# REPORT

August 31, 2015 13-0545.1 S

# Geotechnical Engineering Services

Proposed Mixed-Use Development York Street and High Street Portland, Maine

PREPARED FOR: Opechee Construction Corporation Attention: Jason Blais 11 Corporate Drive Belmont, NH 03220

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



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

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13-0545.1 S

August 31, 2015

Opechee Construction Corporation Attention: Jason Blais 11 Corporate Drive Belmont, NH 03220

Subject: Geotechnical Engineering Services Proposed Mixed Use Development York & High Streets Portland, Maine

Dear Jason:

In accordance with our Agreement, dated July 30, 2015, we evaluated prior explorations relative to the current development concept for the subject project. This report summarizes our findings and geotechnical recommendations relative to foundations and earthwork associated with the proposed construction. The contents of this report are subject to the limitations set forth in Attachment A.

#### **1.0 INTRODUCTION**

#### 1.1 Scope and Purpose

The purpose of our services was to evaluate subsurface information from prior explorations on the site in order to develop recommendations for foundations and earthwork associated with the proposed construction. Our scope of services included a review of prior explorations by S.W.COLE and others, a geotechnical analysis of the subsurface findings and preparation of this report.

We also researched historical records of past site structures, land use and completed environmental screening and laboratory analysis on soil samples that exhibited petroleum contaminants. Our environmental services findings are presented under separate cover to J. B. Brown & Sons, dated February 28, 2014.

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#### 1.2 Site and Proposed Construction

The site consists of several parcels located between York Street and Danforth Street in Portland, Maine and is generally bound by York Street to the east, Danforth Street to the west, a row of houses fronting High Street to the south, and Maple Street to the north. Portions of the site are occupied by buildings that will be demolished in favor of the proposed construction. A previous gas station is situated on the corner of York and High Streets. A gravel parking lot occupies the west and central portion of the site off Danforth Street. Paved parking lots occupy the northern portion of the site off York and Maple Streets.

Based on the information provided, we understand development plans call for construction of a 5-story mixed use building along York Street with a 2-story parking garage behind. We understand the mixed use building will be retail on the ground level with 4 stories of apartments above. We understand the parking garage will have an ongrade level and an elevated deck with a future 3 to 4 story apartment building above. The finished floor elevation for the mixed use building is proposed at 30.8 feet requiring fills approaching 1-foot and cuts approaching 9 feet to achieve proposed grades. The parking garage will have a level entry off York Street at elevation 30 feet sloping up to elevation 37 feet toward Danforth Street on the west side of the site. The second deck of the parking garage will have a level entry off Danforth Street at elevation 48 feet.

Existing and proposed site features are shown on the Exploration Location Plan attached as Sheet 1.

#### 2.0 EXPLORATION AND TESTING

#### 2.1 Explorations

Seven test borings (B-201 through B-207) and fifteen auger probes (P-201 through P-215) were made at the site on November 12 and 13, 2013 by Great Works Test Borings, Inc. of Rollinsford, NH working under subcontract to S. W. Cole Engineering, Inc. (S.W.COLE). The exploration locations were selected and established in the field by S.W.COLE. Owen Haskell (project surveyor) surveyed the pre-marked exploration locations. Several exploration locations were subsequently re-established using taped measurements from existing features due to equipment access. The approximate exploration locations are shown on the "Exploration Location Plan", attached as Sheet



1. Logs of the explorations are attached as Sheets 2 through 9. A key to the notes and symbols used on the logs is attached as Sheet 10. Elevations noted on the logs were estimated based on topographic information shown on Sheet 1.

A series of seven test borings (B-101 through B-107) were made in the northeast portion of the site in March 2010 by Sebago Technics, Inc. for a prior development proposal. The approximate locations of these borings is shown on Sheet 1. Logs of these explorations are attached in Appendix A.

#### 2.2 Testing

The explorations were performed using a combination of solid-stem auger and cased wash-boring techniques. The soils in the test borings were sampled at 2 to 5 foot intervals using Standard Penetration Test (SPT) methods. SPT blow counts are shown on the logs. Rock core was obtained at B-202, B-203 and B-205 using a NQ2 diamond faced core barrel. Rock Quality Designation (RQD) is noted on the logs. Soils were not sampled at the auger probe locations.

#### 3.0 SITE AND SUBSURFACE CONDITIONS

#### 3.1 Surficial Conditions

The site is located in an urban area of Portland that has experienced several development episodes. Historical records research from our environmental services indicate the site generally evolved from residential use to commercial use with multiple structures that have since been demolished, replaced or modified to the current site setting. The site generally grades downward from a high elevation in the southwest to the north and east. Existing site features are shown on the Exploration Location Plan, attached as Sheet 1.

#### 3.2 Subsurface Conditions

Underlying a surficial layer of pavement or gravel fill, the explorations encountered a subsurface profile generally consisting of fill overlying glacial outwash sands with varying fractions of silt and gravel overlying glacial till mantling bedrock. A north-south oriented ridge of shallow bedrock appears to exist along the western side of the proposed parking garage (see probes P-206, P-207 and P-208). The shallow bedrock ridge generally dives from south (High Street) to north (Maple Street). East of the shallow bedrock ridge, the



bedrock surface slopes moderately downward toward York Street. West of the shallow bedrock ridge, the bedrock surface slopes steeply downward toward Danforth Street. The principal strata encountered at the explorations are summarized below. Generalized subsurface sections across the site are attached as Sheet 1A. Refer to the attached logs for more detailed descriptions of the subsurface findings.

<u>Fill:</u> The borings encountered fill materials generally consisting of loose to medium dense sand with silt, gravel, brick, glass, concrete and ash extending to depths varying from about 2 to 11 feet below ground surface. A foundation remnant was encountered in B-201 within the surficial fill layer; other relic foundations, utilities and man-made objects likely exist beneath the site.

<u>Glacial Outwash Sands</u>: Underlying the fill, the borings generally encountered loose to medium dense glacial outwash sands with varying fractions of silt and gravel. This deposit varied in thickness from about 1 foot to 16 feet where penetrated in the test borings.

<u>Glacial Till</u>: Beneath the glacial outwash sands, the test borings generally encountered a medium dense to dense silty sand with gravel (glacial till) generally mantling bedrock. The glacial till deposit generally varied from 1 to 6 feet thick, except at B-102 where the deposit was about 22 feet thick and becomes loose overlying bedrock.

<u>Bedrock</u>: Refusal surfaces (probable bedrock) were encountered at depths of 4 to 29 feet below the ground surface, except at P-201, P-202 and B-106 where refusal was not encountered within the depths explored. Bedrock cores were obtained at borings B-202, B-203 and B-205 using a NQ2 diamond faced core barrel. The bedrock varied from hard, fractured, metavolcanic rock to hard, fractured schist. Fracture angles and RQD are noted on the logs.

#### 3.3 Groundwater Conditions

Within the 100 series borings completed in the northeast portion of the site, groundwater was generally noted at depths of 7 to 15 feet. Within the 200 series explorations, the soils appeared saturated at depths of 4 to 11 feet. Groundwater also appeared dammed along the west side of the shallow bedrock ridge toward Danforth Street. Groundwater likely becomes perched on the relatively impervious glacial till and bedrock encountered at the explorations. Groundwater levels will fluctuate seasonally and with changes in site use.



#### 4.0 CONCLUSIONS AND RECOMMENDATIONS

#### 4.1 General Findings

Based on the subsurface findings, the proposed construction appears feasible from a geotechnical standpoint. The principle geotechnical considerations are as follows:

- Shallow bedrock encountered beneath the site will require blasting or hoe-ramming for removal. Considering the urban setting, we understand hoe-ramming will be the principal means of bedrock removal. Pre-construction surveys of structures and infrastructure within at least 500 feet of the site should be conducted prior to undertaking excavation, hoe-ramming and/or blasting activities.
- The Parking Garage is proposed over an area of shallow bedrock transitioning to overburden soils (see Sheet 1A). Foundations supporting walls and columns of the parking structure will need to extend to bedrock or be supported on ground improved with rammed aggregate piers (RAPs) extending to bedrock.
- If overhead clearance is limited in the parking garage, the unheated ground floor level should be underlain with non-frost susceptible Structural Fill to a depth of 4.5 feet or rigid insulation below the pavement gravels to preclude frost heaves which can adversely affect overhead clearance in parking garages.
- The Retail and Apartment Building is proposed over an area of fill overlying loose to medium dense outwash sands overlying glacial till. We recommend foundations for this building be supported on ground improved with RAPs with soil-supported floor slabs. Existing fills should be densified and soft areas repaired prior to constructing floor slabs.
- Excavations for the garage and retail/apartment building may require braced shoring along the southern edge of the site. We anticipate soldier piles socketed into bedrock will be feasible for shoring. The use of rakes or tie backs may be necessary based upon shoring wall heights. Open cut excavations may be feasible in areas not adjacent to existing streets, utilities and buildings.



- Building foundations, retaining walls and basements should be planned with gravity underdrains to provide positive drainage relief.
- Soils that will be excavated from the site will vary from granular fill with debris and ash, to granular fill with petroleum contaminants, to native sand with silt and gravel to glacial till. Based on our understanding of the proposed development, we anticipate the site will be lowered and is principally an export site. Fills with ash and contaminants have a premium cost for disposal and require specific handling; see our environmental services report.
- Imported select granular materials will be needed for foundation backfill, base materials for foundations, slabs and pavement. Crushed stone will be needed for drainage aggregate.

#### 4.2 Excavation and Dewatering

Excavation work will generally encounter uncontrolled fills, native sands, glacial till, and bedrock. Relic foundations, relic utilities and environmentally impacted soils from past site usage may also be encountered across the site. Saturated soils and groundwater will be encountered in deeper excavations. Care must be exercised during construction to limit disturbance of the bearing soils. Earthwork and grading activities should ideally occur during drier, non-freezing, Summer and Fall seasons. Final cuts to subgrade in soil should be performed with a smooth-edged bucket to help minimize soil disturbance.

Bedrock encountered at the site will require blasting or hoe-ramming for removal. We understand hoe-ramming will be the principal means for rock removal due to the urban setting. If blasting is employed, we recommend the depth of blasting be tightly controlled to limit the depth of overblast that may require excavation and backfilling with Structural Fill. If blasting is undertaking, we recommend that blasting be performed by a licensed, qualified contractor and that pre-blast surveys should be performed on surrounding structures, properties and infrastructure in accordance with City Ordinance. Final cuts to subgrade for foundations bearing on intact bedrock should be performed with a hoe-ram in order to attain the higher bedrock bearing pressures provided herein.



