CITY OF PORTSMOUTH
Department of Public works

Bid # 40-23
Peirce Island Pumphouse and Pool Renovation

ADDENDUM 3

Bidders' questions and answers:

Is there a reason why the geotech report was included in the spec in the first bid and is excluded from the bid in these bid docs?

A. The Geotech report for this pool site is attached to this Addendum 3.

Attachment:

The report of GEOTECHNICAL ENGINEERING EVALUATION
For PEIRCE ISLAND POOL IMPROVEMENTS 05 05 2022

The bidder will acknowledge this addendum within your proposal. Failure to do so may subject the bidder to disqualification.

End of Addendum 3

R.W. Gillespie & Associates, Inc.

Report
of

GEOTECHNICAL ENGINEERING EVALUATION

for

PEIRCE ISLAND POOL IMPROVMENTS
PORTSMOUTH, NEW HAMPSHIRE

Prepared
for

OAK POINT ASSOCIATES
PORTSMOUTH, NEW HAMPSHIRE

Prepared
by

R. W. GILLESPIE & ASSOCIATES, INC.
NEWINGTON, NEW HAMPSHIRE

STATE OF NEW HAMPSHIRE
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05/05/2022
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RWG&A Project No. 0767-152 05 May 2022

TABLE OF CONTENTS

1.0 INTRODUCTION 1
- 1.01 Background 1
- 1.02 Scope of Services 1

2.0 SUBSURFACE EXPLORATION 2

3.0 LABORATORY TESTING 2

4.0 SUBSURFACE CONDITIONS 3
- 4.01 Subsurface Soils 3
- 4.02 Groundwater 3
  - 4.02.01 Building and Tank Borings 3
  - 4.02.02 Infiltration Area Borings 4
- 4.03 Infiltration Rate, Hydraulic Conductivity, and Seasonal Groundwater 4

5.0 EVALUATION OF GEOTECHNICAL DATA 4
- 5.01 General 4
- 5.02 Proposed Construction 5
- 5.03 Foundation and Ground Floor Slab 5
- 5.04 Construction Considerations 5

6.0 RECOMMENDATIONS 6
- 6.01 Site Preparation 6
- 6.02 Site Filling 7
- 6.03 Foundations 8
- 6.04 Ground Floor Slabs 9
- 6.05 Temporary Excavation 10
- 6.06 Geotechnical Observation 10

7.0 CLOSURE 11

FIGURES:
- Figure 1. Locus Map
- Figure 2. Exploration Location Plan

APPENDICES:
- Appendix A. Limitations
- Appendix B. Exploration Logs
- Appendix C. Groundwater Observation Well Detail
- Appendix D. Laboratory Test Results

1.0 INTRODUCTION

1.01 Background

The proposed construction consists of a new one-story pump house building with below grade space and an adjacent surge tank to be built on an open and relatively level area northwest of the existing Peirce Island pool. The project location is shown on Figure 1, *Locus Map*. Current ground surface is grassed and open.

R.W. Gillespie & Associates, Inc.'s (RWG&A's) understanding of the proposed project and existing conditions is based on review of information prepared and provided by Oak Point Associates (all plans dated 4/11/2022):

- Sheet CD101*, Removals Site Plan*
- Sheet CX101, *Existing Conditions Site Plan*
- Sheet CG101, *Grading and Drainage Plan*
- Sheet SB101, *Pump House Foundation Plan*
- Sheet SB501, *Foundation Details 1*
- Email with foundation loads dated 14 April 2022

1.02 Scope of Services

This evaluation was performed to develop site-specific soil and laboratory data, and to make geotechnical evaluations for the proposed construction. These services were performed in general accordance with RWG&A Modification No. 1 to Contract, dated 29 September 2021. Refer to Appendix A for other limitations and use of this report. As performed, RWG&A's scope of services included the following items:

1. Reviewed project information, readily available published subsurface information and geologic mapping, and visited the site to observe surface conditions.

2. Prepared a geotechnical subsurface exploration and sampling program to obtain subsurface information for use in geotechnical evaluations.

3. Marked the boring locations in the field. Contacted DigSafe and coordinated with the City of Portsmouth to verify planned boring locations were clear of utilities.

4. Arranged to have the soil borings performed by a local drilling company as a subcontractor to RWG&A. Provided technical monitoring of exploration activities so that depths, locations, and sampling methods could be modified in response to the subsurface conditions encountered. Observed, logged, and sampled the explorations.

5. Performed laboratory tests on selected soil samples recovered from the subsurface explorations to aid in soil description and for determination of engineering properties needed for foundation design.

6. Conducted engineering evaluations of the geotechnical aspects of the proposed project. Emphasis was placed on foundation type, allowable foundation loads, ground floor slabs, lateral load resistance, seismic site class, perimeter foundation drainage, and excavations.

7. Prepared this report presenting the findings, conclusions, and recommendations of the geotechnical evaluation.

2.0 SUBSURFACE EXPLORATION

The subsurface exploration program consisted of six test borings advanced to depths ranging from about 14.2 to 26.6 feet below local ground surface. The explorations were drilled on 28 March 2022 by Northern Test Boring, Inc. of Gorham, Maine using a track-mounted drill rig. Split-barrel sampling with standard penetration testing (*ASTM D1586, Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils*) was generally performed at about 5-foot intervals in the soil borings, which were advanced using hollow-stem augers.

Exploration activities were coordinated and monitored by RWG&A personnel who prepared the exploration logs. The soils were described in general accordance with *ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).* Logs of the explorations are included in Appendix B. Stratification lines shown on the exploration logs represent the estimated boundaries between the different soil types encountered and approximate refusal depths; the actual transitions will be more gradual and vary over short distances. Subsurface information should only be considered representative of subsurface conditions encountered within the vertical reach of the explorations on the date the explorations were made.

A groundwater observation well was installed in boring B-304. The well installation details are presented in Appendix C, *Groundwater Observation Well Construction Detail*. Groundwater level measurements made in the observation wells are considered representative of stabilized groundwater conditions when the measurements were made.

Figure 2, *Exploration Location Plan*, shows the approximate exploration locations. Boring and probe locations were selected and were marked by RWG&A using tape survey methods prior to drilling. Ground surface elevations used in this report were interpolated from contours shown on the plans provided. Locations and elevations should be considered accurate only to the degree implied by the methodology used to determine them.

3.0 LABORATORY TESTING

Laboratory testing was performed to assist in description and estimation of engineering properties of the soils. The laboratory testing program consisted of three particle-size distribution tests and natural moisture content determinations. The tests were performed in general accordance with the following methods and procedures:

- *ASTM D2216, Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass*.
- *ASTM D1140 – 17, Standard Test Methods for Determining the Amount of Material Finer than 75-µm (No. 200) Sieve in Soils by Washing*.
- *ASTM D6913/6913M – 17, Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis.*

Moisture content test results are presented on the exploration logs. Results of other tests are presented in Appendix D, *Laboratory Test Results*. Tests were conducted at the RWG&A soil and materials testing laboratory in Biddeford, Maine, which is accredited by the American Association of State Highway and Transportation Officials (AASHTO) for the tests performed.

4.0 SUBSURFACE CONDITIONS

4.01 Subsurface Soils

The subsurface conditions consisted of topsoil over naturally deposited clayey to sandy silt and/or silty sand underlain by silty sand with gravel over refusal surfaces. The clayey silt to sandy silt was medium dense and contained frequent silty sand layers and was encountered in B-301, B-303, and B-306. The silty sand to silty sand with gravel was generally loose to medium dense and was underlain by refusal surfaces encountered in each of the explorations at depths of about 14.2 to 26.6 feet below ground surface. The refusal surfaces might be due to bedrock or boulders; rock coring would be needed to verify the nature of the refusal surface. Please refer to the exploration logs in Appendix B for descriptions of subsurface conditions encountered at specific locations.

