REPORT (REV 1)

November 28, 2016
(rev 1: April 3, 2017)
15-0071.1 S

Explorations and Geotechnical Engineering Services

Proposed Fred P. Hall Elementary School
23 Orono Road
Portland, Maine

PREPARED FOR:
Oak Point Associates
Attention: Jonah DeWaters, P.E.
231 Main Street
Biddeford, Maine 04005

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

S.W.COLE ENGINEERING, INC.

- *Geotechnical Engineering*
- *Construction Materials Testing and Special Inspections*
- *GeoEnvironmental Services*
- *Test Boring Explorations*

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Oak Point Associates
Attn: Jonah DeWaters, P.E.
231 Main Street
Biddeford, ME 04005

Subject: Explorations and Geotechnical Engineering Services
Proposed Fred P. Hall Elementary School
23 Orono Road
Portland, Maine

Dear Jonah:

In accordance with our Contract Addendum, dated December 22, 2015, we have performed subsurface explorations for the subject project. This report summarizes our findings and geotechnical engineering recommendations relative to foundations, earthwork and pavements associated with the proposed construction. The contents of this report are subject to the limitations set forth in Appendix A.

1.0 INTRODUCTION

1.1 Scope and Purpose

The purpose of our services was to obtain subsurface information at the site in order to provide geotechnical recommendations for foundations, earthwork and pavements associated with the proposed construction. Our scope of services included: test boring, rod probe and test pit explorations; soils laboratory testing; geotechnical analyses of the subsurface findings; and preparation of this report.

1.2 Proposed Construction

Based on the plans provided and our discussions with you, we understand a new elementary school with associated playfields and paved areas is proposed on the existing Fred P. Hall Elementary School which will be demolished in favor of new construction. We understand the building will be one and two-story construction with

on-grade floor slabs situated northwest of the existing school building. We understand athletic fields and paved parking are proposed south and east of the proposed building envelope. Two utility easements with water and sewer cross beneath the proposed building footprint and will be re-routed behind and around the building.

Based on our discussions, we understand the building will have a finished floor elevation (FFE) of 68 feet (project datum) requiring about 2 feet of grade raise to achieve FFE. We understand the utilities beneath the proposed building will be removed and rerouted around the building requiring trench excavations approaching 15 feet. Based on the site plan and existing grades, we anticipate tapered cuts and fills approaching 3 feet will be needed to achieve proposed grades. We understand a below grade stormwater treatment system is proposed beneath the proposed athletic fields.

Proposed and site features are illustrated on the "Exploration Location Plans" attached in Appendix B.

2.0 EXPLORATION AND TESTING

2.1 Explorations

Two episodes of subsurface explorations have been performed at the site by drilling and excavating companies working under subcontract to S. W. Cole Engineering, Inc. (S.W.COLE). The explorations made at the site include:

- Fifteen test boring explorations (B-101 through B-115) were made on the site on July 13 and 14, 2015 for a preliminary phase investigation;

- Thirteen test boring explorations (B-201 through B-213) were made on the site on June 29 through July 1, 2016 for a design phase investigation;

- Ten test pit explorations (TP-301 through TP-310) made on the site on June 29, 2016 for a design phase investigation.

The exploration locations were selected by S.W.COLE in collaboration with Oak Point Associates. The approximate exploration locations are shown on the "Exploration Location Plans" attached in Appendix B. Logs of the explorations and a key to the

notes and symbols used on the logs are attached as Appendix C. The elevations noted on the logs were estimated based on topographic information shown on "Exploration Location Plans".

2.2 Testing

The borings were performed using a combination of hollow-stem auger, solid-stem auger, cased wash-boring and rod probing techniques. The soils in the test borings were sampled at 2 to 5 foot intervals using a split spoon sampler and Standard Penetration Test (SPT) methods. Where stiffer clay soils were encountered, Pocket Penetrometer Testing (PPT) was performed on split spoon samples recovered from the borings. Where softer clay soils were encountered, Shelby Tube sampling and in-situ Vane Shear Testing (VSTs) was performed. SPT blow counts, as well as PPT and VST results, are shown on the logs.

Soil samples obtained from the explorations were returned to our laboratory for further classification and testing. Moisture content and Atterberg Limit test results are noted on the logs. One-dimensional consolidation test results are attached in Appendix D.

Topsoil samples obtained adjacent to two explorations were forwarded to Maine Soil Testing Service for topsoil testing. The results of pH and nutrient testing are attached in Appendix D.

3.0 SITE AND SUBSURFACE CONDITIONS

3.1 Surficial

The site is located on the west side of Portland, Maine along Capisic Brook. The existing school, parking and playfields are situated in the northern half of the site surrounded by residential properties to the east and west, wooded area to the north and south and Capisic Brook along the north site boundary. Surface relief across the site is relatively flat and level over the central portion of the site. The northern portion of the site slopes downward between 20 to 25 feet to Capisic Brook. Surface relief along the proposed access road slopes downward to a drainage feature in the southern portion of the site. Existing site features are shown on the "Exploration Location Plans" attached in Appendix B.

3.2 Soil and Bedrock

Below a surficial layer of topsoil, forest duff or pavement, the explorations encountered a soil profile generally consisting of a thin layer of surficial fills and native sands overlying a deep deposit of glaciomarine clay that becomes soft at depths ranging from 8 to 13 feet below the ground surface. A buried layer of organics (relic topsoil/forest duff) was encountered beneath the surficial fills at certain exploration locations. Bedrock was not encountered within the depth explored. Not all the strata were encountered within each of the explorations; refer to the attached exploration logs for detailed soils information.

3.3 Groundwater

Groundwater was generally encountered at depths of about 5 feet across the flat area of the site, becoming deeper to about 11 feet approaching the top of the slope leading down to Capisic Brook. Groundwater likely becomes perched on relatively impervious glaciomarine clays present under the site. Long-term groundwater levels were not determined. It should be anticipated that seasonal groundwater levels will fluctuate, especially in response to periods of snowmelt and precipitation, as well as changes in site use. Refer to the attached logs for more detailed groundwater information.

3.4 Frost and Seismic

The 100-year Air Freezing Index for the Portland, Maine area is about 1,407-Farenheit degree-days, which corresponds to a frost penetration depth on the order of 4.5 feet.

Based on the subsurface findings, we interpret the site soils to correspond to Seismic Soil Site Class E, according to 2009 International Building Code.

4.0 EVALUATION AND RECOMMENDATIONS

4.1 General Findings

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

- The proposed building footprint is underlain by a thin crust of relatively stiff clay overlying a deep deposit of soft compressible clay necessitating a relatively low allowable soil bearing pressure of 1 ksf for spread footings, a FFE of at least 68 feet and Seismic Soil Site Class E. The use of combined footings is encouraged to reduce the potential for differential settlement; the use of frequent control joints are encouraged in masonry and brittle walls to help control cracking.

- The existing utilities and associated trench backfill beneath the proposed building and paved areas must be completely removed and replaced with compacted Granular Borrow. Trenching for the new utilities around the building must be outside a 1H:1V plane projected down and away from the building perimeter.

- Fabric wrapped crushed stone mats with integral underdrains are recommended below perimeter footings. Interior footings may be founded on compacted Granular Borrow used to raise building grades or 6 inches of compacted Crushed Stone placed over properly prepared subgrades. On-grade floor slabs should be founded on at least 12 inches of compacted Structural Fill or 6 inches of compacted Crushed Stone overlying a non-woven geotextile fabric.

- Pavements should be underlain with high performance woven geotextile fabrics. Storm drains beneath paved areas should be installed as MaineDOT Type C Underdrains with free-draining sand backfill to provide positive drainage relief of pavement gravels.

- Utilities that penetrate the stiff clay with trench bottoms founded on soft clays should be underlain with geotextile wrapped crushed stone mats beneath customary bedding materials to stabilize trench bottoms for pipes and structures.

- The proposed underground stormwater treatment gallery is anticipated to penetrate the stiff clay and be founded on soft clays. We recommend a 1-foot layer of

Underdrain Sand be placed over the bottom of the excavation to provide a working mat for installation of the liner and system.

- Groundwater was encountered at shallow depths across the site, including within the proposed building footprint. Open cut excavations shallower than about 5 feet may be feasible with sump and pump dewatering techniques. Deeper excavations, such as for utilities and the underground stormwater gallery will likely require braced sheetpiling for shoring and groundwater control.

- Imported Granular Borrow, Structural Fill, and Crushed Stone will be needed for construction.

4.2 Site and Subgrade Preparation

We recommend that site preparation begin with the construction of an erosion control system to protect adjacent drainage ways and areas outside the construction limits. Surficial organics, roots, topsoil and existing foundations should be completely removed from areas of proposed fill and construction. As much vegetation as possible should remain outside construction areas to lessen the potential for erosion and site disturbance.

Stripping and Grubbing: All topsoil, stumps, roots, surficial organics, existing fills and relic topsoil must be removed from areas of proposed fill and construction. Stripping and grubbing depths will approach 2 feet in the building pad and 3 feet beneath paved areas. Actual stripping and grubbing depths to remove topsoil and organics will depend on the contractor's means and methods. A greater stripping and grubbing depth will likely be needed during wet weather periods and in wet areas. Existing drainage features and wetland areas must be dewatered and organics removed before filling.

Building Pad: Following removal of organics and existing fills, we recommend removing the existing water-main, sewer and storm drains and associated uncontrolled trench backfill soils from beneath the building. The former utility trenches should then be backfilled with at least 2 feet of compacted Granular Borrow for Underwater Backfill following by compacted Granular Borrow for Embankment Construction. We then recommend raising the building pad to the bottom of slab base gravel with compacted Granular Borrow prior to excavating for footings.

Footing Subgrades: We recommend that footings be excavated using a smooth-edged bucket. We recommend that perimeter footings be underlain by at least 6 inches of Crushed Stone wrapped in non-woven geotextile filter fabric, such as Mirafi 180N; the thickness of Crushed Stone beneath perimeter footings should increase for shallower footings so that a constant excavation grade is made around the perimeter based on the deepest footing. Interior footings should be founded on compacted Granular Borrow or 3 inches of compacted Crushed Stone over undisturbed native, non-organic soils.

Paved Areas: Following removal of organics and existing fills, we recommend removing the existing water-main, storm drains and associated trench backfill materials from beneath the proposed parking and access roads, where present. The former utilities trenches should then be backfilled with at least 2 feet of compacted Granular Borrow for Underwater Backfill following by compacted Granular Borrow for Embankment Construction. We recommend compacted Granular Borrow for fill to raise grades within the parking lot, bus loop, sidewalks and paved play surfaces.

Fill for the access road embankment may consist of compacted Common Borrow placed over an initial lift of Granular Borrow for Underwater Backfill, as necessary in low-lying wet areas. The initial lift of Granular Borrow for Underwater Backfill should daylight to the toe of the fill embankment to provide positive drainage relief.

Utilities: Based on the subsurface findings and our understanding of the proposed construction, we anticipate deeper buried utilities will encounter soft, gray silty clay at the bottom of trench excavations. If soft, gray silty clay or unstable trench bottoms are encountered, we recommend pipe bedding be underlain with at least 12-inches of crushed stone wrapped in non-woven geotextile fabric such as Mirafi 180N and structures be founded on at least 2 feet of crushed stone wrapped in Mirafi 180N. Excavation to subgrade in soft gray clay and native brown silty clays should be completed with a smooth-edged bucket. We recommend 12 inches of Underdrain Sand be placed over the bottom of the Stormwater Gallery excavation in order to provide a working mat for dewatering and installation of the liner.

4.3 Excavation, Blasting and Dewatering

Excavation work will generally encounter existing fills, relic topsoil and native deposits of clay, silt and sand. Areas of uncontrolled fill and backfill associated with past site usage will be encountered across the site. Saturated soils and groundwater will be encountered at depths as shallow as 5 feet. Based on the subsurface findings, blasting does not appear to be needed.

Care must be exercised during construction to limit disturbance of the bearing soils. Earthwork and grading activities should occur during drier, non-freezing weather of Spring, Summer and Fall. Low pressure tracked equipment will be needed for earthwork activities. Rubber tired construction equipment should not operate directly on the native soils, but should work from advancing fill pads or temporary haul roads. Equipment access in the stormwater gallery is not considered feasible and long-reach excavators or other means of excavation and installation will be needed. Final cuts to subgrade should be performed with a smooth-edged bucket to help minimize soil disturbance.

The contractor should anticipate the need for dewatering in excavations particularly following periods of precipitation and snow melt. Ditching with gravity drainage and sumping and pumping should be adequate to control groundwater seepage in shallow excavations. Deeper excavations will likely require sheetpiling for groundwater control and excavation support. Controlling the water levels to at least one foot below planned excavation depths will help stabilize subgrades during construction. Excavations must be properly shored or sloped in accordance with OSHA Regulations to prevent sloughing and caving of the sidewalls during construction.

The design and planning of excavations, excavation support systems, and dewatering is the responsibility of the contractor. We recommend the contract documents require engineered shop drawings of shoring and dewatering plans for excavations below groundwater and excavations to remove peat and organics.

4.4 Foundations and Walls

We recommend the proposed building be supported on shallow, spread footings. Perimeter footings should be founded on at least 6-inches of crushed stone fully wrapped in non-woven geotextile fabric, such as Mirafi 180N, bearing on undisturbed stiff, brown silty clay or compacted Granular Borrow. Interior footings should be

founded on compacted Granular Borrow used to raise the building pad or 3 inches of compacted Crushed Stone over undisturbed stiff, brown silty clay. For foundations bearing on properly prepared subgrades, we recommend the following geotechnical parameters for design consideration:

Geotechnical Parameters for Spread Footings	
Design Frost Depth	4.5 feet
Net Allowable Soil Bearing Pressure	1.0 ksf or less
Subgrade Modulus (Mat Footings)	50 pci
Base Friction Factor	0.35
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 inch of less
Differential Post-Construction Settlement	½ inch or less

As discussed, we recommend combined footings and grade beams to reduce the potential for differential settlement. Additionally, we recommend frequent control joints in masonry walls and brittle wall systems to help control cracking; the control joints should carry down through foundation concrete.

4.5 Foundation Drainage

We recommend an underdrain system be installed along the outside edge of perimeter footings. We recommend a 4-inch diameter, perforated SDR-35 foundation drain pipe bedded in the layer of geotextile wrapped Crushed Stone below the perimeter footings. The underdrain pipes 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. General underdrain details are illustrated on the “Foundation Detail Sketches” in Appendix B.

4.6 Slab-On-Grade Floors

On-grade floor slabs in heated areas may be designed using a subgrade reaction modulus of 120 pci provided the slab is underlain by at least 12-inches of compacted Structural Fill or 6-inches of compacted Crushed Stone overlying a non-woven geotextile fabric 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 subslab radon venting system. We also recommend a sub-slab vapor retarder particularly in areas of the 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. Additionally, the vapor retarder may be underlain with a shim layer of stone dust over structural fill or non-woven geotextile fabric over crushed stone. 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 and Sidewalks

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 full 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. General details of this frost transition zone are illustrated on the "Foundation Detail Sketches" attached in Appendix B.

4.8 Backfill and Compaction

We recommend the following fill and backfill materials for construction:

Common Borrow: Fill to raise grades in landscape areas and along the proposed Riggs and Lomond Street access road may be non-organic compactable earth meeting the requirements of 2014 MaineDOT Standard Specification 703.18 Common Borrow.

Granular Borrow: Fill and backfill in building and paved areas should be sand or silty sand meeting the requirements for 2014 Standard Specification MaineDOT 703.19 Granular Borrow. Fill and backfill over wet subgrades may require 2014 MaineDOT 703.19 Granular Borrow of Underwater Backfill.

Structural Fill: Fill to repair soft areas, backfill for foundations, slab base material and material below exterior entrances and sidewalks 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
¼ inch	25 to 90
#40	0 to 30
#200	0 to 5

Crushed Stone: Crushed Stone, used beneath foundations, for underdrain aggregate and as slab base material, should meet the requirements of 2014 MaineDOT Standard Specification 703.13 Crushed Stone ¾-Inch. A nominally sized, washed ¾-inch Crushed Stone usually meets this requirement.

Underdrain Sand: Clean, free-draining sand under the Stormwater Gallery meeting the requirement of 2014 MaineDOT 703.22 Type B Underdrain Backfill Material.

Reuse of Site Soils: The existing sandy fills may be suitable for reuse as Granular Borrow. The native stiff brown clay appear suitable for reuse as Common Borrow. The existing topsoil and organics may be screened and processed for reuse as loam. The native gray silty clays are unsuitable for reuse and will require export from the site.