Shallow excavations appear feasible with conventional sump and pump dewatering techniques. Deeper excavations, such as for utilities, may require braced excavations and sheetpiling with pumping for groundwater control. Controlling the water levels to at least one foot below planned excavation depths will help stabilize subgrades.

Excavations must be properly shored or sloped in accordance with OSHA regulations to prevent sloughing and caving of the sidewalls during construction. Care must be taken to preclude undermining adjacent structures, utilities and roadways. Excavations for the garage and retail/apartment building may require braced shoring along the southern edge of the site. We anticipate soldier piles socketed into bedrock will be feasible for shoring. The use of rakes or tie-backs may be necessary based upon shoring wall heights. Open cut excavations may be feasible in areas not adjacent to existing streets, utilities and buildings.

The design, planning and construction of excavations, excavation support and dewatering are the responsibility of the contractor. We recommend the contract documents require engineered shop drawings of shoring and dewatering plans for excavations below groundwater.

#### 4.3 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. Surficial organics, roots and topsoil should be completely removed from areas of proposed fill and construction. As much vegetation as possible should remain outside the construction areas to lessen the potential for erosion and site disturbance. S.W.COLE should observe exposed foundation, slab, and pavement subgrades prior to placement of new fills or concrete.

<u>Parking Garage Subgrades</u>: We anticipate the parking garage footings and ground floor pavement will be founded on subgrade conditions varying from native sandy soils to bedrock to uncontrolled fills.

If bedrock is blasted, we recommend blasted bedrock surfaces be choked with <sup>3</sup>/<sub>4</sub> Crushed Stone to fill voids in the bedrock surface prior to installing footings or compacted pavement gravels. Loose and overblasted bedrock should be removed and replaced with



compacted Structural Fill. Perimeter wall and combined footings founded on intact bedrock should have a 6-inch layer of crushed stone to prevent hard points under the foundation that may crack the walls. Isolated interior column footings founded on intact bedrock may be cast directly on bedrock. Footings founded on uncontrolled fill or native sandy soils must be improved with Rammed Aggregate Piers (RAPs).

At least 6-inches of compacted Crushed Stone wrapped in non-woven geotextile, such as Mirafi 160N or equivalent, should be installed below perimeter footings. Footings supported on RAP improved ground should be underlain with at least 6 inches of compacted Crushed Stone.

Paved areas founded on uncontrolled fills or native sandy soils should be densified with 3 to 5 passes of a vibratory roller having a static weight of at least 10 tons; areas that become soft and yielding should be overexcavated and replaced with compacted Structural Fill.

<u>Proposed Mixed-Used Building</u>: We anticipate the mixed used building footings and ground floor slab will be founded on subgrade conditions varying from native sandy soils to uncontrolled fills.

Footings founded on uncontrolled fill or native sandy soils must be improved with Rammed Aggregate Piers (RAPs). Floor slab areas founded on uncontrolled fills or native sandy soils should be densified with 3 to 5 passes of a vibratory roller having a static weight of at least 10 tons; areas that become soft and yielding should be overexcavated and replaced with compacted Structural Fill.

At least 6-inches of compacted Crushed Stone wrapped in non-woven geotextile, such as Mirafi 160N or equivalent, should be installed below perimeter footings. Footings supported on RAP improved ground should be underlain with at least 6 inches of compacted Crushed Stone.

#### 4.4 Foundations and Walls

The parking garage and mixed use building may be supported on spread footings founded on properly prepared subgrades. Footings founded on blasted bedrock should be choked with <sup>3</sup>/<sub>4</sub>-inch Crushed Stone to fill voids. Footings founded on uncontrolled



fills and native sandy soils must be improved with Rammed Aggregate Piers (RAPs). Footings founded on intact bedrock may use the higher undisturbed bedrock bearing pressure, provided herein. Footings founded on blasted or disturbed bedrock may be designed considering the lower bearing pressure provided herein.

For spread footings founded on properly prepared subgrades, we recommend the following geotechnical parameters for foundation and RAP design consideration:

Geotechnical Parameters for Spread Footings and Backfilled Walls								
Design Frost Depth								
**RAP improved soil & blasted bedrock	4.5 feet							
**Undisturbed, intact bedrock	2.5 feet (pinned to bedrock)							
Net Allowable Bearing Pressure								
**RAP improved soil & blasted bedrock	4.0 ksf or less							
**Undisturbed, intact bedrock	8.0 ksf or less							
Base Friction Factor	0.4							
Total Unit Weight of Backfill	130 pcf (compacted Structural Fill)							
At-Rest Lateral Earth Pressure Coefficient	0.5 (compacted Structural Fill)							
Internal Friction Angle of Backfill	32° (compacted Structural Fill)							
Total Post-Construction Settlement	1/2- inch of less							
Differential Post-Construction Settlement	1/2-inch or less							
Seismic Soil Site Class (2012 IBC)	D							

We recommend the contract documents require an engineered submittal for RAPs to improve ground conditions to meet or exceed the geotechnical parameters for bearing pressure and settlement as presented herein. The RAP submittal should be prepared and sealed by a Professional Engineer licensed in the State of Maine and endorsed by the RAP installer and Geopier Foundation Company. S.W.COLE should be engaged to review the RAP submittal prior to installing RAPs. The RAP contractor should anticipate encountering relic foundations and debris in the site fills. Contract documents should contain unit rate provisions for overexcavation of debris.



#### 4.5 Foundation Drainage

We recommend an underdrain system be installed on the outside edge of the geotextile fabric wrapped Crushed Stone layer recommended below perimeter footings. The underdrain pipe should consist of 4-inch diameter, perforated SDR-35 foundation drain pipe bedded in the layer of geotextile wrapped Crushed Stone provided below foundations. The underdrain pipe must have a positive gravity outlet protected from freezing, clogging and backflow. Surface grades should be sloped away from the building for positive surface water drainage.

#### 4.6 Slab-On-Grade Floors

On-grade floor slabs in heated areas may be designed using a subgrade reaction modulus of 100 pci (pounds per cubic inch) provided the slab is underlain by at least 12-inches of compacted Structural Fill placed over properly prepared subgrades. The structural engineer or concrete consultant must design steel reinforcing and joint spacing appropriate to slab thickness and function.

We recommend installation of a sub-slab soil-gas and radon venting systems for enclosed building areas. We also recommend a sub-slab vapor retarder particularly in areas of enclosed building where the concrete slab will be covered with an impermeable surface treatment or floor covering that may be sensitive to moisture vapors. The vapor retarder must have a permeance that is less than the floor cover or surface treatment that is applied to the slab. The vapor retarder must have sufficient durability to withstand direct contact with the sub-slab base material and construction activity. The vapor retarder material should be placed according to the manufacturer's recommended method, including the taping and lapping of all joints and wall connections. The architect and/or flooring consultant should select the vapor retarder products compatible with flooring and adhesive materials.

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



#### 4.7 Entrance Slabs, Sidewalks and Garage Floors

Entrance slabs and sidewalks adjacent to the building must be designed to reduce the effects of differential frost action between adjacent pavement, doorways, and entrances. We recommend that non-frost susceptible Structural Fill be provided to a depth of at least 4.5 feet below the top of entrance slabs. This thickness of Structural Fill should extend the width of the entrance slab and outward at least 4.5 feet, thereafter transitioning up to the bottom of the adjacent sidewalk or pavement gravels at a 3H:1V or flatter slope. Alternatively, the entrance slab may be founded on footings extending below the frost depth.

If overhead clearance is limited in the parking garage, the unheated ground fleer level should be underlain with non-frost susceptible Structural Fill to a depth of 4.5 feet or rigid insulation below the pavement gravels to preclude frost heaves which can adversely affect overhead clearance in parking garages.

#### 4.8 Backfill and Compaction

We recommend the following fill and backfill materials for construction:

<u>Granular Borrow</u>: Fill to raise grades below building and paved areas should be sand or silty sand meeting the requirements for 2014 Standard Specification MaineDOT 703.19 Granular Borrow.

<u>Structural Fill</u>: Fill to repair soft areas, backfill for foundations, slab base material and material within the frost transition zone below exterior slabs and sidewalks, and non-frost susceptible material below the unheated ground floor level of the parking garage should be clean, non-frost susceptible sand and gravel meeting the gradation requirements for Structural Fill as given below:

Structural Fill							
Sieve Size	Percent Finer by Weight						
4 inch	100						
3 inch	90 to 100						
1/4 inch	25 to 90						
#40	0 to 30						
#200	0 to 5						



<u>Crushed Stone</u>: Crushed Stone, used beneath foundations and for underdrain aggregate, should meet the requirements of 2014 MaineDOT Standard Specification 703.13 Crushed Stone <sup>3</sup>/<sub>4</sub>-Inch.

<u>Reuse of Site Soils</u>: The uncontrolled fills should be exported and properly disposed off-site. The native sandy soils may be suitable for re-use as Granular Borrow. Blasted bedrock may be blended with sand to create Structural Fill and pavement gravels. Ash and environmentally impacted soils should be exported and properly disposed off-site.

<u>Placement and Compaction</u>: Fill should be placed in horizontal lifts and compacted such that the desired density is achieved throughout the lift thickness with 3 to 5 passes of the compaction equipment. Loose lift thicknesses for grading, fill and backfill activities should not exceed 12 inches.

We recommend that fill and backfill in building and paved areas be compacted to at least 95 percent of its maximum dry density as determined by ASTM D-1557. We recommend that basement wall backfill be compacted to between 92 to 95 percent of its maximum dry density as determined by ASTM D-1557 to avoid overstressing the wall. Crushed Stone should be compacted with 3 to 5 passes of a vibratory plate compactor having a static weight of at least 500 pounds.

#### 4.9 Weather Considerations

Construction activity should be limited during wet and freezing weather and the site soils may require drying before construction activities may continue. The contractor should anticipate the need for water to temper fills in order to facilitate compaction during dry weather. If construction takes place during cold weather, subgrades, foundations and floor slabs must be protected during freezing conditions. Concrete and fill must not be placed on frozen soil; and once placed, the concrete and soil beneath the structure must be protected from freezing.



#### 4.10 Design Review and Construction Testing

S.W.COLE should review the construction documents to determine that our earthwork and foundation recommendations have been properly interpreted and implemented.

A testing and special inspections program should be implemented during construction to observe compliance with the design concepts, plans, and specifications. S.W.COLE should be retained to provide geotechnical observations during earthwork, RAP, foundation and paving construction activities, as well as providing testing and special inspection services for soils, 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. We look forward to working with you as design progresses and during construction.

