Section 20. Soils Report

REPORT

January 16, 2015
14-1188 S

Geotechnical Engineering Services

Proposed Retirement Residence
802 Ocean Avenue
Portland, Maine

PREPARED FOR:
Hawthorn Development, LLC
c/o Lenity Architecture
Attention: Mark Lowen
3150 Kettle Court SE
Salem, Oregon 97301

PREPARED BY:
S. W. Cole Engineering, Inc.
286 Portland Road
Gray, Maine 04039
207-657-2866

S.W.COLE ENGINEERING, INC.

- *Geotechnical Engineering*
- *Construction Materials Testing*
- *GeoEnvironmental Services*
- *Ecological Services*

www.swcole.com

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January 16, 2015

Hawthorn Development, LLC
c/o Lenity Architecture
Attention: Mark Lowen
3150 Kettle Court SE
Salem, Oregon 97301

Subject: Geotechnical Engineering Services
Proposed Retirement Residence
802 Ocean Avenue
Portland, Maine

Dear Mark:

In accordance with our Revised Proposal dated November 11, 2014, we have performed subsurface explorations for the subject project in Portland, Maine. This report presents our findings and geotechnical recommendations and its contents are subject to the limitations set forth in Attachment A.

1.0 INTRODUCTION

1.1 Scope and Purpose

The purpose of our services was to obtain subsurface information at the site in order to develop geotechnical recommendations relative to foundations, earthwork and pavement associated with the proposed construction. Our scope of services included review of existing subsurface information, drilling test boring and auger probe explorations, a geotechnical analysis of the subsurface findings and preparation of this report.

1.2 Proposed Construction

Based on the site plan dated October 28, 2014 and the RFP dated October 29, 014, we understand development plans call for construction of a new retirement residence with associated paved access drive and parking areas on an undeveloped parcel located at

802 Ocean Avenue in Portland, Maine. We understand the residence will be four-story with 142 suites and will consist of wood-framed construction.

The building will have a finish floor elevation of 145 feet (project datum) requiring cuts in the west side of the footprint and fills in the east side of the footprint approaching 10 to 12 feet. Additionally, cuts and fills approaching about 15 feet will be required to achieve proposed site grades in paved parking and access drive areas. Two detached garages are proposed south and southeast of the main building.

Proposed and existing site features are shown on the "Exploration Location Plan" attached as Sheet 1.

2.0 EXPLORATION AND TESTING

2.1 Explorations

We performed thirteen explorations for the subject project as well as a review of explorations performed at the site for a previous development proposal. The approximate exploration locations are shown on the "Exploration Location Plan" attached as Sheet 1. Logs of the recent explorations are attached as Sheets 2 through 14. A key to the notes and symbols used on the log is attached as Sheet 15. Logs of the previous explorations are attached as Appendix A.

2.1.1 Recent Explorations

Five test borings (B-101 through B-105) and eight auger probes (P-201 through P-208) were made at the site on November 22, 2014, by Northern Test Boring, Inc of Gorham, Maine working under subcontract to S. W. Cole Engineering, Inc. (S.W.COLE). Bedrock was encountered at the ground surface at B-103 and P-208. The exploration locations were selected and established in the field using a Trimble GPS by S.W.COLE.

2.1.2 Previous Explorations

Seventeen test borings (B-1 through B-17) and eight auger probes (P-1 through P-8) were made at the site in 2004 for a previous development proposal.

2.2 Testing

The explorations were made using cased wash-boring, rock coring, solid stem auger, and air hammer drilling techniques. The soils were sampled at the test borings using a split spoon sampler and Standard Penetration Test (SPT) methods. SPT blow counts are shown on the logs. Soil and bedrock samples obtained from the explorations were returned to our laboratory for visual classification.

3.0 SITE AND SUBSURFACE CONDITIONS

3.1 Surficial Conditions

The site is located at 802 Ocean Avenue in Portland, Maine. The site consists of an undeveloped wood parcel located on the west side of Ocean Avenue. Bedrock outcrops are present across the site. The site generally slopes down to the east with existing topography varying from about elevation 160 to 125 feet within the footprint of proposed construction and elevation 140 to 115 feet along the proposed access drive. Some shallow drainage channels and lower laying areas of ponded water are present at the site, with flow generally draining to the east and southeast. A wetland is present in the northwestern limits of the site, which appears to feed shallow drainage channels. Existing site features and topography are shown on Sheet 1.

3.2 Subsurface Conditions

Underlying a surficial layer of forest duff and topsoil, the explorations generally encountered a thin layer of silty sand and/or silty glacial till overlying shallow bedrock. Bedrock was encountered at the explorations at depths varying from about ½ to 5 feet. The drilling equipment penetrated into an upper zone of weathered bedrock at some exploration locations. Based on rock coring performed as part of the 2004 exploration program, the bedrock is classified as migmatite and biotite-muscovite schist of varying quality. Refer to the attached logs for more detailed subsurface information.

3.3 Groundwater Conditions

The overburden soils encountered at the explorations were generally moist to saturated. Groundwater monitoring wells were installed in several borings made for the 2004 exploration program. Details of these monitoring wells are shown on the borings logs attached in Appendix A. Groundwater measurements obtained at the wells in January, 2005 are as follows:

Boring	Water Depth From Existing Ground Surface (ft)
B-2	4.1 Below
B-4	1.7 Above (Possible Artesian Condition)
B-8	0.5 Above (Possible Artesian Condition)
B-12	0.1 Above (Possible Artesian Condition)
B-16	3.0 Below
B-17 (Shallow)	2.7 Below
B-17 (Deep)	1.1 Above (Possible Artesian Condition)

An attempt was made to locate the monitoring wells at the site during the recent exploration program; however the wells had either been destroyed or were frozen, hindering measurement. Groundwater likely becomes perched on top of the shallow bedrock at the site. It should be anticipated that seasonal groundwater levels will fluctuate, especially during periods of snowmelt and precipitation.

3.4 Seismic and Frost Considerations

The 100-year Air Freezing Index for the Portland, Maine area is about 1,410-Fahrenheit degree-days, which corresponds to a frost penetration depth on the order of 4.5 feet. Based on the findings at the explorations, we interpret the site soils and bedrock to correspond to Seismic Site Class C in accordance with 2009 IBC/ASCE-7.

4.0 EVALUATION AND RECOMMENDATIONS

4.1 General Findings

Based on the subsurface findings, the proposed construction appears feasible from a geotechnical standpoint. Specifically, conventional spread footings and on-grade floor slabs appear suitable for the proposed buildings. The principle geotechnical considerations are as follows:

- Shallow bedrock is present across the site. The bedrock will require blasting to achieve proposed site grades. Blasting and subsequent preparation of blasted bedrock subgrades must be performed in a controlled manner to provide adequate support of the proposed buildings and pavements. Subgrades should be observed by the geotechnical engineer and may need to be overexcavated and replaced as

deemed necessary. Blasted bedrock subgrades must be thoroughly choked with Crushed Stone or blasted bedrock fines.

- Possible artesian groundwater conditions were observed in the monitoring wells. Groundwater seepage in anticipated from cut slopes. A continuous Crushed Stone Drainage blanket with perimeter underdrains is recommended below the entire building.

- Blasted bedrock may be processed on-site to reuse for compacted fills as well as pavement gravels and foundation backfill. The contractor should be prepared to break down larger rock particles as needed to meet the requirements of Rock Borrow, Structural Fill, Pavement Gravel and Crushed Stone. Some imported materials will be needed for construction.

- A sub-slab radon venting system must be installed beneath building. The radon system should be designed by a qualified indoor air quality consultant.

4.2 Site and Subgrade Preparation

We recommend that site preparation begin with the construction of an erosion control system to protect adjacent drainage ways and areas outside the construction limits. As much vegetation as possible should remain outside the construction areas to lessen the potential for erosion.

Following stripping and grubbing of the site, blasting will be required to achieve proposed grades. Blasting and subsequent preparation of blasted bedrock subgrades must be performed in a controlled manner to provide adequate support of the proposed buildings and pavement. Care must be taken to control overblasting below buildings and paved areas. We recommend vertical overblasting be limited to 1-foot below footings and 2-feet below slabs and paved areas.

S.W.COLE should observe blasted bedrock subgrades prior to placing any new fill or concrete. Depending how the rock fractures, some overblasted rock may be able to remain in place; however, the contractor should be prepared to overexcavate and remove loose and overblasted bedrock as deemed necessary by the geotechnical engineer's field observations. We recommend the contract documents contain unit rate provisions for

removal and replacement of overblasted bedrock. Blast rock fines or Crushed Stone should be thoroughly worked into the bedrock surface to choke any voids or fractures in the bedrock.

4.3 Excavation and Dewatering

Excavation work will generally encounter topsoil, a relatively thin layer of silty sand and silty glacial till and shallow bedrock. Final cuts to subgrade elevation in soil, if encountered, should be performed with a smooth-edged bucket to help minimize soil disturbance.

The bedrock encountered at the site is hard and sound and will require blasting for excavation. Blasting can adversely affect adjacent structures, water-wells, septic systems, up-gradient wetlands, and buried utilities. We recommend that blasting be performed by a licensed and qualified contractor and that a blasting plan be prepared sufficiently in advance of blasting activities to coordinate efforts with abutting properties and to serve notice to the general public. Pre-blast surveys of structures, wells, septic systems, pipelines, and protected natural resources within 500 feet of the blast area should be completed prior to blasting.

Groundwater seepage is anticipated in excavations. Sumping and pumping dewatering techniques should be adequate to control groundwater in shallower excavations. The layer of Crushed Stone recommended below foundations will provide a media from which to dewater. Controlling the water levels to below planned excavation depths will help stabilize subgrades during construction.

Excavations must be properly shored and/or sloped to prevent sloughing and caving of the sidewalls during construction. Temporary excavations should be sloped or shored in accordance with OSHA regulations.

4.4 Foundations

We recommend the proposed buildings be supported on spread footing foundations bearing on at least 12-inches of Crushed Stone overlying properly prepared subgrades. Building subgrades are anticipated to consist of blasted bedrock in the western portion of the footprint, transitioning to compacted Rock Borrow fill in the east.

For spread footings bearing on properly prepared subgrades, we recommend the following geotechnical parameters for design consideration:

Geotechnical Parameters for Spread Footings and Foundation Walls	
Design Frost Depth	4.5 feet
Net Allowable Bearing Pressure	4.0 ksf or less
Base Friction Factor	0.4
At-Rest Lateral Earth Pressure Coeff.	0.5
Total Unit Weight of Backfill	130 pcf
Internal Friction Angle of Backfill	30 degrees
Seismic Soil Site Class	C (2009 IBC/ASCE 7)

For the anticipated foundation bearing conditions, we anticipate less than 1-inch of post-construction settlement with differential settlement approaching ½-inch.

4.5 Foundation Drainage

We recommend a perimeter foundation underdrain system be installed beneath the building. The underdrain pipe should consist of 4-inch diameter, perforated SDR-35 foundation drain pipe enveloped within the exterior side of the Crushed Stone provided below the footings. Non-woven geotextile, such as Mirafi 140N or equivalent, should be provided around the exterior side of the Crushed Stone layer prior to placing foundation backfill soils. The underdrain pipe must be connected to a positive gravity outlet protected from freezing, clogging and backflow. The Crushed Stone layer provided below the building footings and floor slabs should be continuous and hydraulically connected to the underdrains. General underdrain details are shown on Sheet 16.