Placement and Compaction: Fill should be placed in horizontal lifts and compacted such that the desired density is achieved throughout the lift thickness with 3 to 5 passes of the compaction equipment. Loose 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 fill and backfill in landscape and playfield areas be compacted to at least 92 percent of its maximum dry density as determined by ASTM D-1557. 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 Paved Areas

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

FLEXIBLE (HMA) PAVEMENT SECTION	
Pavement Layer	**Material Thickness**
MaineDOT 9.5 mm Hot Mix Asphalt (50 Gyration Design)	1 ¼ inches
MaineDOT 19.0 mm Hot Mix Asphalt (50 Gyration Design)	2 ¼ inches
MaineDOT 703.06 Aggregate Base Type A	6 inches
MaineDOT 703.06 Aggregate Subbase Type D	15 inches
Subgrade Reinforcement Fabric (Mirafi 600X or equal)	

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

Pavement Underdrains: We recommend storm drains in paved areas be installed as MaineDOT Type C Underdrains with free-draining Granular Borrow for Underwater Backfill used to backfill up to the bottom of pavement gravels in order to provide positive drainage relief of pavement gravels.

4.11 Design Review and Construction Testing

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

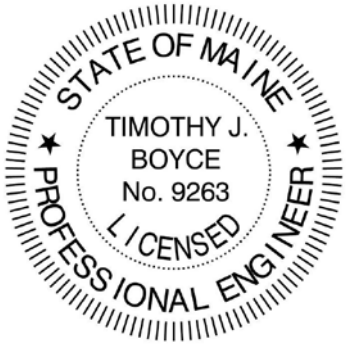
A testing and special inspections program should be implemented during construction to observe compliance with the construction documents. S.W.COLE should be retained to provide geotechnical observations during earthwork, preparation of foundation bearing surfaces and paving. S.W.COLE is also available to provide testing and special inspection services for soils, concrete, masonry, steel, and spray-applied fireproofing.

5.0 CLOSURE

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

Sincerely,

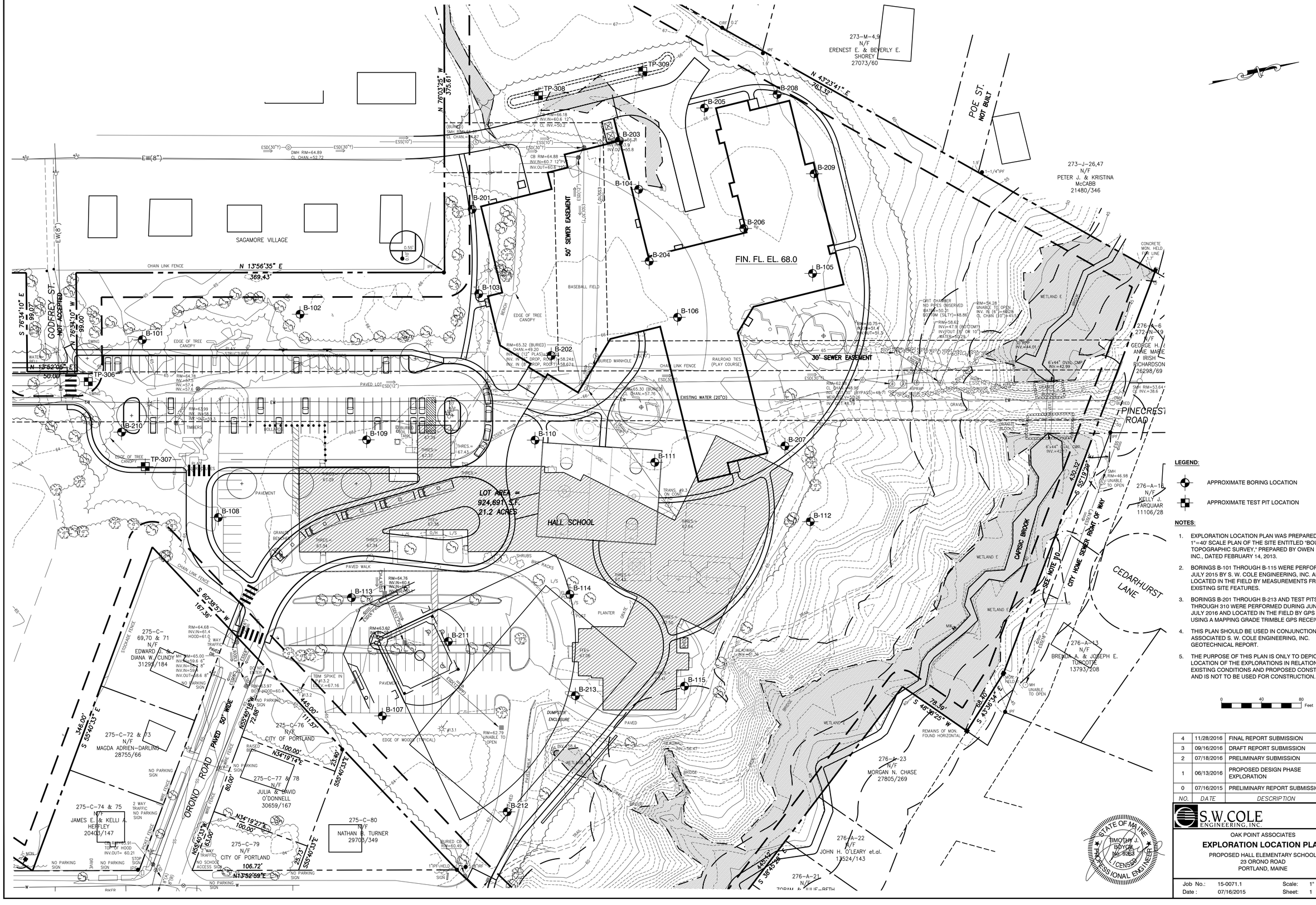
S. W. Cole Engineering, Inc.



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

TJB:emw/rec

APPENDIX B



LEGEND:

- APPROXIMATE BORING LOCATION
- APPROXIMATE TEST PIT LOCATION

NOTES:

1. EXPLORATION LOCATION PLAN WAS PREPARED FROM A 1"=40' SCALE PLAN OF THE SITE ENTITLED "BOUNDARY & TOPOGRAPHIC SURVEY," PREPARED BY OWEN HASKELL, INC., DATED FEBRUARY 14, 2013.
2. BORINGS B-101 THROUGH B-115 WERE PERFORMED IN JULY 2015 BY S. W. COLE ENGINEERING, INC. AND WERE LOCATED IN THE FIELD BY MEASUREMENTS FROM EXISTING SITE FEATURES.
3. BORINGS B-201 THROUGH B-213 AND TEST PITS TP-301 THROUGH 310 WERE PERFORMED DURING JUNE AND JULY 2016 AND LOCATED IN THE FIELD BY GPS SURVEY USING A MAPPING GRADE TRIMBLE GPS RECEIVER.
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.

0 40 80 Feet

NO.	DATE	DESCRIPTION	BY
4	11/28/2016	FINAL REPORT SUBMISSION	CEM
3	09/16/2016	DRAFT REPORT SUBMISSION	CEM
2	07/18/2016	PRELIMINARY SUBMISSION	CEM
1	06/13/2016	PROPOSED DESIGN PHASE EXPLORATION	CEM
0	07/16/2015	PRELIMINARY REPORT SUBMISSION	CEM

S.W.COLE ENGINEERING, INC.

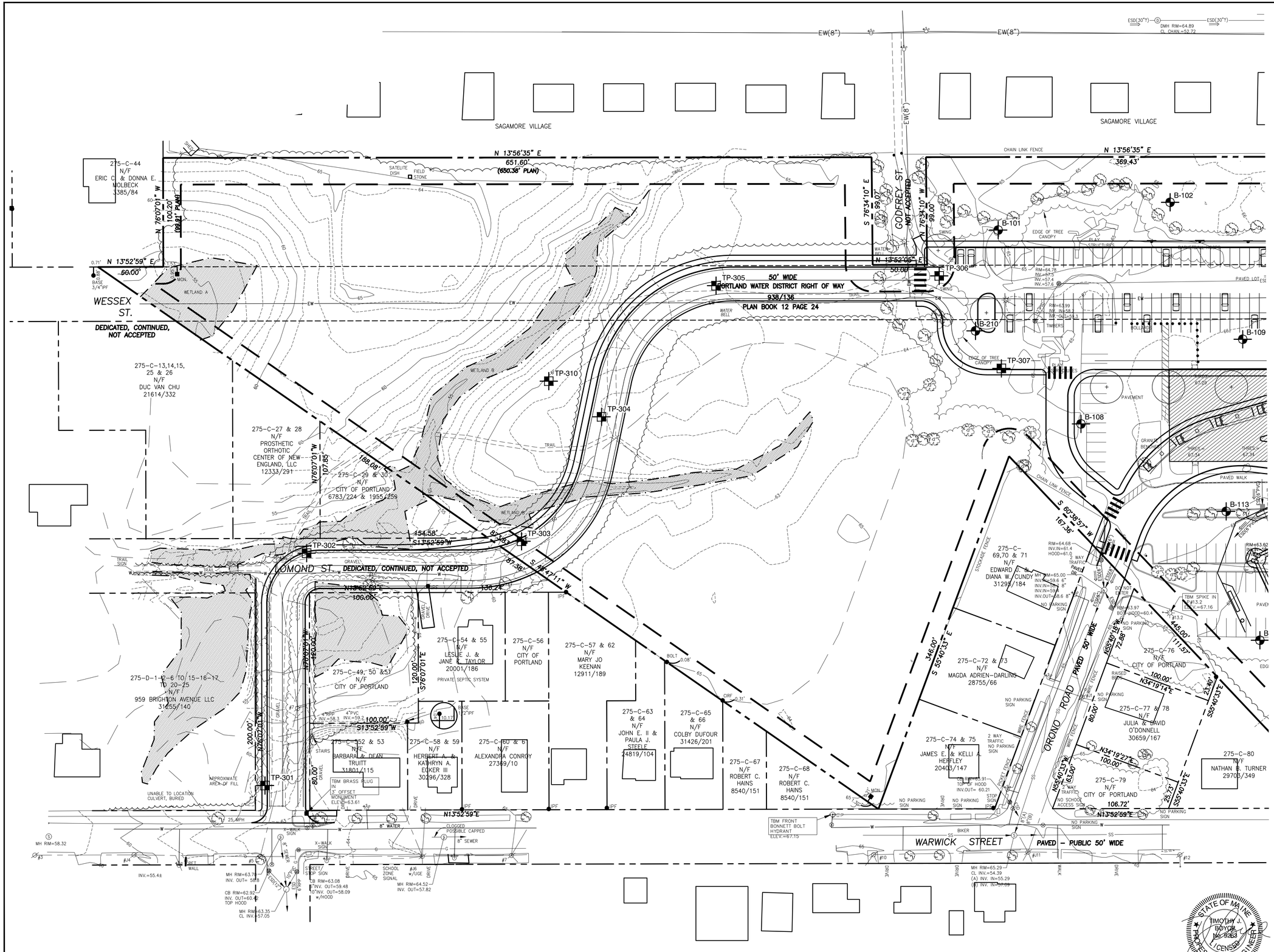
OAK POINT ASSOCIATES

EXPLORATION LOCATION PLAN

PROPOSED HALL ELEMENTARY SCHOOL
23 ORONO ROAD
PORTLAND, MAINE

STATE OF MAINE · TIMOTHY J. BOYCE · No. 9263 · LICENSED PROFESSIONAL ENGINEER

Job No.:	15-0071.1	Scale:	1" = 40'
Date :	07/16/2015	Sheet:	1



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- APPROXIMATE TEST PIT LOCATION

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3. BORINGS B-201 THROUGH B-213 AND TEST PITS TP-301 THROUGH 310 WERE PERFORMED DURING JUNE AND JULY 2016 AND LOCATED IN THE FIELD BY GPS SURVEY USING A MAPPING GRADE TRIMBLE GPS RECEIVER.
4. THIS PLAN SHOULD BE USED IN CONJUNCTION WITH THE ASSOCIATED S. W. COLE ENGINEERING, INC. GEOTECHNICAL REPORT.
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S.W.COLE ENGINEERING, INC.

OAK POINT ASSOCIATES

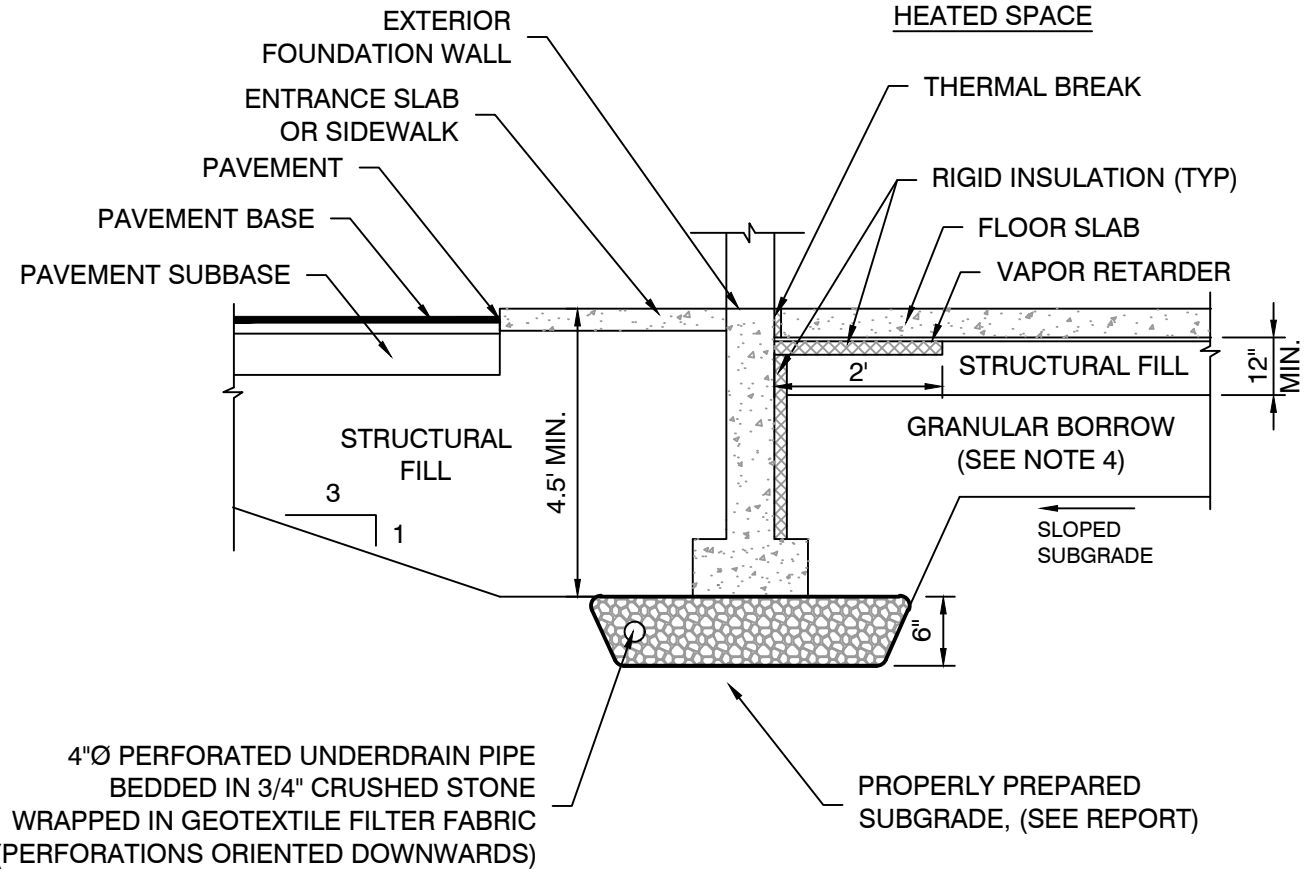
EXPLORATION LOCATION PLAN

PROPOSED HALL ELEMENTARY SCHOOL
23 ORONO ROAD
PORTLAND, MAINE

Job No.: 15-0071.1 Scale: 1" = 40'
Date : 07/16/2015 Sheet: 2

STATE OF MAINE
TIMOTHY J. BOYCE
No. 9263
LICENSED PROFESSIONAL ENGINEER

K:\2015\15-0071.1\CAD\Drawings\15-0071.1 2017 ELP_Rev5.dwg, 3/13/2017 1:02:44 PM, 11, CEM, S. W. Cole Engineering Inc.



