/0.4' | |
| | | | | NR | | | -7.0 SPT Sampler | 47 | |
| -8.0 | 48.0 | | | | | | -8.0 SPT Sampler | 46 | |
| | | | SAND, poorly-graded with silt, mostly rounded fine-grained sand-sized quartz, trace silt, trace shell, moist, homogeneous, brown (SP-SM) | NR | 25 | | SPT Sampler | 44 45 | 95+ |
| | | | | NR | | | -9.4 Advanced Boring | 50/0.4' | |
| | | | | NR | | | -9.5 SPT Sampler | 44 | 50 |
| | | | | NR | 26 | | -10.0 SPT Sampler | 50 | |
| | | | | NR | | | -10.9 Advanced Boring | 50/0.4' | |
| | | | | NR | | | -11.0 SPT Sampler | 50/0.4' | |
| | | | | NR | | | -11.4 Advanced Boring | 48 | |
| | | | | NR | | | -11.5 SPT Sampler | 44 | |
| | | | | NR | 27 | | -12.0 SPT Sampler | 44 44 | 94+ |
| | | | | NR | | | -13.4 Advanced Boring | 50/0.4' | |
| | | | | NR | | | -13.5 SPT Sampler | 46 | |
| | | | | NR | 28 | | -14.0 SPT Sampler | 46 | |
| | | | | | | | SPT Sampler | 39 | 55 |

| DRILLING LOG (Cont. Sheet) | | | INSTALLATION | | | SHEET 4 OF 6 SHEETS | | | |
|---|-------|-------------------------|---|--------|---------------------|------------------------|-------------|----------------------|---------|
| PROJECT PORT CANAVERAL CHANNEL WIDENING | | | COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) | | HORIZONTAL NAD83 | VERTICAL MLLW | | | |
| LOCATION COORDINATES X = 786,305 Y = 1,482,510 | | | ELEVATION TOP OF BORING 40.0 Ft. | | | | | | |
| ELEV. | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % REC. | BOX OR SAMPLE | RQD OR UD | REMARKS | BLOWS/ 0.5 FT. | N-VALUE |
| -16.0 | 56.0 | [Dotted pattern legend] | SAND, poorly-graded, mostly rounded fine-grained sand-sized quartz, trace silt, trace shell, trace phosphate, moist, homogeneous, gray (SP) | NR | 28 | | SPT Sampler | 44 46 | 83 |
| | | | | NR | 29 | | SPT Sampler | 40 37 39 | 76 |
| | | | | NR | 30 | | SPT Sampler | 29 26 27 21 | 48 |
| | | | | NR | 31 | | SPT Sampler | 23 20 20 20 | 40 |
| | | | | NR | 32 | | SPT Sampler | 22 23 25 22 | 47 |
| | | | | NR | 33 | | SPT Sampler | 22 28 26 22 | 48 |
| | | | | NR | 34 | | SPT Sampler | 21 24 34 14 | 48 |
| | | | | NR | 35 | | SPT Sampler | 23 27 25 26 | 51 |
| | | | | NR | 36 | | SPT Sampler | 22 24 24 28 | 52 |
| | | | | NR | 37 | | SPT Sampler | 33 27 29 24 | 53 |
| | | | | NR | 38 | | SPT Sampler | 26 30 38 | |

