Appendix 3.1-2

Geotechnical Engineering Report

GEOTECHNICAL ENGINEERING REPORT

for

SANDS NEW YORK
Phase 1A – Alterations to Existing Coliseum
Uniondale, New York

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INTRODUCTION

This report presents the results of our subsurface investigation and provides geotechnical engineering recommendations for the design and construction of the proposed Phase 1A - Alterations to the Existing Coliseum as part of the redevelopment of the Nassau Coliseum property in Uniondale, New York. All services were performed in general accordance with our Additional Services Request and Statement of Work under Master Service Agreement CW2785281, dated 07 July 2023.

Our understanding of the project is based on review of the documents provided, discussions with your office and the project team, and our general experience in the area. Architectural information was provided by the project architect (Populous Architect, PLLC) and structural information was provided by the project structural engineer (Thornton Tomasetti). All recommendations are in accordance with the 2020 New York State Building Code (NYSBC).

Elevations were interpolated from the survey titled "ALTA/NSPS Land Title Survey," Sheet VL103, prepared by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C., dated 14 March 2023 and updated 22 May 2023. All elevations contained herein are considered approximate and reference the North American Vertical Datum of 1988 (NAVD88)[1]. Based on review of recent survey spot elevations taken at the concourse level of the Nassau Coliseum, we estimate that the elevations referenced on the original design plans and current 50% DD plans should be reduced by approximately 1.4 feet to convert to the NAVD88 datum.

SITE DESCRIPTION

The project site consists of Nassau Coliseum and surrounding parking lots and is located at 1255 Hempstead Turnpike in Uniondale, New York. The property is comprised of multiple parcels referenced on the Nassau County Tax Maps as Section F, Block 44, Lots 351, 411, 412, and 415. The site is generally bound by Charles Lindbergh Boulevard to the north, James Doolittle Boulevard to the east, Hempstead Turnpike to the south, and Earle Ovington Boulevard to the west. A site location map is presented in Figure 1.

The existing Nassau Coliseum ("the Coliseum") includes a concourse level, a below-grade event level, and multi-level event seating. The below-grade event level footprint includes a loading dock and ramp that extends north of the above-grade building limits and an exhibition space that extends east of the above-grade building limits. Original design plans[2] show the Coliseum is supported by a shallow foundation system bearing on dense native sand soils with an allowable bearing pressure of 4 tons per square foot. The below-grade event level floor slab consists of a 6-inch-thick to 8-inch-thick concrete slab-on-grade. The top of the event level floor slab is located

[1] Elevations are with respect to the North American Vertical Datum of 1988 (NAVD88), which is reported to be 1.092 feet above the Mean Sea Level at Sandy Hook, New Jersey, 1929 (NGVD 1929) and the Nassau County Datum.

[2] Design drawings include drawing numbers S-1 through S-3. All drawings are part of "John F. Kennedy Educational, Civic & Cultural Center Coliseum", prepared by Farkas & Barron Structural Engineers, dated 15 January 1969.

at about el 58.6 ft and the top of the loading dock floor slab is located at about el 54.6 ft. Surface grades in the vicinity of the Coliseum vary from about el 79.3 ft to el 82.5 ft.

PROPOSED DEVELOPMENT

We understand the proposed development includes alterations to the Coliseum to facilitate its use as a casino, including demolition of the existing slab-on-grade and installation of new footings and elevator pits below the event level, demolition of the existing slab-on-grade and installation of new footings and a grease interceptor pit in the loading dock, and infill to the existing concourse level. Excavations for the proposed footings and elevator pits are generally expected to extend to depths of about 5 feet below the existing slab-on-grade. Excavation for the new grease interceptor pit is expected to extend to a depth of about 16 feet below the existing slab-on-grade.

ADJACENT STRUCTURES

Long Island Marriott, 101 James Doolittle Boulevard (Section 44, Block F, Lot 326)

The Long Island Marriott hotel, an 11-story building with one cellar level, is located to the east of the Coliseum. The top of the cellar slab is shown in approximate existing conditions drawings to be about 12.7 feet below the ground floor slab (about el 68.4 ft). Foundation drawings were not available at the time of this report, and no formal inspection was made from within the building. The type and extents of the foundations supporting the building are unknown.

REVIEW OF PUBLISHED INFORMATION

FEMA Flood Maps

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), plate 36059C0227G, governs flood zone compliance for the site. The subject FIRM shows that the proposed development falls within unshaded Zone X - Areas of Minimal Flooding. The unshaded Zone X designation corresponds to "Areas determined to be outside the 0.2 percent annual chance floodplain." Therefore, floodproofing is not required by the NYSBC. An excerpt of the FEMA FIRM map relative to the project site is shown in Figure 2.

SUBSURFACE INVESTIGATION

Our subsurface investigation included: 1) drilling 8 geotechnical test borings with in situ testing and sampling of soil; 2) installing two groundwater observation wells; 3) performing laboratory testing on representative soil samples; and 4) reviewing available historic boring data.

Geotechnical Test Borings

Eight geotechnical test borings, identified as LB1A-01(OW) through LB1A-08, were drilled by Wolf Drilling LLC of Rockaway Point, New York between 21 August and 15 September 2023. All borings were drilled within or in close proximity to the footprint of proposed structures (i.e., new footings or the new grease interceptor pit). All borings were drilled using a Fordia Explo portable electric drill rig. Langan provided full-time special inspection of all drilling operations in accordance with the NYSBC. The borings were generally advanced to depths between 52 feet and 102 feet below event level grade. The approximate locations of the borings are shown on the subsurface investigation plan in Figures 3 and 4.

The borings were advanced through soil using mud-rotary drilling techniques with a tri-cone roller bit and drilling fluid. Temporary flush-joint steel casing was installed through soils, as required, to stabilize the boreholes and prevent fluid loss during drilling. The boring locations were initially cleared of utilities using ground penetrating radar (GPR). In addition, the first 5 feet of all borings were hand dug in an effort to clear the boreholes of utilities. The Standard Penetration Test (SPT)[3] was performed in general accordance with ASTM D1586. SPT N_{60}-values[4], visual soil classifications, and other field observations were recorded by a Langan's engineer. Soils were sampled using a standard 2-inch outer-diameter split-spoon sampler driven by a donut hammer. All recovered soil samples were visually classified in the field in accordance with ASTM D2487 and the Unified Soil Classification System (USCS). Soil classifications, SPT N_{60}-values, and other field observations were recorded on the boring logs presented in Appendix A.

