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

Prepared by:

S.W.COLE ENGINEERING, INC.
286 Portland Road
Gray, Maine 04039

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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 — 3.0 ksf (Compacted Crushed Stone)
- Design Frost Depth — 4.5 feet
- Seismic Soil Site Class (IBC 2006) — D
- Base Friction Factor — 0.4 (Mass Concrete to Crushed Stone)
- Passive Lateral Earth Pressure Coefficient (K_p) — 3.0 (Structural Fill)
- Active Lateral Earth Pressure Coefficient (K_a) — 0.3 (Structural Fill)
- At-Rest Lateral Earth Pressure Coefficient (K_o) — 0.5 (Structural Fill)
- Total Unit Weight of Backfill (γ_t) — 130 pcf (Structural Fill)
- Internal Friction Angle (ϕ) — 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
¼ 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.

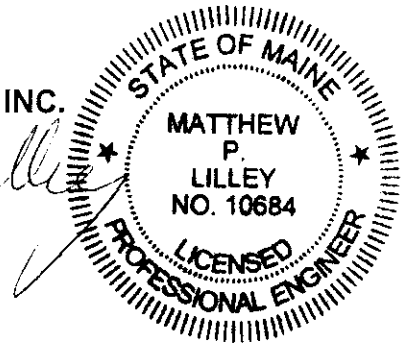
A quality assurance testing program should also be implemented during construction to observe compliance with the design concepts, plans, and specifications. S. W. COLE ENGINEERING, INC. is available to provide field and laboratory testing services for soil, concrete, masonry, steel, spray-applied fireproofing,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

S. W. COLE ENGINEERING, INC.



Matthew P. Lilley, P. E.
Geotechnical Engineer

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.

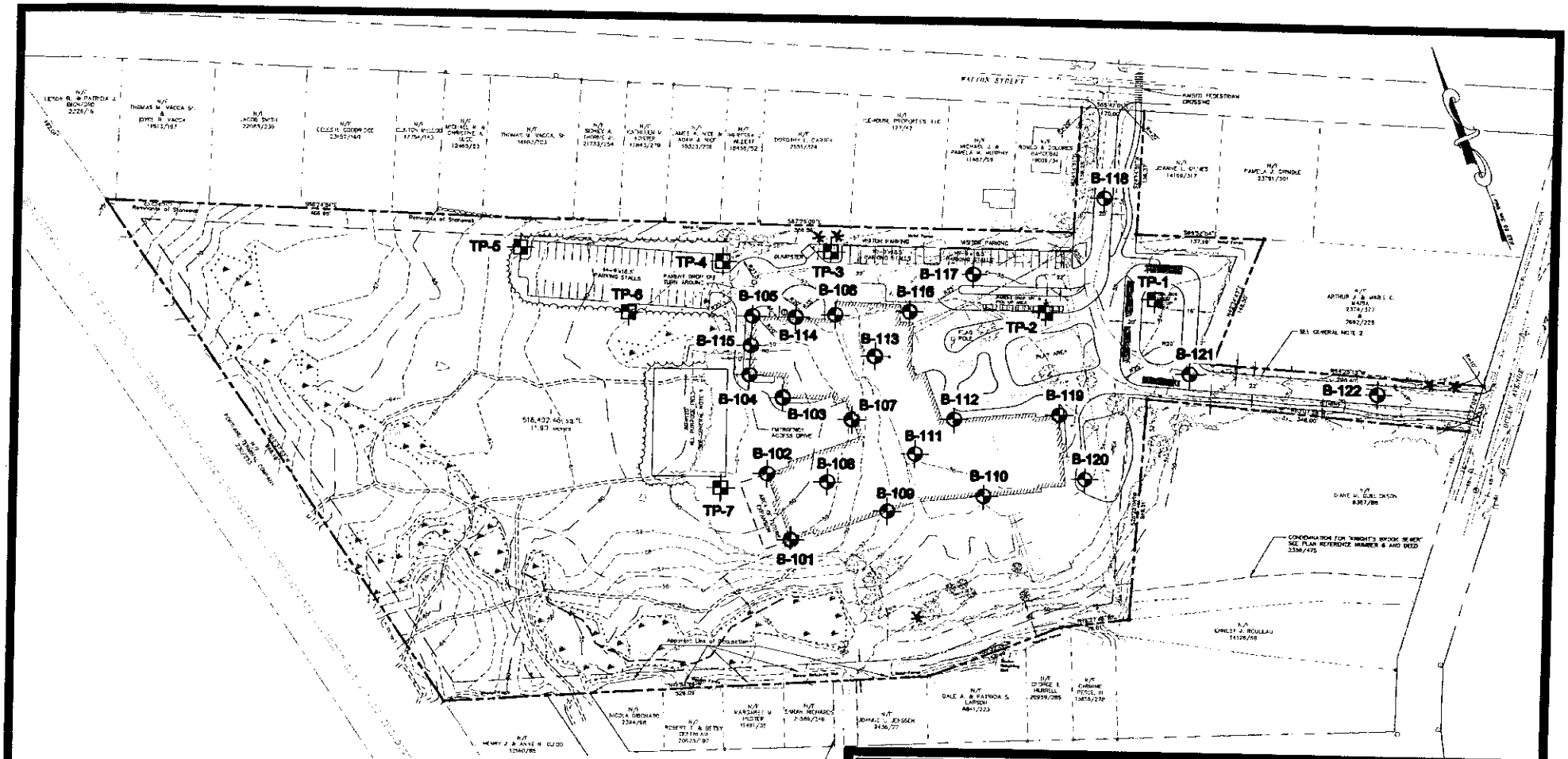
The soil profiles described in the report are intended to convey general trends in subsurface conditions. The boundaries between strata are approximate and are based upon interpretation of exploration data and samples.

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.



LEGEND

APPROXIMATE BORING LOCATION

APPROXIMATE TEST PIT LOCATION

NOTE :

BASE PLAN PROVIDED BY SUSTAINABLE DESIGN STUDIO.

