R.W. Gillespie & Associates, Inc.
Geotechnical Engineering • Environmental Consulting • Materials Testing Services

03 March 2017

Eugene Ardito, President & CEO
cPort Credit Union
c/o Ms. Deirdre L. Pio, CSI, CDT, Director of Interior Design
Gawron Turgeon Architects
25 Black Point Road
Scarborough, Maine 04074

Subject: Report of Geotechnical Evaluation
Proposed cPort Credit Union Building
Portland, Maine
RWG&A Project No. 1607-001

Dear Mr. Ardito:

R. W. Gillespie & Associates, Inc., (RWG&A) is pleased to present the attached geotechnical evaluation report for the proposed cPort Credit Union building in Portland, Maine. The report was prepared in general accordance with RWG&A's Proposal No. P-9453.GI dated 07 November 2016. It is understood the building will be four-stories high and that a basement contemplated when the 07 November 2016 proposal was prepared has been eliminated. The purpose of RWG&A's services for this project was to obtain information regarding subsurface conditions and soil properties on which to base geotechnical recommendations for design and construction of the building's foundation and ground floor slab.

Currently, the site is a relatively level asphalt paved parking lot. Reportedly, the site was most recently occupied by a service station. Underground storage tanks and previous development have been reported by others; debris of prior structures was encountered in the test borings drilled for this evaluation.

Proceeding from ground surface the test borings encountered fill over naturally deposited interlayered silty sand and sandy silt with gravel, overlying bedrock. Refusal surfaces encountered in the test borings ranged from about 13 to 24.5 feet below ground surface. The refusal surfaces were at lower elevations along the west side of the site. Organic or possibly petroleum odors were apparent near the top of bedrock in borings located in the northwest and southwest corners of the site.

Based on the subsurface soil conditions and anticipated structural reactions, RWG&A recommends the building be supported on end-bearing steel H-piles with a maximum allowable axial load of 40 tons. A pile load test isn't required by building code or considered necessary. The ground floor will need to be a pile-supported structural slab. Removal of obstructions to pile installation in the fill with hydraulic-excavators is anticipated. Due to the age and apparent

condition of the building located at the southwest side of the site a preconstruction condition survey of the existing building, and displacement and vibration monitoring during pile installation and earthwork activities are recommended.

RWG&A trusts the report meets the project's needs. However, if there are any questions regarding the design and construction recommendations, then please contact us.

Sincerely,
R.W. GILLESPIE & ASSOCIATES, INC.

Charles R. Nickerson, P.E.
Senior Geotechnical Engineer

Erik J. Wiberg, P.E.
Chief Geotechnical Engineer

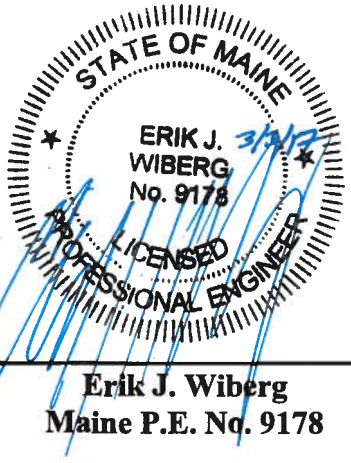
CRN/EJW:md
Submit in duplicate via First Class Mail and via email

R.W. Gillespie & Associates, Inc.

Report
of
GEOTECHNICAL EVALUATION
for
PROPOSED cPORT CREDIT UNION BUILDING
PORTLAND, MAINE

Prepared
for
cPORT CREDIT UNION
PORTLAND, MAINE

Prepared
by
R. W. GILLESPIE & ASSOCIATES, INC.
SACO, MAINE



Erik J. Wiberg
Maine P.E. No. 9178

RWG&A Project No. 1607-001

03 March 2017

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1.0 INTRODUCTION

1.1 Site Conditions

The building will be located at the west side of the intersection of Middle and India Streets at 50 India Street in Portland, Maine as shown on Figure 1, *Locus Map*. R.W. Gillespie & Associates, Inc.'s (RWG&A's) understanding of the proposed building and requested services is based on communications with Gawron Turgeon Architects, and Blais Civil Engineers, Inc., and review of Drawing No. 1, *Proposed Building Layout*, undated, prepared by Gawron Turgeon Architects.

The project site was previously developed but has been used as surface parking for decades. The proposed building will be about 50 feet by 45 feet in plan dimension, have exterior walls within one or two feet of the Middle and India Street right-of-ways, and about 5 feet from an adjacent multi-story, brick masonry building. According to City of Portland assessor information, the adjacent building was built circa 1900 and has a partial height basement.

The proposed building will have four-stories above grade; no below grade spaces other than elevator pits are anticipated. The ground level will be used for retail banking, the second level for a credit union office, and the 3rd and 4th levels for residential condominiums. Proposed site grading and structural design information, such as foundation loads, were not provided when this report was prepared.

1.2 Scope of Services

The primary purpose of this geotechnical evaluation was to obtain information regarding subsurface soil conditions and engineering properties on which to base recommendations for design of foundations and ground floor slabs for the proposed building. Refer to Appendix A for use and limitations of this report. As performed, RWG&A's scope of services included the following items:

- Reviewed readily available geotechnical information from projects located near the site and about the foundation of the existing building southwest of the site. Visited the site to observe the general conditions exposed at ground surface.

- Prepared a geotechnical exploration and sampling program to obtain subsurface information for use in this geotechnical evaluation. The exploration program consisted of four test borings drilled near the primary outside corners of the proposed building. Arranged to have the test borings made by New England Boring Contractors as a subcontractor to RWG&A.

- Marked the planned test boring locations in the field by taping from features visible from ground surface. Contacted DigSafe and OK-TO-DIG registered public utility entities to locate public utilities as needed to conduct the explorations.

- Completed the geotechnical exploration program under the observation of an RWG&A geologist who monitored, logged, and sampled the test borings.

- Made evaluations of the acquired field data and preliminary design information.

- Prepared this report of the geotechnical evaluation presenting RWG&A's findings, conclusions and design recommendations.