NOTES:

1. UNDERDRAIN INSTALLATION AND MATERIAL GRADATION RECOMMENDATIONS ARE CONTAINED WITHIN THIS REPORT.
2. DETAIL IS PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY, NOT FOR CONSTRUCTION.
3. INCREASE CRUSHED STONE DEPTH AS NEEDED FOR SHALLOWER FOOTINGS TO MAINTAIN CONSTANT SUBGRADE ELEVATION FOR FUNCTION OF FOUNDATION UNDERDRAINS (SEE REPORT)
4. MAXIMUM PARTICLE SIZE WITHIN GRANULAR BORROW MATERIAL SHALL BE 3"-MINUS WITHIN 12" OF FOOTINGS OR FOUNDATION WALLS.

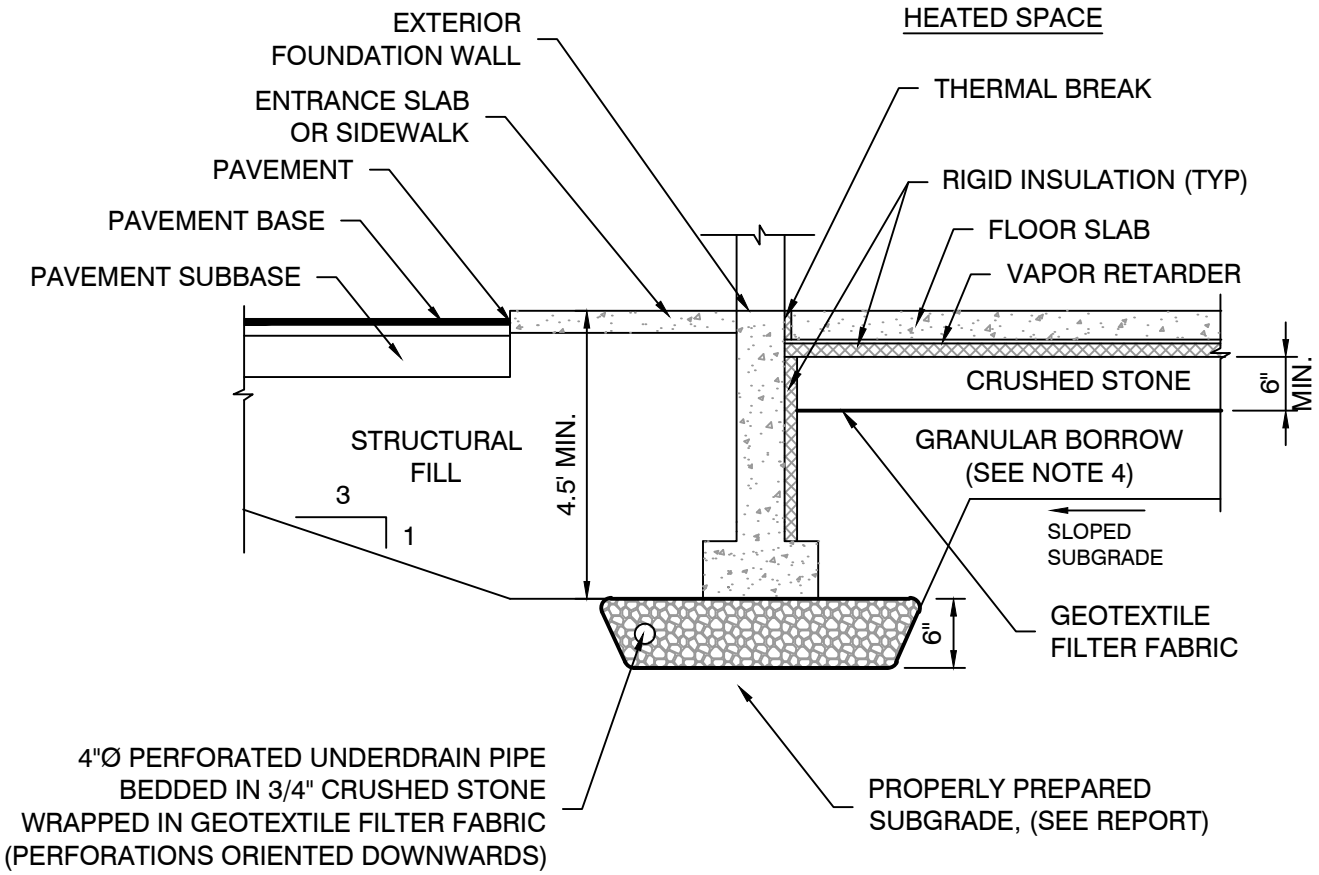
S.W.COLE ENGINEERING, INC.

OAK POINT ASSOCIATES

FOUNDATION DETAIL SKETCH

PROPOSED HALL ELEMENTARY SCHOOL
23 ORONO ROAD
PORTLAND, MAINE

Job No.:	15-0071.1	Scale:	Not to Scale
Date :	04/03/2017	Sheet:	3



NOTES:

1. UNDERDRAIN INSTALLATION AND MATERIAL GRADATION RECOMMENDATIONS ARE CONTAINED WITHIN THIS REPORT.
2. DETAIL IS PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY, NOT FOR CONSTRUCTION.
3. INCREASE CRUSHED STONE DEPTH AS NEEDED FOR SHALLOWER FOOTINGS TO MAINTAIN CONSTANT SUBGRADE ELEVATION FOR FUNCTION OF FOUNDATION UNDERDRAINS (SEE REPORT)
4. MAXIMUM PARTICLE SIZE WITHIN GRANULAR BORROW MATERIAL SHALL BE 3"-MINUS WITHIN 12" OF FOOTINGS OR FOUNDATION WALLS.

S.W.COLE ENGINEERING, INC.

OAK POINT ASSOCIATES

FOUNDATION DETAIL SKETCH

PROPOSED HALL ELEMENTARY SCHOOL
23 ORONO ROAD
PORTLAND, MAINE

Job No.:	15-0071.1	Scale:	Not to Scale
Date :	04/03/2017	Sheet:	4

APPENDIX C

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-101**
SHEET: 1 OF 1
PROJECT NO.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 7/13/2015
DATE FINISH: 7/13/2015
ELEVATION: 65'
SWCOLE REP: TJB

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/2" O.D.		
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER @ 7'

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
									0.8'	FOREST DUFF AND TOPSOIL
	1D	24"	15"	2.0'	2	2	1	2		TAN SANDY SILT
									3'	~ MEDIUM ~
										OLIVE-BROWN SILTY CLAY
										~ STIFF ~
	2D	24"	20"	7.0'	2	3	5	5	7'	
									9'	GRAY SILTY FINE SAND
										~ MEDIUM DENSE ~
										GRAY SILTY CLAY
	3D	24"	24"	12.0'	1	1	1	1		~ MEDIUM TO SOFT~
										BOTTOM OF EXPLORATION @ 12'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 7/14/2015
DATE FINISH: 7/14/2015
ELEVATION: 65'
SWCOLE REP: TJB

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/2" O.D.		
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER @ 6'

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									1.3'	FOREST DUFF OVER ASH OVER RELIC TOPSOIL (RELIC BURN PIT)
	1D	24"	19"	2.0'	1	3	6	8	3'	TAN FINE TO MEDIUM SAND SOME SILT ~ LOOSE ~
									6'	OLIVE-BROWN SILTY CLAY ~ STIFF ~
	2D	24"	24"	7.0'	3	4	2	2	9'	GRAY SILTY CLAY WITH SAND SEAMS ~ MEDIUM ~ q_P = 1.0 to 0.5 ksf
	3D	24"	20"	9.0'	2	2	2	2		BOTTOM OF EXPLORATION @ 9'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 7/14/2015
DATE FINISH: 7/14/2015
ELEVATION: 66'
SWCOLE REP: TJB

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/2" O.D.		
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER @ 5.5'

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
									0.1'	GRASS OVER BROWN SANDY LOAM
	1D	24"	14"	2.0'	4	4	3	7	2'	BROWN-GRAY GRAVELLY SAND SOME SILT (RELIC ROAD)
										FTG Subgrade
										OLIVE-BROWN SILTY CLAY
										~ STIFF ~
									5.5'	q_P = 2 ksf
	2D	24"	24"	7.0'	1	3	2	3		GRAY SILTY CLAY ~ MEDIUM ~ q_P = 0.5 ksf
										BOTTOM OF EXPLORATION @ 7.0'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 7/14/2015
DATE FINISH: 7/14/2015
ELEVATION: 66'
SWCOLE REP: TJB

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/2" O.D.		
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER @ 9'

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									1.2'	GRASS OVER BROWN SILTY LOAM OVER BROWN CLAY (FILL)
	1D	24"	17"	2.0'	7	10	10	9		ORANGE-BROWN SILTY SAND WITH ORGANICS (RELIC B HORIZON TOPSOIL)
									3'	FTG Subgrade
										OLIVE-BROWN SILTY CLAY
										~ VERY STIFF ~
									5.5'	
	2D	24"	24"	7.0'	3	4	4	5		GRAY-BROWN SILTY CLAY q_P = 4 .0 to 3.0 ksf
										~ STIFF ~
									9'	
										GRAY SILTY CLAY q_P = 0.0 ksf
										WITH OCCASIONAL SAND SEAMS
	3D	24"	24"	12.0'	WOR / 18"			WOM		~ SOFT ~
										BOTTOM OF EXPLORATION @ 12'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 7/14/2015
DATE FINISH: 7/14/2015
ELEVATION: 65'
SWCOLE REP: TJB

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"		
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER @ 9'

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
									1.1'	FOREST DUFF OVER DARK BROWN SANDY LOAM OVER ORANGE SILTY SAND
	1D	24"	21"	2.0'	1	2	3	2		TAN FINE TO MEDIUM SAND TRACE TO SOME SILT FTG Subgrade
									4'	
	2D	24"	24"	7.0'	4	5	8	9		OLIVE-BROWN SILTY CLAY WITH OCCASIONAL TAN SILTY FINE SAND SEAMS w = 34.9% q_P = 5.0 ksf
									11.5'	
	3D	24"	24"	12.0'	1	2	1	2		GRAY SILTY CLAY q_P = 0.5 to 0.0 ksf ~ MEDIUM …
	1S	24"	22"	17.0'	PISTON SAMPLER					W_L = 37 W_P = 21 w = 37.4%
	1V			17.8'	3.5" x 7" TAPERED					Sv = 0.47 / 0.02 ksf … BECOMES SOFT ~
	1V'			18.6'	3.5" x 7" TAPERED					Sv = 0.37 / 0.01 ksf
	1S	24"	24"	27.0'	PISTON SAMPLER					W_L = 37 W_P = 22 w = 35.7%
	1V			27.8'	3.5" x 7" TAPERED					Sv = 0.42 / 0.02 ksf
	1V'			28.6'	3.5" x 7" TAPERED					Sv = 0.35 / 0.01 ksf
										ROD PROBE - NO SAMPLING DEPTH RESISTANCE PROBABLE SOIL 27'-68' HYD CLAY 68'-71' HYD SILTY SAND
										BOTTOM OF EXPLORATION @ 71'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 7/14/2015
DATE FINISH: 7/14/2015
ELEVATION: 66'
SWCOLE REP: TJB

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/2" O.D.		
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER @ 8'

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
									0.7'	GRASS OVER BROWN SANDY LOAM
	1D	24"	19"	2.0'	2	3	3	4		TAN FINE TO MEDIUM SAND SOME SILT
									3'	~ LOOSE ~ FTG Subgrade
										OLIVE-BROWN SILTY CLAY
										q_P = 5.0 to 2.5 ksf
	2D	24"	24"	7.0'	2	4	4	5		
									8'	
	3D	24"	24"	9.0'	2	2	2	1		GRAY SILTY CLAY ~ SOFT ~ q_P = 0.5 to 0.0 ksf
										BOTTOM OF EXPLORATION @ 9'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 7/13/2015
DATE FINISH: 7/13/2015
ELEVATION: 65'
SWCOLE REP: TJB

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/2" O.D.		
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
7/13/2015: WATER @ 5'
7/14/2015: WATER @ 5.7', CAVED @ 5.7'

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
										GRASS AT EDGE OF PAVEMENT OVER
	1D	24"	14"	2.0'	2	2	4	11	1.5'	TAN SILTY SAND & SANDY SILT (FILL)
										RUST OXIDE TAN SILTY SAND
										~ MEDIUM DENISE ~
									6'	
	2D	24"	20"	7.0'	4	8	5	3		GRAY SILTY FINE SAND
									8'	~ LOOSE ~
										GRAY SILTY CLAY
										~ MEDIUM TO SOFT ~
	3D	24"	24"	12.0'	WOH / 24"					
										BOTTOM OF EXPLORATION @ 12'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 7/14/2015
DATE FINISH: 7/14/2015
ELEVATION: 65'
SWCOLE REP: TJB

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/2" O.D.		
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER @ 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
									0.9'	SAND OVER BROWN-OXIDE SANDY LOAM
	1D	24"	17"	2.0'	2	2	2	3	2'	GRAY-BROWN MOTTLED CLAYEY SILT TRACE SAND
										BROWN FINE TO MEDIUM SAND WITH FREQUENT BROWN CLAY SEAMS ~ MEDIUM DENSE ~
	2D	24"	24"	7.0'	4	7	13	10		
									8'	
										GRAY SILTY CLAY ~ SOFT ~
	3D	24"	9"	12.0'	1/12"		1/12"			
										BOTTOM OF EXPLORATION @ 12'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 7/13/2015
DATE FINISH: 7/13/2015
ELEVATION: 66'
SWCOLE REP: TJB

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"		
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER @ 8'

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
									0.6'	GRASS OVER DARK BROWN SILTY LOAM
	1D	24"	14"	2.0'	3	3	3	3		OLIVE-BROWN SILTY CLAY
									3'	~ STIFF ~
										LAYERED TAN FINE SAND AND TAN SANDY SILT
										~ MEDIUM DENSE ~
									6'	
	2D	24"	19"	7.0'	7	7	11	12		RUST-OXIDE FINE TO MEDIUM SAND TRACE SILT
									8'	~ MEDIUM DENSE ~
										GRAY SILTY CLAY
										~ MEDIUM …
	3D	24"	24"	12.0'	1	2	1	1		w = 30.8%
	1V			15.8'	3.5" x 7" TAPERED					Sv = 0.37 / 0.00 ksf … BECOMES SOFT ~
	1V'			16.6'	3.5" x 7" TAPERED					Sv = 0.32 / 0.00 ksf
	2V			25.8'	3.5" x 7" TAPERED					Sv = 0.35 / 0.00 ksf
	2V'			26.6'	3.5" x 7" TAPERED					Sv = 0.32 / 0.00 ksf

ROD PROBE - NO SAMPLING

DEPTH	RESISTANCE	PROBABLE SOIL
26.6'-91	HYD	CLAY
91'-94'	HYD	SILTY SAND

BOTTOM OF EXPLORATION @ 94'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 7/14/2015
DATE FINISH: 7/14/2015
ELEVATION: 66'
SWCOLE REP: TJB

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/2" O.D.		
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER @ 6'

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
										GRASS OVER SILT LOAM OVER BROWN SILTY CLAY
	1D	24"	24"	2.0'	2	5	4	3	2'	OVER TAN SAND WITH RELIC LOAM (FILL)
										BROWN-OXIDE MOTTLED FINE TO MEDIUM SAND SOME SILT
	2D	24"	24"	7.0'	9	12	14	13		~ MEDIUM DENSE ~
									8.5'	
										GRAY SILTY CLAY
	3D	24"	24"	12.0'	WOM	1	2	1		~ MEDIUM ~ q_p = 0.5 ksf
										BOTTOM OF EXPLORATION @ 12'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 7/14/2015
DATE FINISH: 7/14/2015
ELEVATION: 66'
SWCOLE REP: TJB

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/2" O.D.		
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER @ 6'

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
										GRASS OVER BROWN SILT LOAM
	1D	24"	19"	2.0'	2	4	4	6	2'	BROWN-MOTTLED TAN SANDY SILT WITH ROOTLETS AND RELIC LOAM
										TAN-OXIDE MOTTLED FINE TO MEDIUM SAND SOME SILT — FTG Subgrade
										~ MEDIUM DENSE ~
									6'	...BECOMES SILTY FINE SAND
	2D	24"	22"	7.0'	8	10	9	9		OLIVE-BROWN SILTY CLAY — q_P = 2.5 to 1.5 ksf
										~ STIFF ~
									9'	
										GRAY SILTY CLAY
										~ MEDIUM ~
	3D	24"	24"	12.0'	WOR	1	2	1		w = 34.9% — q_P = 0.5 ksf
										BOTTOM OF EXPLORATION @ 12'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 7/14/2015
DATE FINISH: 7/14/2015
ELEVATION: 64'
SWCOLE REP: TJB

