CARLIN • SIMPSON & ASSOCIATES
Consulting Geotechnical and Environmental Engineers

61 Main Street, Sayreville, New Jersey 08872
Tel. (732) 432-5757
Fax. (732) 432-5717

Principal:
Robert B. Simpson, P.E.

Associates:
Meredith R. Anke, P.E.
Stephen Rossi, E.I.T.
Kurt W. Anke
Eric J. Shaw

20 December 2017

Park Management, Inc.
571 East New York, Suite A
Brooklyn, NY 11225

Attn: Mr. Allen Weinstein

Re: Report on Subsurface Soil and Foundation Investigation
Proposed 14 Story Building
1125 Whitlock Ave
Bronx, NY (CSA Job # 17-147)

Dear Mr. Weinstein:

In accordance with our proposal revised 25 August 2017 and your subsequent authorization, we have completed a Subsurface Soil and Foundation Investigation (Phase I of II) for the referenced site. The purpose of this study was to determine the nature and engineering properties of the subsurface soil and the groundwater conditions for the one of the new buildings, to recommend a practical foundation scheme, and to determine the allowable bearing capacity of the site soils.

We understand that the planned construction will consist of two new 14-story buildings with below grade parking levels. We expect that site development will also include new underground utilities and a temporary excavation support system. To guide us in our study, you have provided us with preliminary information and a site plan that indicates the location of the planned construction.

Our scope of work for this project included the following:

1. Reviewed the proposed construction, the existing site conditions, the expected soil conditions, and planned this study.

2. Retained General Borings Inc. to advance seven (7) test borings at the subject site.

3. Selected the boring locations in the field, visually identified the soil layers encountered, obtained soil samples, and prepared detailed boring logs and a Boring Location Plan.

4. Performed laboratory soil identification tests on selected representative soil samples.

5. Analyzed the field and laboratory test data and prepared this report containing the results of this study.

SITE DESCRIPTION

The project site is located at 1125 Whitlock Avenue in Bronx, New York. The site is currently occupied by several existing structures. The remainder of the site is occupied by asphalt parking lots and driveways. Site grades are relatively flat and range from approximately elevation +43.0 to +40.0.

SUBSURFACE CONDITIONS

To determine the subsurface soil and groundwater conditions at the site, seven (7) borings were advanced by General Borings Inc. at the locations shown on the enclosed Boring Location Plan. The borings were performed using hollow stem augers and split spoon sampling. Detailed boring logs have been prepared and are included in this report. Our field engineer visually identified all of the soil samples obtained during the boring operations and selected samples were tested in our laboratory.

Soil

The soil descriptions shown on the boring logs are based on the Burmister Classification System. In addition, we have provided the NYC Building Code material classification for each of the major soil stratum. In the Burmister Classification System, the soil is divided into three components: Sand (S), Silt ($) and Gravel (G). The major component is indicated in all capital letters, the lesser in lower case letters. The following modifiers indicate the quantity of each lesser component:

Modifier	Quantity
trace (t)	0 - 10%
little (l)	10% - 20%
some (s)	20% - 35%
and (a)	35% - 50%

The subsurface soil conditions encountered in the test borings may be summarized as follows:

Stratum 1
Asphalt

The surface layer in each of the borings consists of asphalt pavement that is ranges from approximately 1 to 4 inches in thickness.

Stratum 2
Existing Fill
[NYC Class 7]

Below the surface layer in each of the borings is existing fill that generally consists of very loose to medium dense gray brown coarse to fine SAND, little (to some) Silt, trace coarse to fine Gravel, with root fibers. The fill extended to depths ranging from approximately 6'0" to 13'0" below the existing ground surface.

Stratum 3 Silty Sand with Gravel [NYC Class 3b/3a]	Underlying the existing fill is medium dense to dense brown coarse to fine SAND, little (to and) Silt, trace (to little) coarse to fine Gravel. The Silty Sand with Gravel extends to depths ranging from 20'0" to 29'0" below the existing ground surface.
Stratum 4 Weathered Schist Bedrock [NYC Class 1d]	Highly to completely weathered Schist bedrock (NYC Class 1d) was encountered below the Stratum 3 in borings B-1, B-5, and B-6 at depths ranging from 20'0" to 33'0" below the existing ground surface.
Stratum 5 Schist Bedrock [NYC Class 1c, 1b, 1a]	The upper 5'0" to 20'0" of Schist bedrock was cored at 7 of the boring locations. Intact Schist bedrock [NYC Class 1c or better] was encountered at depths ranging from 22'0" to 33'0" below the existing ground surface. The rock core recoveries ranged from 55% to 100% and the rock quality designation (RQD) of the recovered cores ranged from 48% to 100%. This indicates that the upper portion of the bedrock ranges from very poor quality in a shattered, very blocky and seamy condition to excellent quality intact bedrock.

Groundwater

During this investigation, groundwater was encountered throughout the site at depths ranging from 9'0" to 11'0" below the existing ground surface (elevations +33.0 to +30.0). Variations in the location of the long-term water table may occur as a result of changes in precipitation, evaporation, surface water runoff, and other factors not immediately apparent at the time of this exploration.

Depending on the planned lower level floor elevation, temporary dewatering measures may be required to construct the proposed building. The design of the dewatering system should be coordinated with the design of the support of excavation (SOE) system for the project. In addition, the proposed building may have to be designed for hydrostatic uplift forces caused by groundwater. Additional information is provided in the following sections of this report.

EVALUATION

We understand that the proposed construction will consist of a new fourteen (14) story building with below grade parking. Column loads are expected to be on the order of 1,000 to 1,200 kips. At the time of this report, the proposed layout and finished floor elevations were not finalized. It is anticipated that the first floor of the new building will be constructed at approximately the sidewalk elevation and that the basement level will be approximately 10'0" below the sidewalk elevation. We also anticipate that the proposed construction will include new underground utilities and a temporary excavation support system.

The following evaluation is preliminary in nature and has been generalized for the expected development. The recommendations below are intended for planning purposes only and are not intended for final design and construction. Once the proposed building layout and finished floor elevations have been established, a copy of the plans should be forwarded to our office so that we can review them along with the recommendations in this report. At that time, any changes or additional recommendations can be provided, if required.

During this subsurface investigation, seven (7) borings were performed at the locations shown on the enclosed Boring Location Plan. The boring data indicates that existing fill (NYC Class 7, Stratum 2) is present in the building area to depths ranging from 6’0” to 13’0” below the existing ground surface. Underlying the existing fill is medium dense to dense Silty Sand with Gravel (NYC Class 3a/3b, Stratum 3) followed by weathered Schist (NYC Class 1d, Stratum 4) bedrock in portions of the site. Below the Silty Sand with Gravel and weathered Schist is intact Schist bedrock (NYC Class 1c or better, Stratum 5). Groundwater was encountered throughout the site at depths ranging from 9’0” to 11’0” below the existing ground surface. The groundwater, existing fill, unsuitable soil, and bedrock conditions encountered in the borings are summarized in Table 1 below.

Table 1 – Summary of Boring Data

Boring No.	Approximate Ground Surface Elevation	Depth to Bottom of Existing Fill (Elevation)	Depth to Groundwater (Elevation)	Depth to Class 1c Bedrock or Better (Elevation)
B-1	+43.2	11’0” (+32.2)	NWR	23’0” (+23.2)
B-2	+41.4	10’0” (+31.4)	10’0” (+31.4)	23’0” (+18.4)
B-3	+40.5	6’6” (+34.0)	9’0” (+31.5)	29’0” (+11.5)
B-4	+40.0	6’0” (+34.0)	9’6” (+30.5)	23’0” (+17.0)
B-5	+39.0	13’0” (+26.0)	9’0” (+30.0)	33’0” (+6.0)
B-6	+42.0	10’0” (+32.0)	9’0” (+33.0)	28’0” (+14.0)
B-7	+42.5	13’0” (+29.5)	11’0” (+31.5)	22’0” (+20.5)

NWR – No Water Reading

Implications of Existing Fill

The boring data indicates that existing fill [NYC Class 7] is present at the site. In the borings, the existing fill extends to depths ranging from 6’0” to 13’0” (elevations +34.0 to +29.5) below the existing ground surface. The depth of the existing fill is expected to be variable and may be deeper in unexplored areas of the site, especially adjacent to the foundation walls of the existing building basement.