RWG&A's scope of services for this project excluded:

- any environmental site assessment relative to oil and hazardous materials or evidence of a potential release or threat of oil or hazardous materials on, below, or around the site. Any statement in this report, or on the exploration logs, regarding stained soils, odors or unusual or suspicious conditions is for informational purposes only and is not intended to constitute an environmental assessment,

- any service pertaining to on-site environmental conditions including but not limited to waste characterization, health and safety guidelines, excavation methods and off-site disposal requirements, construction dewatering, temporary earth support, or other earthwork aspects related to the removal of on-site fill and soil,

- any service to investigate or detect the presence of mold or other biological contaminants, or any service that was designed or intended to prevent or lower the risk of the occurrence of an infestation of mold or other biological contaminants (MOBC infestation) or intrusion of fugitive vapors, and

- an evaluation of maximum sea level or sea level rise relative to the proposed construction.

2.0 SUBSURFACE EXPLORATION

The subsurface exploration program consisted of four test borings (B-101 through B-104) drilled on 11 January 2017 by New England Boring Contractors of Derry, New Hampshire using a track-mounted drill rig, 4-inch O.D. casing, and drive and wash drilling methods. Split-barrel sampling with standard penetration testing (*ASTM D1586, Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils*) was performed at about 5-foot intervals. All of the test borings were advanced to refusal surfaces; coring with a tri-cone roller bit was performed to explore the nature of the refusal surfaces.

Soil samples were described in general accordance with *ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)*. Logs of the explorations prepared by RWG&A are included in Appendix B of this report. Stratification lines shown on the exploration logs represent the approximate boundaries between the different soil types encountered; the actual transitions will be more gradual and will vary over short distances. Subsurface conditions described on the logs and in this report should only be considered representative of conditions encountered within the vertical reach of the test borings on the date they were drilled.

Free water was observed in the test borings as they were drilled and at completion. Observed free water level in B-101 was about 6 feet below local ground surface and occurred in naturally deposited soil. Free water levels in B-102, B-103, and B-104 occurred in fill materials at depths ranging from about 7 to 10 feet below ground surface. Water levels observed during the subsurface exploration program were influenced by the exploration methods (e.g., slow groundwater response

due to low soil permeability) and might not be representative of stabilized groundwater levels when the borings were drilled.

The test boring locations are shown on Figure 2, *Exploration Location Plan*. The test boring locations shown on Figure 2 should be considered accurate only to the degree implied by the method used to locate them. RWG&A recommends the test boring locations and ground surface elevations be surveyed and shown on the construction drawings.

Subsurface Information Prepared by Others: RWG&A was provided the letter report titled *GPR Survey Results, Portion of 50 India Street (Map 28, Lot P0232) Portland, Maine*, dated 20 April 2016, prepared by Credere Associates, LLC. The report includes information regarding the locations of underground objects at the site. A copy of the report is provided in Appendix C. The report is provided for information purposes only. RWG&A is unable to ensure the accuracy or completeness of information provided, and does not accept responsibility for use of, interpretation of, or accuracy of information prepared by others.

3.0 SUBSURFACE CONDITIONS

Below the surficial 1 to 2-inch thick asphalt pavement, the subsurface conditions at the site consist of fill on interlayered silty sand and sandy silt with gravel overlying bedrock. Results of the test borings are summarized below. Refer to Appendix B, *Test Boring Logs*, for information about subsurface conditions at specific locations and depths.

Test Boring Designation	Free Water Depth Below Surface Grade (feet)	Encountered Thickness (feet)		Refusal Depth (feet)
		Fill	Interlayered Silty Sand and Sandy Silt with Gravel	
B-101	6	4.8	12	17
B-102	7 to 10	9.8	3	13
B-103	7 to 10	9.8	12	22
B-104	7 to 10	9.9	14.5	24.5

Notes: Test borings advanced 0.5 to 3 feet below refusal depths by coring with tri-cone roller bit.

Fill: Encountered thicknesses of fill beneath the asphalt pavement ranged from about 4.8 to 9.9 feet. The fill varied in composition but was generally described as moist, fine to coarse sand, some to little silt, little to some fine to coarse gravel, brick and brick fragments, brown. Little clay was observed in B-101. An approximately 1-inch thick obstruction was encountered at a depth of about 5 feet in B-103. Increased drilling resistance was noted in the fill at a depth of about 9 feet in B-102.

Interlayered Silty Sand (SM) and Sandy Silt with Gravel (ML): Naturally deposited interlayered silty sand and sandy silt with gravel was encountered beneath the fill and ranged from about 3 to 14.5 feet in thickness. The silty sand was described as moist to wet, loose to medium dense, medium to fine sand, some silt, olive gray to gray. Locally the silty sand contained little fine to medium gravel. Occasional 1 to 2-inch thick sand and clay lenses were encountered in B-101. The sandy silt with gravel was described as wet, silt, some fine to medium sand, some fine to medium gravel, brown to gray. Consistency ranged from medium to very soft; increased drilling resistance was encountered in the sandy silt with gravel at a depth of about 13 feet in B-101 and B-104.

Bedrock: The test borings were advanced to refusal surfaces at depths ranging from about 13 to 24.5 feet below local ground surface. Coring with a tri-cone roller bit was performed to an additional depth of 0.5 to 3 feet. The coring encountered weathered rock and rock interpreted to be bedrock. Roller bit coring provides fragmented cuttings which don't allow description of the intact bedrock. Based on geologic mapping of the area, bedrock underlying the site is designated the Spring Point Formation and described as greenish-gray plagioclase-quartz-biotite consisting of metamorphosed volcanic rock.

Free Water Levels: Free water was observed in the test borings at depths ranging from of about 6 to 10 feet below local ground surface. It appeared that water level observed in borings B-102, B-103 and B-104 might have been perched in the fill over the silty sand and sandy silt with gravel. Groundwater levels at the site will fluctuate primarily due to rainfall and snowmelt, flow through underground utility trench bedding and backfill, season, and nearby construction activity; therefore, water levels during and following construction will vary from those observed in the test borings.