S.W.COLE ENGINEERING, INC.

CITY OF PORTLAND

EXPLORATION LOCATION PLAN

PROPOSED K-5 ELEMENTARY SCHOOL
152 OCEAN AVENUE
PORTLAND, MAINE

Job No. 07-0234.1 S
Date : 05/27/08

Scale NOT TO SCALE
Sheet 1

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: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING 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:				

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
									0.3'	TOPSOIL
	1D	24"	21"	2.0'	3	5	4	7	2.0'	BROWN SILTY SAND, TRACE GRAVEL ~LOOSE~
										REFUSAL @ 2.0 FEET
										(PROBABLE 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.: 07-0234.1 S
DATE START: 4/28/2008
DATE FINISH: 4/28/2008
ELEVATION: 60.5' +/-
SWC REP.: MPL

PROJECT: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING 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:				

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'	TOPSOIL
	1D	24"	22"	2.0'	4	3	5	6	2.5'	BROWN SILTY SAND, TRACE GRAVEL ~LOOSE~
										REFUSAL @ 2.5 FEET (PROBABLE 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.: 07-0234.1 S
DATE START: 4/28/2008
DATE FINISH: 4/28/2008
ELEVATION: 60.5' +/-
SWC REP.: MPL

PROJECT: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING DRILLER: PETE MICHAUD

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/4"		
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
									0.4'	TOPSOIL
									4.8'	BROWN SILTY SAND
										REFUSAL @ 4.8 FEET (PROBABLE 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-103**

S.W.COLE ENGINEERING, INC.

BORING LOG

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

PROJECT: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING 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:				

WATER LEVEL INFORMATION
GROUNDWATER AT 5.0'

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.4'	TOPSOIL
	1D	24"	24"	2.0'	5	4	3	4		~LOOSE~ SILTY CLAYEY SAND, TRACE GRAVEL
									4.0'	
									5.0'	BECOMES GRAY AND WET
	2D	24"	24"	7.0'	3	5	7	10		GRAY TO TAN SILTY CLAY, TRACE SAND ~STIFF~
									10.0'	
	3D	24"	24"	12.0'	9	9	6	7	12.0'	BROWN SILTY SAND ~MEDIUM DENSE~
	4D	0"	0"	15.0'	25/0"				15.0'	GRAY SILTY CLAY ~ STIFF ~
										REFUSAL @ 15.0 FEET (PROBABLE 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-104**

S.W.COLE ENGINEERING, INC.

BORING LOG

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

PROJECT: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING 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:				

WATER LEVEL INFORMATION
GROUNDWATER AT 3.5'

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.1'	TOPSOIL
	1D	24"	14"	2.0'	1	2	2	1	0.5'	TAN SAND (FILL)
									0.6'	RELIC TOPSOIL
									4.0'	~ LOOSE ~ GRAY SILTY SAND
	2D	24"	22"	7.0'	6	12	15	18		BROWN SILTY SAND ~MEDIUM DENSE~
									11.0'	
	3D	24"	24"	12.0'	5	15	17	9	13.0'	GRAY SANDY SILTY CLAY ~ STIFF ~
	4D	24"	24"	17.0'	1/12"		1/12"			GRAY SILTY SANDY CLAY ~VERY SOFT~
									19.5'	REFUSAL @ 19.5 FEET (PROBABLE 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.: **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

PROJECT: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING DRILLER: PETE MICHAUD

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/4"		
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
									0.3'	TOPSOIL
									4.6'	BROWN SILTY SAND
										REFUSAL @ 4.6 FEET (PROBABLE 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-106**

S.W.COLE ENGINEERING, INC.

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

PROJECT: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING 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:				

WATER LEVEL INFORMATION

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.2'	TOPSOIL
	1D	24"	24"	2.0'	3	4	3	4		BROWN SILTY SAND
										~LOOSE~
									4.0'	
									5.0'	WEATHERED BEDROCK
										REFUSAL @ 5.0 FEET
										(PROBABLE 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-107**

S.W.COLE ENGINEERING, INC.

BORING LOG

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

PROJECT: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING DRILLER: PETE MICHAUD

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/4"		
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
									0.2'	TOPSOIL
									4.7'	BROWN SILTY SAND
									5.0'	WEATHERED BEDROCK REFUSAL @ 5.0 FEET (PROBABLY 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-108**

S.W.COLE ENGINEERING, INC.

BORING LOG

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

PROJECT: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING DRILLER: PETE MICHAUD

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/4"		
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
									0.2'	TOPSOIL
										BROWN SILTY SAND
	S1			7.0'					7.0'	
										REFUSAL @ 7.0 FEET (PROBABLE 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-109**

S.W.COLE ENGINEERING, INC.

BORING LOG

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

PROJECT: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING 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:				

WATER LEVEL INFORMATION
GROUNDWATER AT 7.0'

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.2'	ASPHALT PAVEMENT
									1.5'	BLACK SILTY SAND, SOME GRAVEL (FILL)
	1D	24"	15"	3.0'	3	1	1	2		OLIVE BROWN SILTY CLAY
	2D	24"	24"	7.0'	4	6	6	7		~STIFF~
	3D	24"	24"	12.0'	1	2	3	4	11.5'	
									13.5'	~ LOOSE ~ BROWN SILTY SAND, WET
	4D	24"	24"	17.0'	WOH/24"					GRAY SILTY SANDY CLAY
										~VERY SOFT~
									19.7'	REFUSAL @ 19.7 FEET (PROBABLE 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-110**

S.W.COLE ENGINEERING, INC.