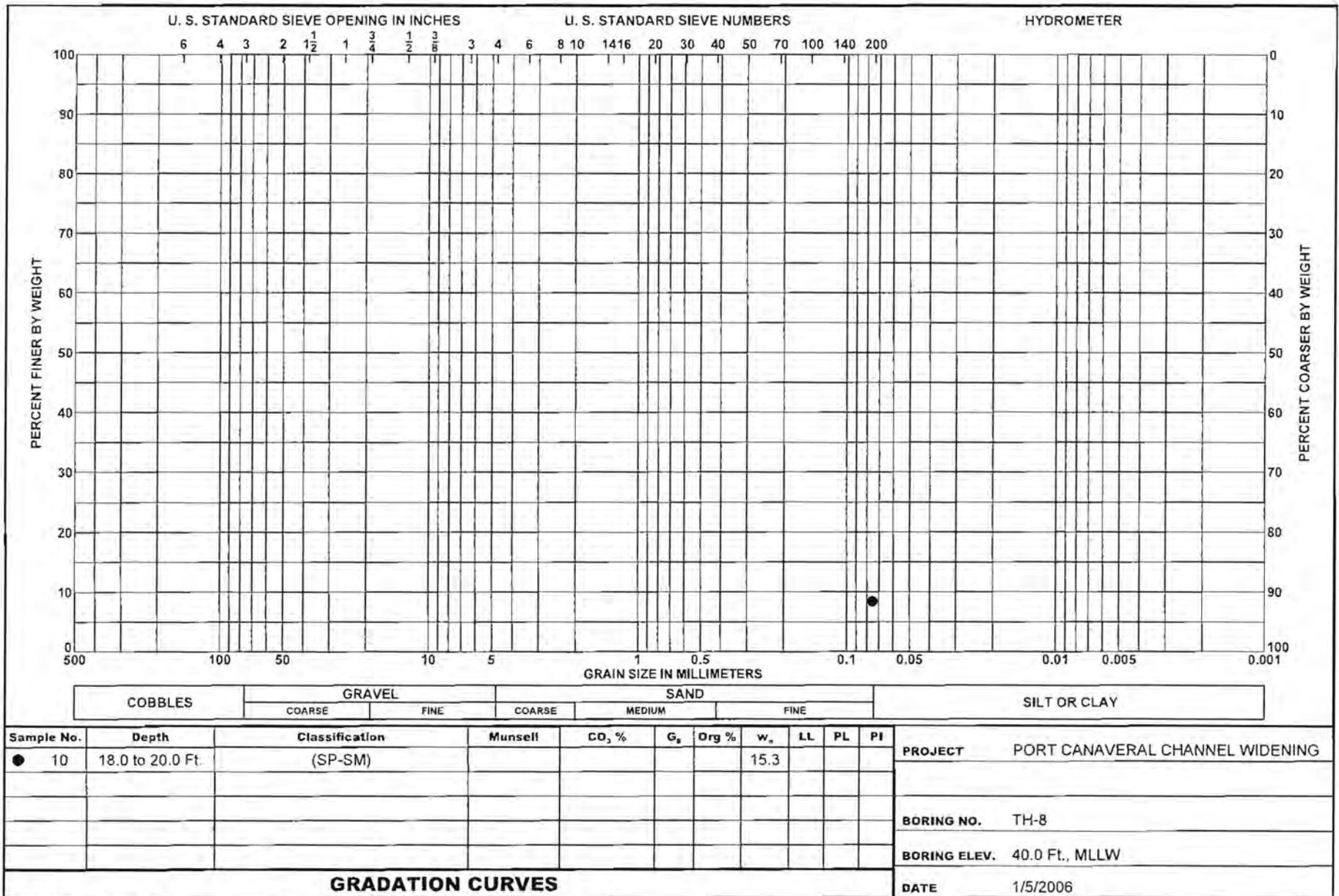
| DRILLING LOG (Cont. Sheet) | | | INSTALLATION | | | SHEET 5 OF 6 SHEETS | | | | | |
|---|-------|--------|--|--------|---------------------|------------------------|-----------------|-------------------|-----------------|---------|-----|
| PROJECT PORT CANAVERAL CHANNEL WIDENING | | | COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) | | HORIZONTAL NAD83 | VERTICAL MLLW | | | | | |
| LOCATION COORDINATES X = 786,305 Y = 1,482,510 | | | ELEVATION TOP OF BORING 40.0 Ft. | | | | | | | | |
| ELEV. | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % REC. | BOX OR SAMPLE | RQD OR UP | REMARKS | BLOWS/ 0.5 FT. | N-VALUE | | |
| | | | From El. -36.0 to -54.0 Ft., mostly subangular fine to coarse-grained sand-sized quartz, trace silt, trace shell, trace fine gravel-sized shell, trace phosphate, moist, homogeneous, gray | NR | 38 | | | 24 | 62 | | |
| | | | | | | | | -36.0 | SPT Sampler | 30 | 75 |
| | | | | | | | | | | 41 | |
| | | | | | | NR | 39 | | SPT Sampler | 49 | 99+ |
| | | | | | | | | -37.4 | | 50/0.4' | |
| | | | | | | | | -37.5 | Advanced Boring | | |
| | | | | | | NR | | | SPT Sampler | 45 | |
| | | | | | | NR | 40 | | SPT Sampler | 48 | |
| | | | | | | | | -38.8 | | 50/0.3' | |
| | | | | | | | | -39.0 | Advanced Boring | | |
| | | | | | | NR | | | SPT Sampler | 47 | |
| | | | | | | | | -40.0 | | 44 | 80 |
| | | | | | | | | | | 41 | |
| | | | | | | NR | 41 | | SPT Sampler | 43 | 93+ |
| | | | | | | | | -41.4 | | 50/0.4' | |
| | | | | | | | | -41.5 | Advanced Boring | | |
| | | | | | | NR | | | SPT Sampler | 41 | |
| | | | | | | | | -42.0 | | 45 | 93 |
| | | | | | | | | 45 | | | |
| | | | | NR | 42 | | SPT Sampler | 48 | | | |
| | | | | | | -44.0 | | 50 | | | |
| | | | | | | | | 41 | 78 | | |
| | | | | | | | | 34 | | | |
| | | | | NR | 43 | | SPT Sampler | 44 | 85 | | |
| | | | | | | -46.0 | | 46 | | | |
| | | | | | | | | 44 | 90 | | |
| | | | | | | | | 47 | | | |
| | | | | NR | 44 | | SPT Sampler | 43 | | | |
| | | | | | | -48.0 | | 44 | | | |
| | | | | NR | 45 | | SPT Sampler | 44 | | | |
| | | | | | | -48.8 | | 50/0.3' | | | |
| | | | | | | -49.0 | Advanced Boring | | | | |
| | | | | NR | | | SPT Sampler | 43 | | | |
| | | | | | | -50.0 | | 46 | 90 | | |
| | | | | | | | | 43 | | | |
| | | | | NR | 46 | | SPT Sampler | 44 | 93 | | |
| | | | | | | | | 49 | | | |
| | | | | | | -51.8 | | 50/0.3' | | | |
| | | | | | | -52.0 | Advanced Boring | | | | |
| | | | | NR | 47 | | SPT Sampler | 40 | 80 | | |
| | | | | | | | | 43 | | | |
| | | | | | | | | 37 | | | |
| -54.0 | 94.0 | | | | | -54.0 | | 38 | | | |
| | | | SAND, silty, mostly rounded fine-grained sand-sized quartz, little silt, trace clay, moist, homogeneous, brown (SM) | NR | 48 | | SPT Sampler | 24 | 95 | | |
| | | | | | | | | 26 | | | |