4.0 PROPOSED CONSTRUCTION

RWG&A's understanding of the proposed four-story building is based on information provided in communications with Gawron Turgeon Architects and Blais Civil Engineers, and review of the following:

- Drawing No. 1, *Proposed Building Layout*, undated, prepared by Gawron Turgeon Architects.
- Drawing, *Boundary Survey at 50 India Street, Portland, Maine, for John Harmon*, survey date 19 February 2012, prepared by Robert T. Greenlaw PLS Land Surveying.
- Document, *Voluntary Response Action Program Work Plan 50 India Street (Map 28, Lot P0232) Portland, Maine*, dated 18 October 2016, prepared by Credere Associates, LLC.
- Document, *GPR Survey Results Portion of 50 India Street Portland, Maine*, dated 20 April 2016, prepared by Credere Associates, LLC.
- Tax Assessor's record for 41 Middle Street Portland, Maine, downloaded 03 February 2017.

Engineering evaluations for this project are based on the subsurface explorations and above design information currently available to RWG&A. Should differing information become known prior to or during construction, these evaluations should be reviewed by RWG&A to confirm their continued applicability.

5.0 RECOMMENDATIONS

The recommendations presented below are provided for use in design of the proposed building foundation and ground floor slab. Foundation design and site work construction will be greatly influenced by subsurface conditions at the project site. RWG&A recommends foundation design and construction be in compliance with the requirements of all applicable City of Portland, Maine building ordinances, regulations, rules, and codes. When this report was prepared, the applicable

building code in Portland, Maine was the Maine Uniform Building and Energy Code which adopts *2009 International Building Code*® by reference.

A deep foundation system consisting of end-bearing, steel H-piles with a structural ground floor slab is recommended to support the proposed four-story cPort Credit Union Building. Pile caps and tie beams would be used to provide resistance to lateral foundation loads. A pile load test isn't required by building code or considered necessary by RWG&A.

5.01 Excavation and Filling

1. Site preparation should include removal of underground structures, utilities and other possible obstructions to pile installation. Potential obstructions to pile installation that might be encountered at the site include, but are not limited to foundations, cisterns, dry wells, underground storage tanks and utilities. It is expected that obstruction removal will be accomplished by excavation. Site preparation should include filling the ends of underground pipes and utility conduits outside proposed building footprint that will be abandoned in-place with concrete or cementitious flowable fill and capping the ends to prevent erosion of material into the conduit or pipe.

2. Excavations near the adjacent building, public right-of-ways, and utilities to remain and other construction activities should be designed to limit movements and vibration of the structures to tolerable amounts as determined by the Structural and Civil Engineers. The effect of potential settlements on existing construction should be evaluated by the designers. The Contractor's temporary earth support design, and excavation and pile installation procedures should be submitted for review and approval by the Structural Engineer and Civil Engineer, as appropriate, prior to construction. RWG&A could assist with the above reviews, if requested.

3. Site grading should provide positive drainage away from newly constructed facilities both during and following construction. It is anticipated that finished grades within and near the proposed building will vary less than a foot from current elevations.

4. Surface runoff and infiltration of groundwater should be controlled so that excavation, foundation construction, and backfilling can be completed in-the-dry. Dewatering requirements will vary across the site based on water levels encountered during construction and soil type. In general, it should be practical to accomplish construction dewatering from within open-cut excavations using open pumping methods.

5. In open areas, backfill should be placed in level, uniform lifts not exceeding 9 inches in uncompacted thickness and be compacted with self-propelled compaction equipment. In confined areas, backfill should be placed in lifts not exceeding 6 inches in uncompacted thickness (note: maximum particle size 3 inches) and be compacted with hand-guided compaction equipment. Backfill should be compacted to at least 92 percent of the maximum dry density as determined by *ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3))*.

6. Large compaction equipment might cause perceivable shaking inside and near the adjacent building. The shaking might be disturbing to those within the building or to vibration

sensitive equipment; wall hangings may be jarred loose and/or could fall. Methods of reducing these vibrations include using smaller compaction equipment and compacting with low vibratory energy or statically, if necessary. Compacting with low vibratory energy or statically will probably require use of thinner lifts and more passes/coverages with the equipment to achieve the specified compaction.

7. Granular fill may be used to backfill excavations resulting from removal of obstructions and should consist of sand or gravel of hard durable particles free from vegetable matter, lumps or balls of clay, frozen material and other deleterious substances. The gradation of granular fill should meet the following requirements:

Screen or Sieve Size	Percent Passing
6 inches	100
No. 40	0-70
No. 200	0-15

Granular fill should contain no particles or fragments with a maximum dimension in excess of the compacted thickness of the layer being placed. Based upon visual descriptions, it appears that some of the on-site soils might be suitable for use as granular fill.

8. Use structural fill to backfill pile caps, tie beams, and foundation walls for the proposed building. Structural fill should be a well-graded sand and gravel mixture meeting the following requirements:

Screen or Sieve Size	Percent Passing
3 inches	100
No. 4	35-70
No. 40	5-35
No. 200	0-5

Based upon visual descriptions, it appears that the on-site soils are unsuitable for use as structural fill.

5.02 Steel H-piles

9. The building foundation should be designed to withstand lateral, uplift, and overturning forces due to earthquake. In accordance with the *2009 International Building Code*® the soil profile in the building addition area is classified as Site Class D. The in-place soils encountered in the explorations are not considered susceptible to liquefaction.

10. Bottoms of pile caps should be a minimum of 4 feet below the lowest adjacent ground surface exposed to freezing for frost protection. Bottoms of pile caps within heated locations may be a minimum of 2 feet below finished floor elevation. Pile cap subgrade soils should not be allowed to freeze. The fill soils at the site are frost-susceptible. Freezing of subgrade soils beneath pile caps may result in frost heaving or lateral wedging. The Contractor should make every effort to prevent freezing of subgrade soils.

11. An HP12x53 steel H-pile is the recommended pile section and type for use on the project. Installation of the low displacement pile will cause less vibration than displacement pile types and the section includes additional steel to offset the long-term deleterious action of existing fill and soil constituents and fluctuating groundwater levels. The H-piles (36 kips per square inch yield strength steel) should be driven to a minimum ultimate capacity of 80 tons (160 kips). The maximum allowable axial load capacity of the installed piles would be 40 tons (80 kips) with a minimum factor of safety of 2.0 on geotechnical capacity.