4.02 Groundwater

4.02.01 Building and Tank Borings

Free water was observed in each of the borings at depths of about 6 to 10 feet below ground surface at the time of drilling. 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 are not considered representative of stabilized groundwater levels.

A groundwater observation well was installed in boring B-304. The following table summarizes groundwater levels measured in the well at the site. The observation from 28 March 2022 was made at the completion of drilling.

Date	Depth Below Current Ground Surface, Ft
28 March 2022	10
29 April 2022	5

Groundwater levels at the site will fluctuate due to season, temperature, rainfall, and construction activity in the area; therefore, water levels during and following construction will vary from those observed in the explorations. The United States Department of Agriculture medium-intensity soil survey indicates that seasonal high groundwater for the soil type mapped at the site is more than 6.5 below ground surface.

4.02.02 Infiltration Area Borings

Free water was observed in the stormwater area borings at depths of about 5 feet below ground surface which corresponds to about elevation 2 feet. The groundwater levels were measured in open boreholes multiple times over a few hours after drilling and are considered to be stabilized levels when the measurements were made.

4.03 Infiltration Rate, Hydraulic Conductivity, and Seasonal Groundwater

Field infiltration tests were performed at boring B-302 in naturally deposited soils. The tests were performed using the Borehole Infiltration test method outlined in Chapter 2 of the *NHDES Stormwater Manual, Volume 2, Revision 1.0, December 2008.* In accordance with the borehole test procedure, the PVC-cased boreholes were filled with water and allowed to pre-soak for 24 hours. RWG&A's personnel performed the saturated hydraulic conductivity (K_{sat}) test procedures described in the manual. The tests were repeated four times at each location. Seasonal high groundwater (SHWT) levels were estimated using observed redoximorphic features of recovered SPT samples. The following table contains the average measured K_{sat} rates, observed groundwater and interpreted SHWT depth, and refusal depth. The test depth shown in the table is the bottom of the PVC casing.

Boring	Estimated Depth to SHWT (feet)	Measured Depth to Groundwater (feet)	Depth to Refusal (feet)	Bottom of Infiltration Test Borehole (feet)	Average Measured Infiltration Rate (inches/hour)
B-SW-1	5	7	16.4	3.0	3.4

Infiltration rates and hydraulic conductivities are affected by soil and groundwater conditions near the test location and are based on short-term conditions. Water quality, frequency of infiltration, maintenance, and site variability will affect long-term infiltration rates. Therefore, short-term infiltration rates from field tests should be factored to account for reductions in filtration capacity with time and uncertainties. The value provided above is unfactored; that is, it has not been adjusted to provide factors of safety, which should be determined by the designer. The New Hampshire Stormwater Manual recommends a minimum factor of safety of 2.

5.0 EVALUATION OF GEOTECHNICAL DATA

5.01 General

Engineering evaluations for this project are based on the subsurface explorations, laboratory testing data, and design information currently available to RWG&A. This report addresses the geotechnical aspects of the design and construction of the proposed one-story building as illustrated on Sheet CG101, *Grading and Drainage Plan*, prepared by Oak Point Associates, dated 11 April 2022. If the site layout is modified, RWG&A should review the engineering evaluations to confirm their continued applicability. It is recommended that the foundation design and construction comply with the requirements of applicable ordinances, regulations, and codes. When this report was prepared, the applicable building code in Portsmouth was the New Hampshire State Building Code which adopts *2015 International Building Code®* by reference.

5.02 Proposed Construction

The planned construction consists of a new pump house and surge tank to be constructed on the west side of the pool near the existing pump house. The pump house building would have plan dimensions of about 30 feet by 45 feet, be one-story above grade, and would have a below grade level with bottom of foundation at elevation 0.17 feet. The surge tank would be about 25 feet by 45 feet in plan dimension with bottom of foundation at elevation 1.5 feet. Oak Point Associates has indicated that wall loads are on the order 1,500 pounds per foot with a 100 pounds per square foot floor load and the tolerable settlement is ¾ inch. Oak Point Associates has also indicated that stormwater treatment is planned near the final pump house location.

5.03 Foundation and Ground Floor Slab

With proper site preparation, the proposed building and surge tank may be supported by spread footing and/or mat foundations all bearing on naturally deposited inorganic soil or compacted structural fill. Total and differential settlement of less than ¾ inch and ½ inch over a distance of 40 feet, respectively, are anticipated.

5.04 Construction Considerations

Temporary Excavation Lateral Support: It is anticipated excavations for the proposed building foundation could be accomplished using sloped, open-cut techniques if groundwater is below the bottom of excavation at the time of construction; a worker protection device (i.e., trench box/shield) might be needed in conjunction with these techniques. Temporary excavation support, anticipated to consist of driven sheet piles with internal cross bracing, would be needed if the excavation size would require slopes steeper than allowed by OSHA or to otherwise control the size of the excavation. The sheets should be driven deep enough into the underlying sand to protect the excavation bottom against heaving/piping. Design of temporary excavation support systems should be performed by a Professional Engineer engaged by the contractor and licensed in the State of New Hampshire.

Construction Dewatering: The on-site naturally deposited soils are moderately sensitive to disturbance when wet. To reduce disturbance of exposed subgrade soils, it will be important to divert runoff, provide positive grading to shed seepage and runoff from flat areas, and compact exposed soils to reduce rutting, ponding, and surface water infiltration. Groundwater was observed at depths of about 5 feet below ground surface in an observation well during April 2022 and excavations of about 7 feet below current ground surface are planned. RWG&A anticipates that if groundwater is encountered during construction, then groundwater control can be accomplished using ditches, sumps, and open pumping for excavations less than about 1 foot below groundwater. It is anticipated that dewatering with deep wells or a well point system would be needed for excavations more than 1 foot below groundwater. The contractor should evaluate the need for dewatering by test pits or observation wells prior to beginning excavations.

It is anticipated that the Contractor, or their Dewatering Contractor, will design, install, operate, and maintain the dewatering system. Details of the proposed dewatering system should be submitted to allow review of its components and adequacy prior to installation. The submittal should provide information on reliable sources of power (note: minimum of two recommended), as well as the layout of sumps, wells, and discharge locations, pump type(s), and capacity, on-site inventory of replacement pumps, and other features.

Contractor evaluations of permeability and dewatering system flow rate may be based on the subsurface information and laboratory test results provided herein. The dewatering contractors should be encouraged to provide designs of alternate dewatering systems based on their experience with similar projects.

Use of On-site Soils: It is anticipated the surficial fill will be stripped and be either incorporated into proposed landscaped areas, where practicable, or hauled off-site.

The subsurface soils from foundation and site work excavations will generally consist of naturally deposited sand with varying amounts of silt and gravel. Moisture-density relationships should be established during construction to provide guidance on appropriate working moisture contents. Working moisture content generally ranges from about minus three to plus one of optimum moisture content.

Laboratory tests indicate the naturally deposited soils would be unsuitable for reuse as structural fill. If on-site soils are proposed for use other than common fill, the soil should be stockpiled separately and tested to determine if it meets specification requirements for its intended use.

6.0 RECOMMENDATIONS

6.01 Site Preparation

1. All topsoil, fill, organic material, debris, rubbish, frozen soils, muck, loose, or disturbed soils and other unsuitable materials should be removed from areas of proposed construction. Unsuitable materials include uncontrolled fills (i.e., fills placed without systematic densification and moisture control to an acceptable percent compaction) and deleterious substances.

2. Due to the previously developed nature of the site, the Contractor should be sensitive to the potential of encountering obstructions such as remnants from prior structures and buildings, associated foundations, and underground utilities (note: both active and abandoned) during site work activities. It is anticipated that obstructions may include, but not be limited to, buried utilities. Except for where otherwise recommended herein, where such items are encountered beneath the planned foundation locations, they should be excavated to their full extent, removed, and replaced with compacted structural fill.