| DRILLING LOG (Cont. Sheet) | | | INSTALLATION | | | SHEET 6 OF 6 SHEETS | | | | | | | | | | | | | | | | | | | | |
|---|--------------|---------------------------|---|-----------|---------------------|---------------------------|-------------|-------------------|---------|----|-----------|--------|----|-----------|--------|----|-----------|-----|----|-----------|--------|--|--|--|--|--|
| PROJECT PORT CANAVERAL CHANNEL WIDENING | | | COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) | | HORIZONTAL NAD83 | VERTICAL MLLW | | | | | | | | | | | | | | | | | | | | |
| LOCATION COORDINATES X = 786,305 Y = 1,482,510 | | | ELEVATION TOP OF BORING 40.0 Ft. | | | | | | | | | | | | | | | | | | | | | | | |
| ELEV. | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % REC. | BOX OR SAMPLE | ROD OR UD | REMARKS | BLOWS/ 0.5 FT. | N-VALUE | | | | | | | | | | | | | | | | | |
| -60.0 | 100.0 | | | NR | 48 | | SPT Sampler | 24 | 50 | | | | | | | | | | | | | | | | | |
| | | | | | | | -56.0 | 17 | | | | | | | | | | | | | | | | | | |
| | | | | NR | 49 | | SPT Sampler | 13 | 14 | | | | | | | | | | | | | | | | | |
| | | | | | | | -58.0 | 9 | | | | | | | | | | | | | | | | | | |
| | | | | | | | | 5 | | | | | | | | | | | | | | | | | | |
| | | | | | | | | 14 | | | | | | | | | | | | | | | | | | |
| | | | | NR | 50 | | SPT Sampler | 10 | 22 | | | | | | | | | | | | | | | | | |
| | | | | | | | -60.0 | 11 | | | | | | | | | | | | | | | | | | |
| | | | | | | | | 11 | | | | | | | | | | | | | | | | | | |
| | | | | | | | | 13 | | | | | | | | | | | | | | | | | | |
| | | | NOTES: 1. Soils are field visually classified in accordance with the Unified Soils Classification System. 2. Borehole grouted at completion of sampling. 3. Laboratory Testing Results <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>8</td> <td>14.0/16.0</td> <td>SP-SM*</td> </tr> <tr> <td>10</td> <td>18.0/20.0</td> <td>SP-SM*</td> </tr> <tr> <td>14</td> <td>26.0/27.4</td> <td>SP-SM*</td> </tr> <tr> <td>24</td> <td>46.0/46.9</td> <td>SM*</td> </tr> <tr> <td>25</td> <td>48.0/49.4</td> <td>SP-SM*</td> </tr> </tbody> </table> *Lab visual classification based on gradation curve. No Atterberg limits. 4. Additional Laboratory Testing 1 Moisture Content 2-4 Moisture Content 5 Moisture Content 6 Moisture Content 7 Moisture Content 8 Moisture Content 10 Moisture Content 14 Moisture Content 15-17 Moisture Content 18-21 Moisture Content 22-23 Moisture Content 24 Moisture Content 25 Moisture Content 29-38 Moisture Content 39-47 Moisture Content 48-50 Moisture Content | SAMPLE ID | SAMPLE DEPTH | LABORATORY CLASSIFICATION | 8 | 14.0/16.0 | SP-SM* | 10 | 18.0/20.0 | SP-SM* | 14 | 26.0/27.4 | SP-SM* | 24 | 46.0/46.9 | SM* | 25 | 48.0/49.4 | SP-SM* | | | 140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.). Abbreviations: NR = Not Recorded. | | |
| SAMPLE ID | SAMPLE DEPTH | LABORATORY CLASSIFICATION | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 14.0/16.0 | SP-SM* | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | 18.0/20.0 | SP-SM* | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | 26.0/27.4 | SP-SM* | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | 46.0/46.9 | SM* | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | 48.0/49.4 | SP-SM* | | | | | | | | | | | | | | | | | | | | | | | | |