12. A minimum of three piles should be provided at each column location and be spaced a minimum of 36 inches center-to-center. Piles installed to support wall foundations should be installed in two-pile groups or staggered a minimum of 1 foot along the wall's longitudinal center of gravity.

13. The piles should be driven using a pile hammer with a rated energy of about 12,000 foot pounds per blow. The piles should completely penetrate the soils and develop end-bearing on and/or in bedrock. Based on the test boring results embedded pile lengths are anticipated to range from about 10 to 25 feet.

14. A final penetration resistance of about 4 to 6 blows per inch should be required for the final few inches of driving. If abrupt refusal is encountered, driving may be terminated when penetration is less than ½ inch for five successive blows. These driving criteria would be revised based on the pile hammer proposed by the Contractor and their wave equation analysis.

15. The maximum allowable lateral load capacity of the installed piles would be 1 ton (2 kips). The allowable lateral load capacity should be reduced by the following factors for groups of piles spaced in the direction of lateral load where D is the pile diameter:

Pile Space	Reduction Factor
8D	1.0
6D	0.8
4D	0.5
3D	0.4

16. Lateral loads from wind and earthquake may also be resisted by passive earth pressure on the sides of the foundation. Passive pressure against backfilled pile caps, grade beams, and foundations walls may be calculated using an equivalent fluid unit weight of 120 pounds per cubic foot, which is based on a passive pressure coefficient of 3, a backfill unit weight of 120 pounds per cubic foot, and a safety factor of 3 (note: 1/3 reduction to account for strain-compatibility with lateral pile resistance).

17. Recommended maximum eccentricity for groups of three or more piles is 3 inches from the design location and 1 inch for single piles and groups of two piles. Piles should be installed as plumb as is practicable. A pile should be considered out of plumb if the inclination is greater than 6 inches in 10 feet for groups of 3 or more piles or 1 inch in 10 feet for single piles and groups of two piles. The use of single piles at column locations would require attention to accuracy of location and verticality during installation. Pile leads should be fixed at two points to control the vertical alignment of driven piles.

18. Project specifications should require the Contractor to submit information on their proposed pile driving system for review by the project Structural Engineer and RWG&A prior to equipment mobilization. The pile driving system should be capable of installing the piles to the specified geotechnical capacity without damaging the piles. Driving stresses should be limited to a maximum compressive stress of 32.4 kips per square inch for the 36 kips per square inch yield strength steel. The Contractor's submittal should include a wave equation analysis of the proposed driving system to evaluate driving stresses.

19. The final 5 feet of each pile should be driven in a continuous manner using the same equipment and to approximately the same penetration resistance. Criteria for the use of pile splices should be provided by the Structural Engineer. Cast steel points should be provided to limit pile damage and prevent tip kick out during driving.

20. Vibratory hammer installation isn't recommended for this project.

21. Adequate provisions should be made to observe pile heave for pile groups of three or more. If measurements indicate more than 1/8 inch of heave has occurred during installation of adjacent piles, then the heaved piles should be re-driven.

5.03 Ground Floor

22. The ground floor should be a structural slab supported on the end-bearing H-piles.

5.04 Elevator Pits

23. It is recommended that the walls and bottom slabs of elevator pits be waterproofed and designed to resist hydrostatic pressures. An equivalent fluid unit weight of 90 pounds per cubic foot should be used for design of elevator pit walls.

5.05 Utilities

24. Underground utilities within the building footprint should be affixed to pile caps, foundation walls, and tie beams to prevent abrupt differential movements due to "mixed" pile and earth support. Sleeves should be provided and designed to accommodate up to 2 inches of movement where earth-supported utilities connect to or pass through the pile supported foundation.

5.06 Temporary Excavations

25. The Contractor should be aware that slope height, slope inclination, and excavation depths (including utility trench excavations) should in no case exceed those specified in local, state, or federal safety regulations, e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations. Such regulations are strictly enforced and, if they are not followed, the Owner, Contractor, and/or earthwork and utility Subcontractors could be liable for substantial penalties.

As a safety measure, it is recommended that all vehicles and spoil piles be kept a minimum lateral distance from the top of excavations equal to no less than 100 percent of the slope height. Exposed slope faces should be protected against the elements.

5.07 Geotechnical Observation

26. Since the above geotechnical recommendations are based on limited numbers of observations and tests, the Owner, Contractors and Designers should be particularly sensitive to the potential need for adjustments in the field. It would be in the best interest of the Owner and project to retain RWG&A to observe geotechnical aspects of the construction including general compliance with the design concepts, specifications, and recommendations, and to assist in development of design changes should subsurface conditions differ from those anticipated. Such observation increases the likelihood of the design intent being considered adequately during construction and will allow RWG&A to confirm its design recommendations. In particular, RWG&A should be engaged to observe excavation, pile installation, and backfilling activities.

    In addition to geotechnical observation, RWG&A can provide full service construction inspection and materials testing. This would include soils and portland cement concrete, and special inspection services in fulfillment of building code requirements.

6.0 CLOSURE

This report has been prepared for specific application to the Proposed cPort Credit Union Building at 50 India Street in Portland, Maine, for the exclusive use of cPort Credit Union. This evaluation has been completed in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made. In the event that any changes are made in the nature or design of the proposed construction, the conclusions and recommendations of this report should be reviewed by RWG&A.

The recommendations presented are based on the results of widely spaced explorations. The nature of variations between the explorations may not become evident until construction has begun. If variations are encountered, it will be necessary for RWG&A to re-evaluate the recommendations presented in this report. RWG&A requests an opportunity for a general review of the final design and specifications to determine that earthwork and foundation recommendations have been interpreted in the manner in which they were intended.

N

0 2000 3000 4000

SCALE, FEET

SOURCE:
USGS 7.5-MINUTE TOPOGRAPHIC QUADRANGLE OF PORTLAND WEST, ME, DATED 2014, AND PORTLAND EAST, ME, DATED 2014.

