### GEOTECHNICAL ENGINEERING SERVICES PROPOSED K- 5 ELEMENTARY SCHOOL OCEAN AVENUE ELEMENTARY SCHOOL 152 OCEAN AVENUE PORTLAND, MAINE

07-0234.1 May 30, 2008

Prepared for: City of Portland Attention: Anita LaChance, Assistant City Manager 389 Congress Street Portland, Maine 04101



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INEERING, INC. • Geotechnical Engineering • Field & Lab Testing • Scientific & Environmental Consulting

07-0234.1

May 30, 2008

City of Portland Attention: Anita LaChance, Assistant City Manager 389 Congress Street Portland, Maine 04101

Subject: Geotechnical Engineering Services Proposed K-5 Elementary School Ocean Avenue Elementary School 152 Ocean Avenue Portland, Maine

Dear Ms. LaChance:

In accordance with our Agreement, dated April 18, 2008, we have made a subsurface investigation for the proposed K-5 elementary school building at 152 Ocean Avenue in Portland, Maine. This report presents our findings and recommendations and is subject to the limitations presented in Attachment A.

### **1.0 INTRODUCTION**

### 1.1 Scope of Work

The purpose of our work was to obtain subsurface information in order to develop geotechnical recommendations for foundations and earthwork associated with the proposed construction. Our scope of work included observing and logging test borings and pits, a review of previous geotechnical data, soils lab testing, and preparation of this report.



### **1.2 Proposed Construction**

Based on information provided by Sustainable Design Studio (project civil engineer), we understand that the project will include the construction of a new Elementary School facility, construction of new parking areas and playfields as well as new utilities. We understand that the entire site is on the order of 12 acres which includes the wooded area to the west, the existing Baxter School structure, grounds, and entrances from Walton Street and Ocean Avenue. The new school will be located on the east side of the property, near the existing school.

Based on the information provided on the site plan, we understand the proposed 2-level, T-shaped building will have a footprint on the order of 46,530 square feet and is planned with a slab-on-grade and spread footings. We anticipate the structure will be steel framed with exterior brick veneer. We understand column loads will not exceed 300 kips (total load). We also understand that the finished floor will be between elevation 59.0 and 60.0 feet (project datum).

We understand that new paved parking areas will be constructed on the northerly side of the school and a new bus loop on the easterly side. A playfield is proposed on the west side of the proposed structure. Additionally, subsurface storm-water management areas may be located beneath the proposed paved areas, bus loop and entry plaza.

## 2.0 EXPLORATION AND TESTING

## 2.1 Exploration

Fourteen test borings and eight probes were made at the site on April 28, 2008 by Great Works Test Boring of Rollinsford, New Hampshire. Seven test pits were made at the same time by Shaw Brothers Construction of Gorham, Maine. Ten test borings and eight probes were completed in the area of the proposed school building. Two test borings and two test pits were completed in the proposed bus loop and entrance drive and two borings and four test pits were completed in the area of the proposed northerly access drive and parking lot. S. W. COLE ENGINEERING, INC established the exploration locations based on measurements from existing site features and limitations of site access. The approximate locations of the explorations are shown on the "Exploration Location Plan" attached as Sheet 1. Logs of the explorations are attached as Sheets 2 through 25. Ground surface elevations noted on the logs were estimated



based on topographic information shown on Sheet 1. A key to the notes and symbols used on the logs is attached as Sheet 26.

### 2.2 Testing

Laboratory testing was performed on selected samples from the explorations. Moisture content test results are shown on the logs. The results of six grain size analyses are attached as Sheets 27 to 32.

## 3.0 SITE AND SUBSURFACE CONDITIONS

### 3.1 Site Conditions

The site is currently occupied by the existing Baxter School building and the surrounding paved parking areas and driveways. A play field is located to the west of the existing Baxter School building. Driveways are located to the east and northeast of the existing building with access from Ocean Avenue and Walton Street. Surface relief at the site is relatively flat in the areas around the existing building, at an elevation of about 56 feet (project datum). The playfield to the west of the existing building is higher than the area immediately surround the building. The playfield slopes upward from about elevation 56 feet to about elevation 60 feet and is relatively flat towards the tree line to the west.

### 3.2 Subsurface Conditions

### 3.2.1 Proposed Building Area

The subsoils encountered in the test borings in the area of the playfield, the southwest wing of the proposed building (B-101, B-102, B-103, B-106, B-107, B-108, B-109), generally consisted of silty sand with gravel (glacial till) overlying bedrock. The subsoils encountered in the test borings in the areas of the north and east wings of the proposed building (B-104, B-105, B-110, B-111, B-112, B-113, B-114, B-115, B-116, B-119, and B-120) generally consisted of silty sand fill underlain by relatively stiff brown silty clay over silty sand with some gravel (glacial till) overlying bedrock. Bedrock was encountered in the borings at depths of 2.5 to 19.7 below the existing ground surface in the proposed building area.



## 3.2.2 Proposed Access Drives and Bus Loop

Below the existing pavement and base gravels, soils encountered in the test borings in the area of the proposed access drives and bus loop (B-117, B-118, B-121, and B-122) generally consisted of silty sand with some gravel (glacial till) overlying bedrock. Bedrock was encountered at depths of 3.7 feet to 10 feet below the existing ground surface in the proposed access drives and bus loop.

### 3.2.3 Proposed Parking Areas

Soils encountered in the explorations in the area of the proposed parking areas generally consisted of silty sand with some gravel (glacial till) overlying bedrock. Bedrock was encountered in boring B-117 at a depth of about 8 feet below the existing ground surface in the proposed parking areas.

Refer to the attached boring and test pit logs for more detailed descriptions of the subsurface findings at the exploration locations.

### 3.3 Groundwater Conditions

Free groundwater was observed in the complete bore holes at depths varying from about 1.5 to 7 feet below the ground surface in borings B-104, B-105, B-110, B-120, and B-121. Free groundwater was not observed in the other borings at the time of drilling, however, the borings were not left open after completion of drilling to allow groundwater levels to be observed.

Where bedrock was encountered at relatively shallow depths (less than 5 feet) and silty clay is near the surface, it is anticipated that the groundwater may become perched at or near the ground surface seasonally. Groundwater will fluctuate seasonally and during periods of heavy precipitation or snow melt.

### 3.4 Seismic and Frost Conditions

According to the 2006 International Building Code, we interpret the subsurface conditions encountered in the explorations to correspond to a seismic soil Site Class D (N-value method). The design freezing index for the Portland, Maine area is about 1,250-Fahrenheit-degree-days, which corresponds to a frost penetration depth on the order of 4.5 feet.



### 4.0 EVALUATIONS AND RECOMMENDATIONS

### 4.1 General Findings

Based on the subsurface findings and our understanding of the proposed construction, it is our opinion that the site is suitable for the proposed construction from a geotechnical standpoint. Specifically, the structure can be supported on spread footing foundations that are founded on at least 6 inches of compacted Crushed Stone overlying bedrock, undisturbed native soils, or new compacted fill. A layer of geotextile fabric is recommended below the crushed stone layer overlying soil subgrades.

Based on the existing topographic information and the proposed finish floor elevations, it appears the majority of the proposed school building area will require new compacted tapered fills approaching 6 feet to achieve grades. Consideration should be given to sequencing the construction so that the fills are placed as soon as possible in the proposed building area. It is recommended that construction of footings and foundation walls begin in the area where bedrock is shallow and continue along the building lines from shallower bedrock to deeper bedrock areas. This will allow the native silty clay soils to re-consolidate and reduce the possibility of post-construction settlement.

Shallow refusal surfaces, presumed to be bedrock, were encountered primarily in the southwest portion of the site. Shallow refusal surfaces (less than 6± feet below the ground surface) were encountered at borings B-101, B-102, B-103, B-104, B-107, B-108, and B-109. Sufficient bedrock will need to be removed below footing, slab and paved areas to allow for a choke stone layer and base/subbase materials. In general, bedrock should be removed to at least 6 inches below footings, and at least 24 inches below the bottom of slabs and pavements.

### 4.2 Excavation

Based on the existing topographic information and proposed finish floor elevations, it appears that a majority of the site will require fills to achieve grades. A cut will be needed in the northwest and southwest wings of the building where shallow bedrock was encountered. Although proposed exterior grading information is not available at this time, we anticipate that some fills will be needed along the new access road, bus loop, parking areas and the west playfield.



Based on the findings at the explorations, groundwater may be encountered near subgrade elevation in foundation and utility excavations, particularly where shallow bedrock is encountered. Precipitation may become ponded on the silty clay or bedrock during construction. The contractor should be prepared to dewater excavations, as needed. Sumping and pumping dewatering techniques from the 6" stone layer should be adequate to control groundwater in foundation excavations. More extensive dewatering techniques may be required for utility excavations depending on the depth of utilities. Controlling the water levels to at least 6 inches below subgrade elevations will help stabilize the subgrade and provide a more suitable working surface during construction.

Precipitation can make the soils difficult to work, thus, the subgrade should not be exposed any longer than necessary. Should the subgrade become loose, soft or difficult to work, we recommend that unsuitable soils be removed and replaced with compacted crushed stone underlain by a woven geotextile fabric.

Excavations must be properly shored and/or sloped to prevent sloughing and caving of the sidewalls during construction. Temporary, unsupported soil excavations should be sloped back to 1V: to 1 ½ H or flatter. All excavations should be consistent with OSHA trenching regulations.

Bedrock removal by blasting should be anticipated in the southwest and northwest wings of the proposed building. A detailed blasting plan should be prepared prior to blasting construction. We recommend that an experienced drilling and blasting contractor be engaged to complete the rock removal and that the contractor be required to submit qualifications and references prior to the excavation. The depth of blast must be controlled to prevent potentially adverse overblast. All loose rock must be removed to expose sound, intact bedrock prior to placing the choke stone material on top of blasted surfaces.

S. W. COLE ENGINEERING, INC. should be on site during excavation and blasting work to observe subgrade conditions and grading activities.



## 4.3 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 undisturbed adjacent to the construction site to lessen the potential for erosion. All topsoil and organic soils (including tree roots), subsurface structures (including existing foundations and other structures), underground utilities, and fill soils should be removed from areas of construction.

We recommend that fill used to raise building and paved areas consist of sand and gravel meeting the requirements of MDOT Standard Specifications 703.19 Granular Borrow. We recommend foundation subgrade preparation consist of over-excavating below all footings at least 6 inches and placing at least 6 inches of compacted Crushed Stone. The crushed stone should be underlain by a woven geotextile for soil subgrades. For bedrock subgrades the crushed stone should be worked into fractures to fill any voids. The width of the Crushed Stone layer should extend at least 12 inches beyond the edges of the proposed footings for each 12 inches of overexcavation (1H to 1V bearing splay). For slab areas, we recommend excavating at least 12 inches below bottom of slab elevation to allow for the slab base aggregate (see section 4.6). If bedrock is encountered, we recommend removing bedrock to at least 24 inches below bottom of slab. Where bedrock is removed to achieve subgrade elevations, a 4 to 6 inch thick layer of crushed stone should be worked into fractured bedrock prior to placing any Granular Borrow or Structural Fill.

S. W. COLE ENGINEERING, INC. should be on-site during earthwork activity to observe subgrade suitability prior to placing any new fills, geotextile fabric, crushed stone, or concrete.

## 4.4 Foundation Design

The proposed structure can derive support from spread footings founded on at least 6 inches of compacted crushed stone overlying a woven geotextile over soil subgrades or 6 inches of crushed stone overlying bedrock. Exterior perimeter footings will need to be cast at least 4.5 feet below exterior finish grade to provide frost protection. For footings bearing on properly prepared subgrades, we recommend the following geotechnical parameters for design of spread footings:



- Allowable Soil Bearing Pressure
- Design Frost Depth
- Seismic Soil Site Class (IBC 2006)
- Base Friction Factor
- Passive Lateral Earth Pressure Coefficient (K<sub>p</sub>)
- Active Lateral Earth Pressure Coefficient (K<sub>a</sub>)
- At-Rest Lateral Earth Pressure Coefficient (K<sub>o</sub>)
- Total Unit Weight of Backfill (γ<sub>t</sub>)
- Internal Friction Angle (φ)

3.0 ksf (Compacted Crushed Stone)
4.5 feet
D
0.4 (Mass Concrete to Crushed Stone)
3.0 (Structural Fill)
0.3 (Structural Fill)
0.5 (Structural Fill)
130 pcf (Structural Fill)
30 degrees (Structural Fill)

Wall footings should be at least 18 inches wide and column footings at least 24 inches in their smallest lateral dimension. Foundation and retaining walls restrained from rotation should be designed considering at-rest lateral earth pressures.