4.6 Slab-On-Grade Floors and Soil-Gas Venting

We recommend on-grade concrete floors be supported on a minimum of 12 inches of compacted Crushed Stone overlying properly prepared subgrades. On-grade floor slabs founded on properly prepared subgrades may be designed considering a modulus of subgrade reaction of 100 pci. The structural engineer or concrete consultant must design steel reinforcing and joint spacing appropriate to slab thickness and function.

The presence of shallow bedrock beneath the proposed building increases the risk of radon intrusion in the building. Consequently, building design must include a sub-slab

radon venting system and positive building pressurization. The venting system should be designed by a qualified indoor air quality consultant.

We recommend a sub-slab vapor retarder overlying at least 1-inch of rigid insulation overlying the 12 inch thick Crushed Stone venting and drainage layer below on-grade floor slabs. The vapor retarder must have a permeance that is less than the floor cover or surface treatment that is applied to the slab. The vapor retarder must have sufficient durability to withstand puncture from construction activity. The vapor retarder material shall be placed according to the manufacturer's recommended method, including the taping and lapping of all joints and wall connections. The architect and/or flooring consultant should select the vapor retarder products compatible with flooring and adhesive materials.

The floor slab should be appropriately cured using moisture retention methods after casting. Typical floor slab curing methods should be used for at least 7 days. The architect or flooring consultant should assign curing methods consistent with current applicable American Concrete Institute (ACI) procedures with consideration of curing method compatibility to proposed surface treatments, flooring and adhesive materials.

4.7 Entrance Slabs and Sidewalks

Entrance slabs and sidewalks adjacent to buildings must be designed to reduce the effects of differential frost action between adjacent pavement, doorways, and entrances. We recommend that clean, non-frost susceptible Structural Fill be provided to a depth of 4.5 feet (or until sound bedrock is encountered) below the top of entrance slabs. This thickness of Structural Fill should extend the full width of the entrance slabs and outward at least 4.5 feet, thereafter transitioning up to the bottom of the adjacent sidewalk or pavement subbase gravel at a 3H:1V or flatter slope. General frost transition zone details for entrance slabs are illustrated on Sheet 16.

4.8 Backfill and Compaction

Based on the subsurface findings, the existing site soils are unsuitable for reuse as fill within building areas, but may be reused in paved areas during dry, non-freezing weather conditions. We recommend the following fill and backfill materials.

Granular Borrow: Imported compacted fill to raise site grades in paved areas should be sand, silty sand or sand and gravel meeting the requirements of MDOT Standard Specification 703.19 “Granular Borrow”.

Rock Borrow: Blasted bedrock fill to raise site grades in building and paved areas should be processed to meet the requirements of MDOT Standard Specification 703.21 “Rock Borrow” with a maximum particle size of 3 feet in greatest dimension. The maximum particle size of Rock Borrow should be limited to 4-inches in the top 5 feet below the building.

Structural Fill: Fill to raise site grades in the top 5 feet below the building, over wet subgrades, backfill for foundations and retaining walls, and backfill below exterior slabs and patios should be non-frost susceptible sand and gravel meeting the gradation requirements for Structural Fill as given below.

Structural Fill	
Sieve Size	**Percent Finer by Weight**
4 inch	100
3 inch	90 to 100
¼ inch	25 to 90
#40	0 to 30
#200	0 to 5

Structural Fill is recommended for use as:

- Fill to raise site grades over wet subgrades
- Backfill for foundations
- Fill and backfill below exterior patios and slabs to at least 4.5 feet below finish grade, or until sound bedrock is encountered

Crushed Stone: Crushed Stone, used below building footings and floor slabs should meet the gradation requirements of MDOT Standard Specifications 703.22 “Underdrain Backfill Type C”. A nominally sized 3/4-inch crushed stone will meet this requirement.

Reuse of Existing Soils and Bedrock: The existing site overburden soils are moisture and frost susceptible and are unsuitable for reuse in the building area, but may be

reused to raise grades in landscape and paved areas during dry and non-freezing conditions.

Blasted bedrock may be reused to raise site grades provided it is processed to meet the requirements of Rock Borrow. Additionally, blasted bedrock may be processed on-site and blended with sand to create Structural Fill and pavement gravels.

Placement and Compaction: Fill should be placed in horizontal lifts and compacted such that the desired density is achieved throughout the lift thickness with 3 to 5 passes of the compaction equipment. Loose soil lift thicknesses for grading, fill and backfill activities should not exceed 12 inches. We recommend that soil fill and backfill in building and paved areas be compacted to at least 95 percent of its maximum dry density as determined by ASTM D-1557.

Rock Borrow should be placed in lifts not exceeding 3 feet and compacted and choked with Crushed Stone or blast fines such that voids are filled within the Rock Borrow mass prior to placing the next lift. Rock borrow lifts should be compacted with at least 3 passes each way of a vibratory roller having a static weight of at least 12-tons.

4.9 Weather Considerations

Considering the site is principally shallow rock, blasting and site grading with Rock Borrow may occur in variable weather conditions. Site grading with soil fills should ideally be performed in drier, non-freezing weather. The contractor should anticipate the need for water to temper fills in order to facilitate compaction during dry weather. If construction takes place during cold weather, subgrades, foundations and floor slabs must be protected during freezing conditions. Concrete and fill must not be placed on frozen soil; and once placed, the concrete and soil beneath the structure must be protected from freezing.

4.10 Paved Areas

We anticipate paved areas will be subjected primarily to passenger vehicle and light delivery truck traffic with occasional heavy delivery truck traffic. Considering the site soils, and proposed usage, we offer the following pavement section for consideration. Materials are based on Maine Department of Transportation 2014 Standard Specifications.

Asphalt Pavement Section	
Material	**Thickness (Inches)**
9.5 mm Hot Mix Asphalt (50 Gyration Design)	1 ¼
19.0 mm Hot Mix Asphalt (50 Gyration Design)	2 ¼
MDOT 703.06 Type A, Crushed Aggregate Base	3
MDOT 703.06 Type D, Crushed Aggregate Subbase	15

The base and subbase materials should be compacted to at least 95 percent of their maximum dry density as determined by ASTM D-1557. Hot mix asphalt pavement should be compacted to 92 to 97 percent of its theoretical maximum density as determined by ASTM D-2041. A tack coat should be used between successive lifts of bituminous pavement.

It should be understood that frost penetration can be on the order of 4.5 feet in this area. In the absence of full depth excavation of frost susceptible soils below paved areas and subsequent replacement with non-frost susceptible compacted fill, frost penetration into the subgrade will occur and some heaving and distress of pavement must be anticipated.

4.11 Fill Slopes and MSE Walls

Fill slopes should be constructed of properly compacted Rock Borrow or Granular Borrow overlying bedrock. The slopes should be constructed as oversized level benches to facilitate proper compaction which are then excavated to grade. Vegetation should be established on the slopes as soon as practicable. Temporary erosion control mesh or other means may be needed to stabilize the slopes during construction.

We understand mechanically stabilized earth walls (MSE Walls) may be needed for site grading. We recommend the following geotechnical parameters for design of MSE Walls:

Geotechnical Parameters for MSE Walls		
Wall Zone	**Unit Weight (pcf)**	**Friction Angle**
Reinforced Soil	130	32
Retained Soil	135	30
Foundation Soil	125	28

S.W.COLE should be retained to review MSE Wall designs and perform a global stability analysis of MSE Walls, as well as cut and fill slopes.

4.12 Design Review and Construction Testing

S.W.COLE should be retained to review the final design and specifications to determine that our earthwork, foundation and pavement recommendations have been properly interpreted and implemented.

A construction materials testing and special inspection program should also be implemented during construction to observe compliance with the design concepts, plans, and specifications. S.W.COLE is available to provide pre-blast surveys, subgrade observations for foundations as well as testing and special inspection services for soils, concrete, asphalt, steel, and spray-applied fireproofing construction materials.

5.0 CLOSURE

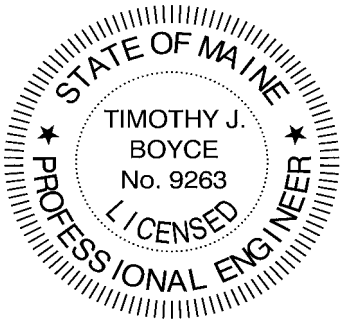
It has been a pleasure to be of assistance to you with this phase of your project. We look forward to working with you during the construction phase of the project.

Sincerely,

S. W. Cole Engineering, Inc.

Evan M. Walker, P.E.
Geotechnical Engineer

Timothy J. Boyce, P.E.
Senior Geotechnical Engineer



EMW:tjb-mas

Attachment A
Limitations

This report has been prepared for the exclusive use Hawthorn Development, LLC and Lenity Architecture for specific application to the proposed Retirement Residence at 802 Ocean Avenue in Portland, Maine. S. W. Cole Engineering, Inc. has endeavored to conduct the work in accordance with generally accepted soil and foundation engineering practices. No warranty, expressed or implied, is made.

The soil profiles described in the report are intended to convey general trends in subsurface conditions. The boundaries between strata are approximate and are based upon interpretation of exploration data and samples.

The analyses performed during this investigation and recommendations presented in this report are based in part upon the data obtained from subsurface explorations made at the site. Variations in subsurface conditions may occur between explorations and may not become evident until construction. If variations in subsurface conditions become evident after submission of this report, it will be necessary to evaluate their nature and to review the recommendations of this report.

Observations have been made during exploration work to assess site groundwater levels. Fluctuations in water levels will occur due to variations in rainfall, temperature, and other factors.

S. W. Cole Engineering, Inc.'s scope of work has not included the investigation, detection, or prevention of any Biological Pollutants at the project site or in any existing or proposed structure at the site. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and the byproducts of any such biological organisms.

Recommendations contained in this report are based substantially upon information provided by others regarding the proposed project. In the event that any changes are made in the design, nature, or location of the proposed project, S. W. Cole Engineering, Inc. should review such changes as they relate to analyses associated with this report. Recommendations contained in this report shall not be considered valid unless the changes are reviewed by S. W. Cole Engineering, Inc.