Sincerely,

#### S. W. Cole Engineering, Inc.

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

TJB:rec



#### Attachment A Limitations

This report has been prepared for the exclusive use of Opechee Construction Corporation for specific application to the proposed Mixed-Use Development on York Street and High Street in Portland, Maine. S. W. Cole Engineering, Inc. (S.W.COLE) 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'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 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.





## LEGEND:

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APPROXIMATE BORING LOCATION

### APPROXIMATE PROBE LOCATION

#### NOTES:

- 1. EXPLORATION LOCATION PLAN WAS PREPARED FROM A SCALE PRELIMINARY CONCEPT PLAN OF THE SITE PREPARED BY OPECHEE CONSTRUCTION CORPORATION, RECEIVED VIA E-MAIL JULY 20, 2015 IN AUTOCAD DWG FILE FORMAT.
- 2. BORINGS B-202 THROUGH B-207 AND PROBES P-202, P-203, P-206, P-209 THROUGH P-215 WERE LOCATED IN THE FIELD BY SURVEY BY OWEN HASKELL, INC. AND PROVIDED ON THE ABOVE REFERENCED PLAN. BORING B-201 AND PROBES P-201, P-204, P-205, P-207 AND P-208 WERE LOCATED IN THE FIELD BY TAPED MEASUREMENTS FROM EXISTING SITE FEATURES.
- 3. BORINGS B-101 THROUGH B-107 WERE PERFORMED BY SEBAGO TECHNICS, INC. THE LOCATIONS WERE PROVIDED ON A PLAN ENTITLED "BORING LOCATION PLAN," PROVIDED BY J.B.BROWN & SOND, DATED 5/10/2010.
- 4. THIS PLAN SHOULD BE USED IN CONJUNCTION WITH THE ASSOCIATED S.W. COLE ENGINEERING, INC. GEOTECHNICAL REPORT.
- 5. THE PURPOSE OF THIS PLAN IS ONLY TO DEPICT THE LOCATION OF THE EXPLORATIONS IN RELATION TO THE EXISTING CONDITIONS AND PROPOSED CONSTRUCTION AND IS NOT TO BE USED FOR CONSTRUCTION.

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	· · · · · ·   · · · · ·   · <b>P</b>		· · · · · · · · · · · · · · · · · · ·	P	-210					· · · · · · · · · · · · =	-
						\ <u></u>					— 40
				· · · · · · · · · · · · · · · · · · ·		:\:					-
<del></del>						$\mathcal{I}$				, F	
									B-205		- 35 E
TY SAND					\	, FILL			(OFFSET 29)	)::::E	Z
						L			· · · · · · <del>· •</del> · · · · · ·		<u>- 30 </u>
				· · · · · · · · · · · · · · · · · · ·					<b>K</b>		
				•••••		· · · · · · · · · · · · · · · · · · ·	· · <del>- · · ·</del> · · <del>· · · · · ·</del> · ·	<u> </u>	<u> </u>	<u> </u>	·25 🗒
	<u></u>										• ш -
TILL :				· · · · · · · · · · · · · · · · · · ·	BEDROCK	<u> </u>		SILTY SAND			-
											<u> </u>
DROCK										, F	-
							<b>`</b>				15
											-
											- 
				· · · · · · · · · · · · · · · · · · ·							- 10
										f E	-
											<u> </u>
											-
									· · · · · · · · · · · · · · · · · · ·		— 0

SCALE: 1"=30' H. 1"= 15' V.

F	ARKING GARAGE								— 60 
	P-207	P.	-208	- EXISTIN	G BUILDING				50 
		FILL		E-1	06		B-103		40 
			BEDROCK			SILTY SAND / SAND			1     30 30 55 55
(P) -									20 
						BEDROCK			- 10 
· · · · ·							· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	- 5







TYPE

НW

SS

NQ 2"

PROPOSED MIXED USE DEVELOPMENT

SIZE

4"

1 3/8" I.D.

GREAT WORKS TEST BORING INC

YORK STREET AND DANFORTH STREET PORTLAND, MAINE

140-LB

## **BORING LOG**

PETER MICHAUD

DRILLER:

30"

HAMMER WT. HAMMER FALL

BORING NO .:	B-201
SHEET:	1 OF 1
PROJECT NO .:	13-0545
DATE START:	11/13/2013
DATE FINISH:	11/13/2013
ELEVATION:	45'
SWC REP.:	K. GIMPEL

WATER LEVEL INFORMATION

SOILS APPEARED SATURATED BELOW 6' +/-

SAMPLER: \_\_\_\_\_ CORE BARREL:

PROJECT:

LOCATION: DRILLING FIRM:

CLIENT :

CASING	SAMPLE				SAM	PLER BI	LOWS F	PER 6"		STRATA & TEST DATA		
PER FOOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24	DEPIN	STRATA & TEST DATA		
SSA												
	1D	24"	12"	2.0'	15	21	17	9	-	BROWN GRAVELLY SILTY SAND		
	0.0	4.0.1	0"	0.51	40	05	00		-			
	20	18"	6	3.5	12	25	30			[PROBABLE RELIC FOUNDATION WALL AT 3.5 - OFFSET 3' AND RESUMED DRILLING		
									5.5'			
	3D	24"	19"	7.0'	2	8	8	11	<u></u>	BROWNISH GRAY SANDY SILT WITH SILTY SAND SEAMS		
									8.0'	~MEDIUM DENSE~		
	4D	24"	24"	9.0'	7	7	15	15		GRAY SILTY SAND SOME GRAVEL		
•									10.0'	~MEDIUM DENSE~		
HW									-			
	G 5D	24"	3"	12.0'	3	3	3	2		GRAY SILTY SAND		
					-				-	~LOOSE~		
	_											
	6D	24"	4"	17.0'	8	7	5	3		~MEDIUM DENSE~		
									-			
•												
	7D	12"	0"	21.0'	50	50			-			
									-	PROBABLE GLACIAL TILL SOILS		
	_								> 23 5'			
									24.5	PROBABLE WEATHERED ROCK (ADVANCE BY ROLLER CONE)		
									~			
										REFUSAL AT 24.5'		
										(PROBABLE BEDROCK)		
	_											
									-			
									-			
	1											
	1								1			
	1											
	1											
SAMP	LES:			SOIL C	LASSI	FIED BY	Y:		REMAR	RKS:		
				<b></b>								
D = SF	CHELD			~	DRI	LLER -	VISUAL					
U = 3.5	5" SHEL	BY TUB	E		LAB		DRY TE	ST		AND THE TRANSITION MAY BE GRADUAL.		



TYPE

HW

SS

PROPOSED MIXED USE DEVELOPMENT

SIZE

4" O.D.

1 3/8" I.D.

GREAT WORKS TEST BORING INC

YORK STREET AND DANFORTH STREET PORTLAND, MAINE

140-LB

## **BORING LOG**

PETER MICHAUD

DRILLER:

30"

HAMMER WT. HAMMER FALL

 BORING NO.:
 **B-202** 

 SHEET:
 1 OF 1

 PROJECT NO.:
 13-0545

 DATE START:
 11/13/2013

 DATE FINISH:
 11/13/2013

 ELEVATION:
 49'

 SWC REP.:
 K. GIMPEL

WATER LEVEL INFORMATION

SOILS APPEARED SATURATED BELOW 6' +/-

CORE BARREL: NQ 2"

PROJECT:

LOCATION:

DRILLING FIRM:

CLIENT :

CASING:

SAMPLER:

CA BL	SING OWS		SAN	/IPLE		SAMPLER BLOWS PER 6"					
P F(	PER DOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
S	SA									1.0'	BROWN GRAVELLY SILTY SAND (FILL)
		1D	24"	15"	2.0'	11	12	7	9	1.8'	BROWN SILTY SAND SOME GRAVEL WITH BRICK (FILL)
										3.0'	~MEDIUM DENSE~ BROWN SAND AND SILT SOME GRAVEL
		2D	24"	16"	4.0'	6	8	9	8	4.0'	~MEDIUM DENSE~ BROWN SILTY SAND AND GRAVEL
											BROWN SILTY SAND
											WITH OCCASIONAL SAND SEAMS
		3D	24"	20"	7.0'	3	4	5	6		~MEDIUM DENSE~
		4D	24"	22"	9.0'	5	5	5	10		WITH TRACE CLAY
•	♦									9.5'	
F	W										GRAY SILTY SAND SOME GRAVEL
CA	SING	5D	24"	14"	12.0'	4	7	7	8	12.0'	~MEDIUM DENSE~
											BROWN SAND TRACE SILT
											~MEDIUM DENSE~
		6D	24"	17"	17.0'	11	11	11	16		
										18.0'	
											GRAY GRAVEL AND SILTY SAND (TILL)
											~DENSE~
		7D	24"	10"	22.0'	23	19	33	35	22.0'	
											WEATHERED ROCK
•	•									24.0'	[ADVANCE BY ROLLER CONE]
											GRAY METAVOLCANIC ROCK, HARD, SLIGHTLY WEATHERED
											FINE-MEDIUM GRAINED, IRON OXIDE STAINING ON FRACTURES
											FRACTURES AT 65 TO 75 DEGREES
		R1	48"	36"	28.0'					28.0'	RQD = 21%
											BOTTOM OF EXPLORATION AT 28.0'
											(BEDROCK)
SA	SAMPLES: SOIL CLASSIFIED BY:						FIED B	Y:		REMAR	KS:
D =	= SPL	IT SPC	DON			DRI	LLER -	VISUAL	LY		STRATIFICATION LINES REPRESENT THE (3)
C =	C = 3" SHELBY TUBE X SOIL TECH VISUALLY					L TECH	I VISL	JALLY		APPROXIMATE BOUNDARY BETWEEN SOIL TYPES	
U =	= 3.5" SHELBY TUBE LABORATORY TEST						ORATO	URY TE	ST		AND THE TRANSITION MAY BE GRADUAL. BORING NO.: B-202



TYPE

HW

SS

NQ 2"

PROPOSED MIXED USE DEVELOPMENT

SIZE

4" O.D.

1 3/8" I.D.