FIGURE 1
LOCUS MAP
GEOTECHNICAL ENGINEERING EVALUATION
PROPOSED CPORT CREDIT UNION BUILDING
PORTLAND, MAINE

MARCH 2017 PROJECT NO. 1607-001

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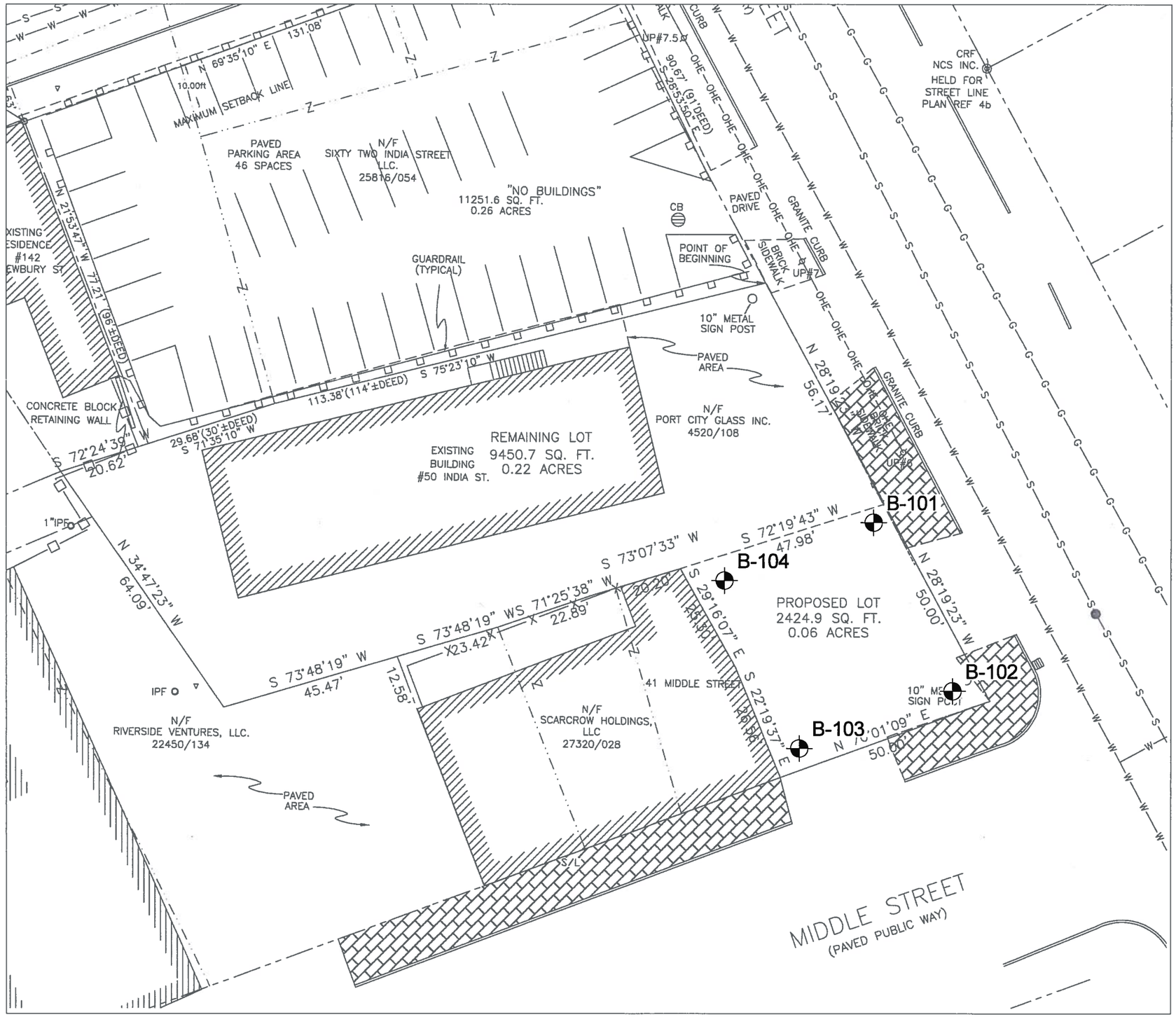
G:\AutoCad\1600\1607-01\FIG 1, LOCUS MAP 1607-001.dwg, 3/2/2017 4:13:36 PM, \\SACO\Xerox WorkCentre 7855 PCL



LEGEND:

B-101 APPROXIMATE LOCATION OF SOIL BORING DRILLED JANUARY 2017.

SOURCE:
SHEET 1 OF 1, TITLED "BOUNDRY PLAN", PREPARED BY ROBERT T. GREENLAW PLS, REVISION DATED 12-02-16.

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0 30 45 60

SCALE, FEET

FIGURE 2
EXPLORATION LOCATION PLAN
GEOTECHNICAL ENGINEERING EVALUATION
PROPOSED CPORT CREDIT UNION BUILDING
PORTLAND, MAINE

MARCH 2017 PROJECT NO. 1607-001

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G:\AutoCad\1600\1607-01\FIG 2, ELP 1607-001.dwg, 3/3/2017 9:13:23 AM, \\SACO\Xerox WorkCentre 7855 PCL

APPENDIX A

LIMITATIONS

Geotechnical Evaluation
Proposed cPort Credit Union Building
Portland, Maine

LIMITATIONS

This geotechnical evaluation has been limited to consideration of the soil and foundation aspects of the Proposed cPort Credit Union Building to be built at 50 India Street in Portland, Maine. The primary purpose of RWG&A's services was to explore subsurface conditions and recommend the building foundation type. This report also provides geotechnical parameters for design and identifies construction considerations solely intended to assist the architect and engineers that will design the project, and monitor its construction. This report is not a technical specification nor is it intended to be used as a specification for bidding or building the project. The report and attached test boring logs may be provided to others for informational purposes, only.