BORING LOG

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

PROJECT: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING DRILLER: PETE MICHAUD

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/4"		
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
									0.2'	ASPHALT PAVEMENT
									1.0'	SILTY SAND, SOME GRAVEL (FILL)
										OLIVE BROWN SILTY CLAY
									10.5'	
									13.0'	PROBABLE SAND
										REFUSAL @ 13.0 FEET (PROBABLE 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-111

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-112**
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

PROJECT: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING 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:				

WATER LEVEL INFORMATION

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.2'	ASPHALT PAVEMENT
									1.0'	BLACK SILTY SAND, TRACE GRAVEL (FILL)
	1D	24"	14"	2.5'	3	3	3	4		~MEDIUM STIFF~
										OLIVE BROWN SILTY CLAY (MOTTLED)
	2D	24"	24"	7.0'	4	5	7	13		~STIFF~
									8.5'	
									11.5'	GRAY SILTY CLAY ~ MEDIUM ~
	3D	24"	24"	12.0'	1	1	2	7		
									15.0'	BROWN SILTY SAND ~ LOOSE ~
										REFUSAL @ 15.0 FEET (PROBABLE 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-112**

S.W.COLE ENGINEERING, INC.

BORING LOG

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

PROJECT: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING DRILLER: PETE MICHAUD

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/4"		
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
									0.2'	ASPHALT PAVEMENT
									1.0'	BROWN SILTY SAND (FILL)
										BROWN SANDY SILT / SILTY SAND
									8.0'	REFUSAL @ 8.0 FEET (PROBABLE 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-113**

S.W.COLE ENGINEERING, INC.

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

PROJECT: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING DRILLER: PETE MICHAUD

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/4"		
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
									0.3'	TOPSOIL
										BROWN SILTY SAND
									9.0'	
										GRAY SILTY CLAY
									17.0'	
										REFUSAL @ 17.0 FEET (PROBABLE 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-114**

S.W.COLE ENGINEERING, INC.

BORING LOG

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

PROJECT: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING DRILLER: PETE MICHAUD

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/4"		
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
									0.3'	TOPSOIL
										BROWN SILTY SAND
									12.0'	
										GRAY SILTY CLAY
									17.5'	
									19.5'	WEATHERED BEDROCK
										REFUSAL @ 19.5 FEET (PROBABLE 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-115**

S.W.COLE ENGINEERING, INC.

BORING LOG

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

PROJECT: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING 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:				

WATER LEVEL INFORMATION

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.2'	ASPHALT PAVEMENT
									1.0'	BROWN SILTY SAND, SOME GRAVEL (FILL)
	1D	24"	6"	2.5'	6	9	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:
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-116**

S.W.COLE ENGINEERING, INC.

BORING LOG

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

PROJECT: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING 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:				

WATER LEVEL INFORMATION

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.2'	ASPHALT PAVEMENT
									1.4'	BROWN SILTY SAND, SOME GRAVEL (FILL)
	1D	24"	16"	4.0'	4	5	4	5		BROWN SILTY CLAY ~STIFF~
									6.0'	
	2D	24"	24"	7.0'	3	4	7	12		BROWN SILTY SAND, TRACE GRAVEL
									8.0'	~MEDIUM DENSE~
										REFUSAL @ 8.0 FEET (PROBABLE 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-117**

S.W.COLE ENGINEERING, INC.

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

PROJECT: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING 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:				

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
									0.2'	ASPHALT PAVEMENT
									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)

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-118**

S.W.COLE ENGINEERING, INC.

BORING LOG

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

PROJECT: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING 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:				

WATER LEVEL INFORMATION

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.2'	TOPSOIL
	1D	24"	21"	2.0'	3	4	3	4		~LOOSE~ BROWN SANDY SILT, TRACE GRAVEL (FILL)
									5.0'	
									6.0'	BROWN SILTY SAND
	2D	24"	24"	7.0'	6	8	8	10		~STIFF~ OLIVE BROWN SILTY CLAY
									9.5'	
										REFUSAL @ 9.5 FEET (PROBABLE 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-119**

S.W.COLE ENGINEERING, INC.

BORING LOG

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

PROJECT: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING 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:				

WATER LEVEL INFORMATION
GROUNDWATER AT 5.0'

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
									0.2'	TOPSOIL
	1D	24"	24"	2.0'	3	4	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:
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-120**

S.W.COLE ENGINEERING, INC.

BORING LOG

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

PROJECT: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING 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:				

WATER LEVEL INFORMATION
GROUNDWATER AT 1.5'

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									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		
										BROWN SILTY CLAY
										~MEDIUM STIFF~
	2D	24"	24"	7.0'	3	4	4	7	7.5'	
										REFUSAL @ 7.5 FEET
										(PROBABLE 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-121

S.W.COLE ENGINEERING, INC.

BORING LOG

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

PROJECT: PROPOSED ELEMENTARY SCHOOL
CLIENT : CITY OF PORTLAND
LOCATION: WALTON AND OCEAN STREETS, PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORING 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:				

WATER LEVEL INFORMATION
GROUNDWATER AT 1.5'

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.2'	ASPHALT PAVEMENT
									0.8'	BROWN SILTY SAND, SOME GRAVEL (FILL)
	1D	24"	12"	2.2'	7	7	6	8	3.5'	~ MEDIUM DENSE ~ BROWN SILTY SAND
										BROWN SILTY CLAY
	2D	24"	24"	7.0'	3	4	4	4		~MEDIUM STIFF~
									10.0'	BOTTOM OF EXPLORATION @ 10.0 FEET

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-122**

SOIL PROFILE / CLASSIFICATION INFORMATION

DETAILED DESCRIPTION OF SUBSURFACE CONDITIONS AT PROJECT SITES

Project Name:	Applicant Name:	Project Location (municipality):
Proposed Elementary School	City of Portland	Portland

Exploration Symbol: TP-1g ☒ Test Pit ☐ Boring

1" Organic horizon thickness Ground surface elev.