GREAT WORKS TEST BORING INC

YORK STREET AND DANFORTH STREET PORTLAND, MAINE

140-LB

## **BORING LOG**

PETER MICHAUD

DRILLER:

30"

HAMMER WT. HAMMER FALL

BORING NO .:	B-203
SHEET:	1 OF 1
PROJECT NO .:	13-0545
DATE START:	11/13/2013
DATE FINISH:	11/13/2013
ELEVATION:	42'
SWC REP.:	K. GIMPEL

WATER LEVEL INFORMATION

SOILS APPEARED SATURATED BELOW 8' +/-

SAMPLER: CORE BARREL:

PROJECT:

LOCATION: DRILLING FIRM:

CLIENT :

CASING	i	SAM	<b>IPLE</b>		SAM	PLER BI	LOWS F	PER 6"	DEDTU	STRATA & TEST DATA
PER FOOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
SSA									0.1'	BROWN SILTY SAND WITH ORGANICS (LAWN AREA)
	1D	24"	16"	2.0'	7	7	6	4		
										BROWN SILTY SAND SOME GRAVEL
	2D	24"	15"	4.0'	4	4	4	3	-	TRACE ORGANICS AND BRICKS (FILL)
	3D	24"	20"	7 0'	2	1	2	1		~ 20032 TO VERT 20032 ~
	00	27	20	7.0	-		-	•	8.0'	
	4D	24"	18"	9.0'	1	3	7	10		GRAY SILTY SAND [PETROLEUM ODOR]
▼									9.5'	~LOOSE~
HW										
CASIN	G 5D	24"	16"	12.0'	6	20	18	8		BROWN SILTY SAND
									-	~DENSE~
									14.0'	
	6D	24"	17"	17.0'	16	20	17	16		
	00	24		17.0	10	20	17	10	-	~DENSE~
									19.0'	
										GRAY SAND SOME SILT
	7D	24"	14"	22.0'	6	7	8	13		~MEDIUM DENSE~
									23.0'	
	00	24"	1.4"	27.0'	15	11	10	10	-	
	80	24	14	27.0	15	14	13	12	28.0'	~ MEDIUM DENSE ~
									20.0	WEATHERED ROCK
•									30.0'	[ADVANCE BY ROLLER CONE]
										LIGHT GRAY METAVOLCANIC ROCK, HARD, SLIGHTLY WEATHERED
										FINE-MEDIUM GRAINED, IRON OXIDE STAINING ON FRACTURES
									-	FRACTURES AT 15 TO 80 DEGREES
	R1	60"	60"	35.0'					35.0'	RQD = 32%
									-	
										BOTTOM OF EXPLORATION AT 35.0
									-	(BEDROOK)
	1									
SAMPL	ES:			SOIL C	LASSI	FIED BY	Y:		REMAR	KS:
n – ep					ופח		1/191101	IV		
C = 3"	SHELB	TUBE		Х	SOI	L TECH	I VISL	JALLY		APPROXIMATE BOUNDARY BETWEEN SOIL TYPES
U = 3.5	" SHELI	BY TUB	E		LAE	ORATO	ORY TE	ST		AND THE TRANSITION MAY BE GRADUAL. BORING NO.: B-203



## **BORING LOG**

 BORING NO.:
 **B-204** 

 SHEET:
 1 OF 1

 PROJECT NO.:
 13-0545

 DATE START:
 11/12/2013

 DATE FINISH:
 11/12/2013

 ELEVATION:
 42'

 SWC REP.:
 E. WALKER

WATER LEVEL INFORMATION

PROJECT:	PROPOSED N	/IXED USE D	EVELOPMENT		
CLIENT :	J.B. BROWN &	& SONS			
LOCATION:	YORK STREE	T AND DANF	ORTH STREET	PORTLAND, MAIN	NE
DRILLING FIRM:	GREAT WORK	KS TEST BOF	DRILLER:	JEFF LEE	
	TYPE	SIZE	HAMMER WT.	HAMMER FALL	
CASING:	SSA	4.5" O.D.			
SAMPLER:	SS	1 3/8" I.D.	140-LB	30"	
CORE BARREL:	N/A				

CA	SING		SAN	/IPLE		SAM	PLER BI	LOWS F	PER 6"		
P	ER	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
S	SA				© 001						BROWN GRAVELLY SAND SOME SILT (FILL) TRACE ORGANICS TOP 6"
		1D	24"	16"	2.0'	5	9	9	8	2.0'	~ MEDIUM DENSE ~
		2D	24"	14"	4.0'	5	4	3	2	5.0'	DARK BROWN SILT AND SAND SOME GRAVEL (FILL) ~ LOOSE ~
		3D	24"	18"	7.0'	6	14	13	17	8.5'	BROWN WITH ORANGE AND DARK BROWN STAINING SILTY SAND SOME GRAVEL WITH WEATHERED BEDROCK FRAGMENTS (GLACIAL TILL) ~ MEDIUM DENSE ~
											(GLACIAL TILL) ~ MEDIUM DENSE ~ REFUSAL AT 8.5' (PROBABLE BEDROCK)
SA	MPLE	ES:		<u>.</u>	SOIL C	LASSIF	FIED B	Y:		REMAR	I RKS:
D = C = U =	SPL 3" S 3.5"	IT SPC HELBY SHELE	ON TUBE 3Y TUB	E	X	DRII SOII LAB	LER - ' L TECH ORATC	VISUAL I VISL DRY TE	_LY JALLY ST		STRATIFICATION LINES REPRESENT THE 5 APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. BORING NO.: B-204



TYPE

НW

SS

NQ 2"

PROPOSED MIXED USE DEVELOPMENT

SIZE

4" O.D.

1 3/8" I.D.

GREAT WORKS TEST BORING INC

YORK STREET AND DANFORTH STREET PORTLAND, MAINE

140-LB

## **BORING LOG**

JEFF LEE

DRILLER:

30"

HAMMER WT. HAMMER FALL

BORING NO .:	B-205
SHEET:	1 OF 1
PROJECT NO .:	13-0545
DATE START:	11/12/2013
DATE FINISH:	11/12/2013
ELEVATION:	29'
SWC REP.:	K. GIMPEL

WATER LEVEL INFORMATION

SOILS APPEARED SATURATED BELOW 4' +/-

SAMPLER: \_\_\_\_\_ CORE BARREL:

PROJECT:

DRILLING FIRM:

CLIENT : LOCATION:

CAS	SING		SAN	<b>IPLE</b>		SAM	PLER BI	LOWS F	PER 6"		
PE FO	ER IOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
SS	SA									0.1'	2-INCHES ASPHALT PAVEMENT
											BROWN SILTY SAND SOME GRAVEL
		1D	24"	16"	2.5'	4	2	2	2	3.0'	WITH BRICKS (FILL)
										3.5'	BROWN SILTY SAND (FILL)
		2D	24"	21"	4.5'	2	2	5	5		
											GRAY SILTY SAND
		3D	24"	15"	7.0'	5	8	11	11		[PETROLEUM ODOR]
											~MEDIUM DENSE BECOMING
							_				
		4D	24"	17"	12.0'	3	2	3	2		LOOSE~
_	7									15.0	
- ч	, \\/									15.0	-DENSE- BROWN GRAVELLY SILTY SAND (TILL)
CAS	ING	5D	17"	16"	16.4'	13	15	50/5"		17.0	
то	16'	00		10	10.4	10	10	00/0		17.0	WEATHERED ROOK
10	10										
											GRAY SCHIST, HARD, SLIGHTLY WEATHERED, MEDIUM GRAINED
											FRACTURES AT 35 TO 75 DEGREES
		R1	60"	39"	23.0'						RQD = 65%
										1	
		R2	60"	50"	28.0'					28.0'	RQD = 63%
											BOTTOM OF EXPLORATION AT 28.0'
											(BEDROCK)
-											
<u> </u>											
SAN	<b>NPLE</b>	S:			SOIL C	LASSI	FIED B	Y:		REMAR	<s:< td=""></s:<>
						T					
D =	SPL				V			VISUAL			STRATIFICATION LINES REPRESENT THE
U =	3 5			F	Ă			ו עוטע עדר	JALLY ST		
0 =	5.5	SHELE					UNAIC		51	I '	BORING NO.: B-205



TYPE

SSA

SS

N/A

PROPOSED MIXED USE DEVELOPMENT

SIZE

4.5" O.D.

1 3/8" I.D.

GREAT WORKS TEST BORING INC

YORK STREET AND DANFORTH STREET PORTLAND, MAINE

140-LB

## **BORING LOG**

JEFF LEE

DRILLER:

30"

HAMMER WT. HAMMER FALL

BORING NO .:	B-206
SHEET:	1 OF 1
PROJECT NO .:	13-0545
DATE START:	11/12/2013
DATE FINISH:	11/12/2013
ELEVATION:	31'
SWC REP.:	K. GIMPEL

WATER LEVEL INFORMATION

NO FREE WATER OBSERVED

SAMPLER: CORE BARREL:

PROJECT:

DRILLING FIRM:

CLIENT : LOCATION:

CASING BLOWS		SAN	<b>IPLE</b>		SAM	PLER BL	LOWS F	PER 6"	DEDTU	ΟΤΡΑΤΑ « ΤΕΩΤ ΡΑΤΑ
PER FOOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24	DEPTH	SIRATA & TEST DATA
SSA									0.2'	2.5-INCHES ASPHALT PAVEMENT
									1.0'	BROWN GRAVELLY SAND TRACE SILT (FILL)
	1D	24"	17"	2.5'	6	8	8	12		
										BROWN GRAVELLY SILTY SAND
	2D	24"	20"	4.5'	9	15	16	16		~MEDIUM DENSE~
	20	0.4"	20"	7.0	40	45	0	10		
	30	24	22	7.0	12	15	9	12		
♦										
	4D	18"	18"	11.5'	12	11	12	25/0"	11.5'	
										REFUSAL AT 11.5'
										(PROBABLE BEDROCK)
					-					
SAMPL	ES:			SOIL C	LASSI	FIED BY	<b>/:</b>		REMAR	KS:
D = SPI				V	DRI	LLER - '	VISUAL			STRATIFICATION LINES REPRESENT THE
U = 3" 8	SHELRI		F	X			VISU NRY TE	JALLY ST		APPROXIMATE BOUNDARY BETWEEN SUIL TYPES
0 = 0.0			· <b>-</b>			SIGNIC		51		BORING NO.: B-206



TYPE

SSA

SS

N/A

PROPOSED MIXED USE DEVELOPMENT

SIZE

4.5" O.D.

1 3/8" I.D.