Groundwater Observation Wells

Groundwater observation wells were installed in boreholes LB1A-01(OW) and LB1A-06(OW) and groundwater levels were measured periodically during and after our subsurface investigation. The observation wells were generally constructed using a 10-foot section of 2-inch-diameter Schedule 40 PVC slotted well screen below an approximately 30-foot section of solid riser pipe. The annulus was backfilled with No. 1 filter sand to a height of at least 2 feet above the screen section; a minimum 2-foot-thick bentonite-pellet seal was installed above the filter sand. The remainder of the annulus was backfilled with soil cuttings. The top 1 foot to 2 feet was grouted to prevent surface water from influencing the well readings. A protective steel flush-mounted well cap was installed at the ground surface at each well location. The observation well construction logs are included in Appendix A.

Laboratory Testing

Laboratory testing was performed on select soil samples to evaluate engineering properties and verify visual classifications made in the field. Laboratory testing of the soil samples included:

- Particle Size Distribution – ASTM D6913 (29 Tests)
- Atterberg Limits – ASTM D4318 (3 Tests)

The laboratory test results are provided in Appendix B.

[3] The Standard Penetration Test is a measure of soil density and consistency. The testing involves driving a 2-inch outer-diameter split-spoon sampler a distance of 2 feet, using a 140-lb hammer free falling from a height of 30 inches.

[4] N_{60}-value – The number of blows required to drive a 2-inch diameter split-spoon sampler 12 inches after an initial "seating" penetration of 6 inches, using a 140-lb hammer free falling from a height of 30 inches, corrected for the hammer's energy ratio. $N_{60} = N_{Field}$(Hammer Efficiency/60)

Previous Investigations by Others

Reliable Drilling Corp. (1966)

A subsurface investigation was completed for the original design of the Nassau Coliseum in 1966. The investigation consisted of 48 borings and four groundwater monitoring wells within the footprint of the Nassau Coliseum. Borings were advanced to depths varying between 50 feet and 101.5 feet below existing grade. In general, the subsurface conditions encountered in the 1966 investigation agree well with those encountered in the 2023 Langan investigation. Approximate locations of the historic borings are shown in Figures 3 and 4. A copy of the available historic boring logs from 1966 is included in Appendix C; we note that some of the historic boring records were missing from the file.

Soil Mechanics Drilling Corp. (2014)

A subsurface investigation comprised of 26 geotechnical borings was completed along the east side of the Coliseum in 2014. Borings were advanced to depths varying between 35 feet and 100 feet below existing grade. In general, the subsurface conditions encountered in the 2014 investigation agree well with those encountered in the 2023 Langan investigation. Approximate locations of the historic borings are shown in Figures 3 and 4. A copy of the historic boring logs from 2014 is included in Appendix D.

SUBSURFACE CONDITIONS

The general subsurface stratigraphy encountered in the Phase 1A borings consists of fill underlain by sand with variable gravel, silt, and clay content; in some cases, layers of clay were present within the sand strata. Bedrock is known to be at great depth in the vicinity of the site. A brief description of each layer is presented below in order of increasing depth.

Stratum 1 – Fill

Fill was observed in all borings and generally consists of coarse to fine sand with variable concentrations of gravel and silt. The fill soils generally appear to be comprised of reworked native soils. The fill layer is estimated to extend to depths of about 4 feet to 9.5 feet below the event level slab, corresponding to about el 54.6 ft and el 46.6 ft. SPT N_{60}-values typically varied from 8 to 40 bpf (blows per foot). The fill layer is generally considered to be in a medium dense to dense condition.

Three particle size distribution analyses were performed on a selected samples from the fill layer. The samples had fines contents varying from 3.0 percent to 5.1 percent.

The fill generally classifies as SP (poorly graded sands, gravelly sands, little or no fines) or SP-SM (poorly graded sands with gravel and silt) in accordance with ASTM D2487 and the USCS.

Stratum 2 – Granular Soil

Granular soil was observed below the fill layer in all borings. The granular soil generally consists of coarse to fine, medium to fine, or fine sand with variable concentrations of gravel, silt, and clay. The soil stratum extends from the bottom of the fill layer (about el 54.6 ft to el 46.6 ft) to the full depth of the boring (about el 6.6 ft to el -47.4 ft). SPT N_{60}-values varied from 10 bpf to refusal (greater than 50 blows over 3 inches) and were typically greater than 20 bpf. The granular soils are generally considered to be in a dense to very dense condition.

Twenty-one particle size distribution analyses were performed on selected samples from the granular soil layer. The samples had fines contents varying from 2.4 percent to 26.5 percent.

The dense granular soil layer generally classifies as SP (poorly graded sands, gravelly sands, little or no fines), SP-SM (poorly graded sands with gravel and silt), SM (silty sands, sand-silt mixtures), SP-SC (poorly graded sands with gravel and clay), or SC (clayey sands, sand-clay mixtures) in accordance with ASTM D2487 and the USCS.

Stratum 2a – Clay and Clayey Sand

Thin clayey sand and clay layers were observed interspersed within the Stratum 2 soils in all borings except LB1A-01(OW) and LB1A-04. These soils generally consist of clay with variable concentrations of fine sand and silt, or fine sands with high concentrations of clay and silt.

Where encountered, the top of the clay and clayey sand layer was observed as shallow as 30 feet and as deep as 102 feet below existing grade, corresponding to about el 28.6 ft and el -47.4 ft. The layer thickness varied from about 7 feet to 40 feet. SPT N_{60}-values typically varied from 10 to 70 bpf. The soil stratum is generally considered to be in a stiff to very stiff condition for clay rich soils and in a medium dense to dense condition for clayey sand soils.

Five particle size distribution analyses were performed on select clayey sand samples. The samples had fines contents varying from 32.7 percent to 41.9 percent. In addition, three Atterberg Limits tests were performed on select clay samples. The samples had Liquid Limits varying from 43 percent to 48 percent, Plastic Limits varying from 22 percent to 28 percent, and Plasticity Indices varying from 20 to 21.

The clay soils generally classify as CL (inorganic clays of low to medium plasticity) and the clayey sand layer generally classifies as SC (clayey sands, sand-clay mixtures) in accordance with ASTM D2487 and the USCS.