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/2" O.D.		
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER @ 9'

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
									0.8'	GRASS OVER DARK BROWN SANDY LOAM
	1D	24"	17"	2.0'	2	2	3	4	3'	TAN-ORANGE SILTY SAND
	2D	24"	24"	7.0'	4	4	6	7	9'	OLIVE-BROWN SILTY CLAY ~ VERY STIFF ~ q_P = 3.0 to 1.5 ksf
	3D	24"	24"	12.0'	1	2	1	2		GRAY SILTY CLAY ~ MEDIUM TO SOFT ~ q_P = 0.5 to 0.0 ksf
										BOTTOM OF EXPLORATION @ 12'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 7/13/2015
DATE FINISH: 7/13/2015
ELEVATION: 65'
SWCOLE REP: TJB

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/2" O.D.		
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER @ 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
										GRASS AT EDGE OF PAVEMENT OVER
	1D	24"	15"	2.0'	8	9	15	15	2'	BROWN GRAVELLY SAND SOME SILT (FILL)
										BROWN-OXIDE MOTTLED FINE TO MEDIUM SAND TRACE SILT
										~ MEDIUM DENSE ~
	2D	24"	19"	7.0'	5	9	9	9	8'	
										GRAY SILTY CLAY
										~ MEDIUM TO SOFT ~
	3D	24"	24"	12.0'	WOH / 24"					
										BOTTOM OF EXPLORATION @ 12'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 7/14/2015
DATE FINISH: 7/14/2015
ELEVATION: 67'
SWCOLE REP: TJB

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/2" O.D.		
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER @ 6'

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.5'	DARK BROWN SILT LOAM (GARDEN SOIL)
	1D	24"	22'	2.0'	2	3	5	7	2'	BROWN-MOTTLED TAN SANDY SILT (FILL)
										TAN-OXIDE MOTTLED FIINE SAND SOME SILT
										~ MEDIUM DENSE…
										…BECOMES TAN WITH OLIVE BROWN SILTY CLAY SEAMS
	2D	24"	24"	7.0'	12	15	16	22		…BECOMES DENSE ~
									9'	
										GRAY SILTY CLAY
										~ MEDIUM ~
	3D	24"	24"	12.0'	WOR	2	1	2		q_P = 0.5 ksf
										BOTTOM OF EXPLORATION @ 12'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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 2
PROJECT NO.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 7/13/2015
DATE FINISH: 7/13/2015
ELEVATION: 66'
SWCOLE REP: TJB

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"		
SAMPLER:	D	1 3/8"	140#	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
									0.7'	GRASS AT EDGE OF PAVEMENT OVER DARK BROWN SANDY LOAM (TOPSOIL)
	1D	24"	20"	2.0'	3	2	3	3	2'	TAN FINE TO MEDIUM SAND TRACE SILT
										TAN SANDY SILT
										~ STIFF ~
									6.5'	
	2D	4"	8"	7.0'	4	8	13	15		TAN-OXIDE MOTTLED FINE TO MEDIUM SAND SOME SILT
										~ LOOSE ~
									9'	
										OLIVE-BROWN-GRAY SILTY CLAY
										~ MEDIUM ~ q_P = 2.5 ksf
	3D	24"	24"	12.0'	3	5	5	6		w = 29.7%
									13'	
										GRAY SILTY CLAY
	1V			15.8'	3.5" x 7" TAPERED					Sv = 0.74 / 0.05 ksf ~ MEDIUM …
	1V'			16.6'	3.5" x 7" TAPERED					Sv = 0.63 / 0.05 ksf
	1S	24"	22"	22.0'	PISTON SAMPLER					W_L = 56 W_P = 26 w = 49.7%
	2V			22.8'	3.5" x 7" TAPERED					Sv = 0.56 / 0.05 ksf
	2V'			23.6'	3.5" x 7" TAPERED					Sv = 0.42 / 0.05 ksf
										… BECOMES SOFT ~
	2S	24"	24"	32.0'	PISTON SAMPLER					W_L = 38 W_P = 22 w = 42.8%
	3V			32.8'	3.5" x 7" TAPERED					Sv = 0.49 / 0.02 ksf
	3V'			33.6'	3.5" x 7" TAPERED					Sv = 0.42 / 0.02 ksf
										CONTINUED…

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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-115**
SHEET: 2 OF 2
PROJECT NO.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 7/13/2015
DATE FINISH: 7/13/2015
ELEVATION: 66'
SWCOLE REP: TJB

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"		
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER @ 11'

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
	4V			40.8'	3.5" x 7" TAPERED					Sv = 0.39 / 0.00 ksf
	4V'			41.6'	3.5" x 7" TAPERED					Sv = 0.52 / 0.00 ksf
										GRAY SILTY CLAY
										~ SOFT ~
	5V			50.8'	3.5" x 7" TAPERED					Sv = 0.52 / 0.00 ksf
	5V'			51.6'	3.5" x 7" TAPERED					Sv = 0.45 / 0.00 ksf
										ROD PROBE - NO SAMPLING
										DEPTH RESISTANCE PROBABLE SOIL
										51.6'-95' HYD CLAY
										95'-100' HYD LAYERED CLAY AND SAND
										100'-104' HYD SILTY SAND
										BOTTOM OF EXPLORATION @ 104'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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-201**
SHEET: 1 OF 1
PROJECT NO.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 6/30/2016
DATE FINISH: 6/30/2016
ELEVATION: 66' +/-
SWCOLE REP: EMW

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	HYD PUSH	
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS MOIST AT GROUND SURFACE
WET BELOW 5', SATURATED BELOW 8' +/-

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
	1D	24"	18"	2.0'	5	8	7	8	1.5'	VEGETATION / DARK BROWN SILTY SAND, SOME GRAVEL WITH ORGANICS (TOPSOIL / FILL)
										GRAY-BROWN TO RUST-BROWN SILTY SAND FTG Subgrade
									4.0'	
									6.0'	GRAY-BROWN SILTY CLAY WITH FREQUENT SAND SEAMS ~ VERY STIFF ~ q_p = 5 KSF
	2D	24"	20"	7.0'	3	3	3	2		~ STIFF ~ q_p = 4 KSF
	3D	24"	20"	9.0'	3	3	3	2		~ MEDIUM ~ q_p = 0.5 KSF
	1S	24"	20"	12.0'	PISTON SAMPLER					W_L = 35 W_P = 19 w = 50.3% q_U = 0.78 KSF
	1V			12.8'	3 5/8" X 7" VANE					S_V = 0.37 / 0.01 KSF
	1V'			13.6'	3 5/8" X 7" VANE					S_V = 0.33 / 0.00 KSF ~ SOFT ~
										GRAY SILTY CLAY WITH FREQUENT SAND SEAMS AND PARTINGS
	2S	24"	24"	22.0'	PISTON SAMPLER					W_L = 36 W_P = 21 w = 44.9%
	2V			22.8'	3 5/8" X 7" VANE					S_V = 0.28 / 0.00 KSF
	2V'			23.6'	3 5/8" X 7" VANE					S_V = 0.30 / 0.00 KSF

ROD PROBE BELOW 23.6' - NO SAMPLING

DEPTH	RESISTANCE	PROBABLE SOIL
23.6' - 55'	WOM	CLAY
55' - 59'	HYD	CLAY
59' - 60.5'	HYD	SAND
60.5' - 61.5'	44 BLOWS	SAND
61.5' - 62.5'	24 BLOWS	SAND
62.5' - 63.5'	32 BLOWS	SAND

BOTTOM OF EXPLORATION @ 63.5'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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-201**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-202**
SHEET: 1 OF 1
PROJECT NO.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 6/30/2016
DATE FINISH: 6/30/2016
ELEVATION: 66' +/-
SWCOLE REP: EMW

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	2 1/4"		
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS DAMP FROM GROUND SURFACE
MOIST BELOW 5', SATURATED BELOW 10' +/-

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
									1.0'	VEGETATION / DARK BROWN SILTY SAND WITH ORGANICS (TOPSOIL / FILL)
	1D	24"	18"	2.0'	2	1	3	3	2.0'	DARK BROWN AND BLACK SILTY SAND WITH TRACE ASH (FILL)
										FTG Subgrade
	2D	24"	18"	4.0'	7	13	12	14		BROWN TO ORANGE-BROWN SAND, TRACE TO SOME SILT
									5'	~ MEDIUM DENSE ~
										BROWN SILTY CLAY WITH FREQUENT SAND SEAMS
	3D	24"	20"	7.0'	5	4	5	6		~ VERY STIFF ~ qp = 5-6 KSF
									8'	
										GRAY SILTY CLAY
										~ SOFT ~
	4D	24"	24"	12.0'	WOH-12"		1	1		
										BOTTOM OF EXPLORATION @ 12.0'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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-202**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-203**
SHEET: 1 OF 1
PROJECT NO.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 7/1/2016
DATE FINISH: 7/1/2016
ELEVATION: 66' +/-
SWCOLE REP: PJO

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/2" O.D		
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS WET AT 5'
SOILS SATURATED AT 10'

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
									0.5'	DARK BROWN SILT LOAM (TOPSOIL) ~LOOSE~
	1D	24"	19"	2.0'	2	5	5	10	1.9'	GRAY SANDY SILT ~MEDIUM DENSE~
										RUST BROWN TO BROWN SILTY MEDIUM TO COARSE SAND — FTG Subgrade
	2D	24"	17"	4.0'	15	12	13	8	3.8'	~MEDIUM DENSE~
										GRAY-BROWN SILTY CLAY
										WITH SAND SEAMS AND LAYERS
	3D	24"	24"	7.0'	6	8	8	10		~STIFF~ q_p = 3.5 ksf
									8.0'	
										GRAY SILTY CLAY WITH SAND SEAMS
	4D	24"	24"	12.0'	W O H / 24"					~SOFT~
										ROD PROBE BELOW 12' - NO SAMPLING

DEPTH	RESISTANCE	PROBABLE SOIL
12' - 66.5'	HYD	CLAY
66.5' - 71.5'	HYD	LAYERED CLAY AND SAND
71.5' - 72.2'	50 BLOWS / 8"	SAND

BOTTOM OF EXPLORATION @ 72.2'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

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

REMARKS: BORING MADE 3' EAST OF STAKED LOCATION

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

BORING NO.: **B-203**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-204**
SHEET: 1 OF 2
PROJECT NO.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 6/30/2016
DATE FINISH: 6/30/2016
ELEVATION: 66' +/-
SWCOLE REP: EMW

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	HYD PUSH	
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS DAMP FROM GROUND SURFACE,
WET BELOW

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
										DARK BROWN SILTY SAND, TRACE GRAVEL, WITH ORGANICS
	1D	24"	20"	2.0'	2	3	6	12	1.5'	(TOPSOIL / FILL)
										RUST BROWN, ORANGE-BROWN AND LIGHT BROWN SAND — FTG Subgrade
	2D	24"	22"	4.0'	18	29	29	26		TRACE TO SOME SILT (CEMENTED)
									5.0'	~ MEDIUM DENSE TO VERY DENSE ~
									5.5'	BROWN SILTY CLAY ~ VERY STIFF ~ — q_p = 5 KSF
	3D	24"	22"	7.0'	4	5	7	7		~ STIFF ~ — q_p = 4 KSF
										GRAY SILTY CLAY
										WITH FREQUENT SAND SEAMS AND LAYERS
	4D	24"	14"	12.0'	WOH	1	1-12"			~ SOFT ~
	1S	24"	24"	17.0'	PISTON SAMPLER					W_L = 54 W_P = 25 w = 54.9%
	1V			17.8'	3 5/8" X 7" VANE					S_V = 0.30 / 0.00 KSF
	1V'			18.6'	3 5/8" X 7" VANE					S_V = 0.28 / 0.00 KSF
	2S	24"	24"	27.0'	PISTON SAMPLER					W_L = 37 W_P = 21 w = 44.7%
	2V			27.8'	3 5/8" X 7" VANE					S_V = 0.29 / 0.00 KSF
	2V'			28.6'	3 5/8" X 7" VANE					S_V = 0.29 / 0.00 KSF
	3S	24"	20"	37.0'	PISTON SAMPLER					W_L = 37 W_P = 20 w = 41.6%
	3V			37.8'	3 5/8" X 7" VANE					S_V = 0.41 / 0.00 KSF
	3V'			38.6'	3 5/8" X 7" VANE					S_V = 0.52 / 0.01 KSF - PROBABLE SAND SEAM

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

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

REMARKS: CONTINUED…

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

BORING NO.: **B-204**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-204**
SHEET: 2 OF 2
PROJECT NO.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 6/30/2016
DATE FINISH: 6/30/2016
ELEVATION: 66' +/-
SWCOLE REP: EMW

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	HYD PUSH	
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS DAMP FROM GROUND SURFACE,
WET BELOW

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
										ROD PROBE BELOW 38.6' - NO SAMPLING
										PROBABLE SILTY CLAY
									66'	
										PROBABLE LAYERED CLAY AND SAND

DEPTH	RESISTANCE	PROBABLE SOIL
38.6' - 66'	HYD	CLAY
66' - 76'	HYD	LAYERED CLAY AND SAND
76' - 76.7'	50 BLOWS	SAND

PROBABLE SAND

BOTTOM OF EXPLORATION @ 76.7'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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-204**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-205**
SHEET: 1 OF 1
PROJECT NO.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 7/1/2016
DATE FINISH: 7/1/2016
ELEVATION: 66' +/-
SWCOLE REP: PJO

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/2" O.D		
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS SATURATED AT 10'

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'	FOREST DUFF
	1D	24"	14"	2.0'	1	1	1 FOR 12"		2.0'	BROWN SILTY SAND WITH ORGANICS AND ROOTLETS ~VERY LOOSE~
										BROWN SILTY SAND — FTG Subgrade
									4.0'	~ LOOSE ~
										BROWN SILTY CLAY WITH SAND SEAMS
										~ VERY STIFF TO STIFF ~ q_p = 4-4.5 ksf
	2D	24"	24"	7.0'	4	6	7	9	7.0'	
										GRAY-BROWN SILTY CLAY q_p = 1.5-2.5 ksf
	3D	24"	15"	9.0'	8	8	7	6	8.8'	WITH SAND SEAMS ~ STIFF TO MEDIUM ~
										GRAY SILTY CLAY
	4D	24"	24"	12.0'	W O H					~SOFT~
										BOTTOM OF EXPLORATION AT 12.0'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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-205**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-206**
SHEET: 1 OF 1
PROJECT NO.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 7/1/2016
DATE FINISH: 7/1/2016
ELEVATION: 66' +/-
SWCOLE REP: PJO

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4 1/2" O.D		
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS SATURATED AT 10'

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'	FOREST DUFF
	1D	24"	18"	2.0'	1	1	1	10	1.5'	RUST BROWN SILTY SAND WITH ORGANICS ~VERY LOOSE~
										RUST BROWN TO BROWN SILTY SAND FTG Subgrade
									4.0'	~MEDIUM DENSE~
										BROWN SILTY CLAY
										WITH FREQUENT SAND SEAMS q_p = 3.5-4 ksf
	2D	24"	20"	7.0'	2	3	4	6		~STIFF TO VERY STIFF~
										q_p = 3-4.5 ksf
	3D	24"	16"	9.0'	7	7	6	4	9.0'	
										GRAY SILTY CLAY WITH SAND SEAMS
	4D	24"	24"	12.0'	W O H		1	2		~SOFT`
										BOTTOM OF EXPLORATION @ 12'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:

	DRILLER - VISUALLY
X	SOIL TECH. - VISUALLY
	LABORATORY TEST

REMARKS: BORING MADE 5' WEST OF STAKED LOCATION

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

BORING NO.: **B-206**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-207**
SHEET: 1 OF 1
PROJECT NO.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 6/29/2016
DATE FINISH: 6/29/2016
ELEVATION: 66' +/-
SWCOLE REP: EMW

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	HYD PUSH	
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS MOIST BELOW 5' +/-
SOILS SATURATED BELOW 9' +/-