This geotechnical evaluation report might also aid the Contractor responsible for construction, but reliance is not extended to the Contractor for the purposes of bidding and/or building the project. The construction considerations provided herein are not intended to be instructions or directives to the project Contractor. The project Contractor must evaluate construction issues encountered in the work on the basis of their experience with similar projects taking into account their own methods and procedures.

This report has not considered the construction from a worker safety perspective. Construction safety is the responsibility of the project Contractor, who is also solely responsible for the means, methods, and sequencing of construction operations. RWG&A is providing this information as a service to cPort Credit Union. Under no circumstances should this information be interpreted to mean that RWG&A and/or cPort Credit Union are assuming responsibility for construction site safety or the Contractor's activities; such responsibility is not being implied and should not be inferred.

RWG&A's scope of services did not include an environmental site assessment relative to oil and hazardous materials or evidence of a potential release or threat of oil or hazardous materials on, below, or around the site. Any statement in this report, or on the exploration logs, regarding odors or unusual or suspicious conditions is for informational purposes only and is not intended to constitute an environmental assessment. RWG&A's scope of services also excluded any service to investigate or detect the presence of mold or other biological contaminants, or any service that was designed or intended to prevent or lower the risk of the occurrence of an infestation of mold or other biological contaminants (MOBC infestation).

APPENDIX B

TEST BORING LOGS

Geotechnical Evaluation
Proposed cPort Credit Union Building
Portland, Maine

RWG&A, Inc. soil descriptions are based on the following criteria. Descriptive terminology is used to denote the grain size and percentage of each component. The soil descriptions are based on visual-manual classification procedures, Standard Penetration Test results, and the results of laboratory testing on selected soil samples, where available. The Unified Soil Classification Group Symbol will be indicated in capital letters.

COMPONENT DEFINITIONS BY GRADATION SIEVE LIMITS

Materials	Definitions	Fractions	Upper	Lower
Boulders	Material too large to pass through an opening 12 in. square.			
Cobbles	Material passing through a 12 in. opening and retained on the 3 in. sieve.			
Gravel	Material passing the 3 in. sieve and retained on 1/4" (No. 4 sieve).	Coarse Fine	3 in. 3/4 in.	3/4 in. 1/4 in.
Sand	Material passing the No. 4 sieve and retained on the No. 200 sieve.	Coarse Medium Fine	No. 4 (1/4") No. 10 (1/8") No. 40 (1/32")	No. 10 (1/8") No. 40 (1/32") No. 200
Silt	Material passing the No. 200 sieve which is usually non-plastic in character and exhibits little or no strength when air dried.		No. 200	
Clay	Material passing the No. 200 sieve which can also be made to exhibit plasticity within a certain range of moisture contents and which exhibits considerable strength when air dried.		No. 200	

SOIL DESCRIPTION

General

Soils are described as to the Unified Soil Classification Systems Group Symbol, density or consistency, color, grain size distribution and other pertinent properties such as plasticity and dry strength. The RWG&A order of descriptors is as follows:

1. USCS Group Name and Symbol, or Fill
2. Density or Consistency
3. Moisture
4. Grain Size & Constituent percentages
5. Other pertinent descriptors
6. Color

DESCRIPTIVE TERMINOLOGY DENOTING COMPONENT PROPORTIONS

Descriptive Terms	Range of Proportions
Noun (major component)	≥50%
Adjective (secondary component)	20 - 50%
Some (third component)	25 - 45%
Little (second or third component)	15 - 25%
Few (second or third component)	5 - 15%
Trace	0 - 5%
With	Amount of component not determined. Used as a conjunction only. Does not indicate component percentile

OTHER DESCRIPTIVE TERMS

Where appropriate, geological classifications are also used (Glacial Till, etc.)

TYPICAL DESCRIPTIONS

SAND WITH SILT (SP-SM): Medium dense, moist, coarse to medium sand, few silt, brown.
FILL; Loose, dry, fine sand, some gravel and silt, with brick and concrete fragments, dark brown.
SILTY CLAY (CL); Very stiff, moist, silty clay, olive-brown.

DENSITY OR CONSISTENCY OF SOILS

COHESIVE SOILS

Consistency of Cohesive Soils	Standard Penetration Test (Blows Per Foot) (N)	Undrained Shear Strength (TSF)
Very Soft	0 - 2	Below 0.13 (250 psf)
Soft	2 - 4	0.13 to 0.25 (to 500 psf)
Medium	4 - 8	0.25 to 0.5 (to 1,000 psf)
Stiff	8 - 15	0.5 to 1.0 (to 2,000 psf)
Very Stiff	15 - 30	1.0 to 2.0 (to 4,000 psf)
Hard	Over 30	over 2.0 (over 4,000 psf)

Consistency of cohesive soils is based upon field vane shear, torvane, or pocket penetrometer, or laboratory vane shear or Unconsolidated-Undrained Triaxial Compression tests. Consistency of cohesive soils is based upon the Standard Penetration test when no other data is available.

COHESIONLESS SOILS

Density of Cohesionless Soils	Standard Penetration Test (Blows per Foot) (in)
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	over 50

PENETRATION RESISTANCE

STANDARD PENETRATION TEST (ASTM D1586) - a 2.0-inch diameter, 1-3/8 inch inside diameter split barrel sample is driven into soil by means of a 140-pound weight falling freely through a vertical distance of 30 inches. The total number of blows required for penetration from 6 to 18 inches is the Standard Penetration Resistance (N).

COBBLES AND BOULDERS

The percentage of cobbles and boulders is estimated visually where possible.

Descriptive Term	Estimated Percentage
Very Few	0 - 10%
Few	10 - 25%
Common	25 - 40%
Numerous	40 - 50%

If the percentage cannot be determined, as in a typical test boring, then use "with" to indicate the presence of cobbles and/or boulders. (i.e., gravelly sand with cobbles and boulders).