Depth below mineral soil surface (inches)

	Texture	Consistency	Color	Mottling
0				
6			dark brown 10YR 3/3	
	silt loam	friable		none observed
12			dk. yel. brn. 10YR 4/6	
18			lt. olive brown 2.5Y 5/4	mfd 2.5Y 4/4 olive brown mfd 2.5Y 5/6
24				
	silty clay loam	firm	gray 5Y 5/1	mmp olive 5Y 5/6
30				
44				
		Bedrock @ 44"		
	* Seep @ 44"			

soil data by	Soil	Classification	Slope	Limiting Factor	
S.E. ▸▸	9 Profile	D Condition	0-3 Percent	14" Depth	☒ Groundwater ☒ Restrictive Layer ☐ Bedrock

soil data by	Soil series/phase name:		Hydrologic
S.S. ▸▸	Lamoine, deep	☐ Hydric ☒ Non-hydric	D Soil Group

Exploration Symbol: TP-2g ☒ Test Pit ☐ Boring

1" Organic horizon thickness Ground surface elev.

Depth below mineral soil surface (inches)

	Texture	Consistency	Color	Mottling
0				
6	loam	friable	dark brown 10YR 3/3	none observed
12	silt loam		lt. olive brn. 2.5Y 5/4	mfd 2.5Y 4/4 mfd 2.5Y 5/6
18			gray	mmp
	silty clay loam	very firm	5Y 5/1	olive 5Y 5/6
33				
	silt loam	firm	olive 5Y 4/3	mfp dk. yel. brn. 10YR 4/6
48				
	silt loam with layers of loamy very fine sand	firm	olive gray 5Y 4/2	mfp dk. yel. brn.
96		Limit of Observation 8'		
	* Seep @ 48"			

soil data by	Soil	Classification	Slope	Limiting Factor	
S.E. ▸▸	8 Profile	D Condition	0-3 Percent	10" Depth	☒ Groundwater ☒ Restrictive Layer ☐ Bedrock

soil data by	Soil series/phase name:		Hydrologic
S.S. ▸▸	Lamoine variant	☐ Hydric ☒ Non-hydric	D Soil Group

Exploration Symbol: TP-3g ☒ Test Pit ☐ Boring

2" Organic horizon thickness Ground surface elev.

Depth below mineral soil surface (inches)

	Texture	Consistency	Color	Mottling
0	sand		olive brown	
6		friable		none observed
	loam w/ brick pieces		dark gray 10YR 4/1	
12				
18	silty clay loam	firm	dark gray 5Y 4/1	mfp olive 5Y 5/6
28				
	silt loam	very firm	gray 5Y 5/1	mfp yellowish brown 10YR 5/6
48				
	silt loam/ loamy very fine sand layers	firm	olive gray 5Y 4/2	mfp l brndk ye
84				
	silty clay	firm	dk. greenish gr. 5GY 4/1	none observed
96		Limit of Observation 8'		
	* Seep @ 53"			

soil data by	Soil	Classification	Slope	Limiting Factor	
S.E. ▸▸	8 Profile	D Condition	0-3 Percent	14" Depth	☒ Groundwater ☒ Restrictive Layer ☐ Bedrock

soil data by	Soil series/phase name:		Hydrologic
S.S. ▸▸	Lamoine variant	☐ Hydric ☒ Non-hydric	D Soil Group

Exploration Symbol: TP-4g ☒ Test Pit ☐ Boring

Organic horizon thickness Ground surface elev.

Depth below mineral soil surface (inches)

	Texture	Consistency	Color	Mottling
0				
6			very dark gray 10YR 3/1	none observed
	silt loam	friable		
12				
18			olive brown 2.5Y 4/4	mfd lt. olive brn 2.5Y 5/6
28		firm	olive 5Y 4/4	mmd 5Y 5/6 lt. olive brn.
	silt loam/ loamy very fine sand layers	firm	dark gray 5Y 4/1	mmp yellowish brown 10YR 5/6
84				
		Limit of Observation 7'		
	* Seep @ 18"			

soil data by	Soil	Classification	Slope	Limiting Factor	
S.E. ▸▸	9 Profile	D Condition	0-3 Percent	10" Depth	☒ Groundwater ☒ Restrictive Layer ☐ Bedrock

soil data by	Soil series/phase name:		Hydrologic
S.S. ▸▸	Roundabout	☐ Hydric ☒ Non-hydric	C Soil Group

INVESTIGATOR INFORMATION AND SIGNATURE

Signature:	Date:
Name Printed/typed:	Cert/Lic/Reg. #

Title: ☐ Licensed Site Evaluator ☐ Certified Soil Scientist ☐ Certified Geologist ☐ Other:

affix professional seal

FORM F 2/02

SOIL PROFILE / CLASSIFICATION INFORMATION

DETAILED DESCRIPTION OF SUBSURFACE CONDITIONS AT PROJECT SITES

Project Name:	Applicant Name:	Project Location (municipality):
Proposed Elementary School	City of Portland	Portland

Exploration Symbol: TP-5g ☒ Test Pit ☐ Boring

3" Organic horizon thickness Ground surface elev.

Depth below mineral soil surface (inches)

Depth	Texture	Consistency	Color	Mottling
0				
6		friable	olive brown	mfd
	silt loam		2.5Y 5/4	olive 5Y 5/6
12				
18			olive	mfp
		firm	5Y 5/3	yellowish brown
28				10YR 5/6
	loamy fine sand	friable	olive brown	none observed
			2.5Y 4/4	
38				
	silt loam/	firm	pale olive	mmp
	loamy very		5Y 6/3	dk. yel. brn.
	fine sand layers			
72				
		Limit of observation 6'		
	* Seep @ 14"			

soil data by S.E. ▸▸	Soil Profile	Classification Condition	Slope Percent	Limiting Factor Depth	
	9	E	0-3	0"	☒ Groundwater ☒ Restrictive Layer ☐ Bedrock

soil data by S.S. ▸▸	Soil series/phase name:		Hydrologic
	Roundabout	☒ Hydric ☐ Non-hydric	C Soil Group

Exploration Symbol: TP-6g ☒ Test Pit ☐ Boring

3" Organic horizon thickness Ground surface elev.