Groundwater

The groundwater level was measured in LB1A-01(OW) and LB1A-06(OW) during and after our subsurface investigation. The stabilized groundwater level varied from about el 46.4 ft and about el 50.4 ft. These readings are consistent with the data collected during the 1966 investigation and are about 2 feet lower than those reported in during the 2014 investigation. Groundwater level readings from the 2023 investigation are summarized in Table 1 below. Please note that the groundwater level may vary seasonally and with changes in precipitation.

Table 1 – Groundwater Observation Well Data

Well No.	Approx. Surface Elevation (feet, NAVD88)	Date	Depth Below Grade (feet)	Approx. Elevation (feet, NAVD88)
LB1A-01(OW)	± 54.6	09/15/2023	8.2 ±	± 46.4
		09/20/2023	4.2 ±	± 50.4
		09/21/2023	4.2 ±	± 50.4
LB1A-06(OW)	± 58.6	08/29/2023	8.5 ±	± 50.1
		08/31/2023	8.7 ±	± 49.9
		09/01/2023	8.6 ±	± 50.0
		09/20/2023	8.9 ±	± 49.7
		09/21/2023	8.9 ±	± 49.7

SEISMIC ANALYSES

Seismic Design Parameters

Seismic design parameters were determined in accordance with Section 1613 of the NYSBC and ASCE 7-16. The subsurface investigation indicates that dense soil is generally present at the site. Therefore, we recommend that the site be assigned to Site Class D. Per the 50% DD plans, we understand that the building is considered Risk Category III. The resulting design spectral acceleration at short periods (S_{DS}) is equal to 0.272g and the design spectral acceleration at 1-second (S_{D1}) is equal to 0.09g. Seismic design parameters are summarized in Table 2 below.

Table 2 - Seismic Design Parameters

Description	Parameter	Recommended Value	NYSBC/ASCE 7 Reference
Mapped Spectral Acceleration for short periods	S_S	0.256g	Figures 1613.2.1(1), (2) ***
Mapped Spectral Acceleration for 1-sec periods	S_1	0.056g	
Site Class	-	**D**	ASCE 7-16 Table 20.3-1
Site Coefficient	F_a	1.595	Tables 1613.2.3(1), (2)
Site Coefficient	F_v	2.4	Table 1613.3.3(2)
5 percent damped design spectral response acceleration at short periods:	$\mathbf{S_{DS}}$	**0.272g**	Section 1613.2.4
5 percent damped design spectral response acceleration at 1-sec period:	$\mathbf{S_{D1}}$	**0.09g**	
Risk Category (per Drawing #C1-S0-05)	-	**III**	Table 1604.5
Seismic Design Category	-	**B**	Table 1613.2.5(1) Table 1613.2.5(2)
Site Adjusted Peak Ground Acceleration	PGA_M	0.229g	ASCE 7-16 Section 11.8.3
*** ASCE Hazards Tool (https://asce7hazardtool.online/)			

Liquefaction Potential

The seismic provisions of the NYSBC require an evaluation of the liquefaction potential of sand, silt, and non-cohesive materials below the groundwater table, and up to a depth of 50 feet below the ground surface. Our evaluation indicates that the potential for liquefaction, liquefaction-induced settlement, and other seismic ground failure at the site is unlikely. Therefore, liquefaction need not be considered in design.

DESIGN AND CONSTRUCTION CONSIDERATIONS

The following section briefly summarizes significant design and construction considerations associated with foundations for the proposed development:

- The site lies outside of FEMA mapped flood hazard areas and does not require floodproofing.
- Groundwater is not anticipated to be encountered during excavation and construction of new isolated footings. However, the grease interceptor pit excavation will likely extend about 12 feet below the groundwater table and will require a support of excavation system capable of reducing groundwater inflow to reduce the quantity of pumped groundwater. We recommend a design groundwater elevation of el 54 ft.
- The site should be designed assuming a seismic design category (SDC) of **B** for Risk Category III. Liquefaction need not be considered in the design.
- The granular soil below the building footprint is suitable for supporting the proposed alterations using a shallow foundation system (i.e., isolated spread footings and strip footings).
- Support of excavation (SOE), underpinning, or other means of ground support will be required where sufficient lateral clearance cannot be provided to permit OSHA compliant sloped/benched excavations.
- Existing structures and utilities to remain must be protected and monitored during excavation and construction activities.

DESIGN RECOMMENDATIONS

Foundations

The subsurface conditions are considered suitable for supporting the proposed alterations using shallow foundations. The following sections provide additional details for foundation design.

<u>Allowable Bearing Pressure</u>

We recommend that footings be designed assuming a gross allowable bearing pressure of four (4) tons per square foot (tsf). This recommended allowable bearing pressure exceeds the presumptive load bearing values prescribed in Table 1806.2 of the NYSBC and requires approval of the building official.

Continuous strip footings should have a minimum width of 2 feet and isolated spread footings should have a minimum width of 3 feet. All footings should bear at least 3 feet below adjacent exterior grade or 3 feet below the top of the event level floor slab. Footing subgrades should be prepared in accordance with the recommendations presented herein.

Footings must bear at or below the line of influence of existing Coliseum footings. The line of influence is defined by projecting an imaginary line from the edge of the lower footing upward and outward at an inclination of 1V:2H. Existing footing subgrades should be protected from disturbance or undermining that could result from nearby excavation.

Settlement

Column loads for the proposed alterations have not been provided at the time of this report. Typical footings for the Coliseum loaded to 4 tsf are estimated to settle less than 1.0 inch. New footings in close proximity to existing footings are estimated to result in settlement of up to about 0.3 inches beyond the existing conditions. The angular distortion (Δ/L) resulting from differential settlement between adjacent columns is estimated to be about 1/600 or less. The majority of the settlement is expected to occur during construction as dead load is applied.

Lateral Resistance

Lateral loads can be resisted by friction on the bottom of footings. We recommend an ultimate friction coefficient of 0.45 for mass concrete poured on medium dense to dense sand. A minimum factor of safety of 1.5 should be utilized when evaluating sliding. If additional resistance is needed, lateral loads can also be resisted by embedding footings deeper to develop passive resistance from the soil. The allowable passive resistance provided by the soil will be dictated by the depth of embedment, characteristics of the surrounding material, and the extent of backfill and compaction at a particular location. Alternatively, floor slabs can be used as diaphragms to transfer loads to the exterior walls.

Uplift Resistance

We expect that uplift forces can be accommodated by the dead load of the structure; however, resistance can be provided by ground anchors (tie-downs) or micropiles if needed. Where required, anchors must consider group effects and need to be evaluated on a case-by-case basis.