The existing fill is not an acceptable bearing material for the new building foundations. In addition, the building column loads are impractical for support with shallow spread footings. In order to prevent damaging differential settlement, the building will be supported by a deep foundation system.

Temporary Construction Excavations and Excavation Protection

Based on the site conditions, we anticipate that the new building will be constructed immediately adjacent to the existing sidewalks and property lines. Depending upon the depth of the excavations required to construct the new building, temporary construction easements and sidewalk permits may be required to permit the required excavations to extend beyond the property lines. In addition, it is anticipated that a temporary excavation support system will be required for the construction of the new building.

Temporary construction excavations shall be conducted in accordance with the most recent OSHA guidelines and applicable federal, state, or local codes. Based on the test boring data and groundwater conditions, we believe that the site soils would be considered either Type “B” or Type “C” soil as defined by the OSHA regulations. An evaluation of the site soil deposits will be required by a qualified person at the time of the excavation to determine which OSHA soil classification should be used.

Temporary support (i.e. sheeting and shoring) should be used for any excavation that cannot be benched or sloped in accordance with the applicable regulations, where necessary to protect adjacent utilities and structures, and where water seepage or saturated soils are encountered within the excavation. In the event that water is encountered within the excavation, an evaluation of the excavation’s stability must be performed. Perched water or groundwater encountered within the excavation will destabilize the sides of the excavation. Temporary support will be required to stabilize the excavation. Dewatering of the excavation will also be required. If a dewatering system is required for construction, the design of the excavation support system should also be coordinated with the dewatering system design.

A drilled-in soldier pile (i.e. H-piles) with timber lagging system or steel sheet piling might be an appropriate temporary excavation support system depending on the planned excavation depth and the method of dewatering. For the soldier pile and timber lagging system, we expect that the “H” beams or pipe piles will be spaced about six (6) to eight (8) feet apart. As the excavation is made, wood lagging is inserted in the web of the H section or behind the pipe pile to complete the temporary wall. Depending upon the required depth of the excavation, a raker or tieback system may be required to restrain the horizontal force on the wall.

If an H-pile and lagging system is used, it will be important to assure that the space between the lagging and the soil outside the excavation is filled immediately after the wood lagging is installed. This is necessary to prevent lateral movement of the soil around the excavation and especially adjacent to existing buildings, sidewalks, or utilities.

Depending on the depth of excavation and the dewatering requirements, a groundwater cutoff system may be required. This cutoff system may consist of interlocking steel sheet piles or other impermeable barriers.

A New York State licensed professional engineer must design all temporary and permanent support systems. The contractor will select the shoring type and submit design calculations for the proposed shoring method to Carlin-Simpson & Associates for review.

The soil adjacent to the excavation support system will exert a horizontal pressure against the system. This pressure is based on the soil density, the coefficient of active earth pressure (k_a), and the depth of the excavation. We estimate the in-situ soil has an in-place density of about 130 pcf and an angle of internal friction (ϕ) of 30^o. The active earth pressure coefficient (k_a) is therefore 0.33.

Anticipated hydrostatic water pressures must be included in the design. Piping failure of the existing site soils within the excavation must also be evaluated. In addition, the surcharge loads from the adjacent sidewalks, streets, structures, construction equipment, or stored materials near the excavation must also be incorporated into the design of the earth support system.

Handling Groundwater During Construction

Groundwater was observed within each of the borings performed for this study at a depths ranging from 9'0" to 11'0" (elevations +33.0 to +29.0) below the ground surface. Based on the anticipated construction, dewatering may be required in order to construct the building. Depending on the depth of the excavation, a wellpoint system or deep well system could be required for dewatering during construction. The use of sump pits and pumps for dewatering will only be effective where the groundwater level is within one or two feet of the planned bottom of the excavation.

The dewatering system should be designed to permit the lower level subgrade excavation to be performed "in the dry". The system should be designed to lower the groundwater level at least two (2) feet below the lowest anticipated excavation depth.

If a dewatering system will be required for the project, it is important to determine: 1) the site groundwater conditions, 2) the effects of dewatering on nearby structures, 3) the permeability characteristics of the soil below the water table, and 4) the quantities of water for the site dewatering system. Therefore, a supplemental groundwater investigation may be required for dewatering system design. The supplemental groundwater investigation would involve installing three (3) groundwater monitoring wells at the site. A series of pump tests (i.e. slug tests, a step-down test, and a constant rate pump test) would then be performed on the wells to determine the hydrogeological properties of the soils and the characteristics of the aquifer.

The impact of the temporary dewatering on nearby structures must be evaluated for dewatering system design. Changes in the effective stress in the overlying soil layers as a result of the dewatering could cause consolidation of the organic soil layer, thus resulting in ground settlement and possibly building foundation settlements around the dewatering system. The pump test data will be used to determine the impacted area (cone of depression) associated with the dewatering. Data obtained from the pump tests will also be used to determine the design discharge quantities and flow rates for the dewatering system.

The dewatering system selected must be capable of operating 24 hours a day until the building has been constructed and can support the uplift forces. The system must also include a backup power supply and an alarm system in the event of system failure. This is necessary to prevent damage to the lower level floor slab and foundation walls.

The water collected in the dewatering system will have to be discharged to some off-site location; most likely this will be the City's stormwater system. The dewatering system could have a discharge rate in excess of 10,000 gallons per day. A permit will be required from the New York City Department of Environmental Protection (DEP) and possibly the New York State Department of Environmental Conservation (NYSDEC) to authorize the discharge of water into the system. A State Pollutant Discharge Elimination System (SPDES) permit may also be required. The permitting agency may require additional engineering and testing such as an evaluation of the receiving system's capacity to handle the additional water, discharge water quality testing, and/or periodic monitoring of the discharge volumes.

The dewatering system must be designed by a dewatering contractor. The dewatering system design shall be provided to Carlin-Simpson & Associates for review and approval prior to beginning construction.

Pile Foundations

Pile foundations will be required for the proposed building. Pile types to be considered for this project are as follows: 1) driven concrete-filled steel pipe piles; 2) driven steel H-piles; and 3) drilled caisson piles. Each of these pile types is discussed in more detail below.

Driven Concrete-Filled Steel Pipe Piles

Close-ended concrete-filled steel pipe piles could be utilized to support the proposed building foundations and structural floor slab. Structural steel piles must conform to the requirements of the New York City Building Code (refer to Section BC 1809 – Driven Piles).

At the time this report was prepared, the allowable pile capacity for this project had not been determined. Pipe piles (8 inch or 10 inch diameter) with a minimum wall thickness of ½-inch filled with 5,000 psi concrete could be used to support a capacity of 80 to 100 tons. The structural engineer shall select the required allowable pile capacity based on the design loads of the proposed structure and shall determine the number of piles required and their locations.

The concrete-filled steel pipe piles must be driven through the existing fill and Silty Sand with Gravel and into the Schist bedrock. In the borings, bedrock was encountered at depths ranging from 20'0" to 29'0" below the existing ground surface.

A PDA test program will be required to establish the pile capacity and pile driving criteria. The final driving resistance that must be achieved for an 80 to 100 ton capacity pile will be established using the wave equation method of analysis and the Pile Driving Analyzer (PDA). A pile load test will also be required to verify the pile capacity. For allowable loads above 40 tons, the wave equation method of analysis and PDA shall be used to estimate pile driveability of both driving stresses and net displacement per blow at the ultimate load. The allowable loads shall be verified by load tests in accordance with the New York City Building Code.

Pile load tests will be required if a design pile capacity exceeding 40 tons is utilized. The pile load test must be conducted in accordance with the requirements of the New York City Building Code.

As shown by the boring data, obstructions may be present within the existing fill and the piles will be driven into a dense soil and/or weathered bedrock layer. Therefore, a conical steel point is required for the driven steel pipe piles. It may be difficult to drive the piles at this site without a degree of breakage. Pile spudding, pre-drilling, or excavation of obstructions may be necessary to advance the piles to the required depth. The contractor may remove any shallow obstructions encountered during installation with an excavator. Alternatively, the contractor may abandon the pile and install an additional pile (or piles) at the locations determined by the project structural engineer.