Depth below mineral soil surface (inches)

Depth	Texture	Consistency	Color	Mottling
0				
		friable	very dark gray	none observed
6			10YR 3/1	
	silt loam			
12				
			olive	mfd
		firm	5Y 5/4	olive 5Y 5/6
18				
24				
	silty clay loam	very firm	dark gray	mmp
			5Y 4/1	yellowish brown
32				10YR 5/6
	silt loam/			
	loamy very	firm	pale olive	mmp
	fine sand layers		5Y 6/3	dk. yel. brn.
				10YR 4/6
72				
		Limit of Observation 6'		
	* Seep @ 20"			

soil data by S.E. ▸▸	Soil Profile	Classification Condition	Slope Percent	Limiting Factor Depth	
	9	D	0-3	8"	☒ Groundwater ☒ Restrictive Layer ☐ Bedrock

soil data by S.S. ▸▸	Soil series/phase name:		Hydrologic
	Roundabout	☐ Hydric ☒ Non-hydric	C Soil Group

Exploration Symbol: TP-7g ☒ Test Pit ☐ Boring

1" Organic horizon thickness Ground surface elev.

Depth below mineral soil surface (inches)

Depth	Texture	Consistency	Color	Mottling
0				
6				
	stony fine	friable		none observed
	sandy loam			
12	(fill)		brown	
			10YR 5/3	
18				
24				
	silt loam	friable	lt. olive brown	mmp
34			2.5Y 5/4	dk. yel. brn.
	silt clay loam	very firm	olive gray	mcp
			5Y 5/2	dk. yel. brn.
48				
	silt loam/			
	loamy very fine	firm	olive gray	mcp
72	sand layers		5Y 4/2	dk. yel. brn.
		Bedrock @ 6'		

soil data by S.E. ▸▸	Soil Profile	Classification Condition	Slope Percent	Limiting Factor Depth	
	8	C	0-3	24"	☒ Groundwater ☒ Restrictive Layer ☐ Bedrock

soil data by S.S. ▸▸	Soil series/phase name:		Hydrologic
	roundabout	☐ Hydric ☒ Non-hydric	C Soil Group

Exploration Symbol: BLANK ☐ Test Pit ☐ Boring

Organic horizon thickness Ground surface elev.

Depth below mineral soil surface (inches)

Depth	Texture	Consistency	Color	Mottling
0				
6				
12				
18				
24				
30				
36				
42				
48				

soil data by S.E. ▸▸	Soil Profile	Classification Condition	Slope Percent	Limiting Factor Depth	
					☐ Groundwater ☐ Restrictive Layer ☐ Bedrock

soil data by S.S. ▸▸	Soil series/phase name:		Hydrologic
		☐ Hydric ☐ Non-hydric	Soil Group

INVESTIGATOR INFORMATION AND SIGNATURE

Signature:	Date:
Name Printed/typed:	Cert/Lic/Reg. #

Title: ☐ Licensed Site Evaluator ☐ Certified Soil Scientist ☐ Certified Geologist ☐ Other:

affix professional seal

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. - based on laboratory unconfined compressive 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. based on 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. RQD is computed from recovered core samples.
γ_T	-	total soil weight
γ_B	-	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: **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.

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	sci	-	sandy clay loam
ls	-	loamy sand	sc	-	sandy clay
sl	-	sandy loam	cl	-	clay loam
l	-	loam	sicl	-	silty clay loam
sil	-	silt loam	sic	-	silty clay
si	-	silt	c	-	clay

CONSISTENCY

loose
very friable
friable
firm
very firm
ext. firm
cemented

MOTTLES

Number	Size	Contrast
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.

S.W.COLE ENGINEERING, INC.

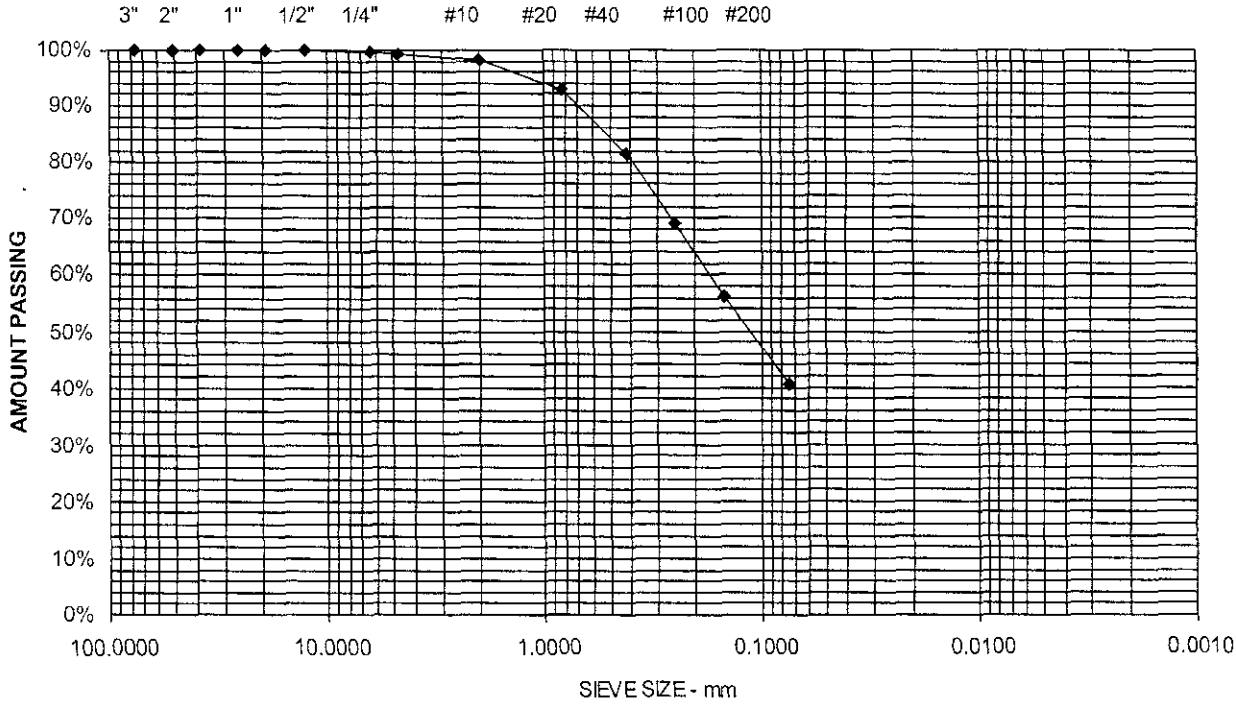
Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND - PROPOSED ELEMENTARY SCHOOL - DESIGN PHASE - GEOTECHNICAL ENGINEERING SERVICES	Project Number	07-0234.1
Client	CITY OF PORTLAND	Lab ID	8481G
Exploration	**0-2**	Date Received	5/22/2008
Material Source	**B-101 1D**	Date Complete	5/27/2008
		Tested By	JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
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