Floor Slabs

Where above the design groundwater elevation, we recommend that the event level slab be designed as a slab-on-grade provided that proper subgrade preparation is implemented. For the purpose of design, we recommend that slab-on-grade floors be designed assuming a modulus of subgrade reaction equal to 200 psi-per-inch. Please note that the modulus of subgrade reaction noted above is not appropriate for use in the design of mat foundations. Slab-on-grade floors should bear atop a minimum 6-inch-thick layer of free draining ¾-inch crushed stone or gravel layer placed over a suitably compacted granular soil subgrade. A vapor barrier or waterproofing membrane should be installed below all moisture sensitive slabs (i.e., occupied interior spaces).

Where below the design groundwater elevation, we recommend that floor and pit slabs be designed as pressure slabs. We recommend that pressure slabs be designed assuming hydrostatic uplift corresponding to the depth below the recommended design groundwater elevation (el 54 ft). Where possible, pressure slabs should be keyed into the building walls and should be cast with integral waterstops at all joints. Pressure slabs should be waterproofed as per the recommendations presented herein.

Below Grade Walls

Restrained Walls

We recommend that permanent below-grade walls or pits be designed to accommodate lateral pressure resulting from soil and surcharge loads. Permanent walls should be designed assuming a triangular distribution resulting from an equivalent fluid weight of 50 psf per foot of depth above the design groundwater table and 85 psf per foot below the design groundwater table. Lateral pressures from surcharge loads should be added as a uniform soil pressure equal to one-half the vertical pressure.

Unrestrained Walls

Walls free to rotate may be designed assuming active earth pressure conditions. Where applicable, we recommend walls be designed assuming an equivalent fluid weight of 30 psf per foot above the groundwater table and 77 psf per foot below the groundwater table. Full passive earth pressure requires potentially significant translation or rotation of a retaining wall. In an effort to limit movement of walls, a reduced passive earth pressure distribution equal to 155 psf per foot is recommended above the groundwater table and 135 psf per foot below the groundwater table. Passive resistance should be ignored within the frost zone.

Waterproofing

For portions of the proposed alterations not expected to extend below the design groundwater table, we recommend that a robust vapor barrier be provided beneath floor slabs and below-grade walls. Concrete admixtures such as Krystol Internal Membrane, Xypex Admix, or Hycrete may also be used in conjunction with the robust vapor barrier to provide added assurance with respect to water leakage during periods of precipitation.

Portions of the structure extending below the design groundwater table should be completely encapsulated using a membrane-type waterproofing system that is fully bonded to the concrete. We recommend waterproofing such as those manufactured by GCP Applied Technologies, Carlisle Coatings and Waterproofing, and AVM Industries. We recommend that waterstops be installed at all concrete joints in addition to the waterproofing membrane. The use of bentonite waterproofing or negative side crystalline waterproofing is not recommended.

The selection of vapor barriers and waterproofing membranes should be coordinated with any environmental design/regulatory requirements (if any). New horizontally applied vapor barriers and waterproofing membranes should be installed on a suitable substrate. A 2-inch to 3-inch-thick mud slab placed over an approved subgrade to provide a smooth, uniform application surface is considered preferable, but the compact native soils are likely sufficient to meet the manufacturer’s standards for substrates. Vertically applied vapor barriers and waterproofing membranes should extend up to grade. Substrate preparation should be in accordance with the manufacturer’s recommendation.

Quality control is critical to a successful waterproofing project. The vapor barrier and waterproofing installation should be inspected daily, especially during placement of reinforcement for the floor slabs and pit walls. Any holes or tears should be repaired in accordance with the manufacturer's recommendations and utility penetrations should be carefully sealed. All seams, including separations between wall and slab membranes should be checked for tightness. We recommend that the vapor barrier and waterproofing manufacturer inspect the waterproofing operations during construction and approve all work prior to placement of concrete. We also suggest discussing vapor barrier and waterproofing detailing with the selected manufacturer and recommend that a warrantee be obtained from both the manufacturer and installer to cover materials and workmanship.

CONSTRUCTION RECOMMENDATIONS

Excavation

Excavation for footings and elevator pits is anticipated to typically extend to depths of about 5 feet with excavation for the grease interceptor pit extending to a depth of about 16 feet. We anticipate that excavation of soils can be accomplished with conventional earthmoving equipment (i.e., track-hoes, etc.). Obstructions such as remnant foundations, abandoned and live utilities, rubble, and other construction debris should be anticipated when excavating and may require larger demolition equipment.

All excavations should be benched or sloped in accordance with applicable OSHA standards. Where required, temporary excavation support should be installed as per the recommendations presented herein.

Temporary Support of Excavation and Underpinning

Temporary support of excavation (SOE) or underpinning may be required locally to facilitate construction of new footings and pits. In no case should excavations extend below the bearing level of existing footings unless adequate support is provided or sufficient lateral clearance permits safe sloping. Based on the subsurface conditions, we expect that a conventional drilled soldier pile and lagging systems are suitable for excavations above the groundwater table and where sufficient clearance from adjoining footings is afforded such that surcharges from existing footings will not result. The necessary clearance can be estimated assuming an influence line projecting downward and outward from the existing footing at 1V:2H to intercept the proposed excavation subgrade elevation. Bracing of SOE walls may be necessary to prevent lateral deflection.

The existing footings adjacent to the grease interceptor pit in the southern area of the loading dock must be supported during excavation. Conventional pit-pier underpinning is not considered appropriate given the footing sizes, the potential for load eccentricity to occur during excavation activity, the potential for raveling of the existing soils during excavation, and the presence of groundwater. While drilled pile underpinning options are considered viable, they would need to be performed in conjunction with a support of excavation system such that the piles are suitably braced. In addition, significant lowering of the groundwater table via dewatering will still be required. Given the above, we believe that a grouting program (e.g., jet grouting or chemical grout) may prove beneficial. Such methods can be used to solidify and stabilize the soil matrix within, below, and around the excavation such that excavation can be safely made without the need for conventional underpinning, SOE, or dewatering. The extents of grouting will vary depending on the method utilized, but the vertical extents should be such that hydrostatic pressures are balanced to mitigate the need for anchorage of the excavation bottom and the horizontal extents should be such that footing axial loads are fully transferred below the excavation limits.