Driven Steel H-Piles

As an alternative to concrete-filled steel pipe piles, steel H-piles could be used to support the proposed building foundations and floor slab. These piles must be driven through the existing fill and Silty Sand with Gravel layers down to the underlying Schist bedrock, which was encountered at depths ranging from 20'0" to 29'0" beneath the ground surface in the borings. The H-piles will be primarily end-bearing with an 80 to 100 ton capacity. The number of piles required and their locations shall be determined by the project structural engineer.

The piles shall be of sufficient strength and rigidity to withstand all driving stress, to prevent distortion caused by driving of adjacent piles, and to maintain perfect shape. Preliminarily, HP12x84 H-piles could be considered for this project. The steel H-piles shall consist of structural steel with a minimum yield strength of 50 ksi. Steel piles must conform to the requirements of the New York City Building Code.

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Driving steel H-piles in sandy or silty soils is generally easy because of the non-displacement character of the pile. However, problems can arise when driving H-piles through fill material, gravelly soils, or deposits containing cobbles and boulders. Specifically, the pile tip can deform to an unacceptable extent and separation of the flanges and web may occur. As shown by the boring data, obstructions may be present within the existing fill (i.e. concrete, debris, etc.) and the piles will be driven into a dense weathered bedrock layer. Therefore, the H-Piles shall be fitted with a steel pile point or shoe prior to driving to prevent damage to the piles. Excavation of obstructions may be necessary to advance the piles through portions of the fill.

Drilled Caisson Piles

For this project, drilled in-place, concrete or neat grout filled steel pipe piles (caisson piles) could also be used to support the new foundations and the floor slab. Caisson piles shall consist of a shaft section of concrete or grout-filled pipe, extending to bedrock, with an uncased socket drilled into bedrock of Class 1c or better and filled with concrete or grout. The project structural engineer shall determine the number of piles required and their locations. The caisson piles shall be designed by a foundation specialty contractor to meet the specified loading conditions as shown on the structural drawings. The piles must also be designed and installed in accordance with the New York City Building Code (refer to Section BC 1810.7 – Caisson Piles). The center-to-center spacing of caisson sockets shall be at least 2.5 times the outside diameter of the pipe but not less than 30 inches.

For this project, we recommend that the steel pipe casing have a minimum nominal diameter of seven (7) inches and a wall thickness of at least 0.408 inches. The casing above the rock socket shall remain in place permanently. The diameter of the rock socket shall be approximately equal to the inside diameter of the pile. The top of the bond zone (rock socket) will be approximately deeper than 23’0” to 33’0” below the existing ground surface. An allowable bond stress of 200 psi on the sides of the socket shall be used for design.

Piles could be designed to provide a design (working) capacity of 100 to 200 tons. The piles will be designed as a combination of end-bearing and friction piles bearing in the Schist bedrock of Class 1c or better. The depth of the rock socket shall be sufficient to develop the full load-bearing capacity of the caisson pile. An estimate of the caisson bond lengths and total caisson lengths are provided in Table 2 below.

Table 2 – Estimated Caisson Capacities and Bond Lengths

Allowable Caisson Capacity	100 tons	150 tons
Bond Length	5 ft.	12 ft.

Reinforcement steel extending to the bond zone shall be placed in the casing to the bottom of the bond zone prior to placing concrete or grout. The full length of the caisson pile shall contain either a steel pipe and/or steel reinforcement. Reinforcement steel shall be in accordance with ASTM A615 Grade 60 or 75 or ASTM A722 Grade 150. Preliminarily, we anticipate that the core reinforcement steel will consist of a single No. 8 steel threaded bar, ASTM A615 Grade 75 (75 ksi yield strength), extending the full length of the pile. As required for structural design, steel reinforcement bars shall extend from the pile and up into the pile cap, grade beam, or floor slab.

The rock socket and pile shall be thoroughly cleaned of foreign materials before filling with concrete or grout. The caisson piles shall be filled with cement grout or concrete having a minimum 28-day compressive strength of at least 4,000 psi. The cement grout or concrete mix shall be designed and proportioned so as to produce a cohesive workable mix with a slump of 4 to 6 inches. The cement grout or concrete must be installed under a pressure exceeding 1.5 times the existing total overburden pressure. Concrete shall not be placed through water except where a tremie or other approved method is used.

The design of the pile to pile cap or grade beam connection should be coordinated between the pile designer and the project structural engineer. Depending upon the design requirements, the top of the piles could be terminated with a bearing plate that extends into the pile cap or grade beam to transfer the applied load. The caisson pile design engineer shall establish the required plate dimensions, thickness, and minimum embedment length into the cap or grade beam based on the anticipated loading. This should be reviewed by the project structural engineer during the submittal review process.

Obstructions (brick, concrete, wood, etc.) may be present within the existing fill. Depending upon the depth of the obstruction below the bottom of the pile cap or grade beam, the contractor shall either remove the obstruction or clear away the obstruction by excavating or other means, or abandon the pile and install an additional pile at the locations determined by the project structural engineer.

The pile contractor will design the individual pile elements and select the pile construction process and installation equipment. The foundation specialty contractor shall submit shop drawings and design calculations to Carlin-Simpson & Associates and the project structural engineer for review and approval.

At a minimum the contractor's submittal should include the following: 1) pile design calculations and shop drawings for all structural steel and pile components prepared and stamped by a New York State registered Professional Engineer; 2) a detailed description of the construction procedure proposed, including type of equipment to be used for installing the piles; 3) a pile location plan; 4) the proposed concrete or cement grout mix design(s) and procedures for placing the concrete or cement grout; 5) detailed plans and procedures for the pile load test(s), including load test apparatus set-up for the pile load testing and current calibration report for the hydraulic jack and gauges, if required; and 6) for caisson piles, method for rock socket inspection.

Pile Uplift and Lateral Capacity

At the time this report was prepared, the pile type and the allowable pile capacity had not been determined. Once the pile type and capacity have been selected, additional recommendations can be provided regarding the uplift capacity and the lateral load capacity of the selected pile system.

Pile Load Tests and Inspection

For driven piles with a capacity greater than 40 tons, a compressional load test will be required per the New York City Building Code (refer to Section BC 1808.4 - Load

Tests). The test may be performed on either a production pile or a sacrificial pile. However, production piles shall not be used as reaction piles. The pile load test(s) must be performed under the full-time inspection of a Carlin-Simpson & Associates representative. Piles used for the pile load test should be installed at least one week prior to testing to allow time for the grout to obtain adequate strength for testing.

For the caisson piles, the rock sockets shall be subject to special inspection. Each caisson rock socket shall be inspected to verify rock quality. Inspection may be accomplished by direct observation or by down-hole video methods. A compressional load test will not be required for the caisson piles.

The piles shall be installed under the full-time inspection of a representative from Carlin-Simpson & Associates. At the completion of the pile installation, Carlin-Simpson & Associates will provide a letter of compliance stating that the piles have been installed in accordance with our recommendations and the project specifications, and that they are capable of supporting the design loads. Special Inspections will be required for the piles. Refer to Section 1704.8 of the New York City Building Code for additional information.

Floor Slab

The new floor slab shall be designed as a structural floor slab supported on piles. Pile recommendations are discussed in the previous sections of this report.

Depending on the planned lower level floor elevation, the structural floor may have to be designed to resist hydrostatic uplift forces caused by groundwater. If the building will extend below the water table, the structural floor slab shall be designed for full hydrostatic pressure conditions. The design water level shall be elevation +35.0. A permanent dewatering system is not required if the foundation walls and slab are designed for full hydrostatic pressure. Depending upon the results of the supplemental groundwater study the design water level may need to be revised.

Foundation Walls

Where foundation walls are required, the soil adjacent to the building walls will exert a horizontal pressure against the wall. This pressure is based on the soil density and coefficient of earth pressure at rest (k_o), which is applicable to non-yielding building walls. We estimate that the backfill material will have an in-place (moist) density of about 130 pcf and a k_o of 0.5. Based on these properties, the soil will produce an equivalent fluid pressure of 65 pcf against the building walls.

For sliding, the coefficient of friction between concrete and the virgin site soils or new structural fill is 0.45. Where passive lateral earth pressure is to be included in the design of the wall, a design value of 195 psf/ft may be used. This is based on a coefficient of passive earth pressure (kp) of 3.0, an in-place soil backfill density of 130 pcf, and a factor of safety of 2.0.