GREAT WORKS TEST BORING INC

YORK STREET AND DANFORTH STREET PORTLAND, MAINE

140-LB

## **BORING LOG**

JEFF LEE

DRILLER:

30"

HAMMER WT. HAMMER FALL

BORING NO .:	B-207
SHEET:	1 OF 1
PROJECT NO .:	13-0545
DATE START:	11/12/2013
DATE FINISH:	11/12/2013
ELEVATION:	32'
SWC REP.:	K. GIMPEL

WATER LEVEL INFORMATION

SOILS APPEARED SATURATED BELOW 11'+/-

SAMPLER: CORE BARREL:

PROJECT:

LOCATION: DRILLING FIRM:

CLIENT :

CASING BLOWS		SAN	<b>IPLE</b>		SAM	PLER BI	_OWS F	PER 6"	DEDTU	STDATA & TEST DATA	
PER FOOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24	DEPIR	STRATA & TEST DATA	
SSA									0.3	4-INCHES ASPHALT PAVEMENT	
									1.0'	BROWN GRAVELLY SAND TRACE SILT (FILL)	
	1D	24"	18"	2.5'	6	6	7	8		BROWN SILTY SAND SOME GRAVEL	
										TRACE ASH (FILL)	
	2D	24"	17"	4.5'	7	5	9	8	4.5'		
									5.5'	~MEDIUM DENSE~ BROWN SILTY SAND SOME GRAVEL	
	3D	24"	24"	7.0'	5	4	6	7	6.5	-MEDIUM DENSE- GRAY SILTY SAND TRACE GRAVEL	
					_		-		8.0'	~MEDIUM DENSE~ BROWN SAND TRACE SILT	
	4D	24"	15"	9.0'	1	8	9	1	8.5	~MEDIUM DENSE~ BROWN GRAVELLY SAND SOME SILT	
									44.01	~MEDIUM DENSE~ BROWN GRAVELLY SILTY SAND	
	50	0.4"	0"	10.01	7	0	4	2	11.0	WITH WEATHERED ROCK FRAGMENTS	
	50	24	0	12.0	1	0	4	3			
										~MEDIONI DENSE~	
									16.0'		
	6D	24"	16"	17.0'	5	10	32	32	10.0	BROWN GRAVELLY SILTY SAND (TILL)	
	-			-			-			~DENSE~	
V									19.0'		
										REFUSAL AT 19.0'	
										PROBABLE BEDROCK	
SAMPL	ES:			SOIL C	LASSI	FIED BY	<i>(</i> :		REMAR	KS:	
D = SPI		ON			DRI	LLER -	VISLIAI	LY		STRATIFICATION LINES REPRESENT THE	в
C = 3" S	SHELBY	TUBE		Х	SOI	L TECH	VISL	JALLY		APPROXIMATE BOUNDARY BETWEEN SOIL TYPES	$\mathcal{I}$
U = 3.5" SHELBY TUBE			AND THE TRANSITION MAY BE GRADUAL. BORING NO.: B-20	7							



## **PROBE DATA**

9

#### PROJECT: PROPOSED MIXED-USE DEVELOPMENT

CLIENT: J.B.BROWN & SONS

LOCATION: DANFORTH AND YORK STREETS, PORTLAND, MAINE

PROBE NUMBER	GROUND SURFACE ELEVATION (FT)	DEPTH TO REFUSAL (FT)	ESTIMATED THICKNESS OF FILL SOILS (FT)
P-201	50	30 NR	8
P-202	43	30 NR	9
P-203	37	28.5	9
P-204	46	24.5	9
P-205	44	27	7
P-206	49	8	5
P-207	45	4	4
P-208	43	10	5
P-209	46	4	3
P-210	40	12.5	9
P-211	42	8	5
P-212	32	12	3
P-213	32	13	5
P-214	31	19	5
P-215	32	21	8

NOTES: P-201: 30-foot depth was not refusal, but probable dense till or bedrock P-202: 30-foot depth was not refusal, but probable dense till or bedrock P-205: Bedrock at 25.5'

P-207: Refusal at 4-feet below ground surface, offset and had refusal at 6.5'



• Geotechnical Engineering • Field & Lab Testing • Scientific & Environmental Consulting

#### 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
- $S_v$  field vane shear strength, kips/sq. ft.
- L<sub>v</sub> 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
- $\gamma_B$  buoyant soil weight

#### **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.

## **APPENDIX A**



16043 57 YOR 16 GRACE

BOLENIG LOCATEONS

SEBAGO TECHNICS, INC

		LOUL	IICS, INC.	I STTER OF TRANGMITTA
	One P.	Chabot S O. Box 1	Street 339	
	WESTBRO	OK, ME C	4098-1339	T000'
				DATE May 10, 2010 JOB NO. 10043
Pho	one (207) 856-0	0277 F	AX (207) 856-2206	ATTENTION VINCENT VEYSNESS Preside
то	J.B. B.M	cosin Q	- Sous	RE: Proposed & Ffire Building
		<u> </u>	al L	- Mapped Office Forty ung
	36 Vant	314	Street	- D 41 / Mari
	Port los	d	MÆ 04101	Portland, Mam
		.,	<b>F</b>	
WE ARE S	SENDING YOU	🗶 Atta	ched 🛛 🗆 Under separate cover	viathe following items:
	Shop drawin	ngs	Prints PI PI	ans 🗆 Samples 🗆 Specifications
	□ Copy of lette	er	🗆 Change order 🛛 🗙	Boring Logs + Plan
COPIES	DATE	NO.		DESCRIPTION
	3/26/10		Los L Ban	- Black Blaz
	10710		Logs of working	
			Summary l'an	ble
			Borning Locate	Ou s
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THESE AR	RE TRANSMITTED	) as check	ed below:	
	□ For approv	'al	$\Box$ Approved as subm	itted 🛛 Resubmit copies for approval
	🔀 For your us	se	Approved as noted	Submit copies for distribution
	As request	ed	Returned for corre	ctions
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REMARKS				
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If enclosures are not as noted, kindly notify us at once.

# **PROPOSED OFFICE BUILDING** SUMMARY OF BORINGS PORTLAND, MAINE **57 YORK STREET TABLE I**

			1			<b></b>			
		Bedrock	0.0*	0.0*	0.0*	0.0*	0.0*	1	0.0*
	Weathered	Bedrock		5.7	2.5	0.6	0.7		-
kness (Ft)		Glacial Till	6.5	21.7	4.0	3.4	0.7	L	7.1
Strata Thic	Glacial	Outwash	5.0	1	9.4	1	6.2	9.0*	14.8
	Glaciomarine	Sand/Silt		1.3	6.4	1	-	ł	1
		Fill	8.5	5.3	5.0	11.0	4.0	3.0	3.5
Depth to	Water	(Ft)	9.5	14.7	8.4	NE	8.3	7.3	NE
	Depth	(Ft)	20.0	34.0	27.3	15.0	11.6	12.0	25.4
	Boring	Number	B101	B102	B103	B104	B105	B106	B107

NOTES:

- NE INDICATES GROUNDWATER NOT ENCOUNTERED WITHIN DEPTH OF BORING.
  - INDICATES STRATUM NOT ENCOUNTERED WITHIN DEPTH OF BORING.
     \* INDICATES DEPTH OF PENETRATION INTO STRATUM.
- .- .. ..

SEBAG TECHN	0 ICS,		TEST BORING REPORT														10.	
INC. PROJEC LOCATIC CLIENT CONTRA DRILLER		OFFICE BI 57 YORK S J. B. BROW MAINE TE M. PORTE	UILDING STREET, PC WN & SONS SST BORING	DRTLAND, I GS, INC.	MAINE				STI JOB NO. PROJECT MGR. FIELD REP. DATE STARTED DATE FINISHED		100 K. R. 3/2 3/2	43 REC EST 6/20 6/20	rag KER ES 10		1			
Elevation		ft.	Datum		Boring	Location	See Plan	Mahila DE2	L Unmer Tune	Dril	line	BALLE	<del>,</del> r		Cacin	<u> </u>	huar	
litem Type		Casing HSA	I Samp	ler   Core B	arrel Rig Ma	ike & Mod ick	lel Tripod	Cat-Head	Hammer Type √ Safety		Ber	toni	te	Ty	pe M	g A etho	od D	epth
Inside Dia	meter (in.)	2.5	1.37	5		v E	] Geoprobe	Winch	Doughnut		Pol	yme	r þ	HSA	/SPIN	/20.0	)	
Hammer V Hammer F	Veight (lb.)		140		Tra	ick L id Γ	Air Track	Cutting Head	Drilling Notes:	<b>∠</b>	Nor	1e						
		Sample		10090000				Contraining in food	I blinning frotoor	Gr	avel		Sand			Fi	eld 1	lest
Depth (ft.)	Sampler Blows per 6 in.	No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visu (density/consistenc: structure, odor	al-Manual Identification & v, color, GROUP NAME & SYME , moisture, optional descriptions	Description 30L, maximum particle size* , geologic interpretation)	% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity
- 0 -					0.2			-BITUMINOUS CONCRE	TE-							•		
	3	S1	0.5	· · · · · · · · · · ·	0.7	SW	Loose, brown well-g	raded SAND with gravel (SW	), mps = 0.75 in., moist	5	20	25	35	15				
	45					sw	Dense, dark brown y	-CONCRETE-	(SW), mps = 0.75 in.,		10	20	40	25	•••+	•••		
	13	8	2.5				ash, brick and cemer	t fragments, moist					a,					
											·			*****		******		
		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · ·			• •••••		-FILL-										
									anna an t-anna an an t-an t-an t-an t-an	~~	-							,
F	4	\$2	5.0		5.3					_	<b>L</b>	<u>.</u>					_	
	1			·		SP-SM	Very loose, dark bro (SP-SM) brick frage	wn to gray-brown poorly-grac tents $mns = 4 mm$ moist to	ied SAND with silt			5	35	50	10	*****		
	1	14	7.0				(or only, onex mus.									929 1979 1979 1987 1979 1979		
		1. I., Angeograp and I. art I.		·····				-FII I +			*****							~~~~
	· · · · · · · · · · · · · · ·				8.5			-1 1125-			*****					*******		
10																******		
10 -	5	\$3	10.0			SW	Medium dense, yello	w-brown to gray-brown well-	graded SAND (SW),		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	10	30	60				
	8						mps = 3 mm, moist											
	11	16	12.0					CLAQUAL OUTWARD DE	OCUTE									
1	··/·							-GLACIAL OUTWASH DEI	05115-					~ ~ ~ ~	~~~~~	******		
	A				13.5													
										****						••••••		(gr.)1007 - 1000 -
15 -							· · · · · · · · · · · · · · · · · · ·											
	3	\$4	15.0			SM	Very loose, gray silt slightly bonded, moi	y SAND with gravel (SM), m st to wet	ps = 1.0 in.,	10	5	15	20	30	20	*****		
	1				-	······································	S									10. 10 and 10.		
	1	8	17.0															
	· · · · · · · · · · · · · · · · · · ·			· · · · · · · · · · · · · · · · · · ·				-GLACIAL TILL DEPOS	ITS-									
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<u> </u>	50/0	NR	20.0		20.0	+			··· ··· ···							_		
							Split-spoon refusal a	20.0 ft. on probable bedrock										
		,					Dottom of exploratio	n at 20.0 ft. below ground su	Tace			1						
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		Water L	evel Data	I	I		Sample ID	Well Diagram			S	umr	nary					
		Flancod	D	epth in feet	to:	-	Open End Pod	Riser Pipe	Overburden (Line	ear ft \					20.0			
Date	Time	Time (hr.)	Bottom of Casing	Bottom of Hole	Water	Т	Thin Wall Tube	Filter Sand	Rock Cored (Line	ar ft.)								
3/26/201	0 0820			14.0	9.5	U s	Undisturbed Samp Split Spoon Sampl	e Cuttings	Number of Samp	les					45			
57207201	- 0020	<u> </u>				Ğ	Geoprobe	<u>⊿</u> ♥ Concrete	BORING NO.	•••				B10	1			
Field	Tests	Dilatanov	R - Pr		W N-Noo	FV e	Field Vane Plasticity:	N - Nonplastic	al L - Low M - Medium H	- Hi	qh							
. ist		Toughnes:	s: L-Lov	v M - Medi	um H-Hig	h	Dry Strength:	N - None L - Low M -	Medium H - High V	- Ver	y Hi	gh						
			*N(	DTE: Maxim	um Particle	Size is de	etermined by direct	observation within the lin	nitations of sampler siz	e.	Inc							