The design of the SOE system should consider the following minimum design parameters included in Table 3 below and following minimum loading conditions:

- Braced Excavations - Free draining or dewatered walls should be designed using a uniform pressure distribution of 20H psf, where H is the total height of the wall.
- Lateral pressures from surcharge loads should be added to the lateral earth pressure load. Surface surcharges should be added as an inverted triangle having a maximum pressure at the ground surface equal to one-half of the vertical surface load (minimum 300 psf). Lateral surcharge pressure can be reduced to zero at a depth of 15 feet below the ground surface. In addition, surcharges from adjoining footings (where applicable) should be evaluated using elastic methods on a case-by-case basis.
- Lateral pressures resulting from adjacent structures (applicable for areas exterior of the building) should be determined using elastic methods and should be added to the above loads.
- Temporary construction loads are not considered herein and must be assessed on a case-by-case basis.

Table 3 – Soil and Groundwater Design Parameters (SOE)

Material	Parameter	Recommended Value
Fill	Moist Unit Weight	120 pcf
	Friction Angle	34-36 degrees
	Cohesion	0 psf
Dense Granular Soil	Moist Unit Weight	125 pcf
	Friction Angle	36-38 degrees
	Cohesion	0 psf

The SOE system must be designed by a professional engineer, licensed in the State of New York. Construction of the SOE system is subject to special inspection. The SOE system should not be installed until adequate controls for survey monitoring of pertinent adjacent structures are in place.

Temporary Construction Dewatering

Excavations for isolated footings and elevator pits are not anticipated to extend below groundwater and significant temporary construction dewatering is not expected. However, dewatering may be required to address water accumulation that may occur during construction. We anticipate that conventional sumps and pumps will be suitable for temporary groundwater control during construction.

Excavation for the grease interceptor pit is anticipated to extend below groundwater and temporary construction dewatering is anticipated to address the groundwater conditions. When paired with an injection grouted SOE system, conventional sumps and pumps may be used to control groundwater during excavation.

All groundwater discharges to municipal sewers exceeding 45 gpm will require a Long Island Well Permit pursuant to 6 NYCRR Part 602. Treatment may be required where the groundwater is found insufficient for meeting water quality standards dictated by the regulatory agencies having jurisdiction. Permitting from the requisite agencies can often take three to four months.

Subgrade Preparation and Protection

Foundation bearing surfaces should be level and clear of debris, standing or frozen water, and other deleterious materials. Soils should be excavated with care to avoid disturbance below the bearing elevation. We recommend that the final 12 inches of excavation be performed with flat bladed buckets in open areas and by hand in confined areas. The subgrade should be protected from the effects of frost, precipitation, groundwater and surface water run-off and construction until concrete is cast. As such, we recommend that the Contractor limit the area of exposed subgrade to prevent deterioration of the bearing conditions.

Areas disturbed by excavation and other areas found to be unacceptable should be re-compacted, or if necessary, excavated and replaced with compacted structural fill, free draining gravel/crushed stone, Controlled Low Strength Material (CLSM), or lean concrete. The resulting subgrade following placement of fill and compaction should be firm and unyielding under the weight of heavy equipment without evidence of rutting, pumping, or heaving. Vibratory and impact compaction shall not be performed on soils that are not within 2% of optimum moisture content. Compaction should be discontinued in the event that soils are observed to “pump or heave” due to wet conditions. Following compaction, we recommend slab subgrades should be capped with crushed stone fill or a mud slab to protect the subgrade from construction disturbance.

We recommend that a Professional Engineer licensed in the state of New York inspect and approve foundation subgrades prior to placement of fill or concrete, to verify that the subgrade material is adequate to provide the recommended allowable bearing pressure. We recommend foundation subgrade be inspected by Langan to verify bearing capacity and that footing bottoms and slab subgrades have been adequately prepared.

Fill Materials, Placement, and Compaction

Structural fill placed to establish the finished subgrade beneath new foundations and floor slabs, or as backfill behind new walls, should consist of a well-graded durable granular material having a maximum particle size of 4 inches in any dimension and no more than 10 percent by dry weight passing the No. 200 sieve. The gradation for all structural fill should follow that identified in NYS DOT Item 733-0401. All fill materials should be free of organics, clay, and other deleterious or compressible materials. The on-site natural sand conforming to the above gradation criteria can be used as controlled fill. All fill materials should be approved by the Geotechnical Engineer prior to placement. Lean concrete or controlled low strength material (CLSM) may be substituted for structural fill.

Where wet subgrades are present from surface water runoff, we recommend that initial placement of fill consist of free draining gravel or crushed stone in an effort to stabilize the subgrade prior to installation of structural fill soils. Free draining gravel or crushed stone should conform to the requirements of New York State Department of Transportation Item 605.0901, Underdrain Filter Type I or AASHTO No. 57 stone. These materials can be utilized to stabilize subgrades prior to placement of structural fill in cases where the subgrade materials are not free draining and have the potential to be disturbed by compaction.

Fill should be placed in uniform loose lifts not exceeding 12-inches in open areas and 6-inches in confined areas. All fill placed below foundations and slabs should be compacted to at least 95% of its maximum dry density as determined by ASTM D1557. Compaction within 5 feet of foundation walls should be performed using hand operated equipment. The water content at the time of compaction should be within 2 percent of the optimum value determined by ASTM D1557. No fill should be placed on areas where free water is standing or on frozen subsoil areas.

Fill should not be placed on subgrades not inspected and approved by the Geotechnical Engineer.

ADDITIONAL RECOMMENDATIONS

Monitoring Program

We recommend that a monitoring program be developed and incorporated into the Contract Documents to evaluate performance of adjacent buildings during construction. Monitoring should include means to measure vibrations as well as structural and ground movement. The type and locations of specific monitoring equipment, threshold values, and durations should be developed based on review of the anticipated construction means and methods in conjunction with proximity to existing structures and utilities with relation to the project site. The purpose of performing monitoring is to provide reasonable feedback to the engineer as to performance of the contractor with respect to protecting existing structures and utilities, and to assess any necessary changes to means and methods of construction.

The monitoring program may include optical surveying, seismographs (vibration monitoring), and crack gauges where warranted. At a minimum, existing columns adjoining excavations for new footings and pits should be subject to optical survey monitoring. The monitoring plan should address means and methods for measuring ground and structural deformation, and vibration levels. We recommend that all monitoring be performed by a third-party consultant independent of the contractor; however, the contractor should reserve the right to perform additional monitoring. Monitoring should be performed, at a minimum, throughout excavation and foundation construction.