The ends of underground pipes and utility conduits outside the proposed construction areas that will be abandoned in-place should be filled with concrete and capped to reduce the likelihood of erosion of material into the conduit or pipe.

3. Surface grading should provide positive drainage away from constructed facilities both during and after construction.

4. Dewatering requirements will vary across the site based on groundwater levels encountered during construction and soil types. In general, it should be practical to accomplish construction dewatering from within excavations using open pumping methods to a depth of one to two feet below groundwater surface. Surface runoff and infiltration of groundwater should be controlled so that excavation, filling, and foundation construction can be completed in-the-dry.

6.02 Site Filling

5. Common fill may be placed in landscaped areas and as fill below exterior slab-on-grade subgrade. Common fill should consist of inorganic mineral soil free of ice, loam, organic, or other unsuitable materials. Common fill may contain cobbles up to 2/3 of the lift thicknesses used to place and compact it; recommended maximum lift thickness for common fill before compaction is 12 inches.

6. The on-site inorganic soils are unsuitable for use as structural fill but may be used as common fill. In addition, the on-site inorganic soils are generally frost susceptible. The moisture content will need to be tightly controlled for placement and compaction to the required density without excessive weaving, pumping, or other types of instability.

7. Only structural fill should be used as fill below foundations, ground floor slabs, and as backfill within 2 feet of footings and piers and 4 feet of foundation walls. Structural fill should be a well-graded sand and gravel mixture free of roots, topsoil, loam, organic material, and any other deleterious materials, as well as clods of silt or clay, and meet the following gradation requirements:

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

(Note: Maximum particle size should be limited to 3 inches within 2 feet of foundation walls, footings, and floor slabs.)

As an alternative, New Hampshire Department of Transportation (NHDOT) item 304.3, *Crushed Gravel* or NHDOT item 304.4, *Crushed Stone Fine*, may be used as structural fill.

8. In open areas, structural fill should be placed in level, uniform lifts not exceeding 12 inches in uncompacted thickness and be compacted with self-propelled compaction

equipment. In confined areas and within 4 feet of foundation walls, structural fill should be placed in lifts not exceeding 6 inches in uncompacted thickness and be compacted with hand-operated compaction equipment. All fill placed for footing and slab support should be structural fill compacted to at least 95 percent of the maximum dry density as determined by *ASTM Standard D1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3))*.

6.03 Foundations

9. The proposed building should be designed to withstand lateral, uplift, and overturning forces due to earthquakes. The in-place soils encountered in the explorations are not considered susceptible to liquefaction. In accordance with the *2015 International Building Code®*, the site is classified as Site Class D.

10. Spread and/or continuous footings bearing on the naturally deposited soils or compacted structural fill should be proportioned for an allowable contact pressure of 2,000 pounds per square foot. Total settlements of less than 3/4 inch and differential settlements of less than 1/2 inch over a distance of 40 feet should be expected. Minimum footing width should be in accordance with concrete design and building code requirements, and no less than 2 feet. For footings having a least lateral dimension less than 3 feet, the above allowable pressure should be taken as 1/3 of the above value times the least dimension in feet.

11. The mat foundations may be designed using a modulus of subgrade reaction, (k1), of 125 pounds per cubic inch for a 1-foot square plate. The modulus of subgrade reaction should be adjusted for footing sizes using the following equation:

    $K = k1 * (L/B+0.5)/(1.5*L/B)$ where
    k1 = modulus of subgrade reaction for 1-foot square plate
    L = mat foundation length in feet
    B = mat foundation width in feet

    The contact pressure below the mat foundations should not exceed 2,000 pounds per square foot. Total settlements of less than 3/4 inch and differential settlements of less than ½ inch over 40 feet should be expected.

12. Excavation of footing, ground floor slab, and mat foundation bearing surfaces in soil or fill should be performed by earthwork equipment fitted with smooth-edged buckets. Following compaction and prior to placement of concrete, care should be taken to limit disturbance of the bearing surfaces. Any loose, softened, or disturbed material due to construction traffic should be removed prior to placement of concrete and backfilled with compacted structural fill. A 6- to 8-inch thick layer of compacted crushed stone or structural fill could be used to reduce subgrade softening from construction disturbance. A separation geotextile should be placed between crushed stone and the naturally deposited soil.

13. It is recommended that design bottom of footing level for foundations bearing on structural fill or naturally deposited soil be a minimum of 4 feet below lowest adjacent ground surface exposed to freezing temperatures. At heated interior locations, foundations may be designed to bear a minimum of 2 feet below top of ground floor slab or adjacent ground surface whichever is lower. If exposure to freezing temperatures is anticipated, either during or following construction, then interior foundations bearing on structural fill or naturally deposited soils should be lowered in accordance with the recommendations for exterior foundations.

14. The integrity of natural soils and structural fill must be maintained during cold weather conditions. Footing, mat, and slab subgrades should not be allowed to freeze. The naturally deposited soils are considered moderately to highly frost susceptible. Freezing of subgrade soils beneath footings, mat foundations, and floor slabs might result in heaving and post-construction settlement. The Contractor should make every effort to prevent freezing of subgrade soils. In the event frost penetration occurs, all frozen and previously frozen soils should be removed and replaced with compacted structural fill. At no time should frozen material be placed as fill.

15. Lateral loads from wind and earthquake may be resisted by friction between the bottoms of foundations and supporting subgrades, and by passive earth pressures against the sides of the foundation. A friction coefficient of 0.25 and an equivalent fluid pressure of 150 pcf against sides of footings should be used in design of footings.

16. It is understood that gravity foundation drainage is not practicable for this project. Therefore, the building and surge tank walls and bottom slab should be waterproofed and designed to resist hydrostatic pressures. An at-rest equivalent fluid unit weight (note: combined earth and water) of 95 lbs. per cu. ft. is recommended for design of wet well/pipe gallery walls. Lateral load from vehicle surcharge can be accounted for by applying a uniform vertical pressure equal to 250 pounds per square foot multiplied by the at-rest earth pressure coefficient. Groundwater should be taken at current ground surface for uplift design.

6.04 Ground Floor Slabs

17. Interior floors may be slab-on-ground construction based on a subgrade modulus of 125 pounds per cubic inch. The slab should be underlain by a minimum of 12 inches of compacted structural fill. A vapor retarder should be provided below the floor slab to minimize moisture infiltration. It is anticipated design and construction details of the floor slab, including concrete thickness, reinforcing, bedding, control joint depth and spacing, and the vapor retarder type and thickness, will be provided by the project Structural Engineer.

18. Exterior slabs at entrances and other locations sensitive to frost action should be underlain by a minimum of four feet of underdrain stone or structural fill. Underdrain stone should consist of *Standard Specifications for Road and Bridge Construction, State of New Hampshire Department of Transportation, 2002*, Section 703, #57 stone. The underdrain stone should be wrapped in filter fabric. Slabs at locations where frost heaving

is tolerable should be directly underlain by a minimum of 18 inches on structural fill or other non-frost susceptible material. The surrounding area should be pitched to drain away to reduce available moisture for ice and frost lens generation.

6.05 Temporary Excavation

19. Soils encountered within the anticipated excavation depth consist of naturally deposited sand with varying amounts of silt and gravel. In general, the zone of influence of an excavation lies above a line extending from the lowest outside corner of the excavation upward and outward on a 1 vertical to 1 horizontal (1V:1H) slope. Structures and utilities located within this zone will be subject to movement as a result of the excavation. In addition, if backfill material in a previous excavation lies within the zone of influence, the backfill material and associated structures or utilities might also experience movement as a result of the proposed excavation.

20. It is anticipated excavations for the proposed building foundation could be accomplished using sloped, open-cut techniques if groundwater is below the bottom of excavation at the time of construction; a worker protection device (i.e., trench box/shield) might be needed in conjunction with these techniques. Temporary excavation support would be needed to control the lateral limits of the excavation and/or to provide groundwater cutoff to aid in dewatering if groundwater levels are above the bottom of the excavation. Temporary excavation support would be anticipated to consist of an internally braced cofferdam with multiple strut levels; the sheets would need to be driven below the bottom of the excavation level to provide a minimum factor of safety greater than 1.5 against heaving/piping.