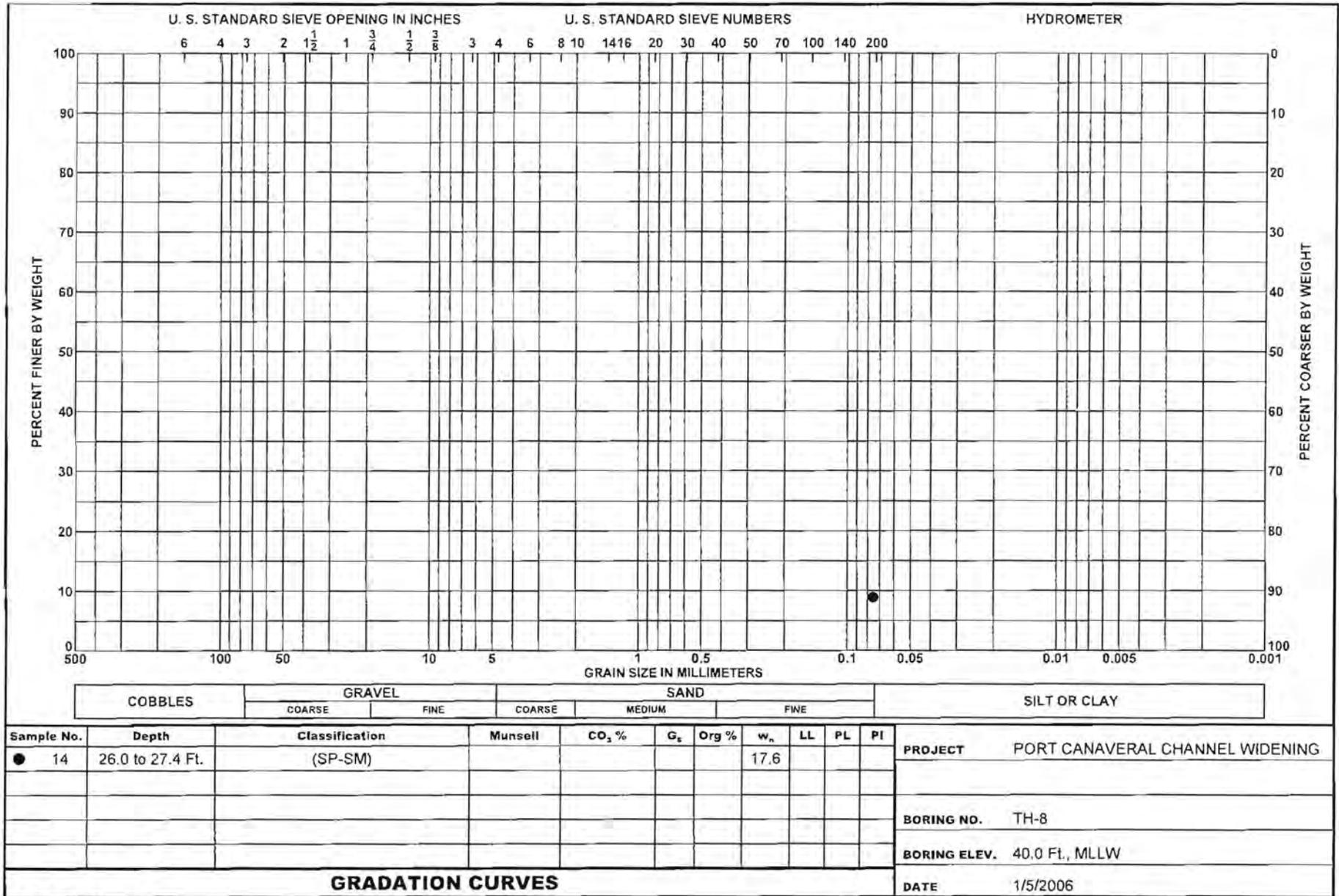
| | | | | | | | |
|---------|--------|------|--------|--------|------|--|--------------|
| COBBLES | GRAVEL | | SAND | | | | SILT OR CLAY |
| | COARSE | FINE | COARSE | MEDIUM | FINE | | |

| Sample No. | Depth | Classification | Munsell | CO ₂ % | G _s | Org % | w _n | LL | PL | PI | PROJECT |
|-------------------------|------------------|----------------|---------|-------------------|----------------|-------|----------------|----|----|----|---------------------------------|
| ● 8 | 14.0 to 16.0 Ft. | (SP-SM) | | | | | 18.9 | | | | PORT CANAVERAL CHANNEL WIDENING |
| | | | | | | | | | | | BORING NO. TH-8 |
| | | | | | | | | | | | BORING ELEV. 40.0 Ft., MLLW |
| GRADATION CURVES | | | | | | | | | | | DATE 1/5/2006 |