Where cellars or sub-cellars are constructed and foundation walls are required, we typically recommend that a footing drain be placed around the exterior of the new structure to prevent water from accumulating against the foundation wall and that one or more sump pits and pumps be installed at the cellar or sub-cellar level. It is our understanding, however, that the New York City Department of Environmental Protection (DEP) may not allow discharges from footing drains and/or sump pits into the combined sewer system. This needs to be further evaluated by the design team. Based on the site conditions and the proposed construction, we expect that it will also not be possible to install a dry well on the site to receive the footing drain and sump pit water. Therefore, adequate waterproofing of the walls and floor slab must be provided to ensure a watertight structure. Water stops shall also be incorporated into the design.

The anticipated hydrostatic water pressures must be included in the design of the walls and floor slab. In addition, the surcharge loads from the adjacent sidewalks, parking lot, driveways, structures, construction equipment, or stored materials near the wall must also be incorporated into the design of the walls.

Depending on the planned lower level floor elevation, the foundation walls may also have to be designed for hydrostatic pressure resulting from the groundwater. For design, we recommend that the foundation walls be designed for a temporary static water elevation of +35.0. Adequate waterproofing of the walls must also be provided to ensure a watertight structure. Water stops should also be used.

Outside the structure, the foundation walls should be backfilled with suitable soil placed in layers up to one (1) foot in thickness. The new fill should be compacted with a vibratory drum trench compactor (i.e. Wacker Model RT560), a heavy vibratory plate tamper (i.e. Wacker BPU 3545A or equivalent), or “jumping jack” style tamper (i.e. Wacker Model BS 600) to at least 92% of its Maximum Modified Dry Density (ASTM D1557). Heavy equipment should not be operated near the wall as damage to the wall could occur. Material excavated from the cut areas on site will only be suitable for reuse as compacted fill if it remains relatively dry enough to be adequately compacted to the required density and it does not contain any debris or organic material (i.e. topsoil and roots).

<u>Seismic Design Considerations & Liquefaction</u>

From site-specific test boring data, the Site Class was determined from Table 1613.5.2 of the 2014 New York City Building Code. The site-specific data used to determine the Site Class typically includes soil test borings to determine Standard Penetration resistances (N-values) in the upper 100 feet of soil profile.

Based on the uncorrected standard penetration resistance (N-values) of the site soils, the loose Sand, loose Sandy Gravel, and loose Silt layers are considered potentially liquefiable. Liquefaction is a phenomenon in which saturated or partially saturated soil loses strength and stiffness when subjected to earthquake-induced ground shaking. Ground shaking of sufficient duration results in the loss of grain-to-grain contact due to rapid rise in pore water pressure causing the soil to behave as a fluid for a short period of time. Liquefaction is most often observed in saturated, loose sandy soils at depths shallower than 50 feet below the ground surface. Factors known to influence liquefaction potential include composition and thickness of soil layers, grain size, relative density, groundwater level, degree of saturation, and both intensity and duration of ground shaking.

The potential for liquefaction was evaluated using the computer program LiquefyPro (Version 5.9) by CivilTech Software. LiquefyPro evaluates liquefaction potential by calculating a factor of safety against liquefaction and calculates the estimated settlement of soil deposits due to seismic loads using SPT blow counts, total unit weight, fines content, peak horizontal acceleration, and earthquake magnitude data. The program is based on the Simplified Liquefaction Evaluation Procedure, or SPT procedure, which is based on the most recent publication of the NCEER Workshop and SP117 Implementation.

For evaluation purposes, an acceleration of 0.176g and an earthquake magnitude of 5.5 were used with subsurface conditions based on the boring data from this investigation. Based on the results of our analysis, an adequate factor of safety against liquefaction exists for the soils beneath the project site. Therefore, the site shall be classified as Site Class C – Very Dense Soil and Soft Rock Profile. It should be understood, however, that some settlement of the ground surface may occur in response to an earthquake. The theoretical earthquake-induced settlement is approximately 1/2-inch at the subject site.

New structures should be designed to resist stress produced by lateral forces computed in accordance with Section BC 1613 of the 2014 New York City Building Code. The values in Table 2 may be used for this project.

Table 3 – Seismic Design Values

Mapped Maximum Spectral Response Acceleration for Short Periods	SS=0.281g
Mapped Maximum Spectral Response Acceleration at 1-Second Period	S1=0.073g
Site Coefficient [Table 1613.5.3 (1)]	Fa=2.37
Site Coefficient [Table 1613.5.3 (2)]	Fv=3.50
Max Considered Earthquake Spectral Response for Short Periods [Eq 16-47]	SMS=0.666g
Max Considered Earthquake Spectral Response at 1-Second Period [Eq 16-48]	SM1=0.256g
Design Spectral Response Acceleration for Short Periods [Eq 16-49]	SDS=0.444g
Design Spectral Response Acceleration for 1-Second Period [Eq 16-50]	SD1=0.170g

Utilities

New utilities may bear in the existing site soils, densified existing fill, or new compacted fill. The bottom of all trenches should be excavated clean so a hard bottom is provided for the pipe support. If any soft or unsuitable soil conditions are encountered during construction, the unsuitable materials must be removed and replaced with new compacted fill.

For areas where existing fill is encountered within the utility excavations, the subgrade at bottom of the utility excavation shall be compacted in place with a vibratory drum trench compactor or "jumping jack" style tamper. Carlin-Simpson & Associates must evaluate these areas for the presence of soft or unsuitable material within the existing fill matrix. If instability is observed, portions of this fill may have to be removed and replaced with new compacted fill. Carlin-Simpson & Associates will determine this during construction.

In the event that water is encountered in the utility trench excavations or the trench bottom becomes soft due to the inflow of surface or trapped water, the soft soil shall be removed and the excavation filled with a minimum of six (6) inches of 3/4-inch clean crushed stone to provide a firm base for support of the pipe. Sump pits and pumps should be used to remove the water from the excavation.

After the utility is installed, the trench must be backfilled with compacted fill. The fill shall consist of suitable on-site soil or imported sand and gravel. Imported sand and gravel shall contain less than 20% by weight passing a No. 200 sieve. Controlled compacted fill shall be placed in one (1) foot loose layers and each layer shall be compacted to at least 92% of its Maximum Modified Dry Density (ASTM D-1557). The backfill must be free of topsoil, debris, cobbles, and boulders.

Suitability of the In-Situ Soils for Use as Compacted Fill

Asphalt is not suitable for compacted fill. During construction, any existing surface asphalt should be removed from the site.

The New York City Building Code requires that new controlled structural fill placed in the building area, if required, consist of well graded sand, gravel, crushed rock, recycled concrete aggregate, or a mixture of these, or equivalent materials with a maximum of 10% material passing a No. 200 sieve, as determined from the amount passing the No. 4 sieve. Based on our laboratory testing, some of the existing site soils meet this gradation requirement and will be suitable for reuse as compacted fill. Excavated material that does not conform to this gradation requirement cannot be reused as compacted fill in the building area.

The existing fill that was encountered at the site generally consists of coarse to fine Silty Sand. The existing fill is does not meet the gradation requirements for structural fill provided by the NYC Building Code and is unsuitable for structural fill use, but the existing fill may be suitable for reuse in other portions of the site provided that it remains relatively dry for optimum compaction and that any debris (i.e. brick, concrete, wood, etc.) and organic material (i.e. topsoil, roots, etc.) have been removed prior to its reuse. The existing fill will be highly moisture sensitive.

The virgin soils that may be encountered during construction generally consist of Silty Sand with Gravel. Some of the virgin soils may be suitable for reuse as compacted fill.

In the event that the existing fill and/or other unsuitable materials are removed from the building area, the contractor should segregate the potentially re-usable existing fill material from the non-reusable fill (i.e. debris and topsoil). We anticipate that some of the excavated material will be suitable for reuse as compacted fill, provided that the excavated material meets the gradation requirements, is properly segregated and screened of debris and other unsuitable materials. Fill containing topsoil and debris is not suitable for use as compacted fill. We anticipate that most of the excavated material will need to be removed from the site and properly disposed of.