21. Design and implementation of supported and unsupported excavations should be the responsibility of the Contractor. The stability of the excavation base against heave, the suitability of the seepage cutoff by sheet piling or groundwater pumping, and the suitability of the excavation support by sheet piling should be reviewed and verified by the Contractor's Professional Engineer licensed in New Hampshire responsible for the design of the temporary lateral support and/or the construction dewatering system.

22. The Contractor should be aware that slope height, slope inclination, and excavation depths 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.

6.06 Geotechnical Observation

The geotechnical recommendations provided as the basis for design of this project were developed using limited numbers of observations and tests. The Owner should be sensitive to the potential need for adjustment in the field. We recommend that the Owner retain RWG&A to observe geotechnical construction aspects of the project. These services should include observing general compliance with the design concepts, specifications, and recommendations, and assisting in development of design changes should subsurface conditions differ from those anticipated prior to the start of construction. Observation improves the likelihood that the design intent will be carried out during construction. In addition, it allows RWG&A to confirm its design recommendations. For this project, geotechnical observation of the following aspects is recommended:

- Site stripping
- Structural fill placement and compaction
- Preparation of foundation subgrades

In addition to geotechnical observation, RWG&A can also provide full-service construction inspection and materials testing. This would include soils, portland cement and asphaltic concrete, structural steel and welding inspections, destructive and non-destructive testing, and special inspection services in fulfillment of building code requirements.

7.0 CLOSURE

This report has been prepared for specific application for the Peirce Island Pool Improvements project to be constructed in Portsmouth, New Hampshire, for the exclusive use of Oak Point Associates. This work has been completed in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made. In the event any changes are made in the nature, design, or location 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 are intended.

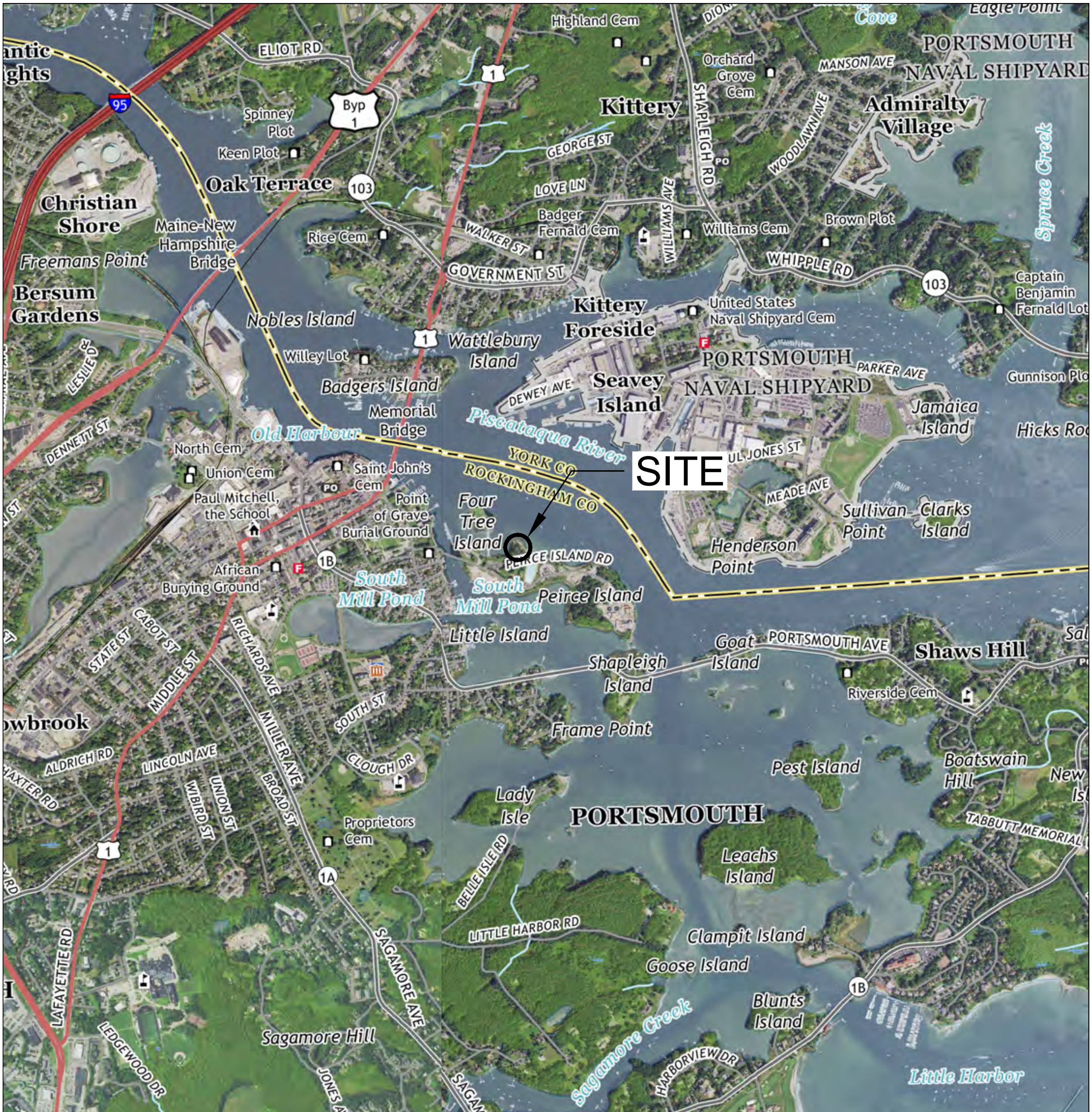


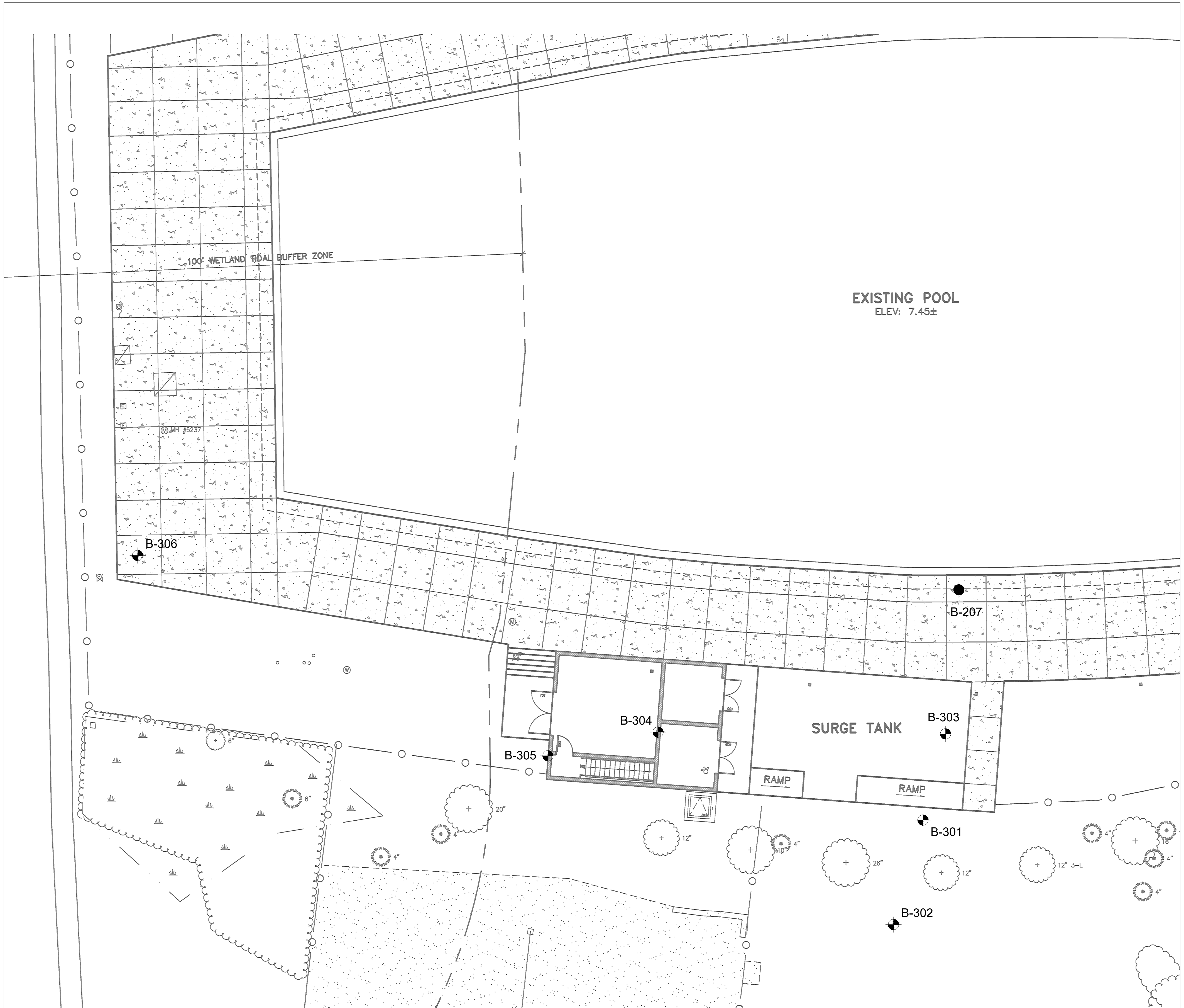
FIGURE 1
LOCUS MAP
GEOTECHNICAL ENGINEERING EVALUATION
PEIRCE ISLAND POOL RENOVATIONS
PORTSMOUTH, NEW HAMPSHIRE