Comments:

S.W.COLE ENGINEERING, INC.

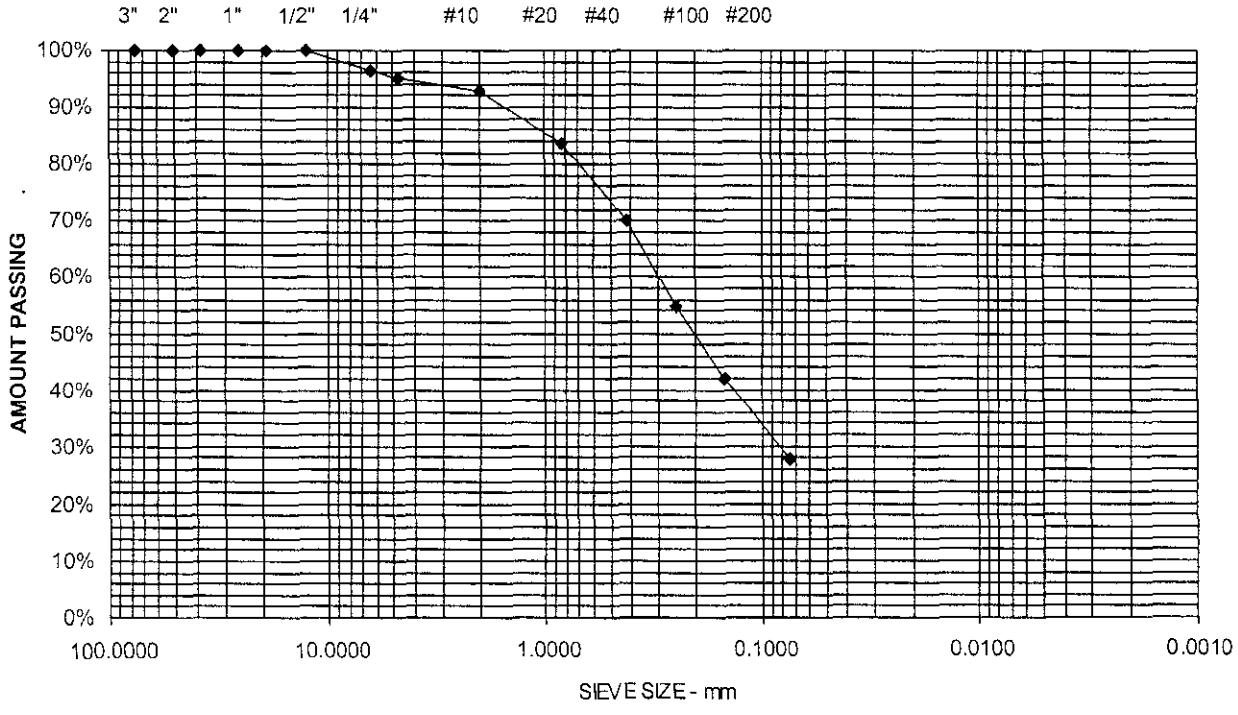
Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND - PROPOSED ELEMENTARY SCHOOL - DESIGN PHASE - GEOTECHNICAL ENGINEERING SERVICES	Project Number	07-0234.1
Client	CITY OF PORTLAND	Lab ID	8482G
Exploration	**0-2**	Date Received	5/22/2008
Material Source	**B-102 1D**	Date Complete	5/27/2008
		Tested By	CRAIG TURCOTTE

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
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



Comments:

S.W.COLE ENGINEERING, INC.