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-101**
SHEET: 1 OF 1
PROJECT NO.: 14-1188

PROJECT: PROPOSED RETIREMENT RESIDENCE
CLIENT : HAWTHORNE DEVELOPMENT, LLC
LOCATION: 802 OCEAN AVENUE, PORTLAND, MAINE
DRILLING FIRM: NORTHERN TEST BORING, INC. DRILLER: MIKE NADEAU

DATE START: 11/22/2014
DATE FINISH: 11/22/2014
ELEVATION:
SWC REP.: E. WALKER

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4" O.D.		
SAMPLER:	SS	1 3/8"	140 LBS.	30"
CORE BARREL:				

WATER LEVEL INFORMATION
ALL SOILS MOIST

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
	1D	8"	4"	0.6'	1	50-2"			0.6'	FOREST DUFF
									0.9'	WEATHERED BEDROCK - ADVANCE BY AUGER
										REFUSAL @ 0.9'
										BEDROCK

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-101**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-102**
SHEET: 1 OF 1
PROJECT NO.: 14-1188

PROJECT: PROPOSED RETIREMENT RESIDENCE
CLIENT : HAWTHORNE DEVELOPMENT, LLC
LOCATION: 802 OCEAN AVENUE, PORTLAND, MAINE
DRILLING FIRM: NORTHERN TEST BORING, INC. DRILLER: MIKE NADEAU

DATE START: 11/22/2014
DATE FINISH: 11/22/2014
ELEVATION:
SWC REP.: E. WALKER

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4" O.D.		
SAMPLER:	SS	1 3/8"	140 LBS.	30"
CORE BARREL:				

WATER LEVEL INFORMATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.4'	FOREST DUFF
	1D	14"	14"	1.2'	1	2	50-2"		1.0'	DARK BROWN SILTY SAND WITH ORGANICS
									1.2'	WEATHERED BEDROCK - ADVANCE BY AUGER
										REFUSAL @ 1.2'
										BEDROCK

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-102**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-103**
SHEET: 1 OF 1
PROJECT NO.: 14-1188
DATE START: 11/22/2014
DATE FINISH: 11/22/2014
ELEVATION:
SWC REP.: E. WALKER

PROJECT: PROPOSED RETIREMENT RESIDENCE
CLIENT : HAWTHORNE DEVELOPMENT, LLC
LOCATION: 802 OCEAN AVENUE, PORTLAND, MAINE
DRILLING FIRM: NORTHERN TEST BORING, INC. DRILLER: MIKE NADEAU

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:				
SAMPLER:				
CORE BARREL:				

WATER LEVEL INFORMATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										BEDROCK AT GROUND SURFACE

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-103**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-104**
SHEET: 1 OF 1
PROJECT NO.: 14-1188

PROJECT: PROPOSED RETIREMENT RESIDENCE
CLIENT : HAWTHORNE DEVELOPMENT, LLC
LOCATION: 802 OCEAN AVENUE, PORTLAND, MAINE
DRILLING FIRM: NORTHERN TEST BORING, INC. DRILLER: MIKE NADEAU

DATE START: 11/22/2014
DATE FINISH: 11/22/2014
ELEVATION:
SWC REP.: E. WALKER

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4" O.D.		
SAMPLER:	SS	1 3/8"	140 LBS.	30"
CORE BARREL:				

WATER LEVEL INFORMATION
ALL SOILS MOIST

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
	1D	8"	8"	1.6'	13	50-2"			0.2'	FOREST DUFF / DARK BROWN SILTY SAND WITH ORGANICS
									1.1'	WEATHERED BEDROCK - ADVANCE BY AUGER
										REFUSAL @ 1.1'
										BEDROCK

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
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SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-104**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-105**
SHEET: 1 OF 1
PROJECT NO.: 14-1188

PROJECT: PROPOSED RETIREMENT RESIDENCE
CLIENT : HAWTHORNE DEVELOPMENT, LLC
LOCATION: 802 OCEAN AVENUE, PORTLAND, MAINE
DRILLING FIRM: NORTHERN TEST BORING, INC. DRILLER: MIKE NADEAU

DATE START: 11/22/2014
DATE FINISH: 11/22/2014
ELEVATION:
SWC REP.: E. WALKER

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4" O.D.		
SAMPLER:	SS	1 3/8"	140 LBS.	30"
CORE BARREL:				

WATER LEVEL INFORMATION
ALL SOILS MOIST

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
	1D	10"	8"	0.8'	2	50-4"			0.4'	FOREST DUFF
									0.8'	DARK BROWN SILTY SAND WITH ORGANICS
									1.8'	WEATHERED BEDROCK - ADVANCE BY AUGER
										REFUSAL @ 1.8'
										BEDROCK

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-105**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **P-201**
SHEET: 1 OF 1
PROJECT NO.: 14-1188
DATE START: 11/22/2014
DATE FINISH: 11/22/2014
ELEVATION:
SWC REP.: E. WALKER

PROJECT: PROPOSED RETIREMENT RESIDENCE
CLIENT : HAWTHORNE DEVELOPMENT, LLC
LOCATION: 802 OCEAN AVENUE, PORTLAND, MAINE
DRILLING FIRM: NORTHERN TEST BORING, INC. DRILLER: MIKE NADEAU

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4" O.D.		
SAMPLER:				
CORE BARREL:				

WATER LEVEL INFORMATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										FOREST DUFF
									1.2'	DARK BROWN SILTY SAND WITH ORGANICS
										REFUSAL @ 1.2'
										BEDROCK
										NOTE: NO SAMPLING - AUGER PROBE

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **P-201**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **P-202**
SHEET: 1 OF 1
PROJECT NO.: 14-1188
DATE START: 11/22/2014
DATE FINISH: 11/22/2014
ELEVATION:
SWC REP.: E. WALKER

PROJECT: PROPOSED RETIREMENT RESIDENCE
CLIENT : HAWTHORNE DEVELOPMENT, LLC
LOCATION: 802 OCEAN AVENUE, PORTLAND, MAINE
DRILLING FIRM: NORTHERN TEST BORING, INC. DRILLER: MIKE NADEAU

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4" O.D.		
SAMPLER:				
CORE BARREL:				

WATER LEVEL INFORMATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										FOREST DUFF
										ORANGE-BROWN SILTY SAND
									2.6'	
									3.1'	WEATHERED BEDROCK
										REFUSAL @ 3.1'
										BEDROCK
										NOTE: NO SAMPLING - AUGER PROBE

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **P-202**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **P-203**
SHEET: 1 OF 1
PROJECT NO.: 14-1188
DATE START: 11/22/2014
DATE FINISH: 11/22/2014
ELEVATION:
SWC REP.: E. WALKER

PROJECT: PROPOSED RETIREMENT RESIDENCE
CLIENT : HAWTHORNE DEVELOPMENT, LLC
LOCATION: 802 OCEAN AVENUE, PORTLAND, MAINE
DRILLING FIRM: NORTHERN TEST BORING, INC. DRILLER: MIKE NADEAU

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4" O.D.		
SAMPLER:				
CORE BARREL:				

WATER LEVEL INFORMATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										FOREST DUFF
									2.0'	ORANGE-BROWN SILTY SAND
										REFUSAL @ 2.0'
										BEDROCK
										NOTE: NO SAMPLING - AUGER PROBE

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **P-203**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **P-204**
SHEET: 1 OF 1
PROJECT NO.: 14-1188
DATE START: 11/22/2014
DATE FINISH: 11/22/2014
ELEVATION:
SWC REP.: E. WALKER

PROJECT: PROPOSED RETIREMENT RESIDENCE
CLIENT : HAWTHORNE DEVELOPMENT, LLC
LOCATION: 802 OCEAN AVENUE, PORTLAND, MAINE
DRILLING FIRM: NORTHERN TEST BORING, INC. DRILLER: MIKE NADEAU

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4" O.D.		
SAMPLER:				
CORE BARREL:				

WATER LEVEL INFORMATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										FOREST DUFF
									1.9'	DARK BROWN SILTY SAND WITH ORGANICS
										REFUSAL @ 1.9'
										BEDROCK
										NOTE: NO SAMPLING - AUGER PROBE

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **P-204**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **P-205**
SHEET: 1 OF 1
PROJECT NO.: 14-1188
DATE START: 11/22/2014
DATE FINISH: 11/22/2014
ELEVATION:
SWC REP.: E. WALKER

PROJECT: PROPOSED RETIREMENT RESIDENCE
CLIENT : HAWTHORNE DEVELOPMENT, LLC
LOCATION: 802 OCEAN AVENUE, PORTLAND, MAINE
DRILLING FIRM: NORTHERN TEST BORING, INC. DRILLER: MIKE NADEAU

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4" O.D.		
SAMPLER:				
CORE BARREL:				

WATER LEVEL INFORMATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										FOREST DUFF
										DARK BROWN SILTY SAND WITH ORGANICS
									2.6'	
										REFUSAL @ 2.6'
										BEDROCK

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **P-205**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **P-206**
SHEET: 1 OF 1
PROJECT NO.: 14-1188
DATE START: 11/22/2014
DATE FINISH: 11/22/2014
ELEVATION:
SWC REP.: E. WALKER

PROJECT: PROPOSED RETIREMENT RESIDENCE
CLIENT : HAWTHORNE DEVELOPMENT, LLC
LOCATION: 802 OCEAN AVENUE, PORTLAND, MAINE
DRILLING FIRM: NORTHERN TEST BORING, INC. DRILLER: MIKE NADEAU

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4" O.D.		
SAMPLER:				
CORE BARREL:				

WATER LEVEL INFORMATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										FOREST DUFF
										DARK BROWN TO BROWN SILTY SAND
									3.4'	
										REFUSAL @ 3.4'
										BEDROCK
										NOTE: NO SAMPLING - AUGER PROBE

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **P-206**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **P-207**
SHEET: 1 OF 1
PROJECT NO.: 14-1188
DATE START: 11/22/2014
DATE FINISH: 11/22/2014
ELEVATION:
SWC REP.: E. WALKER

PROJECT: PROPOSED RETIREMENT RESIDENCE
CLIENT : HAWTHORNE DEVELOPMENT, LLC
LOCATION: 802 OCEAN AVENUE, PORTLAND, MAINE
DRILLING FIRM: NORTHERN TEST BORING, INC. DRILLER: MIKE NADEAU

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4" O.D.		
SAMPLER:				
CORE BARREL:				

WATER LEVEL INFORMATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										FOREST DUFF
									1.9'	BROWN SILTY SAND, TRACE GRAVEL
										REFUSAL @ 1.9'
										BEDROCK
										NOTE: NO SAMPLING - AUGER PROBE

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **P-207**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **P-208**
SHEET: 1 OF 1
PROJECT NO.: 14-1188
DATE START: 11/22/2014
DATE FINISH: 11/22/2014
ELEVATION:
SWC REP.: E. WALKER

PROJECT: PROPOSED RETIREMENT RESIDENCE
CLIENT : HAWTHORNE DEVELOPMENT, LLC
LOCATION: 802 OCEAN AVENUE, PORTLAND, MAINE
DRILLING FIRM: NORTHERN TEST BORING, INC. DRILLER: MIKE NADEAU

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4" O.D.		
SAMPLER:				
CORE BARREL:				

WATER LEVEL INFORMATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										BEDROCK AT GROUND SURFACE

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **P-208**

KEY TO THE NOTES & SYMBOLS
Test Boring and Test Pit Explorations

All stratification lines represent the approximate boundary between soil types and the transition may be gradual.