### 4.5 Foundation Drainage

We recommend that a perimeter foundation drainage system be provided for the structure. Foundation drains should be placed in the crushed stone outside of the perimeter footings. Rigid, 4 inch diameter SDR-35 foundation drainpipes should be utilized. The foundation drain pipe should wrapped with filter fabric and be enveloped with at least 6 inches of crushed stone bedding. The foundation drainage system must have several positive gravity outlets.

Exterior foundation backfill should be sealed with a surficial layer of clayey or loamy soil in areas that are not to be paved or occupied by entrance slabs. This is to reduce direct surface water infiltration into the backfill. Ideally, surface grades should be sloped away from the building for positive surface water drainage.

## 4.6 Floor Slabs

Slab-on-grade floors in heated areas may be designed using a subgrade reaction modulus of 150 pci (pounds per cubic inch) provided the slab is underlain by at least 12 inches of Structural Fill overlying properly prepared subgrades. Geotextile fabric may be needed below the Structural Fill in some slab areas depending upon soil and moisture conditions. We recommend that control joints be installed within the floor slab to accommodate shrinkage in the concrete as it cures. In general, construction joints



are typically installed at 10 to 15 foot spacing, but actual spacing should be determined by the structural engineer with consideration to slab thickness.

A vapor retarder should underlie floor slabs to limit the upward migration of moisture vapors. The vapor retarder should have a permeance that is less than the floor covering being applied on the slab. We recommend consulting flooring manufacturers relative to selection and installation of acceptable vapor retarder systems for use with their products.

Floor slabs should be wet-cured for a period of least 7 days after casting as a measure to reduce the potential for curling of the concrete and excessive drying/shrinkage. After the initial wet-cure period, we recommend that consideration be given to using curing paper installed over the cast-in-place concrete and that the curing paper remain in place as long as possible to improve the quality of the completed floor. In lieu of curing paper, a curing compound may be utilized; however, care must be taken to prevent scuffing of the compound from the floor during the curing period.

Based on the subsurface findings and our understanding of the proposed construction, areas of the proposed building will be underlain by shallow bedrock. Although not in our scope, we recommend that the owner and architect consider a passive sub-slab radon venting system beneath the proposed slab-on-grade floors. Additionally, the ventilation system for the proposed building should be designed to encourage positive air pressurization of the building to help further control intrusion of soil-gas and radon. Design of a sub-slab vent system may require changes to the recommendations in this report. We can assist with design of a sub-slab vent system, if needed.

## 4.7 Exterior Slabs and Sidewalks

Entrance slabs and sidewalks should be designed to reduce the effects of differential frost action between doorways and entrances. We recommend that excavations beneath the entire length and width of entrances, sidewalks, and exterior slabs adjacent to the building continue to at least 4.5 feet below finish grade. These areas should be backfilled with compacted non-frost susceptible Structural Fill to help limit abrupt heave or differential movement. The zone of non-frost susceptible material below entrance slabs and sidewalks should transition up to adjacent sidewalk or pavement subbase at a 3H:1V slope or flatter.



## 4.8 Pavements

Although traffic loading information was not made available to us, we anticipate traffic loading to consist of passenger vehicles, buses and light delivery vehicles. Thus, we offer the following pavement sections based on our experience with similar construction.

FLEXIBLE (ASPHALT) PAVEMENT							
Pavement Layer	Standard Duty	Heavy Duty					
Maine DOT 9.5 mm Superpave, (Standard Specifications for Highways and Bridges)	1.25 inches	1.25 inches					
Maine DOT 19.0 mm Superpave, (Standard Specifications for Highways and Bridges)	2.25 inches	2.75 inches					
Maine DOT Crushed Aggregate Base 703.06 Type A, (Standard Specifications for Highways and Bridges)	6 inches	6 inches					
Maine DOT Aggregate Subbase 703.06 Type D, (Standard Specifications for Highways and Bridges)	12 inches	18 inches					
Geotextile Fabric over soil subgrades (Mirafi 500X)	YES	YES					

The bituminous pavement should be compacted to 92 to 97 percent of its theoretical maximum density as determined by ASTM D-2041. Tack coat should be applied between successive lifts of asphalt. The base and subbase materials should be compacted to at least 95 percent of their maximum dry densities as determined by ASTM D-1557. Fill placed below the subbase material be compacted to at least 95 percent of ASTM D-1557.

Consideration should be given to the development of both surface and subsurface drainage. The paved areas should be graded to promote surface drainage away from the building area and design should consider sloping of the subgrade to enhance drainage of pavement gravels.



Frost penetration can be on the order of 4.5 feet or more in this area of the state. In the absence of full depth excavation of frost susceptible soils or use of insulation, frost will penetrate into the subgrade and some frost heaving and pavement distress must be anticipated.

## 4.9 Backfill and Compaction

The on-site soils are frost susceptible and are not suitable for re-use in the proposed building, access drives, or parking areas. On-site soils may be suitable for re-use as common fill in landscaped areas. This material, if re-used, should be segregated and stockpiled during construction and grain-size analyses should be performed to determine their suitability for re-use on-site. Re-use suitability will also be dependent on gradation and in-situ moisture content. The soil must have a moisture content acceptable for achieving project compaction requirements. Soils may require drying prior to re-use and silty soils may be difficult to re-use in freezing and wet weather.

Granular Borrow used to raise building and pavement area subgrades should meet the requirements of MDOT Standard Specifications 703.19.

Structural Fill used to backfill foundations, below floor slabs, and below entrance slabs and sidewalks should be a clean, non-frost susceptible sand and gravel meeting the following gradation requirements:

Structural Fill							
Sieve Size	Percent Finer by Weight						
4 inch	100						
3 inch	90 to 100						
1/4 inch	25 to 90						
No. 40	0 to 30						
No. 200	0 to 5						

Crushed Stone for use below footings and as a choke stone over fractured bedrock should meet the following gradation:



Crushed Stone						
Sieve Size	Percent Finer by Weight					
1 inch	100					
3/4 inch	90 to 100					
3/8 inch	0 to 75					
No. 4	0 to 25					
No. 200	0 to 5					

Fill and backfill should be placed in horizontal lifts and be compacted such that desired density is achieved throughout the lift thickness with 3 to 5 passes of the compaction equipment. We recommend that the loose lift thickness for soil fills not exceed 12 inches. Fills within the proposed building and paved areas should be compacted to at least 95 percent of its maximum dry density as determined by ASTM D-1557. Fills placed within landscape areas should be compacted to at least 92 percent of its maximum dry density.

### 4.10 Subsurface Storm Water Disposal

The subsoils in the borings and test pits in the areas of the proposed subsurface storm water disposal areas generally consisted of silt and sand with some clay. The permeability of the site soils was estimated using the grain size results and Hazen's formula. The estimated permeability of the on-site soils was in the range of  $10^{-4}$  to  $10^{-5}$  centimeters per second.

### 4.11 Design Review and Construction Testing

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

A quality assurance testing program should also be implemented during construction to observe compliance with the design concepts, plans, and specifications. S. W. COLE ENGINEERING, INC. is available to provide field and laboratory testing services for soil, concrete, masonry, steel, spray-applied fireproofing, and asphalt construction materials.



## **5.0 CLOSURE**

It has been a pleasure to be of assistance to you with this phase of your project. If you have any questions, please do not hesitate to contact us.

Sincerely,



c: Sustainable Design Studio - Ann Archino-Howe

MPL:mpl/jlw

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## Attachment A Limitations

This report has been prepared for the exclusive use by the City of Portland for specific application to the Proposed K-5 Elementary School at 152 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.





## **BORING LOG**

BORING NO,:	B-101
SHEET:	1 OF 1
PROJECT NO.:	07-0234.1 S
DATE START:	4/28/2008
DATE FINISH:	4/28/2008
ELEVATION:	59' +/-
SWC REP.:	MPL

PROJECT:											
CLIENT :	CITY OF PORTLAND WALTON AND OCEAN STREETS, PORTLAND, MAINE										
LOCATION:											
DRILLING FIRM:	GREAT WOR	RKS TEST BO	RING	DRILLER:	PETE MICHAUD						
	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL							
CASING:	SSA	4 1/4"									
SAMPLER:	SS	2 3/8"	140 lb	30"							

Ε S WATER LEVEL INFORMATION

CORE BARREL:

CASING BLOWS		SAN	APLE		SAM	PLER B	LOWS F	PER 6"	DEPTU	DEDTH	OTDATA STFOT DATA
PER FOOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24		JIRAIA & IESI DAIA	
			· · · · · · · · · · · · · · · · · · ·				·		0.3'	TOPSOIL	
	1D	24"	21"	2.0'	3	5	4	7	2.0	BROWN SILTY SAND, TRACE GRAVEL ~LOOSE~	
										BROWN SILTY SAND, TRACE GRAVEL -LOOSE- REFUSAL @ 2.0 FEET (PROBABLE BEDROCK)	
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	SAMPLES: SOIL CLASSIFIED BY:				Y:	·	REMA				
ID = SPLIT SPOON     DRILLER - VISUALLY       C = 3" SHELBY TUBE     X       SOIL TECH VISUALLY		STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES									
U = 3.5'	SHEL	BY TUE	3E	<u> </u>		BORAT	ORY TE	ST		AND THE TRANSITION MAY BE GRADUAL. BORING NO.: B-101	
									-		



## **BORING LOG**

 BORING NO.:
 B-102

 SHEET:
 1 OF 1

 PROJECT NO.:
 07-0234.1 S

 DATE START:
 4/28/2008

 DATE FINISH:
 4/28/2008

 ELEVATION:
 60.5' +/ 

 SWC REP.:
 MPL

 WATER LEVEL INFORMATION

PROJECT:											
CLIENT :	CITY OF PORTLAND										
LOCATION:	WALTON AN	WALTON AND OCEAN STREETS, PORTLAND, MAINE									
DRILLING FIRM:	GREAT WOR	KS TEST BO	RING	DRILLER:	PETE MICHAUD						
	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL							
CASING:	SSA	4 1/4"									
SAMPLER;	SS	2 3/8"	140 lb	30"							
CORE BARREL:					-						

CASING BLOWS		SAN	/IPLE		SAM	SAMPLER BLOWS PER 6"			рертн	H STRATA & TEST DATA		
PER FOOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24				
		i 	Ļ						0.4'	TOPSOIL		
	1D	24"	22"	2.0'		3	5	6	2.5'	BROWN SILTY SAND, TRACE GRAVEL ~L	00SE~	
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C = 3" (	SHELB	Y TUBE	-	L X	so	IL TECI	-1 VIS		l	APPROXIMATE BOUNDARY BETWEEN SOIL TYPES	Ú	
U = 3.5	" SHEL	BY TU	BE		] LAI	BORAT	ORY TE	EST		AND THE TRANSITION MAY BE GRADUAL. BORING NO.:	B-102	



GREAT WORKS TEST BORING

4 1/4"

WALTON AND OCEAN STREETS, PORTLAND, MAINE

SIZE I.D. HAMMER WT. HAMMER FALL

CITY OF PORTLAND

TYPE

SSA

## **BORING LOG**

PETE MICHAUD

DRILLER:

BORING NO .:	B-103
SHEET:	1 OF 1
PROJECT NO.:	07-0234.1 S
DATE START:	4/28/2008
DATE FINISH:	4/28/2008
ELEVATION:	60.5' +/-
SWC REP.:	MPL

WATER LEVEL INFORMATION

CASING: SAMPLER:

PROJECT:

LOCATION:

DRILLING FIRM:

CLIENT :

OAM LEN.