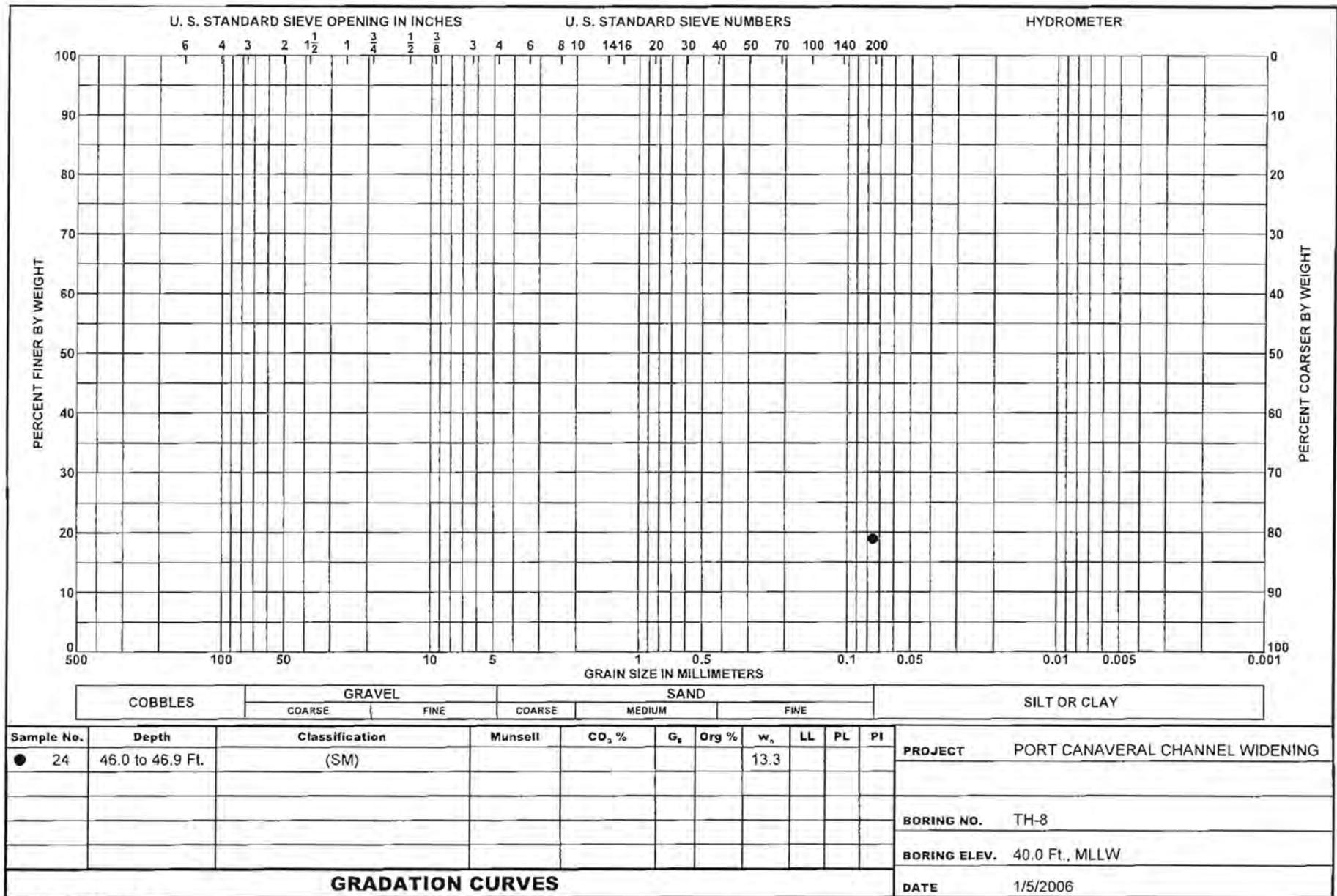
| | | | | | | |
|---------|--------|------|--------|--------|------|--------------|
| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
| | COARSE | FINE | COARSE | MEDIUM | FINE | |

| Sample No. | Depth | Classification | Munsell | CO ₂ % | G _s | Org % | w _p | LL | PL | PI | PROJECT |
|-------------------------|------------------|----------------|---------|-------------------|----------------|-------|----------------|----|----|----|---------------------------------|
| ● 10 | 18.0 to 20.0 Ft. | (SP-SM) | | | | | 15.3 | | | | PORT CANAVERAL CHANNEL WIDENING |
| | | | | | | | | | | | BORING NO. TH-8 |
| | | | | | | | | | | | BORING ELEV. 40.0 Ft., MLLW |
| GRADATION CURVES | | | | | | | | | | | DATE 1/5/2006 |