The on-site representative from Carlin-Simpson & Associates shall evaluate the suitability of the excavated materials for use as compacted fill during the excavation and prior to its reuse. Potentially usable fill should be stockpiled and covered with tarps or plastic sheeting for protection from excess moisture. Any fill material that is wet must be dried prior to its reuse.

Proper moisture conditioning of the soil will be required. In the event that the on-site material is too wet at the time of placement and cannot be adequately compacted, the soil should be aerated and allowed to dry or the material removed and a drier cleaner fill material used. In the event that the on-site material is too dry at the time of placement and cannot be adequately compacted, water may be needed to increase the soil moisture content for proper compaction.

The in-situ soils which exist throughout the site may become soft and weave if exposed to excessive moisture and construction traffic. The instability will occur quickly when exposed to these elements and it will be difficult to stabilize the subgrade. We recommend that adequate site drainage be implemented early in the construction schedule and if the subgrade becomes wet, the contractor should limit construction activity until the soil has dried.

GENERAL

The recommendations within this report are preliminary in nature and are not intended for final design and construction. Additional subsurface investigation will be required for the proposed building in order to comply with the New York City Building Code requirements. Once the supplemental investigation has been completed, additional recommendations will be provided for the project site. As a result, the recommendations within this report are subject to change.

The findings, conclusions and recommendations presented in this report represent our professional opinions concerning subsurface conditions at the site. The opinions presented are relative to the dates of our site work and should not be relied on to represent conditions at later dates or at locations not explored. The opinions included herein are based on information provided to us, the data obtained at specific locations during the study and our past experience. If additional information becomes available that might impact our geotechnical opinions, it will be necessary for Carlin-Simpson & Associates to review the information, reassess the potential concerns, and re-evaluate our conclusions and recommendations.

Regardless of the thoroughness of a geotechnical exploration, there is the possibility that conditions between borings will differ from those encountered at specific boring locations, that conditions are not as anticipated by the designers and/or the contractors, or that either natural events or the construction process have altered the subsurface conditions. These variations are an inherent risk associated with subsurface conditions in this region and the approximate methods used to obtain the data. These variations may not be apparent until construction.

The professional opinions presented in this geotechnical report are not final. Field observations and foundation installation monitoring by the geotechnical engineer, as well as soil density testing and other quality assurance functions associated with site earthwork and foundation construction, are an extension of this report. Therefore, Carlin-Simpson & Associates should be retained by the owner or the owner’s general contractor to observe all earthwork and foundation construction, to document that the conditions anticipated in this study actually exist, and to finalize or amend our conclusions and recommendations. Carlin-Simpson & Associates is not responsible or liable for the conclusions and recommendations presented in this report if Carlin-Simpson & Associates does not perform these observation and testing services.

Therefore, in order to preserve continuity in this project, the owner shall retain the services of Carlin-Simpson & Associates to provide full time geotechnical related monitoring and testing during construction. This shall include, but not be limited to, the observation and testing of the following: 1) the excavation and removal of unsuitable soil, where required; 2) the installation and testing of piles; 3) the proofrolling of the subgrade soil prior to placement of new structural fill; and 4) the placement and compaction of new structural fill.

This report has been prepared in accordance with generally accepted geotechnical engineering practice. No other warranty is expressed or implied. The evaluations and recommendations presented in this report are based on the available project information, as well as on the results of the exploration. Carlin-Simpson & Associates should be given the opportunity to review the final drawings and site plans for this project to determine if changes to the recommendations outlined in this report are needed. Should the nature of the project change, these recommendations should be re-evaluated.

This report is provided for the exclusive use of Park Management Inc. and the project specific design team and may not be used or relied upon in connection with other projects or by other third parties. Carlin-Simpson & Associates disclaims liability for any such third-party use or reliance without express written permission. Use of this report or the findings, conclusions or recommendations by others will be at the sole risk of the user. Carlin-Simpson & Associates is not responsible or liable for the interpretation by others of the data in this report, nor their conclusions, recommendations or opinions.

If the conditions encountered during construction vary significantly from those stated in this report, this office should be notified immediately so that additional recommendations can be made.

Thank you for allowing us to assist you with this project. Should you have any questions or comments, please contact this office.

Very truly yours,

CARLIN-SIMPSON & ASSOCIATES

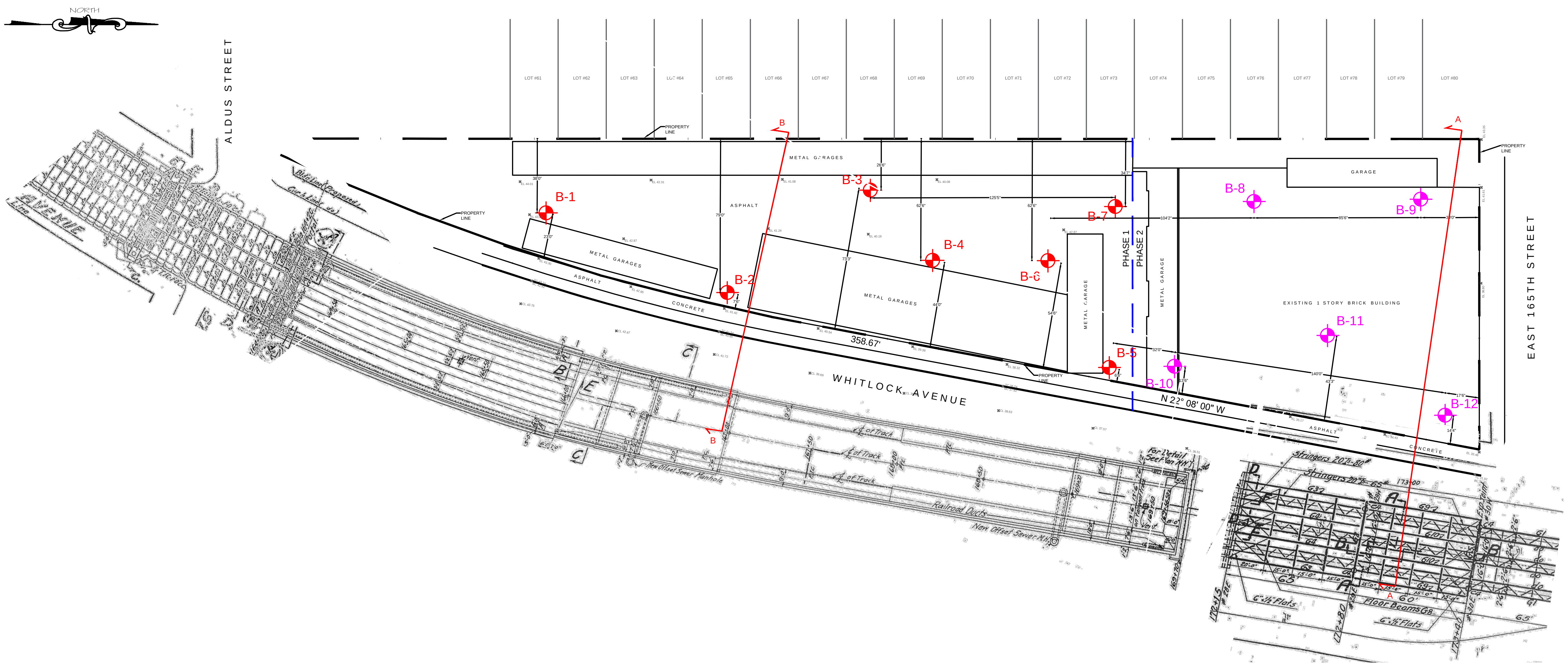
Stephen Rossi

STEPHEN ROSSI, E.I.T.
Project Manager

Robert Simpson

ROBERT B. SIMPSON, P.E.