CORE BARREL:

CASING BLOWS		SAN	<b>IPLE</b>		SAM	MPLER BLOWS PER 6"		DEDTU					
PER FOOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24	-24	SIRATA & LESI DATA			
	·		ļ	<u>↓                                     </u>		ļ	+		0.4'	TOPSOIL			
			<u> </u>	: 		ļ	i						
			<u> </u>			) ·	·		4.8'	BROWN SILTY SAND			
			<u> </u>		···			·					
			ļ	i 	· ·		<u> </u>	<u>}</u>		REFUSAL @ 4.8 FEET			
	⊢			·		<u></u>		·		(PROBABLE BEDROCK)			
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SAMPLES: SOIL CLASSIFIED BY:						FIED B	Y:		REMAR	RKS:			
D = SPLIT SPOON DRILLER - VISUALLY				VISUA	ALLY	1	STRATIFICATION LINES REPRESENT THE						
C = 3" S				X	SO		H VIS		APPROXIMATE BOUNDARY BETWEEN SOIL TYPES				
U = 3.5	SHEL	BA LA	3E					ES!	AND THE TRANSITION MAY BE GRADUAL. BORING NO.: B-10				



4 1/4"

2 3/8"

GREAT WORKS TEST BORING

WALTON AND OCEAN STREETS, PORTLAND, MAINE

SIZE I.D. HAMMER WT. HAMMER FALL

140 lb

CITY OF PORTLAND

TYPE

SSA

SS

## **BORING LOG**

PETE MICHAUD

DRILLER:

30"

BORING NO .:	B-104								
SHEET:	1 OF 1								
PROJECT NO .:	07-0234.1 S 4/28/2008								
DATE START:									
DATE FINISH:	4/28/2008								
ELEVATION:	61' +/-								
SWC REP .:	MPL								
WATER LEVEL INFORMATION									

GROUNDWATER AT 5.0'

SAMPLER: CORE BARREL:

PROJECT:

LOCATION:

DRILLING FIRM:

CLIENT :

CASING:

CASING BLOWS	NG SAMPLE				SAMF	PLER B	_OWS F	'ER 6"	DEPTH	CTDATA & TECT DATA
PER FOOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24		SIRAIA & LESI DALA
			1	i .					0.4'	TOPSOIL
	1D	24"	24"	2.0'	5	4	3	4		~LOOSE~
				i			····			SILTY CLAYEY SAND, TRACE GRAVEL
									4.0'	
	_			<u> </u>					5.0'	BECOMES GRAY AND WET
			i	i			İ			
	2D	24"	24"	7.0'	3	5	7	10	1	GRAY TO TAN SILTY CLAY, TRACE SAND
			[	Ţ				 	ļ	~STIFF~
			i	1				1 I	1	
	·							† - <u> </u>	10.0'	
										BROWN SILTY SAND
	3D	24"	24"	12.0'	9	9	6	7	12.0'	~MEDIUM DENSE~
					F					
				ļ						GRAY SILTY CLAY
	4D	0"	0"	15.0	25/0"			·	15.0'	~ STIFF ~
										REFUSAL @ 15.0 FEET
			·					<u>+</u>	l	(PROBABLE BEDROCK)
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SAMPLES: SOIL CLASSIFIED BY:									REMAR	:KS:
l					_				ļ	
D = SPLIT SPOON DRILLER - VISUALLY					LLER -	VISUA	LLY	1	STRATIFICATION LINES REPRESENT THE (5)	
C = 3" SHELBY TUBE						L TECH	H VIS	UALLY		APPROXIMATE BOUNDARY BETWEEN SOIL TYPES
U = 3.5" SHELBY TUBE LABORATORY TEST							ORY TE	ST		AND THE TRANSITION MAY BE GRADUAL. BORING NO.: B-104



4 1/4"

2 3/8"

GREAT WORKS TEST BORING

WALTON AND OCEAN STREETS, PORTLAND, MAINE

SIZE I.D. HAMMER WT. HAMMER FALL

140 lb

CITY OF PORTLAND

TYPE

SSA

SS

## **BORING LOG**

PETE MICHAUD

DRILLER:

30"

 BORING NO.:
 B-105

 SHEET:
 1 OF 1

 PROJECT NO.:
 07-0234.1 S

 DATE START:
 4/28/2008

 DATE FINISH:
 4/28/2008

 ELEVATION:
 58.5' +/ 

 SWC REP.:
 MPL

WATER LEVEL INFORMATION

GROUNDWATER AT 3.5'

SAMPLER: CORE BARREL:

PROJECT:

LOCATION:

DRILLING FIRM:

CLIENT :

CASING:

CASING BLOWS		SAM	MPLE	na <sub>de</sub> na. Notri en	SAM	SAMPLER BLOWS PER 6"				
PER FOOT	NO.	PEN.	REC.	DEPTH	0-6	6-12	12-18	18-24	UE" I D	SIRAIA & IESIDAIA 
		1				<u>†                                    </u>	;		0.1'	TOPSOIL
i	1D	24"	14"	2.0'	1	2	2	1	0.5	TAN SAND (FILL)
		 	·			<u> </u>	·	!	0.6'	RELIC TOPSOIL
		<u> </u>	<u> </u>	۱ •	<b> </b>		<u> </u>	+	4.0'	~ LOOSE ~ GRAY SILTY SAND
			·	<u> </u>	ļ	·	<u> </u>	!	Į	
		04"		7.01		+	40	40	-	BROWN SILTY SAND
i	20		. 22	1.0	6	12	- 15 -	18	-	~MEDIUM DENSE~
		-1	+						1	
		<u> </u>	†			i	·		-	
							;		11.0	
	3D	24"	24"	12.0'	5	15	17	9	<b> </b>	GRAY SANDY SILTY CLAY
								1	13.0'	~ STIFF ~
		ļ 	¦	; 	L		<u> </u>	·	]	
	, <u> </u>					·	<u> </u>	<u> </u>	4	GRAY SILTY SANDY CLAY
		0.11	i <u> </u>	!			·	L		
	4D	24"	24"	17.0	1/	12" T	1/	12"	4	~VERY SOFT~
	. <u> </u>	<u> </u>	·! ··	·				<u>+</u>	10.5	
			 		<u> </u>					
		;						<u> </u>	1	REFUSAL @ 19.5 FEET
							<u> </u>		}	(PROBABLE BEDROCK)
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SAMPLES: SOIL CLASSIFIED BY:									REMAR	۱RKS:
										$\frown$
D = SPL	IT SPO	NOC			DR	ILLER -	VISUA	LLY	1	STRATIFICATION LINES REPRESENT THE (6)
C = 3" S	HELB	Y TUBE	-		SO	IL TECI	H VIS	UALLY		APPROXIMATE BOUNDARY BETWEEN SOIL TYPES
U = 3.5" SHELBY TUBE LABORATORY TEST								ST		AND THE TRANSITION MAY BE GRADUAL. BORING NO.: B-105



## **BORING LOG**

PETE MICHAUD

DRILLER:

BORING NO .:	B-106						
SHEET:	1 OF 1						
PROJECT NO.:	07-0234.1 S						
DATE START:	4/28/2008						
DATE FINISH:	4/28/2008						
ELEVATION:	57.5' +/-						
SWC REP.:	MPL						
WATER LEVEL INFORMATION							

CLIENT : CITY OF PORTLAND WALTON AND OCEAN STREETS, PORTLAND, MAINE LOCATION: DRILLING FIRM: GREAT WORKS TEST BORING TYPE SIZE I.D. HAMMER WT. HAMMER FALL CASING: SSA 4 1/4"

PROPOSED ELEMENTARY SCHOOL

PROJECT:

SAMPLER:

CORE BARREL:

CASING BLOWS	IG SAMPLE SAMPLER BLOWS PER 6"		БЕРТН	STRATA & TEST DATA								
PER FOOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24		CITATA CITA COLONIA		
			<u> </u>			ļ	·	i	0.3'	TOPSOIL		
		†	+				· 	<u> </u> 	4.6'	BROWN SILTY SAND		
										REFUSAL @ 4.6 FEET (PROBABLE BEDROCK)		
	· · · · · · · · · · · · · · · · · · ·	   	       		·							
SAMPLES: SOIL CLASSIFIED BY:							Y:		REMAR	rks:		
D = SPLIT SPOON C = 3" SHELBY TUBE U = 3.5" SHELBY TUBE LABORATORY TEST					ILLER - IL TEC BORAT	VISUA H VIS ORY TI	LLY WALLY EST	,	STRATIFICATION LINES REPRESENT THE 7 APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. BORING NO.: 8-106			
						<u></u>			<u> </u>			



## BORING LOG

BORING NO .:	B-107							
SHEET:	1 OF 1							
PROJECT NO .:	07-0234.1 S							
DATE START:	4/28/2008							
DATE FINISH:	4/28/2008							
ELEVATION:	59' +/-							
SWC REP .:	MPL							
WATER LEVEL INFORMATION								

PROJECT:	PROPOSED ELEMENTARY SCHOOL												
CLIENT :	CITY OF PORTLAND												
LOCATION:	WALTON AN	WALTON AND OCEAN STREETS, PORTLAND, MAINE											
DRILLING FIRM:	GREAT WOR	RKS TEST BO	RING	DRILLER:	PETE MICHAUD								
	TYPE	SIZE I.D.	HAMMER WT. H	HAMMER FALL									
CASING:	<u> </u>	4 1/4"											
SAMPLER:	SS	2 3/8"	140 lb	30"									
CORE BARREL:			_										

CASING BLOWS		SAN	/PLE		SAMPLER BLOW			WS PER 6"			
PER FOOT	NO.	PEN.	REC.	DEPTH   @ BOT	0-6	6-12	12-18	18-24		SIRATA & IEST DATA	
		i		· 			ļ	I	0.2'	TOPSOIL	
	1D	24"	24"	2.0'	3	4	3	4	}	BROWN SILTY SAND	
				<u>i</u>		ļ				~LOOSE~	
								! 	4.0'		
	·	<u> </u>			•·	<u> </u>		<u></u>	5.0		
		··					<u> </u>	· ·		REFUSAL @ 5.0 FEET	
								!	-	(FROBABLE BEDROCK)	
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SAMPLI	SAMPLES: SOIL CLASSIFIED BY:								REMAR	?KS:	
D = SPI	IT SPO			[]	יסת		VISHA	ПХ			
C = 3" S	= 3" SHELBY TUBE X SOIL TECH VISUALLY				1, - VIS	UALLY		APPROXIMATE BOUNDARY BETWEEN SOIL TYPES			
U = 3.5'	U = 3.5" SHELBY TUBE LABORATORY TEST					ST	AND THE TRANSITION MAY BE GRADUAL. BORING NO.: B-107				
								<u> </u>			



4 1/4"

GREAT WORKS TEST BORING

WALTON AND OCEAN STREETS, PORTLAND, MAINE

SIZE I.D. HAMMER WT. HAMMER FALL

CITY OF PORTLAND

TYPE

SSA

## **BORING LOG**

PETE MICHAUD

DRILLER:

BORING NO.:	B-108
SHEET:	1 OF 1
PROJECT NO.:	07-0234.1 S
DATE START:	4/28/2008
DATE FINISH:	4/28/2008
ELEVATION:	59' +/-
SWC REP.:	MPL

WATER LEVEL INFORMATION

CASING:

PROJECT: CLIENT :

LOCATION:

DRILLING FIRM:

SAMPLER:

CORE BARREL:

CASING BLOWS	ASING LOWS		SAMPLER BLOWS PER 6"					CTDATA & TECT DATA				
PER FOOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24		OINAIA & IEOLDAIA		
				<u> </u>	 	1	: T		0.2'	TOPSOIL		
		  	 	<u>!</u>		ļ	<u> </u>			BROWN SILTY SAND		
			¦			ļ		·	4.7'			
		1		1		<u> </u>			5.0'	WEATHERED BEDROCK		
		 		i		· · _ · · ·	 			REFUSAL @ 5.0 FEET		
							1			(PROBABLY BEDROCK)		
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SAMPLES: SOIL CLASSIFIED BY:								<u> </u>	REMAR	IKS:		
D = SPLIT SPOON DRILLER - VISUALLY						LLER -				STRATIFICATION LINES REPRESENT THE		
U = 3.5" SHELBY TUBE X SOIL TECH VISUALLY U = 3.5" SHELBY TUBE LABORATORY TEST				n VIS ORY TE	ST	APPROXIMATE BOUNDARY BETWEEN SOIL TYPES						
									L			



4 1/4"