MAY 2021 PROJECT NO. 0767-152

SOURCE:
USGS 7.5-MINUTE TOPOGRAPHIC QUADRANGLE OF KITTERY, ME-NH, DATED 2021, AND PORTSMOUTH, NH-ME, DATED 2021.

R.W. Gillespie & Associates
Geotechnical Engineering ● Materials Testing Services
Environmental Consulting ● www.rwgillespie.com

G:\PROJECTS\0700\0767\0767-152-21\AutoCAD\FIG 1, LOCUS MAP 0767-152.dwg, 07/02/2021 1:15:35 PM, 1. DWG To PDF.pc3



LEGEND:

B-301 APPROXIMATE LOCATION OF SOIL BORING DRILLED 28 MARCH 2022.

B-207 APPROXIMATE LOCATION OF SOIL BORING DRILLED 21 & 24 MAY 2021.

SOURCE:
DRAWING TITLED "CONCEPT SITE PLAN - CONCEPT D", PREPARED BY OAK POINT ASSOCIATES, DATED MARCH 8, 2022.

FIGURE 2
EXPLORATION LOCATION PLAN
GEOTECHNICAL ENGINEERING EVALUATION
PEIRCE ISLAND POOL RENOVATIONS
PORTSMOUTH, NEW HAMPSHIRE

MAY 2022 PROJECT NO. 0767-152

R.W. Gillespie & Associates
Geotechnical Engineering ● Materials Testing Services
Environmental Consulting ● www.rwgillespie.com

APPENDIX A

LIMITATIONS

Geotechnical Engineering Evaluation
Peirce Island Pool Improvements
Portsmouth, New Hampshire

LIMITATIONS

This evaluation has been limited considering the geotechnical engineering aspects of the proposed Peirce Island Pool Improvements project in Portsmouth, New Hampshire. The primary purpose of the evaluation was to obtain information regarding subsurface conditions on which to base recommendations about the geotechnical engineering aspects of design and construction of foundations, ground floor slabs, and seismic considerations. This report identifies construction considerations intended to solely assist engineers that will design the project and monitor its construction, and not to benefit others, including but not limited to the Contractor. This report is not a technical specification, nor is it intended to be used as a specification for bidding or building the project.

This geotechnical engineering evaluation might also aid Contractors responsible for constructing the planned building and tank. However, the recommendations and comments provided are not intended to be instructions or directives to the project Contractors. The project Contractors must evaluate construction issues encountered in the work based on their experience with similar projects considering their methods and procedures.

RWG&A 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 Oak Point Associated. Under no circumstances should this information be interpreted to mean that RWG&A and/or Oak Point Associates assume responsibility for construction site safety or the Contractor’s activities; such responsibility is not implied and should not be inferred.

RWG&A’s services 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. (Note: 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.)

- Any service to investigate or detect the presence of mold or other biological contaminants or any service designed or intended to prevent or lower the risk of an infestation of mold or other biological contaminants (MOBC infestation).

- Any service to evaluate shoreline stability or erosion potential, maximum sea levels, or sea level rise relative to the proposed construction.

- Any service to investigate or detect the presence of potentially hazardous subsurface vapor sources or any service designed or intended to prevent or lower the risk of the occurrence of vapor intrusion.

APPENDIX B

EXPLORATION LOGS

Geotechnical Engineering Evaluation
Peirce Island Pool Improvements
Portsmouth, New Hampshire

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	

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

Boring Log: B-301

Total Depth (ft): 18.2

Sheet 1 of 1

Project Name: Peirce Island Pool Renovations
RWG&A Project No. 0767-152
Location: Portsmouth, New Hampshire
Client: Oak Point Associates
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 6.5'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 03/28/2022
Date Completed: 03/28/2022
Surface Elevation: 8 Feet
Drilling Method: 2 1/4" HSA
Casing Type: N/A

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	TOPSOIL AND ORGANIC MATERIAL (12 inches).	2	1 2 2 2	4		
				CLAYEY SILT (ML); Medium dense, moist, silt, few clay, few fine sand, gray-brown.					
			S-2		5	5 6 5 5	11		
5			S-3		17	5 9 14 20	23		
				SILTY SAND (SM); Medium Dense to loose, wet, coarse to fine sand, little to some silt, interbedded silt lenses, brown.					
10			S-4		15	3 3 2 4	5		
15			S-5		15	4 3 3 8	6		
				Auger action indicates gravel and denser strata.					
				Bottom of Exploration at 18.2'; Auger refusal on possible bedrock or boulder.					
20									
25									
30									

Notes: Seasonal high groundwater observed at 5 feet below ground surface.

R.W. Gillespie & Associates

• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-302

Total Depth (ft): 16.4

Sheet 1 of 1

Project Name: Peirce Island Pool Renovations	Drilling Co.: Northern Test Boring
RWG&A Project No. 0767-152	Drill Rig: Diedrich C-50
Location: Portsmouth, New Hampshire	Driller Rep.: Mike Nadeau
Client: Oak Point Associates	Date Started: 03/28/2022
RWG&A Representative: Tom Snow	Date Completed: 03/28/2022
Boring Location: See Exploration Location Plan	Surface Elevation: 8 Feet
Boring Abandonment Method: Backfill with cuttings	Drilling Method: 2 1/4" HSA
Observed Water Depth: 7'	Casing Type: N/A

DEPTH, FT.	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0	S-1	TOPSOIL AND ORGANIC MATERIAL (6 inches).	8	3 7 10 11	17		
		SILTY SAND (SM); Medium dense, dry, coarse to fine sand, little silt, some gravel, brown.					
5	S-2	Few gravel.	12	5 5 6 15	11	16	GS NM
		Wet.					
10	S-3	SILTY SAND (SM); Loose, wet, coarse to fine sand, few silt, trace gravel, brown.	10	5 4 3 3	7		
15	S-4		12	7 20 50/2"			
		SILTY SAND WITH GRAVEL (SM); Dense, wet, coarse to fine sand, some gravel, little silt, gray-brown.					
		Bottom of Exploration at 16.4'; Auger refusal on possible bedrock or boulder.					
20							
25							
30							

Notes: Seasonal high groundwater observed at 5 feet below ground surface.