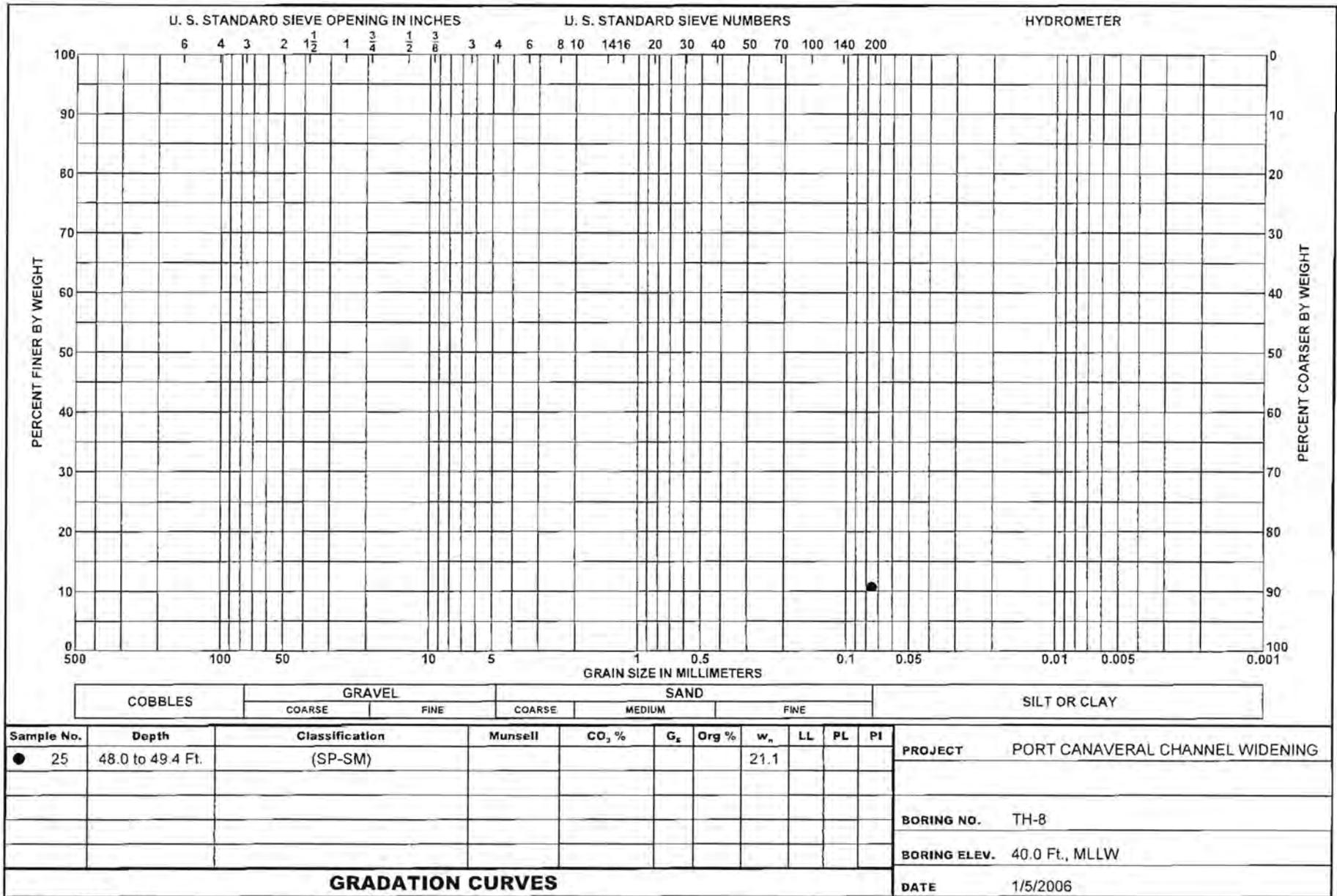
| | | | | | | |
|---------|--------|------|--------|--------|------|--------------|
| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
| | COARSE | FINE | COARSE | MEDIUM | FINE | |

| Sample No. | Depth | Classification | Munsell | CO ₂ % | G _s | Org % | w _n | LL | PL | PI | PROJECT |
|-------------------------|------------------|----------------|---------|-------------------|----------------|-------|----------------|----|----|----|---------------------------------|
| ● 14 | 26.0 to 27.4 Ft. | (SP-SM) | | | | | 17.6 | | | | PORT CANAVERAL CHANNEL WIDENING |
| | | | | | | | | | | | BORING NO. TH-8 |
| | | | | | | | | | | | BORING ELEV. 40.0 Ft., MLLW |
| GRADATION CURVES | | | | | | | | | | | DATE 1/5/2006 |



| | | | | | | |
|---------|--------|------|--------|--------|------|--------------|
| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
| | COARSE | FINE | COARSE | MEDIUM | FINE | |

| Sample No. | Depth | Classification | Munsell | CO ₂ % | G _s | Org % | w _s | LL | PL | PI | PROJECT |
|-------------------------|------------------|----------------|---------|-------------------|----------------|-------|----------------|----|----|----|---------------------------------|
| ● 24 | 46.0 to 46.9 Ft. | (SM) | | | | | 13.3 | | | | PORT CANAVERAL CHANNEL WIDENING |
| | | | | | | | | | | | BORING NO. TH-8 |
| | | | | | | | | | | | BORING ELEV. 40.0 Ft., MLLW |
| GRADATION CURVES | | | | | | | | | | | DATE 1/5/2006 |



| Sample No. | Depth | Classification | Munsell | CO ₂ % | G _s | Org % | w _n | LL | PL | PI | SOIL CLASSIFICATION | |
|-------------------------|------------------|----------------|---------|-------------------|----------------|-------|----------------|----|----|----|---------------------|---------------------------------|
| | | | | | | | | | | | COARSE | FINE |
| ● 25 | 48.0 to 49.4 Ft. | (SP-SM) | | | | | 21.1 | | | | COBBLES | SAND |
| | | | | | | | | | | | | SILT OR CLAY |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| GRADATION CURVES | | | | | | | | | | | PROJECT | PORT CANAVERAL CHANNEL WIDENING |
| | | | | | | | | | | | BORING NO. | TH-8 |
| | | | | | | | | | | | BORING ELEV. | 40.0 Ft., MLLW |
| | | | | | | | | | | | DATE | 1/5/2006 |