SEBAG TECHN	O ICS,						ag	B		ig N 02	0. f	2						
PROJEC LOCATIC CLIENT CONTRA DRILLER	T DN CTOR	OFFICE BU 57 YORK S J. B. BROW MAINE TE M. PORTE	JILDING STREET, PO VN & SONS ST BORING R	RTLAND, M S, INC.	MAINE				STI JOB NO. PROJECT MGR. FIELD REP. DATE STARTED DATE FINISHED	-	1004 K. F R. E 3/25 3/25	13 RECH STE /201	<u>KER</u> S 0					
Elevation		ft.	Datum		Boring	Location	See Plan			D-111		Merel	- 1			- 6 4		
Item		Casing	Sampl	er Core B	arrel Rig Ma	ke & Moo	fel M	Cat-Head	Hammer Type     I     Safety		Ben	tonit	e	Ty	pe M	g Aa athoo	d Dep	e oth
Inside Dia	meter (in.)	2.5	1.375	j		v Ľ	Geoprobe	Winch	Doughnut		Poly	mer	ŀ	ISA/	SPIN	34.0		
Hammer V Hammer F	Veight (lb.)		140		Tra	ick L	Air Track	Cutting Head	Drilling Notes:	<u></u>	Non	e						
Tiatimici I		Sample		NUMBER OF STREET		<u> </u>				Gra	avel	S	and			Fie	ld Te	st
Depth (ft.)	Sampler Blows per in.	6 No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Change (ff.)	USCS Symbol	Visual- (density/consistency, c structure, odor, m	Manual Identification & D polor, GROUP NAME & SYMB( poisture, optional descriptions, s	escription DL, maximum particle size* geologic interpretation)	% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Trunchness	Plasticity	Strength
- 0 -	2	\$1	0.0	······································	1.5	SW-SM	Medium dense, yellow-l (SW-SM), mps = 1.0 in	brown well-graded SAND w n., moist -PILL-	ith silt and gravel	10	10	20	35	25	10	••••••		4° 6
	8	10	2.0			SW	Medium dense, dark bro	own well-graded SAND (SW	/), mps = 1.0 in., moist	5	5	25	40	25		•••		
		· · · · · · · · · · · · · · · · · · ·			· · · · · · · · · · · · · · · · · · ·			-FILL-						·····				
<b>5</b> –	3	S2	5.0		5.3	SW	Medium dense, dark bro	own well-graded SAND (SW	/), brick, glass		10	25	40	25		•••••• ••••••• ••••••		
	6 9 17	20	7.0		6.6	ML/SP	fragments, mps = 0.75 Stiff, olive-brown to ye poorly-graded SAND (S	in., moist -FILL- sllow-brown mottled SILT (N SP), mps > 1 mm, moist to	IL), interbedded with wet									
	· · · · · · · · · · · · · · · · · · ·					sw	Medium dense, light br gravel (SW), mps = 1.0	-MARINE DEPOSITS- own to yellow-brown well-g 0 in., moist	raded SAND with	10	30	20	25	15				<u> </u>
10	a				9.0			-GLACIAL TILL DEPOSI	<u>TS-</u>							• • • -		<b></b>
- 10 -	17 22 21	\$3	10.0			SW-SM	Dense, olive-brown to y gravel (SW-SM), mps =	yellow-brown well-graded S. = 1.3 in., slightly bonded, n	AND with silt and noist to wet	20	15	15	20	20	10		1000 - 1000 - 100 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 -	
	18	18	12.0	· · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·										
	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	·····					-GLACIAL TILL DEPOSI	TS-								1921 - 1924 - 1924 1924 - 1924 - 1924 1924 - 1924 - 1924	
- 15 -	15	S4,	15.0			SW-SM	Dense, olive-brown to	yellow-brown well-graded S	AND with silt and	10	20	15	20	25	10			
	28 21 18	20	17.0	· · · · · · · · · · · · · · · · · · ·	16.2	sw	Dense, dark brown to r	-GLACIAL TILL DEPOSI red-yeliow well-graded SAN	TS- D (SW), mps = 0.25			25	40	30	5	••••		
	,	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		·											****		
20			20.0	· · · · · · · · · · · · · · · · · · ·	10.5			-GLACIAL TILL DEPOSI	TS-		••••••••					·····		
	4 7 6	35	20.0	91	20.1	SM	Medium dense, gray sil slightly bonded, moist	Ity SAND with gravel (SM),	mps = 0.75 in.,	5	15	15	20	25	20	• • • •	- •	
	10	19	22.0		· · · · · · · · · · · · · · · · · · ·						~ · · · · · · · · · · · · · ·					1997 1997 1997 1997 1997 1997 1997 1997		
	· · · · · · · · · · · · · · · · · · ·	10 VII						-GLACIAL HILL DEPOSI	13-	,								
25 -	1 WOH	<u>\$6</u>	25.0		· · · · · · · · · · · ·	SM	Very loose, gray silty S	SAND with gravel (SM), mp	s = 0.75  in.,  wet		15	15	20	25	25	,		
	1	19	27.0					-GLACIAL TILL DEPOSI	TS-		,			·				
					28.3													
30			····· ···	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		·····	-WEATHERED BEDROC	<u> </u>									
		Water L	evel Data	epth in fee	t to;		Sample ID	Well Diagram			S	umn	nary					
Date	Time	Elapsed Time (hr.)	Bottom of Casing	Bottom of Hole	Water		Open End Rod Thin Wall Tube Undisturbed Sample	Screen Filter Sand	Overburden (Line Rock Cored (Line Number of Samp	ear ft.) ear ft.) les					28.3  7S			-
3/25/201	0 1700			18.0	14.7	G FV	Split Spoon Sample Geoprobe Field Vane	Grout Grout Concrete Bentonite Sea	BORING NO.				i	B10:	2			
Field	d Tests	Dilatancy: Toughnes	R - Ra s: L - Low	pid S-Slo / M-Medi	ow N-Nor um H-Hig	ne gh	Plasticity: Dry Strength:	N - Nonplastic L N - None L - Low M -	- Low M - Medium Medium H - High V	-l - Hi - Ver	gh y Hig	gh						
			*NO	DTE: Maxim	um Particle	Size is d	etermined by direct of -manual methods of t	bservation within the lim the USCS system as pra-	itations of sampler si cticed by Sebago Tecl	e. nics,	Inc.							