R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: B-303

Total Depth (ft): 18.9

Sheet 1 of 1

Project Name: Peirce Island Pool Renovations
RWG&A Project No. 0767-152
Location: Portsmouth, New Hampshire
Client: Oak Point Associates
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 6'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich C-50
Driller Rep.: Mike Nadeau
Date Started: 03/28/2022
Date Completed: 03/28/2022
Surface Elevation: 7 Feet
Drilling Method: 2 1/4" HSA
Casing Type: N/A

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	TOPSOIL AND ORGANIC MATERIAL (4 inches).	14	4 9 14 15	23		
				SILTY SAND WITH GRAVEL (SM); Medium dense, moist, coarse to fine sand, some gravel, little silt, brown to gray-brown.					
				CLAYEY SILT (ML); Loose, wet, silt, few clay, trace fine sand, gray. Pocket Penetrometer: Undrained Shear Strength: Su= 1.25 ksf.					
5			S-2		17	3 3 3 3	6		
				SILTY SAND (SM); Medium dense, wet, medium to fine sand, little silt, orange-brown.					
10			S-3		16	12 11 12 14	23	21	GS NM
15			S-4	Coarse to fine sand, orange-brown to brown.	11	5 6 7 12	13		
				Auger action indicates gravel and denser strata.					
				Bottom of Exploration at 18.9'; Auger refusal on possible bedrock or boulder.					
20									
25									
30									

Notes:

R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: B-304

Total Depth (ft): 19.5

Sheet 1 of 1

Project Name: Peirce Island Pool Renovations
RWG&A Project No. 0767-152
Location: Portsmouth, New Hampshire
Client: Oak Point Associates
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 10'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich C-50
Driller Rep.: Mike Nadeau
Date Started: 03/28/2022
Date Completed: 03/28/2022
Surface Elevation: 7 Feet
Drilling Method: 2 1/4" HSA
Casing Type: N/A

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	TOPSOIL AND ORGANIC MATERIAL (6 inches). SILTY SAND WITH GRAVEL (SM); Medium dense to dense, dry, coarse to fine sand, some gravel, little silt, brown to gray-brown.	12	3 9 11 9	20		
			S-2		13	3 5 9 21	14		
5			S-3		10	20 25 50/4"	75+		
10			S-4	Becomes wet.	0	39 35 30 14	65		
15			S-5	SILTY SAND (SM); Loose, wet, coarse to fine sand, few silt, trace gravel, brown. Auger action indicates gravel and denser strata.	12	3 3 3 3	6	22	GS NM
20				Bottom of Exploration at 19.5'; Auger refusal on possible bedrock or boulder.					
25									
30									

Notes:

R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: B-305

Total Depth (ft): 14.2

Project Name: Peirce Island Pool Renovations
RWG&A Project No. 0767-152
Location: Portsmouth, New Hampshire
Client: Oak Point Associates
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 6'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich C-50
Driller Rep.: Mike Nadeau
Date Started: 03/28/2022
Date Completed: 03/28/2022
Surface Elevation: 7 Feet
Drilling Method: 2 1/4" HSA
Casing Type: N/A

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	TOPSOIL AND ORGANIC MATERIAL (4 inches). FILL; Silty sand with gravel, moist, brown.	7	3 4 11 7			
5			S-2	SILTY SAND (SM); Medium dense to loose, moist to wet, medium to fine sand, little silt, light brown to gray.	16	9 12 12 15	24		
10			S-3		18	3 4 6 8	10		
15				Bottom of Exploration at 14.2'; Auger refusal on possible bedrock or boulder.					
20									
25									
30									

Notes:

R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: B-306

Total Depth (ft): 26.6

Sheet 1 of 1

Project Name: Peirce Island Pool Renovations
RWG&A Project No. 0767-152
Location: Portsmouth, New Hampshire
Client: Oak Point Associates
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 7.5'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich C-50
Driller Rep.: Mike Nadeau
Date Started: 03/28/2022
Date Completed: 03/28/2022
Surface Elevation: 7 Feet
Drilling Method: 2 1/4" HSA
Casing Type: N/A

DEPTH, FT.	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0	S-1	CONCRETE (4 inches).	3	4 8 7 7			
		FILL; Silty sand with gravel, gray to brown.					
	S-2	SANDY SILT (ML); Medium dense, moist, little to some medium to fine sand, organic silts 3.5' to 4.0', gray to black.	10	8 8 4 4	12		
5	S-3	SILTY CLAY (CL); Stiff, dry, trace fine sand, gray-brown, mottled.	15	4 6 9 4	15		
10	S-4	SILTY CLAY (CL) and SILTY SAND (SM); Medium dense, wet, interbedded clay and sand, medium to fine sand, gray-brown to orange-brown.	12	3 5 5 7	10		
15	S-5	SILTY SAND WITH GRAVEL (SM); Medium dense, wet, coarse to fine sand, little gravel, gray-brown.	13	4 7 8 8	15		
20	S-6		12	12 12 14 14	26		
25	S-7		10	19 12 12 50/1"	24		
		Bottom of Exploration at 26.6'; SPT refusal on possible boulder.					
30							

Notes:

APPENDIX C

GROUNDWATER OBSERVATION WELL DETAIL

Geotechnical Engineering Evaluation
Peirce Island Pool Improvements
Portsmouth, New Hampshire

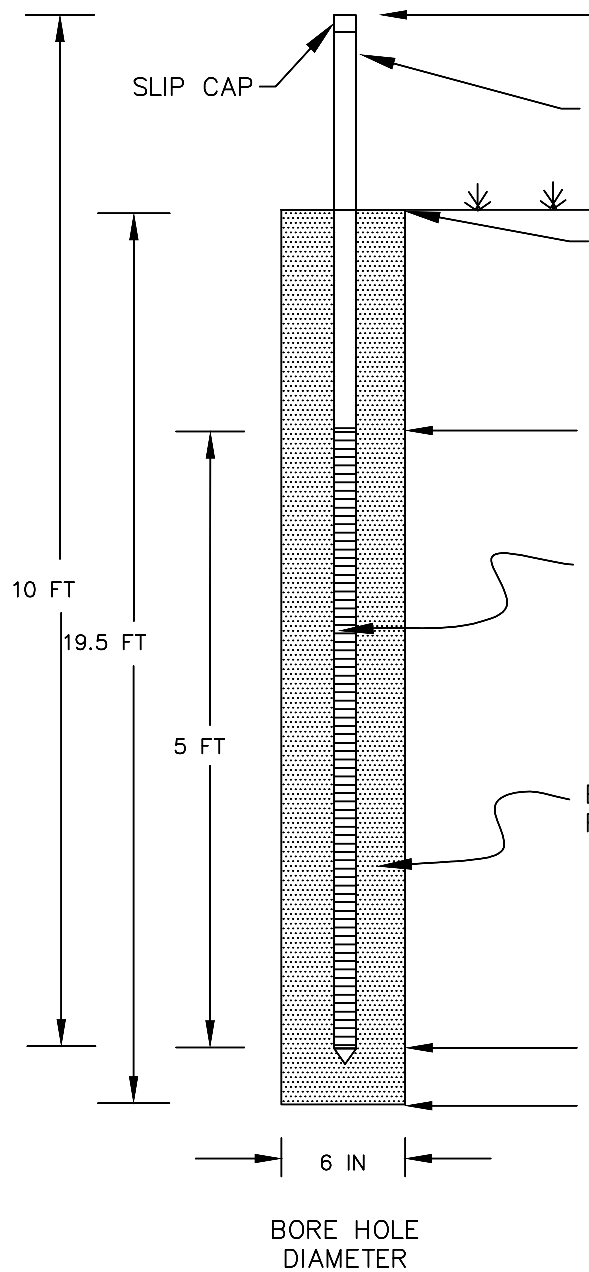
GROUNDWATER OBSERVATION WELL CONSTRUCTION DETAIL

WELL ID: B-304

DATE: 03/28/2022

OBSERVED WATER SURFACE ELEVATION: 0 FT

DISTANCE BELOW GROUND: 7 FT



TOP OF P.V.C.	9 FT
RISER TYPE	SCH. 40 PVC
INSIDE DIAMETER	1 IN
GROUND	7 FT
TOP OF NATIVE SAND PACK	
TOP OF SCREEN	4 FT
TYPE OF SCREEN (TYP.)	SCH. 40 PVC
SIZE OF SLOTS	0.010 IN
INSIDE DIAMETER	1 IN
BACKFILL WITH FILTER SAND	NATIVE
BOTTOM OF SCREEN	−1 FT
BOTTOM OF BORING	−12.5 FT

R.W. GILLESPIE & ASSOCIATES, INC.