Key to Symbols Used:

w	-	water content, percent (dry weight basis)
q_u	-	unconfined compressive strength, kips/sq. ft. - laboratory test
S_v	-	field vane shear strength, kips/sq. ft.
L_v	-	lab vane shear strength, kips/sq. ft.
q_p	-	unconfined compressive strength, kips/sq. ft. – pocket penetrometer test
O	-	organic content, percent (dry weight basis)
W_L	-	liquid limit - Atterberg test
W_P	-	plastic limit - Atterberg test
WOH	-	advance by weight of hammer
WOM	-	advance by weight of man
WOR	-	advance by weight of rods
HYD	-	advance by force of hydraulic piston on drill
RQD	-	Rock Quality Designator - an index of the quality of a rock mass.
γ_T	-	total soil weight
γ_B	-	buoyant soil weight

Description of Proportions:

Trace:	0 to 5%
Some:	5 to 12%
"Y"	12 to 35%
And	35+%

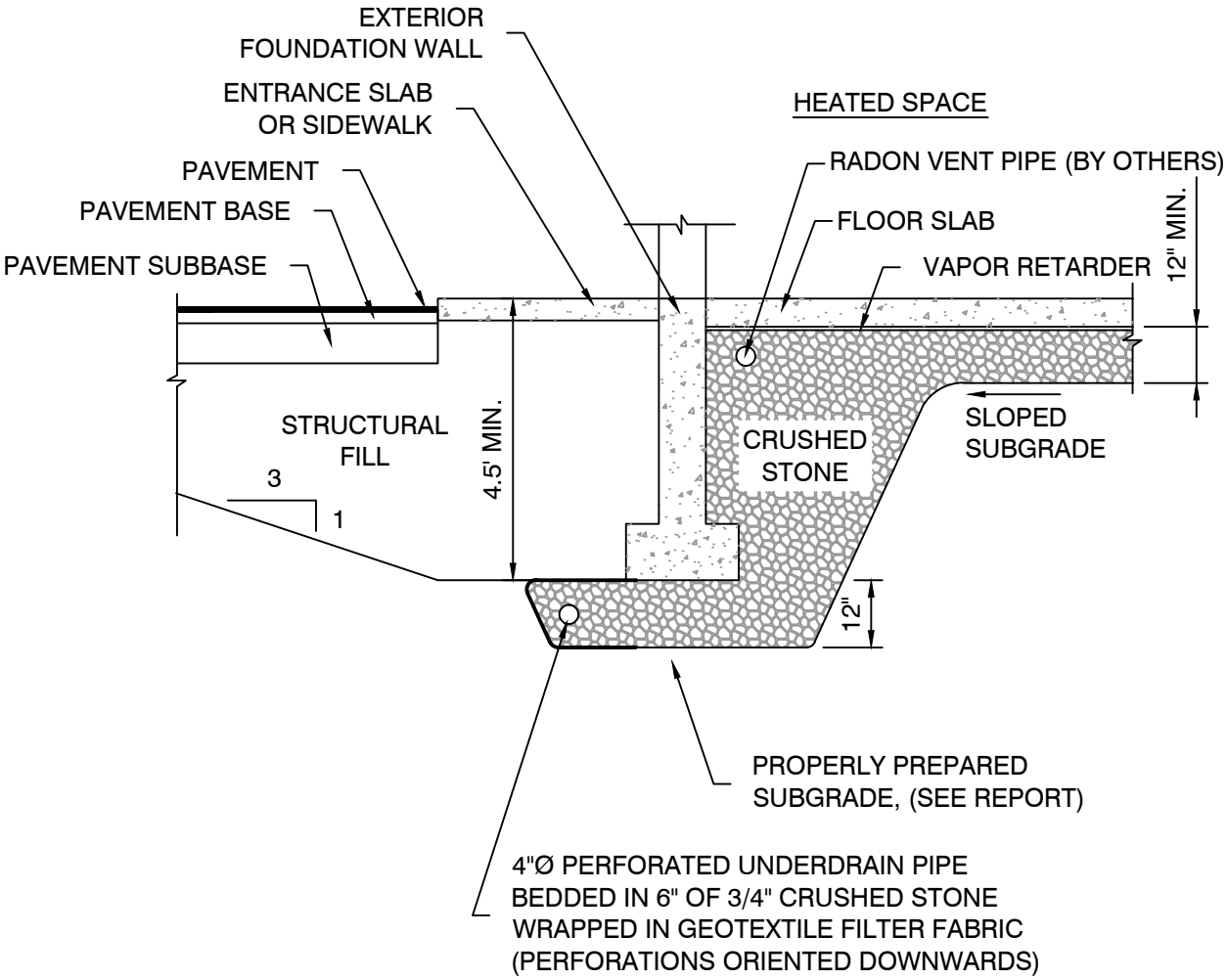
Description of Stratified Soils

Parting:	0 to 1/16" thickness
Seam:	1/16" to ½" thickness
Layer:	½" to 12" thickness
Varved:	Alternating seams or layers
Occasional:	one or less per foot of thickness
Frequent:	more than one per foot of thickness

REFUSAL: **Test Boring Explorations** - Refusal depth indicates that depth at which, in the drill foreman's opinion, sufficient resistance to the advance of the casing, auger, probe rod or sampler was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

REFUSAL: **Test Pit Explorations** - Refusal depth indicates that depth at which sufficient resistance to the advance of the backhoe bucket was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

Although refusal may indicate the encountering of the bedrock surface, it may indicate the striking of large cobbles, boulders, very dense or cemented soil, or other buried natural or man-made objects or it may indicate the encountering of a harder zone after penetrating a considerable depth through a weathered or disintegrated zone of the bedrock.



NOTE:

1. UNDERDRAIN INSTALLATION AND MATERIAL GRADATION RECOMMENDATIONS ARE CONTAINED WITHIN THIS REPORT.

2. DETAIL IS PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY, NOT FOR CONSTRUCTION.

S.W.COLE
ENGINEERING, INC.

HAWTHORN DEVELOPMENT, LLC

UNDERDRAIN DETAIL

PROPOSED RETIREMENT RESIDENCE
802 OCEAN AVENUE
PORTLAND, MAINE

Job No.:	14-1188	Scale:	Not to Scale
Date :	12/05/2014	Sheet:	16

APPENDIX A

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-1**
SHEET: 1 OF 1
PROJECT NO.: 04-1228

PROJECT / CLIENT:
LOCATION: OCEAN AVENUE, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING INC. DRILLER: JEFF LEE

DATE START: 12/9/2004
DATE FINISH: 12/9/2004
ELEVATION: 140.8
SWC REP.: PFK

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	300 lb	18"
SAMPLER:				
CORE BARREL:	NQ2	2"		

WATER LEVEL INFORMATION
OVERBURDEN SOILS SATURATED

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										FOREST DUFF / TOPSOIL
										OVERLYING BROWN SILTY SAND WITH ORGANICS AND COBBLES
										GLACIAL TILL
									5.0'	
										BEDROCK
										INTERBEDDED WHITE TO LIGHT GRAY
										MIGMATITE AND BIOTITE-MUSCOVITE SCHIST
	1R	60"	53"	10.0'						RQD = 37%
	2R	60"	59"	15.0'					15.0'	RQD = 60%
										BOTTOM OF EXPLORATION AT 15.0'

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-1**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-2 / MW**
SHEET: 1 OF 1
PROJECT NO.: 04-1228

PROJECT / CLIENT:
LOCATION: OCEAN AVENUE, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING INC. DRILLER: DONNY BOLSTRIDGE

DATE START: 12/9/2004
DATE FINISH: 12/9/2004
ELEVATION: 158.7
SWC REP.: PFK

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	300 lb	18"
SAMPLER:				
CORE BARREL:	NQ2	2"		

WATER LEVEL INFORMATION
1" PIEZOMETER INSTALLED

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									1.0'	FOREST DUFF / TOPSOIL
										BEDROCK
										[ADVANCED BORING BY AIR HAMMER TO 21.5']
									21.5'	
										INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST
	1R	60"	58"	26.5'						RQD = 77 %
	2R	58"	58"	31.3'					31.3'	RQD = 63 %
										BOTTOM OF EXPLORATION AT 31.3'

PIEZOMETER DETAILS:
SCREEN 26.3' - 31.3'
FILTER SAND 21' - 31.3'
BENTONITE 19' - 21'
SAND TO SURFACE

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-2 / MW**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-3**
SHEET: 1 OF 1
PROJECT NO.: 04-1228
DATE START: 12/9/2004
DATE FINISH: 12/9/2004
ELEVATION: 144.4
SWC REP.: PFK

PROJECT / CLIENT:
LOCATION: OCEAN AVENUE, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING INC. DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	300 lb	18"
SAMPLER:				
CORE BARREL:	NQ2	2"		

WATER LEVEL INFORMATION
OVERBURDEN SOILS SATURATED

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										FOREST DUFF / TOPSOIL
										OVERLYING BROWN SILTY SAND WITH ORGANICS AND COBBLES
									2.5'	GLACIAL TILL
										PROBABLE WEATHERED BEDROCK
									4.5'	
										BEDROCK
									7.0'	[ADVANCED BORING BY ROLLER CONE TO 7.0']
										INTERBEDDED WHITE TO LIGHT GRAY
										MIGMATITE AND BIOTITE-MUSCOVITE SCHIST
	1R	60"	60"	12.0'						RQD = 62 %
	2R	60"	59"	17.0'					17.0'	RQD = 72 %
										BOTTOM OF EXPLORATION AT 17.0'

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-3**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-4 / MW**
SHEET: 1 OF 1
PROJECT NO.: 04-1228
DATE START: 12/9/2004
DATE FINISH: 12/10/2004
ELEVATION: 137
SWC REP.: PFK / KBG

PROJECT / CLIENT:
LOCATION: OCEAN AVENUE, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING INC. DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	300 lb	18"
SAMPLER:	SS	1 3/8"		
CORE BARREL:	NQ2	2"		

WATER LEVEL INFORMATION
1" PIEZOMETER INSTALLED

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									1.0'	FOREST DUFF / TOPSOIL
	1D	24"	12"	2.0'	WOH/12"		2	3		RUST BROWN SILTY SAND WITH COBBLES - GLACIAL TILL
									3.0'	~LOOSE~
	2D	3"	3"	5.2'	50/3"					PROBABLE WEATHERED BEDROCK
										[ADVANCED BORING BY ROLLER CONE TO 12.0']
	3D	3"	3"	10.2'	50/3"					
									12.0'	
										BEDROCK
										INTERBEDDED WHITE TO LIGHT GRAY
										MIGMATITE AND BIOTITE-MUSCOVITE SCHIST
	1R	60"	59"	17.0'						RQD = 40 %
	2R	63"	58"	22.3'					22.3'	RQD = 83 %
										BOTTOM OF EXPLORATION AT 22.3'

PIEZOMETER DETAILS:
SCREEN 17.5' - 22.5'
FILTER SAND 15' - 22.5'
BENTONITE 13' - 15'
SAND TO SURFACE

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-4 / MW**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-5**
SHEET: 1 OF 1
PROJECT NO.: 04-1228
DATE START: 12/10/2004
DATE FINISH: 12/10/2004
ELEVATION: 153.2
SWC REP.: KBG

PROJECT / CLIENT:
LOCATION: OCEAN AVENUE, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING INC. DRILLER: DONNY BOLSTRIDGE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	300 lb	18"
SAMPLER:				
CORE BARREL:	NQ2	2"		

WATER LEVEL INFORMATION
OVERBURDEN SOILS SATURATED

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										TOPSOIL OVERLYING BROWN SILTY SAND AND GRAVEL - GLACIAL TILL
									4.0'	
									5.0'	PROBABLE WEATHERED BEDROCK
										BEDROCK
										[BORING ADVANCED BY AIR HAMMER TO 15']
									15.0'	
										INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST
	1R	60"	53"	20.0'						RQD = 83 %
	2R	60"	58"	25.0'					25.0'	RQD = 63 %
										BOTTOM OF EXPLORATION AT 25.0'