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'	VEGETATION / TOPSOIL (FILL)
	1D	24"	16"	2.0'	3	5	5	9		DARK BROWN SILTY SAND, TRACE GRAVEL, TRACE ORGANICS (FILL)
									3'	~ MEDIUM DENSE ~ FTG Subgrade
										BROWN WITH RUST STAINING SAND, SOME SILT
									6'	
	2D	24"	18"	7.0'	8	8	8	12	7'	LAYERED GRAY-BROWN SILTY CLAY AND SILTY SAND
										GRAY-BROWN SILTY CLAY WITH FREQUENT SAND SEAMS
	3D	24"	20"	9.0'	8	7	10	7	10'	
	4D	24"	18"	12.0'	2	2	2	3		GRAY SILTY CLAY WITH FREQUENT SAND SEAMS
	1V			15.8'	3 5/8" X 7" VANE					S_V = 0.71 / 0.07 KSF ~ MEDIUM ~
	1V'			16.6'	3 5/8" X 7" VANE					S_V = 0.72 / 0.03 KSF
										ROD PROBE BELOW 16.6' - NO SAMPLING
										BOTTOM OF EXPLORATION @ 93'

DEPTH	RESISTANCE	PROBABLE SOIL
16.6' - 87'	HYD	CLAY
87' - 91'	HYD	LAYERED CLAY AND SAND
91' - 92'	46 BLOWS	SAND OR TILL
92' - 93'	32 BLOWS	SAND OR TILL

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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-207**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-208**
SHEET: 1 OF 1
PROJECT NO.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 6/30/2016
DATE FINISH: 6/30/2016
ELEVATION: 65' +/-
SWCOLE REP: EMW

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	HYD PUSH	
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS MOIST FROM GROUND SURFACE
WET TO SATURATED BELOW 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
									0.5'	FOREST DUFF AND ORGANICS
	1D	24"	18"	2.0'	2	1	4	5		FTG Subgrade
									4'	ORANGE-BROWN TO BROWN FINE TO MEDIUM SAND, SOME SILT
	2D	24"	22"	7.0'	3	3	6	5	8'	GRAY-BROWN SILTY CLAY WITH OCCASIONAL SAND SEAMS
	1V			10.8'	3 5/8" X 7" VANE					S_V = 0.94 / 0.08 KSF ~ MEDIUM ~
	1V'			11.6'	3 5/8" X 7" VANE					S_V = 0.45 / 0.02 KSF ~ SOFT ~
	2V			20.8'	3 5/8" X 7" VANE					S_V = 0.26 / 0.00 KSF
	2V'			21.6'	3 5/8" X 7" VANE					S_V = 0.27 / 0.00 KSF

GRAY SILTY CLAY

ROD PROBE BELOW 21.6' - NO SAMPLING

DEPTH	RESISTANCE	PROBABLE SOIL
21.6' - 50'	WOM	CLAY
50' - 68'	HYD	CLAY
68' - 71'	HYD	LAYERED CLAY AND SAND
71' - 71.9'	50 BLOWS	SAND

BOTTOM OF EXPLORATION @ 71.9'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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-208**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-209**
SHEET: 1 OF 1
PROJECT NO.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 6/30/2016
DATE FINISH: 6/30/2016
ELEVATION: 65' +/-
SWCOLE REP: EMW

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	2 1/4"		
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS MOIST BELOW 5' +/-
SOILS SATURATED BELOW 8' +/-

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'	FOREST DUFF AND ORGANICS
	1D	24"	16"	2.0'	1	1	1	2		FTG Subgrade
									4'	BROWN SAND, SOME SILT ~ LOOSE ~
	2D	24"	20"	7.0'	2	5	6	7		GRAY-BROWN SILTY CLAY WITH FREQUENT SAND SEAMS ~ VERY STIFF ~ q_p = 5 KSF
	3D	24"	22"	9.0'	5	5	5	4	9'	
	4D	24"	18"	12.0'	WOH	4	1-12"			GRAY SILTY CLAY WITH FREQUENT SAND SEAMS AND LAYERS ~ SOFT ~
										BOTTOM OF EXPLORATION @ 12.0'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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-209**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-210**
SHEET: 1 OF 1
PROJECT NO.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 6/29/2016
DATE FINISH: 6/29/2016
ELEVATION: 65' +/-
SWCOLE REP: EMW

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	HYD PUSH	
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS WET BELOW 5' +/-
SOILS SATURATED BELOW 6' +/-

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
										BROWN GRAVELLY SAND, TRACE SILT (FILL)
	1D	24"	8"	2.0'	2	5	8	10		~ MEDIUM DENSE ~
									3'	
										GRAY-BROWN SILTY CLAY WITH FREQUENT SAND SEAMS
										q_p = 2 KSF
	2D	24"	18"	7.0'	2	3	3	6		~ STIFF TO MEDIUM ~
									9'	
	1V			10.8'	3 5/8" X 7" VANE					S_V = 0.48 / 0.04 KSF
	1V'			11.6'	3 5/8" X 7" VANE					S_V = 0.34 / 0.02 KSF
										GRAY SILTY CLAY
										~ SOFT ~
	2V			20.8'	3 5/8" X 7" VANE					S_V = 0.29 / 0.00 KSF
	2V'			21.6'	3 5/8" X 7" VANE					S_V = 0.29 / 0.00 KSF
	3V			30.8'	3 5/8" X 7" VANE					S_V = 0.41 / 0.00 KSF
	3V'			31.6'	3 5/8" X 7" VANE					S_V = 0.34 / 0.01 KSF
										BOTTOM OF EXPLORATION @ 31.6'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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-210**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-211**
SHEET: 1 OF 1
PROJECT NO.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 6/29/2016
DATE FINISH: 6/29/2016
ELEVATION: 65' +/-
SWCOLE REP: EMW

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	HYD PUSH	
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS WET BELOW 5' +/-
SOILS SATURATED BELOW 6' +/-

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
									3"	ASPHALT PAVEMENT
										BROWN GRAVELLY SAND, TRACE SILT (FILL)
	1D	24"	3"	2.4'	4	7	4	4	2.5'	~ MEDIUM DENSE ~
									3.5'	LIGHT BROWN SILTY SAND ~ MEDIUM DENSE ~
									5'	BROWN SILTY CLAY ~ STIFF ~
									5.5'	DARK RUST BROWN TO ORANGE-BROWN SAND, TRACE SILT
	2D	24"	16"	7.0'	7	9	11	8		GRAY-BROWN LAYERED SILTY FINE SAND AND SILTY CLAY
									8'	~ MEDIUM DENSE / STIFF ~
										GRAY SILTY CLAY
	3D	24"	22"	12.0'	WOH	1	1	1		~ SOFT ~
	1V			15.8'	3 5/8" X 7" VANE					S_V = 0.31 / 0.00 KSF
	1V'			16.6'	3 5/8" X 7" VANE					S_V = 0.32 / 0.00 KSF
	2V			20.8'	3 5/8" X 7" VANE					S_V = 0.29 / 0.00 KSF
	2V'			21.6'	3 5/8" X 7" VANE					S_V = 0.32 / 0.00 KSF
	3V			25.8'	3 5/8" X 7" VANE					S_V = 0.27 / 0.00 KSF
	3V'			26.6'	3 5/8" X 7" VANE					S_V = 0.28 / 0.00 KSF
	4V			30.8'	3 5/8" X 7" VANE					S_V = 0.56 / 0.00 KSF - PROBABLE SAND SEAM
	4V'			31.6'	3 5/8" X 7" VANE					S_V = 0.38 / 0.00 KSF
										BOTTOM OF EXPLORATION @ 31.6'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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-211**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-212**
SHEET: 1 OF 1
PROJECT NO.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 6/29/2016
DATE FINISH: 6/29/2016
ELEVATION: 62' +/-
SWCOLE REP: EMW

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	HYD PUSH	
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS WET BELOW 5' +/-
SOILS SATURATED BELOW 6' +/-

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
									3"	ASPHALT PAVEMENT
									1'	BROWN GRAVELLY SAND, TRACE SILT (FILL), OVERLYING GEOTEXTILE
	1D	24"	18"	2.5'	6	18	12	12		
										BROWN SAND, SOME SILT
									5'	~ MEDIUM DENSE ~
										LAYERED GRAY-BROWN SILTY SAND AND SILTY CLAY
	2D	24"	22"	7.0'	3	2	2	2	6.5'	~ LOOSE / STIFF ~
										q_p = 0.5-1 KSF
										GRAY-BROWN SILTY CLAY
									10'	~ MEDIUM ~
	1V			10.8'	3 5/8" X 7" VANE					S_V = 0.32 / 0.00 KSF
	1V'			11.6'	3 5/8" X 7" VANE					S_V = 0.37 / 0.00 KSF
										GRAY SILTY CLAY
										~ SOFT ~
	2V			20.8'	3 5/8" X 7" VANE					S_V = 0.27 / 0.00 KSF
	2V'			21.6'	3 5/8" X 7" VANE					S_V = 0.31 / 0.00 KSF
	3V			30.8'	3 5/8" X 7" VANE					S_V = 0.27 / 0.00 KSF
	3V'			31.6'	3 5/8" X 7" VANE					S_V = 0.32 / 0.00 KSF
										BOTTOM OF EXPLORATION @ 31.6'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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-212**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-213**
SHEET: 1 OF 1
PROJECT NO.: 15-0071.1

PROJECT / CLIENT: PROPOSED HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
LOCATION: 23 ORONO ROAD, PORTLAND, MAINE
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

DATE START: 6/29/2016
DATE FINISH: 6/29/2016
ELEVATION: 65' +/-
SWCOLE REP: EMW

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	2 1/4"		
SAMPLER:	D	1 3/8"	140#	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS WET TO SATURATED BELOW 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'	CRUSHED STONE (FILL)
	1D	24"	16"	2.0'	2	2	4	4	1'	DARK BROWN SILTY SAND, SOME GRAVEL, WITH TRACE ORGANICS (FILL)
									5'	LIGHT BROWN MEDIUM SAND, TRACE SILT ~ LOOSE TO MEDIUM DENSE ~
	2D	24"	20"	7.0'	4	8	12	12	8'	BROWN WITH OXIDE STAINING SILTY SAND WITH OCCASIONAL CLAYEY SILT SEAMS ~ MEDIUM DENSE ~
	3D	24"	22"	12.0'	1	1	2	1		GRAY SILTY CLAY WITH OCCASIONAL SAND SEAMS ~ MEDIUM TO SOFT ~
										BOTTOM OF EXPLORATION @ 12.0'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 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-213**

S.W.COLE ENGINEERING, INC.

TEST PIT LOGS

PROJECT/CLIENT: HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
PROJECT NO.: 15-0071.1
LOCATION: ORONO STREET, PORTLAND, MAINE
S.W.COLE REP: TJB
EXCAVATING CO: SHAW BROTHERS CONSTRUCTION

TEST PIT TP-301

DATE: 6/29/2016 SURFACE ELEVATION: 61' +/- LOCATION: SEE SHEET 1

SAMPLE NO.	SAMPLE DEPTH	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
		3'	BROWN SAND & SILT WITH ASPHALT & BRICK DEBRIS (FILL)	
			TAN-OXIDE STAINED SILTY FINE SAND	

COMPLETION DEPTH: 6' DEPTH TO WATER: NONE OBSERVED

TEST PIT TP-302

DATE: 6/29/2016 SURFACE ELEVATION: 54' +/- LOCATION: SEE SHEET 1

SAMPLE NO.	SAMPLE DEPTH	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
		0.8'	DARK BROWN CLAYEY LOAM (TOPSOIL)	
		2'	GRAY-BROWN SILTY CLAY (FILL)	
		3'	DARK BROWN CLAYEY LOAM (RELIC TOPSOIL)	
			GRAY-MOTTLED BROWN SILTY CLAY ~ STIFF ~	

COMPLETION DEPTH: 5' DEPTH TO WATER: NONE OBSERVED

S.W.COLE ENGINEERING, INC.

TEST PIT LOGS

PROJECT/CLIENT: HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
PROJECT NO.: 15-0071.1
LOCATION: ORONO STREET, PORTLAND, MAINE
S.W.COLE REP: TJB
EXCAVATING CO: SHAW BROTHERS CONSTRUCTION

TEST PIT TP-303

DATE: 6/29/2016 SURFACE ELEVATION: 60' +/- LOCATION: SEE SHEET 1

SAMPLE NO.	SAMPLE DEPTH	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
			DARK BROWN SANDY LOAM (TOPSOIL)	
		0.9'		
			TAN SILTY FINE SAND	
		1.7'		
			OLIVE BROWN MOTTLED GRAY SILTY CLAY ~ STIFF ~ 6" OXIDIZED LAYER @ 3'	

COMPLETION DEPTH: 6' DEPTH TO WATER: NONE OBSERVED

TEST PIT TP-304

DATE: 6/29/2016 SURFACE ELEVATION: 63' +/- LOCATION: SEE SHEET 1

SAMPLE NO.	SAMPLE DEPTH	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
			DARK BROWN SILTY LOAM (TOPSOIL)	
		1'		
			GRAY-BROWN MOTTLED SANDY SILT	
		4.6'		
		5'	OXIDE CEMENTED SAND	
			GRAY SILTY FINE SAND	

COMPLETION DEPTH: 6' DEPTH TO WATER: WET BELOW 5'

S.W.COLE ENGINEERING, INC.

TEST PIT LOGS

PROJECT/CLIENT: HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
PROJECT NO.: 15-0071.1
LOCATION: ORONO STREET, PORTLAND, MAINE
S.W.COLE REP: TJB
EXCAVATING CO: SHAW BROTHERS CONSTRUCTION

TEST PIT TP-305

DATE: 6/29/2016 SURFACE ELEVATION: 64' +/- LOCATION: SEE SHEET 1

SAMPLE NO.	SAMPLE DEPTH	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
			DARK BROWN SANDY LOAM (TOPSOIL)	
		1.2'		
			BROWN-MOTTLED GRAY SANDY SILT	
		4.3'		
			OLIVE-BROWN SILTY CLAY ~STIFF ~	

COMPLETION DEPTH: 5' DEPTH TO WATER: NONE OBSERVED

TEST PIT TP-306

DATE: 6/29/2016 SURFACE ELEVATION: 65' +/- LOCATION: SEE SHEET 1

SAMPLE NO.	SAMPLE DEPTH	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
			GRAY-BROWN SILT (FILL)	
		1.5'		
		2'	DARK BROWN SILTY LOAM (RELIC TOPSOIL)	
		2.5'	ORANGE BROWN SANDY SILT	
			BROWN-MOTTLED GRAY SANDY SILT	

COMPLETION DEPTH: 5' DEPTH TO WATER: NONE OBSERVED

S.W.COLE ENGINEERING, INC.

TEST PIT LOGS

PROJECT/CLIENT: HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
PROJECT NO.: 15-0071.1
LOCATION: ORONO STREET, PORTLAND, MAINE
S.W.COLE REP: TJB
EXCAVATING CO: SHAW BROTHERS CONSTRUCTION

TEST PIT TP-307

DATE: 6/29/2016 SURFACE ELEVATION: 65' +/- LOCATION: SEE SHEET 1

SAMPLE NO.	SAMPLE DEPTH	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
		0.5'	PEA STONE (PLAYGROUND SURFACE)	
		2'	BROWN GRAVELLY SAND SOME SILT (FILL) NON-WOVEN FABRIC @ 2'	
		3'	BLACK-BROWN-GRAY SILTY CLAY WITH ORGANICS (RELIC TOPSOIL)	
			TAN OXIDE MOTTLED FINE SAND SOME SILT	

COMPLETION DEPTH: 6.5' DEPTH TO WATER: SEEPAGE AND CAVING BELOW 6'

TEST PIT TP-308

DATE: 6/29/2016 SURFACE ELEVATION: 66' +/- LOCATION: SEE SHEET 1

SAMPLE NO.	SAMPLE DEPTH	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
		1.5'	DARK BROWN SANDY LOAM (TOPSOIL)	
		3.5'	BROWN SANDY SILT	
			GRAY SANDY SILT	

COMPLETION DEPTH: 5.4' DEPTH TO WATER: WET BELOW 3.5'

S.W.COLE ENGINEERING, INC.