PROJECT:	PEIRCE ISLAND POOL RENOVATIONS
LOCATION:	PORTSMOUTH, NEW HAMPSHIRE
PROJECT NO.:	0767−152
DESCRIPTION:	OVERBURDEN GROUNDWATER MONITORING WELL (SHALLOW, UNCONFINED)
DRILLING DATE:	03/28/2022

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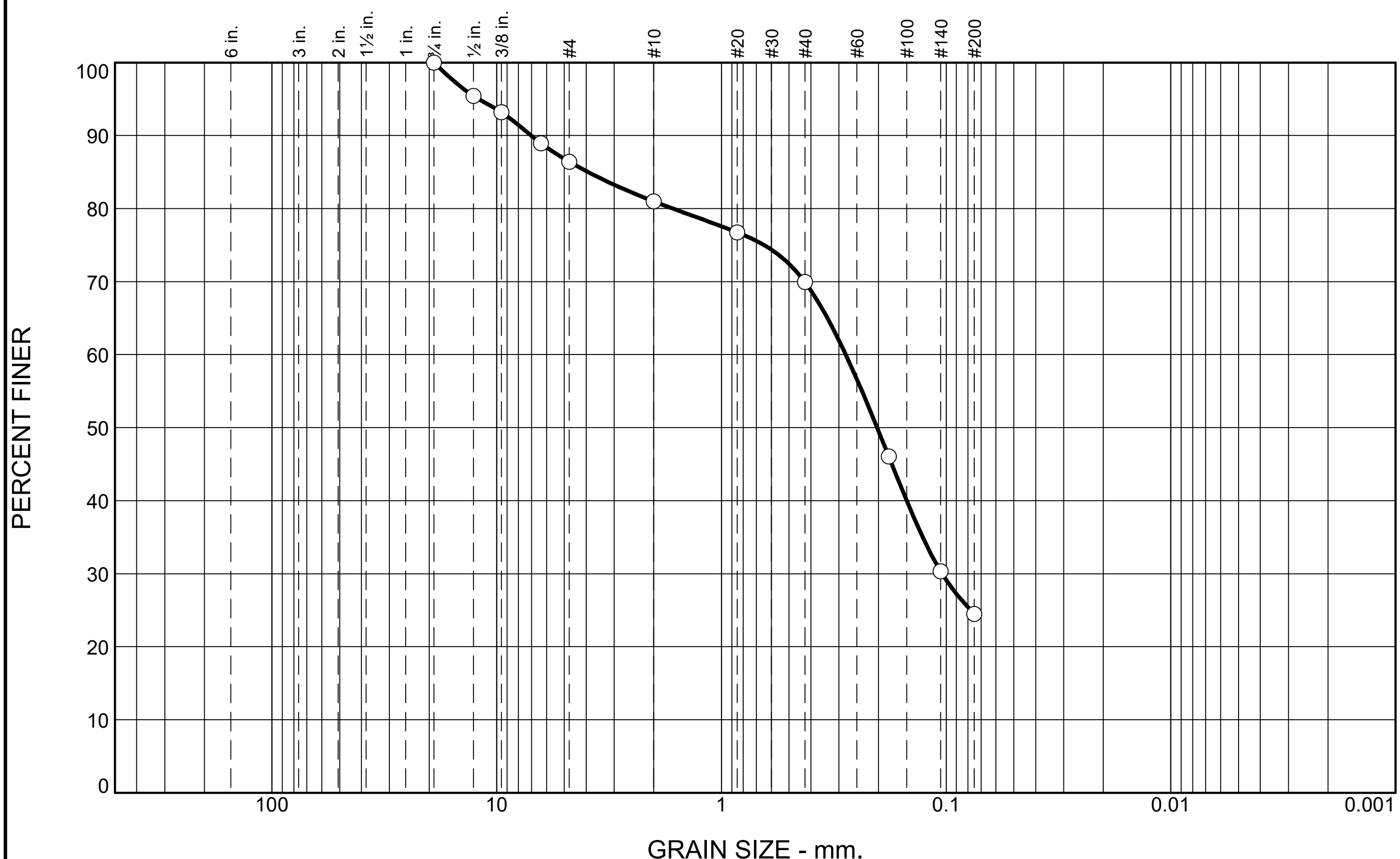
G:\PROJECTS\0700\0767\0767-152-21\AutoCAD\GW OBS.WELL 0767-152.dwg, 05/05/2022 1:32:14 PM

APPENDIX D

LABORATORY TEST RESULTS

Geotechnical Engineering Evaluation
Peirce Island Pool Improvements
Portsmouth, New Hampshire

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	13.6	5.4	11.1	45.4	24.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	95.4		
3/8"	93.2		
1/4"	88.9		
#4	86.4		
#10	81.0		
#20	76.7		
#40	69.9		
#80	46.1		
#140	30.3		
#200	24.5		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 7.0260 D_{85}= 3.9226 D_{60}= 0.2799
D_{50}= 0.2028 D_{30}= 0.1045 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Moisture Content: 16.2%