Appendix 3

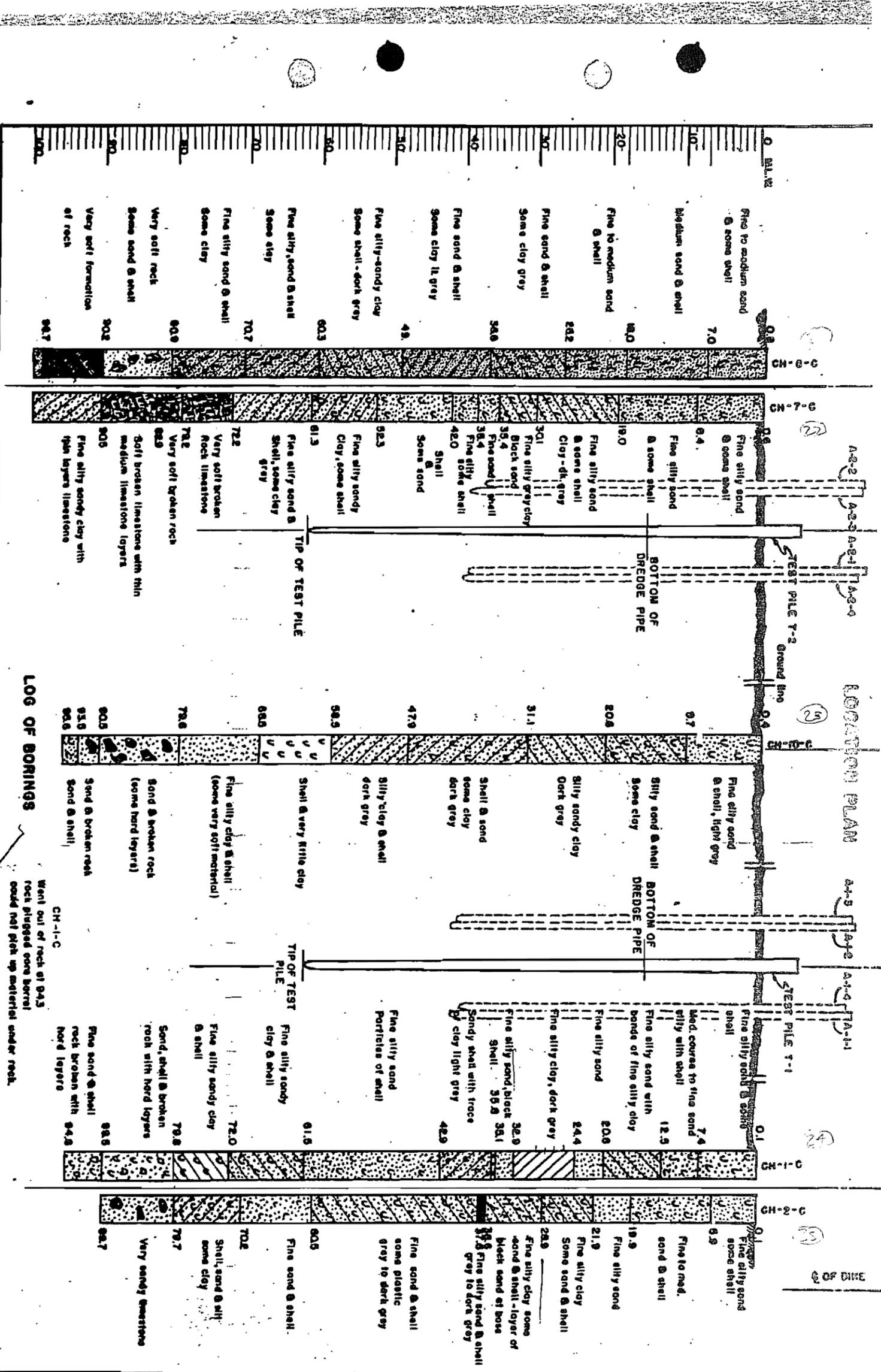
Historic Test Boring Logs - Non-Ardaman

5

MOLE NO. CB-NLS-7

| | | | | | | |
|--|-------|---|--|--|--|---|
| DEPARTMENT OF THE ARMY DIVISION <u>Corps of Engineers</u> INSTALLATION <u>Jacksonville, Florida</u> DRILLING LOG | | | 1. PROJECT <u>Canaveral Harbor</u> <u>New Lock Site</u> | | SHEET 1 OF 1 | |
| 4. HOLE NO. (As shown on drawing title and file No.) | | | 5. NAME OF DRILLER <u>V. Cox</u> | | | |
| 6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED DEGREES WITH VERTICAL | | | 7. THICKNESS OF OVERBURDEN | 8. DEPTH DRILLED INTO ROCK | 9. TOTAL DEPTH OF HOLE <u>33.0'</u> | |
| 10. SIZE AND TYPE OF BIT <u>2" I. D. Spoon</u> | | 11. DATUM FOR ELEVATION SHOWN <u>MLW *</u> | | 12. MANUFACTURER'S DESIGNATION OF DRILL | | |
| 13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED | | 14. TOTAL NO. CORE BOXES | | 15. ELEV. GROUND WATER <u>Tidal</u> | 16. DATE MOLE STARTED <u>1/13/59</u> COMPLETED <u>1/13/59</u> | |
| 17. ELEV. TOP OF HOLE <u>-2.0</u> | | 18. TOTAL CORE RECOVERY FOR BORING (%) | | 19. SOLE CHARGE COORDINATOR <u>R. R. Thompson</u> | | |
| ELEVATION | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS (description) | % CORE RECOVERY | BOX OR SAMPLE NO. | REMARKS (drilling time, water loss, depth of weathering, etc., if significant) |
| -2.0 | 0.0 | | | | | Bit & Barrel Bls/Ft -2.0 |
| | | | SAND, fine/medium quartz, silty, very slightly shelly, gray, quite loose in bottom | | 1 | 2" I.D. Spoon -7.0 |
| | | | | | 2 | " " -12.0 |
| -11.5 | 9.5 | | CLAY, slightly shelly, green | | 3 | Wt of Hammer -17.0 |
| | | | Sandy | | 4 | " " -22.0 |
| -19.7 | 17.7 | | SAND, medium/coarse, very clayey, green | | 5 | " " -25.0 |
| | | | SAND, medium/coarse quartz, brown | | 6 | " " -27.0 |
| -22.0 | 20.0 | | SAND, fine/medium quartz & calcite, shelly, gray | | 7 | " " -32.0 |
| | | | | | 8 | " " -35.0 |
| -25.3 | 23.3 | | | | | 180# Hammer w/30" Drop Used on 2" I. D. Spoon * Banana River MDS = 0.1' below MSL |
| -27.0 | | | | | | |
| -32.0 | | | | | | |
| -35.0 | 33.0 | | | | | |

5



NOTE: Material deposited field inspector.

CANAVERAL LOCATION OF AND CORE E

JAG DOWNVILLE-OSHTIC SCALE AS

