GEOTECHNICAL ▼ ENVIRONMENTAL ▼ RESIDENT ENGINEERING ▼ TESTING

GEOTECHNICAL INVESTIGATION REPORT

Revision 1 – May 3, 2017

CONGRESS AND CHESTNUT STREET STREETSCAPE AND UTILITIES PROJECT
PORTSMOUTH, NEW HAMPSHIRE

Prepared For:

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JTC Project No.: 17-15-011

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GEOTECHNICAL INVESTIGATION REPORT

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DATE: May 2, 2017

RE: **GEOTECHNICAL INVESTIGATION REPORT – Rev. 1 (May 3, 2017)**
CONGRESS AND CHESTNUT STREET STREETSCAPE
AND UTILITIES PROJECT
PORTSMOUTH, NEW HAMPSHIRE
JTC Project No. 17-15-011

John Turner Consulting, Inc. (JTC) is pleased to present this *Geotechnical Investigation Report* for a proposed Congress and Chestnut Street Streetscape and Utilities Project to be located in Portsmouth, New Hampshire. JTC conducted geotechnical explorations, laboratory testing, and engineering evaluations in general accordance with our proposed scope of services submitted to City od Portsmouth on February 6, 2017. Our work was authorized on February 15, 2017.

The purpose of the geotechnical investigation was to obtain information on the subsurface conditions at the site and to provide geotechnical engineering recommendations to support the planning, design, and construction of the proposed development. Geotechnical explorations and laboratory testing services were performed in March of 2017.

This report summarizes available project information, presents the geotechnical exploration and laboratory testing programs, describes the subsurface conditions encountered, and provides geotechnical engineering recommendations to support the planning, design, and construction of the proposed Congress and Chestnut Street Streetscape and Utilities Project. The contents of this report are subject to the attached Limitations.

1.0 PROJECT INFORMATION

The following subsections provide general descriptions of the site, the regional geologic setting, and the proposed development.

1.1 Site Description

The site of the proposed Congress and Chestnut Street Streetscape and Utilities Project is located on Congress, Chestnut, and Porter Streets in Portsmouth, New Hampshire. The roads are subject to moderate to heavy flow of standard passenger vehicles and delivery trucks, and provide direct access to numerous businesses and residences. An *Existing Conditions Plan* (attached) provided by Altus Engineering, Inc. and dated January 20, 2017 indicates moderately sloping ground surface contours with existing grades ranging from about +20 feet to +32 feet within the footprint of the proposed development.

1.2 Regional Geologic Setting

JTC's review of the "Surficial Geologic Map of the Portsmouth and Kittery Quadrangles, Rockingham County, New Hampshire" (Larson, G.J.; 1992) indicates that the native soils are likely to vary among Glacial and Postglacial Water-Laid Deposits, Marine Offshore Deposits, and Glacial Till. Glacial and Postglacial Water-Laid Deposits include sand, gravel, and silt deposited by meltwater streams discharging into the late glacial sea and/or wave-derived nearshore deposits during marine offlap. Marine Offshore Deposits typically include marine sand, silt, and/or clay associated with the Presumscot Formation. Glacial Till is generally a heterogeneous mixture of sand, silt, clay, and stones deposited directly by glacial ice. Stratification is rare and it usually overlays bedrock. The referenced map also indicates some areas (typically near West Road) that may include relatively thin (less than 10 feet thick) layers of overburden soils and/or shallow bedrock.

1.3 Proposed Development

JTC understands that the proposed development involves the construction of a new ornamental arch to span across the end of Chestnut Street where it terminates at Congress Street. JTC further understands that the underground utilities along the three streets are to be replaced/improved.

We understand that design details are still being developed, but the structural engineer, JSN Associates, Inc., provided preliminary site-specific structural loading as follows:

- The intent will be to support the arch on an isolated shallow spread footing, each approximately 6' to 7' square; and

- Foundation loads will be on the order of 20 kips or less (less than 10 kips per footing).

2.0 GEOTECHNICAL EXPLORATIONS & LABORATORY TESTING

The primary components of the geotechnical exploration and laboratory testing programs are described in the following subsections.

2.1 Geotechnical Explorations

Soil Exploration Corp (SoilEx) to perform two (2) geotechnical test borings (designated as B-1 and B-2) and four (4) ledge probes (designated LP-1 through LP-4, inclusive) via a truck-mounted Mobile B57 drill rig. JTC directed the drilling, testing, and sampling activities and logged the subsurface conditions encountered at each exploration location.

The proposed exploration locations were selected by the design team. JTC field-located the proposed explorations considering existing site features and proposed development, and under the constraints of drill rig access and utility conflicts. Subsequently, the relative location of each exploration was established via measurements from existing site features and scaling the dimensions onto the provided plan(s). The attached *Exploration Location Plan* depicts the approximate exploration locations.

The test borings were advanced to depths ranging from 11 to 17.25 feet below the ground surface (bgs) utilizing 2¼-inch inside-diameter continuous-flight hollow-stem-augers (HSAs). As the borings were advanced, standard penetration tests (SPTs) were conducted at regular intervals and soil samples were obtained via 2-inch outside-diameter split-spoon samplers driven by a 140-pound hammer. SPTs were performed in general accordance with ASTM D1586, Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils. Soil samples were sealed in moisture-tight containers and returned to JTC's office for further review, classification, and/or geotechnical laboratory testing. The ledge probes were advanced to depths ranging from 2 to 5.5 feet bgs. The test borings (and probes) were backfilled with soil cuttings upon completion of drilling.

Detailed records of the drilling, testing, and sampling performed and the soil, bedrock, and groundwater conditions observed at each test boring location are provided on the attached *Test Boring Logs*. General descriptions of the subsurface conditions observed at each ledge probe location are provided in the attached *Ledge Probe Summary*.

2.2 Geotechnical Laboratory Testing

JTC selected representative soil samples for geotechnical laboratory testing at our in-house laboratory. The following tests were performed:

- 6 Moisture contents;
- 5 Particle-size analyses; and
- 1 Atterberg Limits.

Geotechnical laboratory testing was performed in general accordance with ASTM procedures. Test results are provided on the attached *Geotechnical Laboratory Testing Reports*.

3.0 SUBSURFACE CONDITIONS

The following subsections describe the site soil, bedrock, and groundwater conditions encountered, based on results of the geotechnical explorations and laboratory testing. Detailed descriptions of the conditions observed at each test boring are provided on the attached *Test Boring Logs*. General descriptions of the conditions observed at each auger probe location are provided in the attached *Ledge Probe Summary*.

3.1 Soils

The overburden soils encountered at the test boring locations appear to be generally consistent with those described by the published geologic data. The primary soil strata are briefly described in the paragraphs below.

3.1.1 Road Base

Road Base materials were encountered directly beneath 3-5 inches of asphalt at each exploration location. The Road Base typically consisted of brown to dark brown silty sand (SM) with few gravel. The Road Base was about 0.5 to 1 feet thick at most exploration locations. The Road Base was typically medium dense and moist.

3.1.2 Existing Fill

Existing Fill materials were encountered directly beneath the Road Base at each test boring location and at most auger probe locations. The Existing Fill was usually described as brown silty sand with gravel (SM) or as brown silty sand (SM). Where encountered (or inferred), the Existing Fill was approximately 1 to 4 feet thick and extended to depths of about 2.5 to 5.5 feet bgs. The Existing Fill was typically described as loose to medium dense to dense based on SPT N-values.

3.1.3 Marine Offshore Deposits

Native soils described as olive brown sandy lean clay (CL) and/or olive brown fine to medium sand (SM) were encountered directly beneath the Fill at each test boring location. This deposit is interpreted to be a Marine Offshore Deposit of Marine Clay and Marine Sand. Where fully penetrated, the clay and/or sand extended to depths ranging from 8.5 to 13.5 feet bgs and was about 3.5 to 8.5 feet thick.

The Marine Clay (CL) typically extended to depths ranging from 8.5 to 13.5 feet bgs. The clay was described as medium stiff to very stiff, based on visual-manual observations and SPT N-values that ranged from 8 to 20 and averaged about 12. The moisture content of the clay ranged from about 22.5% to 22.8%, based on two (2) tests. One Atterberg limits determination yielded liquid limit (LL), plastic limit (PL), and plasticity index (PI) values of 26, 17, and 9, respectively. The moisture content was typically above the PL, which is evidenced by a liquidity index (LI) value of 0.6. The available data indicate that the Marine Clay is moderately to heavily overconsolidated.

The Marine Sand (SM) was encountered in boring B-2 at 5 feet bgs and extended to a depth of 6 feet bgs. Marine sand was not encountered in boring B-1. The sand was medium dense based on SPT N-values.

3.1.4 Glacial Till

Olive brown silty sand with gravel (SM) was encountered beneath the Marine Offshore Deposits at each boring location at depths ranging from about 8.5 to 13.5 feet bgs. This stratum is interpreted to be Glacial Till. The Glacial Till was fully penetrated (i.e., practical refusal to further penetration of the augers) in both borings, and varied from about 2.5 to 4 feet in thickness and extended to depths ranging from 11 to 17.25 feet bgs.

The Glacial Till was typically described as medium dense to very dense based on N-values that ranged from 25 to 50. One (1) particle-size analysis performed on a representative sample indicated 39% sand, 32% gravel, and 29% silt/clay. The moisture content was 8.1%, based on one (1) test.

3.2 Bedrock

Practical refusal to further penetration of the augers and/or split-spoon sampler was encountered at each test boring and ledge probe location at depths ranging from about 2 to 17.25 feet bgs, and was encountered at depths ranging from 11 to 17.25 feet in the vicinity of the proposed archway. The refusal in each exploration is interpreted to be refusal on the probable top of bedrock. Bedrock is not expected to impact the construction of the arch, based on the results of this investigation. Bedrock may impact the redevelopment of underground utilities. As such, a limited amount of rock removal should be expected and a variety of removal methods should be anticipated and budgeted for (obtain unit costs), including mechanical excavation, ripping, hoe-ram, and blasting.

3.3 Groundwater

Groundwater and/or wet soils were encountered in boring B-2 at a depth of approximately 2 feet bgs, at the time of drilling. Boring B-2 is located in close proximity to a street drain and wet soils are likely due to snow meltwater runoff from sidewalks and street.

Short-term (i.e., during drilling, upon completion of drilling, and/or a few hours after drilling) water levels observed in test borings should be considered approximate. Site groundwater levels should be expected to fluctuate seasonally and in response to precipitation events, construction activity, site use, and adjacent site use.

4.0 GEOTECHNICAL DESIGN & CONSTRUCTION RECOMMENDATIONS

The evaluation of the site and the proposed development was based on the subsurface conditions encountered at the geotechnical test borings, results of geotechnical laboratory testing, provided site/grading plans, and assumed/preliminary structural loading conditions, as described herein.

JTC believes that the site soils are generally suitable for support of the proposed arch, provided the site/subgrade is prepared as described herein.

The existing Asphalt, Road Base, and Existing Fill materials are <u>not</u> suitable for direct support of the arch foundations. These soils should be completely removed from the footing zone (i.e., the proposed footing plus at least 5 feet laterally) during the initial phases of site preparation and grading. Subsequently, the proposed arch can be supported upon shallow foundations bearing on undisturbed native Marine Sand/Clay, Glacial Till and/or on *Structural Fill* or crushed stone built-up from properly prepared native soil subgrades, provided that the design and construction recommendations presented herein are satisfied.

4.1 Site Preparation and Grading

Site preparation and grading should be performed in accordance with the following procedures:

- A geotechnical engineer should directly observe site preparation and grading activities;
- The site soils contain substantial proportions of fine sand, silt, and clay, and may degrade and/or become unworkable when subjected to construction traffic or other disturbance during wet conditions. As such, site preparations, grading, and earthworks should be performed during a dry season if possible. The Contractor shall be aware of these conditions and must take precautions to minimize subgrade disturbance. Such precautions may include diverting storm run-off away from construction areas, reducing traffic in sensitive areas, minimizing the extent of exposed subgrade if inclement weather is forecast, backfilling excavations and footings as soon as practicable, grading (and compacting) exposed subgrades to promote surface water run-off, and maintaining an effective dewatering program, as necessary. Over-excavation to remove degraded or unworkable subgrade soils should be anticipated and budgeted (cost and schedule);
- Any existing buildings, structures, and/or associated foundations (including footings, foundation walls, slabs-on-grade, and/or basements) should be completely removed from the proposed arch footprints and replaced/backfilled with properly placed and compacted *Structural Fill;*
- Any existing subsurface utilities and underground structures should be completely removed from the footprint of the proposed arch and replaced/backfilled with properly placed and compacted *Structural Fill*. Any existing subsurface utilities in proposed pavement areas should be removed and/or appropriately abandoned in place (e.g., pressure grouting), as approved by the on-site geotechnical engineer;
- The site should be cleared and stripped of any existing asphalt-concrete pavement not designated to remain; existing trees/vegetation not designated to remain; Topsoil, rootmat, forest mat; loamy/organic-laden Subsoil; and any otherwise unsuitable materials;
    - The explorations indicate that most of the site is presently covered with 3 to 5 inches of Asphalt.
- Existing Fill, Road Base, and any otherwise unsuitable materials should be completely removed from the proposed arch footprint (i.e., the proposed arch footprint plus at least 5

feet laterally);

- The geotechnical explorations indicate that Existing Fill materials extend to depths on the order of 5 to 5.5 feet bgs proximate to the proposed arch; and
- Additional Undocumented Fill materials should also be expected proximate to existing building(s) and subsurface utilities.

- In cut areas, the final foot of excavation should be performed using a smooth-edged cutting bucket (no teeth) to minimize subgrade disturbance;
- Following clearing, stripping, and/or cutting, the exposed subgrade soils should be proof-rolled/proof-compacted using a large walk-behind compactor. However, proof-rolling/proof-compacting should not be performed if/when the exposed subgrade soils are wet (i.e., due to presence of groundwater, stormwater, perched water, etc.) because this may result in soil pumping and instability. Therefore, the proof-rolling/proof-compacting efforts, including the number of passes and whether to employ static or vibratory methods, should be directed by the on-site geotechnical engineer;
  - Any loose, soft, wet, and/or otherwise unsuitable soils (typically evidenced by rutting, pumping, and/or deflection of the subgrade) should be over-excavated to expose suitable soils, or other remedial measures should be taken, as approved by the on-site geotechnical engineer; and
  - The over-excavation should then be backfilled with properly placed and compacted *Structural Fill*.
- *Structural Fill* should be used for subgrade fill within footing pads. The placement of *Structural Fill* materials to achieve design subgrades in footing pads should not begin until the exposed subgrade soils have been directly observed and approved by the on-site geotechnical engineer;
- *Common Fill* is acceptable for subgrade fill in parking and driveway areas. The placement of *Common Fill* materials to achieve design subgrades in pavement areas should not begin until the exposed subgrade soils have been directly observed and approved by the on-site geotechnical engineer; and
- *Structural Fill* and *Common Fill* materials and placement and compaction requirements are provided in the attached *Table 1*.