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-5**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-6**
SHEET: 1 OF 1
PROJECT NO.: 04-1228

PROJECT / CLIENT:
LOCATION: OCEAN AVENUE, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING INC. DRILLER: DONNY BOLSTRIDGE

DATE START: 12/13/2004
DATE FINISH: 12/13/2004
ELEVATION: 153 +/-
SWC REP.: KBG

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	300 lb	18"
SAMPLER:				
CORE BARREL:	NQ2	2"		

WATER LEVEL INFORMATION
NO FREE WATER OBSERVED

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.5'	FOREST DUFF / TOPSOIL
										BEDROCK
										[ADVANCED BORING BY AIR HAMMER TO 15.0']
									15.0'	
										INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST
	1R	60"	56"	20.0'						RQD = 47 %
	2R	60"	58"	25.0'					25.0'	RQD = 83 %
										BOTTOM OF EXPLORATION AT 25.0'

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-6**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-7**
SHEET: 1 OF 1
PROJECT NO.: 04-1228
DATE START: 12/10/2004
DATE FINISH: 12/10/2004
ELEVATION: 156.7
SWC REP.: KBG

PROJECT / CLIENT:
LOCATION: OCEAN AVENUE, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING INC. DRILLER: DONNY BOLSTRIDGE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	300 lb	18"
SAMPLER:				
CORE BARREL:	NQ2	2"		

WATER LEVEL INFORMATION
NO FREE WATER OBSERVED

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										PROBABLE WEATHERED BEDROCK [ADVANCED BORING BY AIR HAMMER TO 20']
									10.0'	BEDROCK
									20.0'	INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST
	1R	60"	59"	25.0'						RQD = 87 %
	2R	60"	52"	30.0'					30.0'	RQD = 78 %
										BOTTOM OF EXPLORATION AT 30.0'

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-7**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-8 / MW**
SHEET: 1 OF 1
PROJECT NO.: 04-1228
DATE START: 12/13/2004
DATE FINISH: 12/13/2004
ELEVATION: 140.8
SWC REP.: KBG

PROJECT / CLIENT:
LOCATION: OCEAN AVENUE, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING INC. DRILLER: DONNY BOLSTRIDGE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	300 lb	18"
SAMPLER:				
CORE BARREL:	NQ2	2"		

WATER LEVEL INFORMATION
1" PIEZOMETER INSTALLED

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										FOREST DUFF / TOPSOIL
									2.0'	OVERLYING BROWN SILTY SAND WITH ORGANICS
										BEDROCK
										[ADVANCED BORING BY AIR HAMMER TO 15.0']
									15.0'	
										INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST
	1R	60"	59"	20.0'						RQD = 78 %
	2R	60"	58"	25.0'					25.0'	RQD = 82 %
										BOTTOM OF EXPLORATION AT 25.0'

PIEZOMETER DETAILS:
SCREEN 20' - 25'
FILTER SAND 16' - 25'
BENTONITE 14' - 16'
SAND TO SURFACE

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-8 / MW**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-9**
SHEET: 1 OF 1
PROJECT NO.: 04-1228

PROJECT / CLIENT:
LOCATION: OCEAN AVENUE, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING INC. DRILLER: JEFF LEE

DATE START: 12/10/2004
DATE FINISH: 12/10/2004
ELEVATION: 136.6
SWC REP.: KBG

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	300 lb	18"
SAMPLER:	SS	1 3/8"		
CORE BARREL:	NQ2	2"		

WATER LEVEL INFORMATION
OVERBURDEN SATURATED
ARTESIAN WATER FLOW AFTER 1R OBTAINED

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									1.0'	FOREST DUFF / TOPSOIL
	1D	24"	15"	2.0'	2	3	2	2		BROWN TO ORANGE SILTY SAND WITH ORGANICS
										OCCASIONAL COBBLES - GLACIAL TILL
									4.0'	~LOOSE~
	2D	0"	0"	5.0'	50/0"					PROBABLE WEATHERED BEDROCK
									6.0'	[ADVANCED BORING BY ROLLER CONE TO 6']
										BEDROCK
										INTERBEDDED WHITE TO LIGHT GRAY
										MIGMATITE AND BIOTITE-MUSCOVITE SCHIST
	1R	60"	59"	11.0'						RQD = 63 %
	2R	60"	59"	16.0'					16.0'	RQD = 98 %
										BOTTOM OF EXPLORATION AT 16.0'

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-9**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-10**
SHEET: 1 OF 1
PROJECT NO.: 04-1228

PROJECT / CLIENT:
LOCATION: OCEAN AVENUE, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING INC. DRILLER: DONNY BOLSTRIDGE

DATE START: 12/13/2004
DATE FINISH: 12/14/2004
ELEVATION: 151.2
SWC REP.: KBG

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	300 lb	18"
SAMPLER:				
CORE BARREL:	NQ2	2"		

WATER LEVEL INFORMATION
NO FREE WATER OBSERVED

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										FOREST DUFF / TOPSOIL
									2.0'	OVERLYING BROWN SILTY SAND WITH ORGANICS
										BEDROCK
										[ADVANCED BORING BY AIR HAMMER TO 20.0']
									20.0'	
										INTERBEDDED WHITE TO LIGHT GRAY TO LIGHT GREEN MIGMATITE AND BIOTITE-MUSCOVITE-CHLORITE SCHIST
	1R	60"	58"	25.0'						RQD = 68 %
										INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST
	2R	60"	60"	30.0'					30.0'	RQD = 92 %
										BOTTOM OF EXPLORATION AT 30.0'

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-10**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-11**
SHEET: 1 OF 1
PROJECT NO.: 04-1228

PROJECT / CLIENT:
LOCATION: OCEAN AVENUE, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING INC. DRILLER: JEFF LEE

DATE START: 12/14/2004
DATE FINISH: 12/14/2004
ELEVATION: 149.9
SWC REP.: KBG

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	300 lb	18"
SAMPLER:				
CORE BARREL:	NQ2	2"		

WATER LEVEL INFORMATION
NO FREE WATER OBSERVED

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										FOREST DUFF / TOPSOIL
									1.5'	OVERLYING BROWN SILTY SAND WITH ORGANICS
										PROBABLE WEATHERED BEDROCK
									4.0'	
										BEDROCK
										[ADVANCED BORING BY ROLLER CONE TO 9.0']
									9.0'	
										WHITE TO LIGHT GRAY MIGMATITE WITH GRAY BIOTITE-MUSCOVITE SCHIST LAYERS
	1R	60"	56"	14.0'						RQD = 68 %
										INTERBEDDED WHITE TO GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST
	2R	60"	58"	19.0'						RQD = 73 %
	3R	60"	59"	24.0'					24.0'	RQD = 65 %
										BOTTOM OF EXPLORATION AT 24.0'

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-11**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-12 / MW**
SHEET: 1 OF 1
PROJECT NO.: 04-1228

PROJECT / CLIENT:
LOCATION: OCEAN AVENUE, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING INC. DRILLER: JEFF LEE

DATE START: 12/10/2004
DATE FINISH: 12/10/2004
ELEVATION: 138.4
SWC REP.: KBG

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	300 lb	18"
SAMPLER:	SS	1 3/8"		
CORE BARREL:	NQ2	2"		

WATER LEVEL INFORMATION
1" PIEZOMETER INSTALLED

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									1.0'	FOREST DUFF / TOPSOIL
	1D	24"	8"	2.0'	1	1	2	2	2.0'	BROWN SILTY SAND WITH ORGANICS
										BEDROCK
									6.0'	[ADVANCED BORING BY ROLLER CONE TO 6']
										BEDROCK GRAY BIOTITE-MUSCOVITE
	1R	60"	60"	11.0'						RQD = 30 % INTERBEDDED WHITE TO GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST
	2R	60"	59"	16.0'					16.0'	RQD = 73 %
										BOTTOM OF EXPLORATION AT 16.0'

PIEZOMETER DETAILS:
SCREEN 11' - 16'
FILTER SAND 10' - 16'
BENTONITE 8' - 10'
SAND TO SURFACE

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-12 / MW**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-13**
SHEET: 1 OF 1
PROJECT NO.: 04-1228

PROJECT / CLIENT:
LOCATION: OCEAN AVENUE, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING INC. DRILLER: DONNY BOLSTRIDGE

DATE START: 12/14/2004
DATE FINISH: 12/15/2004
ELEVATION: 152.9
SWC REP.: KBG

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	300 lb	18"
SAMPLER:				
CORE BARREL:	NQ2	2"		

WATER LEVEL INFORMATION
NO FREE WATER OBSERVED

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										BEDROCK
									3.0'	[ADVANCED BORING BY AIR HAMMER TO 3.0']
										WHITE TO LIGHT GRAY MIGMATITE AND GRAY BIOTITE-MUSCOVITE SCHIST
	1R	60"	60"	8.0'						RQD = 52 %
										WHITE TO LIGHT GRAY MIGMATITE
	2R	60"	60"	13.0'						RQD = 89 %
	3R	60"	56"	18.0'						RQD = 82 %
	4R	60"	54"	23.0'						RQD = 72 %
	5R	60"	60"	28.0'					28.0'	RQD = 82 %
										BOTTOM OF EXPLORATION AT 28.0'

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-13**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-14**
SHEET: 1 OF 1
PROJECT NO.: 04-1228
DATE START: 12/13/2004
DATE FINISH: 12/13/2004
ELEVATION: 147.8
SWC REP.: KBG

PROJECT / CLIENT:
LOCATION: OCEAN AVENUE, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING INC. DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	300 lb	18"
SAMPLER:				
CORE BARREL:	NQ2	2"		

WATER LEVEL INFORMATION
SOIL OVERBURDEN SATURATED

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										FOREST DUFF / TOPSOIL
									2.0'	OVERLYING BROWN SILTY SAND
										BEDROCK
										[ADVANCED BORING BY ROLLER CONE TO 9']
									9.0'	
										GRAY BIOTITE-MUSCOVITE SCHIST WITH WHITE TO LIGHT GRAY MIGMATITE LAYERS
	1R	60"	60"	14.0'						RQD = 45 %
										WHITE TO LIGHT GRAY MIGMATITE WITH GRAY BIOTITE-MUSCOVITE SCHIST LAYERS
	2R	60"	60"	19.0'						RQD = 80 %
	3R	60"	60"	24.0'					24.0'	RQD = 75 %
										BOTTOM OF EXPLORATION AT 24.0'

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-14**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-15**
SHEET: 1 OF 1
PROJECT NO.: 04-1228

PROJECT / CLIENT:
LOCATION: OCEAN AVENUE, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING INC. DRILLER: JEFF LEE

DATE START: 12/13/2004
DATE FINISH: 12/13/2004
ELEVATION: 142.3
SWC REP.: KBG

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	300 lb	18"
SAMPLER:	SS	1 3/8"		
CORE BARREL:	NQ2	2"		