TECHN	ics,			BORING REPORT						B	10	2				
INC.								Gr	avel		Pag	ge d	2	F	of	f
Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size structure, odor, moisture, optional descriptions, geologic interpretation)	% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	
- 30 -	10	67	20.0													
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	···· •••				·		-WEATHERED BEDROCK-								• •	
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					•		Bottom of exploration at 34.0 ft. below ground surface									
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(		· · · · · · · · ·	6 - 1 - 1999,		·····		n na anana ina manana na katalan na katalan na katalan na manana katalan na katalan na katalan da katalan da ka Manana manana katalan na katalan na katalan katalan katalan na katalan na katalan na katalan da katalan katalan		6 . e.		1.	× .			· ·	
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SEBAGO TECHNI	) (CS,				T	EST	BORING REPORT					<b>D</b> .	B	B]	NG [0:	NO. 3		
INC. PROJECT LOCATIO CLIENT CONTRAC DRILLER	N N CTOR	OFFICE BU 57 YORK S J. B. BROW MAINE TE M. PORTE	JILDING STREET, PC VN & SONS SST BORINC R	DRTLAND, M	MAINE			STI JOB NO. PROJECT MGR. FIELD REP. DATE STARTED DATE FINISHED	-	1004 K. F R. E 3/25 3/25	43 REC ESTI 5/20	Pag KER ES 10		1		of		
Elevation		ft.	Datum		Boring	Location	See Plan Mobile P52	Hammer Tuno	Drill	lina	Mur	-		Cacir		dya	200	
Item Type		HSA	Samp SS	ler Core Ba	Tru	ck	Tripod Cat-Head	Safety		Ben	toni	te	Ty	/pe N	leth	od D	Dept	th
Inside Dia	meter (in.)	2.5	1.37	5		v [	Geoprobe Winch	Doughnut Doughnut		Poly	/mer	·	HSA	/SPIN	/27.	3		
Hammer W Hammer F	all (in.)		- 140		Ira □ Ski	.ck ∟ d [	Air Frack C Roller Bit	Drilling Notes:	<u></u>	INUI	ie							
Depth (ft.)	Sampler Blows per 6 In.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & (density/consistency, color, GROUP NAME & SY) structure, odor, moisture, optional description	& Description MBOL, maximum particle size* ns, geologic interpretation)	% Coarse	% Fine lac	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity e1	Strength
_ 0 _	5 6 9	<u>\$1</u>	0.0		1.0	SW SW	Medium dense, yellow-brown to brown well-gra (SW), mps = 1.0 in., moist -FILL- Medium dense, brown to dark brown well-grade	ded SAND with gravel	20	15 15	20 20	25 35	20 25	5				
	12	15	2.0				(SW), mps = 0.25 in., ash, brick fragments, mo	ist					, , , , , , , , , , , , , , , , , , ,					
							FILL-						,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					• • • • •
<u> </u>	1	\$2	5.0	· · · · · · · · · · · · · · · · · · ·	5.0	ML/SP	Medium stiff, olive-brown to yellow-brown SIL' poorly-graded SAND (SP), mottled, mps < 1 m	ſ (ML), interbedded with m, moist					30	70	s	L	L	~~ ~~
	3	24	7.0	алария 2010-ени - Сорон Пород, С. С. С. 24 — Палек — С. С. С. С. 24 — Палек — С. С. С. С.														
10				· · · · · · · · · · · · · · · · · · ·														******
	1 1 4	S3	10.0		11.4	ML/SP SP	Medium stiff, olive-brown SILT (ML), interbed SAND (SP), slightly mottled, mps < 1 mm, we -MARINE DEPOST Medium dense, red-yellow poorly-graded SANE	t TS- (SP), mps < 1 mm, wet				5	30 95	70	5	L		
				· · · · · · · · · · · · · · · · · · ·	13.4		-glacial outwash d	EPOSITS-										
- 15			15.0	anga ant anga Agi ang Tao		SW-SP	Medium dense, brown to vellow-brown well-era	ded SAND (SW)	10	10	20	20	40					())) a a a a a a () a a a a a a a () a a a a a a ()
	8 6 10	24	17.0	• • • • • • • • • • • • • • • • • • •			interbedded with poorly-graded SAND (SP), occ mps = 1.0 in., wet	rasional gravel layers,							•••			
				· · · · · · · · · · · · · · · · · · ·			-GLACIAL OUTWASH D			··· · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·				·····			
_ 20 _	7	S5	20.0		20.8	SW	Medium dense, brown well-graded SAND (SW -GLACIAL OUTWASH D	), mps = 4 mm, wet EPOSITS-			30	55	15					
	18 72	20	22.0	· · · · · · · · · · · · · · · · · · ·		SM	Dense, gray silty SAND (SM), mps = 0.5 in., bonded	moist to wet, slightly		5	20	30	30	15	90.000 (1990) 1990 (1990) 1970 (1990)			
						······································									****			
- 25 -	29 32 33	\$6	25.0		24.8		Very dense, olive-brown to gray moderately we -WEATHERED BEDE	athered bedrock fragments										
	40	8	27.0		27.3		HSA refusal at 27.3 ft											
- 30 -	· · · · · · · · · · · · · · · · · · ·						Bottom of exploration at 27.3 ft. below ground	surface		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1								
		Water L	evel Data				Sample ID Well Diagra	m		S	l iumr	nary	<u> </u>					<u> </u>
Date	Time	Elapsed Time (hr.)	Bottom of Casing	epth in feet Bottom of Hole	to: Water	0 T	Open End Rod Escreen Thin Wall Tube Filter Sand	Overburden (Line Rock Cored (Line Number of Same	ear ft.) ear ft.)	1				24.8				
3/25/2010	) 1530			12.7	8.4	S G	Split Spoon Sample Geoprobe	BORING NO.					B10	13				
Field	Tests	I Dilatancy: Toughness	L R - Ra s: L - Lov *NO	l apid S - Slo v M - Mediu DTE: Maximu	I w N - Nor um H - Hig um Particle	ie ih Size is di	Plasticity: N - Nonplastic Dry Strength: N - None L - Low M etermined by direct observation within the	E L - Low M - Medium 1 - Medium H - High V limitations of sampler si	H - Hi ' - Ver ze.	igh 'y Hi	gh							

SEBAGO TECHN INC.	) ICS,			Pa	Ige		1G N 104	IO.	1							
PROJECT LOCATIO CLIENT CONTRAI DRILLER	N N CTOR	OFFICE BU 57 YORK S J. B. BROW MAINE TE M. PORTE	JILDING TREET, PC VN & SONS ST BORINC R	ORTLAND, N BS, INC.	MAINE			STI JOB NO. PROJECT MGR. FIELD REP. DATE STARTED DATE FINISHED		1004 K. R R. E 3/26 3/26	3 ECKI STES /2010 /2010	BR				
Elevation Item Type Inside Dia Hammer V	meter (in.) /eight (lb.)	ft. Casing HSA 2.5	Datum Samp SS 1.37 140	ler Core Ba	Boring arrel Rig Ma I Tru AT	Location ke & Moc ck	See Plan  I Tripod Geoprobe Air Track Cut Plan  See Plan  Mobile B53 Cat-Head Ninch Ninch Cut Plan Cut	Hammer Type Safety Doughnut Automatic Drilling Notes	Dril	ling N Bent Polyr None	Aud onite mer	T HS7	Casir ype N VSPIN	g Ac etho /15.0	Ivan d De	ce epth
Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification A (density/consistency, color, GROUP NAME & SY structure, odor, moisture, optional description	& Description MBOL, maximum particle siz ns, geologic interpretation)	e*, Coarse %	% Fine	% Coarse % Medium	% Fine	% Fines	Dilatancy	Toughness	est Alasiucity
- 0 -	6 16 · 15 11	S1 17	0.0 2.0			sw	Dense, dark brown to brown well-graded SAND 1.3 in., brick, concrete, glass and bituminous co	with gravel (SW), mps = ncrete fragments, moist	15	15	20 30	0 20				
ć							-FILL-							······································		
- ) -	2 2 1 1	S2	5.0 7.0			SW	Very loose, gray-brown well-graded SAND with and brick fragments, mps = 1.25 in., wet	gravel (SW), concrete	15	20	25 2	0 15	5			,
- 10 -	2	53	10.0	· · · · · · · · · · · · · · · · · · ·		SW	-FILL-	ravel (SW), brick	10	5	5 2	0 60		• • • • • • • • • • • • • • • • • • •		
	5 5 3	14	12.0	· · · · · · · · · · · · · · · ·	11.0	SM	fragments, mps = 1.25 in., wet -FILI Loose, olive-brown silty SAND with gravel (SM slightly bonded	(), mps = 1.3 in., wet,	10	10	15 2	0 25	20			
15	50/0	ŇR	15.0		14.4 15.0		-GLACIAL TILL DEP(	OSITS-								
						<ul> <li>a construction of 000000000</li> <li>a construction of 0000000000000000000000000000000000</li></ul>	Split-spoon refusal at 15.0 ft. Bottom of exploration at 15.0 ft. below ground s	urface								
_ 20 _																
- 25 -																
		Water L	evel Data	····· ··· ··· ··· ··· ··· ··· ··· ···			Sample ID Well Diagra	m [		Su	imma	ry				
Date 3/26/201	Time	Time         Depth in feet to:         Image: Constraint of the state of the stat						Overburden (L Rock Cored (Li Number of Sar				14.4 				
Field	Tests	Dilatancy: Toughness	R - Ra s: L - Low *NC	pid S - Sio / M - Mediu )TE: Maximu	w N - Non um H - Hig um Particle	G FV e h Size is de	Geoprobe Field Vane Sentonite S Plasticity: N - Nonplastic Dry Strength: N - None L - Low M stermined by direct observation within the	BORING NO. L - Low M - Mediur - Medium H - High limitations of sampler	gh y Hig	h	B1	04				

SEBAGO TECHN INC.	D ICS,	DEFICE BUILDING STI JOB NO. 10043											le Ie	B
PROJECT LOCATIO CLIENT CONTRA DRILLER	N N	OFFICE BU 57 YORK S J. B. BROW MAINE TE M. PORTE	JILDING STREET, PC VN & SONS ST BORINC R	DRTLAND, N JS, INC.	MAINE			STI JOB NO. PROJECT MGR. FIELD REP. DATE STARTED DATE FINISHED		K. F R. F 3/26 3/26	+3 REC ESTE 5/20 5/20	KER 3S 10 10	2	
Elevation		ft.	Datum	lar   Core B	Boring arrel Big Ma	Location	See Plan Mobile B53	Hammer Type	Dril	ling	Muć	ī		Cas
Type	Diameter (in.) er Weight (ib.) er Fall (in.) Sampler (ft.) Blows per 6 in. 7 7 7 7	HSA	Samp	Ier Core Ba			Tripod Cat-Head	Safety	]	Ben	tonit	te	Ty	/pe
Inside Dia Hammer V	meter (in.) Veight (ib.)	2.5	1.37	5	Tra	v L ack [	Air Track Roller Bit	Automatic	<u>j</u>	Non	nnei 1e		<u>п</u> зл	/31
Hammer F	all (in.)		30	SN STAR	Ski	id [	Cutting Head	Drilling Notes:	Gr	avel	Ę	Sanc	3	
Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & C (density/consistency, color, GROUP NAME & SYMB structure, odor, moisture, optional descriptions,	Description OL, maximum particle size*, geologic interpretation)	% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines
- 0 -	7		0.0	· · · · · · · · · · · · · · · · · · ·	• • • • • • • • • • • • • • • • • • • •	GW	Medium dense, brown well-graded GRAVEL with	sand (GW), mps =	30	25	20	15	10	
	7 7				1.8		1.5 in., moistFILL-		<u> </u>					
	7	6	2.0		[	SW	Medium dense, dark brown well-graded SAND with 1.3 in hituminous concrete fragments, moist to we	h gravel (SW), mps =	15	20	20	25	15	
		· · · · · · · · · · · · · ·												
	·····				4.0		-FILL-					μ		
C														
)	3	\$2	5.0			SP	Medium dense, yellow-brown to tan poorly-graded mps = 3 mm, moist	SAND (SP),			5	25	70	
	6		7.0			······································								ø
			7.0					00175						*****
							-GLACIAL OUTWASH DEP	00119-		,				
			· · · · · · · · · · · · · · · · · · ·											
10			10.0		10.2									
	/ 50/5"	83 11	10.0		10.2		Medium dense, yellow-brown to olive-brown silty :	SAND with gravel	10	10	15	20	25	
					11.6		(SM), mps = 1.0 in., wet -GLACIAL TILL DEPO Note: weathered bedrock in auger cuttings -WEAT	HERED BEDROCK-						
							HSA refusal at 11.6 ft							
							Bottom of exploration at 11.6 ft. below ground sur	face						
									** <b> </b> ~~~~~	ur	-			
_ 15 _									-					
						-						<u> </u>		••••
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30							, i truć i tana. i talo na unulumu		-			-		
		Water L	evel Data	enth in fact	to:		Sample ID Well Diagram			S	umr	nary	/	_
Date	Time	Elapsed Time (hr.)	Bottom of Casing	Bottom of Hole	Water	O T U	Open End Rod End Screen Thin Wall Tube Filter Sand Undisturbed Sample S. Cuttings	Overburden (Linea Rock Cored (Linea Number of Sample	ar ft. ar ft. es	) )				1
			. –											
3/26/201	0 1150			9.9	8.3	- S G	Geoprobe Grout Concrete	BORING NO.					B10	) <u>f</u>