Preconstruction Conditions Documentation

Preconstruction conditions documentation should be conducted for all structures located within 50 feet of each improvement as well as adjacent sidewalks, pavement, and utilities. The documentation should be made about one month prior to commencing any construction activities.

The purpose of these observations is to provide photographic and/or video documentation representative of general existing conditions, and to identify obvious visual deficiencies. The preconditions observations should also identify areas requiring specific monitoring during construction. Structural integrity is not addressed in such documentation. This baseline information is often critical in the event of future damage claims resulting from construction activities. The preconstruction conditions documentation should be used to inform an observational and instrumentation monitoring program that can be used to evaluate the performance of adjacent structures and construction procedures.

SPECIAL INSPECTIONS

Excavation and foundation work are subject to various Special Inspections as per the requirements outlined in Chapter 17 of the NYSBC. Construction activities that require geotechnical quality control inspections generally include support of excavation, foundation and slab subgrades, fill placement and compaction. This work must be performed under the inspection of a qualified geotechnical engineer and should be performed by Langan. The inspecting engineer should be familiar with the subsurface conditions, as well as the proposed and existing construction onsite. All inspectors must demonstrate competence and relevant experience or training. Written documentation of competence and relevant experience or training must be provided by an approved agency as required by NYSBC Section 1704.2.1. In addition, while not required by the NYSBC, we recommend that regular inspections of foundation waterproofing (where implemented) be made to mitigate the potential for leaks resulting from damaged or improperly installed materials.

CONSTRUCTION DOCUMENTS

Technical specifications and design drawings should incorporate our recommendations to ensure that subsurface conditions and other geotechnical issues at the site are adequately addressed in the construction documents. Langan can prepare specification sections related to geotechnical issues such as earthwork, waterproofing, monitoring, groundwater control, and excavation support. Langan should also review foundation drawings and details, and all contractor submittals and construction procedures related to geotechnical work.

LIMITATIONS

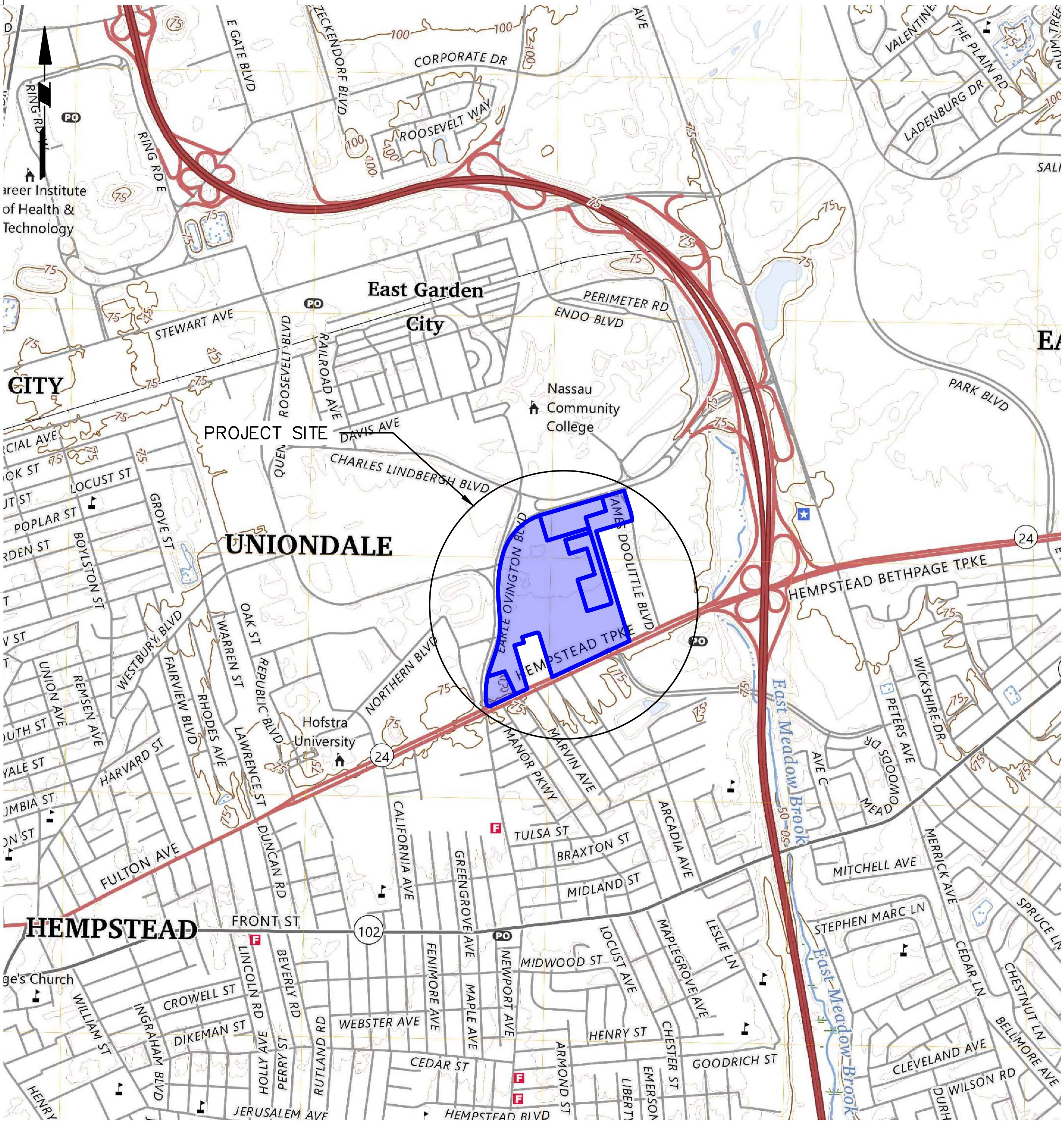
The conclusions and recommendations provided in this report are based on subsurface conditions inferred from a limited number of borings and in situ testing performed within the development parcel. The recommendations provided herein are dependent upon one another and no recommendation should be followed independent of the others.

This report has been prepared to assist the owner, architect, and structural engineer in the design process and is only applicable to the envisioned project discussed herein. Any proposed changes in structures or their locations should be brought to our attention so that we can determine whether such changes affect our recommendations. Langan cannot assume responsibility for use of this report for any areas beyond the limits of this study or for any projects not specifically discussed herein. This report shall not be used for the design of temporary works including scaffolding, construction hoists, and crane pads.