4.2 Shallow Foundations

Based on the subsurface conditions encountered at the exploration locations and our current understanding and assumptions relative to the proposed development, the following preliminary foundation design recommendations are provided:

- The existing Asphalt, Existing Fill, and Road Base materials are <u>not</u> suitable for direct support of shallow foundations. These materials should be completely removed from the footprint(s) of the arch, plus 5 feet laterally, as described in Section 4.2.1;
- The arch can be supported on a system of continuous and/or isolated shallow spread footings bearing on undisturbed native Marine Clay/Sand, Glacial Till, and/or on *Structural*

Fill or crushed stone built-up from properly prepared native soil subgrades;

- Shallow foundations may be designed using an allowable bearing pressure of 3,000 psf.;
- Isolated column footings should have a minimum width of 3 feet;
- Exterior footings should be founded at least 4 feet below the lowest adjacent grade to provide adequate frost protection;
- Total post-construction settlements due to applied foundation loads are estimated to be 0.25 to 0.5 inches or less, based on column footing widths of up to 7 feet. Differential settlements between isolated column footings are estimated to be less than 0.25 inches. The estimated settlements and resulting angular distortion are anticipated to be within the allowable limits for this type of structure;
- The design of the arch foundation should consider pull-out (uplift), sliding, and overturning due to wind-induced uplift, lateral, and/or rotational loads.
    - Resistance to net tensile loads (i.e., uplift) can be provided by the weight of the foundation elements, the weight of the soil directly above the foundation elements (if applicable), and the superstructure. The structural designer should evaluate the actual design tensile loads and the actual tensile resistance (i.e., uplift resistance) based upon the actual foundation configuration, targeting a 1.5 factor of safety;
    - Resistance to lateral loads can be provided by friction along the base of the foundations. An interface friction angle, φ, of about 24 degrees is recommended for mass concrete against silty fine to medium sand and/or stiff clay, which results in a frictional factor, tan φ, of 0.44. Only dead loads should be used in the calculation of available interface friction;
    - An active earth pressure coefficient, Ka, of 0.33 and a passive earth pressure coefficient, Kp, of 1.5 (3.0 divided by reduction factor of 2) may be considered for resistance to lateral loads and overturning; and
    - To resist overturning, the net reaction should be located within the middle third of the footing base.

Recommendations for shallow foundation subgrade preparation/construction and foundation backfilling are provided as follows:

- A geotechnical engineer or his/her representative should directly observe foundation subgrade preparation activities;
- If shallow and/or perched groundwater is encountered, it must be removed in advance of excavation and continuously maintained at least 2 feet below the bottom of excavation and subsequent construction grade until the backfilling is complete;
- Excavations for shallow foundations must extend into undisturbed native Marine Clay/Sand, Glacial Till and/or *Structural Fill* built-up from properly prepared native soils, as described herein;
- The native foundation subgrade soils will be sensitive to moisture and will readily disturb

or soften if exposed to wet conditions and construction activities. Therefore, the final foot, at a minimum, of excavation for foundations should be performed using a smooth-edged cutting bucket (no teeth) to minimize subgrade disturbance. If seepage/shallow groundwater and/or precipitation result in wet conditions, the exposed foundation subgrade should be protected with a 6-inch (minimum) thick layer of ¾-inch minus crushed stone encased in a geotextile fabric (e.g., Mirafi 140N or equal). The crushed stone shall be placed immediately upon exposure of the native foundation subgrade soils and densified with a plate compactor until exhibiting stable conditions. The purpose of the crushed stone is to protect the fine-grained subgrade soils from disturbance, facilitate construction dewatering (if necessary), and provide a dry/stable subgrade upon which to progress construction;

  - If Undocumented Fill and/or otherwise unsuitable soils/materials are encountered at the foundation subgrade, over-excavations should remove all Fill and/or unsuitable soils within the footing zone of influence, which is defined as the area extending laterally 1 foot from edges of the footing and then outward and downward at a 1H:1.5V (horizontal to vertical) splay of bearing until a suitable native subgrade soil is encountered; and
  - Any over-excavations should be backfilled with properly placed and compacted *Structural Fill* or crushed stone as approved by the on-site geotechnical engineer.

- Prior to setting forms and placing reinforcing steel, a geotechnical engineer should directly observe footing subgrades;
  - Footing subgrades should be level or suitably benched and free of standing water and/or debris;
  - Loose, soft, wet, frozen, or otherwise unsuitable soils should either be re-compacted or over-excavated to a suitable subgrade, as approved by the on-site geotechnical engineer; and
  - Over-excavations should be backfilled with properly placed and compacted *Structural Fill* or crushed stone as approved by the on-site geotechnical engineer.
- Foundation subgrade soils should be protected against physical disturbance, precipitation, and/or frost throughout construction. Surface water run-on/run-off should be diverted away from open foundation excavations. The Contractor shall ultimately be responsible for the means and methods to protect the foundation subgrade during construction;
- Exterior footings and piers should be backfilled with non-frost-susceptible fill in order to mitigate potential adverse effects of frost. Backfill for exterior footings and piers should consist of well-graded, free-draining, granular soil conforming to the requirements of *Clean Granular Fill*, as described in the attached *Table 1*. Alternatively, a suitable bond break (such as rigid polystyrene insulation) may be provided as approved by the on-site geotechnical engineer. In this case, footings may be backfilled with *Common Fill* (see attached *Table 1*) having a maximum particle-size of 3 inches, as approved by the on-site geotechnical engineer;
- Backfill for footings and piers should be placed in uniform horizontal lifts having a maximum loose lift thickness of 8 inches and compacted to 95 percent of its modified proctor

maximum dry density (MPMDD; per ASTM D1557). Thinner lifts may be required in order to achieve the required compaction criteria; and

4.3 Protection of Existing Foundations

JTC recommends that where the new arch foundation is within close proximity to the existing buildings, that the new footings be constructed at similar grade as the existing footings to mitigate the overlapping of stresses. An imaginary line drawn between the lower edges of adjoining/adjacent footings shall not have a steeper slope than 26.5˚ (2H:1V) relative to horizontal unless the materials supporting the higher footing are braced or otherwise retained. Furthermore, in no case should the FZOI of the existing foundation be encroached or disturbed without review by a Professional Engineer. The FZOI is defined as that area extending laterally 1 foot from the edge of the existing footing then projecting laterally outward and downward at a 1H:1V splay.

Data from the borings suggests that the existing foundation could be undermined during the removal of Existing Fill. As such, temporary excavation support and/or foundation underpinning may be required for that approach.

If the existing footings do need to be undermined, it is expected that conventional concrete pit underpinning will be the most practical means of support. Such underpinning involves staggered limited-width excavations beneath the existing foundation and subsequent backfilling of the pits with new concrete. The process essentially lowers the bottom of footing (BOF) of the existing foundation. It is recommended that an experienced Contractor be retained for the underpinning. The Contractor should provide a *Technical Submittal* to outline their proposed means and methods to protect the existing building and construct the new underpinning pits. JTC can provide technical assistance if underpinning or shoring is necessary for the project.

4.4 Seismic Considerations

A site class "C" is recommended based on site class definitions of the American Society of Civil Engineers (ASCE) Standard 7-10, Minimum Design Loads for Buildings and Other Structures. The site is not considered to be susceptible to liquefaction, based on the conditions encountered at the test boring locations.

4.5 Re-Use of Site Soils

Most of the Existing Fill, Road Base, and Glacial Till encountered at the exploration locations should be suitable for re-use as Common Fill, provided that it is appropriately segregated from excessively silty, wet, and/or otherwise unsuitable materials. The Existing Fill, Road Base, and Glacial Till are <u>not</u> expected to be suitable for re-use as *Clean Granular Fill* or *Structural Fill*.

The Marine Clay and Marine Sand encountered at the exploration locations are <u>not</u> suitable for re-use as *Structural Fill, Clean Granular Fill*, or *Common Fill*. These soils may be re-used in areas to be landscaped, subject to conformance with the project specifications.

4.6 Construction Monitoring and Quality Control Testing

A qualified geotechnical engineer or representative should be retained to review the site preparation and grading activities and foundation subgrade preparations, at a minimum. Similarly, quality control testing, including in-place field density and moisture tests, should be performed to confirm that the specified compaction is achieved. It is recommended that JTC be retained to provide earthwork construction monitoring and quality control testing services.

Quality control testing recommendations are provided as follows:

- During site grading and foundation subgrade preparation, 1 field density test should be performed for every lift (maximum 8 inches per lift) of *Structural Fill* placement, at a minimum;
- During foundation and/or pier backfilling, 1 field density test should be performed for every lift (maximum 8 inches per lift) of *Clean Granular Fill* placement, at a minimum; and
- During backfilling of utility trenches, at least 1 test should be conducted on *Structural Fill* for every lift (maximum 8 inches per lift) of trench.

4.7 Additional Considerations

Additional design recommendations are provided as follows:

- Exterior concrete sidewalks shall be underlain by at least 15 inches of *Clean Granular Fill*. The thickness of the *Clean Granular Fill* shall be increased to no less than 24 inches for exterior concrete slabs located adjacent to exterior doorways and ramps to provide additional frost protection at building entry/exit points;
- The exterior ground surface adjacent to buildings should be sloped away from the building to provide for positive drainage. Similarly, the final surface materials adjacent to buildings should be relatively impermeable to reduce the volume of precipitation infiltrating into the subsurface proximate to building foundations. Such impermeable materials include cement concrete, bituminous concrete, and/or vegetated silty/clayey topsoil; and
- Permanent fill or cut slopes should have a maximum slope of 2.5H:1V (horizontal to vertical) or flatter for dry conditions. Permanent fill or cut slopes should be no steeper than 3H:1V for wet/submerged conditions (e.g., stormwater basin) unless a properly designed surface slope stabilization system (e.g. rip rap, geosynthetics) is provided.

Additional construction recommendations are provided as follows:

- Safe temporary excavation and/or fill slopes are the responsibility of the Contractor. Excavations should be conducted in accordance with local, state, and federal (OSHA) requirements, at a minimum. If an excavation cannot be properly sloped or benched due to space limitations, adjacent structures, and/or seepage, the Contractor should install an engineered shoring system to support the temporary excavation;

- Subgrade conditions will be influenced by excavation methods, precipitation, stormwater management, groundwater control(s), and/or construction activities. Most of the site soils are poorly-drained, moisture-sensitive, and considered susceptible to disturbance when exposed to wet conditions and construction activities. As such, the Contractor shall be aware of these conditions and must take precautions to minimize subgrade disturbance. Such precautions may include diverting storm run-off away from construction areas, reducing traffic in sensitive areas, minimizing the extent of exposed subgrade if inclement weather is forecast, backfilling excavations and footings as soon as practicable, and maintaining an effective dewatering program, as necessary;
- Proper groundwater control and stormwater management are necessary to maintain site stability. Groundwater should be continuously maintained at least 2 feet below the working construction grade until earthworks and/or backfilling are complete;
- If groundwater seepage and/or wet soils due to shallow groundwater are observed, a ¾-inch minus crushed stone base should be placed atop the exposed subgrade soils. The stone should be immediately placed atop the undisturbed subgrade and then tamped with a plate compactor until exhibiting stable conditions. The stone shall be protected, as required, with a geotextile filter fabric such as Mirafi 140N or equal. The purpose of the stone base is to protect the wet subgrade, facilitate dewatering, and provide a dry/stable base upon which to progress construction; and
- All slopes should be protected from erosion during (and after) construction.

5.0 CLOSING

We trust the contents of this report are responsive to your needs at this time. Should you have any questions or require additional assistance, please do not hesitate to contact our office.

LIMITATIONS

Explorations

1. The analyses and recommendations presented in this report are based in part upon the data obtained from widely-spaced subsurface explorations. Subsurface conditions between exploration locations may vary from those encountered at the exploration locations. The nature and extent of variations between explorations may not become evident until construction. If variations appear, it will be necessary to re-evaluate the recommendations of this report.

2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretation of widely-spaced explorations and samples; actual strata transitions are probably more gradual. For specific information, refer to the individual test pit and/or boring logs.

3. Water level readings have been made in the test pits and/or test borings under conditions stated on the logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors differing from the time the measurements were made.

Review

4. It is recommended that John Turner Consulting, Inc. be given the opportunity to review final design drawings and specifications to evaluate the appropriate implementation of the geotechnical engineering recommendations provided herein.

5. In the event that any changes in the nature, design, or location of the proposed areas are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of the report modified or verified in writing by John Turner Consulting, Inc.

Construction

6. It is recommended that John Turner Consulting, Inc. be retained to provide geotechnical engineering services during the earthwork phases of the work. This is to observe compliance with the design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

Use of Report

7. This report has been prepared for the exclusive use of City of Portsmouth in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.

8. This report has been prepared for this project by John Turner Consulting, Inc. This report was completed for preliminary design purposes and may be limited in its scope to complete an accurate bid. Contractors wishing a copy of the report may secure it with the understanding that its scope is limited to preliminary geotechnical design considerations.

TABLE 1

Recommended Soil Gradation & Compaction Specifications

Structural Fill

SIEVE SIZE	PERCENT PASSING BY WEIGHT
5-inch	100
¾-inch	60 - 100
No. 4	20 - 80
No. 200	0 - 10

NOTES:

1. For use as structural load support below foundations and as subgrade fill within building pads. Structural Fill placed beneath building foundations should include the Footing Zone of Influence which is defined as that area extending laterally one foot from the edge of the footing then outward and downward at a 1H:1.5V splay.
2. ¾-inch crushed stone may be used in wet conditions.
3. Structural Fill should be free of construction and demolition debris, frozen soil, organic soil, peat, stumps, brush, trash, and refuse;
4. Structural Fill should not be placed on soft, saturated, or frozen subgrade soils;
5. Structural Fill should be placed in lifts not exceeding 12 inches for heavy vibratory rollers and 8 inches for vibratory plate compactors.
6. Place and compact within ± 3% of optimum moisture content.
7. Compact to at least 95% relative compaction per ASTM D1557.
8. The adequacy of the compaction efforts should be verified by field density testing.

Clean Granular Fill

SIEVE SIZE	PERCENT PASSING BY WEIGHT
3-inch	100
¾-inch	60 – 90
No. 4	20 – 70
No. 200	2 – 8

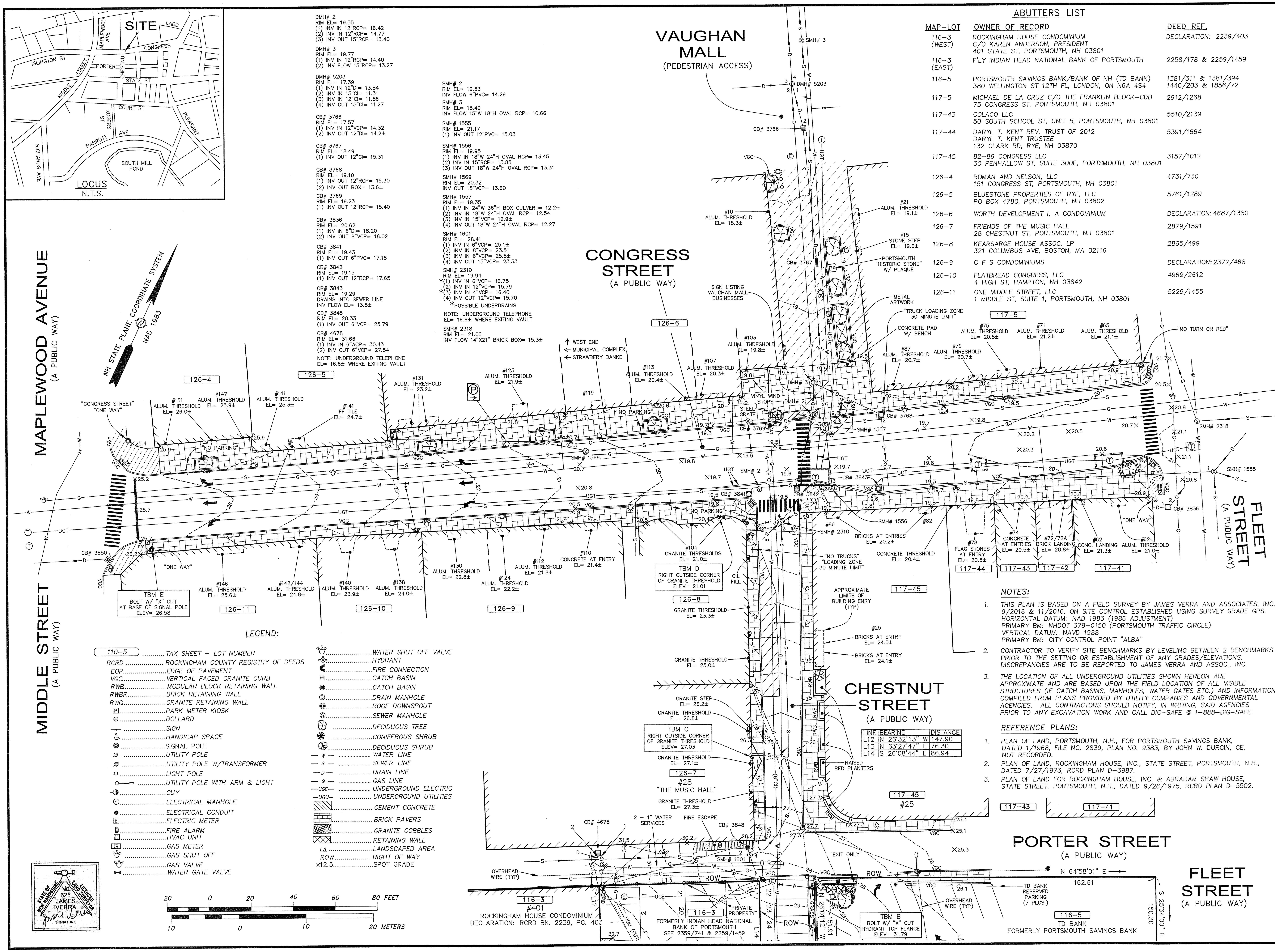
NOTES:
1. For minimum 9-inch base below floor slabs-on-grade.
2. For minimum 15-inch base for exterior concrete slabs exposed to frost.
3. For minimum 24-inch base at exterior ramps, aprons, and loading bays adjacent to entrances/exit ways.
4. For use as footing and foundation wall backfill.
5. For use as backfill behind unbalanced foundation/retaining walls.
6. Place in lifts not exceeding 12 inches for heavy vibratory rollers and 8 inches for vibratory plate compactors.
7. Place and compact within ± 3% of optimum moisture content.
8. Compact to at least 95% relative compaction per ASTM D1557.
9. Compaction efforts should be verified by field density testing.

Common Fill

SIEVE SIZE	PERCENT PASSING BY WEIGHT
6-inch	100
¾-inch	60 – 100
No. 4	20 – 85
No. 200	0 – 25

NOTES:
1. For use as common/subgrade fill for athletic fields, parking areas, and embankments.
2. For use as foundation wall backfill if used in conjunction with a bond break and sized/screened to 3-inch minus.
3. Place in lifts not exceeding 12 inches.
4. Maximum stone size should not exceed ½ the actual lift thickness.
5. Compact to at least 92% relative compaction per ASTM D1557 when placed as subgrade fill in parking areas or roadway embankments.
6. Compact to at least 95% relative compaction per ASTM D1557 when placed as foundation wall backfill in conjunction with a bond break.
7. Compaction efforts should be verified by field density testing.

Existing Conditions Plan, Site Plan, Archway Foundation Plan, & Exploration Location Plan



DMH# 2 RIM EL= 19.55 (1) INV IN 12"RCP= 16.42 (2) INV IN 12"RCP= 14.77 (3) INV OUT 15"RCP= 13.40		

DMH# 2
RIM EL= 19.55
(1) INV IN 12"RCP= 16.42
(2) INV IN 12"RCP= 14.77
(3) INV OUT 15"RCP= 13.40

DMH# 3
RIM EL= 19.77
(1) INV IN 12"RCP= 14.40
(2) INV FLOW 15"RCP= 13.27

DMH# 5203
RIM EL= 17.39
(1) INV IN 12"DI= 13.84
(2) INV IN 15"CI= 11.31
(3) INV IN 12"CI= 11.86
(4) INV OUT 15"CI= 11.27

CB# 3766
RIM EL= 17.57
(1) INV IN 12"VCP= 14.32
(2) INV OUT 12"DI= 14.2±

CB# 3767
RIM EL= 18.49
(1) INV OUT 12"CI= 15.31

CB# 3768
RIM EL= 19.10
(1) INV OUT 12"RCP= 15.30
(2) INV OUT BOX= 13.6±

CB# 3769
RIM EL= 19.23
(1) INV OUT 12"RCP= 15.40

CB# 3836
RIM EL= 20.62
(1) INV IN 6"DI= 18.20
(2) INV OUT 8"VCP= 18.02

CB# 3841
RIM EL= 19.43
(1) INV OUT 6"PVC= 17.18

CB# 3842
RIM EL= 19.15
(1) INV OUT 12"RCP= 17.65

CB# 3843
RIM EL= 19.29
DRAINS INTO SEWER LINE
INV FLOW EL= 13.8±

CB# 3848
RIM EL= 28.33
(1) INV OUT 6"VCP= 25.79

CB# 4678
RIM EL= 31.66
(1) INV IN 6"ACP= 30.43
(2) INV OUT 6"VCP= 27.54
NOTE: UNDERGROUND TELEPHONE
EL= 16.6± WHERE EXITING VAULT

SMH# 2
RIM EL= 19.53
INV FLOW 6"PVC= 14.29

SMH# 3
RIM EL= 15.49
INV FLOW 15"W 18"H OVAL RCP= 10.66

SMH# 1555
RIM EL= 21.17
(1) INV OUT 12"PVC= 15.03

SMH# 1556
RIM EL= 19.95
(1) INV IN 18"W 24"H OVAL RCP= 13.45
(2) INV IN 15"RCP= 13.85
(3) INV OUT 18"W 24"H OVAL RCP= 13.31

SMH# 1569
RIM EL= 20.32
INV OUT 15"VCP= 13.60

SMH# 1557
RIM EL= 19.35
(1) INV IN 24"W 36"H BOX CULVERT= 12.2±
(2) INV IN 18"W 24"H OVAL RCP= 12.54
(3) INV IN 15"VCP= 12.9±
(4) INV OUT 18"W 24"H OVAL RCP= 12.27

SMH# 1601
RIM EL= 28.41
(1) INV IN 6"VCP= 25.1±
(2) INV IN 8"VCP= 23.51
(3) INV IN 6"VCP= 25.8±
(4) INV OUT 15"VCP= 23.33

SMH# 2310
RIM EL= 19.94
*(1) INV IN 6"VCP= 16.75
(2) INV IN 12"VCP= 15.79
*(3) INV IN 4"VCP= 16.40
(4) INV OUT 12"VCP= 15.70
*POSSIBLE UNDERDRAINS
NOTE: UNDERGROUND TELEPHONE
EL= 16.6± WHERE EXITING VAULT

SMH# 2318
RIM EL= 21.06
INV FLOW 14"X21" BRICK BOX= 15.3±

ABUTTERS LIST

MAP-LOT	OWNER OF RECORD	DEED REF.
116-3 (WEST)	ROCKINGHAM HOUSE CONDOMINIUM C/O KAREN ANDERSON, PRESIDENT 401 STATE ST, PORTSMOUTH, NH 03801	DECLARATION: 2239/403
116-3 (EAST)	F'LY INDIAN HEAD NATIONAL BANK OF PORTSMOUTH	2258/178 & 2259/1459
116-5	PORTSMOUTH SAVINGS BANK/BANK OF NH (TD BANK) 380 WELLINGTON ST 12TH FL, LONDON, ON N6A 4S4	1381/311 & 1381/394 1440/203 & 1856/72
117-5	MICHAEL DE LA CRUZ C/O THE FRANKLIN BLOCK-CDB 75 CONGRESS ST, PORTSMOUTH, NH 03801	2912/1268
117-43	COLACO LLC 50 SOUTH SCHOOL ST, UNIT 5, PORTSMOUTH, NH 03801	5510/2139
117-44	DARYL T. KENT REV. TRUST OF 2012 DARYL T. KENT TRUSTEE 132 CLARK RD, RYE, NH 03870	5391/1664
117-45	82-86 CONGRESS LLC 30 PENHALLOW ST, SUITE 300E, PORTSMOUTH, NH 03801	3157/1012
126-4	ROMAN AND NELSON, LLC 151 CONGRESS ST, PORTSMOUTH, NH 03801	4731/730
126-5	BLUESTONE PROPERTIES OF RYE, LLC PO BOX 4780, PORTSMOUTH, NH 03802	5761/1289
126-6	WORTH DEVELOPMENT I, A CONDOMINIUM	DECLARATION: 4687/1380
126-7	FRIENDS OF THE MUSIC HALL 28 CHESTNUT ST, PORTSMOUTH, NH 03801	2879/1591
126-8	KEARSARGE HOUSE ASSOC. LP 321 COLUMBUS AVE, BOSTON, MA 02116	2865/499
126-9	C F S CONDOMINIUMS	DECLARATION: 2372/468
126-10	FLATBREAD CONGRESS, LLC 4 HIGH ST, HAMPTON, NH 03842	4969/2612
126-11	ONE MIDDLE STREET, LLC 1 MIDDLE ST, SUITE 1, PORTSMOUTH, NH 03801	5229/1455

LINE	BEARING	DISTANCE
L12	N 26°32'13" W	147.90
L13	N 63°27'47" E	76.30
L14	S 26°08'44" E	86.94

NOTES:

1. THIS PLAN IS BASED ON A FIELD SURVEY BY JAMES VERRA AND ASSOCIATES, INC. 9/2016 & 11/2016. ON SITE CONTROL ESTABLISHED USING SURVEY GRADE GPS.
HORIZONTAL DATUM: NAD 1983 (1986 ADJUSTMENT)
PRIMARY BM: NHDOT 379-0150 (PORTSMOUTH TRAFFIC CIRCLE)
VERTICAL DATUM: NAVD 1988
PRIMARY BM: CITY CONTROL POINT "ALBA"
2. CONTRACTOR TO VERIFY SITE BENCHMARKS BY LEVELING BETWEEN 2 BENCHMARKS PRIOR TO THE SETTING OR ESTABLISHMENT OF ANY GRADES/ELEVATIONS. DISCREPANCIES ARE TO BE REPORTED TO JAMES VERRA AND ASSOC., INC.
3. THE LOCATION OF ALL UNDERGROUND UTILITIES SHOWN HEREON ARE APPROXIMATE AND ARE BASED UPON THE FIELD LOCATION OF ALL VISIBLE STRUCTURES (IE CATCH BASINS, MANHOLES, WATER GATES ETC.) AND INFORMATION COMPILED FROM PLANS PROVIDED BY UTILITY COMPANIES AND GOVERNMENTAL AGENCIES. ALL CONTRACTORS SHOULD NOTIFY, IN WRITING, SAID AGENCIES PRIOR TO ANY EXCAVATION WORK AND CALL DIG-SAFE @ 1-888-DIG-SAFE.

REFERENCE PLANS:

1. PLAN OF LAND, PORTSMOUTH, N.H., FOR PORTSMOUTH SAVINGS BANK, DATED 1/1968, FILE NO. 2839, PLAN NO. 9383, BY JOHN W. DURGIN, CE, NOT RECORDED.
2. PLAN OF LAND, ROCKINGHAM HOUSE, INC., STATE STREET, PORTSMOUTH, N.H., DATED 7/27/1973, RCRD PLAN D-3987.
3. PLAN OF LAND FOR ROCKINGHAM HOUSE, INC. & ABRAHAM SHAW HOUSE, STATE STREET, PORTSMOUTH, N.H., DATED 9/26/1975, RCRD PLAN D-5502.

LEGEND:

110-5 .... TAX SHEET - LOT NUMBER
RCRD .... ROCKINGHAM COUNTY REGISTRY OF DEEDS
EOP .... EDGE OF PAVEMENT
VGC .... VERTICAL FACED GRANITE CURB
RWB .... MODULAR BLOCK RETAINING WALL
RWBR .... BRICK RETAINING WALL
RWG .... GRANITE RETAINING WALL
.... PARK METER KIOSK
.... BOLLARD
.... SIGN
.... HANDICAP SPACE
.... SIGNAL POLE
.... UTILITY POLE
.... UTILITY POLE W/TRANSFORMER
.... LIGHT POLE
.... UTILITY POLE WITH ARM & LIGHT
.... GUY
.... ELECTRICAL MANHOLE
.... ELECTRICAL CONDUIT
.... ELECTRIC METER
.... FIRE ALARM
.... HVAC UNIT
.... GAS METER
.... GAS SHUT OFF
.... GAS VALVE
.... WATER GATE VALVE
.... WATER SHUT OFF VALVE
.... HYDRANT
.... FIRE CONNECTION
.... CATCH BASIN
.... CATCH BASIN
.... DRAIN MANHOLE
.... ROOF DOWNSPOUT
.... SEWER MANHOLE
.... DECIDUOUS TREE
.... CONIFEROUS SHRUB
.... DECIDUOUS SHRUB
— W — .... WATER LINE
— S — .... SEWER LINE
— D — .... DRAIN LINE
— G — .... GAS LINE
—UGE— .... UNDERGROUND ELECTRIC
—UGU— .... UNDERGROUND UTILITIES
.... CEMENT CONCRETE
.... BRICK PAVERS
.... GRANITE COBBLES
.... RETAINING WALL
LA .... LANDSCAPED AREA
ROW .... RIGHT OF WAY
×12.5 .... SPOT GRADE

20 0 20 40 60 80 FEET
10 0 10 20 METERS

STATE OF NEW HAMPSHIRE
JAMES VERRA
No. 625
LICENSED LAND SURVEYOR
SIGNATURE

SURVEYOR:
James Verra and Associates, Inc.
LAND SURVEYORS
101 SHATTUCK WAY - SUITE 8
NEWINGTON, N.H. 03801- 7876
603-436-3557
JOB NO: 23684
PLAN NO: 23684-2

ENGINEER:
ALTUS ENGINEERING, INC.
133 COURT STREET PORTSMOUTH, NH 03801
(603) 433-2335 www.ALTUS-ENG.com

ISSUED FOR:
ENGINEERING DESIGN

ISSUE DATE:
JANUARY 20, 2017

REVISIONS NO.	DESCRIPTION	BY	DATE
1	ENGINEERING DESIGN	JV	1/20/2017
2	ADD STRUCTURE SIZES	JV	2/24/2017

DRAWN BY: JCS
APPROVED BY: JV
DRAWING FILE: 23684.DWG

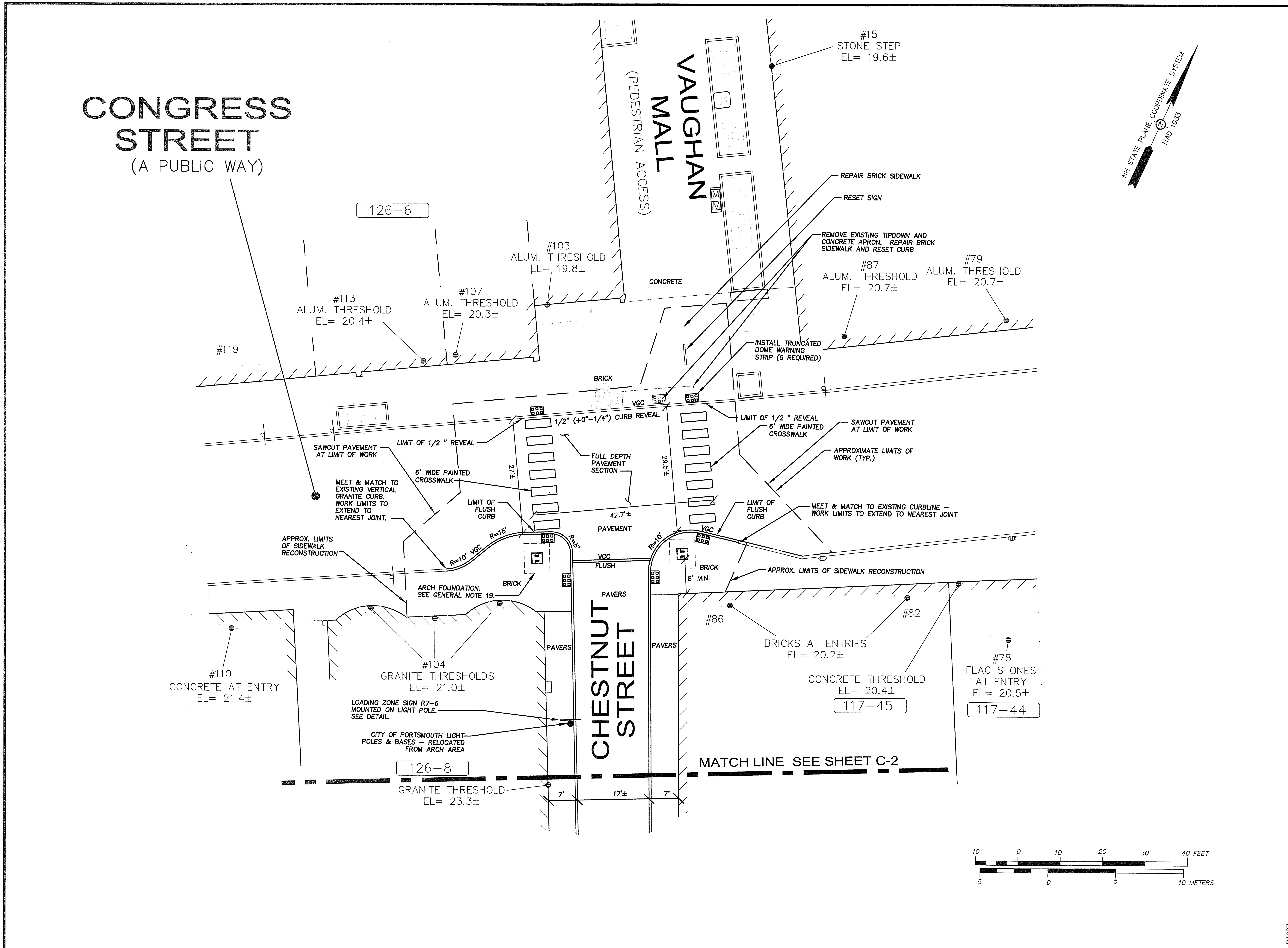
SCALE:
22" x 34" - 1" = 20'
11" x 17" - 1" = 40'

OWNER/APPLICANT:
CITY OF PORTSMOUTH
1 JUNKINS AVENUE
PORTSMOUTH, N.H. 03801

PROJECT:
CHESTNUT STREET STREETSCAPE PROJECT
CONGRESS STREET TO PORTER STREET

TITLE:
EXISTING CONDITIONS PLAN

SHEET NUMBER:
1 OF 1



ENGINEER:

ALTUS ENGINEERING, INC.

133 COURT STREET PORTSMOUTH, NH 03801
(603) 433-2335 www.ALTUS-ENG.com

ISSUED FOR:
CLIENT REVIEW

ISSUE DATE:
MARCH 21, 2017

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	ENGINEERING DESIGN	EDW	03/21/17

DRAWN BY: RLH
APPROVED BY: EDW
DRAWING FILE: 4087.DWG

SCALE:
24" x 36" – 1" = 10'
12" x 18" – 1" = 20'

OWNER/APPLICANT:

CITY OF PORTSMOUTH
1 JUNKINS AVENUE
PORTSMOUTH, N.H. 03801

PROJECT:

CHESTNUT STREET STREETSCAPE PROJECT

CONGRESS STREET TO PORTER STREET

TITLE:

SITE PLAN A

SHEET NUMBER:

C-1

GENERAL

1. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF ALL APPLICABLE STATE AND LOCAL CODES, INCLUDING BUT NOT LIMITED TO:

   2009 INTERNATIONAL BUILDING CODE
   ANSI/ASCE 7-05
   ACI 318-08 "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE"
   ACI 301 "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS"

2. ANY DISCREPANCIES BETWEEN THE ABOVE LISTED CODES AND THE CONSTRUCTION DOCUMENTS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER FOR CLARIFICATION BEFORE PROCEEDING WITH AFFECTED WORK.
3. ALL WORK SHALL BE PERFORMED BY PERSONS QUALIFIED IN THEIR TRADE AND LICENSED TO PRACTICE SUCH TRADE IN THE STATE IN WHICH THE PROJECT IS LOCATED.
4. THESE DRAWINGS SHALL BE USED IN CONJUNCTION WITH ALL ARCHITECTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS IN ADDITION TO SPECIFICATIONS AND ANY SHOP DRAWINGS PROVIDED BY SUBCONTRACTORS AND SUPPLIERS.
5. ALL DIMENSIONS, ELEVATIONS, AND CONDITIONS SHALL BE VERIFIED IN THE FIELD BY THE GENERAL CONTRACTOR (G.C.) AND ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER FOR CLARIFICATION BEFORE PROCEEDING WITH THE AFFECTED PART OF WORK.
6. UNLESS OTHERWISE NOTED, DETAILS, SECTIONS, AND NOTES SHOWN ON THESE DRAWINGS SHALL BE CONSIDERED TYPICAL FOR ALL SIMILAR DETAILS.
7. ALL SHOP DRAWINGS PROVIDED BY OTHERS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO THE FABRICATION OF MATERIAL OR THE PURCHASE OF NON-RETURNABLE STOCK. QUANTITY AND DIMENSIONAL REVIEW IS THE CONTRACTOR'S RESPONSIBILITY.
8. ANY AND ALL TEMPORARY BRACING OR SHORING WHICH IS NEEDED TO HOLD THE STRUCTURE IN A SAFE AND STABLE POSITION UNTIL THE STRUCTURE IS COMPLETE, IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR. CONSULT INDEPENDENT ENGINEER IF DESIGN ASSISTANCE OR REVIEW IS NEEDED.
9. THE BUILDING PERMIT APPLICANT (e.g. OWNER, CONTRACTOR) MUST PROVIDE SPECIAL INSPECTIONS PER THE REQUIREMENTS OF CHAPTER 17 OF THE 2009 INTERNATIONAL BUILDING CODE AND FURNISH INSPECTION REPORTS TO THE CODE OFFICIAL AND TO THE ENGINEER OF RECORD. THE TESTING/INSPECTION AGENCY(S) MUST BE APPROVED BY THE ENGINEER OF RECORD. A SCHEDULE OF SPECIAL INSPECTIONS SHALL BE SUBMITTED TO ENGINEER FOR REVIEW AND APPROVAL, OR PROVIDED BY ENGINEER UPON REQUEST.

DESIGN LOADS

1. THE STRUCTURE IS DESIGNED IN ACCORDANCE WITH 2009 IBC TO CARRY ALL THE DEAD LOADS OF THE VARIOUS STRUCTURAL, ARCHITECTURAL, MECHANICAL, AND OTHER SYSTEMS AND THE FOLLOWING MINIMUM LIVE LOADS:

   BASIC GROUND SNOW LOAD 50 PSF
   Ce = 1.0
   Ct = 1.0
   Is = 1.0

   WIND SPEED = 110 MPH
   EXPOSURE "B"
   Iw = 1.0

   SEISMIC
   SITE CLASS "D"
   Ie = 1.0
   SDs = 0.360
   SD1 = 0.125
   SEISMIC DESIGN CAT. "C"

SOIL BEARING

1. ALL FOOTINGS SHALL BE CARRIED DOWN TO REST ON UNDISTURBED SOIL OR SHALL BEAR ON STRUCTURAL FILL COMPACTED IN 12" LAYERS TO 95% COMPACTION. THE UNDERLYING SOILS AND THE STRUCTURAL FILL SHALL HAVE A MINIMUM SAFE LOAD BEARING CAPACITY OF 3000 PSF.
2. REMOVE ALL EXISTING TOPSOIL, PAVEMENT, ORGANIC MATERIALS, OR OTHER SOIL THAT APPEAR TO BE UNSUITABLE PRIOR TO PREPARING THE FOOTING GRADE.
3. IF ANY ADVERSE SOIL CONDITIONS ARE ENCOUNTERED WHICH EXTEND BELOW FOOTING LEVEL, SUCH AS THOSE LISTED ABOVE, THE GENERAL CONTRACTOR SHALL CONTACT THE ENGINEER IMMEDIATELY FOR DETERMINATION OF HOW TO REMEDY THE CONDITION BEFORE CONTINUATION OF THE WORK.
4. NO FOOTINGS SHALL BE PLACED IN WATER OR ON FROZEN GROUND. ALL EXTERIOR CONSTRUCTION SHALL BE CARRIED DOWN TO A MINIMUM OF FOUR (4) FEET BELOW FINISHED, ADJACENT EXTERIOR GRADE.
5. A GEOTECHNICAL ENGINEER SHALL PROVIDE VERIFICATION THAT SOILS ARE SUITABLE FOR DESIGN LOAD. CONTRACTOR OR OWNER SHALL ASSUME FULL RESPONSIBILITY IF A GEOTECHNICAL ENGINEER IS NOT RETAINED.

STRUCTURAL STEEL

1. STRUCTURAL STEEL WORK SHALL CONFORM TO "SPECIFICATIONS FOR DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS (AISC CURRENT EDITION)", "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS (AISC CURRENT EDITION)", AND "STRUCTURAL WELDING CODE (AWS D1.1-04)".
2. STRUCTURAL STEEL SHALL BE NEW STEEL CONFORMING TO THE FOLLOWING:
   A. ROLLED SHAPES AND PLATES - ASTM A36 (EXCEPT AS NOTED BELOW)
   B. STRUCTURAL TUBES - ASTM A500, GRADE B
   C. ANCHOR RODS - ASTM F1554 GRADE 36 (HEADED BOLTS)
3. VOIDS BENEATH COLUMN BASE PLATES SHALL BE DRY PACKED WITH NON-SHRINK CONSTRUCTION GROUT BEFORE APPLICATION OF LOADS.
4. WELDED CONNECTIONS SHALL BE MADE BY AWS QUALIFIED WELDERS USING FILLER MATERIAL CONFORMING TO E70XX, LOW HYDROGEN.
5. ALL HSS COLUMNS SHALL BE SEALED TO PREVENT WATER PENETRATION DURING CONSTRUCTION OR DURING SERVICE AND SHALL BE PROVIDED WITH A DRAIN HOLE NEAR THE BASE ON SIDE OF COLUMN.

CAST-IN-PLACE-CONCRETE

1. ALL WORK SHALL CONFORM TO "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318-08) AND "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS" (ACI 301)
2. ALL FOOTINGS ARE TO REST ON UNDISTURBED SOIL OR CLEAN GRANULAR FILL COMPACTED IN LAYERS OF 12" OR LESS TO 95% COMPACTION.
3. MINIMUM CONCRETE PROTECTION FOR REINFORCING STEEL SHALL BE AS FOLLOWS:
   CONCRETE CAST AGAINST EARTH: 3 INCHES
   FORMED CONCRETE EXPOSED TO EARTH OR WEATHER:
   1-1/2 INCHES FOR #5 BARS AND SMALLER
   2 INCHES FOR #6 BARS AND GREATER
4. CALCIUM CHLORIDE IS PROHIBITED IN ANY CONCRETE MIX.
5. CONCRETE SHALL BE ADEQUATELY PROTECTED FROM HOT OR COLD WEATHER AS REQUIRED BY ACI PUBLICATIONS 305 AND 306, RESPECTIVELY.
6. ALL CONCRETE FOR FOOTINGS AND PIERS SHALL BE NORMAL-WEIGHT, ¾" AGGREGATE AND ATTAIN A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS (U.N.O.). CYLINDERS SHALL BE TAKEN AND TESTED IN ACCORDANCE WITH ACI RECOMMENDATIONS.
7. ALL CONCRETE SHALL BE CURED BY AN APPROVED METHOD AS PRESCRIBED BY ACI.
8. MID-RANGE WATER REDUCERS (MRWR) ARE REQUIRED FOR ALL CONCRETE MIXES EXCEPT FOOTINGS.
9. MAXIMUM WATER TO CEMENT RATIO FOR MIXES WITH MRWR:
   FOR 3000 PSI CONCRETE 0.5
   FOR 4000 PSI CONCRETE 0.45

   MAXIMUM WATER TO CEMENT RATIO FOR MIXES W/OUT MRWR (PERMITTED FOR FOOTINGS ONLY):
   FOR 3000 PSI CONCRETE 0.53
10. MINIMUM CEMENT QUANTITIES:
   FOR 3000 PSI CONCRETE 517 LB./CY
   FOR 4000 PSI CONCRETE 611 LB./CY
11. MAXIMUM CONCRETE SLUMP:
   FOR MIXES WITH MRWR 7 IN
   FOR MIXES WITHOUT MRWR 4 IN
12. REINFORCING BARS AND ALL EMBEDDED ITEMS, INCLUDING ANCHOR BOLTS, MUST BE ACCURATELY PLACED AND ADEQUATELY SUPPORTED BEFORE CONCRETE IS PLACED. "WET-STICKING" OF ANCHOR BOLTS OR VERTICAL PIER REINFORCING IS NOT ACCEPTABLE

REINFORCING STEEL

1. ALL REINFORCING SHALL BE DEFORMED BARS CONFORMING TO ASTM A615 GRADE 60.

FOUNDATION

SCHEDULE OF SPECIAL INSPECTIONS

PROJECT: PORTSMOUTH MUSIC HALL ARCHWAY
LOCATION: PORTSMOUTH NH

STRUCTURAL ENGINEER OF RECORD (SER): JEFFREY S. NAWROCKI, PE

THIS STATEMENT OF SPECIAL INSPECTIONS IS SUBMITTED AS A CONDITION FOR PERMIT ISSUANCE IN ACCORDANCE WITH THE SPECIAL INSPECTION REQUIREMENTS OF THE 2009 INTERNATIONAL BUILDING CODE. IT INCLUDES A SCHEDULE OF SPECIAL INSPECTION SERVICES APPLICABLE TO THIS PROJECT AS WELL AS THE NAME OF SPECIAL INSPECTORS AND THE IDENTITY OF OTHER APPROVED AGENCIES INTENDED TO BE RETAINED FOR CONDUCTING THESE SERVICES.

THE SPECIAL INSPECTOR SHALL KEEP RECORDS OF ALL INSPECTIONS AND SHALL FURNISH INSPECTION REPORTS TO THE BUILDING OFFICIAL, STRUCTURAL ENGINEER AND ARCHITECT OF RECORD. DISCOVERED DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR.

A FINAL REPORT OF SPECIAL INSPECTIONS BY THE SPECIAL INSPECTOR(S) DOCUMENTING COMPLETION OF ALL REQUIRED SPECIAL INSPECTIONS AND CORRECTION OF ANY DISCREPANCIES NOTED IN THE INSPECTIONS SHALL BE SUBMITTED PRIOR TO ISSUANCE OF A CERTIFICATE OF USE AND OCCUPANCY.

THE SPECIAL INSPECTOR, WHO IS GENERALLY EMPLOYED BY THE PRIMARY TESTING AGENCY, MAY USE VARIOUS INSPECTORS WHO ARE FAMILIAR WITH EACH CATEGORY OF WORK. IF SPECIAL INSPECTIONS ARE ALSO PERFORMED BY AGENTS WHO ARE NOT EMPLOYED BY PRIMARY TESTING AGENCY, EACH OF THESE ADDITIONAL SPECIAL INSPECTORS SHALL ISSUE A FINAL REPORT FOR THEIR CATEGORY OF INSPECTION. ONLY AFTER THE FINAL REPORT(S) HAS(HAVE) BEEN ISSUED BY THE SPECIAL INSPECTOR(S) CAN THE ARCHITECT AND EOR ISSUE FINAL AFFIDAVITS FOR THE PROJECT COMPLETION.

JOB SITE SAFETY AND MEANS AND METHODS OF CONSTRUCTION ARE SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.

SCHEDULE OF SPECIAL INSPECTION SERVICES

THE FOLLOWING TABLES COMPRISE THE REQUIRED SCHEDULE OF SPECIAL INSPECTIONS FOR THIS PROJECT. THE CONSTRUCTION DIVISIONS WHICH REQUIRE SPECIAL INSPECTIONS FOR THIS PROJECT ARE AS FOLLOW:

SOILS AND FOUNDATIONS
CAST-IN-PLACE CONCRETE

INSPECTION AGENTS	FIRM	ADDRESS
1. SPECIAL INSPECTOR*	TBD	TBD
2. TESTING LABORATORY	TBD	TBD
3. STRUCTURAL ENGINEER	JSN ASSOCIATES, INC.	ONE AUTUMN STREET PORTSMOUTH, NH 03801 (603) 433-8639

NOTE: THE INSPECTION AND TESTING AGENT SHALL BE ENGAGED BY THE OWNER OR THE OWNER'S AGENT, AND NOT BY THE CONTRACTOR OR SUBCONTRACTOR WHOSE WORK IS TO BE INSPECTED OR TESTED. ANY CONFLICT OF INTEREST MUST BE DISCLOSED TO THE BUILDING OFFICIAL, PRIOR TO COMMENCING WORK.

* THE SPECIAL INSPECTOR IS GENERALLY AN EMPLOYEE OF THE TESTING AND GEOTECHNICAL COMPANY.

SEISMIC DESIGN CATEGORY: C
BASIC WIND SPEED: 110 MPH
WIND EXPOSURE CATEGORY: B

QUALIFICATIONS OF INSPECTORS AND TESTING TECHNICIANS

THE QUALIFICATIONS OF ALL PERSONNEL PERFORMING SPECIAL INSPECTION ACTIVITIES ARE SUBJECT TO THE APPROVAL OF THE BUILDING OFFICIAL. THE CREDENTIALS OF ALL INSPECTORS AND TESTING TECHNICIANS SHALL BE PROVIDED IF REQUESTED.

IT IS RECOMMENDED THAT THE PERSON ADMINISTERING THE SPECIAL INSPECTIONS PROGRAM BE A PROFESSIONAL ENGINEER EXPERIENCED IN THE DESIGN OF BUILDINGS.

SOILS AND FOUNDATIONS

ITEM	AGENT NO.	SCOPE
1. SHALLOW FOUNDATIONS	1	VERIFY THAT UNSUITABLE BEARING MATERIALS ARE REMOVED. VERIFY THE SOIL LOAD-BEARING CAPACITY COINCIDES WITH THAT IDENTIFIED IN THE CONSTRUCTION DOCUMENTS.
2. CONTROLLED STRUCTURAL FILL	1	INSPECT COMPACTED FILL OPERATIONS TO VERIFY THE FILL MATERIAL, LIFT HEIGHTS, AND LEVEL OF COMPACTION ARE IN CONFORMANCE WITH THE REQUIREMENTS OF CONSTRUCTION.

CAST-IN-PLACE CONCRETE

ITEM	AGENT NO.	SCOPE
1. MIX DESIGN	3	REVIEW FOR COMPLIANCE WITH CONSTRUCTION DOCUMENTS.
2. MATERIAL CERTIFICATION	3	REVIEW FOR COMPLIANCE WITH CONSTRUCTION DOCUMENTS.
3. REINFORCEMENT INSTALLATION	1	REVIEW THE INSTALLATION OF THE REINFORCING STEEL FOR COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS AND THE APPROVED SHOP DRAWINGS. REVIEW FOR 100% OF PIERS & PIER FOOTINGS.
4. CAST-IN-PLACE ANCHORS	1	VISUALLY INSPECT CAST-IN ANCHORS PRIOR TO CONCRETE PLACEMENT. VERIFY LOCATION OF ANCHORS IS IN ACCORDANCE WITH CONSTRUCTION DOCUMENTS, AND EDGE DISTANCE AND SPACING REQUIREMENTS ARE MET. VERIFY THE CORRECT ANCHOR SIZE, TYPE, AND EMBEDMENT IS USED.
5. FORMWORK GEOMETRY	1	REVIEW GEOMETRY FOR COMPLIANCE WITH THE STRUCTURAL CONSTRUCTION DOCUMENTS. CONDUCT REVIEW WHEN REINFORCING STEEL INSTALLATION IS BEING REVIEWED.
6. CONCRETE PLACEMENT	1	INSPECT THE PLACEMENT OF CONCRETE FOR CONFORMANCE WITH THE CONSTRUCTION DOCUMENTS. TEST SLUMP AND TEMPERATURE OF EACH BATCH. TEST AIR CONTENT WHEN COMPRESSIVE STRENGTH TEST SPECIMENS ARE MOLDED.
7. EVALUATION OF CONCRETE STRENGTH	1	OBTAIN ONE SET OF (4) STANDARD CYLINDERS FOR EACH COMPRESSIVE STRENGTH TEST. TEST ONE SPECIMEN AT 7-DAYS, (2) AT 28-DAYS, AND RETAIN ONE IN RESERVE FOR LATER TESTING IF REQUIRED. IN COLD WEATHER, TEST CYLINDERS SHALL BE FIELD CURED. ADDITIONAL CYLINDERS SHALL BE TAKEN AND LABORATORY CURED PER ACI REQUIREMENTS. TESTING FREQUENCY: (1) COMPRESSIVE STRENGTH TEST SHOULD BE PERFORMED FOR EACH DAY'S POUR EXCEEDING 5 CU. YDS. AND (1) ADD'L SET FOR EACH 50 CU. YDS. MORE THAN THE FIRST 25 CU. YDS.
8. CURING AND PLACEMENT	1	VERIFY THE CONCRETE IS ADEQUATELY PROTECTED UNDER HOT AND COLD WEATHER CONDITIONS AS INDICATED IN THE CONCRETE SPECIFICATIONS. VERIFY THAT SLABS ARE CURED IN ACCORDANCE WITH ACI RECOMMENDED STANDARD PROCEDURES.

STRUCTURAL STEEL

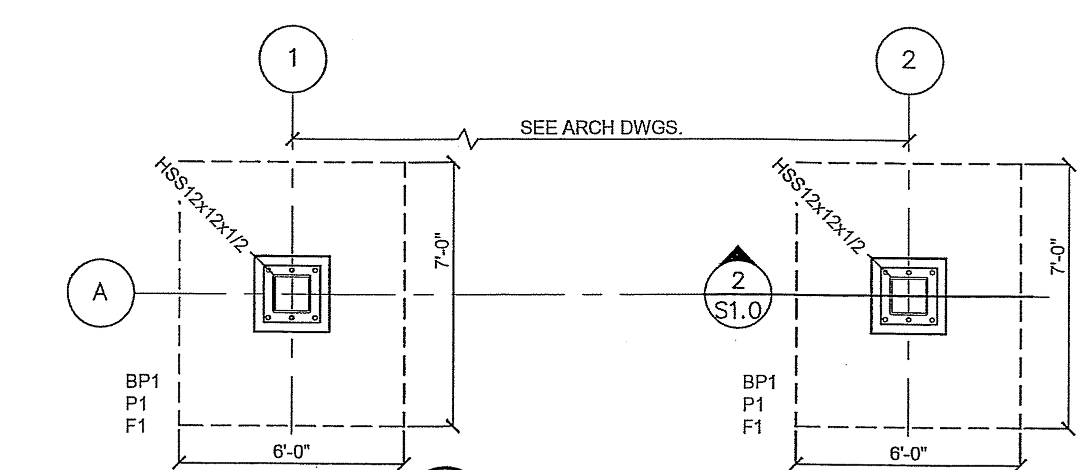
ITEM	AGENT NO.	SCOPE
1. WELDING	1	PERFORM VISUAL INSPECTION OF ALL WELDS IN ACCORDANCE WITH AWS D1.1. SUBMIT WELDER QUALIFICATION STATEMENTS. ADDITIONALLY, THE TESTING AGENCY (TO BE APPROVED BY JSN ASSOCIATES, INC.) MUST PERFORM A VISUAL INSPECTION OF ALL FIELD WELDS. MULTI PASS WELDS OR WELDS GREATER THAN 5/16" MUST BE SPOT TESTED AT A RATE OF ONE TEST PER MEMBER USING THE MAGNETIC PARTICLE METHOD. ONE HUNDRED PERCENT (100%) OF ALL FIELD AND SHOP FULL PENETRATION WELDS MUST BE TESTED USING THE ULTRASONIC METHOD.

FOOTING SCHEDULE

FTG.	SIZE	REINFORCING
F1	7'-0"x6'-0"x1'-4"	(7) #6 BARS E.W.
PROVIDE BARS EACH WAY, SPACED EVENLY, TIED IN MAT, AT 3" CLEAR FROM BOTTOM OF FOOTING (U.N.O.)		

LEGENDS

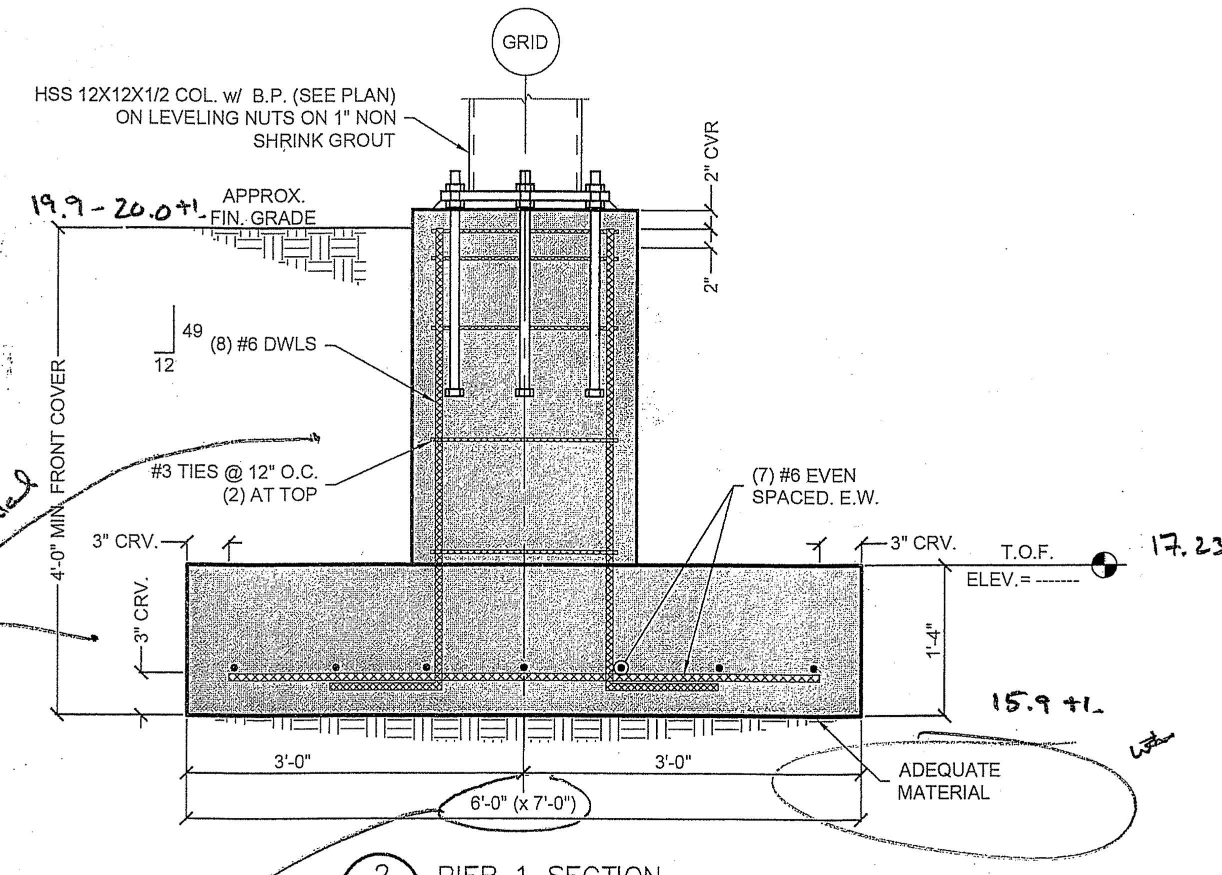
XX'X" = T.O.SLAB & APPROXIMATE EXTERIOR FINISH GRADE RELATIVE TO T.O.SLAB
BASE PLATE. TYPE → BPX
CONC. PIER TYPE → PX
FOOTING TYPE. REFER TO FOOTING SCHEDULE → FX



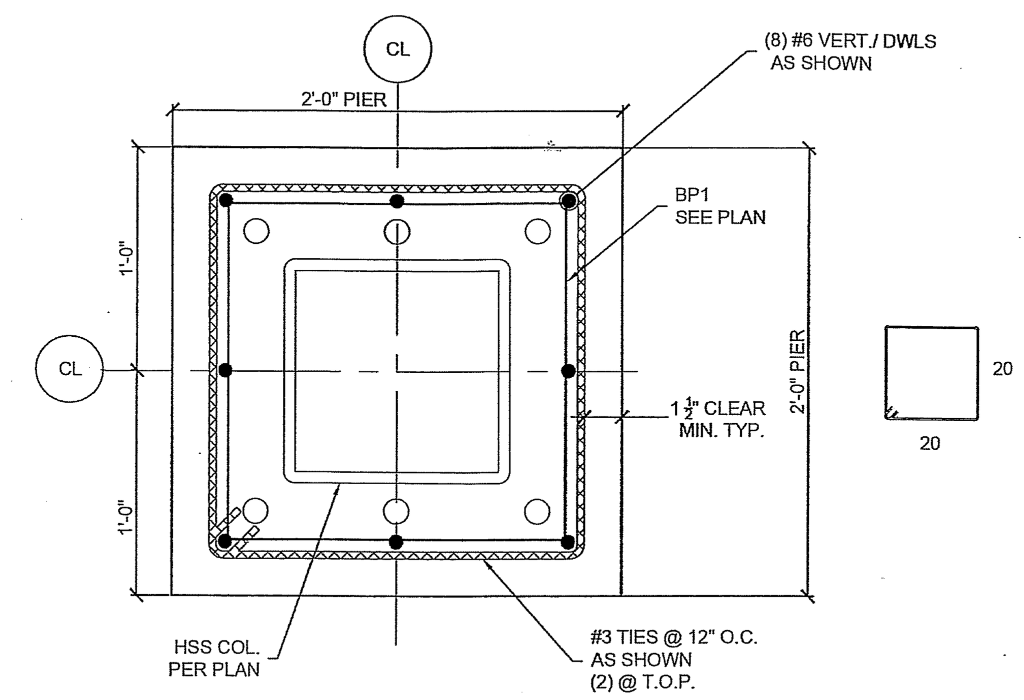
1 ARCHWAY PIER PLAN S1.0 Scale: 1/4" = 1'-0"

FOUNDATION NOTES:

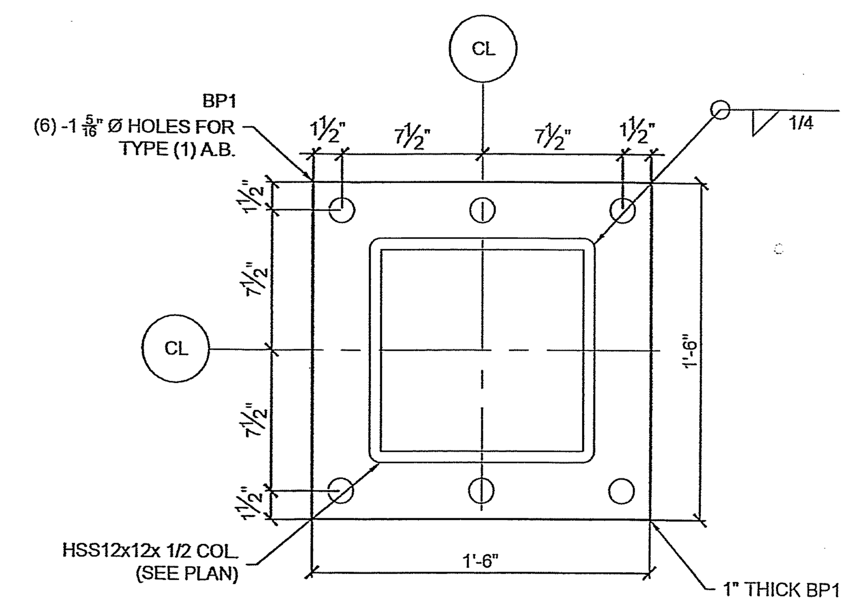
1. SEE SHEET S1.0 FOR ADDITIONAL STRUCTURAL NOTES AND SCHEDULE OF SPECIAL INSPECTIONS.
2. SEE S1.0 FOR FOUNDATION SECTIONS AND DETAILS.
3. BASE PLATES SHALL BE LEVELED WITH NUTS. PACK VOID BETWEEN BOT. OF BASE PLATE AND TOP OF PIER SOLID WITH NON-SHRINK GROUT.
4. MAINTAIN A MINIMUM OF 4'-0" FROST COVER FROM GRADE TO BOTTOM OF FOOTING AT ALL FOOTING LOCATIONS.
5. AFTER EXCAVATION CONTACT JSN FOR ANY MODIFICATIONS IF UTILITIES ARE ENCOUNTERED



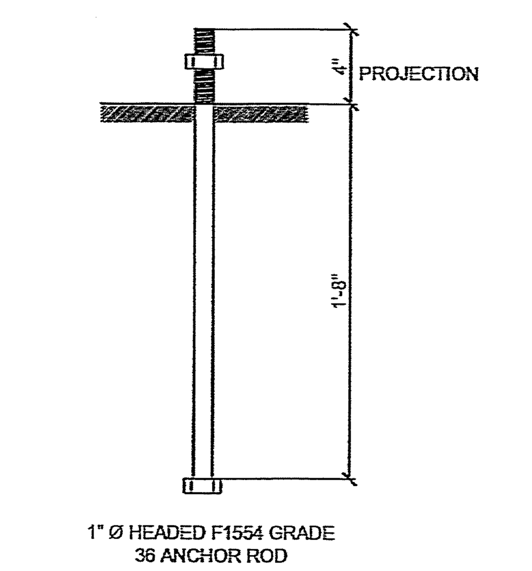
2 PIER 1 SECTION S1.0 Scale: 3/4" = 1'-0"



3 PIER 1 REINFORCING PLAN S1.0 Scale: 1-1/2" = 1'-0"



4 BASE PLATE -BP1 S1.0 Scale: 1-1/2" = 1'-0"



5 TYPE 1 ANCHOR BOLT DETAIL S1.0 Scale: 1-1/2" = 1'-0"

JSN Associates, Inc.
Consulting Structural Engineers
One Autumn Street
Portsmouth, NH 03801
Phone: (603) 433 - 8639
Fax: (603) 431 - 2811
www.jsneng.com

Client:
TERRA FIRMA Landscape Arch.
163a Court Street
Portsmouth, NH

MUSIC HALL ARCHWAY
Portsmouth, NH

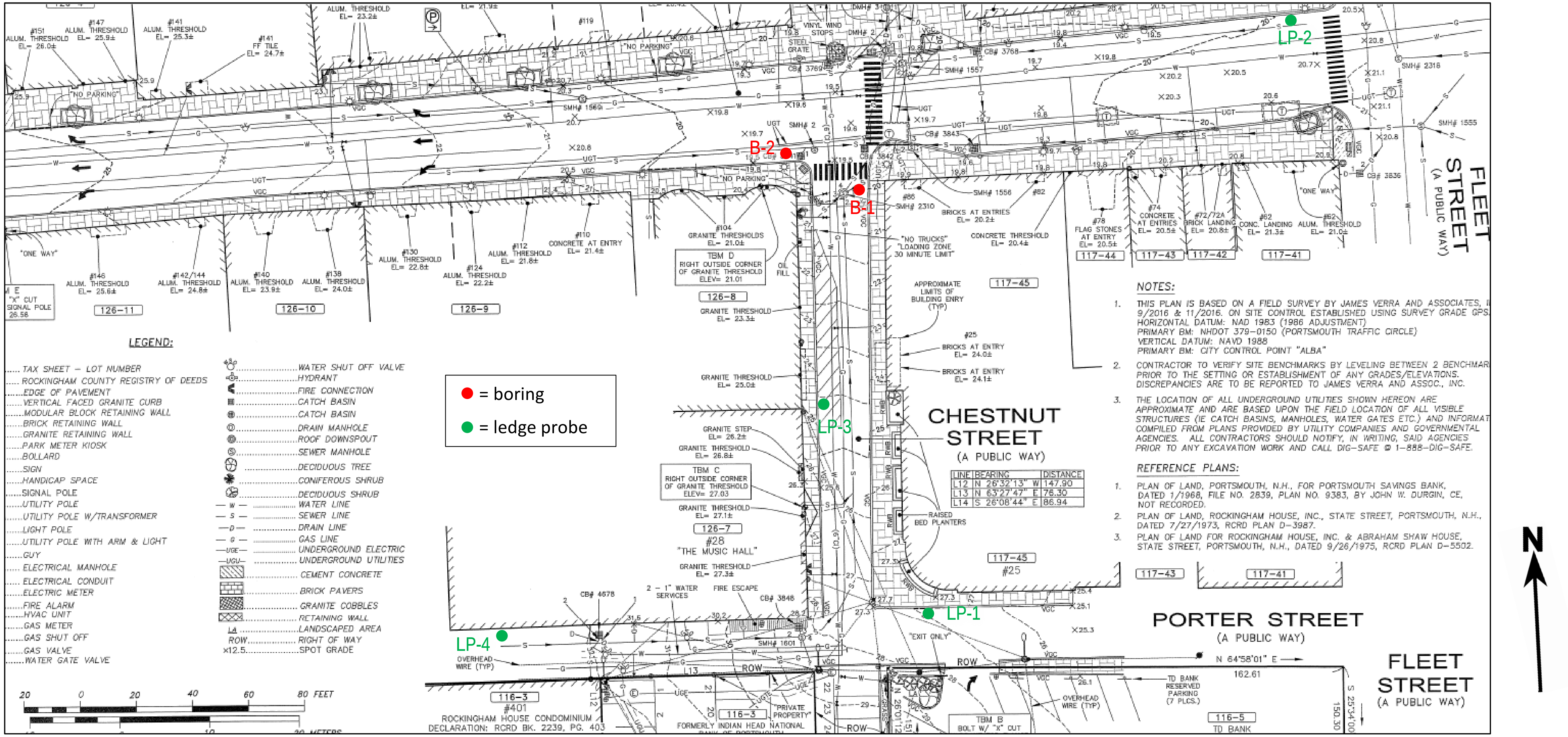
Date:	03/1/17
Scale:	As Noted
Design By:	EL
Approved By:	-

Revisions

GEN. NOTES-SPECAIL INSPECTION ARCHWAY FND. PLAN SECTIONS & DETAILS

S1.0

Project No: 170219



Notes:

1. Explorations were performed on March 22, 2017 under the direction of JTC.
2. Exploration locations should be considered approximate.
3. Refer to the Test Boring Logs and Summary of Auger Probes for the subsurface conditions encountered at each exploration location.
4. Basemap source: January 20, 2017 “Existing Conditions Plan” prepared by Altus Engineering, Inc.
5. Not to scale.

City of Portsmouth **1 Junkins Avenue** **Portsmouth, New Hampshire 03801**	**Congress and Chestnut Street Streetscape and Utilities Project** **Portsmouth, New Hampshire**
JTC John Turner Consulting	**EXPLORATION LOCATION PLAN**

Test Boring Logs, Key to Symbols and Descriptions, & Ledge Probe Summary

PROJECT: Congress and Chestnut Street Streetscape and Utilities Project **PROJECT NO.:** 17-15-011
CLIENT: City of Portsmouth
PROJECT LOCATION: Chestnut Street, Portsmouth NH
LOCATION: See Exploration Location Plan **ELEVATION:**
DRILLER: SoilEx **LOGGED BY:** RC
DRILLING METHOD: HSA **DATE:** 3/22/17
DEPTH TO - WATER> INITIAL: ▽ **AFTER 24 HOURS:** ▼

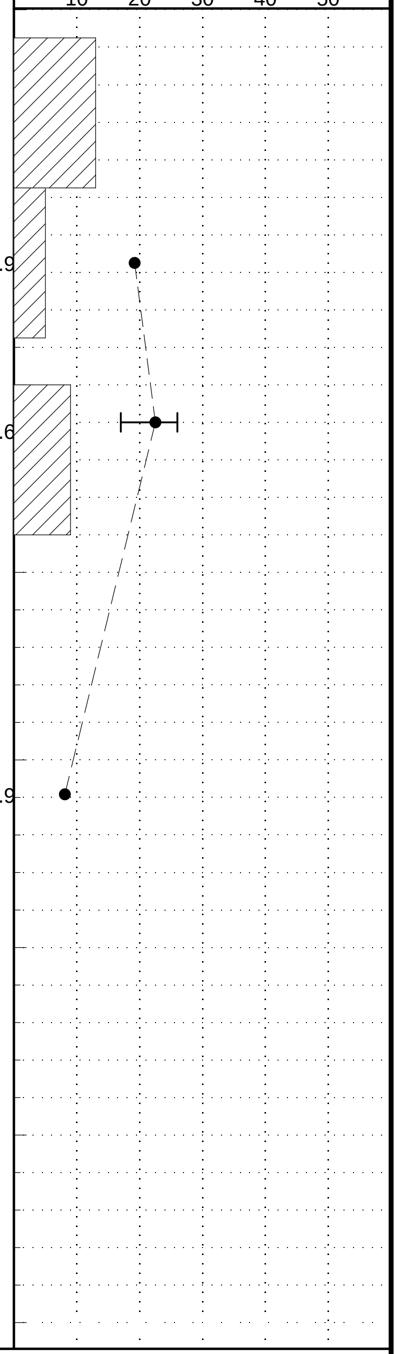
JTC John Turner Consulting

LOG OF BORING No. B-1

Depth (feet)	Description	Elevation (feet)	Sample No.	Blow Counts	% < #200
0 – 0.375	4.5" Asphalt				
0.375 – 1.375	Dark brown, silty sand (SM) - few gravel medium dense; moist: ROAD BASE		SS01	7 7 6 3	
1.375 – 5.5	Brown, silty sand (SM) - few gravel; medium dense; moist: FILL - Becomes loose		SS02	2 2 3 3	16.9
5.5 – 8.5	Olive brown, sandy lean clay (CL) - stiff; moist: MARINE CLAY Pen Su = 2,500 psf Torvane Su = 400 psf		SS03	4 3 6 10	78.6
8.5 – 11	Olive brown, silty sand w/ gravel (SM) - very dense; moist: GLACIAL TILL - Rock in tip		SS04	25 50/5" - -	28.9
11	Boring terminated at 11 ft. Auger refusal on probable bedrock				

TEST RESULTS

Plastic Limit ├──┤ Liquid Limit
Water Content - ●
Penetration - ▨



This information pertains only to this boring and should not be interpreted as being indicative of the site.

LOG OF BORING No. B-2

JOHN TURNER CONSULTING

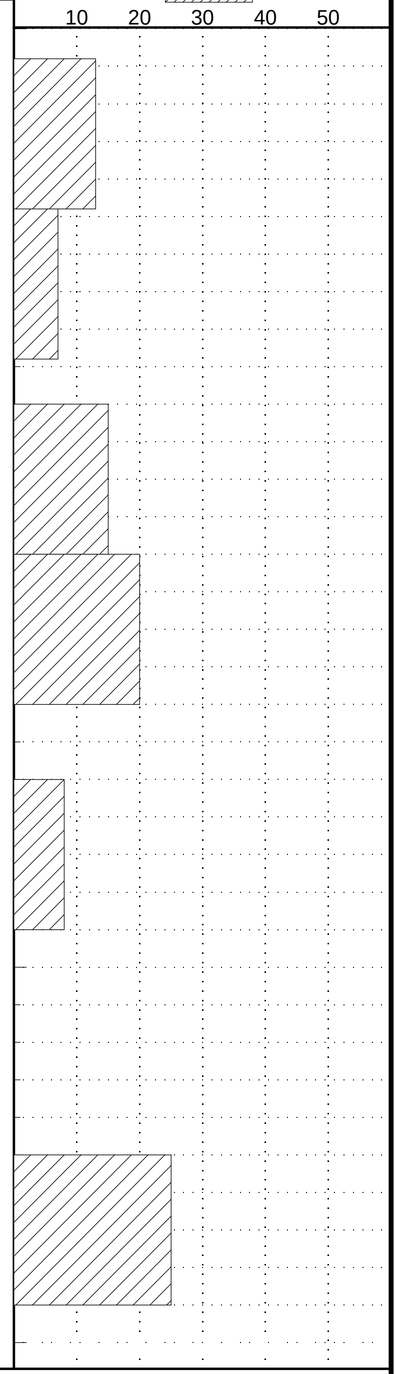
PROJECT: Congress and Chestnut Street Streetscape and Utilities Project **PROJECT NO.:** 17-15-011
CLIENT: City of Portsmouth
PROJECT LOCATION: Chestnut Street, Portsmouth NH
LOCATION: See Exploration Location Plan **ELEVATION:**
DRILLER: SoilEx **LOGGED BY:** RC
DRILLING METHOD: HSA **DATE:** 3/22/17
DEPTH TO - WATER> INITIAL: **AFTER 24 HOURS:**

Depth (feet)	Description	Graphic	Elevation (feet)	Sample No.	Blow Counts	% < #200
0	5" Asphalt					
0.4	Tan brown, silty sand (SM) - few gravel; medium dense; moist: ROAD BASE			SS01	7 7 6 3	
2.4	Brown, silty sand with gravel (SM) - loose; moist: FILL - Becomes wet (located near street drain)			SS02	5 4 3 2	
5	Olive brown, fine to medium sand (SM) - trace silt; medium dense; moist: MARINE SAND			SS03	5 8 7 8	
6	Olive brown, sandy lean clay (CL) - very stiff; moist: MARINE CLAY Pen Su = 3,000 psf Torvane Su = 400 psf			SS04	3 8 12 12	
	- Becomes medium stiff Pen Su = 1,500 psf Torvane Su = 400 psf			SS05	4 4 4 10	
13.5	Olive brown, silty sand w/ gravel (SM) - medium dense; moist: GLACIAL TILL			SS06	7 11 14 19	
	Auger refusal on probable bedrock Boring terminated at 17.25 ft.					

Depth scale: 0, 2.5, 5, 7.5, 10, 12.5, 15, 17.5

TEST RESULTS

Plastic Limit ├──┤ Liquid Limit
Water Content - ●
Penetration - ▨



This information pertains only to this boring and should not be interpreted as being indicative of the site.

MAJOR DIVISIONS			GROUP SYMBOLS	GENERAL DESCRIPTIONS
COARSE GRAINED SOILS (More than 50% RETAINED on No. 200 sieve)	GRAVELS (More than 50% of coarse fraction RETAINED on No. 4 sieve)	CLEAN GRAVELS (Less than 5% fines)	GW	Well graded gravels or gravel-sand mixtures; trace or no fines.
			GP	Poorly graded gravels or gravel-sand mixtures; trace or no fines.
		GRAVELS WITH FINES (More than 12% fines)	GM	Silty gravels or gravel-sand-silt mixtures.
			GC	Clayey gravels or gravel-sand-clay mixtures.
	SANDS (50% or more of coarse fraction PASSES the No. 4 sieve)	CLEAN SANDS (Less than 5% fines)	SW	Well graded sands or sand-gravel mixtures; trace or no fines.
			SP	Poorly graded sands or sand-gravel mixtures, trace or no fines.
		SANDS WITH FINES (More than 12% fines)	SM	Silty sands or sand-gravel-silt mixtures.
			SC	Clayey sands or sand-gravel-clay mixtures.
FINE GRAINED SOILS (50% or more PASSES the No. 200 sieve)	SILTS AND CLAYS (Liquid Limit LESS than 50)		ML	Inorganic silts or rock flour. Non-plastic or very slightly plastic. PI < 4 or plots below "A" line.
			CL	Inorganic lean clay. Low to medium plasticity. PI > 7 and plots on or above "A" line.
			OL	Organic silts, clays, and silty clays. Low to medium plasticity.
	SILTS AND CLAYS (Liquid Limit of 50 or GREATER)		MH	Inorganic elastic silt. PI plots below "A" line.
			CH	Inorganic fat clay. High plasticity. PI plots on or above "A" line.
			OH	Organic silts and clays. High plasticity.
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils. Decomposed vegetable tissue. Fibrous to amorphous texture.

<u>BOUNDARY CLASSIFICATIONS:</u> Soils possessing characteristics of two groups are designated by combinations of group symbols.

SILT OR CLAY	SAND			GRAVEL		Cobbles	Boulders
	Fine	Medium	Coarse	Fine	Coarse		

No.200 No.40 No.10 No.4 3/4" 3" 12"

U.S. STANDARD SIEVE SIZE

<u>References:</u> ASTM D 2487 (Unified Soil Classification System) and ASTM D 2488 (Visual-Manual Procedure).

TYPICAL SYMBOLS	
Shelby Tube	Auger Cuttings
Standard Split Spoon Sample	3" Split Spoon Sample
Rock Core	Dynamic Cone Penetrometer
Vane Shear	Bulk/Grab Sample
Geoprobe Sample	Sonic or Vibro-Core Sample
Water Table at time of drilling	Water Table after 24 hours

CORRELATION OF STANDARD PENETRATION TEST (SPT) WITH RELATIVE DENSITY AND CONSISTENCY

GRAVEL, SAND, & SILT (NON-PLASTIC)		SILT (PLASTIC) & CLAY		
N-Value	Relative Density	N-Value	Su (psf)	Consistency
0 - 4	Very Loose	0 - 2	0 - 250	Very Soft
4 - 10	Loose	2 - 4	250 - 500	Soft
10 - 30	Medium Dense	4 - 8	500 - 1000	Medium Stiff
30 - 50	Dense	8 - 15	1000 - 2000	Stiff
Over 50	Very Dense	15 - 30	2000 - 4000	Very Stiff
		Over 30	Over 4000	Hard

SPT Notes: WR = Weight of Rods; WH = Weight of Hammer

TERMS DESCRIBING SOILS (excludes particles > 3", organics, debris, etc.)		TERMS DESCRIBING MATERIALS (i.e. particles > 3", organics, debris, etc.)	
Trace:	Particles present, but < 5%	Occasional:	Particles present, but < 10%
Few:	5% to 15%	Frequent:	10% to 25%
Little:	15% to 25%	Many:	> 25%
Some:	25% to 50%		

TERMS DESCRIBING MOISTURE		TERMS DESCRIBING STRUCTURE	
Dry:	Absence of moisture; dusty	Layer:	> 3" thick
Moist:	Damp, but no visible water	Seam:	1/16" to 3" thick
Wet:	Visible/free water	Parting:	< 1/16" thick

KEY TO SYMBOLS AND DESCRIPTIONS

JTC
JOHN TURNER CONSULTING

Client: City of Portsmouth
Project: Congress and Chestnut Street Streetscape and Utilities Project

JTC Proj. No.: 17-15-011
Drill Date(s): 03/22/17
JTC Rep.: Rachel Cannon
Driller: SoilEx

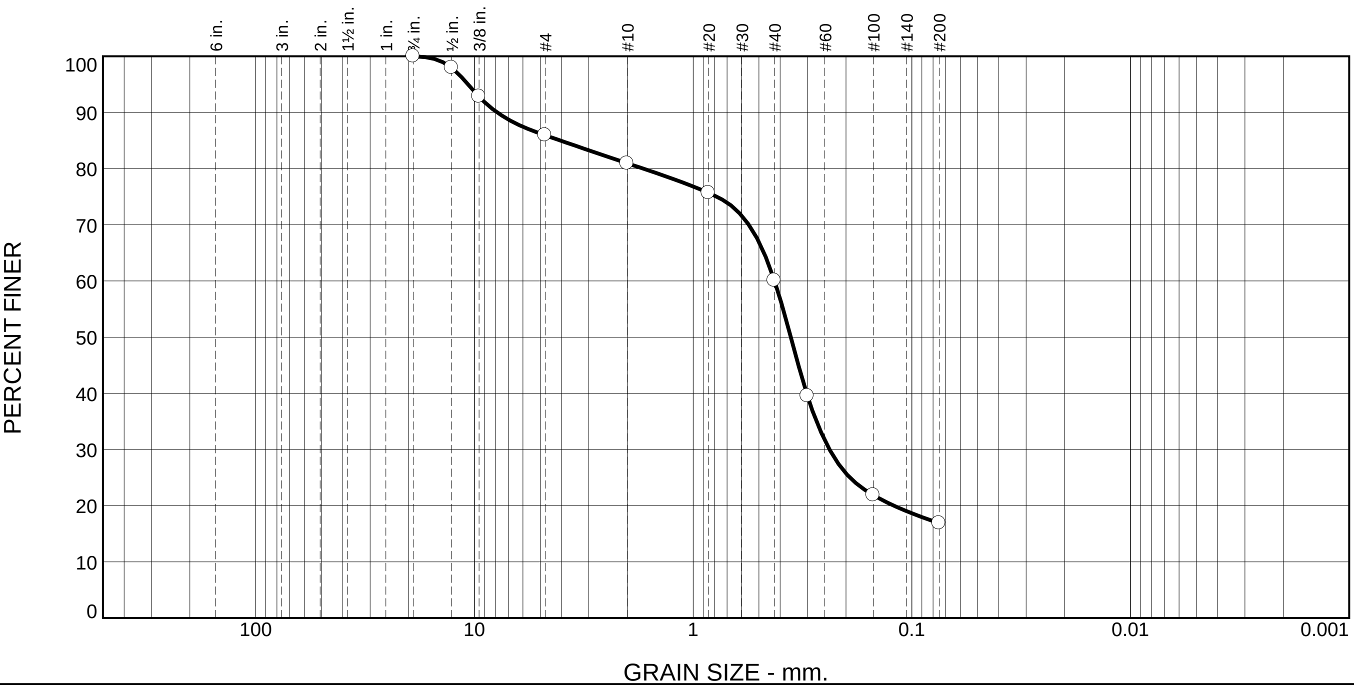
SUMMARY OF LEDGE PROBE FINDINGS							
Probe No.	**Asphalt Thickness (inches)**	**Road Base Thickness (inches)**	**Existing Fill Thickness (ft)**	**Depth to Ledge (ft bgs)**	**Depth to Water (ft bgs)**	**Location (street name)**	**Notes**
LP-1	4	approx. 6-12	1.0-2.0+	5.5	N/A	Porter	
LP-2	4	approx. 6-12	-	-	N/A	Congress	Encountered former concrete sewer main at 0.75ft bgs. Offset 18" to south; same results. Abndoned location per client request.
LP-3	5	approx. 12	-	2.0	N/A	Chestnut	Ecountered concrete at 1ft bgs. Offset to east (approx. 18 inches from curb); same results. Drill through concrete into ledge.
LP-4	3	approx. 6-12	1.0-2.0+	4.0	N/A	Porter	

Notes:

1 Stratum thicknesses are based on visual observations of cuttings and drilling difficulty and should be considered approximate.

Geotechnical Laboratory Testing Reports

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	14.1	5.0	20.8	43.2	16.9	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4	100.0		
1/2	97.9		
3/8	92.8		
#4	85.9		
#10	80.9		
#20	75.7		
#40	60.1		
#50	39.5		
#100	21.9		
#200	16.9		

* (no specification provided)

Material Description

Silty sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=**

Coefficients

D_{90}= 7.8719 D_{85}= 4.0488 D_{60}= 0.4244
D_{50}= 0.3578 D_{30}= 0.2379 D_{15}=
D_{10}= C_u= C_c=

Remarks

In-Situ Moisture: 19.2%

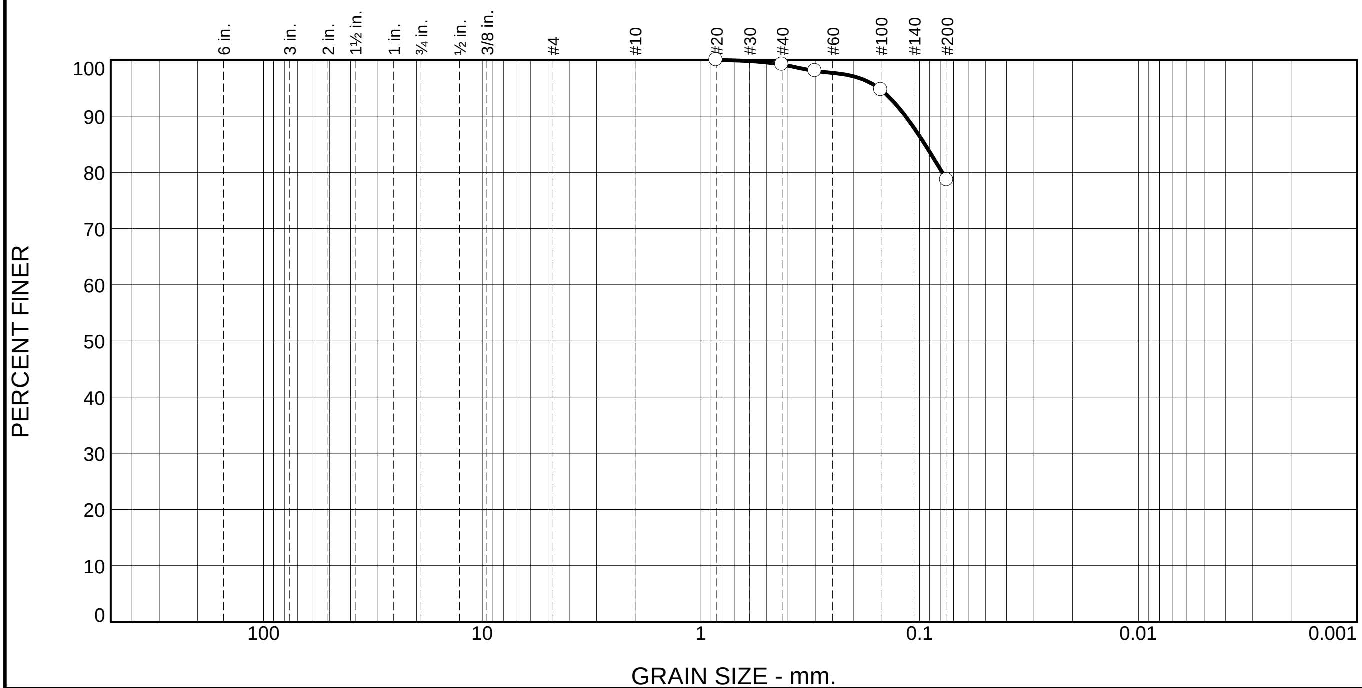
Date Received: 3-22-17 **Date Tested:** 3-24-17
Tested By: Ted Moody
Checked By: Travis Carpenter
Title: VP of Geotech Engineering

Location: B-1(S-2)
Sample Number: 17-155 **Depth:** 2-4'
Date Sampled: 3-22-17

Client: City of Portsmouth
Project: Congress and Chestnut Street Streetscape and Utilities Project

Project No: 17-15-011 **Figure** 001

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.8	20.6	78.6	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#20	100.0		
#40	99.2		
#50	98.1		
#100	94.7		
#200	78.6		

* (no specification provided)

Material Description

Sandy Lean clay

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= CL **AASHTO (M 145)=**

Coefficients

D_{90}= 0.1159 D_{85}= 0.0946 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

In-Situ Moisture: 22.5%

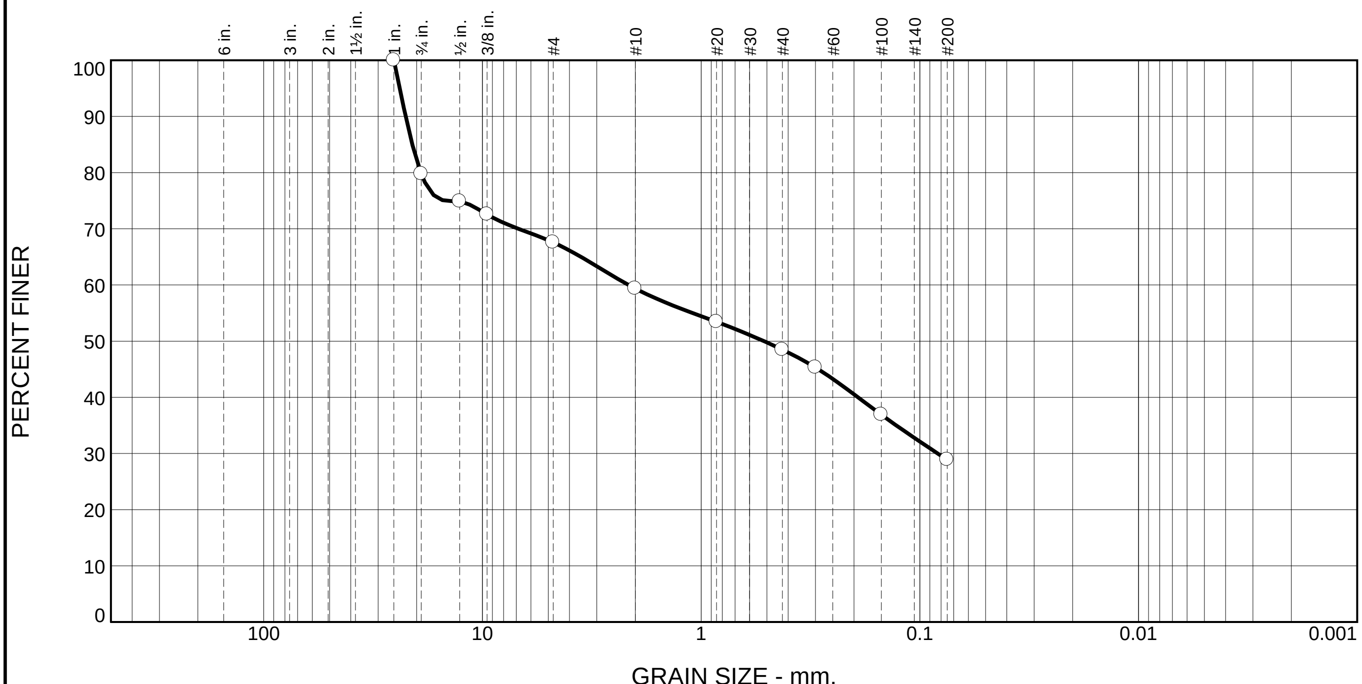
Date Received: 3-22-17 **Date Tested:** 3-24-17
Tested By: Jason Spry
Checked By: Travis Carpenter
Title: VP of Geotech Engineering

Location: B-1(S-3)
Sample Number: 17-156 **Depth:** 5'-7'
Date Sampled: 3-22-17

Client: City of Portsmouth
Project: Congress and Chestnut Street Streetscape and Utilities Project

Project No: 17-15-011 **Figure** 002

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	20.2	12.2	8.2	10.9	19.6	28.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1	100.0		
3/4	79.8		
1/2	74.9		
3/8	72.5		
#4	67.6		
#10	59.4		
#20	53.4		
#40	48.5		
#50	45.3		
#100	36.9		
#200	28.9		

* (no specification provided)

Material Description

Silty sand with gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=**

Coefficients

D_{90}= 22.4444 D_{85}= 20.9218 D_{60}= 2.1452
D_{50}= 0.5162 D_{30}= 0.0828 D_{15}=
D_{10}= C_u= C_c=

Remarks

In-Situ Moisture: 8.1%

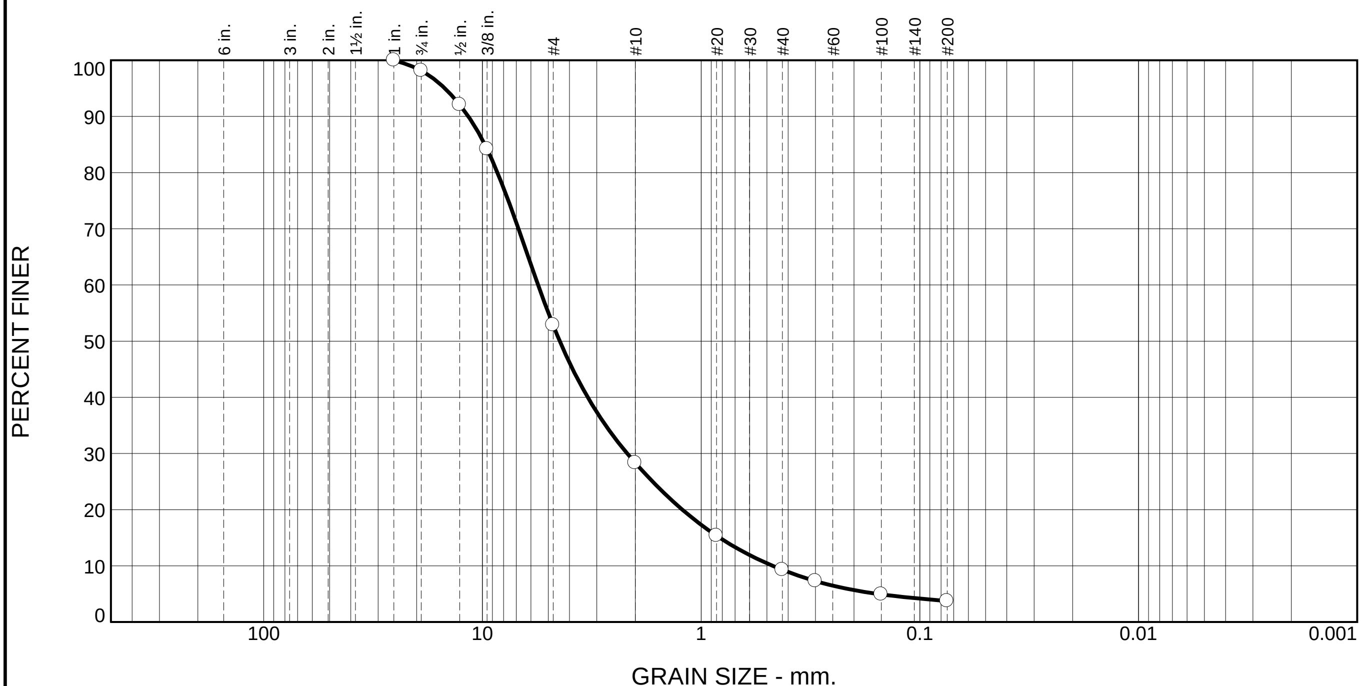
Date Received: 3-22-17 **Date Tested:** 3-24-17
Tested By: Jason Spry
Checked By: Travis Carpenter
Title: VP of Geotech Engineering

Location: B-1(S-4)
Sample Number: 17-157 **Depth:** 10'-12'
Date Sampled: 3-22-17

CONSULTING TESTING INSPECTION JTC inc. GEOTECHNICAL • CONSTRUCTION

Client: City of Portsmouth
Project: Congress and Chestnut Street Streetscape and Utilities Project
Project No: 17-15-011 **Figure** 003

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	1.9	45.3	24.5	19.0	5.5	3.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1	100.0		
3/4	98.1		
1/2	92.1		
3/8	84.2		
#4	52.8		
#10	28.3		
#20	15.4		
#40	9.3		
#50	7.3		
#100	4.9		
#200	3.8		

* (no specification provided)

Material Description

Well-graded gravel with sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GW **AASHTO (M 145)=**

Coefficients

D_{90}= 11.5954 D_{85}= 9.7470 D_{60}= 5.5635
D_{50}= 4.4307 D_{30}= 2.1772 D_{15}= 0.8226
D_{10}= 0.4698 C_u= 11.84 C_c= 1.81

Remarks

In-Situ Moisture: 3.3%

Date Received: 3-22-17 **Date Tested:** 3-27-17
Tested By: Jason Spry
Checked By: Travis Carpenter
Title: VP of Geotech Engineering

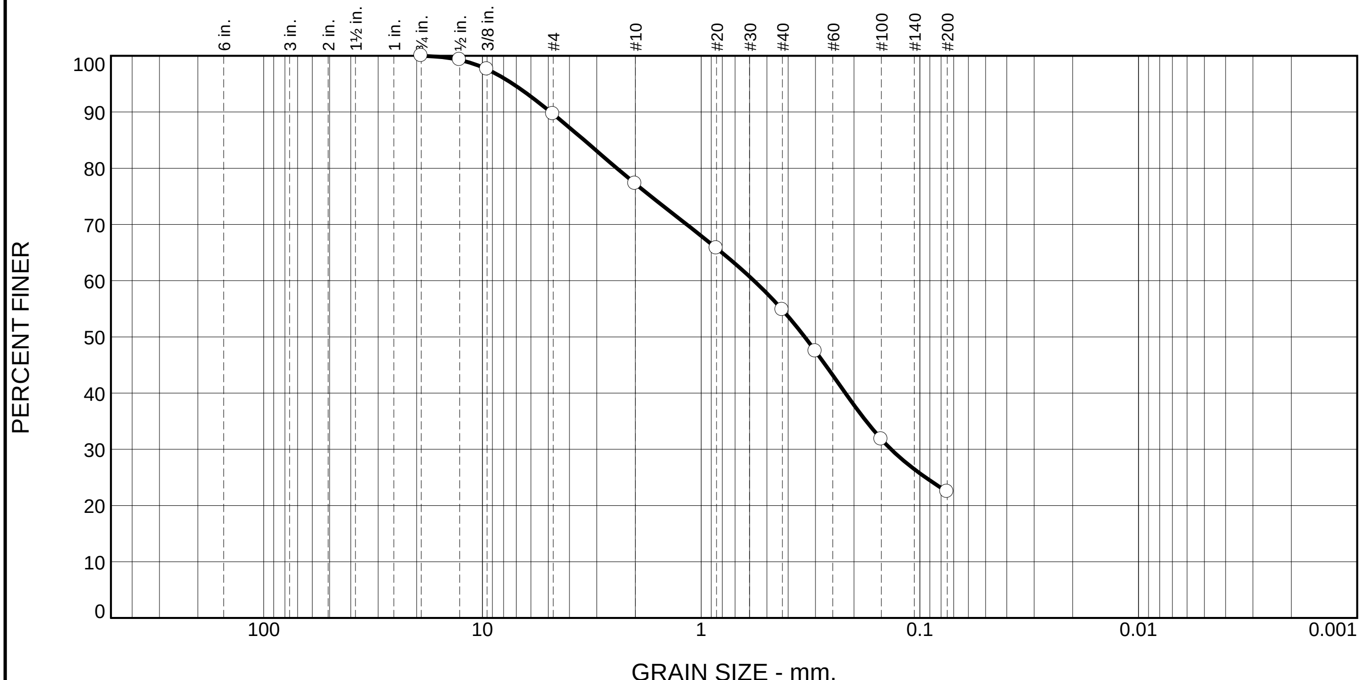
Location: LP-1 Asphalt **Date Sampled:** 3-22-17
Sample Number: 17-159 **Depth:** 0'

CONSULTING TESTING INSPECTION JTC inc. GEOTECHNICAL • CONSTRUCTION

Client: City of Portsmouth
Project: Congress and Chestnut Street Streetscape and Utilities Project

Project No: 17-15-011 **Figure** 004

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	10.4	12.3	22.5	32.3	22.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4	100.0		
1/2	99.3		
3/8	97.6		
#4	89.6		
#10	77.3		
#20	65.8		
#40	54.8		
#50	47.5		
#100	31.8		
#200	22.5		

* (no specification provided)

Material Description

Silty sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=**

Coefficients

D_{90}= 4.8742 D_{85}= 3.4271 D_{60}= 0.5735
D_{50}= 0.3361 D_{30}= 0.1353 D_{15}=
D_{10}= C_u= C_c=

Remarks

In-Situ Moisture: 10.0%

Date Received: 3-22-17 **Date Tested:** 3-27-17

Tested By: Ted Moody

Checked By: Travis Carpenter

Title: VP of Geotech Engineering

Location: LP-1 Road Base
Sample Number: 17-160 **Depth:** 0.5'

Date Sampled: 3-22-17

CONSULTING TESTING INSPECTION JTC inc. GEOTECHNICAL • CONSTRUCTION

Client: City of Portsmouth

Project: Congress and Chestnut Street Streetscape and Utilities Project

Project No: 17-15-011 **Figure** 005

Summary of Moisture Content Testing
ASTM D2216

Congress and Chestnut Street
Streetscape and Utilities Project
Portsmouth, NH

Boring No.	Sample Depth (ft bgs)	Moisture Content (%)
B-2(S-4)	7’-9’	22.8

Notes:

1. This table summarizes results of “stand-alone” moisture content testing performed on selected samples. Additional moisture content test results are provided on the associated Particle-Size Distribution Report, Summary of Atterberg Limits Testing Report, Summary of Organic Content Testing Report, and/or other geotechnical laboratory testing reports, as applicable.

Tested by: JY
Checked by: TC

Summary of Atterberg Limits Testing
ASTM D4318

Congress and Chestnut Street Streetscape and Utilities Project Portsmouth, NH

Boring No.	Sample Depth (ft bgs)	Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	USCS Classification
B-1(S-3)	5'-7'	22.5	26	17	9		CL

Tested by: JY
Checked by: TC

Site Photographs

SITE PHOTOGRAPHS

CONGRESS AND CHESTNUT STREET STREETSCAPE AND UTILITIES PROJECT – PORTSMOUTH, NEW HAMPSHIRE

Proposed location of arch, To Northeast

Proposed location of arch, To North

Multiple utility conflicts at Chestnut & Porter

Set up on LP-3, to North

Sample of FILL in B-2

Sample of native SAND in B-2