WATER LEVEL INFORMATION
OVERBURDEN SOILS SATURATED

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										FOREST DUFF / TOPSOIL
	1D	24"	3"	2.0'	1	1	1	5	1.5'	~LOOSE~
									3.0'	BROWN SILTY SAND TRACE GRAVEL
										BROWN SILTY SAND SOME GRAVEL
	2D	5"	5"	5.3'	50/5"				4.8'	WITH OCCASIONAL COBBLES
									6.0'	PROBABLE WEATHERED BEDROCK
										BEDROCK
									11.0'	[ADVANCED BORING BY ROLLER CONE TO 11.0']
										BROWN SULFIDIC SCHIST AND GRAY BIOTITE-MUSCOVITE SCHIST
	1R	60"	58"	16.0'						RQD = 23 %
										GRAY BIOTITE-MUSCOVITE SCHIST AND WHITE TO LIGHT GRAY MIGMATITE
	2R	60"	60"	21.0'					21.0'	RQD = 93 %
										BOTTOM OF EXPLORATION AT 21.0'

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-15**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-16 / MW**
SHEET: 1 OF 1
PROJECT NO.: 04-1228

PROJECT / CLIENT:
LOCATION: OCEAN AVENUE, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING INC. DRILLER: JEFF LEE

DATE START: 12/15/2004
DATE FINISH: 12/15/2004
ELEVATION: 155.2
SWC REP.: KBG

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	300 lb	18"
SAMPLER:				
CORE BARREL:	NQ2	2"		

WATER LEVEL INFORMATION
1" PIEZOMETER INSTALLED

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										FOREST DUFF / TOPSOIL
										OVERLYING BROWN SILTY SAND WITH ORGANICS
									3.0'	
									3.5'	PROBABLE WEATHERED BEDROCK
										BEDROCK
										[ADVANCED BORING BY AIR HAMMER TO 18.0']
									18.0'	
										WHITE TO LIGHT GRAY MIGMATITE WITH
										GRAY BIOTITE-MUSCOVITE SCHIST LAYERS
	1R	60"	58"	23.0'						RQD = 78 %
	2R	60"	59"	28.0'					28.0'	RQD = 65 %
										BOTTOM OF EXPLORATION AT 28.0'
										PIEZOMETER DETAILS: SCREEN 23' - 28'
										FILTER SAND 22' - 28"
										BENTONITE 20' - 22'
										SAND TO SURFACE

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-16 / MW**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-17 / MW**
SHEET: 1 OF 1
PROJECT NO.: 04-1228
DATE START: 12/14/2004
DATE FINISH: 12/14/2004
ELEVATION: 114.5
SWC REP.: KBG

PROJECT / CLIENT:
LOCATION: OCEAN AVENUE, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING INC. DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	300 lb	18"
SAMPLER:	SS	1 3/8"		
CORE BARREL:	NQ2	2"		

WATER LEVEL INFORMATION
NESTED 1" PIEZOMETERS INSTALLED

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										FOREST DUFF / TOPSOIL
									2.0'	OVERLYING BROWN SILTY SAND WITH ORGANICS
										BEDROCK
										[ADVANCED BORING BY ROLLER CONE TO 10.0']
									10.0'	
										INTERBEDDED GRAY GRANITIC GNEISS AND SCHIST
	1R	60"	60"	15.0'						RQD = 45 %
	2R	60"	57"	20.0'					20.0'	RQD = 65 %
										BOTTOM OF EXPLORATION AT 20.0'

PIEZOMETER DETAILS:
SCREEN 15' - 20'
FILTER SAND 14' - 20'
BENTONITE 11' - 14'
SCREEN 5' - 10'
FILTER SAND 4' - 11'
BENTONITE TO SURFACE

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS: PROPOSED POND

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-17 / MW**

S.W.COLE ENGINEERING, INC.

ROCK CORE LOG

PROJECT: _____ **BORING NO.:** B-1

CLIENT: _____ **PROJECT NO.:** 04-1228

LOGGED BY: MTT **DATE:** 1/10/2005 **SHEET NO.:** 1 OF 1

CHECKED BY: GWB **DATE:** 1/13/2005 **CORE SIZE:** NQ2

DEPTH BELOW SURFACE (FT)	CORE RUN	CORE INTERVAL (IN)	CORE RECOVERY (IN)	RQD (%)	ROCK QUALITY	GRAPHIC LOG	ROCK DESCRIPTION AND IDENTIFICATION
5.0'							
	R1	60"	53"	22"/60" 37%	POOR		INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD, MODERATELY WEATHERED, FRACTURES @ 15 TO 40 DEGREES FROM HORIZONTAL.
							HIGHLY FRACTURED ZONE
10.0'							ZONE OF CORE LOSS
	R2	60"	59"	36"/60" 60%	FAIR		INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD, MODERATELY WEATHERED, FRACTURES @ 15 TO 40 DEGREES FROM HORIZONTAL.
							HIGHLY FRACTURED ZONE
15.0'							ZONE OF CORE LOSS
							BOTTOM OF EXPLORATION @ 15.0'

S.W.COLE ENGINEERING, INC.

ROCK CORE LOG

PROJECT: _____ **BORING NO.:** B-2

CLIENT: _____ **PROJECT NO.:** 04-1228

LOGGED BY: MTT **DATE:** 1/10/2005 **SHEET NO.:** 1 OF 1

CHECKED BY: GWB **DATE:** 1/13/2005 **CORE SIZE:** NQ2

DEPTH BELOW SURFACE (FT)	CORE RUN	CORE INTERVAL (FT)	CORE RECOVERY (FT)	RQD (%)	ROCK QUALITY	GRAPHIC LOG	ROCK DESCRIPTION AND IDENTIFICATION
21.5'	R1	60"	58"	46"/60" 77%	GOOD		INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD, SLIGHTLY WEATHERED, FRACTURES @ 10 TO 40 DEGREES FROM HORIZONTAL
26.5'	R2	58"	58"	37"/58" 63%	FAIR		ZONE OF CORE LOSS INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD, SLIGHTLY WEATHERED, FRACTURES @ 10 TO 40 DEGREES FROM HORIZONTAL
31.3'							BOTTOM OF EXPLORATION @ 31.3'

S.W.COLE ENGINEERING, INC.

ROCK CORE LOG

PROJECT: _____ **BORING NO.:** B-3

CLIENT: _____ **PROJECT NO.:** 04-1228

LOGGED BY: MTT **DATE:** 1/10/2005 **SHEET NO.:** 1 OF 1

CHECKED BY: GWB **DATE:** 1/13/2005 **CORE SIZE:** NQ2

DEPTH BELOW SURFACE (FT)	CORE RUN	CORE INTERVAL (IN)	CORE RECOVERY (IN)	RQD (%)	ROCK QUALITY	GRAPHIC LOG	ROCK DESCRIPTION AND IDENTIFICATION
7.0'	R1	60"	60"	37"/60" 62%	FAIR		INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD, MODERATELY WEATHERED, FRACTURES @ 25 TO 50 DEGREES FROM HORIZONTAL.
12.0'	R2	60"	59"	46"/60" 72%	FAIR		INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD, MODERATELY WEATHERED, FRACTURES @ 25 TO 50 DEGREES FROM HORIZONTAL.
17.0'							ZONE OF CORE LOSS
							BOTTOM OF EXPLORATION @ 17.0'

S.W.COLE ENGINEERING, INC.

ROCK CORE LOG

PROJECT: _____ **BORING NO.:** B-4

CLIENT: _____ **PROJECT NO.:** 04-1228

LOGGED BY: MTT **DATE:** 1/10/2005 **SHEET NO.:** 1 OF 1

CHECKED BY: GWB **DATE:** 1/13/2005 **CORE SIZE:** NQ2

DEPTH BELOW SURFACE (FT)	CORE RUN	CORE INTERVAL (IN)	CORE RECOVERY (IN)	RQD (%)	ROCK QUALITY	GRAPHIC LOG	ROCK DESCRIPTION AND IDENTIFICATION
12.0'							
	R1	60"	59"	24"/60" 40%	POOR		HIGHLY FRACTURED ZONE INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD, VERY WEATHERED TO MODERATELY WEATHERED, FRACTURES @ 20 TO 60 DEGREES FROM HORIZONTAL
17.0'							ZONE OF CORE LOSS
	R2	63"	58"	52"/63" 83%	GOOD		INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD SLIGHTLY WEATHERED, FRACTURES @ 20 TO 60 DEGREES FROM HORIZONTAL
22.3'							ZONE OF CORE LOSS
							BOTTOM OF EXPLORATION @ 22.3'

S.W.COLE ENGINEERING, INC.

ROCK CORE LOG

PROJECT: _____ **BORING NO.:** B-5

CLIENT: _____ **PROJECT NO.:** 04-1228

LOGGED BY: MTT **DATE:** 1/10/2005 **SHEET NO.:** 1 OF 1

CHECKED BY: GWB **DATE:** 1/13/2005 **CORE SIZE:** NQ2

DEPTH BELOW SURFACE (FT)	CORE RUN	CORE INTERVAL (IN)	CORE RECOVERY (IN)	RQD (%)	ROCK QUALITY	GRAPHIC LOG	ROCK DESCRIPTION AND IDENTIFICATION
15.0'	R1	60"	53"	50"/60" 83%	GOOD		INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD, SLIGHTLY WEATHERED, FRACTURES @ 20 TO 40 DEGREES FROM HORIZONTAL
20.0'							ZONE OF CORE LOSS
	R2	60"	58"	38"/60" 63%	FAIR		INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD, SLIGHTLY WEATHERED, FRACTURES @ 20 TO 40 DEGREES FROM HORIZONTAL
25.0'							ZONE OF CORE LOSS
							BOTTOM OF EXPLORATION @ 25.0'

S.W.COLE ENGINEERING, INC.

ROCK CORE LOG

PROJECT: _____ **BORING NO.:** B-6

CLIENT: _____ **PROJECT NO.:** 04-1228

LOGGED BY: MTT **DATE:** 1/10/2005 **SHEET NO.:** 1 OF 1

CHECKED BY: GWB **DATE:** 1/13/2005 **CORE SIZE:** NQ2

DEPTH BELOW SURFACE (FT)	CORE RUN	CORE INTERVAL (IN)	CORE RECOVERY (IN)	RQD (%)	ROCK QUALITY	GRAPHIC LOG	ROCK DESCRIPTION AND IDENTIFICATION
15.0'	R1	60"	56"	28"/60" 47%	POOR		INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD, MODERATELY WEATHERED, FRACTURES @ 10 TO 35 DEGREES FROM HORIZONTAL HIGHLY FRACTURED ZONE ZONE OF CORE LOSS
20.0'	R2	60"	58"	50"/60" 83%	GOOD		INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD, SLIGHTLY WEATHERED, FRACTURES @ 10 TO 35 DEGREES FROM HORIZONTAL HIGHLY FRACTURED ZONE ZONE OF CORE LOSS
25.0'							BOTTOM OF EXPLORATION @ 25.0'

S.W.COLE ENGINEERING, INC.