TEST PIT LOGS

PROJECT/CLIENT: HALL ELEMENTARY SCHOOL / OAK POINT ASSOCIATES
PROJECT NO.: 15-0071.1
LOCATION: ORONO STREET, PORTLAND, MAINE
S.W.COLE REP: TJB
EXCAVATING CO: SHAW BROTHERS CONSTRUCTION

TEST PIT TP-309

DATE: 6/29/2016 SURFACE ELEVATION: 66' +/- LOCATION: SEE SHEET 1

SAMPLE NO.	SAMPLE DEPTH	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
		1.5'	DARK BROWN SANDY LOAM (TOPSOIL)	
		3.5'	BROWN SANDY SILT	
			GRAY SANDY SILT	

COMPLETION DEPTH: 6' DEPTH TO WATER: WET BELOW 3.5'

TEST PIT TP-310

DATE: 6/29/2016 SURFACE ELEVATION: 60' +/- LOCATION: SEE SHEET 1

SAMPLE NO.	SAMPLE DEPTH	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
		1'	DARK BROWN SILTY LOAM	
		4.3'	TAN SANDY SILT	
			GRAY-BROWN SILTY CLAY FISSURED AND OXIDE STAINED	

COMPLETION DEPTH: 6' DEPTH TO WATER: NONE OBSERVED

S.W.COLE ENGINEERING, INC. • Geotechnical Engineering • Field & Lab Testing • Scientific & Environmental Consulting

KEY TO NOTES & SYMBOLS
Test Boring and Test Pit Explorations

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

Key to Symbols Used:

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

Description of Proportions:

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

Description of Stratified Soils

Parting:	0 to 1/16" thickness
Seam:	1/16" to 1/2" thickness
Layer:	½" to 12" thickness
Varved:	Alternating seams or layers
Occasional:	one or less per foot of thickness
Frequent:	more than one per foot of thickness

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

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

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

APPENDIX D

S.W.COLE ENGINEERING, INC.

Consolidation Test

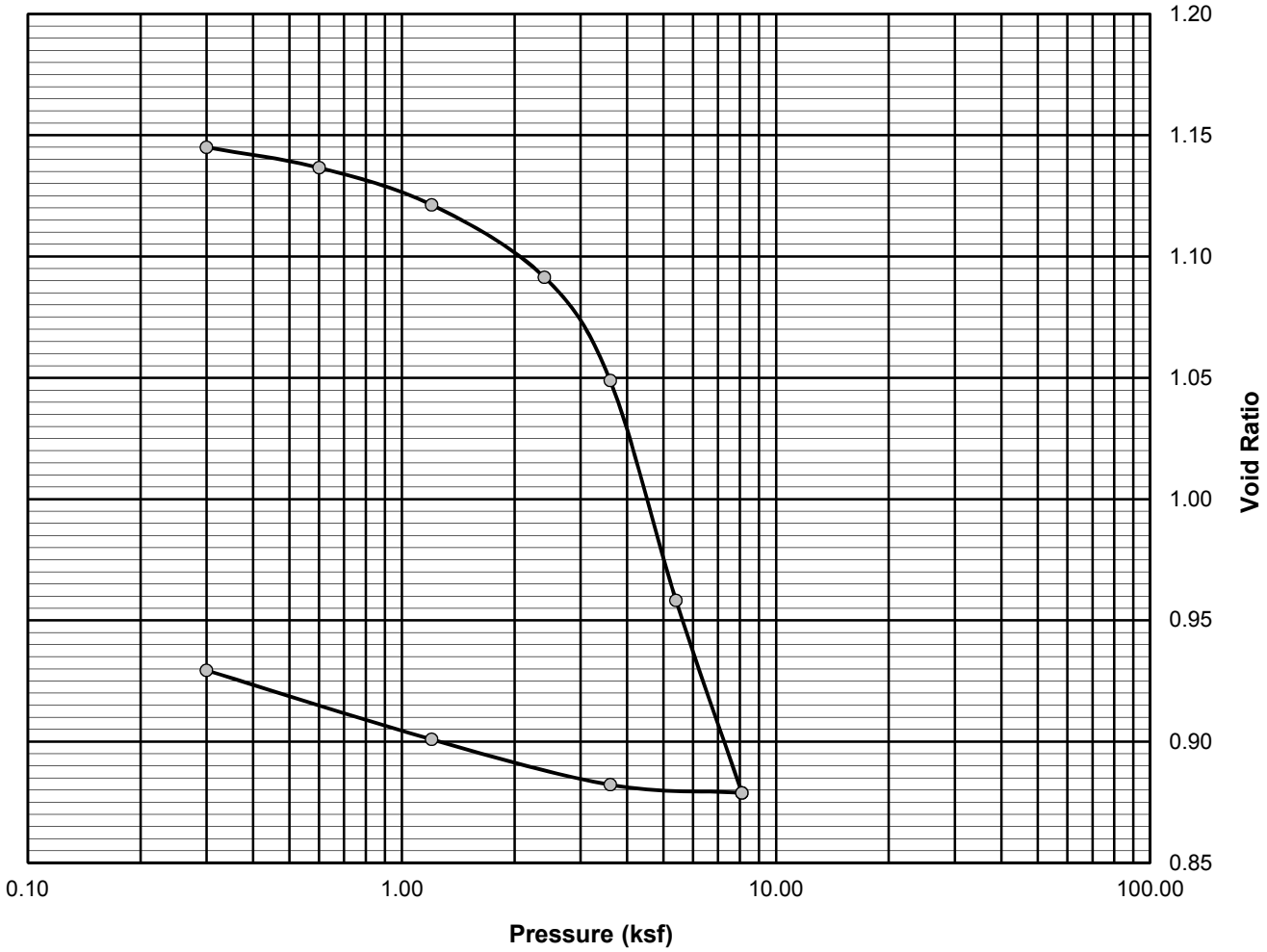
ASTM D-4767

Project Name: Proposed Fred P. Hall Elementary School
Client: Oak Point Associates

Project Number: 15-0071.1
Lab ID: 15645B
Date: 7/15/2015

Boring: B-105
Sample: 1S
Depth: 15-17'

P_C =	2.9 ksf
C_C =	0.48
C_R =	0.05
w =	37.4%
W_L =	37
W_P =	21



Comments:

T. Boyce
Reviewed By

S.W.COLE ENGINEERING, INC.

Consolidation Test

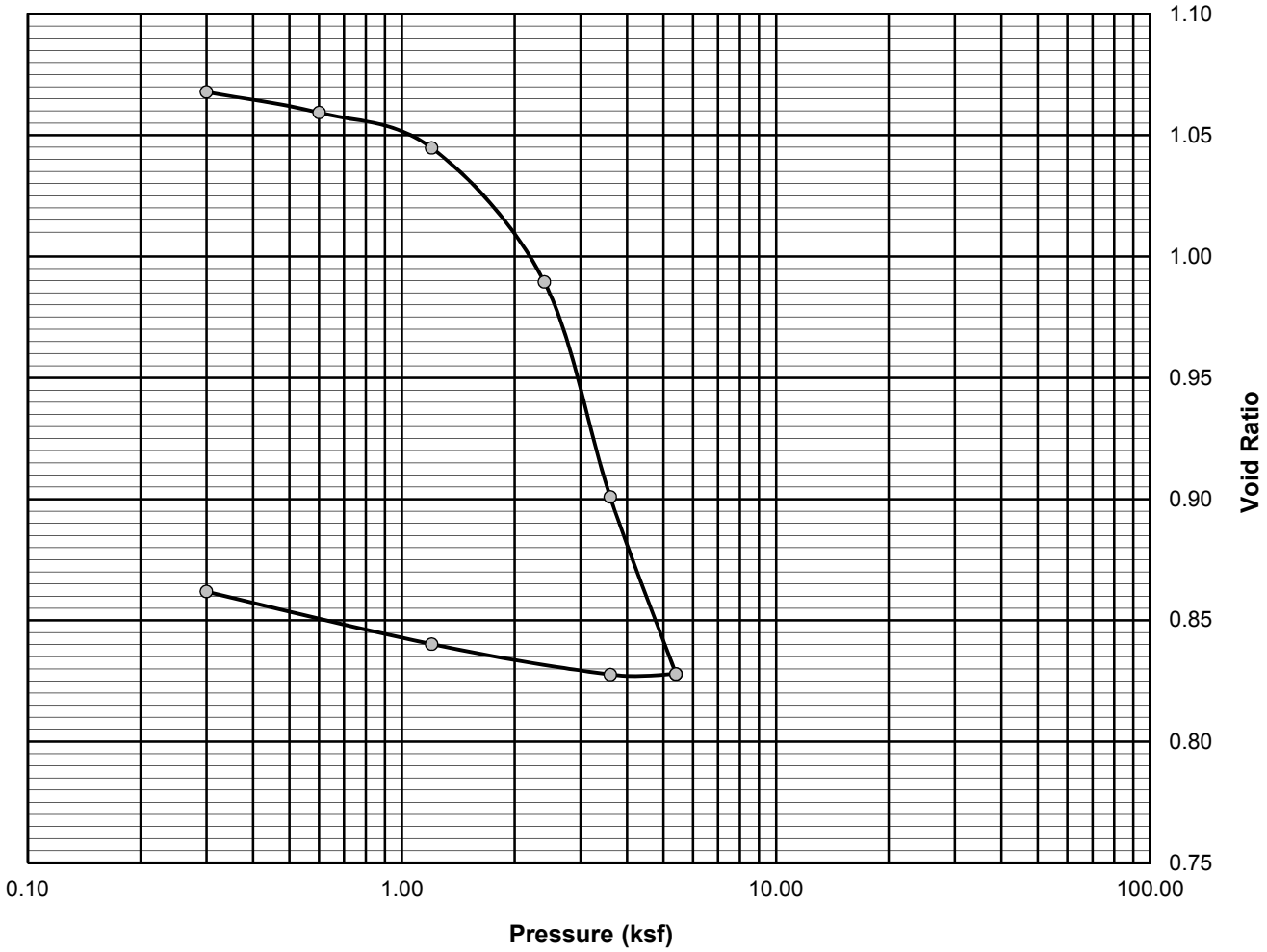
ASTM D-4767

Project Name: Proposed Fred P. Hall Elementary School
Client: Oak Point Associates

Project Number: 15-0071.1
Lab ID: 15646B
Date: 7/15/2015

Boring: B-105
Sample: 1S
Depth: 25-27'

P_C =	2.0 ksf
C_C =	0.46
C_R =	0.04
w =	35.7%
W_L =	37
W_P =	22



Comments:

T. Boyce
Reviewed By

S.W.COLE ENGINEERING, INC.

Consolidation Test

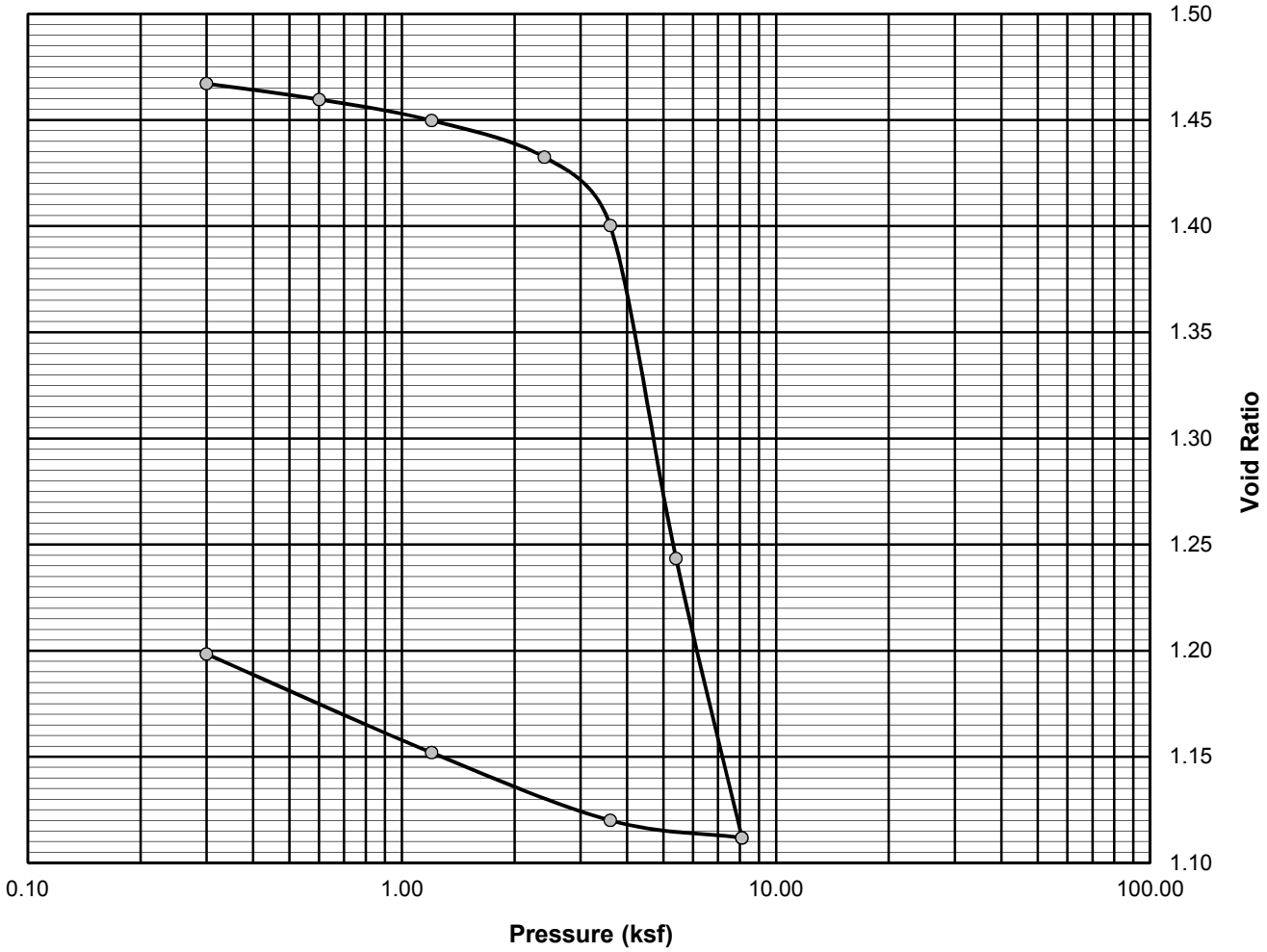
ASTM D-4767

Project Name: Proposed Fred P. Hall Elementary School
Client: Oak Point Associates

Project Number: 15-0071.1
Lab ID: 15647B
Date: 7/18/2015

Boring: B-115
Sample: 1S
Depth: 20-22'

P_C =	3.3 ksf
C_C =	0.82
C_R =	0.03
w =	49.7%
W_L =	56
W_P =	26



Comments:

T. Boyce
Reviewed By

S.W.COLE ENGINEERING, INC.