FILLS

The following terminology is used to denote size range of man-made materials within fill deposits:

Size Range	Comparative Soil Terms
<No. 200 Sieve	Silt - size
No. 200 to 1/4 in.	Sand - size
1/4 in. to 3 in.	Gravel - size
3 in. to 12 in.	Cobble - size
>12 in.	Boulder - size

SUPPLEMENTAL SOIL DESCRIPTION TERMINOLOGY

Term	Example	
Seam	Typically 1/16 to 1/2 inch thick	1/4 inch sand seams
Layer	Greater than 1/2 inch thick	2-inch sand layers
Occasional	One or less per foot of thickness	
Frequent	More than one per foot of thickness	
Interbedded	Alternating soil layers of different composition	
Varved	Alternating thin seams of silt and clay	
Mottled	Variations in color	

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Boring Log: B-101
Total Depth (ft): 20
Sheet 1 of 1

Project Name: Proposed cPort Credit Union Building
RWG&A Project No. 1607-001
Location: Portland, Maine
Client: cPort Credit Union
RWG&A Representative: D. Walker
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfilled w/cuttings, asphalt patch
Observed Water Depth: 6'

Drilling Contractor: N. E. Boring Contractors
Drill Rig: Acker Truck Mount
Driller Rep.: Mark D. Jim
Date Started: 01/11/2017
Date Completed: 01/11/2017
Surface Elevation: ()
Drilling Method: 3" Roller bit, Drive + wash
Casing Type: 4" O.D.

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0			S-1	ASPHALTIC PAVEMENT (2 inches).	10	12 12 12 7	24		
				FILL; Moist, fine to medium sand, some silt, little clay, and fine to medium gravel, trace brick fragments, brown.					
5			S-2	INTERLAYERED SILTY SAND (SM) AND SANDY SILT WITH GRAVEL (ML); Loose, Moist to wet, fine sand, some silt, occasional 1/2" sand and clay lenses, olive-gray. Becomes soft.	24	6 5 4 3	9		
10			S-3	Very soft, wet, silt, some fine to medium sand, little fine to medium gravel, brown. Becomes gray. Increased drilling resistance at 13'.	24	2 WOR 1 1	WOR		
15			S-4		1	6 7 5 8	12		
				Casing refusal at 17'. Roller bit through rock/weathered rock to 20'.					
20				Bottom of Exploration at 20'; Assumed bedrock.					
25									
30									

Notes:

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Boring Log: B-102
Total Depth (ft): 15
Sheet 1 of 1

Project Name: Proposed cPort Credit Union Building
RWG&A Project No. 1607-001
Location: Portland, Maine
Client: cPort Credit Union
RWG&A Representative: D. Walker
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfilled w/cuttings, asphalt patch
Observed Water Depth: 7'-10'

Drilling Contractor: N. E. Boring Contractors
Drill Rig: Acker Truck Mount
Driller Rep.: Mark D. Jim
Date Started: 01/11/2017
Date Completed: 01/11/2017
Surface Elevation: ()
Drilling Method: 3" Roller Bit, Drive + wash
Casing Type: 4" O.D.

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0			S-1	ASPHALTIC PAVEMENT (2 inches).	8	33 11 16 8	27		
				FILL; Moist, fine to coarse sand, some fine to coarse gravel, little silt, brown.					
5			S-2	Brick.	10	27 3 7 15	10		
				Moist, fine to coarse sand, some fine to medium gravel, trace silt, brown.					
				Drilling resistance at 9'.					
10			S-3	INTERLAYERED SILTY SAND (SM) AND SANDY SILT WITH GRAVEL (ML); Loose, wet, fine to medium sand, some silt, little fine to medium gravel, gray.	16	3 3 5 11	8		
				Casing refusal at 13'. Roller bit through rock/weathered rock to 15'. Black, shaley, occasional quartz fragment.					
15				Bottom of Exploration at 15'; Assumed bedrock.					
20									
25									
30									

Notes:

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Boring Log: B-103
Total Depth (ft): 24
Sheet 1 of 1

Project Name: Proposed cPort Credit Union Building
RWG&A Project No. 1607-001
Location: Portland, Maine
Client: cPort Credit Union
RWG&A Representative: D. Walker
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfilled w/cuttings, asphalt patch
Observed Water Depth: 7'-10'

Drilling Contractor: N. E. Boring Contractors
Drill Rig: Acker Truck Mount
Driller Rep.: Mark D. Jim
Date Started: 01/11/2017
Date Completed: 01/11/2017
Surface Elevation: ()
Drilling Method: 3" Roller Bit, Drive + wash
Casing Type: 4" O.D.

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0			S-1	ASPHALTIC PAVEMENT (2 inches).	12	29 15 8 6	23		
				FILL; Moist, fine to medium sand, some silt, little fine to medium gravel, brown.					
5			S-2	Spoon refusal, possible concrete obstruction. Roller bit ≈ 1' through obstruction.	0	50/1"			
10			S-3	INTERLAYERED SILTY SAND (SM) AND SANDY SILT WITH GRAVEL (ML); Medium dense, wet, fine to medium sand, some silt, little fine to medium gravel, gray.	12	12 8 11 8	19		
15			S-4	Becomes fine to coarse sand and fine to coarse gravel.	8	8 6 6 9	12		
20			S-5	Becomes fine to medium sand and fine gravel. Soft silty lense at 21'. Organic or possible petroleum odor, no sheen on drilling wash water.	12	5 2 16 25/5"	18		
				Spoon refusal at 22'. Roller bit through rock/weathered rock to 24'. Black, shaley fragments, occasional quartz fragments.					
25				Bottom of Exploration at 24'; Assumed bedrock.					
30									

Notes:

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Boring Log: B-104
Total Depth (ft): 25
Sheet 1 of 1

Project Name: Proposed cPort Credit Union Building
RWG&A Project No. 1607-001
Location: Portland, Maine
Client: cPort Credit Union
RWG&A Representative: D. Walker
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfilled w/cuttings, asphalt patch
Observed Water Depth: 7'-10'

Drilling Contractor: N. E. Boring Contractors
Drill Rig: Acker Truck Mount
Driller Rep.: Mark D. Jim
Date Started: 01/11/2017
Date Completed: 01/11/2017
Surface Elevation: ()
Drilling Method: 3" Roller Bit, Drive + wash
Casing Type: 4" O.D.