LEGEND:
 (Symbol) Test Pile
 (Symbol) Anchor Pile
 (Symbol) Core Borehole



PITTSBURGH TESTING LABORATORY

3281 N.W. 7th STREET MIAMI 35, FLORIDA

AS A MUTUAL PROTECTION TO CLIENTS, THE PUBLIC AND OURSELVES, ALL REPORTS ARE SUBMITTED AS THE CONFIDENTIAL PROPERTY OF CLIENTS, AND AUTHORIZATION FOR PUBLICATION OF STATEMENTS, CONCLUSIONS OR EXTRACTS FROM OR REPRODUCING OUR REPORTS IS RESERVED PENDING OUR WRITTEN APPROVAL

TEST BORING REPORT

P-1

CLIENT Canaveral Port Authority, Cocoa, Florida ORDER No. KA-1432
 PROJECT Test Borings in easterly part of the Port Authority HOLE No. 1 (Sheet 1 of 3)
 LOCATION Shown on location plat drawn by Gee & Property DATE STARTED 11-18-56
Jensen, Consulting Engineers Inc. W. Palm Beach, Fla. DRILLER Gaultney & Chapman DRILL No. 10 DATE COMPLETED 11-23-56

| GROUND ELEVATION | DESCRIPTION OF MATERIALS | Sample Number | Hammer Blows on Sampler | Penetration Foot | Hammer Blow on Casing |
|----------------------|--|---------------|-------------------------|--|-----------------------|
| Established @ 100.0' | | | | | |
| | Loose to very loose Grey & Tan medium to fine sand with shell fragments | 103 | 9 | 1.0 2.0 3.0 4.0 5.0 6.0 7.0 | |
| 7.5' 7.5' | | | | | |
| | Very Loose Grey silty sand with shell fragments | 111 | 1 | 8.0 9.0 10.0 11.0 12.0 13.0 14.0 | |
| 13.5' 8.0' | | | | | |
| | Medium to Loose Grey medium to fine sand | 116 | 21 | 15.0 16.0 17.0 18.0 19.0 20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 | |
| 29.0' 15.5' | | | | | |
| | Grey sandy clay | 131 | 2 | 30.0 31.0 32.0 33.0 34.0 35.0 | |
| 32.5' 3.5' | | | | | |
| | Scale _____ = 1 foot Hammer weight: Casing _____ lbs. Spoon <u>140</u> lbs. Hammer drop: Casing _____ ins. Spoon <u>30</u> ins. Sampler size <u>1 3/8</u> O.D. <u>2</u> " O.D. <u>Std.</u> Pen. Casing size: _____ I.D. _____ O.D. Type <u>Drilling Mud</u> Water level: <u>2.5</u> below surface at <u>8.00</u> date <u>11-19-56</u> | | | | |

As a mutual protection to the owners and ourselves, the engineer in the owner's behalf shall check this report with the samples submitted prior to the purchase of property or designing of structures.

PITTSBURGH TESTING LABORATORY

BY J. C. Hanley