Location: B-302
Sample Number: S-2 **Depth:** 5'-7' **Date:** 04/15/2022

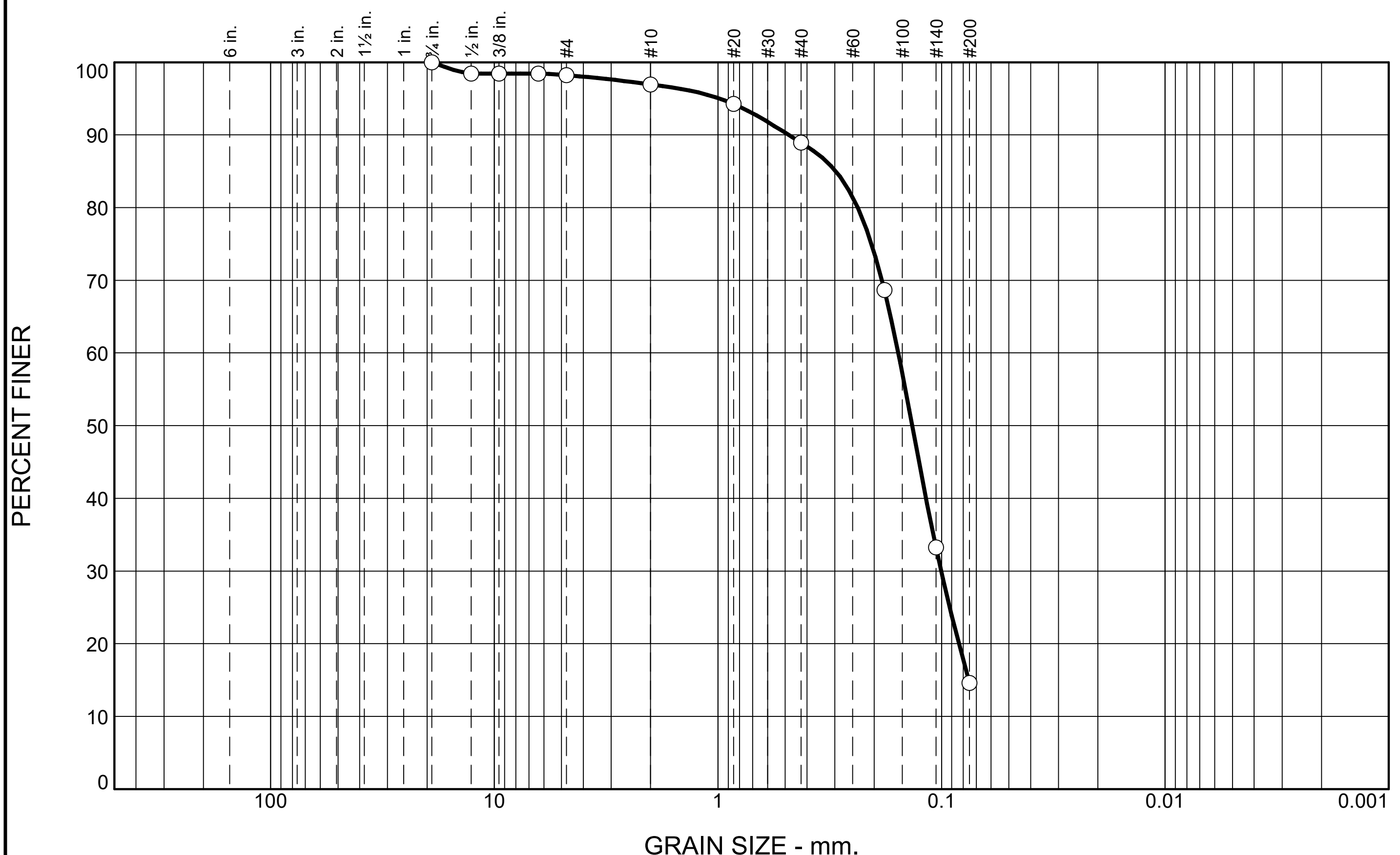
R.W. Gillespie & Associates, Inc. Biddeford, Maine

Client: Oak Point Associates
Project: Proposed Pool Building
Portsmouth, NH
Project No: 0767-152 **Lab No.** 16954-01

Tested By: JMT **Checked By:** MTG

MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.8	1.3	8.0	74.3	14.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	98.4		
3/8"	98.4		
1/4"	98.4		
#4	98.2		
#10	96.9		
#20	94.2		
#40	88.9		
#80	68.6		
#140	33.3		
#200	14.6		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.4827 D_{85}= 0.2970 D_{60}= 0.1562
D_{50}= 0.1352 D_{30}= 0.1005 D_{15}= 0.0756
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Moisture Content: 21.5%

Location: B-303
Sample Number: S-3 **Depth:** 10'-12' **Date:** 04/15/2022

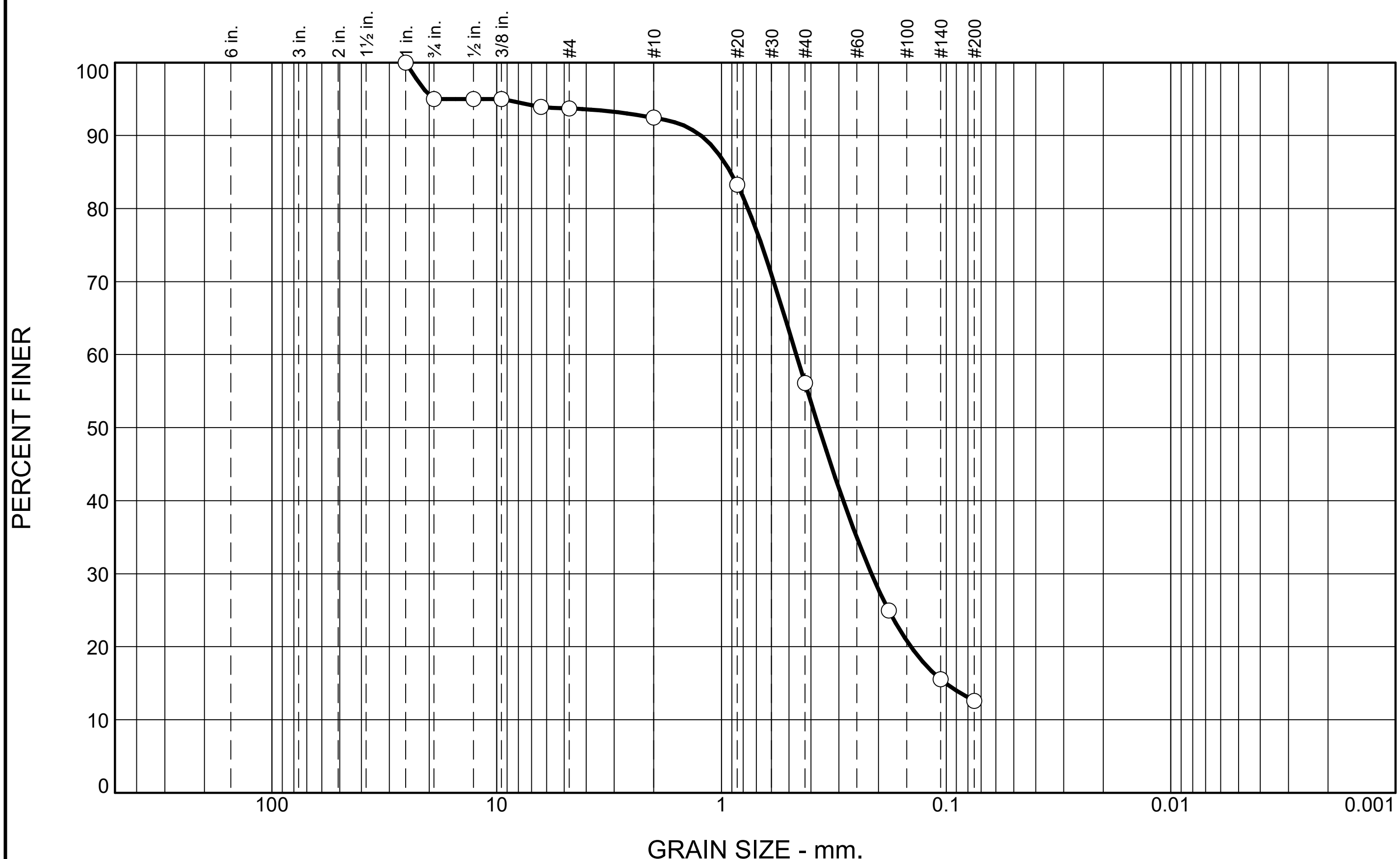
R.W. Gillespie & Associates, Inc. Biddeford, Maine

Client: Oak Point Associates
Project: Proposed Pool Building
Portsmouth, NH
Project No: 0767-152 **Lab No.** 16954-02

Tested By: JMT **Checked By:** MRG

MRG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.0	1.3	1.3	36.3	43.5	12.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	95.0		
1/2"	95.0		
3/8"	95.0		
1/4"	93.9		
#4	93.7		
#10	92.4		
#20	83.3		
#40	56.1		
#80	25.0		
#140	15.6		
#200	12.6		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.2362 D_{85}= 0.9106 D_{60}= 0.4642
D_{50}= 0.3684 D_{30}= 0.2150 D_{15}= 0.1005
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Moisture Content: 22.0%

Location: B-304
Sample Number: S-5 **Depth:** 15'-17' **Date:** 04/15/2022

R.W. Gillespie & Associates, Inc. Biddeford, Maine

Client: Oak Point Associates
Project: Proposed Pool Building
Portsmouth, NH
Project No: 0767-152 **Lab No.** 16954-03

Tested By: JMT **Checked By:** MRG

MRG