Information on subsurface strata and groundwater levels shown on the logs represents conditions encountered only at the locations indicated and at the time of investigation. If different conditions are encountered during construction, they should immediately be brought to our attention for evaluation as this may affect our recommendations.

Environmental issues (such as potentially contaminated soil and groundwater) are outside the scope of this study.

FIGURES



SOURCE: "FREEPORT QUADRANGLE MAP, NEW YORK–NASSAU COUNTY 7.5–MINUTE SERIES", U.S. GEOLOGICAL SURVEY, 2023.

NOTE: ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

2000 0 1000 2000

SCALE: 1 INCH = 2000 FEET

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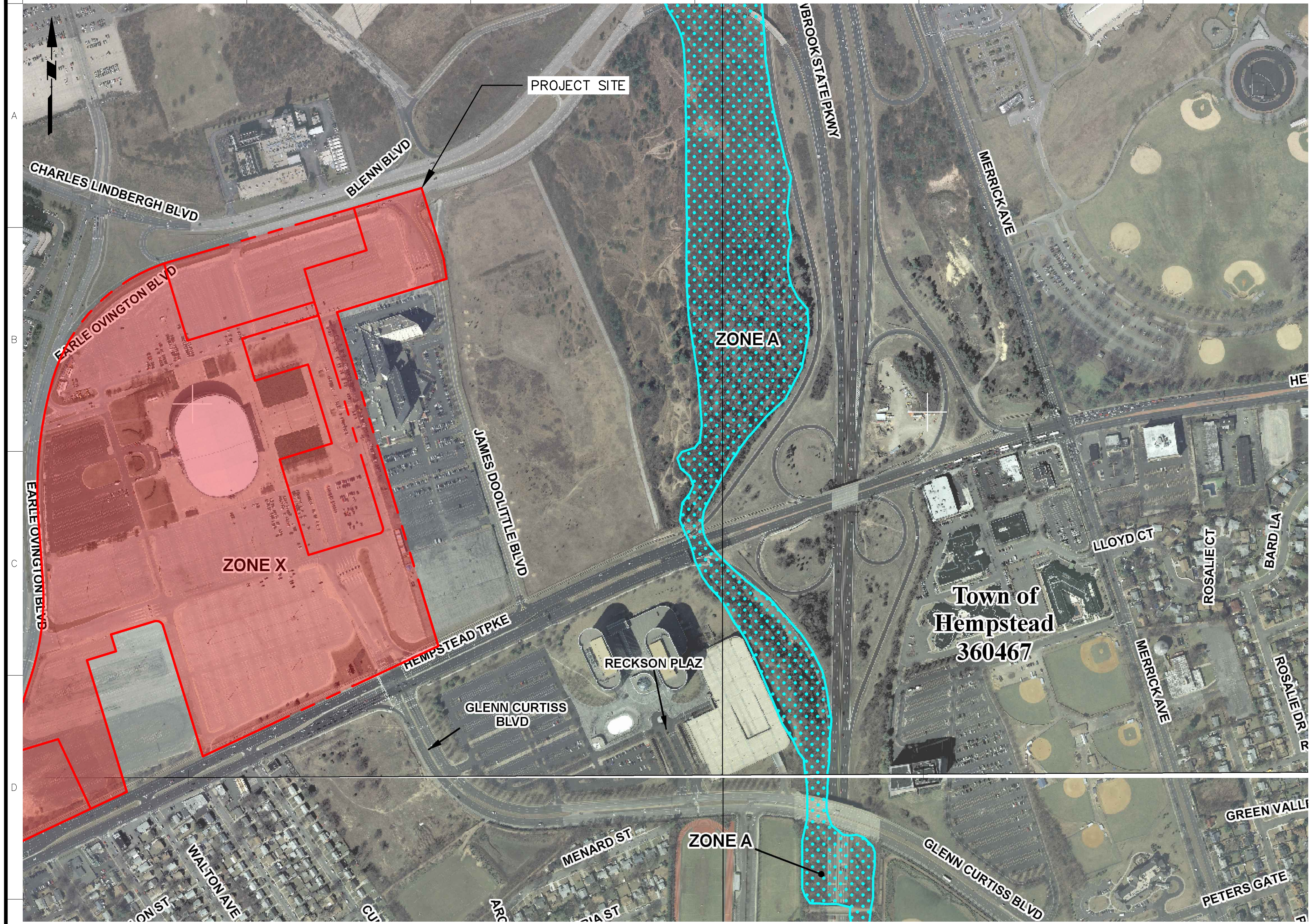
Project	Figure Title	Project No.	Figure
SANDS NEW YORK SECTION No. 44, BLOCK F LOTS No. 411, 412, 415, AND 351 TOWN OF HEMPSTEAD NASSAU COUNTY NEW YORK	**SITE LOCATION MAP**	170754501 Date: 10/06/2023 Drawn By: JJL Checked By: SS	**1** Sheet 1 of 4



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
	Limit of Moderate Wave Action
~~ 513 ~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
3 — 3	Limited detail cross section line
23 - - - 23	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
$^{24}76^{000m}$N	1000-meter Universal Transverse Mercator grid values, zone 18
600000 FT	5000-foot grid values: statename State Plane coordinate system, spzone (FIPSZONE fipszone), spherename projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

SOURCE: FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM), TOWN OF HEMPSTEAD, NEW YORK, PANELS 227 AND 229 OF 366 [36059C0227G AND 36059C0229G], MAP REVISED, EFFECTIVE, 11 SEPTEMBER 2009.