File No. 17-147



GENERAL NOTES:

1. BORING LOCATIONS WERE LAID OUT IN THE FIELD BY CARLIN-SIMPSON & ASSOCIATES (CSA).

2. THE BORINGS WERE PERFORMED BY GENERAL BORINGS INC. IN SEPTEMBER 2017 2017 UNDER THE FULL TIME INSPECTION OF CSA.

3. LOCATIONS ARE APPROXIMATE.

LEGEND:

- COMPLETED PHASE I BORING LOCATION

- PROPOSED PHASE II BORING LOCATION

ROBERT B. SIMPSON, P.E.
PROFESSIONAL ENGINEER

LICENSE NO. | SIGNATURE | DATE

BORING LOCATION PLAN

PROP. 14-STORY BUILDINGS
1125 WHITLOCK AVE.
BRONX, NY

DRAWN SR	SCALE 1" = 60'	CARLIN-SIMPSON AND ASSOCIATES 61 Main Street Sayreville, NJ 08872 Consulting Geotechnical and Environmental Engineers
CHECKED RBS	DATE 26-SEP-17	
PROJECT NO. 17-147	DWG NO. FIG - 1	
APPROVED		

CARLIN - SIMPSON & ASSOCIATES Sayreville, N.J.	TEST BORING LOG	BORING NUMBER B-1

Project:	**Proposed 14 Story Building, Phase I, 1156 East 165 St, Bronx NY**	**SHEET NO.:**	1 of 2
Client:	**Park Management Inc.**	**JOB NUMBER:**	17-147
Drilling Contractor:	**General Borings Inc.**	**ELEVATION:**	+43.2

GROUNDWATER					**CASING**	**SAMPLE**	**CORE**	**TUBE**	**DATUM:**	TOPO
DATE	**TIME**	**DEPTH**	**CASING**	**TYPE**	**HSA**	**SS**	**NX**		**START DATE:**	18-Sep-17
No Water Reading				**DIA.**	**3 1/4"**	**1 3/8"**	**2 3/8"**		**FINISH DATE:**	18-Sep-17
				WGHT		**140#**			**DRILLER:**	P.C.
				FALL		**30"**			**INSPECTOR:**	CKS

Depth (ft.)	Casing Blows pre Foot	Sample Number	Blows on Sample Spoon per 6"	SYM	IDENTIFICATION	REMARKS
					Asphalt 0'2"	
1						
2						Cobble 1'0"-1'6"
3		**S-1**	1 2 5 4		FILL (Br cf S, l (-) $, l (-) mf G)	Rec = 14" moist
4						
5					**FILL (Brown coarse to fine SAND, little (+) Silt, trace (+) medium to fine Gravel)** **[NYC Class 7]**	
6		**S-2**	10 12 20 24		FILL (same)	Rec = 10" moist
7						
8						
9		**S-3**	3 3 7 8		FILL (same, s (-) $)	Rec = 17" moist
10						
11		**S-4**	2 5 20 28		FILL (same, a (-) $) 11'0" Br cf S, l $, l (-) mf G	Rec = 13"
12						
13						
14						
15					**Brown coarse to fine SAND, little Silt, little (-) medium to fine Gravel** **[NYC Class 3a]**	
16		**S-5**	34 50/4"		same	Rec = 8"
17						
18						
19						
20					20'0"	
21		**S-6**	50/1"		Schist, highly to completely weathered **Schist, highly to completely weathered** **[NYC Class 1d]**	Rec = 1"
22						Auger refusal @ 23'0"

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-1
Project: Proposed 14 Story Building, Phase I, 1156 East 165 St, Bronx NY		**SHEET NO.:** 2 of 2
Client: Park Management Inc.		**JOB NUMBER:** 17-147

Depth (ft.)	Casing Blows pre Foot	Sample Number	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
					Schist, highly to completely weathered	
23					**[NYC Class 1d]** 23'0"	
					Gr Mica Schist massive, mod jointed, slightly weatherd	
24						
25						
		Run			**Gray mica Schist with Quartz intrusions,**	Run #1
26		#1			**massive, moderterly jointed, slightly**	23'0"-28'0"
					weathered [NYC Class 1b]	Run = 60"
27						Rec = 100%
						RQD = 75%
28					28'0"	
					Gr Mica Schist intact, fresh	
29						
30						
		Run				Run #2
31		#2				28'0"-33'0"
						Run = 60"
32						Rec = 93%
						RQD = 87%
33						
					same	
34						
35						
		Run				Run #3
36		#3				33'0"-38'0"
					Gray Mica Schist intact, fresh	Run = 60"
37					**[NYC Class 1a]**	Rec = 98%
						RQD = 98%
38						
					same	
39						
40						
		Run				Run #4
41		#4				38'0"-43'0"
						Run = 60"
42						Rec = 100%
						RQD = 98%
43					43'0"	
					End of Boring @ 43'0"	
44						
45						
46						
47						

CARLIN - SIMPSON & ASSOCIATES Sayreville, N.J.	TEST BORING LOG	BORING NUMBER B-2
Project: Proposed 14 Story Building, Phase I, 1156 East 165 St, Bronx NY		**SHEET NO.:** 1 of 2
Client: Park Management Inc.		**JOB NUMBER:** 17-147
Drilling Contractor: General Borings Inc.		**ELEVATION:** +41.4

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	DATUM:	TOPO
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS	NX		START DATE:	15-Sep-17
15-Sep-17	1100	10'0"	HSA	DIA.	3 1/4"	1 3/8"	2 3/8"		FINISH DATE:	15-Sep-17
				WGHT		140#			DRILLER:	P.C
				FALL		30"			INSPECTOR:	CKS

Depth (ft.)	Casing Blows pre Foot	Sample Number	Blows on Sample Spoon per 6"	SYM	IDENTIFICATION	REMARKS
					Asphalt 0'1"	
1						Boulder
2						
3					**FILL (Brown coarse to fine SAND, little Silt, trace medium to fine Gravel) [NYC Class 7]**	
			29			
4		S-1	12		FILL (Br cf S, l $, t mf G)	Rec = 2"
			12			moist
5			13			
			13			
6		S-2	11		FILL (same)	Rec = 14"
			12			moist
7			16			
			24			
8		S-3	17		FILL (Mttld, Br cf s, s (-) $, t mf G)	Rec = 15"
			20			moist to wet
9			25			
10					10'0"	
			9			
11		S-4	7		Gr br cf S, a (-) $, t (-) f G	Rec = 16"
			5			wet
12			6			Gr stained
13					**Gray brown coarse to fine SAND, and (-) Silt, trace (-) fine Gravel [NYC Class 3b]**	
14						
15						
			3			
16		S-5	2		same 16'6"	Rec = 18"
			8		Br cf S, l $, t mf G	wet
17			23			
18						
19					**Brown coarse to fine SAND, little Silt, trace medium to fine Gravel [NYC Class 3a]**	
20						
			17			
21		S-6	27		same, l (+) $	Rec = 15"
			37			wet
22			50		22'0"	

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-2
Project: Proposed 14 Story Building, Phase I, 1156 East 165 St, Bronx NY		**SHEET NO.:** 2 of 2
Client: Park Management Inc.		**JOB NUMBER:** 17-147

Depth (ft.)	Casing Blows pre Foot	Sample Number	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
23					Gr Mica Schist , shattered v. blocky & seamy, highly wthrd	
24						
25						
26		**Run #1**			**<u>Gray Mica Schist, Shattered very blocky and seamy, highly weathered [NYC Class 1c]</u>**	<u>Run #1</u> 23'0'-28'0" Run = 60" Rec = 75% RQD = 48%
27						
28					28'0"	
29					Gr Mica Schist , blocky & seamy, moderately weathered	
30						
31		**Run #2**			**<u>Gray Mica Schist with Quartz infusion, block and seamy, moderately weathered [NYC Class 1b]</u>**	<u>Run #2</u> 28'0"-33'0" Run = 60" Rec = 93% RQD = 63%
32						
33					33'0"	
34					**<u>End of Boring @ 33'0"</u>**	
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						

CARLIN - SIMPSON & ASSOCIATES Sayreville, N.J.	TEST BORING LOG	BORING NUMBER B-3
Project: Proposed 14 Story Building, Phase I, 1156 East 165 St, Bronx NY		**SHEET NO.:** 1 of 2
Client: Park Management Inc.		**JOB NUMBER:** 17-147
Drilling Contractor: General Borings Inc.		**ELEVATION:** +40.5

GROUNDWATER					CASING	SAMPLE	CORE	TUBE		
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS	QX		DATUM:	TOPO
13-Sep-17	1030	9'0"	HSA	DIA.	3 1/4"	1 3/8"	2 3/8"		START DATE:	13-Sep-17
				WGHT		140#			FINISH DATE:	13-Sep-17
				FALL		30"			DRILLER:	P.C.
									INSPECTOR:	CKS