Consolidation Test

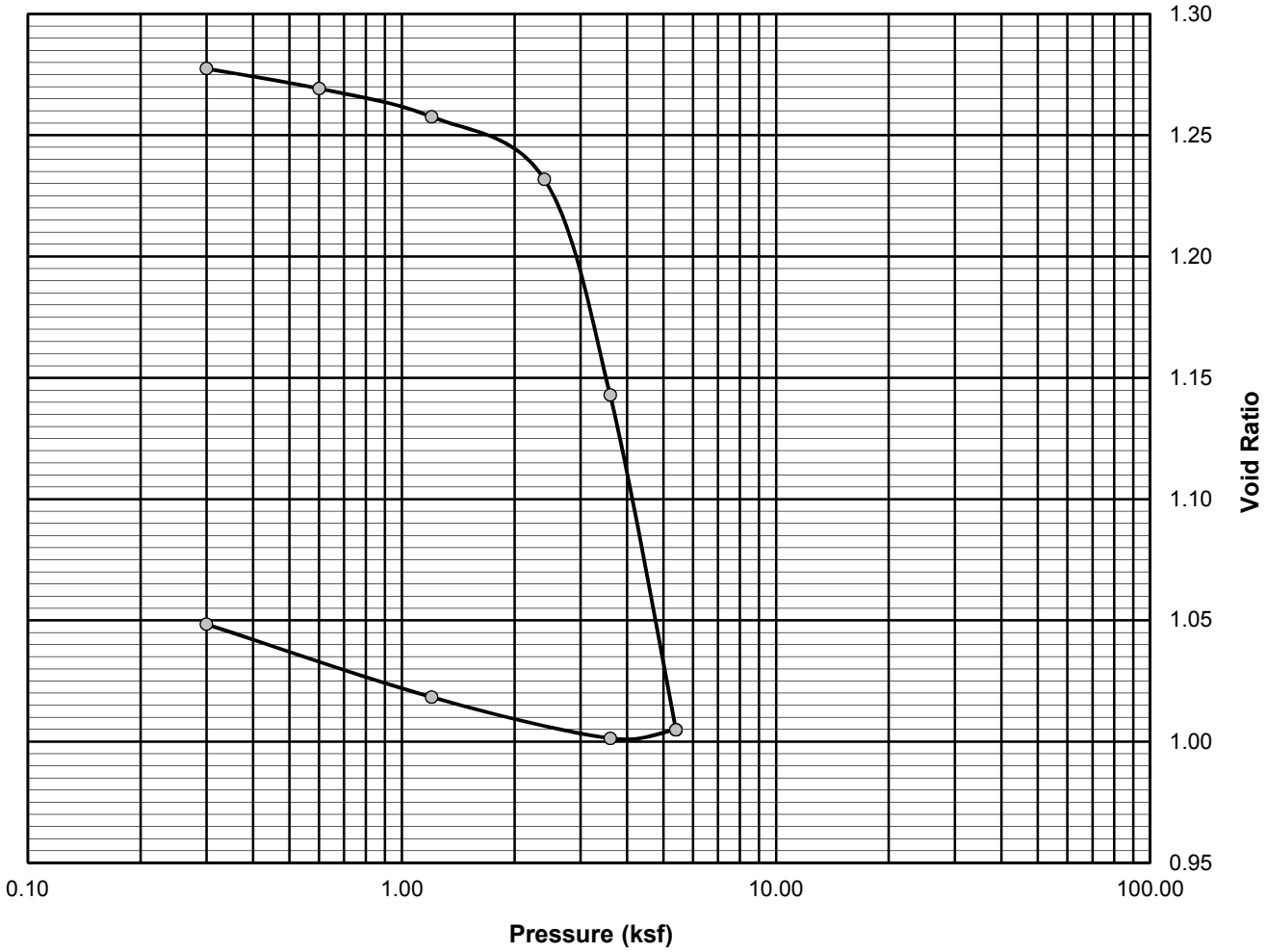
ASTM D-4767

Project Name: Proposed Fred P. Hall Elementary School
Client: Oak Point Associates

Project Number: 15-0071.1
Lab ID: 15648B
Date: 7/18/2015

Boring: B-115
Sample: 2S
Depth: 30-32'

P_C =	2.9 ksf
C_C =	0.64
C_R =	0.03
w =	42.8%
W_L =	38
W_P =	22



Comments:

T. Boyce
Reviewed By

S.W.COLE ENGINEERING, INC.

Consolidation Test

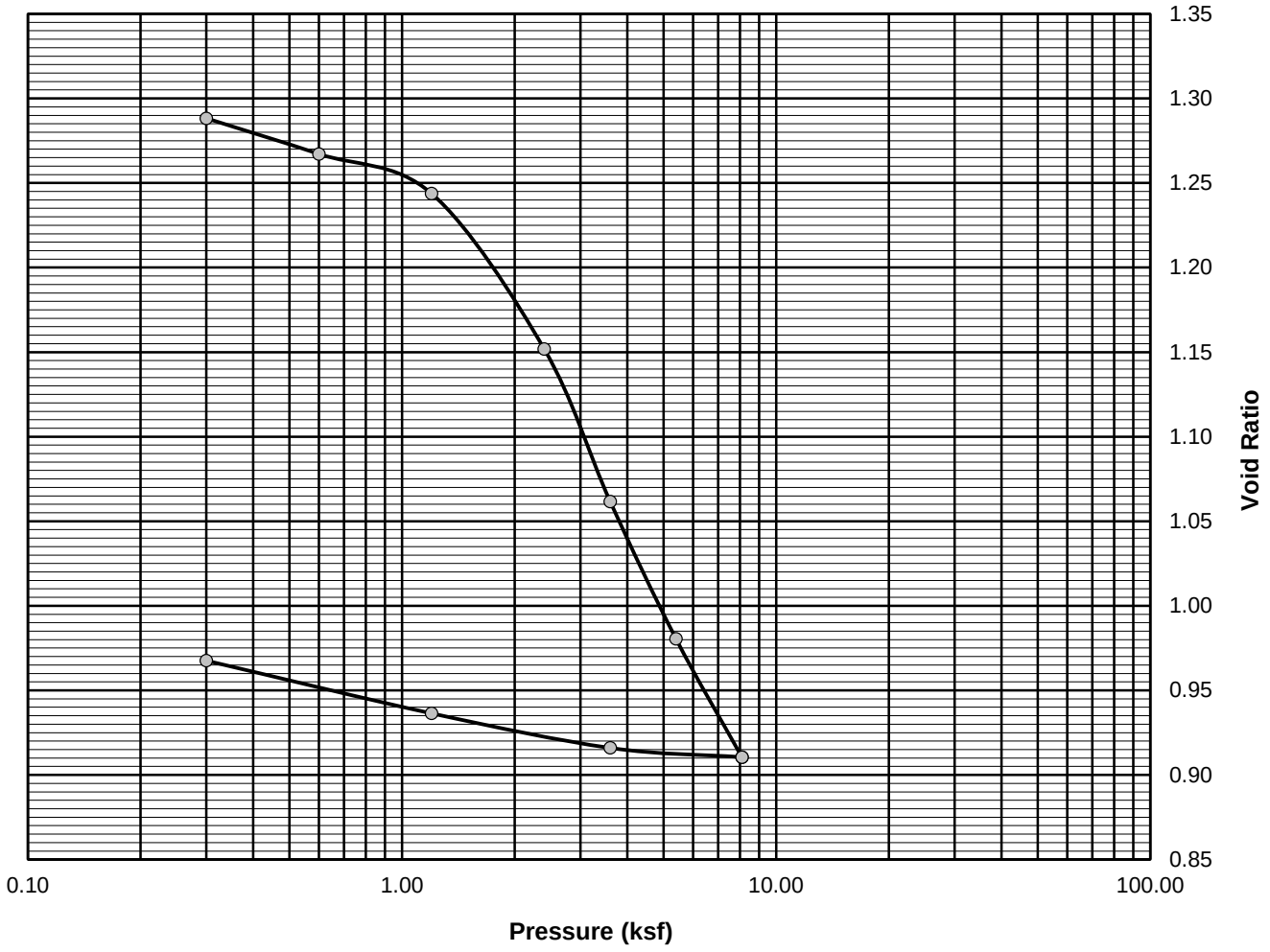
ASTM D-4767

Project Name: Proposed Fred P. Hall Elementary School
Client: Oak Point Associates, Inc.

Project Number: 15-0071.1
Lab ID: 19665B
Date: 7/15/2016

Boring: B-201
Sample: 1S
Depth: 10-12'

P_C =	1.8 ksf
C_C =	0.49
C_R =	0.07
w =	50.3%
W_L =	35
W_P =	19



Comments:

T. Boyce
Reviewed By

S.W.COLE ENGINEERING, INC.

Consolidation Test

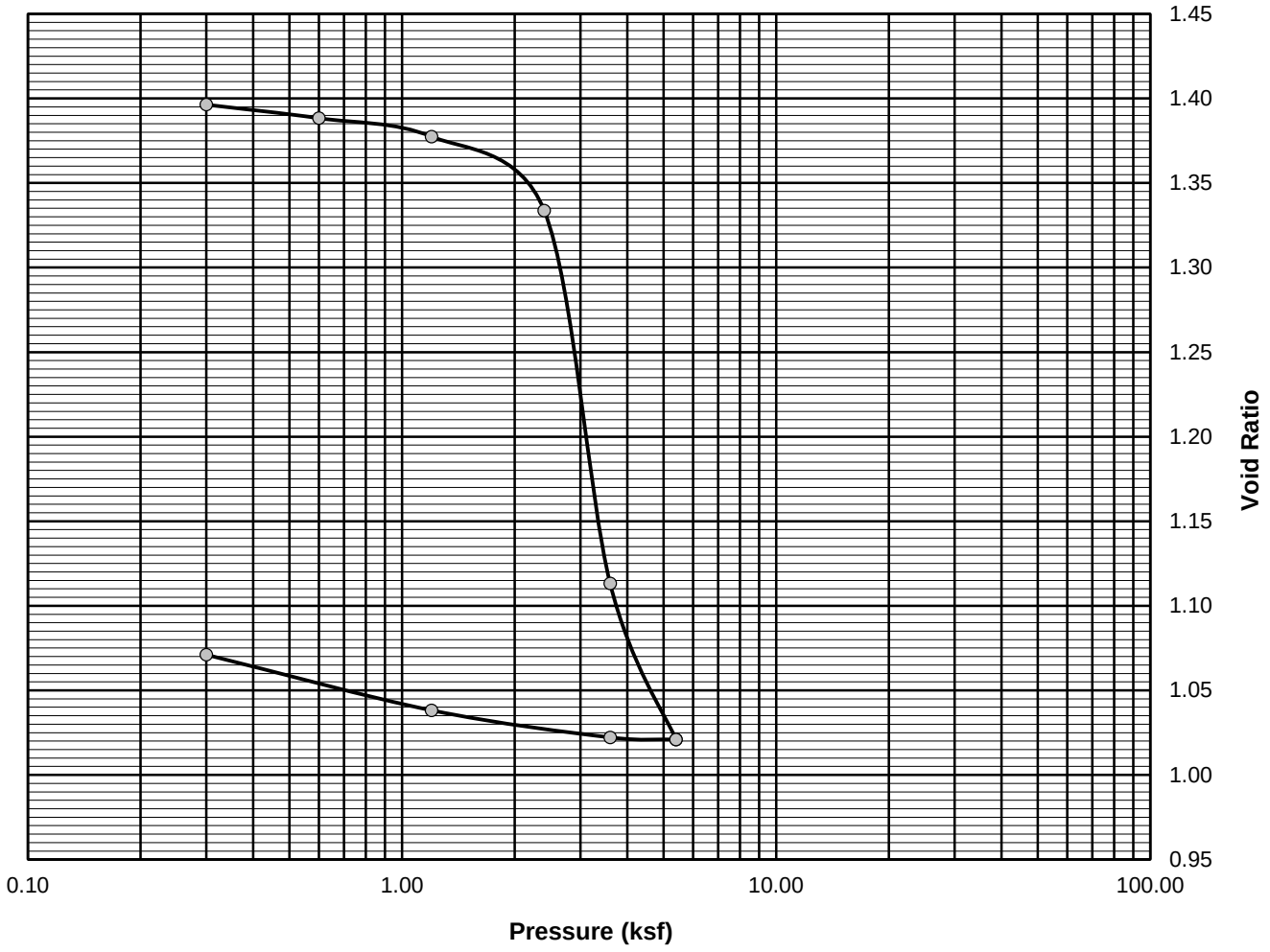
ASTM D-4767

Project Name: Proposed Fred P. Hall Elementary School
Client: Oak Point Associates, Inc.

Project Number: 15-0071.1
Lab ID: 19666B
Date: 7/26/2016

Boring: B-201
Sample: 2S
Depth: 20-22'

P_C =	2.2 ksf
C_C =	1.25
C_R =	0.03
w =	44.9%
W_L =	36
W_P =	21



Comments:

T. Boyce
Reviewed By

S.W.COLE ENGINEERING, INC.

Consolidation Test

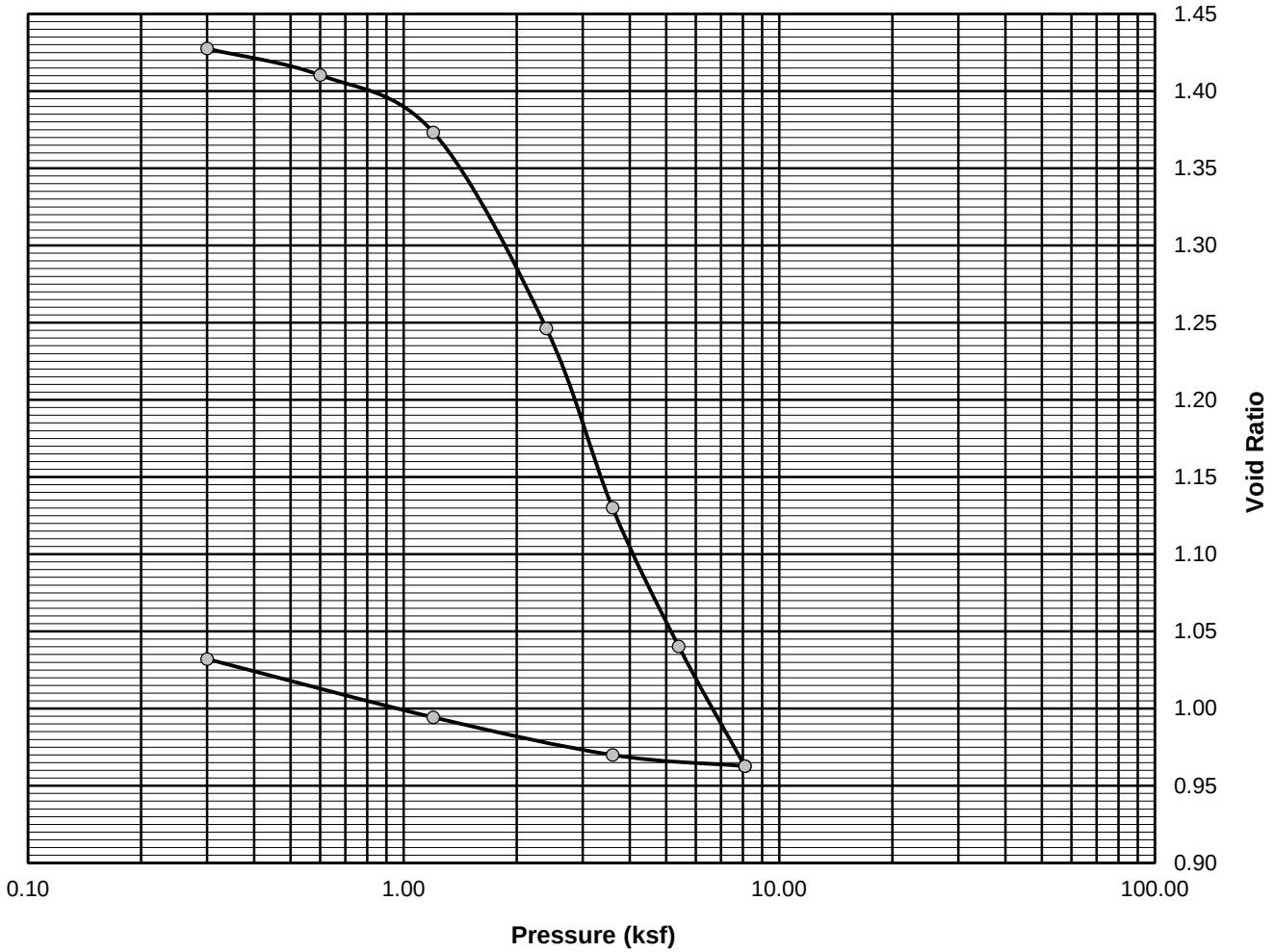
ASTM D-4767

Project Name: Proposed Fred P. Hall Elementary School
Client: Oak Point Associates, Inc.

Project Number: 15-0071.1
Lab ID: 19662B
Date: 7/15/2016

Boring: B-204
Sample: 1S
Depth: 15-17'

P_C =	1.8 ksf
C_C =	0.66
C_R =	0.06
w =	54.9%
W_L =	54
W_P =	25



Comments:

T. Boyce
Reviewed By

S.W.COLE ENGINEERING, INC.