GREAT WORKS TEST BORING

WALTON AND OCEAN STREETS, PORTLAND, MAINE

SIZE I.D. HAMMER WT. HAMMER FALL

CITY OF PORTLAND

TYPE

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## **BORING LOG**

PETE MICHAUD

DRILLER:

BORING NO .:	B-109
SHEET:	1 OF 1
PROJECT NO .:	07-0234.1 S
DATE START:	4/28/2008
DATE FINISH:	4/28/2008
ELEVATION:	57' +/-
SWC REP.:	MPL

WATER LEVEL INFORMATION

CASING: SAMPLER:

PROJECT:

LOCATION:

DRILLING FIRM:

CLIENT :

CORE BARREL:

CASING SAMPLE SAMPLER BLOWS PER 6" BLOWS DEPTH **STRATA & TEST DATA** PER DEPTH NO. PEN. 0-6 6-12 12-18 18-24 REC. FOOT @ BOT TOPSOIL 0.2 BROWN SILTY SAND S1 7.0' 7.0' REFUSAL @ 7.0 FEET (PROBABLE BEDROCK) SAMPLES: SOIL CLASSIFIED BY: REMARKS: 10 D = SPLIT SPOON DRILLER - VISUALLY STRATIFICATION LINES REPRESENT THE C = 3" SHELBY TUBE Х SOIL TECH. - VISUALLY APPROXIMATE BOUNDARY BETWEEN SOIL TYPES U = 3.5" SHELBY TUBE LABORATORY TEST AND THE TRANSITION MAY BE GRADUAL. BORING NO .: B-109



4 1/4"

2 3/8"

GREAT WORKS TEST BORING

WALTON AND OCEAN STREETS, PORTLAND, MAINE

SIZE I.D. HAMMER WT. HAMMER FALL

140 lb

CITY OF PORTLAND

TYPE

SSA

SS

## **BORING LOG**

PETE MICHAUD

DRILLER:

30"

 BORING NO.:
 B-110

 SHEET:
 1 OF 1

 PROJECT NO.:
 07-0234.1 S

 DATE START:
 4/28/2008

 DATE FINISH:
 4/28/2008

 ELEVATION:
 56' +/ 

 SWC REP.:
 MPL

WATER LEVEL INFORMATION

GROUNDWATER AT 7.0

CORE BARREL:

PROJECT:

LOCATION:

DRILLING FIRM:

CLIENT :

CASING:

SAMPLER:

CASING BLOWS	SAMPLE SAMPLE				SAM	PLER B		PER 6"	DEDTU			
PER FOOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24		SIRAIA'& IESI UAIA		
			4 <u></u>				;		0.2	ASPHALT PAVEMENT		
		2.47	452	· · · · ·		· 	! 	<u> </u>	1.5'	BLACK SILTY SAND, SOME GRAVEL (FILL)		
<u> </u>		24	10	3.0		<u>!                                     </u>	1					
	 		[			+	:	1		OLIVE BROWN SILTY CLAY		
			24"					· · · · · · · · · · · · · · · · · · · ·				
			24	1.0		L				~\$1177~		
	·						 					
		<u> </u>		· · · · · · · · · · · · · · · · · · ·		<u> </u>			44 51			
	3D	24"	24"	12.0'	1	2	3	4				
						÷	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	13.5'	~ LOOSE ~ BROWN SILTY SAND, WET		
		∔				 	!			GRAY SILTY SANDY CLAY		
	4D	24"	24"	17.0'		wo	L H/24"	· ·	ļ 1	~VERY SOFT~		
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									4	REFUSAL @ 19.7 FEET		
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SAMPLE	SAMPLES: SOIL CLASSIFIED BY:								REMAR	RKS:		
D = SPL	IT SP	DON			DR	ILLER -	VISUA	LLY		STRATIFICATION LINES REPRESENT THE		
C = 3" S	C = 3" SHELBY TUBE X SOIL TECH VISUALLY					IL TECH	H VIS	UALLY		APPROXIMATE BOUNDARY BETWEEN SOIL TYPES		
U = 3.5" SHELBY TUBE					LA	BORAT	ORY TE	EST		AND THE TRANSITION MAY BE GRADUAL. BORING NO.: B-11		



4 1/4"

GREAT WORKS TEST BORING

WALTON AND OCEAN STREETS, PORTLAND, MAINE

SIZE I.D. HAMMER WT. HAMMER FALL

CITY OF PORTLAND

TYPE

SSA

## **BORING LOG**

PETE MICHAUD

DRILLER:

 BORING NO.:
 B-111

 SHEET:
 1 OF 1

 PROJECT NO.:
 07-0234.1 S

 DATE START:
 4/28/2008

 DATE FINISH:
 4/28/2008

 ELEVATION:
 56' +/ 

 SWC REP.:
 MPL

WATER LEVEL INFORMATION

CASING:

PROJECT:

CLIENT :

LOCATION:

DRILLING FIRM:

SAMPLER:

CORE BARREL:

CASING BLOWS	3 SAMPLE				SAM	PLER BI	LOWS F	'ER 6"		
PER FOOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24		STRATA & TEST DATA
									0.2	ASPHALT PAVEMENT
			Ţ	-i		<u> </u>		·	1.0'	SILTY SAND, SOME GRAVEL (FILL)
		<u>i</u>							1	
		<u> </u>	i 							OLIVE BROWN SILTY CLAY
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		 •				İ	·		10.5'	
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		! 				<u> </u>	! 		-	PROBABLE SAND
· ·			l	<u> </u>		: ;	ļ	۱ ۱	13.0	, 
		! 1 <sup></sup> ·				! ?	T			REFUSAL @ 13.0 FEET
		<u> </u>	<u> </u>	: 				<u> </u>	Į	(PROBABLE BEDROCK)
			<u> </u>	<u> </u>		L				
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SAMPLE	ES:			SOIL C	LASSI	FIED B	Y:		REMAR	?KS:
D = SPI	IT SP(	DON		<b></b>	ופת	(  FR -	VISUA		}	STRATIFICATION LINES REPRESENT THE
C = 3'' S	HELBY			-x	50		1 VISI			APPROXIMATE BOUNDARY BETWEEN SOULTYPES
U = 3.5"	SHEL	BY TUP	BE	<u> </u>	LAP			ST	1	AND THE TRANSITION MAY BE GRADUAL
U = 3.5" SHELBY TUBE				<u> </u>	1				1	BORING NO.: B-111



U = 3.5" SHELBY TUBE

LABORATORY TEST

## **BORING LOG**

B-112 BORING NO .: SHEET: 1 OF 1 PROJECT NO .: 07-0234.1 S DATE START: 4/28/2008 DATE FINISH: 4/28/2008 ELEVATION: 56' +/-SWC REP .: MPL WATER LEVEL INFORMATION

PROJECT:	PROPOSED	PROPOSED ELEMENTARY SCHOOL												
CLIENT :	CITY OF PORTLAND													
LOCATION:	WALTON AN	WALTON AND OCEAN STREETS, PORTLAND, MAINE												
DRILLING FIRM:	GREAT WOR	DRILLER:	PETE MICHAUD											
	TYPE	SIZE I.D.	HAMMER WT. H	AMMER FALL		_								
CASING:	SSA	4 1/4"												
SAMPLER:	SS	2 3/8"	140 lb	30"										

CASING BLOWS		SAN	IPLE		SAM	PLER BI	LOWS F	PER 6"	перты	CTDATA & TECT DATA
PER FOOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24		ΟΙΚΑΙΑ « ΙΕΟΙ ΔΑΙΑ
		·;		ļ					0.2'	ASPHALT PAVEMENT
			1	ļ		 		ļ	1.0'	BLACK SILTY SAND, TRACE GRAVEL (FILL)
	1D		14"	2.5	3	3	3	4	} [	~MEDIUM STIFF~
	·		<u>+</u> · ·	<u> </u>			·	ļ 		OLIVE BROWN SILTY CLAY (MOTTLED)
		·				 				
	2D	_24"	24"	7.0'	4	5	7	13		~STIFF~
			<u> </u>	<u>↓</u>		·	! · ·	L	8.5	
	<u> </u>		i	<u>.                                    </u>						GRAY SILTY CLAY
				!			, <u> </u>		11.5'	~ MEDIUM ~
	3D	24"	24"	12.0'	1	1	2	7		
			 	 T'				<u> </u>		BROWN SILTY SAND
			ļ	÷		· ·		+	15.01	~ LOOSE ~
						+			15.0	REFLISAL @ 15.0 FEET
			ļ·							(PROBABLE BEDROCK)
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SAMPL	=S:		<u>.                                    </u>	<b>نے</b> ۔۔۔۔ ۲ ۱۱۵۶	1 4591		└─── <b>─</b> ── Ƴ∙			Kö.
	IAIVIFLES. SUIL GLASSIFIED BY:						• •			~~ · · · · · · · · · · · · · · · · · ·
D = SPL	IT SPO	DON			DRI	LLER -	VISUA	LLY		STRATIFICATION LINES REPRESENT THE (13)
C = 3" S	SHELB	Y TUBE		IXI	SO	IL TECH	H VIS	UALI Y	1	APPROXIMATE BOUNDARY BETWEEN SOIL TYPES

AND THE TRANSITION MAY BE GRADUAL.

BORING NO .:

B-112



4 1/4"

GREAT WORKS TEST BORING

WALTON AND OCEAN STREETS, PORTLAND, MAINE

SIZE I.D. HAMMER WT. HAMMER FALL

CITY OF PORTLAND

TYPE

SSA

## **BORING LOG**

PETE MICHAUD

DRILLER:

BORING NO .:	B-113
SHEET:	1 OF 1
PROJECT NO.:	07-0234.1 S
DATE START:	4/28/2008
DATE FINISH:	4/28/2008
ELEVATION:	57' +/-
SWC REP.:	MPL

WATER LEVEL INFORMATION

CASING: SAMPLER:

CORE BARREL:

PROJECT:

CLIENT :

LOCATION:

DRILLING FIRM:

CASING BLOWS SAMPLE			SAM	PLER BI	LOWS F	PER 6"				
PER FOOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.2	ASPHALT PAVEMENT
		†				<u></u>			1.0'	BROWN SILTY SAND (FILL)
			·			Ì		ļ	]	BROWN SANDY SILT / SILTY SAND
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SAMPLI	ES:			SOIL C	LASSI	FIED B	Y;		REMAR	IKS:
D = SPL		DON			DRI	LLER -	VISUA	LLY		STRATIFICATION LINES REPRESENT THE
C = 3" 5	SHELB'	Y TUBE	<u>:</u>	⊢×_	SO		H VISI	UALLY		
U = 3.5" SHELBY TUBE					] LAE	ORATI	JRY TE	51	1	AND THE TRANSITION MAY BE GRADUAL. BORING NO.: B-113



# BORING LOG

BORING NO .:	B-114									
SHEET:	1 OF 1									
PROJECT NO.:	07-0234.1 S									
DATE START:	4/28/2008									
DATE FINISH:	4/28/2008									
ELEVATION:	58' +/-									
SWC REP.:	MPL									
WATER LEVEL INFORMATION										

PROJECT:	PROPOSED	ELEMENTAR	Y SCHOOL									
CLIENT :	CITY OF POI	CITY OF PORTLAND										
LOCATION:	WALTON AN											
DRILLING FIRM:	GREAT WOR	RKS TEST BO	RING	DRILLER:	PETE MICHAUD							
	TYPE	SIZE I.D.	HAMMER WT. H	AMMER FALL								
CASING:	SSA	4 1/4"										
SAMPLER:												

CORE BARREL:

CASING BLOWS		SAN	MPLE		SAM	PLER BI	LOWS P	PER 6"		CTDATA & TECT DATA
PER FOOT	NO,	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24		JINATA JEJIDATA
			<u>.</u>			: ; ·			0.3'	TOPSOIL
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	· · ·	<u> </u>	 	÷						(PROBABLE BEDROCK)
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SAMPL	ES:			SOIL C	LASSI	FIED B	Y:		REMAR	RKS:
D = SPI	LIT SP	DON			DR	ILLER -	VISUA	LLY		STRATIFICATION LINES REPRESENT THE (15)
C = 3" S	SHELB` " s⊔⊏i	r tube		X	SO			UALLY	1	
0 - 3.5	U = 3.5" SHELBY TUBE					JURAI	URI IE	201		BORING NO.: B-114

S.V	V.	C(	JC	E
ENG	INE	ERI	NG,	INC.