Depth (ft.)	Casing Blows pre Foot	Sample Number	Blows on Sample Spoon per 6"	SYM	IDENTIFICATION	REMARKS
					Asphalt 0'1"	
1						
			6			
2		S-1	8		FILL (Gr br cf S, l (-) $, t mf G)	Rec = 15"
			5		**FILL (Gray brown coarse to fine SAND,**	moist
3			5		**little (-) Silt, trace (+) medium to fine**	
			6		**Gravel) [NYC Class 7]**	
4		S-2	5		FILL (same)	Rec = 13"
			5			moist
5			3			
			9			
6		S-3	8		FILL (same, l (-) mf G)	Rec = 18"
			4		6'6"	moist
7			11		Gr cf S, s $, t mf G	some perched water
			12			
8		S-4	12			Rec = 17"
			16		same	moist
9			13			residual soil
10						
			4			
11		S-5	7		same	Rec = 0"
			11		**Gray brown coarse to fine SAND, some (+)**	wet
12			9		**Silt, trace medium to fine Gravel**	
					[NYC Class 3b]	
13						
14						
15						
			2			
16		S-6	4		Gr br cf S, s (+) $, t (-) f G	Rec = 18"
			6			wet
17			6			with occasional root fibers
18						
19						
20					20'0"	
		S-7	50/3"		Br cf S, s $, t mf G	Rec = 3"
21					**Brown coarse to fine SAND, some Silt,**	wet
					trace medium to fine Gravel	dense drilling 20'-25'
22					**[NYC Class 3a]**	

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-3
Project: Proposed 14 Story Building, Phase I, 1156 East 165 St, Bronx NY		**SHEET NO.:** 2 of 2
Client: Park Management Inc.		**JOB NUMBER:** 17-147

Depth (ft.)	Casing Blows pre Foot	Sample Number	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
23						
24					**Brown coarse to fine SAND, some (-) Silt, trace fine Gravel, with completely weathered Schist fragments [NYC Class 3a]**	
25			35			
26		S-8	50/1"		Br cf S, s (-) $, t f G	Rec = 3" wet
27						
28						dense drilling 25'-29'
29					29'0"	Auger Refusal @ 29'0"
30					Gr Mica Schist, shattered, v. blocky & seamy, hghly wthrd	
31						
32		Run #1			**Gray Mica Schist shattered, very blocky and seamy, highly weathered [NYC Class 1c]**	Run #1 29'0"-34'0" Run = 60" Rec = 57" = 95% RQD = 48%
33						
34					34'0"	
35					**End of Boring @ 34'0"**	
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						

CARLIN - SIMPSON & ASSOCIATES Sayreville, N.J.	TEST BORING LOG	BORING NUMBER B-4

Project:	**Proposed 14 Story Building, Phase I, 1156 East 165 St, Bronx NY**	**SHEET NO.:**	1 of 2
Client:	**Park Management Inc.**	**JOB NUMBER:**	17-147
Drilling Contractor:	**General Borings Inc.**	**ELEVATION:**	+40.0

GROUNDWATER					**CASING**	**SAMPLE**	**CORE**	**TUBE**	**DATUM:**	TOPO
DATE	**TIME**	**DEPTH**	**CASING**	**TYPE**	**HSA**	**SS**			**START DATE:**	13-Sep-17
13-Sep-17	**1330**	**9'6"**	**HSA**	**DIA.**	**3 1/4"**	**1 3/8"**			**FINISH DATE:**	13-Sep-17
				WGHT		**140#**			**DRILLER:**	P.C.
				FALL		**30"**			**INSPECTOR:**	CKS

Depth (ft.)	Casing Blows pre Foot	Sample Number	Blows on Sample Spoon per 6"	SYM	IDENTIFICATION	REMARKS
					Asphalt 0'4"	
1						
			5			
2		**S-1**	7		FILL (Bk cf S, l (+) $, t mf G)	Rec = 13"
			14		**FILL (Gray brown, black coarse to fine**	moist
3			9		**SAND, little (+) Silt, trace medium to fine**	
			6		**Gravel) [NYC Class 7]**	
4		**S-2**	11		FILL (same, gr br)	Rec = 17"
			13			moist
5			14			
			7			
6		**S-3**	5		FILL (same) 6'0"	Rec = 13"
			10		Br cf S, l (+) $, t mf G	moist
7			14			perched water
			12			
8		**S-4**	7		same, s (-) $	Rec = 15"
			6			moist
9			5			slightly mottled
10						
			3			
11		**S-5**	13		same, s (-) $	Rec = 10"
			7			wet
12			13		**Brown coarse to fine SAND, some (-) Silt,**	
					trace medium to fine Gravel	
13					**[NYC Class 3b]**	
14						
15						
			3			
16		**S-6**	6		same, gr, l $	Rec = 13"
			9			wet
17			8			
18						
19						
20					20'0"	
			10		Br cf S, s $, t mf G	
21		**S-7**	32		**Brown coarse to fine SAND, some Silt, trace**	Rec = 15"
			47		**medium to fine Gravel [NYC Class 3a]**	wet
22			47			

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-4
Project: Proposed 14 Story Building, Phase I, 1156 East 165 St, Bronx NY		**SHEET NO.:** 2 of 2
Client: Park Management Inc.		**JOB NUMBER:** 17-147

Depth (ft.)	Casing Blows pre Foot	Sample Number	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
					Brown coarse to fine SAND, some Silt, trace	
23					**medium to fine Gravel [NYC Class 3a]** 23'0"	
					Gr Mica Schist, shattered, v. blocky & seamy, hghly wthrd	
24						
25						
26		**Run #1**			**Gray Mica Schist shattered, very blocky and seamy, highly weathered [NYC Class 1d]**	Run #1 23'0"-28'0"
27						Run = 60" Rec = 75% RQD = 33%
28					28'0"	
					End of Boring @ 28'0"	
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						

CARLIN - SIMPSON & ASSOCIATES Sayreville, N.J.	TEST BORING LOG	BORING NUMBER B-5

Project:	**Proposed 14 Story Building, Phase I, 1156 East 165 St., Bronx NY**	**SHEET NO.:**	1 of 2
Client:	**Park Management Inc.**	**JOB NUMBER:**	17-147
Drilling Contractor:	**General Borings Inc.**	**ELEVATION:**	+35.0

GROUNDWATER					**CASING**	**SAMPLE**	**CORE**	**TUBE**	**DATUM:**	TOPO
DATE	**TIME**	**DEPTH**	**CASING**	**TYPE**	**HSA**	**SS**	**NX**		**START DATE:**	13-Sep-17
14-Sep-17	**800**	**9'0"**	**HSA**	**DIA.**	**3 1/4"**	**1 3/8"**	**2 3/8"**		**FINISH DATE:**	13-Sep-17
				WGHT		**140#**			**DRILLER:**	P.C.
				FALL		**30"**			**INSPECTOR:**	CKS

Depth (ft.)	Casing Blows pre Foot	Sample Number	Blows on Sample Spoon per 6"	SYM	IDENTIFICATION	REMARKS
					Asphalt 0'4"	
1						
			1			
2		**S-1**	3		FILL (Br br cf S, s $, t mf G)	Rec = 6"
			50/1"			moist
3					**FILL (Gray brown coarse to fine SAND,**	
					some Silt, trace medium to fine Gravel)	
4					**[NYC Class 7]**	
5						
			8			
6		**S-2**	6		FILL (same)	Rec = 18"
			7			moist
7			7			
			8			
8		**S-3**	7		FILL (same)	Rec = 14"
			9			moist
9			8			
10						
			9			
11		**S-4**	5		FILL (same, w/ root fibers)	Rec = 16"
			4			wet
12			6			
13					13'0"	
14						
15						
			5			
16		**S-5**	9		Br cf S, s (+) $, t mf G	Rec = 15"
			7			wet
17			14		**Brown coarse to fine SAND, some (+) Silt,**	
					trace medium to fine Gravel	
18					**[NYC Class 3b]**	
19						
20					20'0"	
			17		Br cf S, s (-) $, t mf G	
21		**S-6**	23		**Brown coarse to fine SAND, some (-) Silt,**	Rec = 8"
			37		**trace medium to fine Gravel**	wet
22			40		**[NYC Class 3a]**	