SEBAG TECHN INC.	0 ICS,													Pag	B	ORII B1	NG 1	10. 0	1		
PROJEC LOCATIC CLIENT CONTRA DRILLER	T DN CTOR	OFFICE B 57 YORK S J. B. BROW MAINE TE M. PORTE	UILDING STREET, PC WN & SONS EST BORING BR	DRTLAND, N SS, INC.	MAINE				ST PF FII DA DA	I JOB NO. OJECT MGR. ELD REP. ATE STARTED ATE FINISHED		100 K. R. 3/2 3/2	043 REC ESTI 6/20 6/20	KER 3S 10	2						
Elevation		ft.	Datum	·	Boring	Location	See Plan														
Item		Casing	g Samp	ler Core Ba	arrel Rig Ma	ke & Moo	let Mol	oile B53	lead [	Hammer Type	Dril	ling Ber	Muc	ie		casir be M	g Ai	dvan od De	ce enth		
Inside Dia	meter (in.)	2.5	1.37	5		v C	Geoprobe	Winc	h	Doughnut		Pol	ymer		HSA	SPIN	/10.0	)	<u> </u>		
Hammer V	Veight (lb.)		140		Tra	ick [	Air Track	Rolle	r Bit Dr.	Automatic		Nor	ne								
rannier		Sample		dis probible (3				J Outan	ig ricao pr	ining reces.	Gr	avel	5	Sand			Fi	eld T	est		
Depth (ff.)	Sampler Blows per in.	6 Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-M (density/consistency, colo structure, odor, mois	anual Ider or, GROUP sture, option	ntification & Desc NAME & SYMBOL, r nal descriptions, geolo	ription naximum particle size ogic interpretation)	 % Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dílatancy	Toughness	Strength		
<b>⊢</b> ∘ –	1	<u>S1</u>	0.0			sw	Loose, dark brown to bro 1.3 in., moist	wn weil-gr	aded SAND with gr	avel (SW), mps =	20	15	15	25	25		· · · · · · · · · · · · · · · · · · ·		· · · · · · · · ·		
	<u>8</u> 11	13	2.0						-FILL-			-			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				,		
	· ····		· · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	3.0																
<u> </u>	14	<u>\$2</u>	5.0			SM-SP	Medium dense, olive-brov	vn to yelloy	w-brown silty SAN	D with gravel	10	10	10	20	30	20	·····				
	16 12 25	9	7.0	· · · · · · · · · · · · · · · · · · ·			(SM), interbedded with poorly-graded SAIND (SP), mps = 1.25 m., to wet -GLACIAL OUTWASH DEPOSITS-												****		
				····· •, ····· · · ·			-GL/	S-													
10		53	10.0	·····	10.3	SD-SM	Similar to \$2 from 10.0 fr			,											
	4		10.0		10.3	SP-SM	Similar to S2 from 10.0 to 10.3 ft. Loose, yellow-brown poorly-graded SAND (SP), occasional silt seams mps = 1.0 in., wet -GLACIAL OUTWASH DEPOSITS-							5	90	5			••••••••••••••••••••••••••••••••••••••		
							Loose, yellow-brown poorly-graded SAND (SP), occasional silt seams mps = 1.0 in., wet 					-				· +					
	·····		· · · · · · · · · · · · · · · · · · ·																		
- 15 -		· · · · · · · · · · · · · · · · · · ·		·		· · · · · · · · · · · · · · · · · · ·						******									
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- 25 -			· · · · · · · · · · · · · · · · · · ·			<ul> <li>March and State (1999) 1999 1999 1999</li> <li>March and Andrew State (1999) 1999</li> <li>March and Andrew State (1999) 1999</li> <li>March and Andrew State (1999) 1999</li> </ul>															
		· · · · · · · · · · · · · · · · · · ·			ана ала саналана на на селана на кала на селана султ - селана селана на селана на селана порела услу удраги на селана на селана	<ul> <li>Accesso and Accesso and Acces</li></ul>															
30																					
		Water L	evel Data		i		Sample ID	w	ell Diagram	1		s	l umn	hary							
Date	Time	Elapsed Time (hr.)	Di Bottom of	Bottom of	to: Water	о т	Sample ID Well Diagram UD Riser Pipe O Open End Rod Thin Wall Tube Filter Sand			Overburden (Lin Rock Cored (Lin	ear ft.) ear ft.)					12.0			_		
3/26/201	D 1110 D 1115		10.0	10.2 9.1	7.7	U S G	Undisturbed Sample Split Spoon Sample Geoprobe		Cuttings Grout Concrete	Number of Samp BORING NO.	oles				B10	3S 6					
Field	Tests	Dilatancy: Toughness	R - Ra s: L - Lov	ipid S - Slo / M - Mediu	w N-Non Jm H-Hig	FV e h	Field Vane Plasticity: Dry Strength: N -	N - N N - N None L	Bentonite Seal Nonplastic L - Lo - Low M - Med	┃ ow M - Medium ium H - High ∖	n H - High V - Very High										
	Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very F *NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.											inc.									

SEBAG TECHN	D ICS,				Т	EST	BORING RE	EPORT					Dag	E	BORI B	ng 10'	NО. 7		••••••			
INC. PROJECT LOCATIO CLIENT CONTRA		OFFICE BU 57 YORK S J. B. BROW MAINE TE	JILDING STREET, PC VN & SONS IST BORING	DRTLAND, M GS, INC.	MAINE				STI JOB NO. PROJECT MGR. FIELD REP. DATE STARTED DATE FINISHED		1004 K. H R. H 3/26	43 REC ESTI 5/20	KER ES 10									
Elevation		ft.	Datum		Boring	Location	n See Plan															
ltem	• •	Casing	Samp	ler   Core B	arrel Rig Ma	ke & Moc	lel M	obile B53	Hammer Type	Drill	ling	Mud	-	- T.	Casir	1g A	dva	nce				
Type Inside Dia	meter (in.)	HSA 2.5	1.37	5		ICK L	Geoprobe	Winch	Doughnut	5	Poly	/mer		HSA	/SPIN	1/25.	0	ept	<u>n</u>			
Hammer V	Veight (lb.)		140		Tra	ick	Air Track	Roller Bit	Automatic [	~	Non	e										
Hammer F	all (in.)	Somple	30	100001000				Utiling Head	Draing Notes:	Gra	vel	5	Sand			F	ield	Tes	t			
Depth (ft.)	Sampler Blows per 6 in.	No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ff.)	USCS Symbol	Visual- (density/consistency, c structure, odor, m	Manual Identification & E olor, GROUP NAME & SYMB oisture, optional descriptions,	Description OL, maximum particle size*, geologic interpretation)	% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength			
- 0 -	16 17 12	S1	0.0			SW	Medium dense, brown v in., brick, concrete and	vell-graded SAND with gra bituminous concrete fragme	vel (SW), mps = 1.0 nts, moist	20	15	20	30	15								
	8	13	2.0					-FILL-														
	· · · · · · · · · · · · · · ·	· · · · · ·	······		3.5																	
<u> </u>	4 5 5	<u>\$2</u>	5.0			SP-SW	Loose, yellow-brown to well-graded SAND (SW	SP), interbedded with		5	15	30	50					••••••••				
	6	16	7.0					LACIAL OUTWASH DEP	OSITS-													
10			10.0	, , , , , , , , , , , , , , , , , , ,		CUL					-	25	40	30		• • • • • • • • • • • • • • • • • • •						
	6 8 9 12	15	10.0			5₩	0.25 in., moist	AND (3 w), mps =		2	45	40	30				,					
								LACIAL OUTWASH DEP	OSITS-													
- 15 -	5	S4	15.0	· · · · · · · · · · · · · · · · · · ·		SW	Medium dense, yellow- wet	brown well-graded SAND (	SW), mps = 0.25 in.,		5	25	40	30								
	8 9	18	17.0				-G	LACIAL OUTWASH DEP	OSITS-													
20	· · · · · · · · · · · · · · · ·			· · · · · · · · · · · · · · · ·	18.3																	
_ 20 _	11 16 15 5	S5 18	20.0			SM	Dense, gray silty SANE slightly bonded	) with gravel (SM), mps =	1.3 in., moist to wet,	10	10	15	20	25	20	••••••						
			• • • • • • • • • • • • • • • • • • •					-GLACIAL TILL DEPOS	ITS-		-											
_ 25 _	50/5"	56	25.0		25.2		Similar to S5 from 25.0	1 to 25.2 ft.								*****		· · · · · · · ·				
		5	25.4		25.4	SP SP	Dense, light brown poo	-GLACIAL TILL DEPOS	s = 4 mm, wet				5	90	5	-						
							Bottom of exploration a	t 25.4 ft. below ground sur	face							•••••••••••••••••••••••••••••••••••••••	*****					
	······	Water L	evel Data				Sample ID	Well Diagram	, , , , , , , , , , , , , , , , , , ,		S	umn	nary			, , , ,						
Date	Time	Elapsed Time (hr.)	De Bottom of Casing	Bottom of Hole	to: Water	O T U	Open End Rod Thin Wall Tube Undisturbed Sample	Riser Pipe Screen Filter Sand	Overburden (Line Rock Cored (Line Number of Sampl	ar ft.) ar ft.) es			25.4 									
3/26/201 3/26/201	0 0855 0 0920			15.0	14.3 Dry	G FV	Split Spoon Sample Geoprobe Field Vane	Grout Grout Concrete SSS Bentonite Sea	BORING NO.					B10	7	_			_			
Field	I Tests	Sets         Dilatancy:         R - Rapid         S - Slow         N - None         Plasticity:         N - Nonplastic         L - Low         M - Medium         H - High           Toughness:         L - Low         M - Medium         H - High         Dry Strength:         N - None         L - Low         M - Medium         H - High           *NOTE:         Maximum         Particle         Size is determined by direct observation within the limitations of sampler size.																				