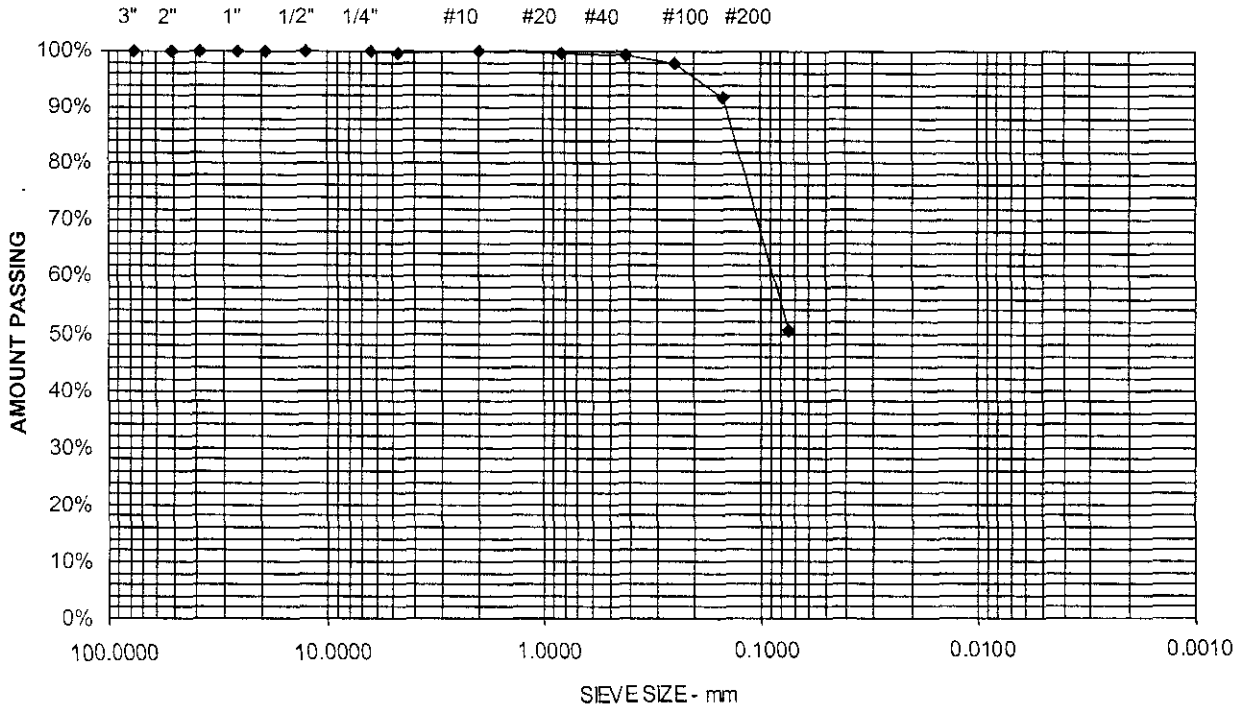
Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND - PROPOSED ELEMENTARY SCHOOL - DESIGN PHASE - GEOTECHNICAL ENGINEERING SERVICES	Project Number	07-0234.1
Client	CITY OF PORTLAND	Lab ID	8483G
Exploration	**5-7**	Date Received	5/22/2008
Material Source	**B-105 2D**	Date Complete	5/27/2008
		Tested By	CRAIG TURCOTTE

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
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



Comments: w = 20.4%

S.W.COLE ENGINEERING, INC.

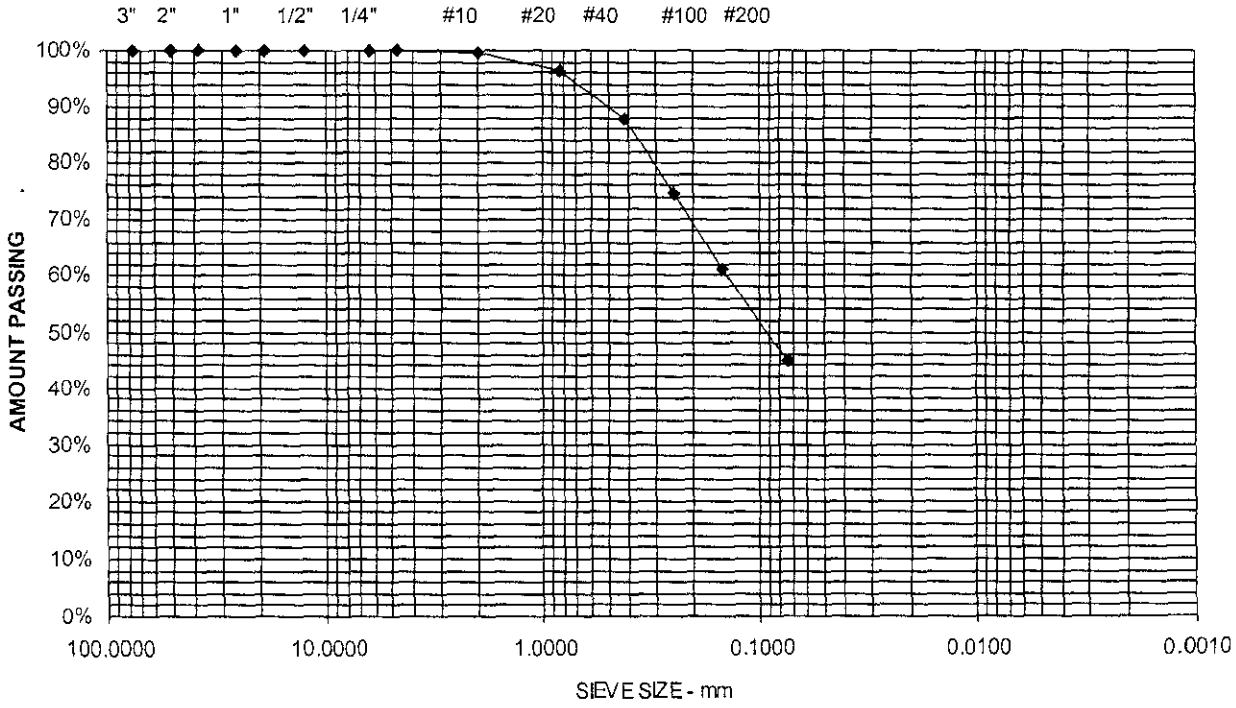
Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND - PROPOSED ELEMENTARY SCHOOL - DESIGN PHASE - GEOTECHNICAL ENGINEERING SERVICES	Project Number	07-0234.1
Client	CITY OF PORTLAND	Lab ID	8484G
Exploration	**2-4**	Date Received	5/22/2008
Material Source	**B-119 1D**	Date Complete	5/27/2008
		Tested By	JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
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



Comments:

S.W.COLE ENGINEERING, INC.