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-5
Project: Proposed 14 Story Building, Phase I, 1156 East 165 St., Bronx NY		**SHEET NO.:** 2 of 2
Client: Park Management Inc.		**JOB NUMBER:** 17-147

Depth (ft.)	Casing Blows pre Foot	Sample Number	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
23						
24					**Brown coarse to fine SAND, and Silt, trace fine Gravel [NYC Class 3b]**	
25						
26		**S-7**	4 / 3 / 5 / 41		same, a $	Rec = 8"
					26'0"	wet
27					Schist, highly to completely weathered	
28						
29						
30					**Schist, highly to completely weathered [NYC Class 1d]**	
31		**S-8**	50/5"		same	Rec = 4" wet
32						
33					33'0"	Auger refusal @ 33'
34					Gr Mica Schist, crushed, highly weatherd	
35						
36		**Run #1**			**Gray Mica Schist with Quartz, crushed highly weathered [NYC Class 1d]**	Run #1 33'0"-38'0" Run = 60" Rec = 33" = 55% RQD = 20%
37						
38					38'0"	
39					**End of Boring @ 38'0"**	
40						
41						
42						
43						
44						
45						
46						
47						

CARLIN - SIMPSON & ASSOCIATES Sayreville, N.J.	TEST BORING LOG	BORING NUMBER B-6

Project:	**Proposed 14 Story Building, Phase I, 1156 East 165 St., Bronx NY**	**SHEET NO.:**	1 of 2
Client:	**Park Management Inc.**	**JOB NUMBER:**	17-147
Drilling Contractor:	**General Borings Inc.**	**ELEVATION:**	+42.0

GROUNDWATER					**CASING**	**SAMPLE**	**CORE**	**TUBE**	**DATUM:**	TOPO
DATE	**TIME**	**DEPTH**	**CASING**	**TYPE**	**HSA**	**SS**			**START DATE:**	14-Sep-17
14-Sep-17	**1200**	**10'0"**	**HSA**	**DIA.**	**3 1/4"**	**1 3/8"**			**FINISH DATE:**	14-Sep-17
				WGHT		**140#**			**DRILLER:**	P.C.
				FALL		**30"**			**INSPECTOR:**	CKS

Depth (ft.)	Casing Blows pre Foot	Sample Number	Blows on Sample Spoon per 6"	SYM	IDENTIFICATION	REMARKS
					Asphalt 0'1"	
1						
			16			
2		**S-1**	16		FILL (Br cf S, l (+) $, l (-) mf G)	Rec = 18"
			18			moist
3			11			
			17			
4		**S-2**	9		FILL (same)	Rec = 14"
			11		**FILL (Brown coarse to fine SAND, little**	moist
5			8		**(+) Silt, little (-) medium to fine Gravel)**	
			8		**[NYC Class 7]**	
6		**S-3**	5		FILL (same)	Rec = 10"
			4			moist
7			5			
			5			
8		**S-4**	4		FILL (same)	Rec = 6"
			4			moist
9			2			
10					10'0"	
			6			
11		**S-5**	7		Br cf S, s $, t mf G	Rec = 10"
			8			wet
12			13			Staining @ 11'
						Boulder @ 13'
13						
					Brown coarse to fine SAND, some Silt,	
14					**trace medium to fine Gravel**	Auger refusal @ 14' on boulder
					[NYC Class 3b]	Moved hole 8' South
15						
			4			
16		**S-6**	4		same	Rec = 2"
			6			wet
17			10			
18						
19						
20					20'0"	
			10		Br cf S, s $, t mf G	
21		**S-7**	30		**Brown coarse to fine SAND, some Silt,**	Rec = 15"
			50/2"		**trace medium to fine Gravel**	wet
22					**[NYC Class 3a]**	

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-6
Project: Proposed 14 Story Building, Phase I, 1156 East 165 St., Bronx NY		**SHEET NO.:** 2 of 2
Client: Park Management Inc.		**JOB NUMBER:** 17-147

Depth (ft.)	Casing Blows pre Foot	Sample Number	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
23					**Brown coarse to fine SAND, some Silt, trace medium to fine Gravel [NYC Class 3a** 23'0"	
24					Gr Mica Schist, shattered, v. blocky & seamy, hghly wthrd	
25						
26		**Run #1**			**Gray Mica Schist shattered, very blocky and seamy, highly weathered [NYC Class 1d]**	Run #1 23'0"-28'0" Run = 60" Rec = 55% RQD = 35%
27						
28					28'0"	
29					Gr Mica Schist, massive, mod jointed, slightly wthrd	
30						
31		**Run #2**			**Gray Mica Schist, massive moderately jointed, slightly weathered [NYC Class 1b]**	Run #2 28'0"-33'0" Run = 60" Rec = 100% RQD = 85%
32						
33					33'0"	
34					Gr Mica Schist w/ Quartz intrusions, intact, fresh	
35						
36		**Run #3**			**Gray Mica Schist with Quartz intrusions, intact, fresh [NYC Class 1a]**	Run #3 33'0"-38'0" Run = 60" Rec = 100% RQD = 93%
37						
38						
39					same	
40						
41		**Run #4**				Run #4 38'0"-43'0" Run = 60" Rec = 100% RQD = 98%
42						
43					43'0"	
44					**End of Boring @ 43'0"**	
45						
46						
47						

CARLIN - SIMPSON & ASSOCIATES Sayreville, N.J.	TEST BORING LOG	BORING NUMBER B-7

Project:	**Proposed 14 Story Building, Phase I, 1156 East 165 St., Bronx NY**	**SHEET NO.:**	1 of 2
Client:	**Park Management Inc.**	**JOB NUMBER:**	17-147
Drilling Contractor:	**General Borings Inc.**	**ELEVATION:**	+42.5

GROUNDWATER					**CASING**	**SAMPLE**	**CORE**	**TUBE**		
DATE	**TIME**	**DEPTH**	**CASING**	**TYPE**	**HSA**	**SS**	**NX**		**DATUM:**	TOPO
15-Sep-17	**0730**	**11'0"**	**HSA**	**DIA.**	**3 1/4"**	**2 3/8"**	**2 3/8"**		**START DATE:**	14-Sep-17
				WGHT		**140#**			**FINISH DATE:**	14-Sep-17
				FALL		**30"**			**DRILLER:**	P.C.
									INSPECTOR:	CKS

Depth (ft.)	Casing Blows pre Foot	Sample Number	Blows on Sample Spoon per 6"	SYM	IDENTIFICATION	REMARKS
					Asphalt 0'2"	
1						
2						
			2			
3		**S-1**	3		FILL (Br cf S, l (-) $, t mf G)	Rec = 12"
			2			moist
4			2			
5					**FILL (Brown coarse to fine SAND, little (+) Silt, trace medium to fine Gravel) [NYC Class 7]**	
			10			
6		**S-2**	7		FILL (same)	Rec = 13"
			9			moist
7			16			
			5			
8		**S-3**	4		FILL (same, s (-) $ w root fibers)	Rec = 14"
			6			moist
9			10			Stained no odor
10						
			7			
11		**S-4**	3		FILL (same)	Rec = 0"
			2			wet
12			2			
13					13'0"	
14						
15						
			21			
16		**S-5**	27		Br cf S, s (-) $, t mf G	Rec = 10"
			50/4"			wet
17						
18					**Brown coarse to fine SAND, some (-) Silt, trace medium to fine Gravel [NYC Class 3a]**	
19						
20						
		S-6	50/4"		same	Rec = 3"
21						wet
22					22'0"	Residual soil, completely weathered

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-7
Project: Proposed 14 Story Building, Phase I, 1156 East 165 St., Bronx NY		**SHEET NO.:** 2 of 2
Client: Park Management Inc.		**JOB NUMBER:** 17-147

Depth (ft.)	Casing Blows pre Foot	Sample Number	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
23					Gr Mica Schist, blocky and seamy, slightly weathered	
24						
25		Run #1			**Gray Mica Schist, blocky and seamy, slightly weathered [NYC Class 1b]**	Run #1 22'0"-27'0" Run = 60" Rec = 100% RQD = 75%
26						
27						
28					same	
29						
30		Run #2				Run #2 27'0"-32'0" Run = 60" Rec = 100% RQD = 85%
31						
32					32'0"	
33					**End of Boring @ 32'0"**	
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						