4 1/4"

GREAT WORKS TEST BORING

WALTON AND OCEAN STREETS, PORTLAND, MAINE

SIZE I.D. HAMMER WT. HAMMER FALL

CITY OF PORTLAND

TYPE

SSA

## **BORING LOG**

PETE MICHAUD

DRILLER:

 BORING NO.:
 B-115

 SHEET:
 1 OF 1

 PROJECT NO.:
 07-0234.1 S

 DATE START:
 4/28/2008

 DATE FINISH:
 4/28/2008

 ELEVATION:
 59' +/ 

 SWC REP.:
 MPL

WATER LEVEL INFORMATION

CASING: SAMPLER:

PROJECT:

LOCATION:

DRILLING FIRM:

CLIENT :

CORE BARREL:

CASING BLOWS		SAN	/PLE		SAM	PLER BI	OWS P	PER 6"	DEPTU	CTDATA C TOTAL
PER FOOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24		ΟΙΚΑΙΑ & ΙΕΣΓΌΑΤΑ
		ļ		Ļ					0.3'	TOPSOIL
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·						· · · · · · · · · · · · · · · · · · ·			19.5'	WEATHERED BEDROCK
				·						REFUSAL @ 19.5 FEET
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SAMPLE	ES:			SOIL C	LASSI	FIED B	Y:		REMAR	
D = SPLIT SPOON DRILLER - VISUALLY						LLER -	VISUAI	LLY		STRATIFICATION LINES REPRESENT THE
C = 3" SHELBY TUBE U = 3.5" SHELBY TUBE					SOI LAE	L TECH BORAT(	i VISI ORY TE	UALLY EST		APPROXIMATE BOUNDARY BETWEEN SOIL TYPES
				L						BOKING NU B-115



4 1/4"

2 3/8"

GREAT WORKS TEST BORING

WALTON AND OCEAN STREETS, PORTLAND, MAINE

SIZE I.D. HAMMER WT. HAMMER FALL

140 lb

CITY OF PORTLAND

TYPE

SSA

SS

## **BORING LOG**

PETE MICHAUD

DRILLER:

30"

 BORING NO.:
 B-116

 SHEET:
 1 OF 1

 PROJECT NO.:
 07-0234.1 S

 DATE START:
 4/28/2008

 DATE FINISH:
 4/28/2008

 ELEVATION:
 56' +/ 

 SWC REP.:
 MPL

WATER LEVEL INFORMATION

SAMPLER: CORE BARREL:

CASING:

PROJECT:

LOCATION:

DRILLING FIRM:

CLIENT :

CASING SAMPLE SAMPLER BLOWS PER 6" BLOWS DEPTH STRATA & TEST DATA PER DEPTH NO. PEN. i REC. 6-12 12-18 18-24 0-6 FOOT @ 801 0.2 ASPHALT PAVEMENT 1.0' BROWN SILTY SAND, SOME GRAVEL (FILL) 1D 24" i 6" 9 2.5' 6 10 8 ~VERY STIFF~ OLIVE BROWN SILTY CLAY 6.0' 2D 24" 22" 7.0' 5 6 15 23 7.3' ~ DENSE ~ BROWN SILTY SAND, SOME GRAVEL REFUSAL @ 7.3 FEET (PROBABLE BEDROCK) SAMPLES: SOIL CLASSIFIED BY: REMARKS: 17 D = SPLIT SPOON **DRILLER - VISUALLY** STRATIFICATION LINES REPRESENT THE C = 3" SHELBY TUBE X SOIL TECH. - VISUALLY APPROXIMATE BOUNDARY BETWEEN SOIL TYPES U = 3.5" SHELBY TUBE LABORATORY TEST AND THE TRANSITION MAY BE GRADUAL. BORING NO .: B-116



4 1/4"

2 3/8"

GREAT WORKS TEST BORING

WALTON AND OCEAN STREETS, PORTLAND, MAINE

SIZE I.D. HAMMER WT. HAMMER FALL

140 lb

CITY OF PORTLAND

TYPE

SSA

SS

## **BORING LOG**

PETE MICHAUD

DRILLER:

30"

 BORING NO.:
 B-117

 SHEET:
 1 OF 1

 PROJECT NO.:
 07-0234.1 S

 DATE START:
 4/28/2008

 DATE FINISH:
 4/28/2008

 ELEVATION:
 55' +/ 

 SWC REP.:
 MPL

WATER LEVEL INFORMATION

SAMPLER:

CASING:

PROJECT:

LOCATION:

DRILLING FIRM:

CLIENT :

CORE BARREL:

CASING BLOWS	NG VS SAMPLE		<b>IPLE</b>		SAM	PLER B	LOWSF	PER 6"		
PER FOOT	NO.	PEN.	REC.	DEPTH Ø BOT	0-6	6-12	12-18	18-24		SIRAIA & IESI DATA
		i				<u> </u>	<u> </u>	<u></u> ,	0.2	ASPHALT PAVEMENT
			i	;			!		1.4'	BROWN SILTY SAND, SOME GRAVEL (FILL)
	_1D	24"	16"	4.0'	4	5	4	5		BROWN SILTY CLAY ~STIFF~
	20			7.0'					6.0	
·			24	1.0		4	1 1	12	0 0'	BROWN SILTY SAND, TRACE GRAVEL
								·	0.0	
										REFUSAL @ 8.0 FEET (PROBABLE BEDROCK)
L		L	÷			!	<u> </u>	<u> </u>		
			<u> </u>			[ 	Ì			
SAMPLI D = SPL C = 3" S	L ES: LIT SP( SHELB)	DON Y TUBE			LASSI DR SO	FIED B	I Y: VISUA H VIS	LLY UALLY	REMAR	STRATIFICATION LINES REPRESENT THE 18
U = 3.5'	' SHEL	BY TU	BE		LA	BORAT	ORY TE	EST		AND THE TRANSITION MAY BE GRADUAL. BORING NO.: B-117



## **BORING LOG**

 BORING NO.:
 B-118

 SHEET:
 1 OF 1

 PROJECT NO.:
 07-0234.1 S

 DATE START:
 4/28/2008

 DATE FINISH:
 4/28/2008

 ELEVATION:
 55.5' +/ 

 SWC REP.:
 MPL

 WATER LEVEL INFORMATION

PROJECT:	PROPOSED	ELEMENTAR				
CLIENT :	CITY OF POP	RTLAND				_
LOCATION:	WALTON AN	D OCEAN ST	AND, MAINE		_	
DRILLING FIRM:	GREAT WOR	KS TEST BO	RING	DRILLER:	PETE MICHAUD	_
	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL		_
CASING:	SSA	4 1/4"				
SAMPLER:	SS	2 3/8"	140 lb	30"		
CORE BARREL:			_			

CASING BLOWS		SAN	IPLE		SAM	PLER BI	OWS P	ER 6"	DEPTH	STRATA & TEST DATA
FOOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24		
		·					L		0.2	ASPHALT PAVEMENT
				L		<u> </u>			1.5'	BROWN SILTY SAND, SOME GRAVEL (FILL)
	1D	24"	24"	4.0'	3	3	4	5		BROWN SILTY CLAY ~MEDIUM STIFF~
	2D	24"	24"	7.0'	4	4	6	10	7.0'	
									9.5'	PROBABLE SAND
										REFUSAL @ 9.5 FEET (PROBABLE BEDROCK)
SAMDU	=0.	! <u> </u>		8011.0			v.	†	DEMAS	
SAMPLES:     SOIL CLASSIFIED BY:     I       D = SPLIT SPOON     DRILLER - VISUALLY       C = 3" SHELBY TUBE     X     SOIL TECH VISUALLY       U = 3.5" SHELBY TUBE     LABORATORY TEST						LLER - L TECH	T: VISUAI H VISI ORY TE	LLY UALLY ST		AND THE TRANSITION MAY BE GRADUAL.



4 1/4"

2 3/8"

GREAT WORKS TEST BORING

WALTON AND OCEAN STREETS, PORTLAND, MAINE

SIZE I.D. HAMMER WT. HAMMER FALL

140 lb

CITY OF PORTLAND

TYPE

SSA

SS

## **BORING LOG**

PETE MICHAUD

DRILLER:

30"

BORING NO.:	B-119
SHEET:	1 OF 1
PROJECT NO.:	07-0234.1 S
DATE START:	4/28/2008
DATE FINISH:	4/28/2008
ELEVATION:	56' +/-
SWC REP.:	MPL

WATER LEVEL INFORMATION

SAMPLER:

PROJECT:

CLIENT :

CASING:

LOCATION:

DRILLING FIRM:

CORE BARREL:

CASING BLOWS		SAMPLE		an an Ing Ang ang ang	SAMPLER BLOWS PER 6"			'ER 6"	DEDTU	OTDATA 9 TECT DATA
PER FOOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24		SIRAIA & IESI DATA
		· · · · · · ·	L.					;	0.2	TOPSOIL
· · ·	1D	24"	21"	2.0'	3	4	3	4	]	~LOOSE~
l			ļ	·				 	1	BROWN SANDY SILT, TRACE GRAVEL (FILL)
		; ;	i 	<u> </u>		i 		 		
		<u> </u>	<u>.</u>	<u>.</u>					5.0	
·	2D	24"	24"	7 0'	6	8	8	10		~STIFE~
		i —···				<u>}</u>		<u> </u>	1	OLIVE BROWN SILTY CLAY
						Τ			9.5'	
								<u> </u>		
		ļ	Ļ				·	 	-	REFUSAL @ 9.5 FEET
				ļ		: 				(PROBABLE BEDROCK)
		<u>.</u>		<u> </u>		<u> </u>				
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			·			<u> </u>	<u>.                                    </u>	; 	-	
		<u>.</u>	 				ļ	÷··		
				-		† · ·			-	
SAMPL	ES:		•	SOIL C	LASSI	FIED B	Y:		REMAR	RKS:
D = SP	LIT SP	OON	_		DR	ILLER -	VISUA	LLY		STRATIFICATION LINES REPRESENT THE
C = 3" SHELBY TUBE X SOIL TECH U = 3.5" SHELBY TUBE LABORATORY			H. <b>-</b> VIS ORY TE	UALLY EST		APPROXIMATE BOUNDARY BETWEEN SOIL TYPES				
L			-						<u> </u>	

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4 1/4"

2 3/8"

GREAT WORKS TEST BORING

WALTON AND OCEAN STREETS, PORTLAND, MAINE

SIZE J.D. HAMMER WT. HAMMER FALL

140 lb

CITY OF PORTLAND

TYPE

SSA

SS

## **BORING LOG**

PETE MICHAUD

DRILLER:

30"

BORING NO .:	B-120					
SHEET:	1 OF 1					
PROJECT NO.:	07-0234.1 S					
DATE START:	4/28/2008					
DATE FINISH:	4/28/2008					
ELEVATION:	54' +/-					
SWC REP.:	MPL					
WATER LEVEL INFORMATION						

**GROUNDWATER AT 5.0'** 

SAMPLER: CORE BARREL:

PROJECT:

LOCATION:

DRILLING FIRM:

CLIENT :

CASING:

CASING SAMPLE SAMPLER BLOWS PER 6" BLOWS DEPTH STRATA & TEST DATA PER DEPTH NÖ. 6-12 | 12-18 PEN. REC. 0-6 18-24 FOOT @ BOT 0.2' TOPSOIL 1D 2.0' 24" 24" 4 3 4 5 BROWN SANDY SILT, TRACE GRAVEL ~LOOSE~ 6.0' 2D 20" 6.7 3 5 11 50/9' 6.7' BROWN SILTY SAND REFUSAL @ 6.7 FEET (PROBABLE BEDROCK) SAMPLES: SOIL CLASSIFIED BY: REMARKS: 21 D = SPLIT SPOON **DRILLER - VISUALLY** STRATIFICATION LINES REPRESENT THE C = 3" SHELBY TUBE SOIL TECH. - VISUALLY APPROXIMATE BOUNDARY BETWEEN SOIL TYPES Х AND THE TRANSITION MAY BE GRADUAL. U = 3.5" SHELBY TUBE LABORATORY TEST BORING NO .: B-120



4 1/4"

2 3/8"

GREAT WORKS TEST BORING

WALTON AND OCEAN STREETS, PORTLAND, MAINE

SIZE I.D. HAMMER WT. HAMMER FALL

140 lb

CITY OF PORTLAND

TYPE

SSA

SS

## **BORING LOG**

DRILLER:

30"

PETE MICHAUD

BORING NO .:	B-121
SHEET:	1 OF 1
PROJECT NO .:	07-0234.1 S
DATE START:	4/28/2008
DATE FINISH:	4/28/2008
ELEVATION:	53' +/-
SWC REP.:	MPL

WATER LEVEL INFORMATION

GROUNDWATER AT 1.5'

CORE BARREL:

DRILLING FIRM:

PROJECT:

LOCATION:

CLIENT :

CASING:

SAMPLER:

CASING BLOWS	SAMPLE				SAMPLER BLOWS PER 6"				ЛЕРТН	CTDATA 9 TECT DATA			
PER FOOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24		SIRAIAG IESI JAIA			
									0.2	ASPHALT PAVEMENT			
						·	+		1.6'	BROWN SILTY SAND, SOME GRAVEL (FILL)			
	·	· ····································		· · · · · · · · · · · · · · · · · · ·			-		3.0'	~ LOOSE ~ BROWN SILTY SAND			
	1D	24"	19"	4.0'	5	2	1	4	7.5)	BROWN SILTY CLAY ~MEDIUM STIFF~			
· -	20	24	24	7.0	3	4	- 4		·				
										REFUSAL @ 7.5 FEET (PROBABLE BEDROCK)			
		<u> </u>		· 									
						·	+						
				·		<u> </u>			-				
SAMPL D = SPI C = 3" 5	L LIT SP( SHELB)		<u>                                     </u>		LASSI DRI	FIED B	i Y: VISUA H VIS	LLY UALLY	REMAR	STRATIFICATION LINES REPRESENT THE 22			
U = 3.5	" SHEL	BY TUE	3E		LAE	BORAT	ORY TE	ST		AND THE TRANSITION MAY BE GRADUAL. BORING NO.: B-121			



4 1/4"

2 3/8"

GREAT WORKS TEST BORING

WALTON AND OCEAN STREETS, PORTLAND, MAINE

SIZE I.D. HAMMER WT. HAMMER FALL

140 lb

CITY OF PORTLAND

TYPE

SSA

SS

## **BORING LOG**

PETE MICHAUD

DRILLER:

30"

 BORING NO.:
 B-122

 SHEET:
 1 OF 1

 PROJECT NO.:
 07-0234.1 S

 DATE START:
 4/28/2008

 DATE FINISH:
 4/28/2008

 ELEVATION:
 49.5' +/ 

 SWC REP.:
 MPL

WATER LEVEL INFORMATION

GROUNDWATER AT 1.5'

SAMPLER: CORE BARREL:

PROJECT:

LOCATION:

DRILLING FIRM:

CLIENT :

CASING:

CASING BLOWS		SAN	/PLE		SAM	PLER BI	OWS F	'ER 6"				
PER FOOT	NO.	PEN.	REC.	I DEPTH	0-6	6-12	12-18	18-24		JIRALA & IEST DATA		
				ļ		i		i	0.2	ASPHALT PAVEMENT		
									0.8'	BROWN SILTY SAND, SOME GRAVEL (FILL)		
	- <u>1D</u> -	24"	12"	2.2'	7	7	6	8	3.5'	~ MEDIUM DENSE ~ BROWN SILTY SAND		
	 		 			<u> </u>		 		BROWN SILTY CLAY		
	2D	24"	24"	7.0'	3	4	4	4		~MEDIUM STIFF~		
				÷			<u>↓</u>	└ <u></u> ├───	40.01			
			: [			·	i	<u> </u>	10.0			
		i 	 ;				<u>-</u>			BOTTOM OF EXPLORATION @ 10.0 FEET		
	·			·				- · · · · · · · · · · · · · · · · · · ·	-			
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SAMPL	ES:	· · · · · · · · · · · · · · · · · · ·	· ·	SOIL C	LASSI	FIED B	<u> </u> Y:	ļ	REMAR	RKS:		
D = SPI	LIT SPO	DON Y TUBE	-	x	DR SO	ILLER -	VISUA H VIS	LLY UALLY		STRATIFICATION LINES REPRESENT THE 23		
U = 3.5" SHELBY TUBE				ORY T	EST	AND THE TRANSITION MAY BE GRADUAL. BORING NO.:						

SOIL PROFILE / CLASSIFICATION INFORMATION         DETAILED DESCRIPTION or SUBSURFACE CONDINGS AT PROJECTS THES Project Location (municipality): Proposed Elementary School           Project Name: Proposed Elementary School         Applicant Name: Cly of Portland         Project Location (municipality): Portland           Exploration Symbol: TP-1g         B Test PII         B Boring           1º Organic horizon blotness         Ground surface elev.           0         Testure         Consistency         Color           1º Organic horizon blotness         Ground surface elev.         1º Organic horizon blotness         Ground surface elev.           10         Testure         Consistency         Color         Modifing	PAGE 2	4						FOR	M F 2/02			
Project Location (municipality): Proposed Elementary School City of Portland Exploration Symbol: TP-1g © Test Pit © Boring 1* Organic horizon biocress Ground surface elev. Texture Consistency Color Moding 1* Consis	SOIL	PROFILE	/ CLASS	IFICATION		TION		SUBSUR	DETAIL	ED DE DNDIT	SCRIPTION OI	F ECT SITES
Exploration Symbol: TP-1g a Test Pit D Boring 1' Organic horizon trickness Ground surface elev. Texture Consistency Calor Moding an base Consistency Calor Moding an base Consistency Calor Moding an base Consistency Calor Moding an base Consistency Calor Moding and an base Consistency Calor	Project Propos	Name: sed Element	ary School	Applic City o	cant Name: of Portland		·	P	roject Lo ortiand	catio	n (municipality	):
1* Organic horizon thickness Ground surface elev. Texture Consistency Color Motting Texture Consistency Color Motting	Explor	ation Symbo	l: TP-1g	I Test Pit	🗆 Boring	Exp	lor	ation Symbo	ol: TP-2	g	I Test Pit	□ Boring
Texture         Consistency         Color         Motting           10         1000000000000000000000000000000000000	1" Org	anic horizon thic	ckness Grou	nd surface elev.		1" Or	gar	nic horizon thic	kness (	Ground	d surface elev.	
Set         Set         Construction         Set         Set <t< td=""><td>0</td><td>Texture</td><td>Consistency</td><td>Color</td><td>Mottling</td><td></td><td>0</td><td>Texture</td><td>Consist</td><td>ency</td><td>Color</td><td>Mottling</td></t<>	0	Texture	Consistency	Color	Mottling		0	Texture	Consist	ency	Color	Mottling
gg       12       ist learn       table from down of the Even of the	6			dark brown 10YR 3/3	al er so "te" 1997 1997 1997 1998 1994 av son se "F" () son a fan ange a 1 () () an a'		6	loam	friable		dark brown 10YR 3/3	none observed
Bit       12	hes	silt loam	friable		none observed	hes)						
Bit Sign         Sign Sign Sign         Sign Sign Sign         Sign Sign Sign         Sign Sign Sign Sign Sign Sign Sign Sign	0 (j) 12			dk. yel. brn. 10YR 4/6		(inc	12	sitiloam			lt dive hm	mfd 2.5V 4/4
an and an and an and an and an and an and an and and	<sup>18</sup>	Mada		It. olive brown	mfd 2.5Y 4/4 olive brown	Irface	18				2.5Y 5/4	mfd 2.5Y 5/6
a       a	oil su			2.5Y 5/4	mfd 2.5Y 5/6	oil st		silty clay loam	very firm		gray 5Y 5/1	mmp olive 5Y 5/6
B       District of the second	24 [12] 8	silby clay loam	firm			aral s	33					
B       44       1	01 10 10 10 10 10 10			5Y 5/1	dive 5Y 5/6	w mine	_	silt loam	firm		olive 5Y 4/3	dk. yel. brn.
E       Jeanor (g. 44*)       Jeanor (g. 44*)       Jeanor (g. 44*)       Jeanor (g. 44*)         Sold data       Sold Classification       Sold Class	ojaq 44		······································			pelo,	48					10YR 4/6
• Sep. @ 4**	Depth		Bedroo	ck @ 44"	- 	Depth		silt loam with layers of loamy very	i firm		olive gray 5Y 4/2	mfp dk. yel. brn.
soil table Soil table Str.>     Soil     Classification Soil     Slope Profile Canadowire Profile Can		* Seep @ 44"					96	fine sand	Li	mit of O	bservation 8'	
SE       9       D       D-3       14*       Image: Constrainty curves and cur	soil data	Soil Classi	fication Slope	Limiting Factor	g Groundwater	soil dat	ta	Soil Class	ification	Slope	Limiting Factor	Groundwater
soll carls       Soll series/phase name:        Hydric Soll carls       Soll series/phase name:        Hydric Soll carls              Soll series/phase name:              Hydric Soll carls              Hydric Soll carls              Soll carls	s.E.₩	9 Profile Con	D 0-3 dition Percent	14" Depth	Restrictive Layer Bedrock	S.E.	₩	8 Profile Con	D	0-3 Percent	10"	Restrictive Layer     Bedrock
S.S. >>       Lamoine, deep       © Non-hydric       D Sol Group       S.S. >>       Lamoine variant       © Non-hydric       D Sol Group         2* Organic horizon thickness       Ground surface elev.       Image: S.S. >>       Lamoine variant       © Non-hydric       D Sol Group         2* Organic horizon thickness       Ground surface elev.       Image: S.S. >>       Exploration Symbol: TP-4g       © Test Pit       Image: Boring         0       Texture       Consistency       Color       Mottling       Organic horizon thickness       Ground surface elev.         0       Sand       Organic horizon thickness       Group       Color       Mottling         0       Sand       Organic horizon thickness       Group       Color       Mottling         12       Image: Sand       Image	soil data by	Soil series/phas	e name:	U Hydric	Hydrologic	soil da	ta	Soil series/phas	se name:	ercont	Hydric	Hydrologic
Exploration Symbol: TP-3g g Test Pit Debring 2' Organic horizon thickness Ground surface elev.	S.S. <b>»</b>	Lamoir	ne, deep	Non-hydric	D Soil Group	S.S.)	*	Lamoine variar	nt		Non-hydric	D Soil Group
2" Organic horizon thickness Ground surface elev.	Explor	ation Symbo	l: TP-3g	I Test Pit	Boring	Expl	lora	ation Symbo	ol: TP-4g	3	🛛 Test Pit	□ Boring
Texture       Consistency       Color       Mottling         6       olive brown       olive brown       olive brown         12       finable       olive brown       olive brown         13       sift ocam       cark gray       mfp         14       sift ocam       finable       olive brown         15       sift ocam       finable       olive brown         16       sift ocam       finable       olive brown         18       sift ocam       finable       olive brown         19       get       finable       sift ocaw       finable         10       finable       finable       sift ocaw       finable       sift ocaw         10       get       finable       finable       sift ocaw       finable       sift ocaw	2" Or	ganic horizon th	ickness Gro	und surface elev	/.	Or	gar	nic horizon thick	kness G	Ground	l surface elev.	-
6       friable       none observed         12       104m       dark gray       10YR 4/1         12       10YR 4/1       10YR 4/1       10YR 4/1         12       11       0ive brown       mid         18       sill loam       10YR 4/1       10YR 4/1         10       10YR 4/1       10/YR 5/6       10         10       10YR 5/6       10       10/YR 5/6         10       10/YR 5/6       10       10/YR 5/6         10       10/YR 5/6       10/YR 5/6       10/YR 5/6 <td>0</td> <td>Texture</td> <td>Consistency</td> <td>Color</td> <td>Mottling</td> <td></td> <td>0</td> <td>Texture</td> <td>Consist</td> <td>ency</td> <td>Color</td> <td>Mottling</td>	0	Texture	Consistency	Color	Mottling		0	Texture	Consist	ency	Color	Mottling
6       Imable       Inone observed         90       12       Imable       Imable <td< td=""><td>ļ</td><td>sand</td><td></td><td>olive brown</td><td></td><td></td><td></td><td></td><td></td><td></td><td>very dark gray</td><td>······································</td></td<>	ļ	sand		olive brown							very dark gray	······································
ai       Definition       Diversion       Diversion       Diversion       middle         12	6 8)	loom	friable	dark orov	none observed	<i>•</i>	6		- Irin bla		10YR 3/1	none observed
E       12       0lve brown       mfd         18       silty clay loam       firm       dark gray       mfb         18       silty clay loam       firm       dark gray       mfb         28       5Y 4/1       olive 5Y 5/6       5Y 4/4       II. olive brn         38       silt loam       very firm       gray       mfp       5Y 5/7         38       silt loam       very firm       gray       mfp       silt loam/       firm       olive       mmd 5Y 5/6         38       silt loam/       5Y 5/1       yellowtsh brown       firm       dark gray       mmp         10       firm       olive gray       mfp       silt loam/       firm       dark gray       mmp         10       silt loam/       10YR 5/6       silt loam/       firm       dark gray       mmp         10       silt loam/       firm       olive gray       mmp       silt loam/       firm       dark gray       mmp         10       silt loam/       firm       olive gray       mmp       silt loam/       firm       dark gray       mmp         10       silt data       Soil data       Soil data       Soil data       Soil data       Soil data	che:	w/ brick pieces		10YR 4/1		ches		silt loam	mable	·····		
0       18       sifty clay loam       firm       dark gray       mfp         0       5Y 4/1       olive 5Y 5/6       5Y 4/1       olive 5Y 5/6         0       5Y 4/1       olive 5Y 5/6       5Y 4/1       olive 5Y 5/6         0       5Y 4/1       olive 5Y 5/6       5Y 4/1       olive 5Y 5/6         18       silt loam       very firm       gray       mfp         10       5Y 5/1       yellowish brown       firm       dark gray       mmp         10       5Y 5/1       yellowish brown       firm       dark gray       mmp         10       5Y 5/6       10 WR 5/6       silt loam/       firm       dark gray       mmp         10       firm       olive gray       mfp       silt loam/       firm       dark gray       mmp         10       silt loam/       firm       olive gray       mfp       sol       firm       dark gray       mmp         10       firm       olive gray       mfp       firm       dark gray       mmp         10       firm       olive gray       mfp       firm       dark gray       mmp         10       firm       olive gray       mfp       firm       firm	<sup>12</sup>		L			j (in	12		<u> </u>		olive brown	mfd
28       5Y 4/1       oive SY 5/6       5         30       5Y 4/1       oive SY 5/6       5Y 4/4       11. oive brn.         48       sill loam       yeiglowish brown       5Y 4/4       11. oive brn.         48       5Y 5/1       yeiglowish brown       5Y 4/4       11. oive brn.         48       5Y 5/1       yeiglowish brown       5Y 4/4       11. oive brn.         48       5Y 5/1       yeiglowish brown       5Y 4/1       yeiglowish brown         100/R 5/6       100/R 5/6       5Y 4/1       yeiglowish brown         10amy very       firms sand       5Y 4/2       10 mrk ye         96       10/R 5/6       10/R 5/6       10/R 5/6         96       10/R 5/6       10/R 5/6       10/R 5/6         96       10/R 5/6       10/R 5/6       10/R 5/6         97       53"       50il Classification 8       50il Classification 7'       50il Classification 7'         50il data       Soil Classification 8       10''       Bedrock       Soil data       Soil Group       Soil data       Soil data       Soil data       Soil data       Soil data       Soil Group       Soil da	0 18 18	silty clay loam	firm	dark grav	mfp	face	18	· · · · · · · · · · · · · · · · · · ·			2.5Y 4/4	It. ofive brn 2 5Y 5/6
Open 28       firm       olive       mmd SY 5/6         sitt loam       very firm       gray       mfp       sitt loam/       it, olive brn.         48       Sitt loam/       SY 5/1       yellowish brown       sitt loam/       sitt lo	lsu		· · · · · · · · · · · · · · · · · · ·	5Y 4/1	olive 5Y 5/6	sur	· • ·					
Sill loam       very firm       gray       mfp         48       Sill loam       SY 5/1       yellowish brown         48       Sill loam       10YR 5/6         sill loam/       10YR 5/6         ilagers       SY 4/1       yellowish brown         fine sand       SY 4/2       1 brndk ye         48       Sill loam       SY 4/2         96       Sill yellowish brown         96       Sill yellowish brown         96       Sill yellowish brown         1ayers       Ibrndk ye         Sill yellowish brown       fine sand         1ayers       Sill yellowish brown         Sill yellowish brown       fine sand         1ayers       Sill yellowish brown         Sill yellowish brown       fine sand         1ayers       Sill yellowish brown         1ayers       Sill yellowish brown         1ayers       Sill yellowish brown         Soil data       Soil Classification         Soil data       Soil Classification         by       8       D         Profile       Condition         Percent       Depth         Bedrock       Soil data         Soil data       Soil	iOS 28				· · · · · · · · · · · · · · · · · · ·	soil	28				olive 5Y 4/4	mmd 5Y 5/6 It, olive brn
48       57'5/1       yellowish brown       firm       dark gray       mmp         60       silt loam/       10YR 5/6       silt loam/       firm       dark gray       mmp         10amy very       firm       olive gray       mtp       firm sand       10YR 5/6       firm sand       10YR 5/6         60       fine sand       5Y 4/1       yellowish brown       firm sand       10YR 5/6         60       fine sand       5Y 4/2       1bmdk ye       firm       layers       iayers         96       5GY 4/1       imit of Observation 8'       imit of Observation 8'       imit of Observation 8'       imit of Observation 7'       imit of Observation 7'         50il data       Soil       Classification       Siope       Limit of Observation 8'       imit g Factor       g Groundwater         by       8       D       0-3       14"       g Restrictive Layer       Soil data       Soil data       Soil series/phase name:       Hydric Layer       Depth       Bedrock         soil data       Soil series/phase name:       Hydric by       Non-hydric       D       Soil Group       Soil Group       Soil Group         Soil Group       Soil Group       Soil Group       Soil Group       Soil Group       Soil Group <td>era</td> <td>silt loam</td> <td>very firm</td> <td>gray</td> <td>míp</td> <td>eral</td> <td></td> <td></td> <td>1</td> <td></td> <td></td> <td></td>	era	silt loam	very firm	gray	míp	eral			1			
No       10/H 5/6       Joamy very       SY 4/1       yellowish brown         Sill loam/ itoamy very       firm       olive gray       mtp       fine sand       10/H 5/6       10/H 5/6         B4       layers       isity clay       firm       olive gray       mtp       iavers       iavers <td>min t</td> <td></td> <td></td> <td>5Y 5/1</td> <td>yellowish brown</td> <td>l n</td> <td></td> <td>silt loam/</td> <td>firm</td> <td></td> <td>dark gray</td> <td></td>	min t			5Y 5/1	yellowish brown	l n		silt loam/	firm		dark gray	
Ibamy very       firm       olive gray       mip       mip <thmip< th="">       mip       mip<td></td><td>siit loam/</td><td></td><td></td><td>10YR 5/6</td><td>MO</td><td>ĺ</td><td>fine sand</td><td></td><td></td><td>5Y 4/1</td><td>yellowish brown 10YR 5/6</td></thmip<>		siit loam/			10YR 5/6	MO	ĺ	fine sand			5Y 4/1	yellowish brown 10YR 5/6
End       B4       Intersent       Differ	bel	loamy very	firm	olive gray	mfp	bel		layers	ļ			
Soil data       Soil       Classification       Siope       Limit of Observation 8'         by       8       0-3       14"       Conductor       Conductor       Soil data       Soil Classification       Slope       Limit of Observation 7'       Conductor         by       8       0       0-3       14"       Restrictive Layer       Soil data       Soil classification       Slope       Limit of Observation 7'       Conductor         by       8       0       0-3       14"       Restrictive Layer       Soil data       Soil classification       Slope       Limiting Factor       Conductor         soil data       Soil series/phase name:       Depth       Depth       Depth       Bedrock       Soil data       Soil series/phase name:       Hydric by       Hydrologic       Hydrologic       Soil Group	4 the state	layers	·····	01 4/2	гынакуе	pth			+			
Limit of Observation 8'       Limit of Observation 7'         soil data       Soil       Classification       Slope       Limiting Factor       Image: Groundwater         by       8       D       0-3       14"       Restrictive Layer       Soil       Soil       Classification       Slope       Limiting Factor       Image: Groundwater       Soil       Soil       Classification       Slope       Limiting Factor       Image: Groundwater       Soil       Soil       Classification       Slope       Limiting Factor       Image: Groundwater         by       8       D       0-3       14"       Restrictive Layer       Soil       Soil       Classification       Slope       Limiting Factor       Image: Groundwater         Soil data       Soil series/phase name:       Depth       Depth       Bedrock       Soil data       Soil series/phase name:       Hydrologic       Hydrologic       by       Soil data       Soil series/phase name:       Hydrologic       Hydrologic       Soil Group       Soil Grou	പ്പ് 96	silty clay	firm	dk. greenish gr. 5GY 4/1	none observed	De	84					
soil data       Soil       Classification       Slope       Limiting Factor       Imiting Factor <t< td=""><td></td><td>* Seen @ 53*</td><td>Limit of C</td><td>Observation 8</td><td>······································</td><td></td><td></td><td>* Seen @ 18"</td><td>Lim</td><td>it of Obs</td><td>ervation 7</td><td>ar</td></t<>		* Seen @ 53*	Limit of C	Observation 8	······································			* Seen @ 18"	Lim	it of Obs	ervation 7	ar
Uy     8     D     0-3     14"     Restrictive Layer       S.E. >>     Profile     Condition     Percent     Depth     Depth     Dedrock       soil data by     Soil series/phase name:     D     Hydrologic     Soil series/phase name:     Hydrologic       S.S. >>     Lamoine variant     D     Non-hydric     D     Soil Group	soil data	Soil Class	ification Slope	Limiting Factor	B Groundwater	soil da	ta	Soil Class	ification	Slope	Limiting Factor	Broundwater
Promine     Condition     Percent     Depth     Depth     Debuluck       soil data by     Soil series/phase name:     Hydrologic     Soil data     Soil series/phase name:     Hydrologic       S.S. >>     Lamoine variant     Its Non-hydric     Non-hydric     D Soil Group     Soil Group	by S.E. ₽	8	D 0-3	14"	Restrictive Layer	SE		9	D	0-3	10"	Restrictive Layer
by S.S. → Lamoine variant □ Hydric D Soil Group S.S. → Roundabout □ Hydric C Soil Group S.S. → Roundabout □ Hydric C Soil Group	soil data	Soil series/phas	e name:		Hydrologic	soil da	ta	Profile Cor Soil series/phase	se name:	Percent	Depth	Hydrologic
Soil Group Soil Group	by S.S. ₩	Lamoine varia	int	□ Hydric ⊠ Non-hvdric	D	by	, İ	Roundabout			□ Hydric ⊠ Non-h∨drin	c
		·			Soil Group	0.0.						Soil Group

ļ	INVESTIGATOR INFORM	ATION AND SIGNATURE	. (
Signature	e:	Date:	
Name Pi	rinted/typed:	Cert/Lic/Reg. #	
Title:	<ul> <li>Licensed Site Evaluator</li> <li>Certified Geologist</li> </ul>	□ Certified Soil Scientist □ Other:	affix professional seal

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	DEP Form F	Rev. 9/01

PAGE 2	PAGE 25 FORM F 2/02								
SOIL	SOIL PROFILE / CLASSIFICATION INFORMATION DETAILED DESCRIPTION OF SUBSURFACE CONDITIONS AT PROJECT SITES								
Projec Propo	Project Name:       Project Location (municipality):         Proposed Elementary School       City of Portland       Portland								
Explo	ation Symbo	l: TP-5g	🛛 Test Pit	□ Boring	Explor	ation Symbo	l: TP-6g	🛛 Test Pit	□ Boring
3" Org	anic horizon the	ckness Grour	nd surface elev.		3" Orgar	nic horizon thick	kness Ground	l surface elev.	
0	Texture	Consistency	Color	Mottling	0	Texture	Consistency	Color	Mottling
6 (s	sitioam	friable	olive brown	mfd dive 5X 5/5	(e	silleom	friable	very dark gray 10YR 3/1	none observed
9 4 12		· · · · · · · · · · · · · · · · · · ·	2.01 014			Sin Uain	······		
ace (i					ace (i		firm	olive 5Y 5/4	mfd olive 5Y 5/6
jung 18		fim	olive 5Y 5/3	mfp yellowish brown 10YR 5/6	18 Info				
mineral s	loamy fine sand	friable	alive brown 2.5Y 4/4	none observed	s 24 100 22	silty clay laom	very firm	dark gray 5Y 4/1	mmp yellowish brown 10YR 5/6
Depth below	silt loam/ loamy very fine sand layers	firm	pale olive 5Y 6/3	mmp dk. yel. brn.	Depth below	silt laom/ loamy very fine sand layers	firm	pale olive 5Y 6/3	mmp dk. yel. brn. 10YR 4/6
	* Seep @ 14*	Limit of obs	ervation 6'		_	* Seen @ 20"	Limit of Obsi	ervation 6'	
soil data by S.E. ▶	Soil Class 9 Profile Con	ification Slope E 0-3 Idition Percent	Limiting Factor 0" Depth	<ul> <li>Groundwater</li> <li>Restrictive Layer</li> <li>Bedrock</li> </ul>	soil data by S.E. ▶	Soil Classi 9 Profile Con	ification Slope D 0-3	Limiting Factor 8"	B Groundwater B Restrictive Layer ■ Bedrock
soil data by S.S. ₩	Soil series/phas Round	se name: dabout	⊠ Hydric □ Non-hydric	Hydrologic C Soil Group	soit data by S.S. ▶	Soil series/phas Roundabout	se name:	□ Hydric ⊠ Non-hydric	Hydrologic C Spil Group
Exploi	ation Symbo	l: TP-7g	⊠ Test Pit	Boring	Explor	ation Symbo	I: BLANK	Test Pit	□ Boring
1" Or	ganic horizon th Texture	iickness Grou Consistency	ind surface elev Color	r. Mottling	Orgar	ic horizon thick Texture	ness Ground	surface elev.	Mottling
				,					
es)	stony fine	friable		none observed	es)				
linch 15	(fill)		brown 10YR 5/3		4) 12				
18 Inface					90 18				
					15 105 24	9 11 11 11 11 11 11 11 11 11 11 11 11 11			
minera 34	silt loam	friable	It. olive brown 2.5Y 5/4	mmp dk. yel. brn.	os minera				
pelow	silt clay loam	very firm	olive gray 5Y 5/2	mcp dk. yel. brn.	below 36	91 al al la la la constante per aggi per ga de la constante constante a su constante a su constante constante a La constante de la constante de la constante de la constante de la constante de la constante de la constante de	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		999 (1999) (1999) (1999) (1999) (1997
Depth	sih loam/ loamy very fine	firm	olive gray	mcp	Septh 55		······································		······································
72	sand layers		5Y 4/2	dk. yel. brn.					
soil data	Soil Class	ification Slope	Limiting Factor	Groundwater	48 soil data	Soil Class	ification Slope	Limiting Factor	Groundwater
by S.E.₩	8 Profile Con	C 0-3 dition Percent	24" Depth	Restrictive Layer     Bedrock	by S.E.₩	Profile Con	ndition Percent	Depth	Restrictive Layer     Bedrock
soil data by	Soil series/phas	se name:	Hydric	Hydrologic	soil data by	Soil series/phas	se name:	Hydric	Hydrologic
S.S. ₩	roundabout		Don-hydric	Soil Group	S.S.#		. <u> </u>	□ Non-hydric	Soil Group

	INVESTIGATOR INFORM	IATION AND SIGNATURE	
Signature	э:	Date:	
Name Pr	inted/typed:	Cert/Lic/Reg. #	
Title:	<ul> <li>Licensed Site Evaluator</li> <li>Certified Geologist</li> </ul>	<ul> <li>Certified Soil Scientist</li> <li>Other:</li> </ul>	affix professional seal

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### 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<sub>u</sub> unconfined compressive strength, kips/sq. ft. based on laboratory unconfined compressive test
- S<sub>v</sub> field vane shear strength, kips/sq. ft.
- $L_v$  lab vane shear strength, kips/sq. ft.
- q<sub>p</sub> unconfined compressive strength, kips/sq. ft. based on pocket penetrometer test
- O organic content, percent (dry weight basis)
- W<sub>L</sub> liquid limit Atterberg test
- W<sub>P</sub> 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. RQD is computed from recovered core samples.
- $\gamma_{T}$  total soil weight
- γ<sub>B</sub> buoyant soil weight
- f fines content (percent by weight passing U.S. No. 200 Sieve)

#### **Description of Proportions:**

0 to 5% TRACE 5 to 12% SOME 12 to 35% "Y" 35+% AND

**REFUSAL:** <u>Test Boring Explorations</u> - 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:** <u>Test Pit Explorations</u> - 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.



### KEY TO THE NOTES & SYMBOLS Soil Profile Test Pit Explorations

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

#### Key to Symbols Used:

#### TEXTURES

S	-	sand
s	-	loamy sand
sl	-	sandy loam
1	-	loam
sil	-	silt Ioam
si	-	silt

sci - sandy clay loam sc - sandy clay cl - clay loam sicl - silty clay loam sic - silty clay c - clay

#### CONSISTENCY

loose very friable friable firm very firm ext. firm cemented

#### MOTTLES

Number	Size	<u>Contrast</u>
few (f) <2%	fine (f) <0.2"	faint (f)
common (c) 2 – 20%	medium (m) 0.2" – 0.6"	distinct
many (m) >20%	coarse (c) >0.6"	prominent

Example: Many, medium size, distinct mottles would be designated as: mmd

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.



# **Report of Gradation**

ASTM C-117 & C-136

Project NamePORTLAND - PROPOSED ELEMENTARY SCHOOL - DESIGN<br/>PHASE - GEOTECHNICAL ENGINEERING SERVICESProject<br/>Lab IDClientCITY OF PORTLANDDate IDExploration0-2Date IDMaterial SourceB-101 1DTester

Project Number	07-0234.1
Lab ID	8481G
Date Received	5/22/2008
Date Complete	5/27/2008
Tested By	JUSTIN BISSON

<u>STANDARD</u> DESIGNATION (mm/µm)	<u>SIEVE SIZE</u>	<u>AMOUNT PASSING (%</u>	)
150 mm	6"	100	
125 mm	5"	100	
100 mm	4"	100	
75 mm	3"	100	
50 mm	2"	100	
38.1 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
6.3 mm	1/4"	100	
4.75 mm	No. 4	99	0.5% Gravel
2.00 mm	No. 10	98	
850 um	No. 20	93	
425 um	No. 40	82	59% Sand
250 um	No. 60	69	
150 um	No. 100	56	
75 um	No. 200	40.4	40.4% Fines

#### SILT AND SAND, TRACE GRAVEL







8482G

5/22/2008

CRAIG TURCOTTE

Project Name PORTLAND - PROPOSED ELEMENTARY SCHOOL - DESIGN Project Number 07-0234.1 PHASE - GEOTECHNICAL ENGINEERING SERVICES Lab ID Client CITY OF PORTLAND Date Received Exploration 0-2 Date Complete 5/27/2008 Material Source B-102 1D Tested By STANDARD SIEVE SIZE AMOUNT PASSING (%)

**DESIGNATION** (mm/µm)

150 mm	6"	100	
125 mm	5"	100	
100 mm	4"	100	
75 mm	3"	100	
50 mm	2"	100	
38.1 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
6.3 mm	1/4"	96	
4.75 mm	No. 4	95	5% Gravel
2.00 mm	No. 10	93	
850 um	No. 20	84	
425 um	No. 40	70	67.2% Sand
250 um	No. 60	55	
150 um	No. 100	42	
75 um	No. 200	27.8	27.8% Fines

#### SILTY SAND, TRACE GRAVEL







Project NamePORTLAND - PROPOSED ELEMENTARY SCHOOL - DESIGN<br/>PHASE - GEOTECHNICAL ENGINEERING SERVICESClientCITY OF PORTLANDExploration5-7Material SourceB-105 2D

Project Number	07-0234.1
Lab ID	8483G
Date Received	5/22/2008
Date Complete	5/27/2008
Tested By	CRAIG TURCOTTE

<u>STANDARD</u> DESIGNATION (mm/µm)	<u>SIEVE SIZE</u>	<u>AMOUNT PASSING (%</u>	)
150 mm	6"	100	
125 mm	5"	100	
100 mm	4"	100	
75 mm	3"	100	
50 mm	2"	100	
38.1 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
6.3 mm	1/4"	100	
4.75 mm	No. 4	100	0.2% Gravel
2.00 mm	No. 10	100	
850 um	No. 20	100	
425 um	No. 40	99	49.1% Sand
250 um	No. 60	98	
150 um	No. 100	92	
75 um	No. 200	50.7	50.7% Fines

#### SILT AND SAND, TRACE GRAVEL



### <u>Sheet</u> 30





 Project Name
 PORTLAND - PROPOSED ELEMENTARY SCHOOL - DESIGN<br/>PHASE - GEOTECHNICAL ENGINEERING SERVICES

 Client
 CITY OF PORTLAND

 Exploration
 2-4

Material Source B-119 1D

Project Number	07-0234.1
Lab ID	8484G
Date Received	5/22/2008
Date Complete	5/27/2008
Tested By	JUSTIN BISSON

<u>STANDARD</u> DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%	2
150 mm	6"	100	
125 mm	5"	100	
100 mm	4"	100	
75 mm	3"	100	
50 mm	2"	100	
38.1 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
6.3 mm	1/4"	100	
4.75 mm	No. 4	100	0% Gravel
2.00 mm	No. 10	100	
850 um	No. 20	96	
425 um	No. 40	88	55.3% Sand
250 um	No. 60	75	
150 um	No. 100	61	
75 um	No. 200	44.7	44.7% Fines

#### SILT AND SAND





# **Report of Gradation**

ASTM C-117 & C-136

Project NamePORTLAND - PROPOSED ELEMENTARY SCHOOL - DESIGN<br/>PHASE - GEOTECHNICAL ENGINEERING SERVICESPro<br/>LaiClientCITY OF PORTLANDDaExploration5-6.7DaMaterial SourceB-120 2DTe

Project Number	07-0234.1
Lab ID	8485G
Date Received	5/22/2008
Date Complete	5/27/2008
Tested By	JUSTIN BISSON

<u>STANDARD</u> DESIGNATION (mm/µm)	<u>SIEVE SIZE</u>	AMOUNT PASSING (%)	1
150 mm	6"	100	
125 mm	5"	100	
100 mm	4"	100	
75 mm	3"	100	
50 mm	2"	100	
38.1 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
6.3 mm	1/4"	99	
4.75 mm	No. 4	99	1.4% Gravel
2.00 mm	No. 10	98	
850 um	No. 20	97	
425 um	No. 40	92	45.2% Sand
250 um	No. 60	84	
150 um	No. 100	73	
75 um	No. 200	53.4	53.4% Fines

#### SILT AND SAND, TRACE GRAVEL







Project NamePORTLAND - PROPOSED ELEMENTARY SCHOOL - DESIGN<br/>PHASE - GEOTECHNICAL ENGINEERING SERVICESClientCITY OF PORTLANDExploration0.2-2.2Material SourceB-122 1D

Project Number	07-0234.1
Lab (D	8486G
Date Received	5/22/2008
Date Complete	5/27/2008
Tested By	JUSTIN BISSON

<u>STANDARD</u> DESIGNATION (mm/µm)	<u>SIEVE SIZE</u>	AMOUNT PASSING (%)	L
150 mm	6"	100	
125 mm	5"	100	
100 mm	4"	100	
75 mm	3"	100	
50 mm	2"	100	
38.1 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	88	
6.3 mm	1/4"	82	
4.75 mm	No. 4	80	19.9% Gravel
2.00 mm	No. 10	74	
850 um	No. 20	53	
425 um	No. 40	33	71.6% Sand
250 um	No. 60	22	
150 um	No. 100	15	
75 um	No. 200	8.5	8.5% Fines

#### **GRAVELLY SAND, TRACE SILT**