ROCK CORE LOG

PROJECT: _____ **BORING NO.:** B-7

CLIENT: _____ **PROJECT NO.:** 04-1228

LOGGED BY: MTT **DATE:** 1/10/2005 **SHEET NO.:** 1 OF 1

CHECKED BY: GWB **DATE:** 1/13/2005 **CORE SIZE:** NQ2

DEPTH BELOW SURFACE (FT)	CORE RUN	CORE INTERVAL (IN)	CORE RECOVERY (IN)	RQD (%)	ROCK QUALITY	GRAPHIC LOG	ROCK DESCRIPTION AND IDENTIFICATION
20.0'	R1	60"	59"	52"/60" 87%	GOOD		INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD, SLIGHTLY WEATHERED, FRACTURES @ 10 TO 35 DEGREES FROM HORIZONTAL
25.0'							ZONE OF CORE LOSS
	R2	60"	52"	47"/60" 78%	GOOD		INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD, SLIGHTLY WEATHERED, FRACTURES @ 10 TO 35 DEGREES FROM HORIZONTAL
30.0'							ZONE OF CORE LOSS
							BOTTOM OF EXPLORATION @ 30.0'

S.W.COLE ENGINEERING, INC.

ROCK CORE LOG

PROJECT: _____ **BORING NO.:** B-8

CLIENT: _____ **PROJECT NO.:** 04-1228

LOGGED BY: GWB **DATE:** 12/21/2004 **SHEET NO.:** 1 OF 1

CHECKED BY: GWB **DATE:** 1/13/2005 **CORE SIZE:** NQ2

DEPTH BELOW SURFACE (FT)	CORE RUN	CORE INTERVAL (IN)	CORE RECOVERY (IN)	RQD (%)	ROCK QUALITY	GRAPHIC LOG	ROCK DESCRIPTION AND IDENTIFICATION
15.0'	R1	60"	59"	47"/60" 78%	GOOD		INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD, MODERATELY WEATHERED BECOMING SLIGHTLY WEATHERED, FRACTURES @ 0 TO 55 DEGREES FROM HORIZONTAL.
20.0'							ZONE OF CORE LOSS
	R2	60"	58"	49"/60" 82%	GOOD		INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD, SLIGHTLY WEATHERED, FRACTURES @ 10 TO 35 DEGREES FROM HORIZONTAL.
25.0'							ZONE OF CORE LOSS
							BOTTOM OF EXPLORATION @ 25.0'

S.W.COLE ENGINEERING, INC.

ROCK CORE LOG

PROJECT: _____ **BORING NO.:** B-9

CLIENT: _____ **PROJECT NO.:** 04-1228

LOGGED BY: MTT **DATE:** 1/10/2005 **SHEET NO.:** 1 OF 1

CHECKED BY: GWB **DATE:** 1/13/2005 **CORE SIZE:** NQ2

DEPTH BELOW SURFACE (FT)	CORE RUN	CORE INTERVAL (IN)	CORE RECOVERY (IN)	RQD (%)	ROCK QUALITY	GRAPHIC LOG	ROCK DESCRIPTION AND IDENTIFICATION
6.0'							
	R1	60"	59"	38"/60" 63%	FAIR		HIGHLY FRACTURED ZONE INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD, MODERATELY TO MODERATELY WEATHERED, FRACTURES @ 15 TO 35 DEGREES FROM HORIZONTAL
11.0'							ZONE OF CORE LOSS
	R2	60"	59"	59"/60" 98%	EXCELLENT		INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD, MODERATELY TO MODERATELY WEATHERED, FRACTURES @ 15 TO 35 DEGREES FROM HORIZONTAL
16.0'							ZONE OF CORE LOSS
							BOTTOM OF EXPLORATION @ 16.0'

S.W.COLE ENGINEERING, INC.

ROCK CORE LOG

PROJECT: _____ **BORING NO.:** B-10

CLIENT: _____ **PROJECT NO.:** 04-1228

LOGGED BY: GWB **DATE:** 12/21/2004 **SHEET NO.:** 1 OF 1

CHECKED BY: GWB **DATE:** 1/13/2005 **CORE SIZE:** NQ2

DEPTH BELOW SURFACE (FT)	CORE RUN	CORE INTERVAL (IN)	CORE RECOVERY (IN)	RQD (%)	ROCK QUALITY	GRAPHIC LOG	ROCK DESCRIPTION AND IDENTIFICATION
20.0'							
	R1	60"	58"	41"/60" 68%	F A I R		INTERBEDDED WHITE TO LIGHT GRAY TO LIGHT GREEN MIGMATITE AND BIOTITE-MUSCOVITE-CHLORITE SCHIST, HARD, SLIGHTLY WEATHERED, FRACTURES @ 10 TO 25 DEGREES FROM HORIZONTAL
25.0'							ZONE OF CORE LOSS
	R2	60"	60"	55"/60" 92%	E X C E L L E N T		INTERBEDDED WHITE TO LIGHT GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD, SLIGHTLY WEATHERED, FRACTURES @ 5 TO 25 DEGREES FROM HORIZONTAL
30.0'							
							BOTTOM OF EXPLORATION @ 30.0'

S.W.COLE ENGINEERING, INC.

ROCK CORE LOG

PROJECT: _____ **BORING NO.:** B-11

CLIENT: _____ **PROJECT NO.:** 04-1228

LOGGED BY: GWB **DATE:** 12/20/2004 **SHEET NO.:** 1 OF 1

CHECKED BY: GWB **DATE:** 1/13/2005 **CORE SIZE:** NQ2

DEPTH BELOW SURFACE (FT)	CORE RUN	CORE INTERVAL (IN)	CORE RECOVERY (IN)	RQD (%)	ROCK QUALITY	GRAPHIC LOG	ROCK DESCRIPTION AND IDENTIFICATION
9.0'	R1	60"	56"	41"/60" 68%	FAIR		WHITE TO LIGHT GRAY MIGMATITE WITH GRAY BIOTITE-MUSCOVITE SCHIST LAYERS, VERY HARD (MIGMATITE) TO MODERATELY HARD (SCHIST), SLIGHTLY WEATHERED, FRACTURES @ 10 TO 45 DEGREES FROM HORIZONTAL
14.0'							ZONE OF CORE LOSS
	R2	60"	58"	44"/60" 73%	FAIR		INTERBEDDED WHITE TO GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD, SLIGHTLY WEATHERED, FRACTURES @ 20 TO 45 DEGREES FROM HORIZONTAL
19.0'							ZONE OF CORE LOSS
	R3	60"	59"	39"/60" 65%	FAIR		INTERBEDDED WHITE TO GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD, SLIGHLTY WEATHERED, FRACTURES @ 0 TO 35 DEGREES FROM HORIZONTAL
24.0'							ZONE OF CORE LOSS BOTTOM OF EXPLORATION @ 24.0'

S.W.COLE ENGINEERING, INC.

ROCK CORE LOG

PROJECT: _____ **BORING NO.:** B-12

CLIENT: _____ **PROJECT NO.:** 04-1228

LOGGED BY: GWB **DATE:** 12/21/2004 **SHEET NO.:** 1 OF 1

CHECKED BY: GWB **DATE:** 1/13/2005 **CORE SIZE:** NQ2

DEPTH BELOW SURFACE (FT)	CORE RUN	CORE INTERVAL (IN)	CORE RECOVERY (IN)	RQD (%)	ROCK QUALITY	GRAPHIC LOG	ROCK DESCRIPTION AND IDENTIFICATION
6.0'	R1	60"	60"	18"/60" 30%	POOR		GRAY BIOTITE-MUSCOVITE, MODERATELY HARD, MODERATELY WEATHERED, HIGHLY FRACTURED, FRACTURES @ 5 TO 40 DEGREES FROM HORIZONTAL
11.0'	R2	60"	59"	44"/60" 73%	FAIR		INTERBEDDED WHITE TO GRAY MIGMATITE AND BIOTITE-MUSCOVITE SCHIST, HARD, SLIGHTLY WEATHERED, FRACTURES @ 0 TO 35 DEGREES FROM HORIZONTAL
16.0'							ZONE OF CORE LOSS
							BOTTOM OF EXPLORATION @ 16.0'

S.W.COLE ENGINEERING, INC.

ROCK CORE LOG

PROJECT: _____ **BORING NO.:** B-13

CLIENT: _____ **PROJECT NO.:** 04-1228

LOGGED BY: GWB **DATE:** 12/20/2004 **SHEET NO.:** 1 OF 2

CHECKED BY: GWB **DATE:** 1/13/2005 **CORE SIZE:** NQ2

DEPTH BELOW SURFACE (FT)	CORE RUN	CORE INTERVAL (IN)	CORE RECOVERY (IN)	RQD (%)	ROCK QUALITY	GRAPHIC LOG	ROCK DESCRIPTION AND IDENTIFICATION
3.0'	R1	60"	60"	31"/60" 52%	FAIR		WHITE TO LIGHT GRAY MIGMATITE AND GRAY BIOTITE- MUSCOVITE SCHIST, VERY HARD TO MODERATELY HARD, MODERATELY TO SLIGHTLY WEATHERED, FRACTURES @ 10 TO 35 DEGREES FROM HORIZONTAL
8.0'	R2	60"	60"	53"/60" 89%	GOOD		WHITE TO LIGHT GRAY MIGMATITE, VERY HARD, SLIGHTLY WEATHERED, FRACTURES @ 5 TO 25 DEGREES FROM HORIZONTAL
13.0'	R3	60"	56"	49"/60" 82%	GOOD		WHITE TO LIGHT GRAY MIGMATITE, VERY HARD, SLIGHTLY WEATHERED, FRACTURES @ 5 TO 20 DEGREES FROM HORIZONTAL
18.0'							ZONE OF CORE LOSS

S.W.COLE ENGINEERING, INC.

ROCK CORE LOG

PROJECT: _____ **BORING NO.:** B-13

CLIENT: _____ **PROJECT NO.:** 04-1228

LOGGED BY: GWB **DATE:** 12/20/2004 **SHEET NO.:** 2 OF 2

CHECKED BY: GWB **DATE:** 1/13/2005 **CORE SIZE:** NQ2

DEPTH BELOW SURFACE (FT)	CORE RUN	CORE INTERVAL (IN)	CORE RECOVERY (IN)	RQD (%)	ROCK QUALITY	GRAPHIC LOG	ROCK DESCRIPTION AND IDENTIFICATION
18.0'	R4	60"	54"	43"/60" 72%	FAIR		WHITE TO LIGHT GRAY MIGMATITE, VERY HARD, SLIGHTLY WEATHERED, FRACTURES @ 0 TO 25 DEGREES FROM HORIZONTAL
23.0'							ZONE OF CORE LOSS
	R5	60"	60"	49"/60" 82%	GOOD		WHITE TO LIGHT GRAY MIGMATITE, VERY HARD, SLIGHTLY WEATHERED, FRACTURES @ 0 TO 40 DEGREES FROM HORIZONTAL
28.0'							
							BOTTOM OF EXPLORATION @ 28.0'

S.W.COLE ENGINEERING, INC.