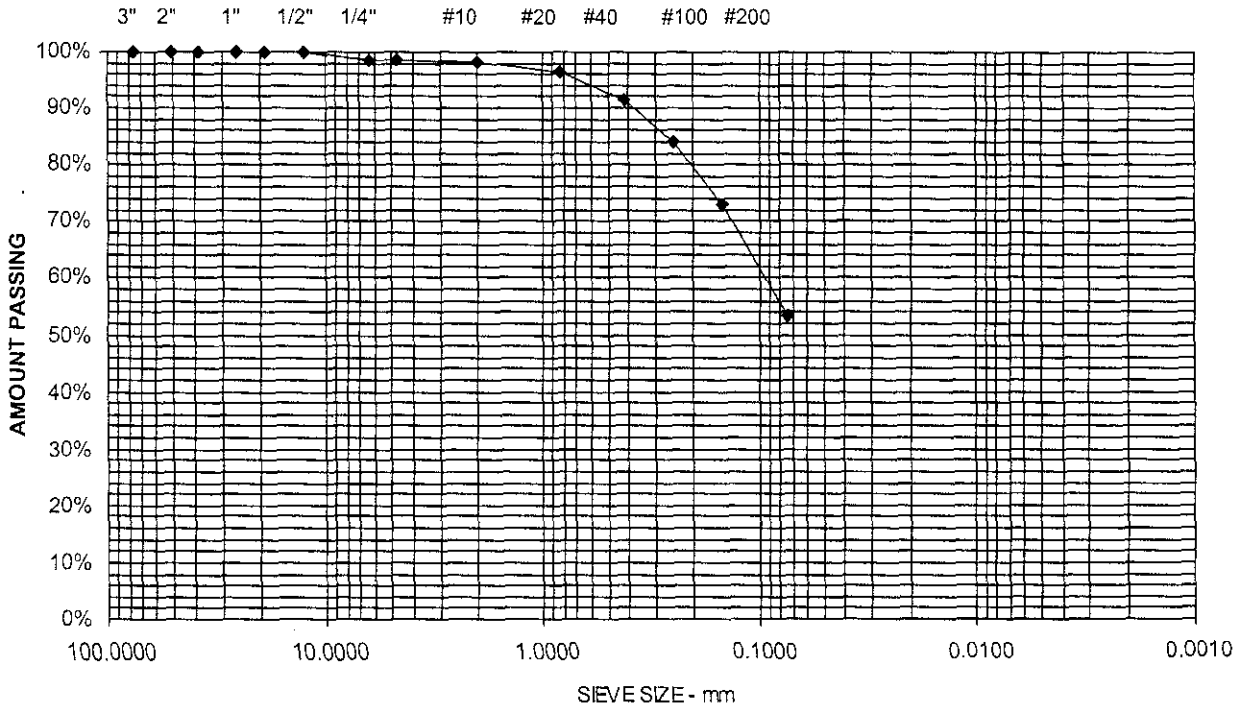
Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND - PROPOSED ELEMENTARY SCHOOL - DESIGN PHASE - GEOTECHNICAL ENGINEERING SERVICES	Project Number	07-0234.1
Client	CITY OF PORTLAND	Lab ID	8485G
Exploration	**5-6.7**	Date Received	5/22/2008
Material Source	**B-120 2D**	Date Complete	5/27/2008
		Tested By	JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
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



Comments:

S.W.COLE ENGINEERING, INC.

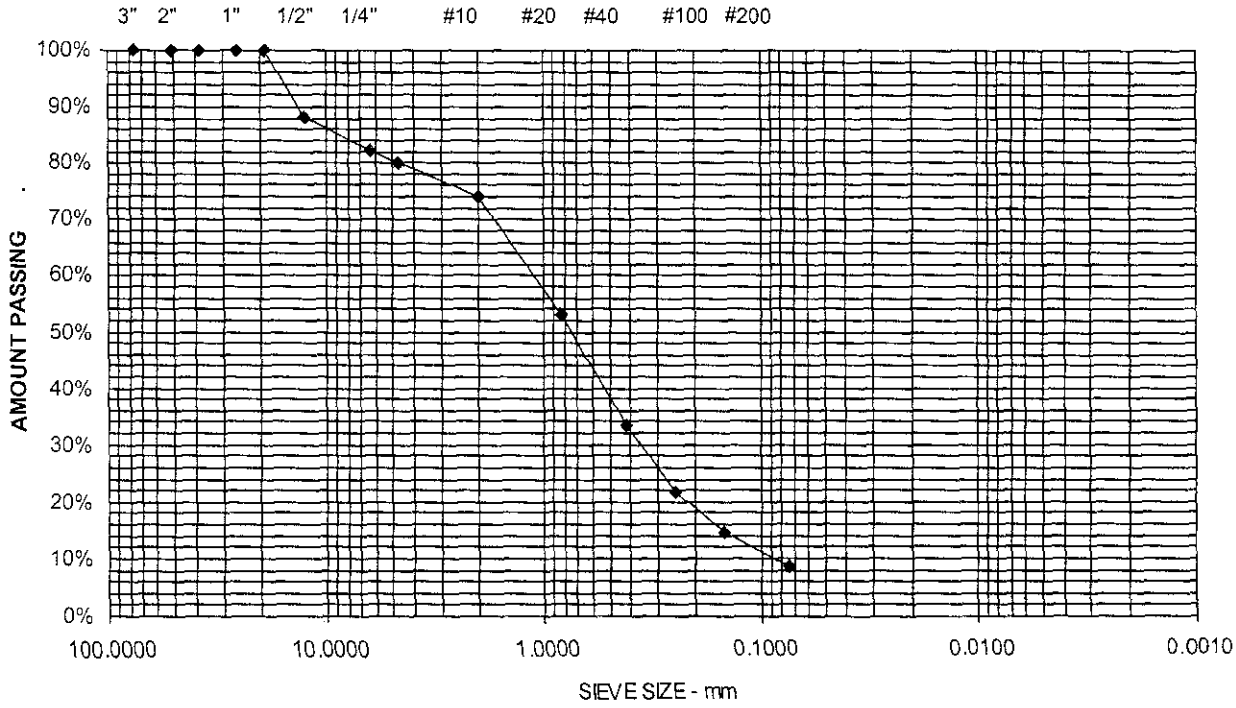
Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND - PROPOSED ELEMENTARY SCHOOL - DESIGN PHASE - GEOTECHNICAL ENGINEERING SERVICES	Project Number	07-0234.1
Client	CITY OF PORTLAND	Lab ID	8486G
Exploration	**0.2-2.2**	Date Received	5/22/2008
Material Source	**B-122 1D**	Date Complete	5/27/2008
		Tested By	JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
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



Comments: