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DRAFT

PRELIMINARY GEOTECHNICAL INVESTIGATION REPORT

For

2740 – 2768 Webster Avenue Residential Development
2740 – 2768 Webster Avenue
Bronx, New York

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Prepared for:
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Table of Contents

DRAWING

APPENDICES

1.0 INTRODUCTION

SESI Consulting Engineers (SESI) previously completed a preliminary geotechnical investigation in conjunction with our Phase II Environmental Site Assessment investigation for the proposed mixed-use developments located at 2740 and 2768 Webster Avenue in the Bronx, New York (referred to herein as “the Site”). Our joint investigation was completed in accordance with our Professional Services Agreement dated May 8, 2024. The proposed construction consists of constructing two (2) mixed-use buildings: a 12-story building (Building A), and an 11-story building (Building B) with footprints of approximately 61,040 and 22,542 square feet (SF), respectively. This report summarizes SESI’s preliminary geotechnical investigation, our initial findings, our initial foundation design recommendations, and proposed supplemental investigations for the currently proposed development. This preliminary report also presents our initial recommendations regarding other construction-related aspects of the proposed development, such as site preparation, groundwater control, temporary excavation support, and utility support.

2.0 PROJECT DESCRIPTION

2.1 Site and Surrounding Conditions

According to the *A.L.T.A./N.S.P.S. Survey*, for 2740 and for 2768 Webster Avenue prepared by Empire State Land Surveyors, P.C., dated December 27, 2019, and March 5, 2021, respectively, the combined Site covers approximately ±1.94 acres. Building A, identified as 2768 Webster Avenue (Block 3273, Tax Lot 100), covers approximately ±1.41 acres, and Building B identified as 2740 Webster Avenue (Block 3273, Tax Lot 85) covers approximately ±0.53 acres of the total acreage.

The Site is bordered on the north and west by Webster Avenue and on the east and south by Metro North Railroad with Fordham University Campus beyond.

The Building A portion of the Site currently contains existing 1- and 2-story commercial buildings with frontage along Webster Avenue and with an open-air paved parking lot towards the rear of the lot. The Building B portion of the Site currently serves as an open-air paved commercial parking lot. A Metro North Railroad easement partitions the two (2) proposed building lots. The surface grades were between elevation (el.) ±55.0 and el. ±61.0 throughout the Site. A boundary and topographic survey should be performed to verify site elevations.

2.2 Proposed Development

According to preliminary discussions with the project team and the *Draft Project and Site Summary* provided to our office, the proposed development will consist of two (2) mixed-use buildings. Building A, identified as 2768 Webster Avenue, consists of a proposed footprint of approximately ±61,040 square feet with a partial below-grade level occupying approximately ±34,100 square feet of the total footprint. The below-grade level is proposed to provide parking/loading and some residential space, while the first floor is proposed to consist of parking/loading, commercial and residential spaces with floors 2 through 12 consisting of residential spaces.

Building B, identified as 2740 Webster Avenue, consists of a proposed footprint of approximately ±22,542 square feet, also having a partial below-grade level, which will occupy about ±5,000 square feet of the total developed footprint. The below-grade level is proposed to consist of residential space with the first floor proposed to consist of commercial and residential spaces. similar to Building A, floors 2 through 11 will consist of residential space.

We understand the proposed buildings will have entrances for parking/loading, residential, and commercial uses along Webster Avenue. We anticipate that the Site grades outside of the building will remain similar to existing grades, unless otherwise provided to us. For this Preliminary Geotechnical Report, we have assumed typical wall, column, and slab loads for the proposed construction. SESI should be provided with the latest site, architectural and structural plans prior to our supplemental geotechnical investigation to confirm that our investigation and initial recommendations remain valid.

3.0 AVAILABLE INFORMATION REVIEW

We obtained and reviewed available historic aerial photographs, and geologic maps for the Site as part of the preparation of this report. Our review of these resources is provided below:

- Historic Aerial Photographs – Historic aerial photographs indicate the existing conditions of the portion of the Site located at 2768 Webster Avenue has remained relatively unchanged, consisting of only minor differences. On the other hand, the existing portion of the Site at 2740 Webster Avenue has undergone some changes. The Building B portion of the Site appears to have buildings built prior to 1924 with some changes occurring between 1924 and 1951. Current site conditions appear to have been completed between 1951 and 1996 with minor changes occurring to the present day.
- Surficial Geological Map – A 1989 surficial geological map of New York, Lower Hudson Sheet prepared by the United States Geological Survey (USGS) identifies the Site soils as till, described to be between 3 and 164 feet thick and have a variable texture, usually poorly sorted material sizes, relatively impermeable (loamy matrix) and variable clast content.
- Bedrock Geologic Map – A 1992 historic bedrock and engineering geology map prepared by the United States Geological Survey (USGS), indicates the Site is within proximity of three (3) formations consisting of the Hartland formation to the east, Cameron's Line along the center and Inwood Marble to the west. The main formation along the Site is underlain by rock of the Inwood Marble formation, which consists of white, coarse-grained calcite dolomite marble interlayered with bands of silicates. The Inwood Marble varies in thickness from about 100 feet to nearly 1000 feet. Due to the proximity of Cameron's line to the site, Manhattan Schist consisting of gray, medium to coarse grained layered sillimanite-muscovite-biotite-kyanite schist may be encountered.

4.0 PRELIMINARY SUBSURFACE INVESTIGATION AND LABORATORY PROGRAM

4.1 Field Investigation by Others

A Geotechnical Investigation was performed by GTA Engineering Services of New York, P.C. between December 7th and 16th in 2022 at 2740 Webster Avenue. The twelve (12) borings were completed to depths between 27 and 100 feet below existing site grades.

The subsurface conditions encountered in these borings consisted of fill overlaying glacial soils underlain by residual soils and soft rock. The surface material and fill generally were observed to be between 6 and 13 feet thick, followed by glacial deposits, which extended up to 25 and 55 feet below grade. The residual soil and soft rock were encountered below the glacial material down to the boring termination depths.

In GTA's investigation, groundwater was encountered at approximately 20 to 24 feet below existing site grades.

Soil laboratory testing consisting of Gradation Testing was performed on six (6) samples and the results can be reviewed in GTA's Geotechnical Investigation Report presented in **Appendix C**.

4.2 SESI Field Investigation

Our engineering study consisted of a review of the investigation performed by others, the existing soils and geologic data, and a field investigation consisting of drilling thirty-two (32) environmental borings, B-1 through B-32, of which eight (8) of those borings served also as geotechnical borings that extended below the fill layer at the Site. The borings were drilled between June 10, 2024, and June 14, 2024. Borings B-17, B-18, B-31 and B-32 were performed within the proposed Building B footprint meanwhile all others were performed within the proposed Building A footprint.

The eight (8) geotechnical borings, B-19 through B-21, B-23, B-24, B-26, B-28 and B-30 were drilled to depths ranging between ±17 and ±27 feet below existing grade using a subcontracted Geoprobe drill rig utilizing hollow stem auger techniques. These borings were completed within the proposed Building A footprint.

Temporary groundwater wells (GW) were installed within completed borings B-2 and B-16 at completion of the borings. The approximate location of our borings is presented on the *Subsurface Investigation Location Plan*, attached as **Drawing No. 1**. Individual geotechnical boring logs, which describes the materials encountered along with a key to SESI soil terminology, are presented in **Appendix A**. For the purposes of this report, we have not included the environmental boring logs because all of the borings were advanced in uncontrolled fill.

Soil samples suitable for identification purposes were extracted from the SPT borings at near-continuous intervals in accordance with the Standard Penetration Test (ASTM D1586-11). For this test, a standard split-spoon sampler (2 inches outside diameter, one and three-eighths inches inside diameter) is driven into the soil by a 140-pound weight falling 30 inches. After discounting the initial six inches of penetration due to possible disturbance of the material resulting from the drilling operation, the number of blows required to advance the sampler 12 inches is recorded and designated as the standard penetration resistance or "N" value. The "N" value is an indication of the relative compactness of the soil in-situ. The soil samples were classified in the field by our engineer in general accordance with the Burmeister System and the NYCBC. The samples were transported to our office, where soil descriptions were confirmed by our office project personnel.

The field work was performed under the direct technical observation of a geotechnical engineer from SESI Consulting Engineers. Our representative located the explorations in the field, maintained continuous logs of the explorations as work proceeded, and coordinated the soil sampling operations to develop the desired subsurface information. The boring locations were laid out in the field using Google Earth Mapping software and an electronic device. Ground surface locations at each of the exploration locations were obtained from Google Earth. The actual boring locations may differ by several feet and should be confirmed by a survey, if required.

4.3 Geotechnical Laboratory Program

Soil samples suitable for identification purposes were extracted from the borings. The soil samples were brought to our soil mechanics laboratory for additional classification and appropriate geotechnical testing. The laboratory testing program consisted of one (1) mechanical grain size analysis and two (2) percent passing the sieve No. 200 tests. The results of the percent passing sieve No. 200 tests are presented on the individual boring logs. The result of the mechanical grain size analysis is presented on the individual boring log and in graphical form in **Appendix B**.

4.4 Subsurface Conditions

The investigation data indicates the subsurface conditions at the Site generally consist of uncontrolled fill, underlain by sandy soils with varying proportions of silt, clayey silt and gravel deposits; rock was not encountered to boring termination depth. The soils encountered in our borings generally agreed with the published geological records. The following generalized strata are listed in the order of increasing depth.

4.4.1 Uncontrolled/Controlled Fill (NYCBC Class 7)

Uncontrolled fill was encountered at grade and generally consisted of coarse to fine sand with varying proportions of gravel, silt, clay and miscellaneous debris such as brick, porcelain, plastic, millings, glass and concrete. The fill stratum ranged from 6 to 13 feet thick and was generally found to be in a loose to dense condition as evidenced by SPT N-values typically ranging between Weight of Hammer (WOH) and 2 to 95 blows/foot. The relatively higher SPT N-values are attributed to the presence of relatively larger debris in the fill. The fill is classified as NYCBC Class 7 material.

4.4.2 Sand (NYCBC Class 6, Class 3b, Class 3a)

A stratum generally consisting of coarse to fine sand with varying proportions of silt, clayey silt and gravel was encountered directly below the fill and extending to boring termination depths in all the borings, except in boring B-21, in which a layer of dense gravel was encountered below this stratum. The sand stratum was observed to be in a medium dense to very dense condition, as evidenced by SPT N-values ranging from 10 to 82 blows/foot. An isolated about 2- to 5-foot-thick layer of loose sand, as evidenced by SPT N-value ranging from 6 to 9 blows/foot, was observed within this stratum in borings B-19, and B-28 at approximately 15 feet below grade.

The medium dense to dense stratum is classified as NYCBC 3b and 3a material. The isolated layer of loose sand is classified as NYCBC Class 6 material. The dense gravel layer is classified as NYCBC Class 2a material.

4.4.3 Groundwater

Groundwater level was inferred based on the relative wetness of the soil samples. Groundwater was observed in the borings at an approximate depth between ±11.0 and ±15.0 feet below grade between el. ±40.0 and el. ±45.0. Fluctuations in the groundwater levels should be anticipated based on the time of year and amount of recent precipitation. The groundwater elevations may also be influenced by tidal fluctuations by the nearby Harlem River.

5.0 EVALUATION AND RECOMMENDATIONS

5.1 Introduction

The recommended site preparation and building support considerations discussed in this report are based primarily on the preliminary geotechnical investigation and geotechnical engineering considerations. Our preliminary geotechnical design considerations may require modifications to address environmental and/or legal considerations. This may include the handling and disposal of soils, pumping/treating of groundwater, etc. In addition, modifications to our preliminary recommendations will be required based on future data obtained from supplemental investigations, changes of building configurations, and discussions with Metro North Railroad.

There are several aspects of the Site conditions and the proposed development which should be considered during the design and construction of the proposed development. SESI understands that the proposed development will consist of a below-grade level within both the Building A and Building B portion of the Site. Typical construction usually sets the top of the below-grade level at approximately 10 feet below-grade. Based on the investigations, the native bearing layer for the Site exists at depths ranging from 6 to 13 feet below-grade. Considering the proposed cellars and foundations, the foundations in the cellar will likely bear at approximately 14 to 15 feet below grade, which would be at or below the existing groundwater table.

The proposed below-grade levels are proposed to occupy only a portion of the building footprints. In areas that are proposed to be constructed without a cellar, additional consideration will be required. The uncontrolled fills encountered throughout the Site are not suitable for support of the proposed building without improvement in-place or by-passing using deep foundations. The uncontrolled fills encountered on the Site will likely settle under the new building loads. The settlement would result in unacceptable total and differential settlement. Therefore, further improvement of the Class 7 material or removal and replacement of the uncontrolled fills would be required to allow for design and construction of conventional shallow foundation support over these portions of the proposed buildings. Our recommendations for removal and replacement of the uncontrolled fill are presented in Section 5.5 of this report. If the building footprints are to remain in their currently proposed configuration, bypassing or improving the uncontrolled fills will need to be considered during the design of the foundation support for the proposed building. Alternatively, if the proposed below-grade level is designed to occupy the entire footprint of the proposed buildings, removal and replacement of the uncontrolled fill can be avoided and the foundations would bear on the medium dense to dense sandy soils.

5.2 Shallow Foundations Support

The elevations for the top of the proposed cellar and first floor slabs have not been determined; however, based on similar projects, we anticipate the proposed top of cellar slab to be approximately 10 feet below grade between el. ±48.0 and el. ±50.0. We anticipate the new building foundations will bear approximately 4 to 5 feet below this level. Based on the investigations performed to date, the native soils below the uncontrolled fill consisted of medium dense to dense sandy soils at or below the foundation bearing elevation mentioned above. Importantly, groundwater was observed to be between ±11.0 and ±15.0 feet below grade or between el. ±40.0 and el. ±45.0, which will need to be considered relative to the proposed cellar floor slab elevation and installation of foundations. If dewatering of the Site or creating a watertight bathtub is not feasible or desired, we recommend bearing the foundations above the water table. Therefore, we anticipate shallow foundations bearing on these soils above the water table can be designed using a net allowable bearing pressure of 3 tons per square-foot (tsf). It should be noted that the bearing capacity for the soils will be based on the proposed foundation types and dimensions, bury depths, and water table. As such, SESI will need to revise the bearing capacity for the building once the final building configuration has been determined. We can work with your structural engineer during the building design phase to develop site-specific bearing capacities to size the proposed foundations.

If building column and wall layouts and load magnitudes necessitate the use of a continuous mat foundation, we preliminarily recommend a subgrade reaction modulus of 60 pounds-per-cubic-inch (pci) be used for initial mat thickness and reinforcement design. Once initial mat foundation layout is determined, we will need to perform an iterative settlement analysis in collaboration with the Project Structural Engineer to assist them with final mat foundation design and/or to confirm that the individual column footing settlements and differential settlements can be expected to remain within tolerable limits. The results of this analysis will need to be reviewed to determine the magnitude of mat foundation loading and settlement along the Site perimeter to confirm any induced settlements at the adjacent structures, such as the Metro North Railroad tracks, streets, sidewalks, and existing utilities will remain within tolerable limits. If the analysis results indicate significant localized overstressing of mat subgrade beyond the limiting values provided in the NYCBC, or significant mat foundation or neighboring structure settlements, we anticipate that drilled-in settlement-reducing elements can be utilized at strategic locations within the mat footprint to control mat foundation contact stresses and resulting settlements.

Foundation excavation should be performed using a backhoe bucket fitted with a smooth steel plate to minimize potential disturbance of the soil subgrade. Subgrades should be immediately sealed with a concrete sealer or with a 6- to 12-inch-thick layer of ¾ inch clean crushed stone; reinforcement and concrete placement for the footings should be performed as soon as possible after sealer placement.

Based on our recommendations to bear the foundations above the groundwater table, care should be taken so the soil subgrade can be maintained in a dry condition during excavation and preparation. The excavations should be properly sloped, and sufficient dewatering efforts should be used to prevent accumulation and ponding of rainwater and perched water to ensure excavation subgrade can be maintained in a dry and stable condition at all times. After excavating to the required subgrade level, the foundation subgrade should be proof-rolled with at least six (6) overlapping passes of a dual-drum walk-behind vibratory roller, such as a Wacker RT 82-SC-2 or equivalent. In borings B-19 and B-28, loose sandy soils classified as NYCBC Class 6 material was encountered at about el. ±44.0. Therefore, any loose and soft areas observed to be pumping or weaving should be adequately over-excavated and backfilled with controlled granular material compacted to at least 95% of the material's maximum dry density, as determined by a Modified Proctor Compaction Test (ASTM D1557).

Foundation excavation and subgrade preparation is subject to special inspection by a qualified geotechnical engineer per the NYCBC requirements. The contractor should be responsible for maintaining the subgrade in its "as approved" condition until the foundations are constructed and the surrounding area is backfilled, as necessary.

Resistance against lateral loads imposed on the foundations can be provided by shear resistance developed from the normal force at the base of the footings and the coefficient of static friction; an initial coefficient of static friction of 0.5 can be used for initial design of footings bearing on the natural sandy soils. Should additional lateral resistance be required, it can be provided by means of soil shear keys.

Uplift loads due to wind, seismic, and hydrostatic forces can be sustained using the dead weight of the footings or using double-corrosion-protected soil tie-down anchors. If required, we preliminarily anticipate that soil-socketed tie-down anchors can be designed to provide individual uplift capacity on the order of 35 to 50 kips per anchor. The anchor lengths will need to be designed based on actual soil conditions encountered in the individual building footprints and based on the anchor layout to ensure that adequate factor of safety against group uplift is available. If tie-down anchors are required, we can provide supplemental recommendations for tie-down anchor design.

5.3 Deep Foundation Support

Due to the close proximity of the proposed development to the Metro North Railroad and the potential for a partial cellar at each building, a drilled deep foundation alternative was evaluated in the event that this foundation type is warranted based on the final building configuration. Considering the fact that the deep foundation elements will need to be drilled from the existing grade, we anticipate a drilled-in hollow bar or steel casing micro-piles will be the most practical foundation support option to bypass the uncontrolled fill and support higher foundation loads.

This type of pile consists of hollow, threaded, high-strength steel bar or a drilled steel casing both fitted with a bit drilled into the ground. The bit diameter is sized to match the desired design pile diameter. While the bar or casing is advanced, high-strength cement grout is injected through the bar or casing and ejected laterally from apertures in the drill bit, permeating and mixing with the soil, and thereby improving the ground around the pile. The grout is circulated upward along the side of the bar or casing during pile installation. After reaching the design length, cement grout having the desired design compressive strength is pumped under pressure through the bar's or casing's tip. The high-strength bar or casing remains in place and is used as permanent pile reinforcement.

We anticipate a properly designed and constructed pressure-grouted 13.625-inch-diameter, 0.5-inch-thick, minimum 50 ksi micro-pile can provide individual net compression capacities on the order of about 125 tons per pile. The micro-pile will need to be filled with a minimum of 5,000 psi grout. We anticipate the preliminary pile lengths would be on the order of 50 to 60 feet below existing grade. We anticipate a pile as constructed above can provide an individual uplift capacity of 25 tons. Pile lateral capacities vary depending on the pile-top-to-pile-cap connection and should be further evaluated once a desired pile capacity has been established.

Note the uplift capacity indicated above is for a single pile, and group conditions will result in reduction in the pile uplift capacity. The uplift capacity can be maintained under group conditions by extending the piles deeper or by increasing pile spacing. Lateral pile capacities can be increased by increasing pile diameter and introducing a pile casing in the upper portion of the pile. Once pile layout is finalized, and definitive structural loading information is available, pile group analysis should be performed to finalize pile lengths, diameters, and reinforcement details. If deemed more cost effective, at a later date based on additional contractor interaction, we can provide supplemental recommendations for alternative pile types.

Pile Load Testing

Pile compression, uplift, and lateral capacities (in excess of 1 ton per pile) are subject to verification by means of full-scale static load tests. Static load tests should be performed in accordance with the requirements of the 2022 NYCBC. The test program should consist of installing index piles throughout the Site; select index piles should be chosen for static load testing based on observations during index pile installation. Index pile installation and load testing should be performed as soon as possible so that design modifications, if necessary, can be made prior to production pile installation.

5.4 Below-Grade Slab and Wall Construction

The below-grade walls should be assumed to be fixed against rotation and designed to sustain soil and surcharge loading. Considering the proposed development and seismic Site Class D, we anticipate the proposed building will be in Seismic Design Category B; for structures in Seismic Design Category B, the NYCBC does not require dynamic earth pressure to be considered in foundation wall design.

We recommend the perimeter foundation walls be designed to resist hydrostatic pressure from a groundwater level at el. ±45.0, which is the highest observed groundwater level in the borings. In addition, the foundation walls along the adjacent streets should be checked for a temporary water level near street grade in case a water main break was to occur along the streets. Surcharge loading along streets and the associated sidewalks should also be considered in foundation wall design. Below-grade walls should be designed to withstand lateral loading from adjacent building foundations, calculated as a surcharge, where the adjacent building foundations are located above a 1H:1V theoretical influence line extending upward from the bottoms of the new building foundation walls.

In areas where a cellar is anticipated (if the mat option is not needed), the cellar slab can be constructed over properly compacted/proof-rolled soil subgrade and designed as a slab-on-grade using a modulus of subgrade reaction of 175 pounds/inch^3. Depending on the final configuration, if the cellar slab is to be below the water table, a bathtub foundation or under-slab drainage system will be necessary.

In areas where a cellar is not present, we anticipate the first-floor slab (outside of the pavement area) can be constructed over properly compacted/proof-rolled soil subgrade and designed as a slab-on-grade using a modulus of subgrade reaction of 175 pci.

If the proposed top of cellar slab is proposed below the static groundwater level, the cellar slab should be designed as a pile-supported structural slab and should be fully waterproofed. The cellar slab should be designed to withstand the design hydrostatic pressure. In addition, all below-grade walls should be fully waterproofed, and water-stops should be placed at all below-grade joints. Drainage panels should also be placed behind all below grade walls extending from the sidewalk level down to el. ±45.0 or lower to facilitate foundation wall drainage. SESI will need to further evaluate the Site based on the final configuration and future required investigation to provide sufficient recommendations as it relates to waterproofing, dewatering, and building structural considerations.

5.5 Site Preparation Procedures

The Site preparation procedures will differ slightly depending on which of the above options is selected to support the proposed buildings; however, Site preparation should begin by removing old building foundations (if present), paved areas, topsoil, and vegetation, from within and at least ten (10) feet beyond the limits of the proposed buildings and pavement areas. The former building foundations, if encountered, should be excavated, and staged on-site until proper environmental evaluation and disposal can be arranged. As an alternative, concrete encountered on-site can be crushed and reused on-site as fill, only if approved by SESI for both environmental and geotechnical purposes.

All subsurface utilities that will be abandoned should be completely removed from within the limits of the proposed buildings and paved areas of the site or filled solid. Any excavations created by the removal of utilities or old foundations should be backfilled with controlled compacted structural fill. The controlled compact structural fill should be placed in accordance with the recommendations of this report under the observation of a geotechnical engineer. All clearing activities should be performed in accordance with any approved soil erosion and sediment control plans prepared for the project. All Site preparation work should be performed in accordance with any environmental regulations and requirements established for the Site, as well as all Local, State, and Federal regulations. If the Site is entered into the NYSDEC Brownfield Cleanup Program, then additional environmental restrictions and procedures will need to be considered for handling soils, demolitions materials, dewatering, etc.

The remediation of the uncontrolled fill would allow for the proposed building to be constructed on conventional shallow spread footings. This alternative would require removing and replacing the uncontrolled fill which extends up to ±13 feet below existing surface grades.The uncontrolled fill removal may encounter the static groundwater table and will need to be controlled during excavation. Control of groundwater may be controlled using gravel filled sumps. The exposed subgrade would then be heavily proof rolled with large vibratory roller (minimum 10-ton static drum weight) making a minimum of four (4) complete coverages of the proposed building area prior to placing fill back to reach the proposed subgrades. The proofrolling should be completed under the observation of a qualified geotechnical engineer. If saturated subgrades are encountered at the bottom of the fill, SESI recommends that the first ±18 inches of backfill consist of 3-to-6-inch diameter open graded crushed stone prior to proofrolling. Any soft areas disclosed during the proofrolling should be re-excavated to stable material and backfilled with suitable structural fill in compacted lifts in accordance with Section 7.1.3 of this report. The re-excavation should extend 6-inches horizontally for every 12-inches of vertical over-excavation.

6.0 OTHER DESIGN CRITERIA

6.1 Seismic Design

We have reviewed the NYCBC seismic design requirements with respect to the currently proposed development scheme and available boring data. Our preliminary review indicates the NYCBC would allow the use of the following preliminary seismic design parameters for building design:

Seismic Design	
2022 NYCBC Seismic Design Parameters	**Value**
Structural Occupancy/Risk Category	II/III
Seismic Site Class	Site Class D
Mapped Maximum Considered Earthquake Spectral Response Accelerations	S_s = 0.296 g (short periods) S_1 = 0.061 g (1-second period)
Site Coefficients as a function of Site Class and Mapped Spectral Response Acceleration	F_a = 1.57 (short periods) F_v = 2.40 (1-second period)

We analyzed liquefaction potential of the on-site soils beneath the assumed proposed lowest slab level first using NYCBC liquefaction chart and then using a more sophisticated method based on comparison of the Cyclic Stress Ratio (CSR, driving force causing liquefaction) to the Cyclic Resistance Ratio (CRR, force resisting liquefaction). NYCBC-specified earthquake magnitude (M = 5.75) and maximum considered earthquake geometric mean peak ground acceleration adjusted for site class effects (PGA_M = 0.26g) were used for the analysis, and soil gradation (including percent fines) was also considered. Based on these analyses, we anticipate liquefaction of the on-site soils is unlikely.

6.2 Settlements

Once the column and wall layouts for the proposed buildings are finalized, and column and wall loading schedules are available, a settlement analysis should be performed by SESI to confirm the estimated total and differential foundation settlements will be within tolerable limits.

7.0 ADDITIONAL CONSTRUCTION RECOMMENDATIONS

7.1 Earthwork

7.1.1 Re-Use of Existing On-site Soils

Suitable excavated on-site granular material free of trash, debris, organics, and compressible soils can be used as on-site backfill around footings and pit walls. Alternatively, suitable imported granular backfill material meeting the NYCBC requirements for controlled fill can be used for backfilling; all imported fill should meet the Project environmental requirements for clean fill. The backfill material should be placed in loose lifts not exceeding 10 inches in thickness and compacted; in areas where fill is required for structural support, the fill should be compacted to at least 92% (with an average of greater than 95 percent) of the material's maximum dry density, as determined by Modified Proctor Compaction Testing performed in accordance with ASTM D1557. Prior to backfilling, the existing subgrade should be proof-rolled with a minimum of six (6) overlapping passes of an approved dual-drum vibratory roller compactor. Any soft areas identified during proof-rolling should be excavated to a satisfactory depth and replaced with approved compacted granular fill.

7.1.2 Imported Fill

Imported fill should have a maximum particle size of 3 inches and the maximum amount of "fines" (percentage passing a No. 200 mesh sieve) should be 15% to help facilitate construction during wet weather. The "fines" should be non-plastic. The use of any imported fill containing a higher percentage of fines should be evaluated by SESI during construction. Imported fill should be free of organic, frozen, and other deleterious materials. It should be verified to be free of chemical constituents and approved by SESI prior to import.

Grain size distribution and Modified Proctor density tests (ASTM D1557) should be performed on representative samples of the imported fill. The contractor should provide a sample of the imported fill material, along with any laboratory testing results, and should obtain approval from the geotechnical and environmental engineers prior to moving material on-site.

7.1.3 Structural Fill Placement

All structural fill should be properly compacted in loose lifts not exceeding 12 inches in thickness. The lifts should be compacted to at least 92 percent with an average of greater than 95 percent of the Modified Proctor density or as specified by the specialty contractor. In-place field density tests should be performed to determine the adequacy of the compacted fill.

Backfill in confined areas, such as utility trenches, and foundations within load bearing or paved areas should be placed in maximum 6-inch-thick layers and compacted to a minimum of 92 percent with an average of 95 percent density as described above.

Areas which will not have any foundations or other structural loads, may be compacted to a minimum of 90 percent of the maximum Modified Proctor density.

Care should be taken to prevent disturbance and/or softening of structural subgrade areas prior to finished construction. At a minimum, all subgrade areas should be temporarily sealed and graded by rolling with a smooth-drum roller at the end of each working day, as necessary, to maximize surface water runoff and minimize potential ponding and infiltration. Construction vehicles should not be permitted to drive over previously prepared subgrades. If required, construction haul roads should be constructed to support construction traffic across prepared structural subgrade areas. SESI recommends that a typical construction haul road consist of a minimum of 12-inches of DGA or similar free draining aggregate material. A thicker section may be required depending on the time of year the construction road is constructed and the existing subgrade conditions. Construction haul roads should be evaluated by a qualified geotechnical engineer.

7.2 Excavation and Dewatering

Prior to commencing excavation and other on-site activities, the locations of adjacent utilities, ancillary sidewalk structures/furniture, and street trees should be confirmed by the contractor and conflicts properly resolved. Any conflicting utilities and structures should be properly relocated with approval from pertinent utility companies and City agencies. Trees should also be removed or relocated as necessary with approval from the Parks Department. Any basement extensions, stairwells, and access hatches located along the sidewalks and associated with former on-site buildings should be properly backfilled.

We anticipate the Site will need to be excavated to approximately 15 feet below the existing Site grade to facilitate basement excavation. In addition, we anticipate isolated about 4-to-5-foot-deep excavations will be required below the first floor and cellar slab levels at foundation cap and pit locations. We anticipate that excavation above el. ±45.0 can be accomplished with minimal dewatering effort beyond that typically required for rainwater and perched water pumping and discharge.

We anticipate a significant dewatering system will be required to facilitate excavation and foundation construction in dry conditions below approximately el. ±45.0. SESI will provide recommendations in supplemental reports for dewatering based on the final configuration of the proposed buildings.

7.3 Excavation Support

As previously discussed, we anticipate the Site will need to be excavated up to 15 feet below the existing Site grade to facilitate basement excavation. We anticipate the support of excavation system for the Site can consist of a combination of different types of support of excavation systems. The choice of appropriate types of support of excavation systems should be made by the excavation contractor based on several factors, including depth of excavation relative to depth of static groundwater level, proximity of vibration- or settlement-sensitive adjacent structures and utilities, general space constraints, and potential presence of subsurface obstructions. Considering the presence of adjacent structures (e.g., Metro North Railroad tracks, utilities and nearby roadways), we recommend that drilled support of excavation systems be utilized. The use of driven support of excavation elements, such as driven soldier beams or sheet piles, should be avoided as far as possible and otherwise limited to areas of the site that are a sufficient distance away from adjacent vibration- or settlement-sensitive structures such as the Metro North Railroad and utilities. If the use of such elements cannot be avoided in certain areas, the contractor should utilize suitable low-vibration-producing installation means and methods, like resonant frequency hammers and pushed-in piling system.

Relatively shallower excavations or upper portions of tiered excavations that do not extend below the groundwater level can be supported using a conventional soldier beam and lagging system.

For excavation support below the groundwater level, if required, we recommend that a continuous closed sheeting/cut-off system be utilized around the excavation perimeter to facilitate excavation below the groundwater level and to minimize the magnitude of required dewatering, the dewatering effluent quantity to be disposed of off-site and off-site impacts of the dewatering operations on adjacent structures. Further consideration would need to be made to the effect of mass dewatering on adjacent structures.

Other cut-off systems such as drilled soil-cement-mix barrier with supplemental soldier beam support or a secant pile wall system can be utilized. The excavation support system should be extended sufficiently below the bottom of excavation level to create an effective groundwater cut-off. Groundwater levels within and outside the Site should be carefully monitored during excavation and foundation construction to confirm excessive groundwater lowering is not being caused below the adjacent properties due to on-site activities. If such groundwater lowering is observed, suitable modifications to the dewatering means and methods should be made to avoid adverse impacts to the adjacent properties, structures, and utilities.

The excavation support systems should be designed with sufficiently rigid lateral bracing to resist the surcharge loads, soil loads, and hydrostatic pressure without undergoing excessive deformations that can cause adverse impact to the neighboring / bordering structures, streets, and utilities. Information regarding street and sidewalk utilities should be reviewed, verified, and incorporated in the excavation support system design, so that active utilities can be avoided during construction. Internal bracing systems (such as diagonal braces, cross braces, and rakers and heel blocks) should be utilized whenever possible. Tie-back anchors should be utilized and located with caution to ensure adjacent structures and utilities are not adversely impacted. The excavation support systems should be properly installed with excavation performed in front of these systems so as not to cause soil deformation or loss of ground from underneath the neighboring/bordering sidewalks, streets, and utilities.

We anticipate localized interior excavations for footings, pile caps and/or pits can be properly sloped in most areas to avoid excavation support. Such temporary excavation slopes should not be steeper than 1.5H:1V. If space constraints or adjacent structures prevent sloping of excavations, we anticipate that relatively shallower interior excavations can be supported using properly designed and constructed timber sheeting, and relatively deeper interior excavations can be supported by installing cantilevered timber or steel soldier piles and timber lagging around the excavation perimeters

All excavation support should be designed by the Excavation Contractor's Professional Engineer licensed in the State of New York. The NYCBC requires that site-specific plans and details be prepared for temporary excavation support systems. After the on-site structures are demolished, test pits should be performed at strategic locations to confirm the adjacent building foundation depths and conditions, so this information can be utilized by the support of excavation system designer. Signed and sealed support of excavation design drawings should be submitted to Ownership for review and to the NYCDOB for filing and approval. NYCBC requires that an independent NYCDOB-approved Special Inspection Agency, directly engaged by Ownership, perform special inspection of the excavation support systems.

7.4 Protection of Adjacent Structures

All excavation, excavation support construction, and foundation construction work should be performed carefully so as not to adversely impact or cause loss of support to the neighboring structures, sidewalks, streets, and utilities. We recommend performing a pre-construction existing conditions documentation to establish existing conditions of the neighboring structures prior to start of construction activities at the Site. As a minimum, the pre-construction conditions documentation should consist of a photographic documentation of exposed and accessible portions of the neighboring building exteriors and any associated yard areas, and streets and sidewalks within at least 50 feet of the Site; we recommend the neighboring building interiors also be documented within at least 25 feet of the Site. Ambient vibration levels at the Site and at the neighboring structures should be measured as part of the documentation work. If the respective property owners grant permission during the documentation work, crack-monitoring gauges should be established for future monitoring at select pre-existing cracks observed at the neighboring structures. In addition, a Professional Land Surveyor licensed in the State of New York should establish elevation and lateral position control points at select locations along the adjacent structures and utilities.

The neighboring structures and utilities should be monitored periodically during the on-site excavation and foundation construction activities using the crack-monitoring gauges and elevation and lateral position control points. The purpose of the monitoring is so the Contractor(s) performing the work can determine if the neighboring structures/utilities are at risk of being adversely impacted by their work, and so the Contractor(s) can make any necessary modifications to their means and methods to avoid such adverse impacts. Vibration levels at the neighboring structures and utilities should also be continuously monitored during nearby on-site activities using seismograph vibration monitors placed at strategic locations within/along these structures/utilities.

At this time, we preliminarily recommend a limiting resultant peak particle velocity of vibration level of 1.0 inch/second be established for the buildings neighboring the Site. This is a tentative value and field conditions may require adjustments to a lower threshold level, if necessary. Limiting vibration threshold level at the Metro North Railroad limits is 0.5 inch/second. Limiting vibration levels at nearby utilities should be determined after discussions with the utility owners. We recommend a preliminary vertical and lateral movement threshold level of 0.25 inch at the neighboring structures based on our typical NYC and Metro North Railroad experience; however, this movement threshold level should be confirmed by a Structural Engineer after observation of the adjacent structures. Movement thresholds for the adjacent utilities and associated structures should be confirmed with the respective utility owners. Neighboring structure monitoring should be performed per the applicable NYCDOB and Metro North Railroad requirements.

7.5 Utility Lines

The Site soils approved for reuse will provide suitable support for the proposed utility lines. Cobbles greater than 4 inches in diameter should be removed from the utility line subgrade or a minimum 4-inch-thick sand layer placed beneath the utility lines. If utility lines fall within soft soils, the excavation should be extended an additional 12 inches and replaced with ¾-inch clean crushed stone or clean sand and gravel. If piles are selected to support the proposed building, utilities should be hung from the foundation to allow for some subsidence of the utilities outside of the pile supported area. In addition, we recommend that all utilities be installed with flexible connections where they enter the building.

Backfill material placed around utility lines to 6 inches above the utility line should have a maximum particle size of 1.5 inches. Backfill of utility trenches that fall within load-bearing areas should be placed in maximum 12-inch-thick lifts and compacted to the same density requirements as in the building/parking areas. Trench backfill in non-load bearing areas should be compacted to 90 percent of Modified Proctor density (ASTM D1557).

7.6 Supplemental Investigation

As previously stated in our Agreement dated May 8, 2024, the preliminary borings performed by SESI at the site to date, do not satisfy the NYCBC minimum requirement for subsurface investigation. Our supplemental geotechnical investigation will require a minimum of ten (10) additional borings extending between 25 and 100 feet below grade and two (2) groundwater monitoring wells. This report will be revised based on the results of the supplemental investigations, and the final configuration of the buildings.

8.0 TESTING AND INSPECTION REQUIREMENTS

8.1 Testing Requirements

During the placement of all fills, visual observations and in-place density tests shall be performed to determine the adequacy of the compacted fill. In-place density testing shall be conducted in accordance with appropriate ASTM testing standards. Additionally, SESI recommends utility trench and footing backfill compaction be visually observed, and in-place density tests be performed where deemed necessary by the geotechnical engineer. Density testing should be done in accordance with the following minimum frequency requirements; or as determined by the geotechnical engineer.

Building Subgrade Areas: Minimum of 4 tests per 12-inch lift; spacing not to exceed 50 feet between test locations, or as determined by the geotechnical engineer.

Parking/Roadway Areas: Minimum of 3 tests per 12-inch lift; spacing not to exceed 100 feet between test locations, or as determined by the geotechnical engineer.

Utility Trenches: Minimum of 1 test per 6-inch lift; spacing not to exceed 50 feet between test locations, or as determined by the geotechnical engineer.

8.2 Special Inspections

The recommendations presented in the previous sections of this preliminary report assume that the Site preparation procedures will be done under special inspections by a representative of this office. SESI should inspect the over-excavation of the existing fill, the drilled piles including load testing if required, the placement of structural fill, the proofrolling operations, the subgrade preparation, and pavement placement. Visual observations and in-place density testing should be done throughout fill construction to determine that the work is done in accordance with our recommendations.

We should also inspect and approve the bottom of all footing excavations prior to placement of concrete to determine that the founding materials can support the anticipated foundation loads.

9.0 ADDITIONAL SERVICES

We recommend the following additional geotechnical-related engineering services for the proposed development:

- Additional subsurface investigation in accordance with section 7.6 of this report.
- Once foundation layout and structural loading are determined, a settlement analysis should be performed to calculate individual column footing and differential settlements to confirm they will be within tolerable limits. If a mat foundation is utilized, an iterative settlement and bearing pressure analysis should be performed in collaboration with the Project Structural Engineer.
- Once pile loading requirements, layouts, and details are finalized, group uplift and lateral capacity analyses should be performed to finalize pile length and reinforcement requirements.
- Site-specific temporary excavation support design drawings should be prepared and submitted to the NYCDOB and Metro North Railroad for approval and permitting purposes.

- Technical specifications should be prepared for the geotechnical aspects of the proposed construction.
- An adjacent structure documentation and monitoring plan should be prepared and submitted to Metro North Railroad for their review and approvals.
- Pre-construction existing conditions documentation of the neighboring/bordering structures should be performed prior to commencing excavation and foundation construction activities at the Site. A similar post-construction conditions documentation should be performed if required by Metro North Railroad.
- Special inspection of deep foundations and shallow foundation subgrade preparation and backfilling should be performed per NYCBC requirements. In addition, quality assurance observation during tie-down anchor installation and testing work (if applicable) should be performed.
- Neighboring structures should be monitored during excavation, support of excavation system installation, dewatering (if applicable), and foundation construction activities using seismographs, crack-monitoring gauges, and elevation and lateral position control points. Results of monitoring should be summarized in reports periodically submitted to Ownership.

SESI has investigated and interpreted the Site subsurface conditions and developed the preliminary foundation design recommendations contained herein and is therefore best suited to perform the above-mentioned special inspections and quality assurance observation and testing. Recognizing that construction is essentially the completion of design, SESI's special inspections and quality assurance observation and testing during construction is necessary to maintain our continuity of responsibility as it relates to the geotechnical aspects of this project.

10.0 LIMITATIONS

The preliminary subsurface investigation performed identifies the subsurface conditions only at the locations of the explorations and at the depths where the samples were taken. SESI Consulting Engineers reviews the published geologic data and the field and laboratory data and uses their professional judgment and experience to render an opinion on the subsurface conditions throughout the Site. Because the actual subsurface conditions may differ, we recommend that SESI be retained to provide construction inspection to minimize the risks associated with unanticipated conditions. This report should not be used:

- When the nature of the proposed building is changed;
- When the size or configuration of the proposed building is altered;
- When the location or orientation of the proposed building is modified;
- When there is a change in ownership; or
- For application to an adjacent or any other site.

SESI shall not accept any responsibility for problems which may occur if SESI is not consulted when there are changes to the factors considered in this report's development. The soil logs should not be separated from the Engineering Report to minimize the possibility of soil log misinterpretation.

11.0 DISCLAIMER

This Preliminary Report was prepared by SESI for the sole and exclusive use of MADDD Equities. Nothing under the Professional Services Agreement between SESI and its client MADDD Equities shall be construed to give any rights or benefits to anyone other than Client and SESI, and all duties and responsibilities undertaken pursuant to the Agreement will be for the sole and exclusive benefit of Client and SESI and not for the benefit of any other party. This Preliminary Report has been prepared and issued subject to the express condition that same is not to be disseminated to anyone other than Client, without the advance written consent of SESI (which SESI, in its sole discretion, is free to grant or withhold). Use of the Preliminary Report by any other person is unauthorized and such use is at the sole risk of the user.

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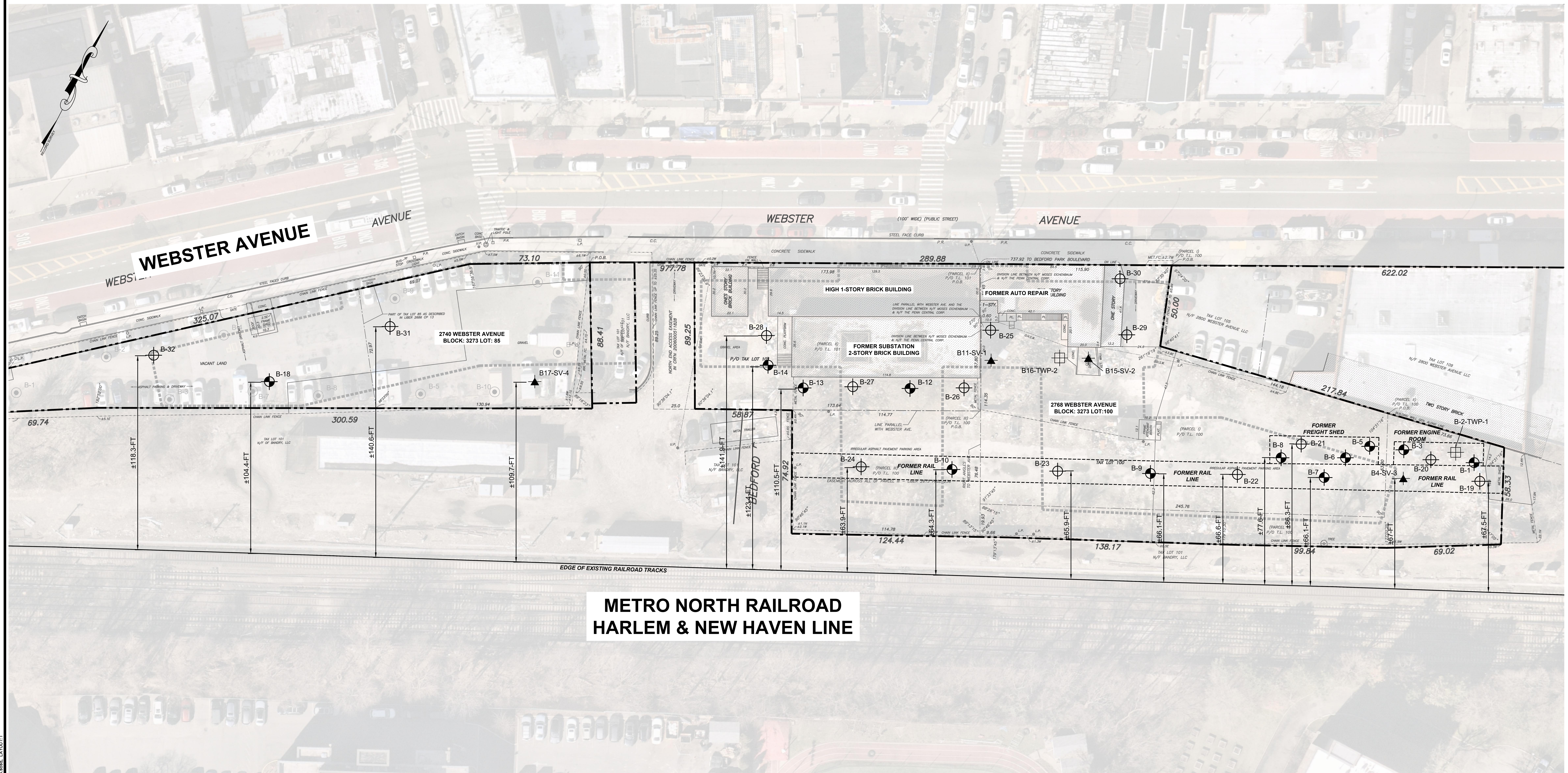

LEGEND:

(property boundary line)	- PROPERTY BOUNDARY
(dashed line)	- PROPOSED APPROXIMATE BUILDING FOOTPRINT
B-#	- COMPLETED SESI ENVIRONMENTAL AND GEOTECHNICAL BORING NUMBER & APPROX. LOCATION
B-#	- COMPLETED SESI ENVIRONMENTAL BORING NUMBER & APPROX. LOCATION
B-#-SV-#	- COMPLETED SESI SOIL BORING/SOIL VAPOR NUMBER & APPROX. LOCATION
B-#-TWP-#	- COMPLETED SESI SOIL BORING/TEMPORARY WELL NUMBER & APPROX. LOCATION
B-#	- COMPLETED SOIL BORINGS BY GTA ENGINEERING SERVICES OF NEW YORK DATED FEBRUARY 2022.

NOTE:

1. THIS PLAN IS FOR LOCATING BORINGS AND ASSOCIATED DATA ONLY. OTHER SITE WORK SHOWN HERE IS NOT INTENDED FOR CONSTRUCTION.
2. PRELIMINARY GEOTECHNICAL BORINGS WERE COMPLETED BETWEEN JUNE 12, 2024 AND JUNE 14, 2024 DURING A DUAL GEOTECHNICAL AND ENVIRONMENTAL SUBSURFACE INVESTIGATION.

REFERENCE:

1. EXISTING CONDITIONS & BOUNDARY ARE TAKEN FROM "A.L.T.A/N.S.P.S. LAND TITLE SURVEY" FOR 2740 WEBSTE AVENUE AND 2768 WEBSTER AVENUE, PREPARED BY EMPIRE STATE LAND SURVEYOR, P.C., DATED MARCH 5, 2021.
2. NEARMAP AERIAL, MARCH 8, 2024.
3. GTA ENGINEERING SERVICES OF NEW YORK, P.C., "BORING LOCATION PLAN", DATED JANUARY 2022.

Scale: 1"= 30'

0 15 30 60 90 120

N:\ACAD\13581\CAD\GEOTECHNICAL\LOCATION PLANS\13581.GT.SUBSURFACE INVESTIGATION PLAN.DWG 10/11/24 05:14:42PM, sergio.sosa, LAYOUT:1

rev	date	description	by

drwg by: AW
chk by: SCS
scale: AS NOTED
date: 10/11/2024

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL
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DRAFT

PROPOSED RESIDENTIAL DEVELOPMENT
2740 - 2768 WEBSTER AVENUE
BRONX, NEW YORK 10458

title:
SUBSURFACE INVESTIGATION LOCATION PLAN

job no. 13581
drawing no.
1

1 of 1

APPENDIX A
SESI SOIL BORING LOGS

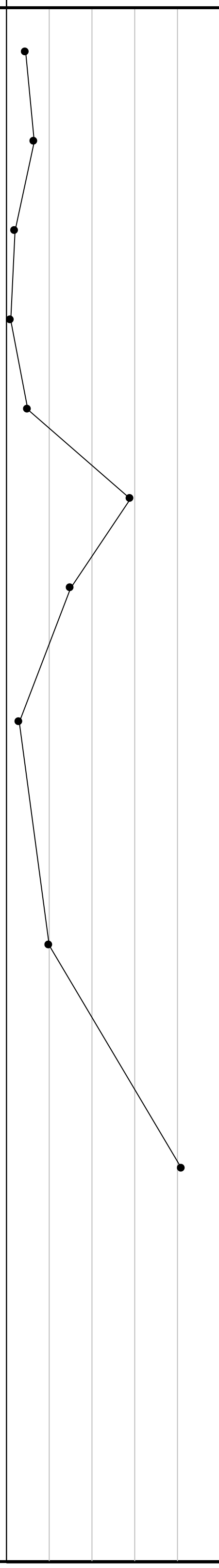
BOREHOLE NUMBER: B-19

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

PROJECT NAME	Proposed Residential Development	**PROJECT LOCATION**	2740-2768 Webster Avenue, Bronx, NY
PROJECT NO.	13581	**ELEVATION DATUM**	
		GROUND ELEVATION	59.3±
DATE STARTED	06-12-2024	**COMPLETED**	06-13-2024
DRILLING METHOD	HSA		
DRILLING CONTRACTOR	Coastal	**SAMPLE HAMMER**	Auto
SAMPLER	Split Spoon	**AUGER INNER DIAMETER**	
		OUTER DIAMETER	
EQUIPMENT	Geoprobe 7822DT	**ROTARY BIT DIAMETER**	
DRILLING FOREMAN	John	**HELPER**	Jay
CASING DIAMETER	3.00 in	**GROUNDWATER LEVELS:**	
		▽ **AT TIME OF DRILLING**	
LOGGED BY	Christian Barletta	**CHECKED BY**	Sergio Chong Sosa
CASING DEPTH	25.0 ft	▼ **AT END OF DRILLING**	14.50± ft
LATITUDE	40.866052	**LONGITUDE**	-73.884633
FINAL DEPTH	27.0± ft	▽ **AFTER DRILLING**	

EL (ft)	Sample Description	Depth (ft)	NYC BC Soil Class	Number	Rec. (in)	Moisture	Blows/6-in Core time/ft	Remarks
	Fill: Brown coarse to fine SAND, little medium to fine Gravel, trace Silt, with millings debris		7	S-1	17	Moist	10-5-4-7 (9)	
	Fill: Dark brown coarse to fine SAND, little Silt, little medium to fine Gravel, with porcelain debris		7	S-2	14	Moist	5-5-8-6 (13)	Environment sample B.19 (4-4.5) @11:10 AM 06/12/2024
55	Fill: Brown medium to fine Sand, and Silt, trace medium to fine Gravel	5	7	S-3	8	Moist	3-2-2-1 (4)	
	Fill: Brown Clayey Silt, and medium to fine Sand, trace medium to fine Gravel		7	S-4	11	Moist	1-1-1-5 (2)	
50	Fill: Brown/Gray Clayey Silt, and medium to fine Sand, some coarse to fine Gravel		7	S-5	13	Moist	10-5-5-14 (10)	
	Brown coarse to fine SAND, little Silt, trace fine Gravel	10	3a	S-6	9	Moist	22-28-30-22 (58)	
	Brown coarse to fine SAND, some coarse to fine Gravel, trace Silt		3b	S-7	15	Moist	19-18-12-12 (30)	
45	Brown medium to fine SAND, trace Silt	15	6	S-8	24	Wet	4-3-3-5 (6)	Wet, ground water W.C. = 27.4%, (-200) = 15.2%
40	Brown coarse to fine Sand, some Clayey Silt, little coarse to fine Gravel	20	3b	S-9	22	Wet	10-10-10-15 (20)	Wet, Ground water
35	Brown coarse to fine Gravel, some coarse to fine Sand, some Clayey Silt	25	2a	S-10	20	Wet	38-54-28-21 (82)	Wet, ground water
30	BORING COMPLETED AT 27± FEET	30						
25								

N-Value (Blows/ft)



SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: B-20

PROJECT NAME Proposed Residential Development
PROJECT LOCATION 2740-2768 Webster Avenue, Bronx, NY
PROJECT NO. 13581
ELEVATION DATUM
GROUND ELEVATION 59.7±
DATE STARTED 06-13-2024 **COMPLETED** 06-13-2024
DRILLING METHOD HSA
DRILLING CONTRACTOR Coastal
SAMPLE HAMMER Auto
SAMPLER Split Spoon
AUGER INNER DIAMETER
OUTER DIAMETER
EQUIPMENT Geoprobe 7822DT
ROTARY BIT DIAMETER
GROUNDWATER LEVELS:
DRILLING FOREMAN John **HELPER** Jay
CASING DIAMETER 3.00 in
▽ **AT TIME OF DRILLING**
LOGGED BY Christian Barletta **CHECKED BY** Sergio Chong Sosa
CASING DEPTH 23.0 ft
▼ **AT END OF DRILLING** 15.00± ft
LATITUDE 40.866030 **LONGITUDE** -73.884748
FINAL DEPTH 27.0± ft
▽ **AFTER DRILLING**

Material Symbol	EL (ft)	Sample Description	Depth (ft)	NYC BC Soil Class	Number	Type	Rec. (in)	Moisture	Blows/6-in Core time/ft	N-Value (Blows/ft)	Remarks
Fill		Fill: Brown coarse to fine Sand, some medium to fine Gravel, trace Silt, with concrete debris		7	S-1	X	14	Moist	18-15-9-2 (24)	24	
Fill		Fill: Brown coarse to fine Sand, some coarse to fine Gravel, little Clayey Silt, with slag debris		7	S-2	X	19	Moist	3-2-3-4 (5)	5	Environmental boring sample B-20 (3.5-4)
Fill	55	Fill: Dark brown coarse to fine Sand, some Clayey Silt, little medium to fine Gravel, with slag debris	5	7	S-3	X	20	Moist	4-3-4-3 (7)	7	
Fill		Fill: Dark brown coarse to fine Sand, some Clayey Silt, little medium to fine Gravel, with slag debris		7	S-4	X	9	Moist	5-4-3-3 (7)	7	
Sand		Brown coarse to fine SAND, some Silt, little coarse to fine Gravel		3a	S-5	X	22	Moist	9-18-30-28 (48)	48	
Sand	50	Brown/ gray coarse to fine SAND, some coarse to fine Gravel, little Silt	10	3a	S-6	X	22	Moist	45-74-35-31 (109)	109	
Sand		Brown/ gray coarse to fine SAND, some coarse to fine Gravel, little Silt		3a	S-7	X	20	Moist	8-26-22-17 (48)	48	
Sand	45	Brown coarse to fine SAND, little Silt	15	3b	S-8	X	14	Wet	9-5-6-4 (11)	11	Wet, ground water
Sand	40	Brown coarse to fine SAND, some Silt, little coarse to fine Gravel	20	3a	S-9	X	24	Wet	3-4-6-8 (10)	10	Wet, ground water
Sand	35	Gray-brown coarse to fine Sand, some Clayey Silt, some coarse to fine Gravel	25	3b	S-10	X	2	Wet	6-8-7-9 (15)	15	Wet, ground water
	30	BORING COMPLETED AT 27± FEET	30								

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: B-21

PROJECT NAME	Proposed Residential Development	**PROJECT LOCATION**	2740-2768 Webster Avenue, Bronx, NY
PROJECT NO.	13581	**ELEVATION DATUM**	
		GROUND ELEVATION	57.9±
DATE STARTED	06-13-2024	**COMPLETED**	06-13-2024
DRILLING METHOD	HSA		
DRILLING CONTRACTOR	Coastal	**SAMPLE HAMMER**	Auto
SAMPLER	Split Spoon	**AUGER INNER DIAMETER**	
		OUTER DIAMETER	
EQUIPMENT	Geoprobe 7822DT	**ROTARY BIT DIAMETER**	
DRILLING FOREMAN	John	**HELPER**	Jay
CASING DIAMETER	3.00 in	**GROUNDWATER LEVELS:**	
LOGGED BY	Christian Barletta	**CHECKED BY**	Sergio Chong Sosa
CASING DEPTH	23.0 ft	**AT TIME OF DRILLING**	
LATITUDE	40.865920	**LONGITUDE**	-73.884996
FINAL DEPTH	27.0± ft	**AT END OF DRILLING**	14.50± ft
		AFTER DRILLING	

Depth (ft)	EL (ft)	Sample Description	NYC BC Soil Class	Number	Rec. (in)	Moisture	Blows/6-in (N)	Remarks
0–2		Fill: Brown coarse to fine Sand , some coarse to fine Gravel, little Silt, with brick and concrete fragments	7	S-1	18	Moist	8-18-24-14 (42)	
2–4		Fill: Brown/ black coarse to fine Sand, some coarse to fine Gravel little Silt, with slag debris	7	S-2	14	Moist	4-3-2-5 (5)	Environmental boring sample B-21 (2.5-3)
4–6	53	Fill: Brown coarse to fine Sand, some Silt , little medium to fine Gravel	7	S-3	16	Dry	8-13-12-11 (25)	
6–8		Fill: Brown/ dark brown coarse to fine Sand, and Clayey Silt , little coarse to fine Gravel	7	S-4	24	Moist	4-7-4-2 (11)	
8–10	48	Dark brown Clayey SILT, some coarse to fine Sand, little coarse to fine Gravel	7	S-5	16	Moist	3-4-5-10 (9)	
10–12		Brown/ gray coarse to fine Sand, and Silt, little coarse to fine Gravel	3b	S-6	16	Moist	6-11-14-23 (25)	
12–14		Brown coarse to fine SAND, some Clayey Silt, little coarse to fine Gravel	3a	S-7	12	Wet	21-24-19-30 (43)	Wet, ground water
15–17	43	Brown/ black coarse to fine SAND, little medium to fine Gravel, little Silt	3a	S-8	20	Wet	24-19-20-20 (39)	Wet, ground water
20–22	38	Gray coarse to fine Sand, some Clayey Silt, little coarse to fine Gravel	3a	S-9	17	Wet	30-29-22-21 (51)	
25–27	33	Gray coarse to fine Gravel, and coarse to fine Sand, little Clayey Silt	2b	S-10	10	Wet	50-35-35-48 (70)	Wet, ground water

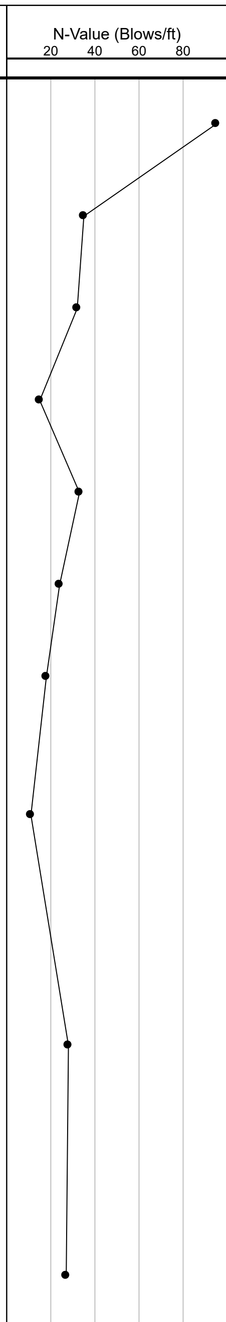
BORING COMPLETED AT 27± FEET

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: B-23

PROJECT NAME	Proposed Residential Development	**PROJECT LOCATION**	2740-2768 Webster Avenue, Bronx, NY
PROJECT NO.	13581	**ELEVATION DATUM**	
		GROUND ELEVATION	56.2±
DATE STARTED	06-13-2024	**COMPLETED**	06-13-2024
DRILLING METHOD	HSA		
DRILLING CONTRACTOR	Coastal	**SAMPLE HAMMER**	Auto
SAMPLER	Split Spoon	**AUGER INNER DIAMETER**	
		OUTER DIAMETER	
EQUIPMENT	Geoprobe 7822DT	**ROTARY BIT DIAMETER**	
DRILLING FOREMAN	John	**HELPER**	Jay
CASING DIAMETER	3.00 in	**GROUNDWATER LEVELS:**	
LOGGED BY	Cristian Barletta	**CHECKED BY**	Sergio Chong Sosa
CASING DEPTH	25.0 ft	▽ **AT TIME OF DRILLING**	11.00± ft
LATITUDE	40.865636	**LONGITUDE**	-73.885386
FINAL DEPTH	27.0± ft	▼ **AT END OF DRILLING**	
		▼ **AFTER DRILLING**	

Material Symbol	EL (ft)	Sample Description	Depth (ft)	NYC BC Soil Class	Number	Type	Rec. (in)	Moisture	Blows/6-in Core time/ft	Remarks
Fill		Fill: Brown coarse to fine Sand, some coarse to fine Gravel, trace Silt		7	S-1	SS	19	Moist	32-47-48-41 (95)	
Fill		Fill: Dark brown/ dark gray coarse to fine Sand , little Clayey Silt, trace medium to fine Gravel		7	S-2	SS	24	Moist	38-18-17-13 (35)	
Fill	52	Fill: Dark brown Clayey Silt, some coarse to fine Sand , little coarse to fine Gravel	5	7	S-3	SS	20	Moist	13-10-22-24 (32)	
Fill		Fill: Brown/ gray-brown coarse to fine SAND, some Silt, little medium to fine Gravel		7	S-4	SS	23	Moist	4-6-9-10 (15)	
Sand	47	Brown/ gray-brown coarse to fine SAND, some Silt, some medium to fine Gravel		3a	S-5	SS	19	Moist	9-19-14-15 (33)	
Sand		Brown coarse to fine SAND, little Silt, little medium to fine Gravel	10	3b	S-6	SS	17	Wet	13-12-12-11 (24)	Water level at 11' wet sample
Sand		Brown coarse to fine SAND, little coarse to fine Gravel , little Silt		3b	S-7	SS	24	Wet	4-8-10-9 (18)	
Sand	42	Dark brown / Brown coarse to fine SAND, little fine Gravel , trace Silt	15	3b	S-8	SS	12	Wet	5-5-6-7 (11)	Wet
Sand	37	Brown coarse to fine SAND, trace Silt	20	3b	S-9	SS	14	Wet	8-13-15-12 (28)	Wet
Sand	32	Brown coarse to fine SAND, trace Silt	25	3b	S-10	SS	14	Wet	8-14-13-10 (27)	Wet
		BORING COMPLETED AT 27± FEET								
	27		30							
	22									



SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: B-24

PROJECT NAME	Proposed Residential Development	**PROJECT LOCATION**	2740-2768 Webster Avenue, Bronx, NY
PROJECT NO.	13581	**ELEVATION DATUM**	
		GROUND ELEVATION	55.2±
DATE STARTED	06-14-2024	**COMPLETED**	06-14-2024
DRILLING METHOD	HSA	**DRILLING CONTRACTOR**	Coastal
SAMPLE HAMMER	Auto	**SAMPLER**	Split spoon
AUGER INNER DIAMETER		**OUTER DIAMETER**	
EQUIPMENT	Geoprobe 7822DT	**ROTARY BIT DIAMETER**	
DRILLING FOREMAN		**HELPER**	Ronin
CASING DIAMETER	3.00 in	**CASING DEPTH**	
LOGGED BY	ELD	**CHECKED BY**	Sergio Chong Sosa
LATITUDE	40.865442	**LONGITUDE**	-73.885736
FINAL DEPTH	20.2± ft		

GROUNDWATER LEVELS:
- AT TIME OF DRILLING 15.00± ft
- AT END OF DRILLING
- AFTER DRILLING

EL (ft)	Sample Description	Depth (ft)	NYC BC Soil Class	Number	Type	Rec. (in)	Moisture	Blows/6-in Core time/ft	N-Value (Blows/ft)	Remarks
	Fill: Brown/ dark brown coarse to fine Sand, some medium to fine Gravel, some Silt, with brick fragments		7	S1		21	Moist	7-14-18-13 (32)	32	
	Fill: Dark brown/ black medium to fine SAND, some coarse to fine Gravel, some Silt		7	S2		16	Moist	12-8-10-12 (18)	18	
51	Fill: Brown medium to fine Sand, and Clayey Silt, little medium to fine Gravel	5	7	S3		20	Moist	2-WOH-WOH-WOH (0)	0	
	Brown coarse to fine SAND, some medium to fine Gravel, little Silt		3a	S4		18	Moist	6-20-17-23 (37)	37	
46	Brown/ gray medium to fine SAND, some Silt, some coarse to fine Gravel		3a	S4		23	Moist	14-20-23-49 (43)	43	
	Brown/ tan coarse to fine SAND, little medium to fine Gravel, little Silt	10	3a	S6		18	Moist	48-23-21-24 (44)	44	
41										
	Brown coarse to fine SAND, and Silt, trace fine Gravel	15								
	Grading to Gray coarse to fine SAND, some Silt, trace medium to fine Gravel		3a	S7		20	Wet	11-16-24-30 (40)	40	
36										
	No Recovery	20		S8		0	No Sample	40/2"		Refusal
	BORING COMPLETED AT 20.2± FEET DUE TO SPLIT SPOON REFUSAL									
31		25								
26		30								
21										

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: B-26

PROJECT NAME Proposed Residential Development
PROJECT LOCATION 2740-2768 Webster Avenue, Bronx, NY
PROJECT NO. 13581
ELEVATION DATUM
GROUND ELEVATION 57.0±
DATE STARTED 06-14-2024 **COMPLETED** 06-14-2024
DRILLING METHOD HSA
DRILLING CONTRACTOR Coastal
SAMPLE HAMMER Auto
SAMPLER Split Spoon
AUGER INNER DIAMETER
OUTER DIAMETER
EQUIPMENT Geoprobe 7822DT
ROTARY BIT DIAMETER
GROUNDWATER LEVELS:
DRILLING FOREMAN **HELPER** Ronin
CASING DIAMETER 3.00 in
AT TIME OF DRILLING 15.00± ft
LOGGED BY ELD **CHECKED BY** Sergio Chong Sosa
CASING DEPTH 25.0 ft
AT END OF DRILLING
LATITUDE 40.865652 **LONGITUDE** -73.885661
FINAL DEPTH 27.0± ft
AFTER DRILLING

Material Symbol	EL (ft)	Sample Description	Depth (ft)	NYC BC Soil Class	Number	Type	Rec. (in)	Moisture	Blows/6-in Core time/ft	Remarks
Fill		Fill: Dark brown/ Black coarse to fine Sand, and coarse to fine Gravel, trace Silt		7	S-1		15	Moist	6-10-7-15 (17)	
		Fill: Gray coarse to fine Sand, and coarse to fine Gravel, little Silt			S-2		5		50/5"	
				7				Moist		
	52	Fill: Brown coarse to fine Sand, some Silt, trace fine Gravel	5	7	S-3		19	Moist	2-1-7-5 (8)	
		Fill: Dark brown/ brown coarse to fine Sand, some Silt, little medium to fine Gravel		7	S-4		14	Moist	4-2-3-8 (5)	
		Brown coarse to fine Sand, and medium to fine Gravel, little Silt		3a	S-5		19	Moist	16-16-15-20 (31)	
	47	Gray-brown/ brown medium to fine SAND, some medium to fine Gravel, little Silt	10	3a	S-6		17	Moist	26-37-22-18 (59)	
	42	Brown medium to fine SAND, little Silt	15	3b	S-7		18	Wet	15-6-6-7 (12)	W.C. = 23.5%, (-200) = 48.2%
	37	Gray- brown medium to fine SAND, some coarse to fine Gravel, little Silt	20	3b	S-8		19	Wet	10-9-18-19 (27)	
	32	Light gray coarse to fine Sand, and coarse to fine Gravel, little Silt	25	3a	S-9		32	Wet	24-30-32-29 (62)	
		BORING COMPLETED AT 27± FEET								
	27		30							

N-Value (Blows/ft): 20 40 60 80

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: B-28

PROJECT NAME	Proposed Residential Development	**PROJECT LOCATION**	2740-2768 Webster Avenue, Bronx, NY
PROJECT NO.	13581	**ELEVATION DATUM**	
		GROUND ELEVATION	59.0±
DATE STARTED	06-14-2024	**COMPLETED**	06-14-2024
DRILLING METHOD	HSA	**SAMPLE HAMMER**	Auto
DRILLING CONTRACTOR	Coastal	**SAMPLER**	Split Spoon
AUGER INNER DIAMETER		**OUTER DIAMETER**	
EQUIPMENT	Geoprobe 7822DT	**ROTARY BIT DIAMETER**	
DRILLING FOREMAN		**HELPER**	Ronin
CASING DIAMETER	3.00 in	**CASING DEPTH**	25.0 ft
LOGGED BY	ELD	**CHECKED BY**	Sergio Chong Sosa
LATITUDE	40.865521	**LONGITUDE**	-73.886077
FINAL DEPTH	27.0± ft		

GROUNDWATER LEVELS:
- AT TIME OF DRILLING 15.00± ft
- AT END OF DRILLING
- AFTER DRILLING

EL (ft)	Sample Description	Depth (ft)	NYC BC Soil Class	Number	Type	Rec. (in)	Moisture	Blows/6-in Core time/ft	N-Value (Blows/ft)	Remarks
	Fill: Gray-brown coarse to fine Sand, and coarse to fine Gravel, trace Silt, with concrete fragments		7	S-1		19	Moist	20-11-26-30	(37)	
	Fill: Brown medium to fine Sand, some Silt, little medium to fine Gravel, with plastic debris		7	S-2		15	Moist	23-19-13-12	(32)	
54	Fill: Brown/ gray/ orange coarse to fine Sand, some Silt, little medium to fine Gravel, with Glass debris	5	7	S-3		12	Moist	7-3-3-7	(6)	
	Fill: Gray-brown coarse to fine SAND, some Clayey Silt, little coarse to fine Gravel, with asphalt milling debris		7	S-4		15	Moist	3-19-7-5	(26)	
	Fill: Orange-brown coarse to fine SAND, little Silt, trace medium to fine Gravel, with roots		7	S-5		24	Moist	3-4-3-3	(7)	W.C. = 15.3%, (-200) = 32.2%
49	Brown medium to fine Sand, some medium to fine Gravel, little Silt	10	3a	S-6		24	Moist	12-20-15-12	(35)	
	Orange-brown coarse to fine SAND, some medium to fine Gravel, little Silt		3a	S-7		12	Wet	18-13-18-10	(31)	
44	Orange-brown medium to fine SAND, little Silt	15	6	S-8		21	Wet	5-3-3-4	(6)	
39	Orange-brown medium to fine SAND, little Silt	20	6	S-9		19	Wet	4-5-4-5	(9)	
34	Gray coarse to fine SAND, little medium to fine Gravel, trace Silt	25	3b	S-10		14	Wet	8-6-5-7	(11)	
	BORING COMPLETED AT 27± FEET									
29		30								

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: B-30

PROJECT NAME	Proposed Residential Development	**PROJECT LOCATION**	2740-2768 Webster Avenue, Bronx, NY
PROJECT NO.	13581	**ELEVATION DATUM**	
		GROUND ELEVATION	61.3±
DATE STARTED	06-14-2024	**COMPLETED**	06-14-2024
DRILLING METHOD	HSA		
DRILLING CONTRACTOR	Coastal	**SAMPLE HAMMER**	Auto
SAMPLER	Split Spoon	**AUGER INNER DIAMETER**	
		OUTER DIAMETER	
EQUIPMENT	Geoprobe 7822DT	**ROTARY BIT DIAMETER**	
DRILLING FOREMAN		**HELPER**	Ronin
CASING DIAMETER	3.00 in	**GROUNDWATER LEVELS:**	
		AT TIME OF DRILLING	
LOGGED BY	ELD	**CHECKED BY**	Sergio Chong Sosa
CASING DEPTH	15.0 ft	AT END OF DRILLING	Not Encountered
LATITUDE	40.865955	**LONGITUDE**	-73.885534
FINAL DEPTH	16.7± ft	AFTER DRILLING	

Material Symbol	EL (ft)	Sample Description	Depth (ft)	NYC BC Soil Class	Number	Type	Rec. (in)	Moisture	Blows/6-in Core time/ft	N-Value (Blows/ft)	Remarks
		Fill: Brown/ gray-brown/ orange coarse to fine Sand, some Silt, some medium to fine Gravel, with asphalt milling and concrete debris		7	S-1		17	Moist	16-12-29-20 (41)	41	
		Fill: Brown coarse to fine Gravel, some medium to fine Sand, trace Silt		7	S-2		7	Moist	2-13-11-6 (24)	24	
	57	Fill: Brown/ gray-brown/ tan coarse to fine Sand, some medium to fine Gravel, little Silt, with brick fragments	5	7	S-3		15	Moist	3-5-5-4 (10)	10	
		Fill: Brown/ gray-brown/ tan coarse to fine Sand, some medium to fine Gravel, little Silt, with brick fragments		7	S-4		15	Moist	7-6-4-13 (10)	10	
	52	Fill: Brown Clayey Silt, and medium to fine Sand, little medium to fine Gravel, with brick fragments and occasional wood pieces		7	S-5		10	Moist	2-WOH-WOH-WOH (0)	0	
		Fill: Black Silty Clay, trace medium to fine Sand, with occasional roots	10	7	S-6		24	Moist	1-1-4-3 (5)	5	
	47										
		Gray-brown/ brown/ tan coarse to fine SAND, some medium to fine Gravel, little Silt	15	3a	S-7		15	Moist	13-21-45-30/2" (66)	66	
		BORING COMPLETED AT 16.667± FEET DUE TO SPLIT SPOON REFUSAL									
	42		20								
	37		25								
	32		30								
	27										

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

SOILS CLASSIFICATION AND EXPLORATION LOG KEY

Our experience has shown that the following field identification system, which is pattered somewhat after the Burmister System, permits a more detailed breakdown of the components within a soil sample than other identification systems allow. It also compels the supervising technician to examine a sample quite closely in order to accurately describe the components within the sample.

Grain Size and Classifications

Gravel:
Coarse gravel ranges from 3-in to 1-in
Medium gravel ranges from 1-in to 3/8-in
Fine gravel ranges from 3/8-in to No. 10 sieve

Sand:
Coarse sand ranges from No. 10 to No. 30 sieve
Medium sand ranges from No. 30 to No. 60 sieve
Fine sand ranges from No. 60 to No. 200 sieve

Silt:
Material which passes the No. 200 sieve
Exhibits little to no plasticity

Clay:
Material which passes the No. 200 Sieve
Exhibits varying degrees of plasticity

Component Classification

CAPITALS	More than 50% of the sample by weight
Proper Case	Less than 50% of the sample by weight

Proportion Terms

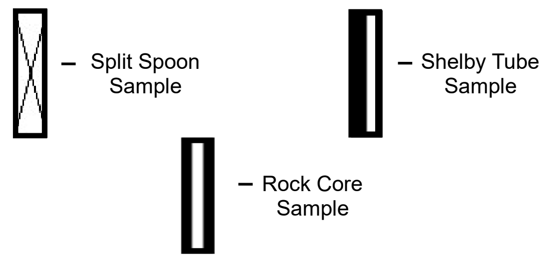
and	Component ranges from 35% to 50% of the sample by weight
some	Component ranges from 20% to 35% of the sample by weight
little	Component ranges from 10% to 20% of the sample by weight
trace	Component ranges from 0% to 10% of the sample by weight

Gradation Designation

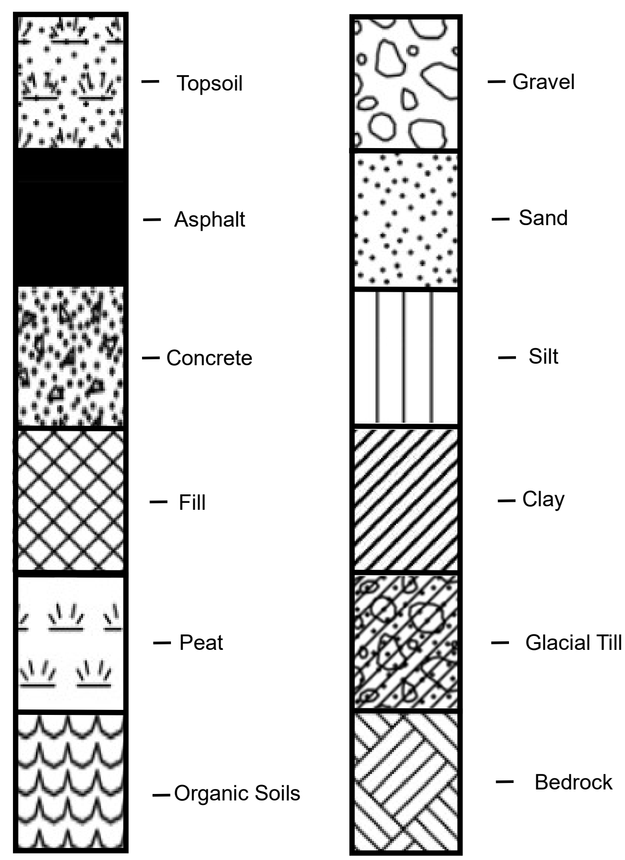
Coarse to fine (c-f)	All fractions greater than 10% of the component
Coarse to Medium (c-m)	Less than 10% of the component is fine
Medium to fine (m-f)	Less than 10% of the component is coarse
Coarse (c)	Less than 10% of the component is medium or fine
Medium (m)	Less than 10% of the component is coarse or fine
Fine (f)	Less than 10% of the component is coarse or medium

The subsurface information shown hereon was obtained for the design and estimating purposes for our client. It is made available to authorized users only that they may have access to the same information available to our client. It is presented in good faith, but it is not intended as a substitute for investigations, interpretations or judgement of such authorized users. Information on the logs should not be relied upon without the geotechnical engineer's recommendations contained in the report from which these logs were extracted.

Sampling Types



Generalized Stratum Types



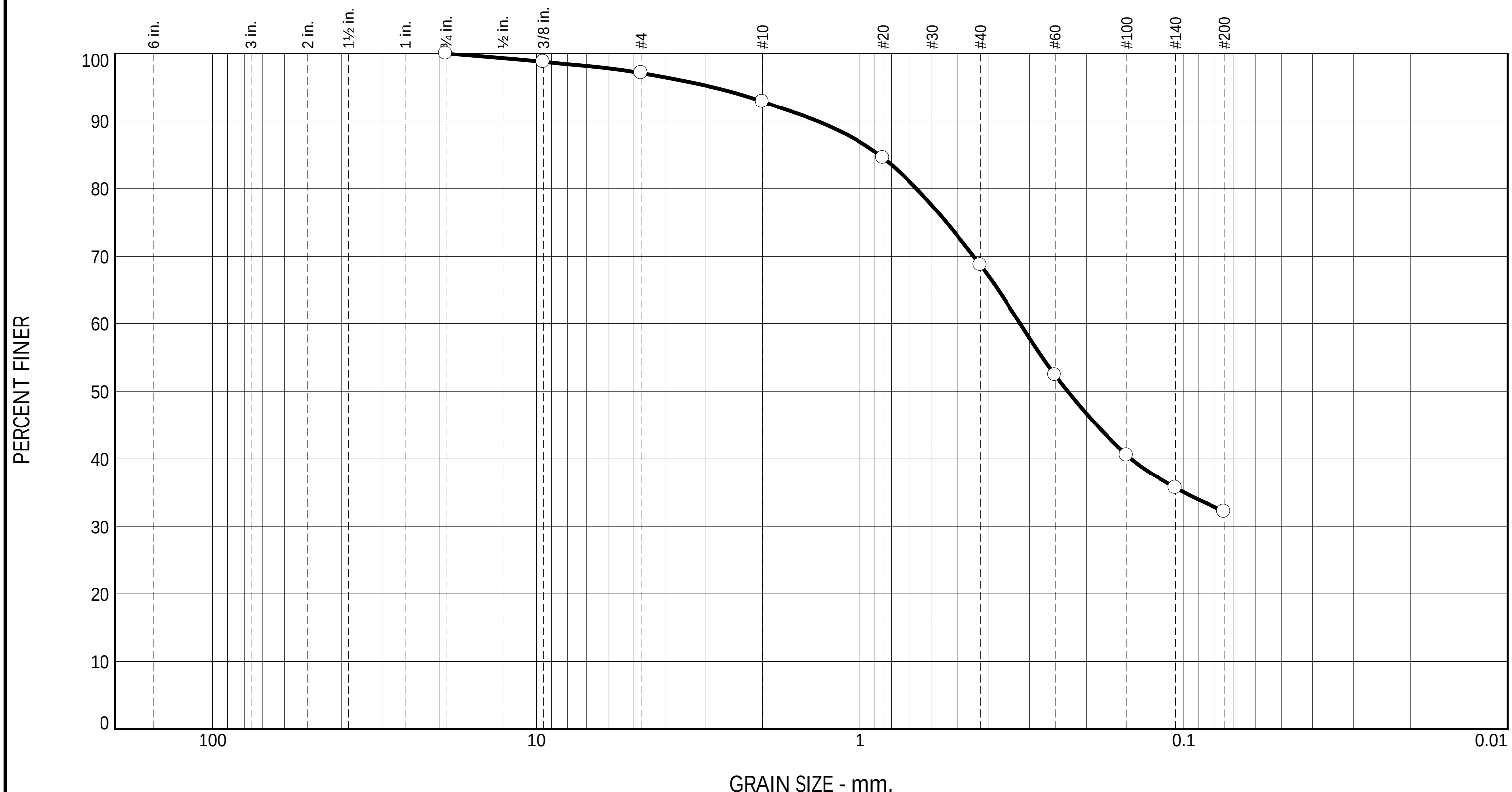
Strata Separation

———————	Approximate Change in Strata
– – – – – – –	Inferred Change in Strata

APPENDIX B
SESI LAB TEST RESULTS

Particle Size Distribution Report

ASTM D6913



% +3"	% Gravel=7.1			% Sand=60.7			% Fines
	Coarse	Medium	Fine	Coarse	Medium	Fine	
0.0	0.0	1.3	5.8	15.4	25.1	20.2	32.2

Test Results (ASTM D6913)

Sieve Size or Diam. (in.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
.75	100.0			
.375	98.7			
#4	97.1			
#10	92.9			
#20	84.6			
#40	68.7			
#60	52.4			
#100	40.5			
#140	35.7			
#200	32.2			

* (no specification provided)

Material Description

Orange-brown coarse to fine SAND, some Clayey Silt, trace medium to fine Gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.3538 D_{85}= 0.8734 D_{60}= 0.3203
D_{50}= 0.2282 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Test Remarks

Water Content(%)= 15.3

Location: B-28
Sample Number: S-5 Depth: 8-10 Sample Date: 06/13/2024

SESI CONSULTING ENGINEERS

Client: MADDD Equities
Project: Proposed Residential Development

Project No: 13581 Figure 1

Tested By: AD/JDT Checked By: MLT

APPENDIX C
GEOTECHNICAL REPORT BY OTHERS

REPORT OF GEOTECHNICAL EXPLORATION

2740 Webster Avenue

Borough of The Bronx, New York

February 2022

Prepared For:

Longhouse Properties
63 East Field Drive
Bedford, NY 10506

Attn: Mr. Clint Olsen

Prepared By:

GTA Engineering Services of New York, P.C.
Geotechnical and Environmental Consultants
211Gates Road, Suite K
Little Ferry, New Jersey 07643
(201) 641-1850

GTA Job No: 34211441

TABLE OF CONTENTS

APPENDICES

GTA Engineering Services of New York, P.C.

GEOTECHNICAL AND
ENVIRONMENTAL CONSULTANTS

An affiliate of Geo-Technology Associates, Inc.

February 10, 2022

Longhouse Properties
63 East Field Drive
Bedford, NY 10506

Attn: Mr. Clint Olsen

Re: Report of Geotechnical Exploration
2740 Webster Avenue
Borough of The Bronx, New York

Dear Mr. Olsen:

In accordance with our agreement dated June 29, 2021, GTA Engineering Services of New York, P.C. (GTA) has performed a geotechnical engineering exploration for the proposed construction of a new 11-story building to be located at 2740 Webster Avenue in the Borough of The Bronx, New York. The exploration consisted of performing 12 Standard Penetration Test borings throughout the project site, visually classifying the encountered soils, and performing limited laboratory testing. This report presents the results of our findings and conclusions regarding subsurface conditions with respect to foundation support and other geotechnical considerations.

Should you have any questions or require additional information, please do not hesitate to contact our office.

Very truly yours,
GTA Engineering Services of New York, P.C.

Douglas Fernandez
Project Manager

Robert Dykstra, P.E.
Vice President

DF/rd/rd
Job No. 34211441

REPORT OF GEOTECHNICAL EXPLORATION
2740 WEBSTER AVENUE
BOROUGH OF THE BRONX, NEW YORK
FEBRAURY 2022

INTRODUCTION

GTA Engineering Services of New York, P.C. (GTA) has performed a geotechnical engineering exploration for the proposed construction of a new 11-story building to be located at 2740 Webster Avenue in the Borough of The Bronx, New York. The site location is shown on the Site Location Map, Figure 1 in Appendix A, and identified as Block 3273, Lot 85 on New York City tax maps.

The scope of this study included a field exploration, laboratory testing, and engineering analyses. The field exploration consisted of 12 Standard Penetration Test (SPT) borings. Samples were obtained from the borings and were visually examined and subjected to limited laboratory testing to further characterize general subsurface conditions. Conclusions and recommendations were derived from engineering analyses of field and laboratory data.

SITE AND PROJECT DESCRIPTION

The project site is located on the south side of Webster Avenue between East 195th and 197th Streets. The site is currently occupied by an active parking lot. The site is neighbored to the east by an Metro North easement, and to the south by an Metro North railway running parallel with the site.

We understand that the proposed building will be an 11-story mixed-use structure with a partial cellar level established approximately 11 feet below the existing sidewalk level. The building will occupy a base footprint of approximately 22,669 square feet. The tower portion of the structure will occupy a base footprint of 19,486 square feet. After discussions with the client, we understand the building may be redesigned to have a full cellar level.

SUBSURFACE EXPLORATION

The subsurface exploration program performed for this study consisted of drilling 12 Standard Penetration Test (SPT) borings. The test borings were performed by DK Drilling of New York, Inc. between December 7th and 16th, 2022. The borings were advanced to completion depths ranging from approximately 27 to 100 feet below the existing ground surface using truck-mounted drilling equipment. A combination of Hollow Stem Auger (HSA) and mud-rotary drilling techniques were used to advance the borings.

GTA located the explorations in the field, documented drilling procedures, maintained continuous logs of the explorations, and obtained soil and rock samples. The approximate locations of the explorations are shown on the Boring Location Plan, which is included as Figure 2 in Appendix A. Detailed descriptions of the encountered subsurface conditions are indicated on the Logs of Borings which are presented in Appendix B.

Standard Penetration Testing (SPT) was performed using an automatic hammer in general accordance with procedures of ASTM D1586. Soil samples were obtained in two- to five foot increments within the boreholes. The SPT involves driving a 2-inch O.D., 1⅜-inch I.D. split-spoon sampler with a 140-pound hammer free-falling from a height of 30-inches. The number of blows required to drive the sampler was recorded in six-inch intervals. The SPT N-value, given as blows per foot, is defined as the total number of blows required to drive the sampler from the 6- to 18-inch interval.

Soil and rock samples obtained from the explorations were brought to GTA's laboratory for visual classification by a geotechnical engineer and limited laboratory testing. The soils were classified in accordance with the Unified Classification System (USCS) and New York City Building Code (NYCBC). The descriptions provided on the logs are therefore based on visual observations of the samples as summarized in the Notes for Exploration Logs and Notes for Rock Descriptions included in Appendix B, and supplemented by the laboratory test results.

SITE GEOLOGY

According to the Bedrock Geology Map of New York (1995), the site is at a contact point between the Fordham gneiss and Inwood marble geological units. The contact point between these two units is typically associated with both fractured and brecciated bedrock faults that act as conduits for ground water to chemically weather the bedrock. This process creates a thick layer of Saprolite (chemically weathered bedrock) near the contact that overlies the bedrock, resulting in large drop offs in the elevation of competent bedrock.

SUBSURFACE CONDITIONS

The subsurface conditions encountered in the borings generally consisted of a layer of fill material overlying natural soils of glacial origin, which were underlain by residual soils or soft rock derived from the in-place weathering of the parent bedrock and generally reflects the geological mapping. Generalized descriptions of these strata are presented below in order of increasing depth. Individual boring logs are presented in Appendix B.

Surface Materials: An approximately 3-inch-thick layer of asphalt or gravel was present at the ground surface in the borings.

Fill: A layer of fill material, approximately 6 to 13 feet thick was encountered below the surface materials in the borings. The fill material consisted of silty sand with gravel and construction debris. Boulders and obstructions were also encountered within the fill, and remnant foundation elements may also be present. The fill was loose to very dense in relative density based on the SPT N-values and was classified as "uncontrolled fill," Class 7 material in accordance with the NYCBC.

Glacial Soils: Natural glacial soils were encountered beneath the fill and surface materials in the borings and extended to depths ranging from approximately 25 to 55 feet below the existing site grade. The natural soils typically consisted of poorly-graded sands and silty sands with varying amounts of gravel, with occasional clay layers encountered in several borings. The soils were medium dense to very dense in relative density, and classified as SM or SP-SM, Classes 3a and 3b in accordance with the USCS and NYCBC, respectively. The clay layers were medium stiff to hard in terms of relative density, and classified as CL. Classes 4c, 4b, and 4a in accordance with the USCS and NYCBC, respectively.

Residual Soil and Soft Rock: Residual soil and soft rock was encountered beneath the glacial material in the deep borings at depths ranging from approximately 25 to 55 feet and extended to the completion depths of the borings. The residual soil maintained the fabric of the parent bedrock but was completely weathered to a stiff to hard sandy clay (CL), Class 4a and 4b. Below the residual soil, the material encountered was very hard, with SPT "N" values above 50, and was classified as Soft Rock, Class 1d. The weathered bedrock was not competent enough to perform any rock coring.

Groundwater: Based on the moisture conditions of the recovered soil samples, groundwater was encountered about 20 to 24 feet below existing site grades. Note that groundwater levels can fluctuate due to seasonal variations in precipitation, and additional shallow perched groundwater may be encountered following periods of inclement weather.

LABORATORY TESTING

Laboratory testing performed for this study included gradation analyses for classification of the soils in accordance with the Unified Soil Classification System (USCS), and natural moisture content determinations. Classification of soils in accordance with the USCS provides information regarding the engineering properties of the on-site materials that will likely support foundations, slabs, and pavements, or be used as controlled compacted fill, and backfill. The results of the gradation testing performed for this study are summarized in the table below. Detailed results of the gradation testing performed for this study are included in Appendix C.

SUMMARY OF GRADATION TESTING

BORING LOCATION	DEPTH (FT)	NATURAL MOISTURE CONTENT (%)	USCS CLASSIFICATION
B-1	65	26.8	Silty SAND (SM)
B-2	35	10.2	Clayey SAND with Gravel (SC)
B-5	25	10.5	Silty SAND with Gravel (SM)

BORING LOCATION	DEPTH (FT)	NATURAL MOISTURE CONTENT (%)	USCS CLASSIFICATION
B-9	55	18.3	Silty SAND (SM)
B-11	15	4.7	Poorly-graded SAND with Silt (SP-SM)
B-12	35	23.9	Silty SAND (SM)

CONCLUSIONS AND RECOMMENDATIONS

It is GTA's opinion that the proposed development of the site is feasible provided that the geotechnical recommendations are followed, and that the standard level of care is maintained during construction. Geotechnical issues that may impact site development include the presence of deep fill, the possible need for Support of Excavation (SOE) Walls, variable subsurface conditions, and the presence of the Metro North railway to the southeast. The following sections of the report provide the relevant geotechnical design parameters for the design and construction of the proposed building.

Metro North Railroad

A Metro North rail line is present to the southeast of the project site, with an easement located to the north of the proposed building. Proposed foundations located along the property line may be considered to have an impact on the Metro North structures. It may be necessary to submit a Support of Excavation (SOE) design and the design for subsurface structural elements to the Metro North for review prior to the start of work. Survey and vibration monitoring of its structures may be required during construction.

Shallow Foundations – Mat Slab and Spread Footings

The proposed structure may be supported by conventional shallow spread foundations bearing in the natural glacial soils, Class 3b or 3a, at a depth of at least 13 feet below the existing site grade. Spread footings bearing in the glacial soils at this depth can be designed using an allowable bearing pressure of 5,000 pounds per square foot (psf). Settlement of footings bearing in the natural soils is anticipated to be less than 1-inch. The at grade portion of the building will have to supported at this depth due to deep fill and soft soils encountered in the upper 13 feet. It may be cost effective to redesign the building to have a full cellar to make use of the deep excavations required.

If the structure is redesigned to have a full basement level, and the allowable bearing pressures result in spread footings that are becoming too large, we believe the structure can be supported by a mat foundation bearing in the natural soil about 15 feet below the existing site grade. Settlements on the order of ¾-inch to 1-inch are estimated for a mat foundation bearing at this depth assuming an allowable bearing pressure of 3,500 pounds per square foot (psf). A modulus of subgrade reaction of 150 pounds per cubic inch may be used for the design of the mat. If a mat design is used, GTA should be allowed the opportunity to review the bearing pressure diagram to confirm if has been designed with the recommendations of this report.

Where soft/loose natural soils, clay, or existing fill materials are encountered at the footing subgrade or within the zone of foundation stress influence, the foundation excavations should extend to stable natural materials. Footing subgrades requiring over-excavation may be backfilled to the design bearing grade with lean concrete or crushed stone meeting the gradational requirements of AASHTO Size No. 57. The decision to undercut footings or perform other foundation remedial measures should be made in the field by the geotechnical engineer during footing construction. If a mat foundation is used, we recommend excavating the soil subgrade and placing a 6-inch layer of crushed aggregate over the exposed support to help maintain the stability of the subgrade and facilitate dewatering during periods of inclement weather.

Footing subgrades should be thoroughly cleaned of all mud, debris, and loose material prior to the placement of concrete. The subgrade must be evaluated to verify the bearing capacity of the soil and documented by an engineering technician working under the supervision of a professional engineer licensed in the State of New York. Detailed foundation subgrade evaluations should be performed as sections are prepared prior to the placement of reinforcing steel or concrete to confirm that the design allowable soil bearing capacity is available. The subgrade evaluations should be performed using a combination of visual observation, hand-rod probing, Dynamic Cone Penetrometer testing, and comparisons with the test borings.

Seismic Information

The proposed structure must be designed in accordance with all applicable New York City Building Code seismic design criteria. The site classes are based on the average soil properties in the upper 100 feet. It is GTA's opinion that the soils encountered in the borings most closely resemble a "Stiff Soil Profile," Site Class D. The soil profile is based on Table 1613.5.2 of the NYCBC, and the peak accelerations may be estimated using Tables 1613.5.3(1) and 1613.5.3(2). It is our assessment that liquefaction is unlikely based on the subsurface conditions encountered in the borings.

Excavation and Support of Excavation Walls

All construction excavations should be sloped and shored per OSHA excavation regulations or stricter local governing safety codes. It is GTA's opinion that the existing fill, undisturbed natural soils, or controlled compacted fill composed of similarly-graded materials would generally be classified as "Type C" soils under the OSHA excavation regulations. Flatter excavation sideslopes will be required where water seepage occurs. Positive drainage should be maintained during construction to prevent inundation of subgrade soils by surface water runoff.

We anticipate that Support of excavation (SOE) walls may be required along portions of the property line where proper sideslopes cannot be maintained in order to prevent ground loss and undermining of adjacent structures, sidewalks, utilities and roadways. The SOE walls will need to be designed for the appropriate surcharge loads, hydrostatic and lateral earth pressures. We believe drilled soldier piles and timber lagging would be an appropriate SOE system for this project. Depending on the depth of the excavation and type of soldier piles used, one or more levels of bracing may be required to resist lateral earth pressures. The SOE maybe designed using the parameters presented in the *Lateral Earth Pressure and Damp/Waterproofing* section of this report. Survey monitoring should be performed on the SOE walls to measure structural deflections and potential ground movements.

Lateral Earth Pressure and Damp/Waterproofing

Below-grade foundation walls, and temporary SOE walls (if required) will have to be designed to resist the lateral earth pressure. These elements should also be designed for appropriate hydrostatic and surcharge pressures. The foundation walls for this project are expected to be braced by the cellar and first floor slabs and thus restrained from movement at the top, creating an "at-rest" earth pressure condition. Surcharge loads from adjacent floor slabs, roadways, elevated rail structures etc. must also be considered. The following soil properties can be used for design of below grade structural elements, assuming horizontal backfill:

- Soil Unit Weight (γ) = 125 pcf
- Internal Friction Angle (φ) = 30°
- Active Earth Pressure Coefficient (K_A) = 0.3
- Passive Earth Pressure Coefficient (K_P) = 3.0
- At-Rest Earth Pressure Coefficient (K_0) = 0.5

To reduce dampness within below grade areas, GTA recommends that the foundation walls be damp proofed or waterproofed in accordance with requirements of Section 1807 of the NYCBC. Damp proofing/waterproofing can be accomplished through the use of mastics, bituthene membranes, or pre-applied membranes. A drainage composite should be placed over the damp proofing/waterproofing material for protection during backfilling. Seepage water may become trapped against foundation walls, elevator pits and utility pits at locations where the foundation elements extend into the bedrock stratum. A perimeter drain or underslab should be considered to protect against stormwater infiltration and may discharge into an approved drainage system that complies with the *New York City Plumbing Code*. The perimeter drain should consist of a minimum 4-inch diameter perforated pipe encased by No. 57 crushed aggregate and wrapped in a non-woven filter fabric.

Utilities

GTA has not been provided with information regarding proposed underground utilities; however, it is our opinion that the natural soils or controlled compacted fill are considered suitable for support of subsurface utilities, which will likely include water, storm, and sanitary sewer lines. GTA recommends that a six-inch thick granular bedding consisting of AASHTO No. 57 stone aggregate be placed where loose or soft soil is encountered to provide uniform support as dictated by site conditions. Utilities installed below pavements, sidewalks, and other structural areas should be backfilled using controlled fill, compacted in accordance with the *Backfill and Compaction* section of this report.

Contractors should provide adequate earth support and dewatering systems in utility trench excavations as required. Problems associated with water seepage include partial loss of stability, sloughing of soils, and running sands. These problems can be reduced at the time of construction through the use of "sump and pump" dewatering techniques.

Backfill and Compaction

All fill placed beneath sidewalks, slabs-on-grade, pavements, and used for backfilling foundation walls should consist of controlled compacted fill. Backfill should be spread in layers on the order of 8 to 12 inches in loose thickness and each layer should be compacted to at least 95 percent of the maximum dry density at moisture contents required to achieve the required densities per the ASTM D-1557 (modified Proctor) test procedure. All compactive effort should be verified by in-place density testing by an engineering technician working under the supervision of a professional engineer licensed in the State of New York. The New York City Building Code requires that fill subgrades and each lift of fill be observed and tested on a full-time basis.

The natural site soils are considered suitable for use as controlled fill with some limitations. Moisture conditioning of the on-site soils may be necessary to attain the recommended degree of compaction, depending on the prevailing weather conditions at the time the earthwork is performed. Off-site borrow, if required, should meet USCS designation SM, SP, SW, GP, GM, or GW and be approved by the geotechnical engineer before use.

Pre-construction Survey and Monitoring

A pre-construction survey should be conducted for each of the neighboring buildings, structures, and properties to document existing conditions. Each building and/or structure should be inspected and photographed, inside and out, to record existing conditions. The pre-condition survey will provide the owner and foundation contractor with a baseline to assess potential future damage claims. The survey should be prepared prior to the start of construction.

A survey-monitoring program should be implemented for the neighboring buildings, particularly in areas adjacent to foundation work. A minimum of three benchmark locations should be established on the exterior of each of the adjacent buildings prior to the start of new construction. The benchmarks should be read a minimum of two times per week throughout the duration of the foundation construction. Any observable movement, horizontal or vertical displacement, should be immediately brought to the attention of the construction manager and excavation should be suspended until the issue is addressed by the Owner and his appropriate professionals. Vibration monitoring should also be performed during pile driving or drilling operations, if required for SOE walls. Monitoring of the MTA structures will need to be performed as required in accordance with MTA standards.

LIMITATIONS

This report, including all supporting exploration logs, field data, field notes, laboratory testing, calculations, estimates and other documents prepared by GTA in connection with this Project have been prepared for the exclusive use of Longhouse Properties (Client) pursuant to the June 29, 2021 agreement between GTA and the Client, and in accordance with generally accepted engineering practice. All terms and conditions set forth in the Agreement and the General Provisions attached thereto are incorporated herein by reference. No warranty, express or implied, is made herein. Use and reproduction of this report by any other person without the expressed written permission of GTA and Longhouse Properties is unauthorized and such use is at the sole risk of the user.

The analysis and recommendations contained in this report are based on the data obtained from limited observation of the encountered materials. The test borings indicate soil conditions only at the test boring locations and times and only at the depth penetrated. It does not necessarily reflect strata or variations that may exist between or beyond the exploration locations. Consequently, the analysis and recommendations must be considered preliminary until the subsurface conditions can be further evaluated by additional explorations and verified by direct observation at the time of construction. If variations of subsurface conditions from those described in this preliminary report are noted during construction, recommendations in this report may need to be re-evaluated.

In the event that any changes in the nature, design, or location of the improvements are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report are verified in writing. GTA is not responsible for any claims, damages, or liability associated with interpretation of subsurface data or reuse of the subsurface data or engineering analysis without the expressed written authorization of GTA.

The scope of our services for this geotechnical exploration did not include any environmental assessment or investigation for the presence or absence of wetlands, or hazardous or toxic materials in the soil, surface water, groundwater or air, on or below or around this site. Any statements in this report or on the logs regarding odors or unusual or suspicious items or conditions observed are strictly for the information of our Client.

This report and the attached log are instruments of service. The subject matter of this report is limited to the facts and matters stated herein. Absence of a reference to any other conditions or subject matter shall not be construed by the reader to imply approval by the writer. We appreciate the opportunity to provide assistance to you for this project. Please contact us at (201) 641-1850 if you have questions regarding this report.

34211441 **GTA Engineering Services of New York, P.C.**

Important Information about Your
Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical-Engineering Report Is Based on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical-engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical-engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold-prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical-engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold-prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your GBA-Member Geotechncial Engineer for Additional Assistance

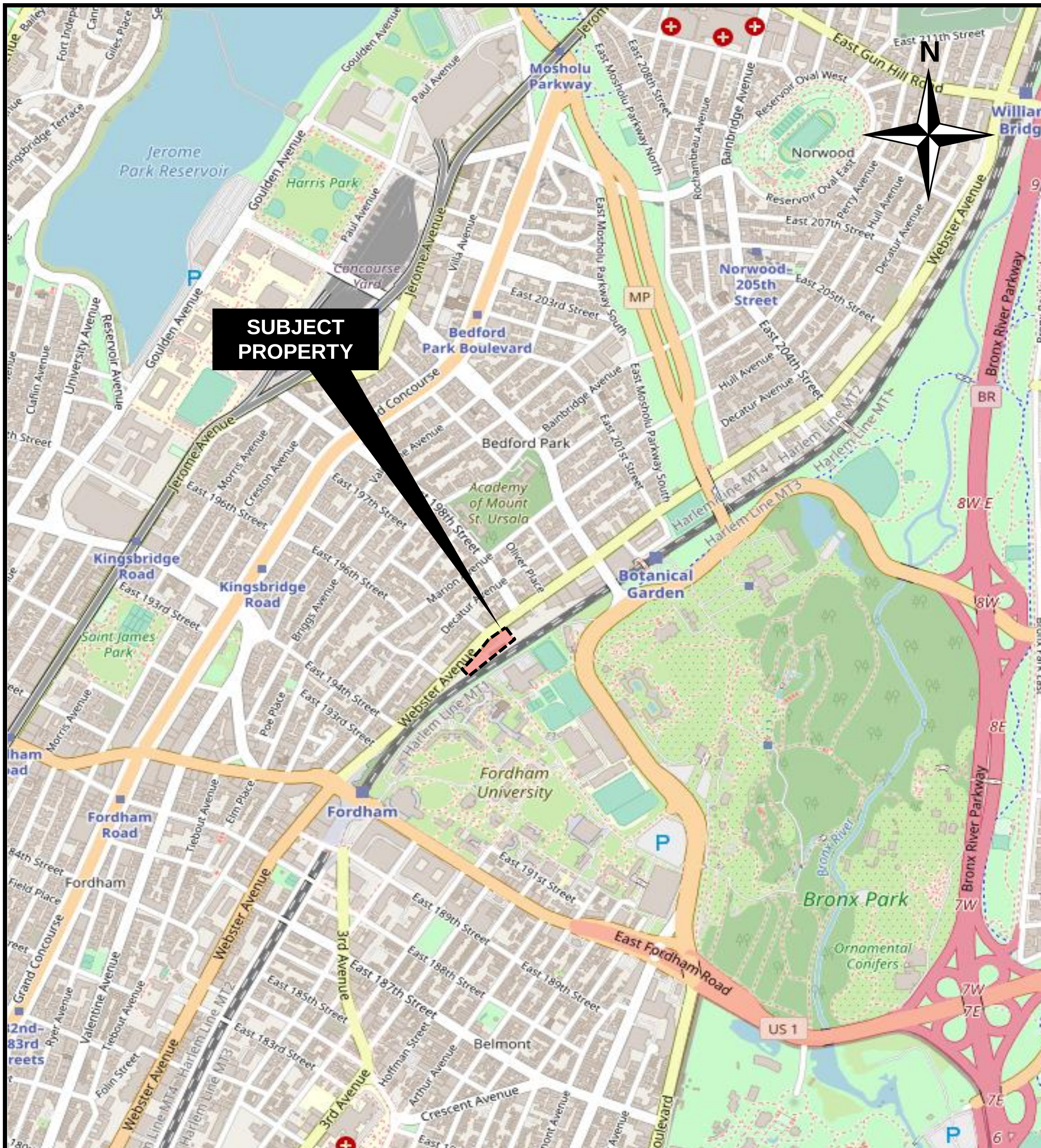
Membership in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk confrontaton techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your GBA-member geotechnical engineer for more information.

GEOPROFESSIONAL BUSINESS ASSOCIATION

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org

APPENDIX A

Figures



SITE LOCATION MAP

211-K Gates Road
Little Ferry, New Jersey 07643
(201) 641-1850
fax (201) 641-1655

GTA ENGINEERING SERVICES OF NEW YORK, P.C.

2740 Webster Avenue

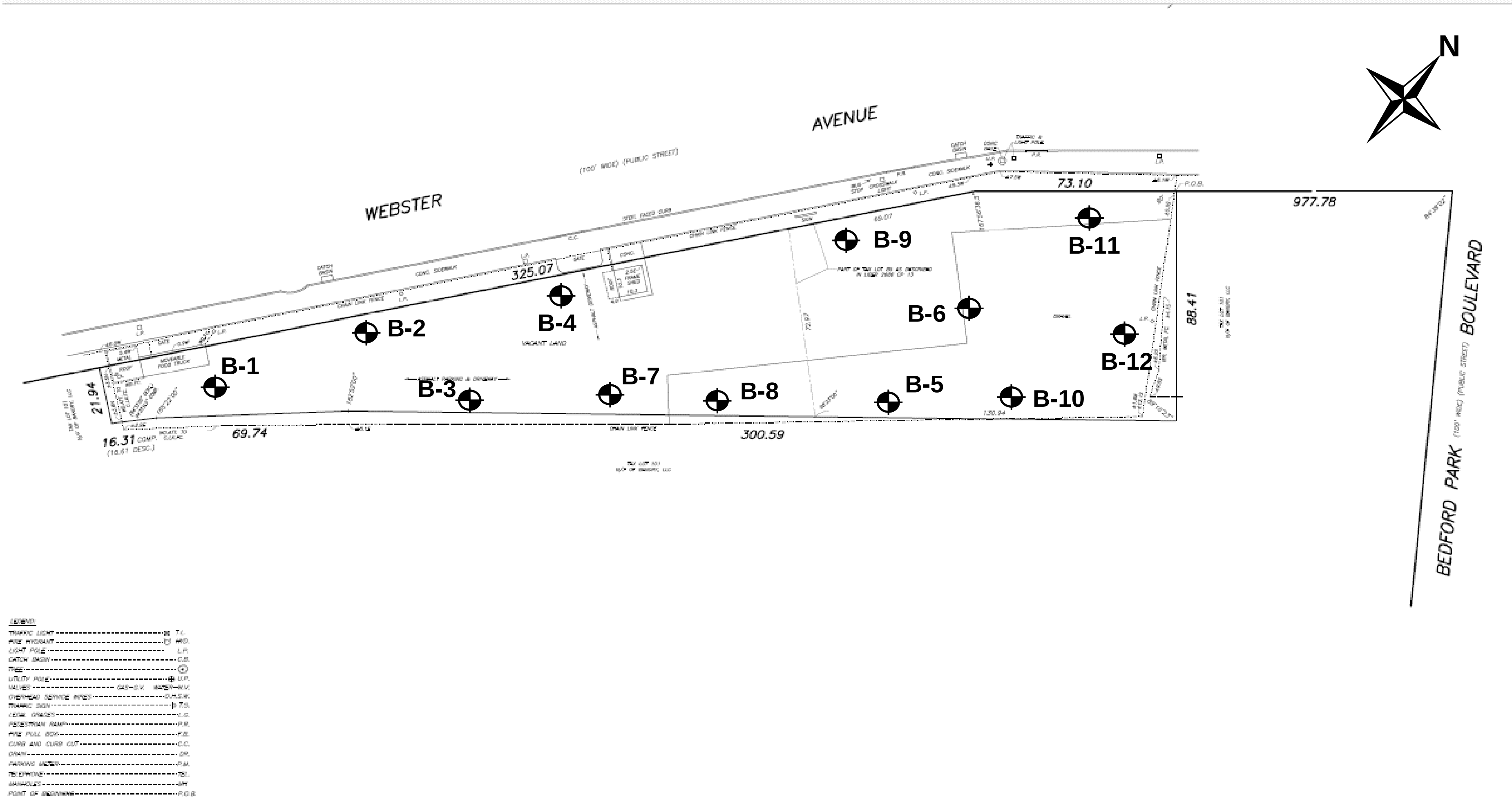
Borough of The Bronx, New York

Prepared For: Longhouse Properties

SOURCE: Open Street Maps, 2021

SCALE: NTS	DATE: JAN 2022	PROJECT #: 34211441

Figure 1



BORING LOCATION PLAN

211-K Gates Road
Little Ferry, New Jersey 07643
(201) 641-1850
fax (201) 641-1655

GTA ENGINEERING SERVICES OF NEW YORK, P.C.

LEGEND:

⊕ **B-X** Approximate location of test boring preformed

2740 Webster Avenue

Borough of The Bronx, New York

Prepared For: Longhouse Properties LLC

DESIGN BY: *	DRAWN BY: BG	REVIEWED BY: RD
SCALE: NTS	DATE: JAN 2022	PROJECT #: 34211441

APPENDIX B

Exploration Logs

NOTES FOR EXPLORATION LOGS

KEY TO USCS TERMINOLOGY AND GRAPHIC SYMBOLS

MAJOR DIVISIONS (BASED UPON ASTM D 2488)				SYMBOLS GRAPHIC	SYMBOLS LETTER
COARSE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LESS THAN 15% PASSING THE NO. 200 SIEVE)			GW
					GP
		GRAVELS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)			GM
					GC
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LESS THAN 15% PASSING THE NO. 200 SIEVE)			SW
					SP
		SANDS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)			SM
					SC
FINE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILT OR CLAY (<15% RETAINED ON THE NO. 200 SIEVE) SILT OR CLAY WITH SAND OR GRAVEL (15% TO 30% RETAINED ON THE NO. 200 SIEVE) SANDY OR GRAVELLY SILT OR CLAY (>30% RETAINED ON THE NO. 200 SIEVE)		SILTS AND LEAN CLAYS LIQUID LIMIT LESS THAN 50		ML
					CL
					OL
			ELASTIC SILTS AND FAT CLAYS LIQUID LIMIT GREATER THAN 50		MH
					CH
					OH
HIGHLY ORGANIC SOILS					PT

NOTE: DUAL SYMBOLS ARE USED TO INDICATE COARSE-GRAINED SOILS WHICH CONTAIN AN ESTIMATED 5 TO 15% FINES BASED ON VISUAL CLASSIFICATION OR BETWEEN 5 AND 12% FINES BASED ON LABORATORY TESTING; AND FINE-GRAINED SOILS WHEN THE PLOT OF LIQUID LIMIT & PLASTICITY INDEX VALUES FALLS IN THE PLASTICITY CHART'S CROSS-HATCHED AREA. FINE-GRAINED SOILS ARE CLASSIFIED AS ORGANIC (OL OR OH) WHEN ENOUGH ORGANIC PARTICLES ARE PRESENT TO INFLUENCE ITS PROPERTIES. LABORATORY TEST RESULTS ARE USED TO SUPPLEMENT SOIL CLASSIFICATION BY THE VISUAL-MANUAL PROCEDURES OF ASTM D 2488.

ADDITIONAL TERMINOLOGY AND GRAPHIC SYMBOLS

	DESCRIPTION		GRAPHIC SYMBOLS
ADDITIONAL DESIGNATIONS	TOPSOIL		
	MAN MADE FILL		
	GLACIAL TILL		
	COBBLES AND BOULDERS		
RESIDUAL SOIL DESIGNATIONS	DESCRIPTION	"N" VALUE	
	HIGHLY WEATHERED ROCK	50 TO 50/1"	
	PARTIALLY WEATHERED ROCK	MORE THAN 50 BLOWS FOR 1" OF PENETRATION OR LESS, AUGER PENETRABLE	

COARSE-GRAINED SOILS
(GRAVEL AND SAND)

DESIGNATION	BLOWS PER FOOT (BPF) "N"
VERY LOOSE	0 - 4
LOOSE	5 - 10
MEDIUM DENSE	11 - 30
DENSE	31 - 50
VERY DENSE	>50

NOTE: "N" VALUE DETERMINED AS PER ASTM D 1586

FINE-GRAINED SOILS
(SILT AND CLAY)

CONSISTENCY	BPF "N"
VERY SOFT	<2
SOFT	2 - 4
MEDIUM STIFF	5 - 8
STIFF	9 - 15
VERY STIFF	16 - 30
HARD	>30

NOTE: ADDITIONAL DESIGNATIONS TO ADVANCE SAMPLER INDICATED IN BLOW COUNT COLUMN:
WOH = WEIGHT OF HAMMER
WOR = WEIGHT OF ROD(S)

SAMPLE TYPE

DESIGNATION	SYMBOL
SOIL SAMPLE	S-
SHELBY TUBE	U-
ROCK CORE	R-

WATER DESIGNATION

DESCRIPTION	SYMBOL
ENCOUNTERED DURING DRILLING	
UPON COMPLETION OF DRILLING	
24 HOURS AFTER COMPLETION	

NOTE: WATER OBSERVATIONS WERE MADE AT THE TIME INDICATED. POROSITY OF SOIL STRATA, WEATHER CONDITIONS, SITE TOPOGRAPHY, ETC. MAY CAUSE WATER LEVEL CHANGES.

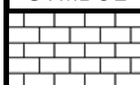
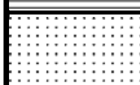
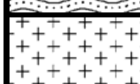
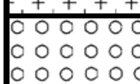
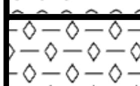
NOTES FOR ROCK DESCRIPTION

WEATHERING TERM	DESCRIPTION
FRESH	ROCK CRYSTALS BRIGHT. COLOR OF CORE IS CONSISTENT. JOINTS SHOW LITTLE STAINING.
SLIGHTLY WEATHERED	ROCK GENERALLY FRESH. JOINTS STAINED AND DISCOLORATION AROUND JOINTS MAY EXTEND UP TO 0.5 INCHES INTO ROCK. SOME CRYSTALS MAY APPEAR DULL OR DISCOLORED.
MODERATELY WEATHERED	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION. MANY VISIBLE MINERALS ARE DULL AND DISCOLORED. ROCK HAS DULL SOUND WHEN HIT BY HAMMER AND HAS SIGNIFICANT STRENGTH LOSS.
HIGHLY WEATHERED	ALL ROCK IS DISCOLORED AND STAINED. ROCK FABRIC IS EVIDENT BUT ZONES OF ROCK HAVE BEEN REDUCED TO SOFT STRENGTH. SOME HARD PIECES OF ROCK ARE USUALLY PRESENT BETWEEN SOFT ZONES.

HARDNESS DESCRIPTION	STRENGTH RANGE (PSI)	FIELD HARDNESS TEST
VERY HARD	>10,000	CANNOT BE SCRATCHED WITH KNIFE. CORE RINGS UNDER HARD BLOWS OF A HAMMER.
HARD	3,500 to 10,000	DIFFICULT TO SCRATCH WITH KNIFE. HARD BLOW OF HAMMER REQUIRED TO BREAK.
MODERATELY HARD	1,500 to 3,500	CAN BE SCRATCHED WITH KNIFE. MODERATE BLOW OF HAMMER BREAKS CORE.
SOFT	500 to 1,500	CAN BE GOUGED OR GROOVED WITH KNIFE. SMALL PIECES CAN BE BROKEN BY HAND.

FRACTURING CLASSIFICATION	DESCRIPTION
HIGHLY FRACTURED	LESS THAN 2 INCHES
MODERATELY FRACTURED	2 INCHES TO 12 INCHES
SLIGHTLY FRACTURED	12 INCHES TO 36 INCHES
MASSIVE	GREATER THAN 36 INCHES

BEDDING DESCRIPTION	SEPARATION
VERY THIN	LESS THAN 2 INCHES
THIN	2 INCHES TO 1 FOOT
MEDIUM	1 FOOT TO 3 FEET
THICK	3 FEET TO 10 FEET
VERY THICK	MORE THAN 10 FEET

GRAPHIC SYMBOL	ROCK DESCRIPTION
	LIMESTONE/DOLOMITE/MARBLE (CARBONATE ROCK)
	SHALE/MUDSTONE/SILTSTONE (FINE-GRAINED SEDIMENTARY ROCKS)
	SANDSTONE
	SLATE/PHYLLITE (FINE-GRAINED METAMORPHIC ROCKS)
	GNEISS/SCHIST (COARSE-GRAINED METAMORPHIC ROCKS)
	BASALT/DIABASE/GABBRO (IGNEOUS ROCKS)
	CONGLOMERATE
	GYPSUM

<u>DESCRIPTION SYNTAX</u>: COLOR, WEATHERING, HARDNESS, FRACTURING, ROCK TYPE, “WITH” BEDDING (IF SEDIMENTARY).

<u>ROCK QUALITY DESIGNATION</u> (RQD) =

$$\left[\frac{\text{TOTAL LENGTH OF CORE PIECES THAT ARE 4-INCHES OR LONGER (IN.)}}{\text{TOTAL LENGTH OF CORE RUN (IN.)}}\right] \text{X } 100\%$$

LOG OF BORING NO. B-1

PROJECT: **2740-2768 Webster Avenue**
PROJECT NO.: **34211441**
PROJECT LOCATION: **Bronx, New York**

WATER LEVEL (ft): **24 ft.** | **----** | **BOC**
DATE: **12-13-21** | **----** | **12-14-21**
NORTHING: **----** EASTING: **----**

DATE STARTED: **12-13-2021**
DATE COMPLETED: **12-14-2021**
DRILLING CONTRACTOR: **D.K. Drilling of New York, Inc.**
DRILLER: **Kostas**
DRILLING METHOD: **Mud Rotary**
SAMPLING METHOD: **SPT**

HAMMER TYPE: **Automatic**
GROUND SURFACE ELEVATION: **0.0 +/-**
DATUM: **Sidewalk**
EQUIPMENT: **CME 75**
LOGGED BY: **BG**
CHECKED BY: **RD**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	SPT-N VALUE	ELEVATION (ft.)	DEPTH (ft.)	STRATA	DESCRIPTION	REMARKS
S-1	0.0	8	11-9-6-15	15	0.0 -0.2	0	FILL	2" Asphalt FILL: Brown, moist, medium dense, silty sand with gravel and concrete fragments and debris (Class 7)	
S-2	5.0	12	3-27-14-10	41		6		-same	
S-3	10.0	14	3-2-1-3	3		10		F2: Black to brown, moist, dense, sandy clay with gravel (Class 7)	
					-13.0	13	SM	Brown, moist, very dense, Silty SAND with Gravel (Class 3a)	
S-4	15.0	20	27-37-32-28	69		16		-same	
S-5	20.0	15	17-33-50-46	83		20		-same	
						24			▽
S-6	25.0	10	22-17-13-12	30		26		-same, wet, dense, less Gravel	
S-7	30.0	20	3-4-6-10	10	-30.0	30	CL	Orange brown, wet, stiff Sandy CLAY, with Gravel (Class 4b)	-residual soil
S-8	35.0	16	12-13-15-15	28		36		-same, brown, very stiff	
S-9	40.0	10	21-24-50/3"	74+	-40.0	40	HW	Brown, Highly weathered ROCK (Class 1d)	
S-10	45.0	14	26-34-44-56	78		46		-same	
S-11	50.0	12	38-47-52-50/3"	99		50		-same	
S-12	55.0	10	47-50/5"	50+		56		-same	
						60			

NOTES: **BOC = Backfilled on competition**

LOG OF BORING NO. B-1

PROJECT: **2740-2768 Webster Avenue**
PROJECT NO.: **34211441**
PROJECT LOCATION: **Bronx, New York**

WATER LEVEL (ft):	24 ft.	----	BOC
DATE:	12-13-21	----	12-14-21
CAVED (ft):	----	----	BOC

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	SPT-N VALUE	ELEVATION (ft.)	DEPTH (ft.)	STRATA	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S-13	61.0	4	50/4"	50+		62	HW		Brown, Highly weathered ROCK (Class 1d)	
S-14	65.0	16	14-26-28-39	54		66			-same	
S-15	70.0	20	29-27-31-52	58		70			-same	
S-16	75.0	10	21-25-27-35	52		76			-same	
S-17	80.0	1	50/2"	50+		80			-same	
S-18	90.0	2	50/2"	50+		90			-same	
S-19	100.0	1	50/1"	50+	-100.1	100			-same Boring complete at 100.1ft.	

Depth scale (ft.): 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100

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211-K Gates Road
Little Ferry, NJ 07643

LOG OF BORING NO. B-2

PROJECT: **2740-2768 Webster Avenue**
PROJECT NO.: **34211441**
PROJECT LOCATION: **Bronx, New York**

WATER LEVEL (ft): **20 ft.** | **----** | **BOC**
DATE: **12-10-21** | **----** | **12-10-21**
NORTHING: **----** EASTING: **----**

DATE STARTED: **12-10-2021**
DATE COMPLETED: **12-10-2021**
DRILLING CONTRACTOR: **D.K. Drilling of New York, Inc.**
DRILLER: **Kostas**
DRILLING METHOD: **HSA**
SAMPLING METHOD: **SPT**

HAMMER TYPE: **Automatic**
GROUND SURFACE ELEVATION: **0.0 +/-**
DATUM: **Sidewalk**
EQUIPMENT: **CME 75**
LOGGED BY: **BG**
CHECKED BY: **RD**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	SPT-N VALUE	ELEVATION (ft.)	DEPTH (ft.)	STRATA	DESCRIPTION	REMARKS
S-1	0.0	12	8-5-6-6	11	0.0	0		2" Asphalt	
					-0.2		FILL	FILL: Brown, moist, medium dense, silty sand with gravel, brick fragments, and debris (Class 7)	
S-2	2.0	2	11-7-4-3	11		2		-same	
S-3	5.0	2	7-4-5-7	9		6		-same, with wood	
S-4	10.0	15	3-3-2-4	5	-10.0	10	SM	Brown, moist, loose, Silty SAND with Gravel (Class 6)	
S-5	15.0	12	8-10-8-6	18		16		-same, medium dense (Class 3b)	
S-6	20.0	20	9-6-6-7	12		20		-same, wet	▼ (water level)
S-7	25.0	10	9-15-21-13	36		26		-same, dense, more Gravel (Class 3a)	-boulder encountered at 28 ft.
S-8	30.0	15	15-11-12-14	23	-30.0	30	SC/CL	Orange brown, wet, very stiff, Sandy CLAY with Gravel (Class 4b)	
S-9	35.0	18	20-22-18-26	40		36		-same, hard (Class 4a)	
					-37.0	37		Boring complete at 37 ft.	

NOTES: **BOC = Backfilled on completion**

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211-K Gates Road
Little Ferry, NJ 07643

LOG OF BORING NO. B-2

LOG OF BORING NO. B-3

PROJECT: **2740-2768 Webster Avenue**
PROJECT NO.: **34211441**
PROJECT LOCATION: **Bronx, New York**

WATER LEVEL (ft): **20 ft.** | **----** | **BOC**
DATE: **12-10-21** | **----** | **12-10-21**
NORTHING: **----** EASTING: **----**

DATE STARTED: **12-10-2021**
DATE COMPLETED: **12-10-2021**
DRILLING CONTRACTOR: **D.K. Drilling of New York, Inc.**
DRILLER: **Kostas**
DRILLING METHOD: **HSA**
SAMPLING METHOD: **SPT**

HAMMER TYPE: **Automatic**
GROUND SURFACE ELEVATION: **0.0 +/-**
DATUM: **Sidewalk**
EQUIPMENT: **CME 75**
LOGGED BY: **BG**
CHECKED BY: **RD**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	SPT-N VALUE	ELEVATION (ft.)	DEPTH (ft.)	STRATA	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					0.0	0			2" Asphalt	
S-1	0.0	15	10-8-15-37	23	-0.2		FILL		FILL: Brown, moist, medium dense, silty sand with gravel and debris (Class 7)	
S-2	2.0	20	14-27-25-18	52		2			-same, dense, with brick fragments	
S-3	5.0	5	8-5-6-9	11		6			-same, medium dense, no brick, with wood fragments	
S-4	10.0	10	5-4-3-2	7	-10.0	10	CL		Dark gray, moist, medium stiff, Sandy CLAY (Class 4c)	
S-5	15.0	1	50/1"		-15.0	16	SM		Gray, moist, medium dense, Silty SAND with Gravel (Class 3b)	-boulder encountered at 15 ft.
S-6	20.0	8	4-7-7-9	14		20			-same, brown, wet	(water level 20 ft.)
S-7	25.0	14	10-11-14-19	25		26			-same	
					-27.0				Boring complete at 27 ft.	

NOTES: **BOC = Backfilled on completion**

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Service of NY, P.C.
211-K Gates Road
Little Ferry, NJ 07643

LOG OF BORING NO. B-4

PROJECT: **2740-2768 Webster Avenue**
PROJECT NO.: **34211441**
PROJECT LOCATION: **Bronx, New York**

WATER LEVEL (ft): **20 ft.** | **----** | **BOC**
DATE: **12-10-21** | **----** | **12-10-21**
NORTHING: **----** EASTING: **----**

DATE STARTED: **12-10-2021**
DATE COMPLETED: **12-10-2021**
DRILLING CONTRACTOR: **D.K. Drilling of New York, Inc.**
DRILLER: **Kostas**
DRILLING METHOD: **HSA**
SAMPLING METHOD: **SPT**

HAMMER TYPE: **Automatic**
GROUND SURFACE ELEVATION: **0.0 +/-**
DATUM: **Sidewalk**
EQUIPMENT: **CME 75**
LOGGED BY: **BG**
CHECKED BY: **RD**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	SPT-N VALUE	ELEVATION (ft.)	DEPTH (ft.)	STRATA	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S-1	0.0	18	8-8-6-12	14	0.0 / -0.2	0	FILL		2" Asphalt	
S-2	2.0	8	18-8-5-5	13		2			FILL: Brown, moist, medium dense, silty sand with gravel, asphalt fragments, and debris (Class 7)	
						4			-same	
S-3	5.0	12	2-3-4-13	7		6			-same	
						8				2' obstruction at 7 ft. (concrete or boulder)
S-4	10.0	5	5-5-4	9		10			-same	
					-13.0	12				
						14	SM		Brown, moist, medium dense, Silty SAND with Gravel (Class 3b)	
S-5	15.0	15	8-21-24-34	45		16			-same, dense (Class 3a)	
						18				
S-6	20.0	22	8-9-9-14	18		20			-same, wet, medium dense (Class 3b)	▼ (water level)
						22				
S-7	25.0	20	20-20-18-18	38		24, 26			-same, dense (Class 3a)	
						28				
S-8	30.0	24	12-15-14-21	29	-30.0	30	CL		White, wet, very stiff, Sandy CLAY with trace Gravel (Class 4b)	-residual soil
						32, 34				
S-9	35.0	15	22-21-33-30	54	-37.0	36			-same, brown, hard (Class 4a)	
									Boring complete at 47 ft.	

NOTES: **BOC = Backfilled on completion**

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211-K Gates Road
Little Ferry, NJ 07643

LOG OF BORING NO. B-5

PROJECT: **2740-2768 Webster Avenue**
PROJECT NO.: **34211441**
PROJECT LOCATION: **Bronx, New York**

WATER LEVEL (ft): **20 ft.** | **----** | **BOC**
DATE: **12-9-21** | **----** | **12-9-21**
NORTHING: **----** EASTING: **----**

DATE STARTED: **12-9-2021**
DATE COMPLETED: **12-9-2021**
DRILLING CONTRACTOR: **D.K. Drilling of New York, Inc.**
DRILLER: **Kostas**
DRILLING METHOD: **HSA**
SAMPLING METHOD: **SPT**

HAMMER TYPE: **Automatic**
GROUND SURFACE ELEVATION: **0.0 +/-**
DATUM: **Sidewalk**
EQUIPMENT: **CME 75**
LOGGED BY: **BG**
CHECKED BY: **RD**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	SPT-N VALUE	ELEVATION (ft.)	DEPTH (ft.)	STRATA	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S-1	0.0	10	9-9-10-10	19	0.0	0	FILL		2" Gravel FILL: Brown, moist, medium dense, Silty SAND with Gravel (Class 7)	
S-2	2.0	14	10-10-8-7	18		2			-same, with brick fragments	
						4				
S-3	5.0	10	6-5-6-50/0"	11		6			F2: Gray, decomposed concrete	-2' of decomposed concrete encountered at 6.5 ft.
						8				
S-4	10.0	20	5-3-4-4	7	-10.0	10	CL		Dark Gary, moist, medium stiff, Sandy CLAY (Class 4c)	
						12				
						14				
S-5	15.0	12	15-13-16-14	29	-15.0	16	SP-SM		Brown, moist, medium dense, Poorly-graded SAND with Gravel and Silt (Class 3b)	
						18				
S-6	20.0	16	5-6-6-7	12		20			-same, wet	▽
						22				
						24				
S-7	25.0	22	7-15-15-21	30		26			-same, dense (Class 3a)	
					-27.0				Boring complete at 27 ft.	

NOTES: **BOC = Backfilled on completion**

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Service of NY, P.C.
211-K Gates Road
Little Ferry, NJ 07643

LOG OF BORING NO. B-6

PROJECT: **2740-2768 Webster Avenue**
PROJECT NO.: **34211441**
PROJECT LOCATION: **Bronx, New York**

WATER LEVEL (ft): **20 ft.** | **----** | **BOC**
DATE: **12-9-21** | **----** | **12-9-21**
NORTHING: **----** EASTING: **----**

DATE STARTED: **12-9-2021**
DATE COMPLETED: **12-9-2021**
DRILLING CONTRACTOR: **D.K. Drilling of New York, Inc.**
DRILLER: **Kostas**
DRILLING METHOD: **HSA**
SAMPLING METHOD: **SPT**

HAMMER TYPE: **Automatic**
GROUND SURFACE ELEVATION: **0.0 +/-**
DATUM: **Sidewalk**
EQUIPMENT: **CME 75**
LOGGED BY: **BG**
CHECKED BY: **RD**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	SPT-N VALUE	ELEVATION (ft.)	DEPTH (ft.)	STRATA	DESCRIPTION	REMARKS
S-1	0.0	20	8-13-27-22	40	0.0	0	FILL	2' Gravel FILL: Brown, moist, dense, silty sand with gravel and debris (Class 7)	
S-2	5.0	4	50/4"	50+		6		-same, with concrete	-concrete encountered from 5.5 ft. to 8.5 ft.
S-3	10.0	1	6-12-11-8	23		10		-black with wood	
					-13.0	13	SP-SM	Brown, moist, medium dense, Poorly-grade SAND with Silt and Gravel (Class 3b)	
S-4	15.0	15	14-12-14-16	26		15		-same	
S-5	20.0	16	6-8-8-9	16		20		-same, wet	(water level symbol)
S-6	25.0	12	14-18-19-18	37		25		-same, dense (Class 3a)	
					-27.0	27		Boring complete at 27 ft.	

NOTES: **BOC = Backfilled on completion**

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LOG OF BORING NO. B-7

PROJECT: **2740-2768 Webster Avenue**
PROJECT NO.: **34211441**
PROJECT LOCATION: **Bronx, New York**

WATER LEVEL (ft): **20 ft.** | **----** | **BOC**
DATE: **12-15-21** | **----** | **12-16-21**
NORTHING: **----** EASTING: **----**

DATE STARTED: **12-15-2021**
DATE COMPLETED: **12-16-2021**
DRILLING CONTRACTOR: **D.K. Drilling of New York, Inc.**
DRILLER: **Kostas**
DRILLING METHOD: **Mud Rotary**
SAMPLING METHOD: **SPT**

HAMMER TYPE: **Automatic**
GROUND SURFACE ELEVATION: **0.0 +/-**
DATUM: **Sidewalk**
EQUIPMENT: **CME 75**
LOGGED BY: **BG**
CHECKED BY: **RD**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	SPT-N VALUE	ELEVATION (ft.)	DEPTH (ft.)	STRATA	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S-1	0.0	14	9-6-7-7	13	0.0 -0.2	0	FILL		2" Asphalt FILL: Dark brown, moist, medium dense, silty sand with gravel, brick fragments and debris (Class 7)	
S-2	5.0	10	41-22-10-4	32		5			-same, Black with wood	-6" of concrete from 4.5 to 5 ft.
S-3	10.0	<1	8-5-3-4	8		10			-same	
					-13.0	13	SM		Gray, moist, medium dense, Silty SAND with Gravel (Class 3b)	
S-4	15.0	12	21-14-12-13	26		15			-same	
S-5	20.0	10	32-50/4"	50+		20			-same, dense	▼ (water level)
S-6	25.0	1	50/3"	50+	-25.0	25	HW		White, Highly weathered ROCK (Class 1d)	
S-7	30.0	1	50/3"	50+		30			-same	
S-8	35.0	0	50/1"	50+		35			-same	
S-9	40.0	2	50/2"	50+		40			-same	
S-10	45.0	2	50/3"	50+		45			-same, white to brown	
S-11	50.0	3	50/3"	50+		50			-same, brown	
S-12	55.0	1	50/1"	50+		55			-same	

NOTES: **BOC = Backfilled on completion**

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211-K Gates Road
Little Ferry, NJ 07643

LOG OF BORING NO. B-7

PROJECT: **2740-2768 Webster Avenue**
PROJECT NO.: **34211441**
PROJECT LOCATION: **Bronx, New York**

WATER LEVEL (ft):	**20 ft.**	**----**	**BOC**
DATE:	**12-15-21**	**----**	**12-16-21**
CAVED (ft):	**----**	**----**	**BOC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	SPT-N VALUE	ELEVATION (ft.)	DEPTH (ft.)	STRATA	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S-13	61.0	2	50/2"	50+		62	HW		White, Highly weathered ROCK (Class 1d)	
						64				
S-14	65.0	3	50/4"	50+		66			-same, brown	
						68				
S-15	70.0	3	50/3"	50+		70			-same	
						72				
						74				
S-16	75.0	6	36-55-50/4"	105+		76			-same	
						78				
S-17	80.0	5	58-50/4"	50+		80			-same	
						82				
						84				
						86				
						88				
S-18	90.0	6	56-50/5"	50+		90			-same	
						92				
						94				
						96				
						98				
						100				
S-19	100.0	4	50/4"	50+	-100.4				-same	
									Broing complete at 100.4 ft.	

LOG OF BORING NO. B-8

PROJECT: **2740-2768 Webster Avenue**
PROJECT NO.: **34211441**
PROJECT LOCATION: **Bronx, New York**

WATER LEVEL (ft): **20 ft.** | **----** | **BOC**
DATE: **12-09-21** | **----** | **12-09-21**
NORTHING: **----** EASTING: **----**

DATE STARTED: **12-09-2021**
DATE COMPLETED: **12-09-2021**
DRILLING CONTRACTOR: **D.K. Drilling of New York, Inc.**
DRILLER: **Kostas**
DRILLING METHOD: **HSA**
SAMPLING METHOD: **SPT**

HAMMER TYPE: **Automatic**
GROUND SURFACE ELEVATION: **0.0 +/-**
DATUM: **Sidewalk**
EQUIPMENT: **CME 75**
LOGGED BY: **BG**
CHECKED BY: **RD**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	SPT-N VALUE	ELEVATION (ft.)	DEPTH (ft.)	STRATA	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					0.0	0	FILL		2" Gravel	
S-1	0.0	18	6-7-6-15	13					FILL: Brown to gray, moist, medium dense, silty sand with gravel, debris, and asphalt fragments (Class 7)	
S-2	2.0	16	10-16-15-15	31		2			-same, dense, with brick fragments	
S-3	5.0	12	4-4-3-5	7		4, 6, 8			-same, loose	
S-4	10.0	20	4-4-4-5	8		10, 12			F2: Dark gray, moist, medium stiff, sandy clay (Class 7)	
					-13.0	14	SP-SM		Gray, moist, medium dense, Poorly-graded SAND with Silt and Gravel (Class 3b)	
S-5	15.0	18	15-12-14-21	26		16, 18			-same	
S-6	20.0	NR	36-22-50/3"	72		20, 22, 24			-same, very dense (Class 3a)	spoon pushing boulder
S-7	25.0	15	22-24-31-28	55	-27.0	26			-same	
									Broing complete at 27 ft.	

NOTES: **BOC = Backfilled on completion**

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211-K Gates Road
Little Ferry, NJ 07643

LOG OF BORING NO. B-8

LOG OF BORING NO. B-9

PROJECT: **2740-2768 Webster Avenue**
PROJECT NO.: **34211441**
PROJECT LOCATION: **Bronx, New York**

WATER LEVEL (ft): **20 ft.** | **----** | **BOC**
DATE: **12-08-21** | **----** | **12-08-21**
NORTHING: **----** EASTING: **----**

DATE STARTED: **12-08-2021**
DATE COMPLETED: **12-08-2021**
DRILLING CONTRACTOR: **D.K. Drilling of New York, Inc.**
DRILLER: **Kostas**
DRILLING METHOD: **Mud Rotary**
SAMPLING METHOD: **SPT**

HAMMER TYPE: **Automatic**
GROUND SURFACE ELEVATION: **0.0 +/-**
DATUM: **Sidewalk**
EQUIPMENT: **CME 75**
LOGGED BY: **BG**
CHECKED BY: **RD**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	SPT-N VALUE	ELEVATION (ft.)	DEPTH (ft.)	STRATA	DESCRIPTION	REMARKS
S-1	0.0	12	7-6-6-6	12	0.0 / -0.2	0	FILL	2" Asphalt	
S-2	2.0	20	8-8-8-10	16		2		FILL: Brown to black, moist, medium dense, silty sand with gravel and debris (Class 7)	
S-3	5.0	8	8-3-3-50/1"	6		4–8		-same, brown	
S-4	10.0	15	6-6-15-19	21	-10.0	10	SM	Brown, moist, medium dense, Silty SAND with Gravel (Class 3b)	
S-5	15.0	22	11-8-8-11	16	-15.0	16	SP-SM	Brown, moist, medium dense, Poorly-graded SAND with Silt (Class 3b)	
S-6	20.0	24	7-5-6-8	11		20		-same, wet	(water level symbol)
S-7	25.0	16	7-6-7-12	13		26		-same, with 2" lenses of SILT	
S-8	30.0	15	17-17-18-24	35	-30.0	30	SM	Gray, wet, dense, Silty SAND with Gravel (Class 3a)	
S-9	35.0	14	22-21-20-26	41		36		-same	-residual soil
S-10	40.0	22	18-12-8-21	20	-40.0	40	CL/SC	White to orange, wet, very stiff, CLAY with Sand and Gravel (Class 4b)	
S-11	45.0	20	9-18-15-23	33		46		-same, hard (Class 4a)	
S-12	50.0	15	22-31-35-41	66		50		-same, brown	
S-13	55.0	14	37-32-34-58	66	-55.0	56	HW	Highly weathered ROCK (Class 1d)	
						60			

NOTES: **BOC = Backfilled on completion**

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211-K Gates Road
Little Ferry, NJ 07643

LOG OF BORING NO. B-9

LOG OF BORING NO. B-9

PROJECT: **2740-2768 Webster Avenue**
PROJECT NO.: **34211441**
PROJECT LOCATION: **Bronx, New York**

WATER LEVEL (ft):	**20 ft.**	**----**	**BOC**
DATE:	**12-08-21**	**----**	**12-08-21**
CAVED (ft):	**----**	**----**	**BOC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	SPT-N VALUE	ELEVATION (ft.)	DEPTH (ft.)	STRATA	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S-14	60.0	20	39-41-38-52	79	-62.0	62			-same	
									Boring complete at 62 ft.	

LOG OF BORING NO. B-10

PROJECT: **2740-2768 Webster Avenue**
PROJECT NO.: **34211441**
PROJECT LOCATION: **Bronx, New York**

WATER LEVEL (ft): **20 ft.** | **----** | **BOC**
DATE: **12-09-21** | **----** | **12-09-21**
NORTHING: **----** EASTING: **----**

DATE STARTED: **12-09-2021**
DATE COMPLETED: **12-09-2021**
DRILLING CONTRACTOR: **D.K. Drilling of New York, Inc.**
DRILLER: **Kostas**
DRILLING METHOD: **HSA**
SAMPLING METHOD: **SPT**

HAMMER TYPE: **Automatic**
GROUND SURFACE ELEVATION: **0.0 +/-**
DATUM: **Sidewalk**
EQUIPMENT: **CME 75**
LOGGED BY: **BG**
CHECKED BY: **RD**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	SPT-N VALUE	ELEVATION (ft.)	DEPTH (ft.)	STRATA	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S-1	0.0	15	7-7-7-6	14	0.0	0	FILL		2" Gravel FILL: Brown, moist, medium dense, silty sand with gravel (Class 7)	
S-2	2.0	18	8-9-10-8	19		2			-same, with brick fragments	
S-3	5.0	10	3-4-15-25	19		4, 6, 8			F2: Gray, decomposed concrete	
S-4	10.0	20	5-5-6-5	11	-10.0	10	SP-SM		Brown, moist, medium dense, Poorly-graded SAND with Silt (Class 3b)	
					-12.0	12, 14	CL		Dark-gray, moist, medium stiff, CLAY	
S-5	15.0	14	30-12-15-19	27	-15.0	16, 18	SP-SM		Brown, moist, medium dense, Poorly-graded SAND with Silt and Gravel (Class 3b)	
S-6	20.0	12	15-13-10-12	23		20, 22, 24			-same, wet	▽
S-7	25.0	14	5-6-7-11	13	-25.0	26	SM		Gray-brown, moist, medium dense, Silty SAND with Gravel	
					-27.0				Broing complete at 27 ft.	

NOTES: **BOC = Backfilled on completion**

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LOG OF BORING NO. B-11

PROJECT: **2740-2768 Webster Avenue**
PROJECT NO.: **34211441**
PROJECT LOCATION: **Bronx, New York**

WATER LEVEL (ft): **20 ft.** | **----** | **BOC**
DATE: **12-07-21** | **----** | **12-07-21**
NORTHING: **----** EASTING: **----**

DATE STARTED: **12-07-2021**
DATE COMPLETED: **12-07-2021**
DRILLING CONTRACTOR: **D.K. Drilling of New York, Inc.**
DRILLER: **Dorbal**
DRILLING METHOD: **HSA**
SAMPLING METHOD: **SPT**

HAMMER TYPE: **Automatic**
GROUND SURFACE ELEVATION: **0.0 +/-**
DATUM: **Sidewalk**
EQUIPMENT: **CME 55**
LOGGED BY: **BG/NV**
CHECKED BY: **RD**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	SPT-N VALUE	ELEVATION (ft.)	DEPTH (ft.)	STRATA	DESCRIPTION	REMARKS
S-1	0.0	16	7-6-10-15	16	0.0 -0.2	0	FILL	2" Asphalt FILL: Brown to gray, moist, medium dense, Silty SAND with Gravel, brick and asphalt fragments (Class 7)	
S-2	2.0	6	10-12-10-7	22		2		-same	
S-3	5.0	<1	8-10-5-9	15		6		-same	
S-4	10.0	12	7-8-8-11	16	-10.0	10	SP-SM	Brown, moist, medium dense, Poorly-graded SAND with Silt (Class 3b)	
S-5	15.0	12	5-5-5-7	10		16		-same	
S-6	20.0	20	2-3-4-3	7		20		-same, loose, wet (Class 6)	▽
S-7	25.0	24	5-6-7-10	13		26		-same, medium dense (Class 3b)	
S-8	30.0	24	7-8-9-7	17	-32.0	30–32		-same	
								Broing complete at 32 ft.	

NOTES: **BOC = Backfilled on completion**

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LOG OF BORING NO. B-11

LOG OF BORING NO. B-12

PROJECT: **2740-2768 Webster Avenue**
PROJECT NO.: **34211441**
PROJECT LOCATION: **Bronx, New York**

WATER LEVEL (ft): **20 ft.** | **----** | **BOC**
DATE: **12-07-21** | **----** | **12-07-21**
NORTHING: **----** EASTING: **----**

DATE STARTED: **12-07-2021**
DATE COMPLETED: **12-07-2021**
DRILLING CONTRACTOR: **D.K. Drilling of New York, Inc.**
DRILLER: **Dorbal**
DRILLING METHOD: **HSA**
SAMPLING METHOD: **SPT**

HAMMER TYPE: **Automatic**
GROUND SURFACE ELEVATION: **0.0 +/-**
DATUM: **Sidewalk**
EQUIPMENT: **CME 55**
LOGGED BY: **BG/NV**
CHECKED BY: **RD**

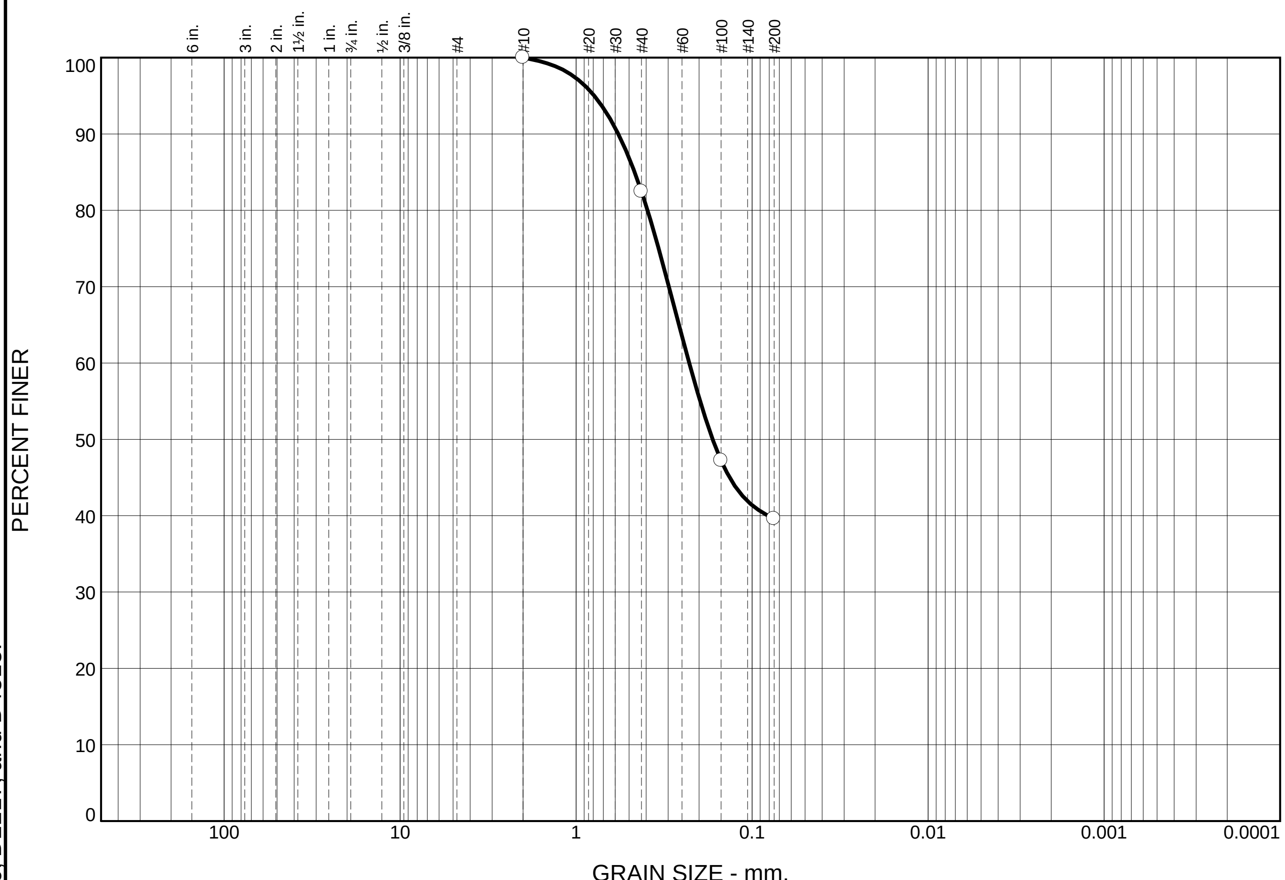
SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	SPT-N VALUE	ELEVATION (ft.)	DEPTH (ft.)	STRATA	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S-1	0.0	12	7-9-8-11	17	0.0	0	FILL		2" Gravel	
S-2	2.0	16	8-9-13-14	22		2			FILL: Brown to gray, moist, medium dense, silty sand with gravel and concrete fragments (Class 7) -same, with brick fragments	
S-3	5.0	19	10-40-20-10	60	-6.0	6	SM		Brown, moist, very dense, Silty SAND with Gravel (Class 3a)	
S-4	10.0	18	4-6-4-3	10		10			-same, medium dense (Class 3b)	
S-4	15.0	21	10-10-15-17	25	-15.0	16	SP-SM		Brown, moist, medium dense, Poorly-graded SAND with Silt (Class 3b)	
S-5	20.0	22	6-4-4-4	8		20			-same, wet, loose (Class 6)	▽
S-6	25.0	24	5-4-4-5	8		26			-same	
S-7	30.0	24	3-6-9-19	15		30			-same, medium dense, with 2" lenses of SILT (Class 3b)	
S-8	35.0	24	15-17-20-21	37		36			-same, dense (Class 3a)	-residual soil
					-37.0				Broing complete at 37 ft.	

NOTES: **BOC = Backfilled on completion**

APPENDIX C

Laboratory Data

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	17.5	42.9	39.6	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.4648	0.2274	0.1675					

Material Description	USCS	AASHTO
○ Gray Highly Weathered ROCK	HW	

Project No. 34211441 **Client:** Longhouse Properties

Project: 2740-2768 Webster Avenue

○ **Source of Sample:** B-1 **Depth:** 65 **Sample Number:** S-14

Date: ○ 12/17/2021

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Remarks:

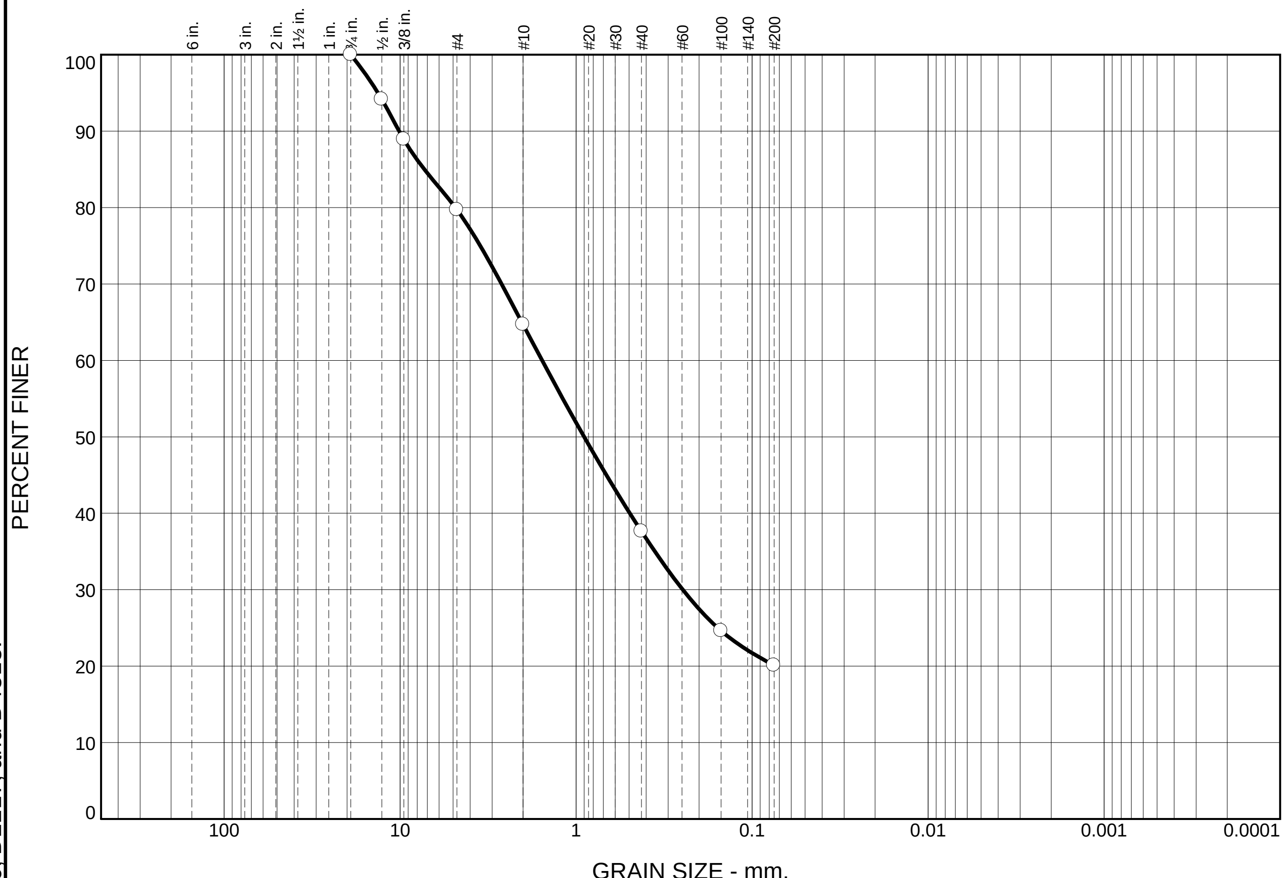
○NMC = 26.8%

Figure

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: BG **Checked By:** RD

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	20.3	15.0	27.1	17.5	20.1	

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
			7.2850	1.5604	0.8993	0.2474				

Material Description	USCS	AASHTO
Orange-Brown, Clayey SAND with Gravel	SC	

Project No. 34211441 **Client:** Longhouse Properties

Project: 2740-2768 Webster Avenue

Source of Sample: B-2 **Depth:** 35 **Sample Number:** S-9

Date: 12/17/2021

Remarks:

NMC = 10.2%

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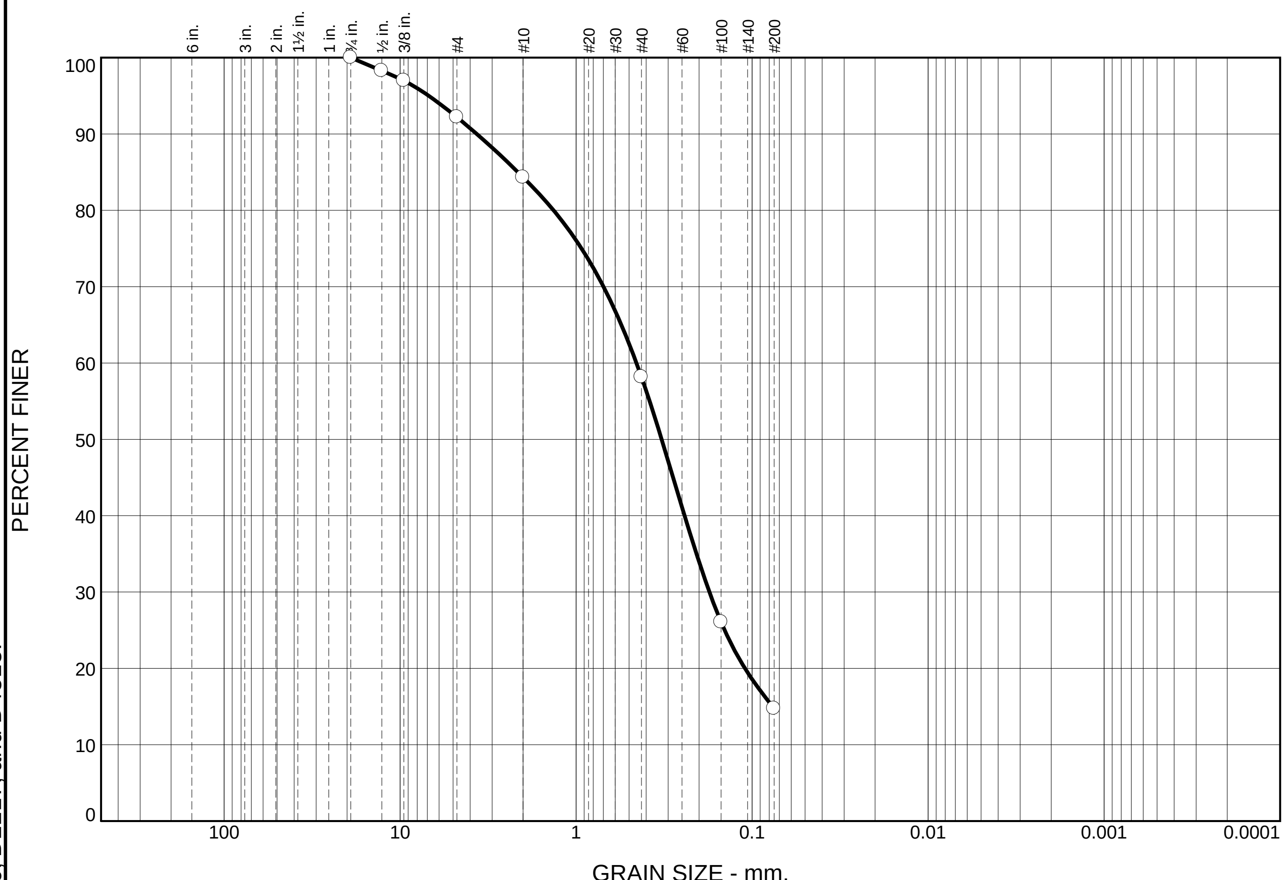
Figure

Tested By: BG **Checked By:** RD

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Particle Size Distribution Report



% +3"	% Gravel Coarse	% Gravel Fine	% Sand Coarse	% Sand Medium	% Sand Fine	% Fines Silt	% Fines Clay
0.0	0.0	7.8	7.9	26.1	43.5	14.7	

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
			2.1404	0.4538	0.3267	0.1747	0.0766			

Material Description	USCS	AASHTO
Brown, Poorly-graded SAND with Silt and Gravel	SP-SM	

Project No. 34211441 **Client:** Longhouse Properties

Project: 2740-2768 Webster Avenue

Source of Sample: B-5 **Depth:** 25 **Sample Number:** S-7

Date: 12/17/2021

Remarks:
NMV = 10.5%

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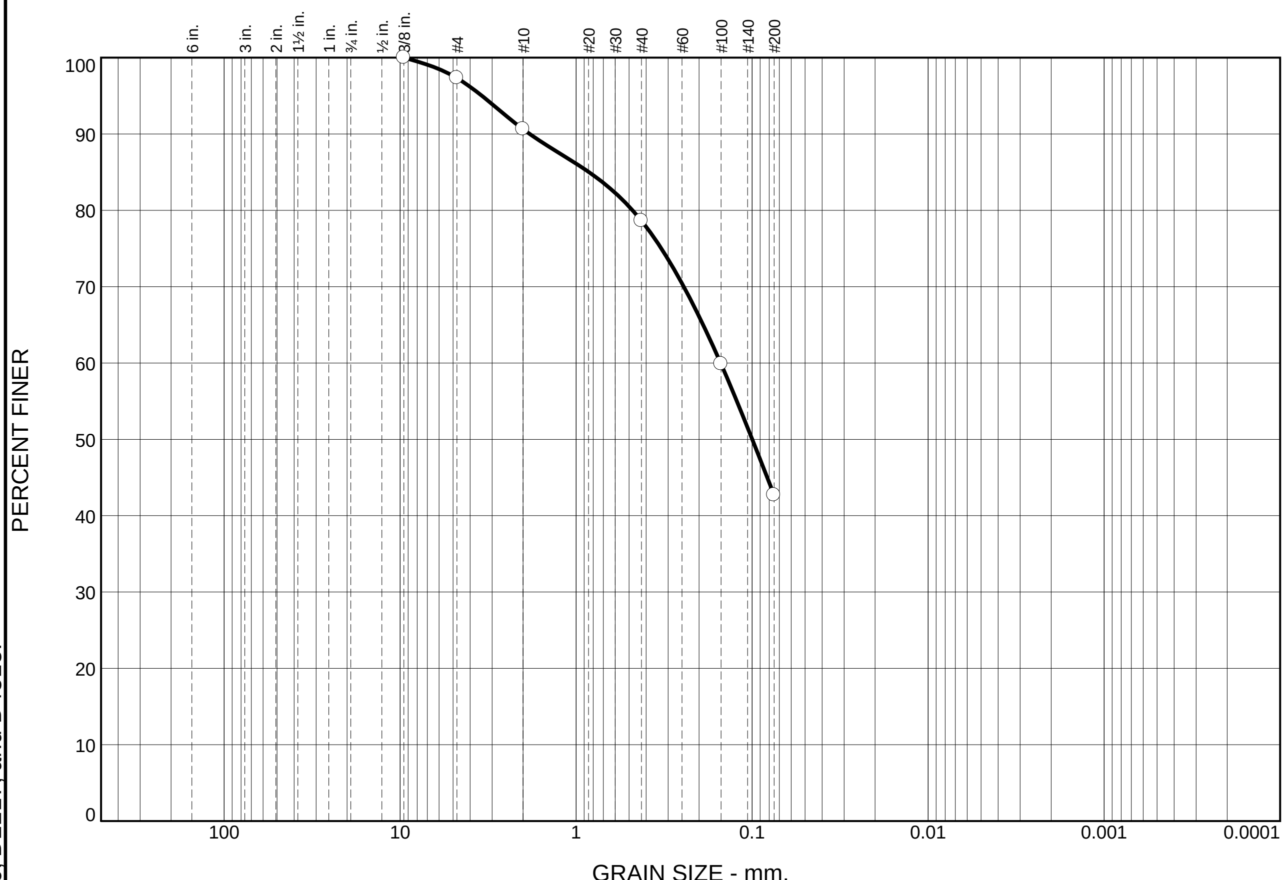
Figure

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: BG **Checked By:** RD

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.7	6.7	12.0	35.9	42.7	

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
			0.8451	0.1509	0.0998					

Material Description	USCS	AASHTO
Highly weathered ROCK	HW	

Project No. 34211441 **Client:** Longhouse Properties

Project: 2740-2768 Webster Avenue

Source of Sample: B-9 **Depth:** 55 **Sample Number:** S-13

Date: 12/17/2021

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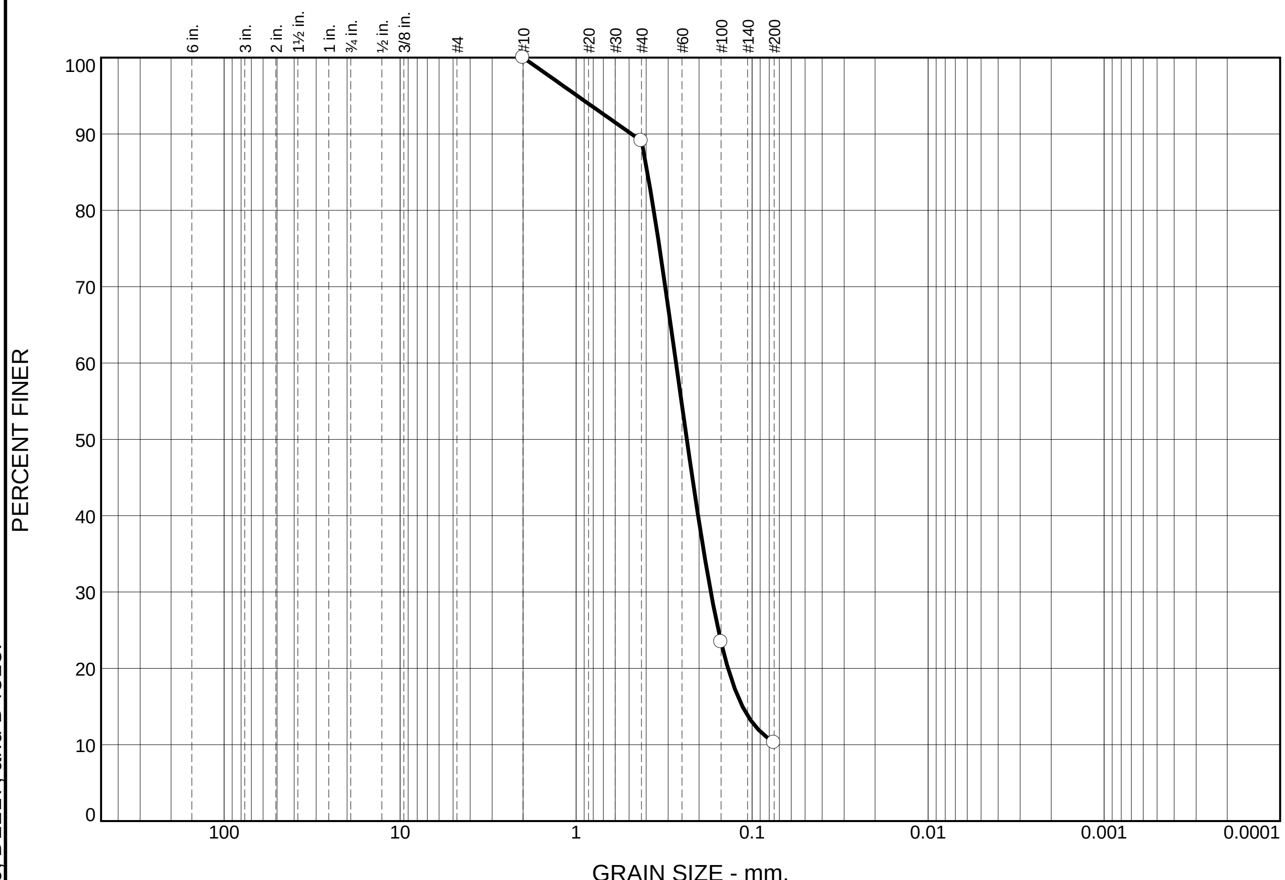
Remarks:
NMC = 18.3

Figure

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: BG **Checked By:** RD

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	10.9	78.8	10.3	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.3941	0.2703	0.2347	0.1716	0.1134			

Material Description	USCS	AASHTO
○ Brown, Poorly-graded SAND with Silt	SP-SM	

Project No. 34211441 **Client:** Longhouse Properties

Project: 2740-2768 Webster Avenue

○ **Source of Sample:** B-11 **Depth:** 15 **Sample Number:** S-5

Date: ○ 12/17/2021

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Remarks:

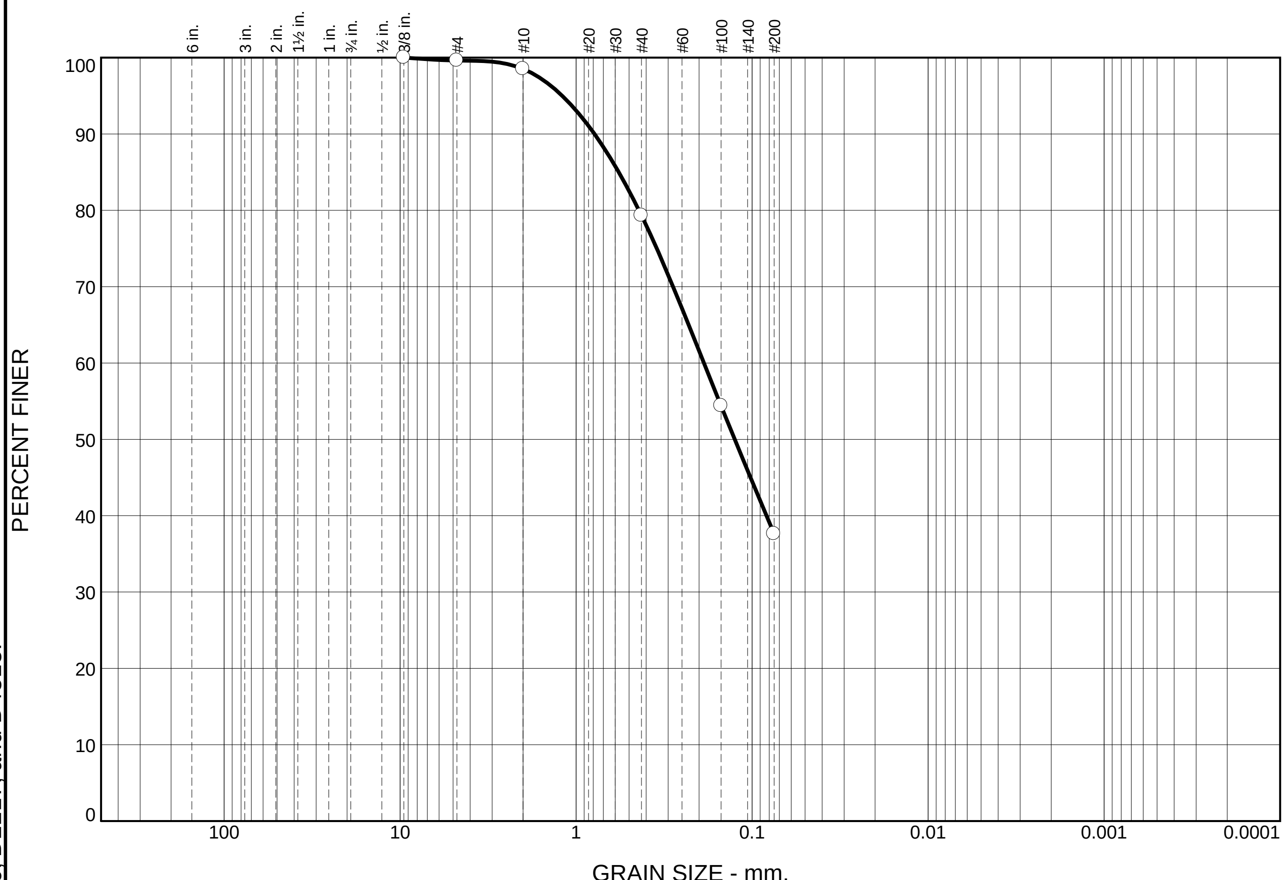
○NMC = 4.7%

Figure

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: BG **Checked By:** RD

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.4	1.1	19.2	41.7	37.6	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.5724	0.1877	0.1255					

Material Description	USCS	AASHTO
○ Brown, Silty SAND	SM	

Project No. 34211441 **Client:** Longhouse Properties

Project: 2740-2768 Webster Avenue

○ **Source of Sample:** B-12 **Depth:** 35 **Sample Number:** S-8

Date: ○ 12/17/2021

Remarks:

○NMC = 23.9%

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Figure

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: BG **Checked By:** RD