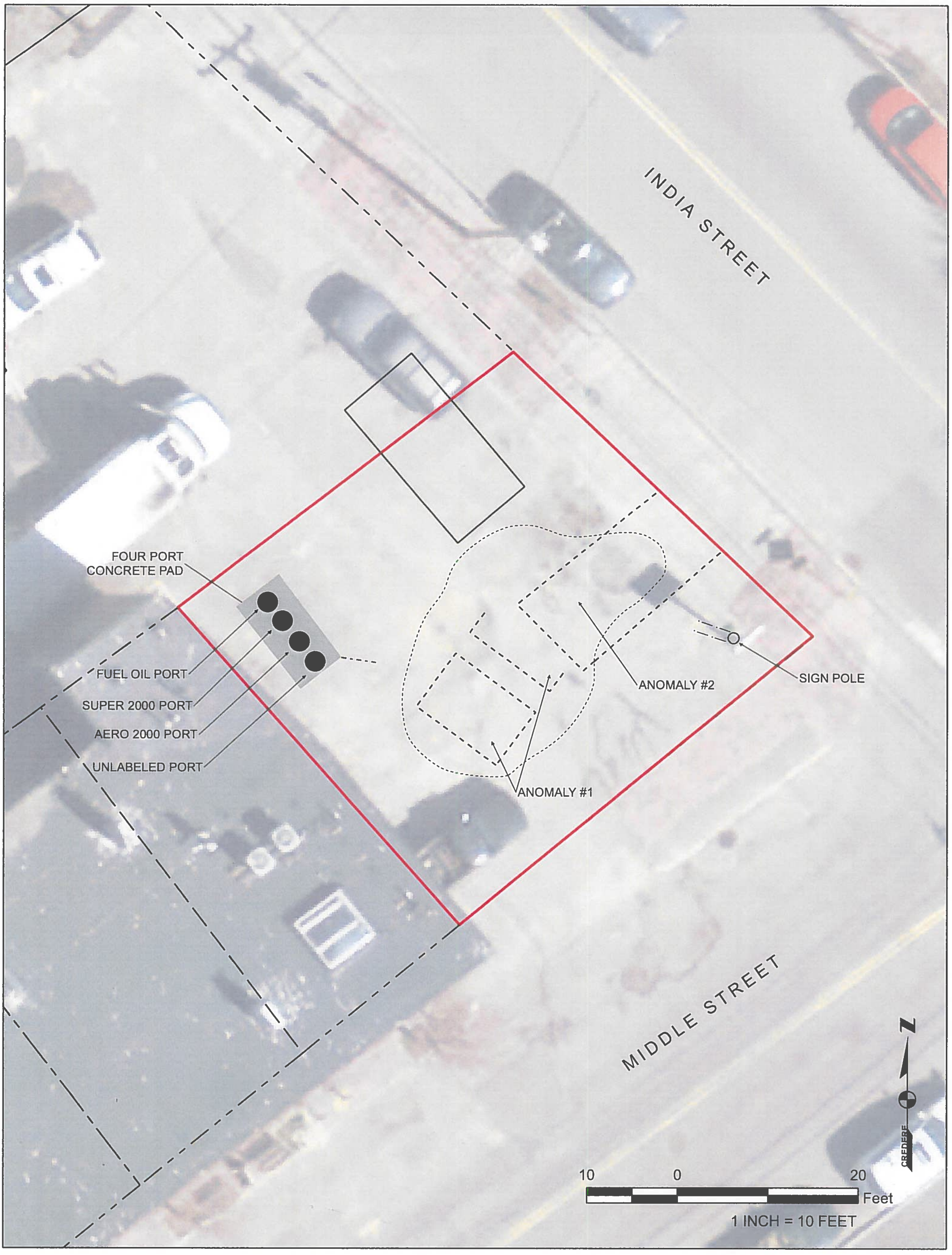
DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0				ASPHALTIC PAVEMENT (1 inch).					
			S-1	FILL; Moist, fine to medium sand, some silt, little fine to medium gravel, brick fragments.	8	1 3 1 1	4		
5			S-2	Becomes medium dense.	10	9 7 6 3	13		
10			S-3	INTER-LAYERED SILTY SAND (SM) AND SANDY SILT WITH GRAVEL (ML); Medium stiff, wet, silt, some fine to medium sand, and fine to medium gravel, gray. Increased drilling resistance at 13'.	3	2 4 2 2	6		
15			S-4	Loose, wet, fine to medium sand, some silt, little fine to medium gravel, gray.	15	7 1 7 5	8		
20			S-5	Occasional soft sandy silt lenses.	18	8 5 1 1	6		
25				Roller bit through rock/weathered rock. Wash water has organic or possible petroleum odor. No sheen. Bottom of Exploration at 25'; Assumed bedrock.					
30									

Notes:

APPENDIX C

CREDERE ASSOCIATES, LLC
GPR SURVEY RESULTS

Geotechnical Evaluation
Proposed cPort Credit Union Building
Portland, Maine



NOTE:
EXISTING CONDITION FEATURES ON THIS PLAN ARE APPROXIMATE AND BASED ON INFORMATION OBTAINED FROM THE MAINE OFFICE OF GIS, MARCH 10, 2016, EDR RADIUS MAP, AND GROUND PENETRATING RADAR (GPR) SURVEY PERFOMED ON APRIL 18, 2016.

DRAWN BY: **MAK**	DATE: **4/19/2016**
CHECKED BY: **ASD**	PROJECT: **16001335**

Credere Associates, LLC
776 MAIN STREET
WESTBROOK, MAINE
Tel. 207.828.1272
Fax 207.887.1051
WWW.CREDERELLC.COM

FIGURE 1
GPR SURVEY RESULTS

PORTION OF 50 INDIA STREET
PORTLAND, MAINE 04101

- SITE BOUNDARY AND GPR SURVEY EXTENT
- 1 FOOT DEEP PIPE
- GPR ANOMALY
- EXTENT OF BROKEN ASPHALT
- CONCRETE PAD
- APPROXIMATE PARCEL BOUNDARY

Document Path: T:\Data\ME\Town\Portland\16001335 - India and Middle Street\Figure 1 - GPR Survey Results.mxd