ROCK CORE LOG

PROJECT: _____ **BORING NO.:** B-14

CLIENT: _____ **PROJECT NO.:** 04-1228

LOGGED BY: GWB **DATE:** 12/20/2004 **SHEET NO.:** 1 OF 1

CHECKED BY: GWB **DATE:** 1/13/2005 **CORE SIZE:** NQ2

DEPTH BELOW SURFACE (FT)	CORE RUN	CORE INTERVAL (IN)	CORE RECOVERY (IN)	RQD (%)	ROCK QUALITY	GRAPHIC LOG	ROCK DESCRIPTION AND IDENTIFICATION
9.0'	R1	60"	60"	27"/60" 45%	POOR		GRAY BIOTITE-MUSCOVITE SCHIST WITH WHITE TO LIGHT GRAY MIGMATITE LAYERS, VERY HARD (MIGMATITE) TO MODERATELY HARD (SCHIST), MODERATELY TO SLIGHTLY WEATHERED, FRACTURES @ 0 TO 80 DEGREES FROM HORIZONTAL.
14.0'	R2	60"	60"	48"/60" 80%	GOOD		WHITE TO LIGHT GRAY MIGMATITE WITH GRAY BIOTITE-MUSCOVITE SCHIST LAYERS, VERY HARD (MIGMATITE) TO MODERATELY HARD (SCHIST), SLIGHTLY WEATHERED, FRCATURES @ 0 TO 40 DEGREES FROM HORIZONTAL.
19.0'	R3	60"	60"	45"/60" 75%	GOOD		WHITE TO LIGHT GRAY MIGMATITE WITH GRAY BIOTITE-MUSCOVITE SCHIST LAYERS, VERY HARD (MIGMATITE) TO MODERATELY HARD (SCHIST), SLIGHTLY WEATHERED, FRCATURES @ 10 TO 45 DEGREES FROM HORIZONTAL.
24.0'							BOTTOM OF EXPLORATION @ 24.0'

S.W.COLE ENGINEERING, INC.

ROCK CORE LOG

PROJECT: _____ **BORING NO.:** B-15

CLIENT: _____ **PROJECT NO.:** 04-1228

LOGGED BY: GWB **DATE:** 12/21/2004 **SHEET NO.:** 1 OF 1

CHECKED BY: GWB **DATE:** 1/13/2005 **CORE SIZE:** NQ2

DEPTH BELOW SURFACE (FT)	CORE RUN	CORE INTERVAL (IN)	CORE RECOVERY (IN)	RQD (%)	ROCK QUALITY	GRAPHIC LOG	ROCK DESCRIPTION AND IDENTIFICATION
11.0'	R1	60"	58"	14"/60" 23%	VERY POOR		BROWN SULFIDIC SCHIST (11.0' TO 12.8') AND GRAY BIOTITE-MUSCOVITE SCHIST (12.8' TO 16.0'), SOFT BECOMING MODERATELY HARD, MODERATELY WEATHERED, HIGHLY FRACTURED, FRACTURES @ 0 TO 50 DEGREES FROM HORIZONTAL. HIGHLY FRACTURED ZONE ZONE OF CORE LOSS
16.0'	R2	60"	60"	56"/60" 93%	EXCELLENT		GRAY BIOTITE-MUSCOVITE SCHIST (16.0' TO 17.3') AND WHITE TO LIGHT GRAY MIGMATITE (17.3' TO 21.0'), MODERATELY HARD BECOMING VERY HARD, SLIGHTLY WEATHERED, FRACTURES @ 5 TO 15 DEGREES FROM HORIZONTAL.
21.0'							BOTTOM OF EXPLORATION @ 21.0'

S.W.COLE ENGINEERING, INC.

ROCK CORE LOG

PROJECT: _____ **BORING NO.:** B-16

CLIENT: _____ **PROJECT NO.:** 04-1228

LOGGED BY: GWB **DATE:** 12/20/2004 **SHEET NO.:** 1 OF 1

CHECKED BY: GWB **DATE:** 1/13/2005 **CORE SIZE:** NQ2

DEPTH BELOW SURFACE (FT)	CORE RUN	CORE INTERVAL (IN)	CORE RECOVERY (IN)	RQD (%)	ROCK QUALITY	GRAPHIC LOG	ROCK DESCRIPTION AND IDENTIFICATION
18.0'	R1	60"	58"	47"/60" 78%	GOOD		WHITE TO LIGHT GRAY MIGMATITE WITH GRAY BIOTITE-MUSCOVITE SCHIST LAYERS, VERY HARD (MIGMATITE) TO MODERATELY HARD (SCHIST), SLIGHTLY WEATHERED, FRACTURES @ 5 TO 25 DEGREES FROM HORIZONTAL
23.0'							ZONE OF CORE LOSS
	R2	60"	59"	39"/60" 65%	FAIR		WHITE TO LIGHT GRAY MIGMATITE WITH GRAY BIOTITE-MUSCOVITE SCHIST LAYERS, VERY HARD (MIGMATITE) TO MODERATELY HARD (SCHIST), SLIGHTLY WEATHERED, FRACTURES @ 0 TO 35 DEGREES FROM HORIZONTAL
28.0'							ZONE OF CORE LOSS
							BOTTOM OF EXPLORATION @ 28.0'

S.W.COLE ENGINEERING, INC.

ROCK CORE LOG

PROJECT: _____ **BORING NO.:** B-17

CLIENT: _____ **PROJECT NO.:** 04-1228

LOGGED BY: GWB **DATE:** 12/21/2004 **SHEET NO.:** 1 OF 1

CHECKED BY: GWB **DATE:** 1/13/2005 **CORE SIZE:** NQ2

DEPTH BELOW SURFACE (FT)	CORE RUN	CORE INTERVAL (IN)	CORE RECOVERY (IN)	RQD (%)	ROCK QUALITY	GRAPHIC LOG	ROCK DESCRIPTION AND IDENTIFICATION
10.0'	R1	60"	60"	27"/60" 45%	POOR		INTERBEDDED GRAY GRANITIC GNEISS AND SCHIST, HARD, SLIGHTLY WEATHERED, FRACTURES @ 5 TO 40 DEGREES FROM HORIZONTAL
15.0'	R2	60"	57"	39"/60" 65%	FAIR		INTERBEDDED GRAY GRANITIC GNEISS AND SCHIST, HARD, SLIGHTLY WEATHERED, FRACTURES @ 5 TO 35 DEGREES FROM HORIZONTAL. HIGHLY FRACTURED ZONE
20.0'							ZONE OF CORE LOSS
							BOTTOM OF EXPLORATION @ 20.0'

S. W. COLE ENGINEERING, INC.

AUGER PROBE LOG

PROJECT/CLIENT:
CLIENT:
LOCATION: OCEAN AVENUE, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING, INC.

PROJECT NUMBER 04-1228
AUGER PROBE SIZE O.D. SOLID STEM

BORING NO. **P-1**
GROUND ELEV. 141 +/-
DATE 12/15/2004

DEPTH (FT)	STRATUM DESCRIPTION
	FOREST DUFF / TOPSOIL
	OVERLYING BROWN SILTY SAND
	WITH ORGANICS AND COBBLES
2.4'	
	REFUSAL AT 2.4'
	(PROBABLE BEDROCK)

BORING NO. **P-2**
GROUND ELEV. 142 +/-
DATE 12/15/2004

DEPTH (FT)	STRATUM DESCRIPTION
	FOREST DUFF / TOPSOIL
	OVERLYING BROWN SILTY SAND
	WITH ORGANICS AND COBBLES
4.0'	
	PROBABLE WEATHERED BEDROCK
9.0'	
	REFUSAL AT 9.0'
	(PROBABLE BEDROCK)

SOIL CLASSIFIED BY:

	DRILLER - VISUALLY
X	SOIL TECHNICIAN - VISUALLY
	LABORATORY TESTS

S. W. COLE ENGINEERING, INC.

AUGER PROBE LOG

PROJECT/CLIENT:
CLIENT:
LOCATION: OCEAN AVENUE, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING, INC.

PROJECT NUMBER 04-1228
AUGER PROBE SIZE O.D. SOLID STEM

BORING NO. **P-3**
GROUND ELEV. 134 +/-
DATE 12/15/2004

DEPTH (FT)	STRATUM DESCRIPTION
	FOREST DUFF / TOPSOIL OVERLYING BROWN SILTY SAND WITH ORGANICS AND COBBLES
3.0'	REFUSAL AT 3.0' (PROBABLE BEDROCK)

BORING NO. **P-4**
GROUND ELEV. 142 +/-
DATE 12/15/2004

DEPTH (FT)	STRATUM DESCRIPTION
	FOREST DUFF / TOPSOIL OVERLYING BROWN SILTY SAND WITH ORGANICS AND COBBLES
3.0'	PROBABLE WEATHERED BEDROCK
5.0'	REFUSAL AT 5.0' (PROBABLE BEDROCK)

SOIL CLASSIFIED BY:

	DRILLER - VISUALLY
X	SOIL TECHNICIAN - VISUALLY
	LABORATORY TESTS

S. W. COLE ENGINEERING, INC.

AUGER PROBE LOG

PROJECT/CLIENT:
CLIENT:
LOCATION: OCEAN AVENUE, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING, INC.

PROJECT NUMBER 04-1228
AUGER PROBE SIZE O.D. SOLID STEM

BORING NO. **P-5**
GROUND ELEV. 132 +/-
DATE 12/15/2004

DEPTH (FT)	STRATUM DESCRIPTION
	FOREST DUFF / TOPSOIL
	OVERLYING BROWN SILTY SAND
	WITH ORGANICS AND COBBLES
2.7'	
	REFUSAL AT 2.7'
	(PROBABLE BEDROCK)

BORING NO. **P-6**
GROUND ELEV. 139 +/-
DATE 12/15/2004

DEPTH (FT)	STRATUM DESCRIPTION
	FOREST DUFF / TOPSOIL
	OVERLYING BROWN SILTY SAND
1.5'	WITH ORGANICS AND COBBLES
2.0'	PROBABLE WEATHERED BEDROCK
	REFUSAL AT 2.0'
	(PROBABLE BEDROCK)

SOIL CLASSIFIED BY:

	DRILLER - VISUALLY
X	SOIL TECHNICIAN - VISUALLY
	LABORATORY TESTS

S. W. COLE ENGINEERING, INC.

AUGER PROBE LOG

PROJECT/CLIENT:
CLIENT:
LOCATION: OCEAN AVENUE, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING, INC.

PROJECT NUMBER 04-1228
AUGER PROBE SIZE O.D. SOLID STEM

BORING NO. **P-7**
GROUND ELEV. 135 +/-
DATE 12/15/2004

DEPTH (FT)	STRATUM DESCRIPTION
	FOREST DUFF / TOPSOIL
	OVERLYING BROWN SILTY SAND
	WITH ORGANICS AND COBBLES
5.2'	
	REFUSAL AT 5.2'
	(PROBABLE BEDROCK)

BORING NO. **P-8**
GROUND ELEV. 142 +/-
DATE 12/15/2004

DEPTH (FT)	STRATUM DESCRIPTION
	FOREST DUFF / TOPSOIL
	OVERLYING BROWN SILTY SAND
1.5'	WITH ORGANICS AND COBBLES
	REFUSAL AT 1.5'
	(PROBABLE BEDROCK)

SOIL CLASSIFIED BY:

	DRILLER - VISUALLY
X	SOIL TECHNICIAN - VISUALLY
	LABORATORY TESTS