Consolidation Test

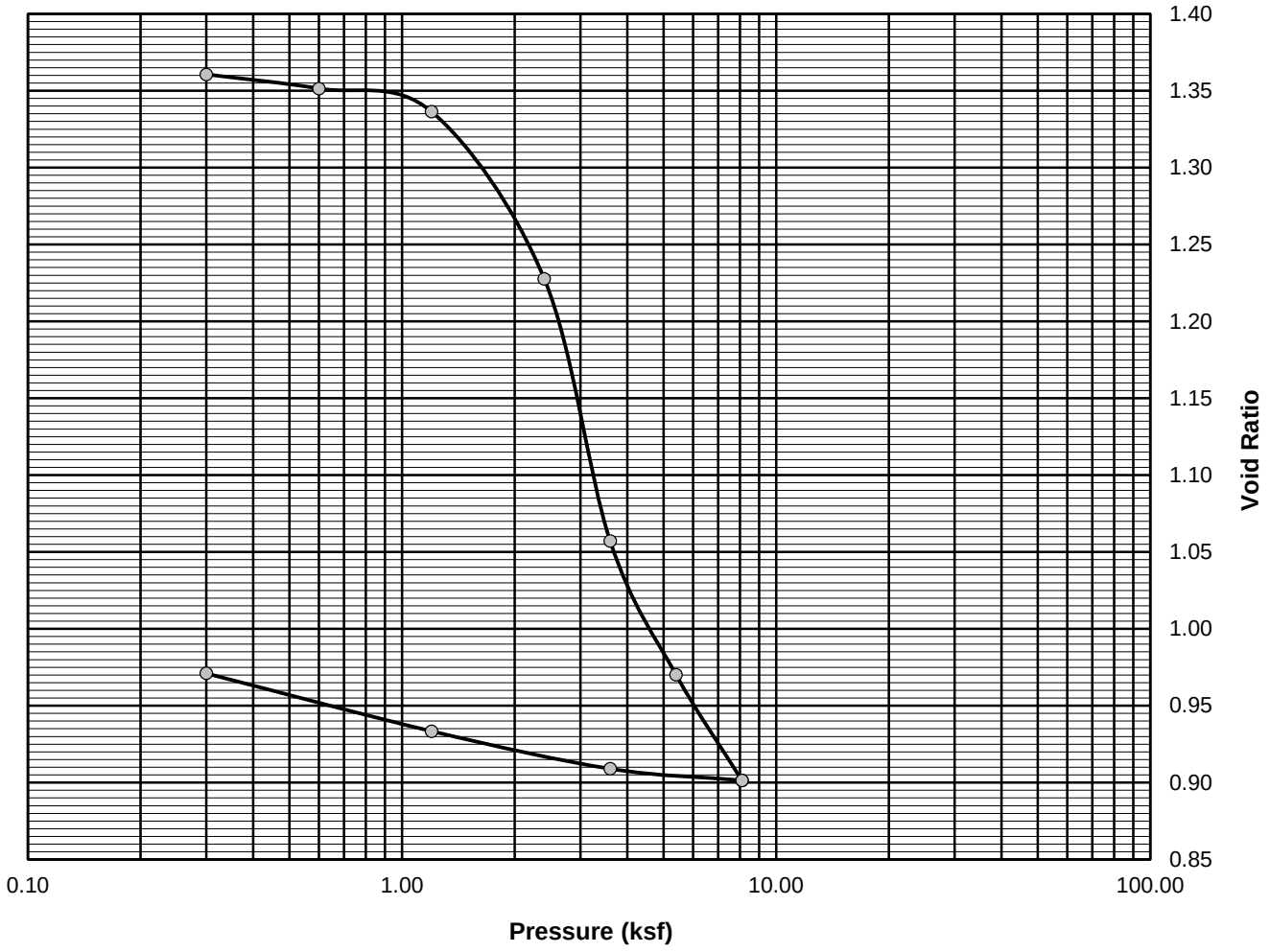
ASTM D-4767

Project Name: Proposed Fred P. Hall Elementary School
Client: Oak Point Associates, Inc.

Project Number: 15-0071.1
Lab ID: 19663B
Date: 7/15/2016

Boring: B-204
Sample: 2S
Depth: 25-27'

P_C =	2.0 ksf
C_C =	0.97
C_R =	0.04
w =	44.7%
W_L =	37
W_P =	21



Comments:

T. Boyce
Reviewed By

S.W.COLE ENGINEERING, INC.

Consolidation Test

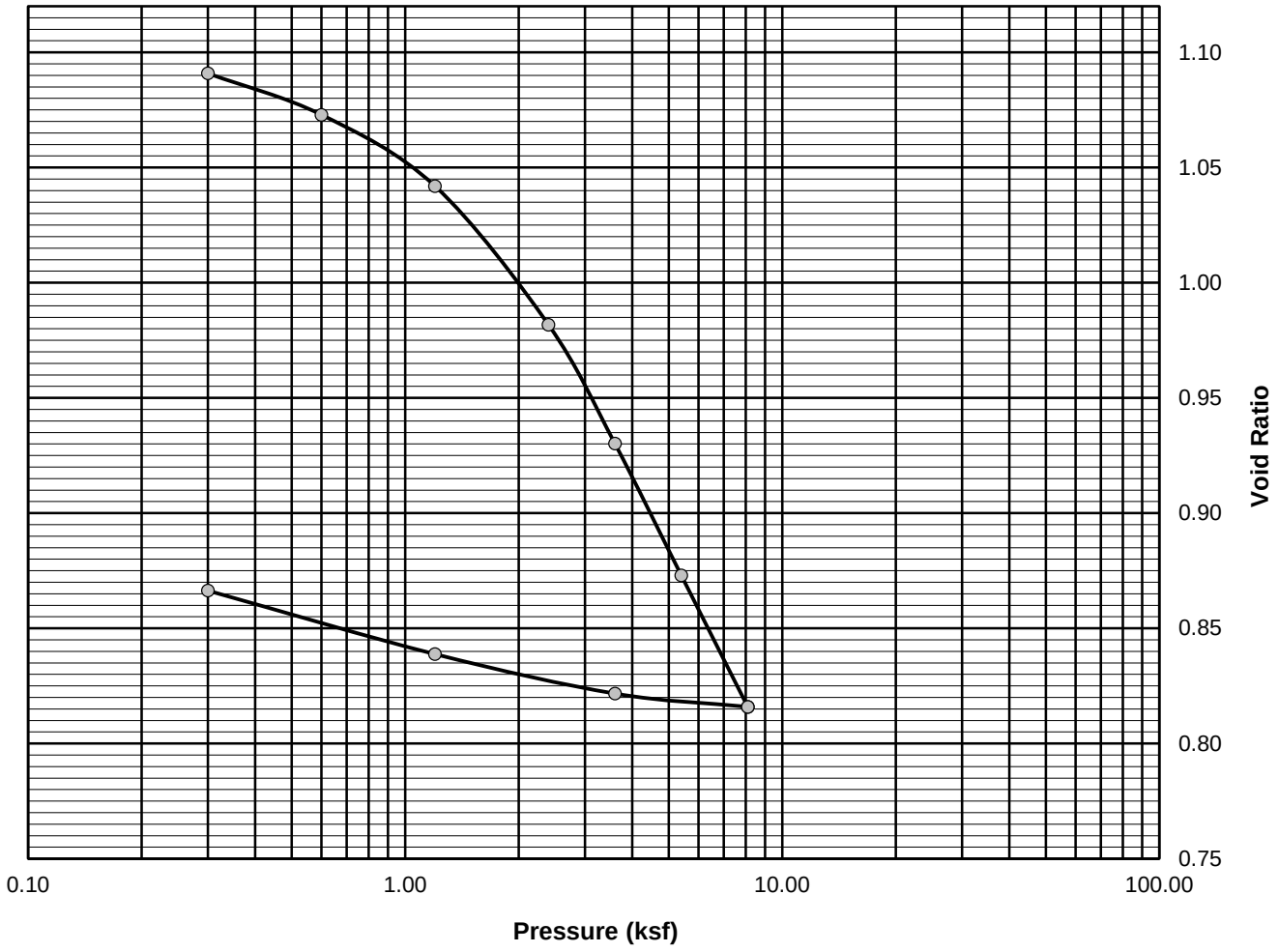
ASTM D-4767

Project Name: Proposed Fred P. Hall Elementary School
Client: Oak Point Associates, Inc.

Project Number: 15-0071.1
Lab ID: 19664B
Date: 7/15/2016

Boring: B-204
Sample: 3S
Depth: 35-37'

P_C =	1.9 ksf
C_C =	0.32
C_R =	0.06
w =	41.6%
W_L =	37
W_P =	20



Comments:

T. Boyce
Reviewed By

08/10/2015	5320	B106 S1	CUMBERLAND	20000 sq. ft
PRINT DATE	LAB NO.	SAMPLE IDENTIFICATION	COUNTY	ACRES OR SQ. FT.

SOIL TEST REPORT FOR:

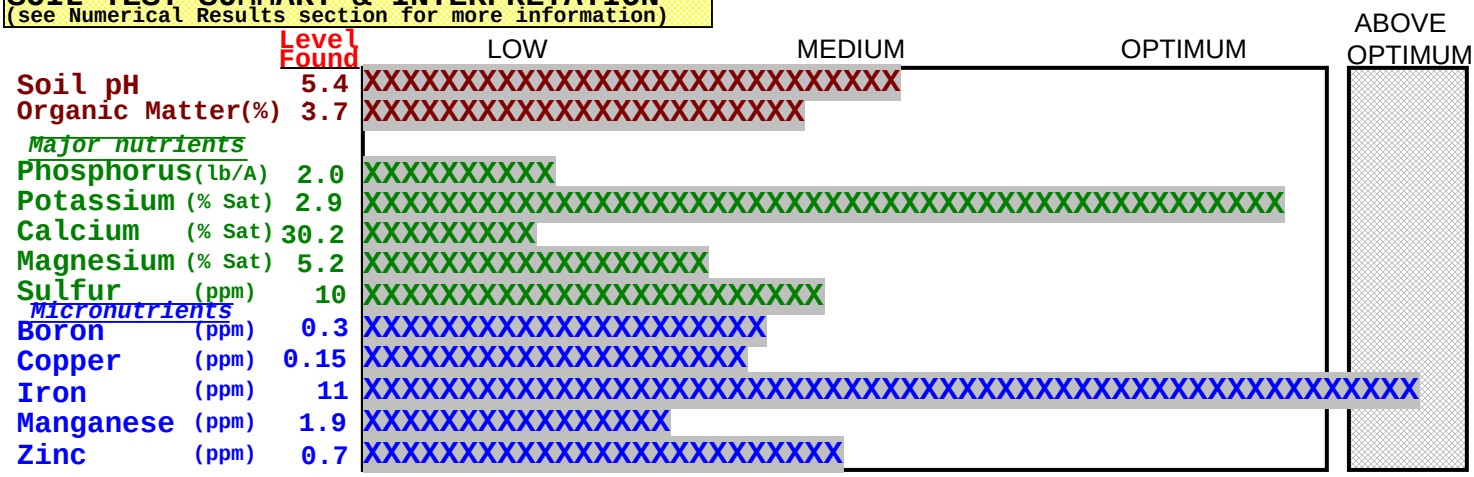
S.W. COLE ENGINEERING INC (TIM BOYC

286 PORTLAND RD

GRAY ME 04039

MAINE SOIL TESTING SERVICE
UNIVERSITY OF MAINE 1865
5722 DEERING HALL
ORONO,MAINE 04469-5722

SOIL TEST SUMMARY & INTERPRETATION
(see Numerical Results section for more information)



RECOMMENDED ADDITIONS FOR ALL TURF-NEW SEEDING - Crop Code # 211

To raise soil pH to 6.0, apply 70 pounds of lime per 1000 sq. ft.

To meet crop magnesium requirement, use a magnesium lime.
Calculated major nutrient requirements as follows:
2.0 pounds nitrogen per 1000 sq. ft.
3.7 pounds phosphate per 1000 sq. ft.
0.7 pounds potash per 1000 sq. ft.

To meet major nutrient requirements:
Apply 20 lb 10-20-10 or 40 lb 5-10-5 fertilizer/1000 sq. ft.

Other fertilizers of similar N-P-K ratio may be substituted.
Till in lime (if needed) and fertilizer to a 4-6 inch depth.
Till in an inch of compost or peat, with lime & fertilizer, to a 4-6 inch depth before seeding to improve soil nutrient & water holding capacity.

For information on micronutrient management and recommendations, see enclosed form.

NUMERICAL RESULTS

(Test methodology: pH in water and Mehlich buffer, available nutrients by modified Morgan extract)
(Organic matter measured by LOI, P determined colorimetrically, all others measured by ICP-OES)

CEC and nutrient balance calculations assume the pH will be raised to 6.0

	Soil pH	Lime Index 2	Phosphorus (lb/A)	Potassium (lb/A)	Magnesium (lb/A)	Calcium (lb/A)	CEC (me/100 g)	K	Mg (% Saturation)	Ca (% Saturation)	Acidity
Level Found	5.4	5.80	2.0	110	60	581	4.8	2.9	5.2	30.2	61.7
Optimum Range	5.5-6.5	N/A	10-20	see % Saturation levels			> 5	2.1-3.0	10-20	60-80	< 10

	Organic Matter(%)	Sulfur (ppm)	Copper (ppm)	Iron (ppm)	Manganese (ppm)	Zinc (ppm)
Level Found	3.7	10	0.15	10.9	1.9	0.7
Normal Range	5 - 8	> 15	.25-.60	6 - 10	4 - 8	1 - 2

(Extras)	Boron (ppm)	Sodium (ppm)	Soluble Salts (mmhos/cm)	Nitrate-N (ppm)	Ammonium-N (ppm)
Level Found	0.3	N/A	N/A	N/A	N/A
Normal Range	0.5-1.2				

Additional Results or Comments:

Lead scan: NORMAL BACKGROUND LEVEL - no health risk.

PRINT DATE	LAB NO.	SAMPLE IDENTIFICATION	COUNTY	ACRES OR SQ. FT.
08/10/2015	5321	B110 S1	CUMBERLAND	20000 sq. ft

▪SOIL TEST REPORT FOR:

S.W. COLE ENGINEERING INC (TIM BOYC
286 PORTLAND RD
GRAY ME 04039

MAINE SOIL TESTING SERVICE
UNIVERSITY OF MAINE
5722 DEERING HALL
ORONO,MAINE 04469-5722

▪SOIL TEST SUMMARY & INTERPRETATION
(see Numerical Results section for more information)

		Level Found
Soil pH		5.5
Organic Matter(%)		2.7
Major nutrients		
Phosphorus	(lb/A)	1.7
Potassium	(% Sat)	3.0
Calcium	(% Sat)	31.9
Magnesium	(% Sat)	5.5
Sulfur	(ppm)	8
Micronutrients		
Boron	(ppm)	0.2
Copper	(ppm)	0.15
Iron	(ppm)	8.2
Manganese	(ppm)	4.9
Zinc	(ppm)	0.7

LOW — MEDIUM — OPTIMUM — ABOVE OPTIMUM

▪RECOMMENDED ADDITIONS FOR ALL TURF-NEW SEEDING - Crop Code # 211

To raise soil pH to 6.0, apply 50 pounds of lime per 1000 sq. ft.

To meet crop magnesium requirement, use a magnesium lime.
Calculated major nutrient requirements as follows:
2.0 pounds nitrogen per 1000 sq. ft.
3.8 pounds phosphate per 1000 sq. ft.
0.7 pounds potash per 1000 sq. ft.

To meet major nutrient requirements:
Apply 20 lb 10-20-10 or 40 lb 5-10-5 fertilizer/1000 sq. ft.

Other fertilizers of similar N-P-K ratio may be substituted.
Till in lime (if needed) and fertilizer to a 4-6 inch depth.
Till in an inch of compost or peat, with lime & fertilizer, to a 4-6 inch depth before seeding to improve soil nutrient & water holding capacity.

For information on micronutrient management and recommendations, see enclosed form.

▪NUMERICAL RESULTS

(Test methodology: pH in water and Mehlich buffer, available nutrients by modified Morgan extract)
(Organic matter measured by LOI, P determined colorimetrically, all others measured by ICP-OES)

CEC and nutrient balance calculations assume the pH will be raised to 6.0

	Soil pH	Lime Index 2	Phosphorus (lb/A)	Potassium (lb/A)	Magnesium (lb/A)	Calcium (lb/A)	CEC (me/100 g)	K (% Saturation)	Mg (% Saturation)	Ca (% Saturation)	Acidity
Level Found	5.5	5.95	1.7	87	48	465	3.6	3.0	5.5	31.9	59.6
Optimum Range	5.5-6.5	N/A	10-20	see % Saturation levels			> 5	2.1-3.0	10-20	60-80	< 10

	Organic Matter(%)	Sulfur (ppm)	Copper (ppm)	Iron (ppm)	Manganese (ppm)	Zinc (ppm)
Level Found	2.7	8	0.15	8.2	4.9	0.7
Normal Range	5 - 8	> 15	.25-.60	6 - 10	4 - 8	1 - 2

(Extras)	Boron (ppm)	Sodium (ppm)	Soluble Salts (mmhos/cm)	Nitrate-N (ppm)	Ammonium-N (ppm)
Level Found	0.2	N/A	N/A	N/A	N/A
Normal Range	0.5-1.2				

Additional Results or Comments:

Lead scan: NORMAL BACKGROUND LEVEL - no health risk.