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SCALE IN FEET

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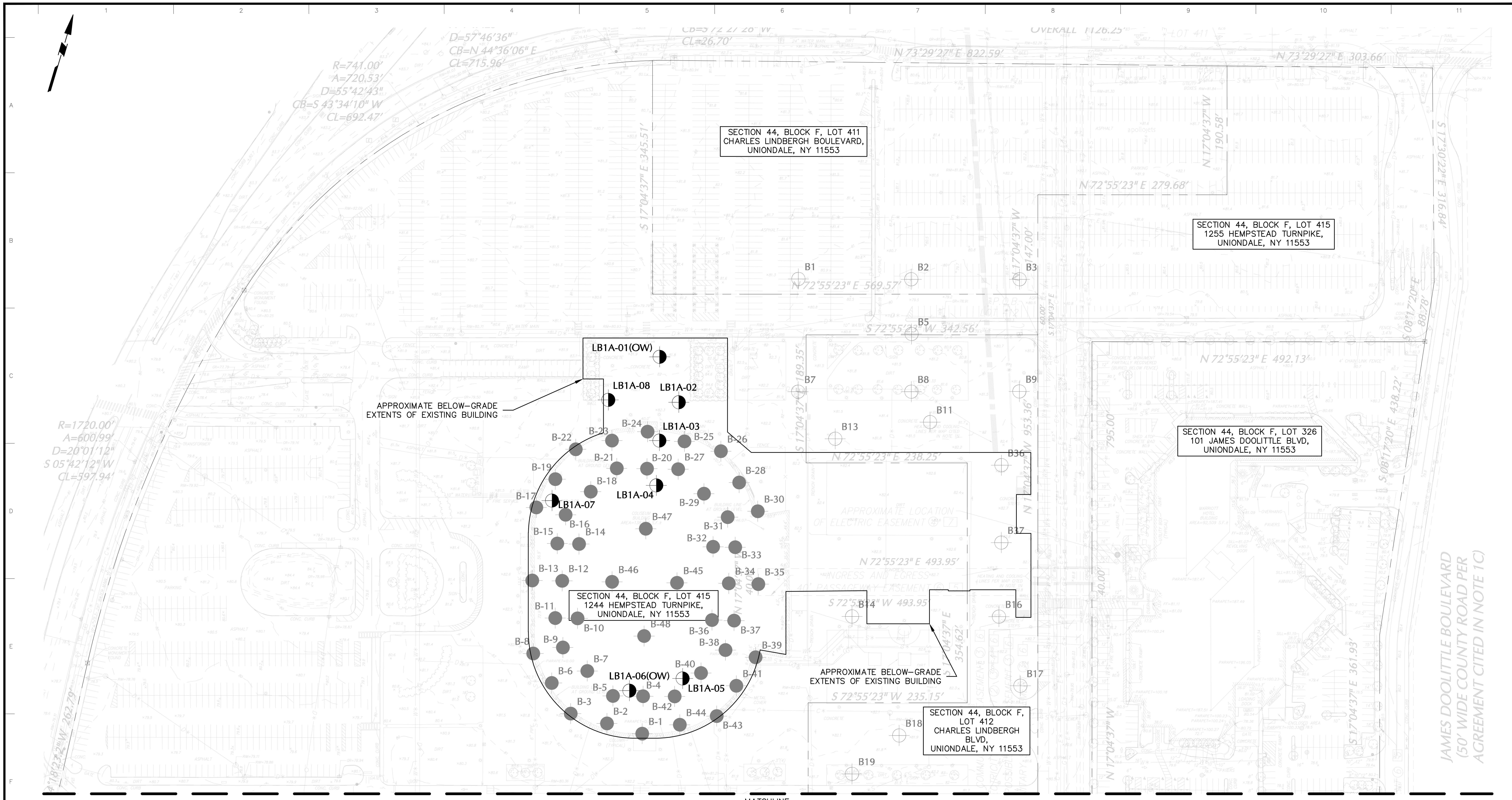
Project	Figure Title		Figure
SANDS NEW YORK SECTION No. 44, BLOCK F LOTS No. 411, 412, 415, AND 351 TOWN OF HEMPSTEAD NASSAU COUNTY NEW YORK	EFFECTIVE FEMA FLOOD HAZARD MAP	Project No. 170754501 Date 10/06/2023 Drawn By JJL Checked By SS	2 Sheet 2 of 4

Filename: \\langan.com\data\NYC\data5\170754501\Project Data\CAD-Geotech\01\Sheet Files\Phase 1a GER\170754501-BI001-0101.dwg Date: 10/4/2023 Time: 09:48 User: jlangewis Style Table: Langan.stb Layout: Figure 2 - Effective FEMA Flood Hazard Map



GENERAL NOTES:

1. ALL ELEVATIONS SHOWN HEREIN ARE WITH RESPECT TO THE NORTH AMERICAN VERTICAL DATUM (NAVD88). TYPICAL DATUM CONVERSIONS ARE AS FOLLOWS:

   NGVD = NAVD88 + 1.1 FEET
   NASSAU COUNTY DATUM = NAVD88 + 1.1 FEET

2. SURVEY BASE MAP TAKEN FROM SURVEY TITLED "ALTA/NSPS LAND TITLE SURVEY, PROJECT MAXIMUS, SECTION NO. 44, BLOCK F, LOTS NO. 326, 401, 402, 411, 412, 415 AND 351, TOWN OF HEMPSTEAD, NASSAU COUNTY, NEW YORK", PREPARED BY LANGAN ENGINEERING, ENVIRONMENTAL, SURVEYING, LANDSCAPE ARCHITECTURE AND GEOLOGY, D.P.C., DATED 22 MAY 2023.
3. ALL LANGAN BORINGS WERE DRILLED UNDER THE FULL-TIME INSPECTION OF A LANGAN REPRESENTATIVE. ALL DRILLING WAS PERFORMED BY WOLF DRILLING LLC FROM 21 AUGUST TO 15 SEPTEMBER 2023.
4. DISTURBED SAMPLES WERE TAKEN USING A 2-INCH DIAMETER SPLIT-SPOON SAMPLER DRIVEN BY A 140-LB DONUT HAMMER FREE-FALLING 30-INCHES.
5. ALL BORING LOCATIONS WERE LAID OUT BY LANGAN REPRESENTATIVES BY MEASURING FROM EXISTING SITE FEATURES. ALL LOCATIONS SHOULD BE CONSIDERED APPROXIMATE.
6. THE MONITORING WELLS INSTALLED IN BORINGS DESIGNATED (OW) WERE USED TO MEASURE GROUNDWATER DEPTH DURING AND AFTER THE PERFORMANCE OF THE SUBSURFACE INVESTIGATION.
7. REFER TO APPENDIX A FOR BORING AND OBSERVATION WELL CONSTRUCTION LOGS.
8. REFER TO APPENDIX C FOR 1966 HISTORICAL BORINGS LOGS.
9. REFER TO APPENDIX D FOR 2014 HISTORICAL BORING LOGS.

LEGEND:

LB1A-# — LANGAN PHASE 1A BORING LOCATION
B# — 2014 HISTORICAL BORING LOCATION BY OTHERS
B-# — 1966 HISTORICAL BORING LOCATION BY OTHERS
(OW) — DENOTES OBSERVATION WELL
PROPERTY LINE

100 0 50 100
SCALE IN FEET

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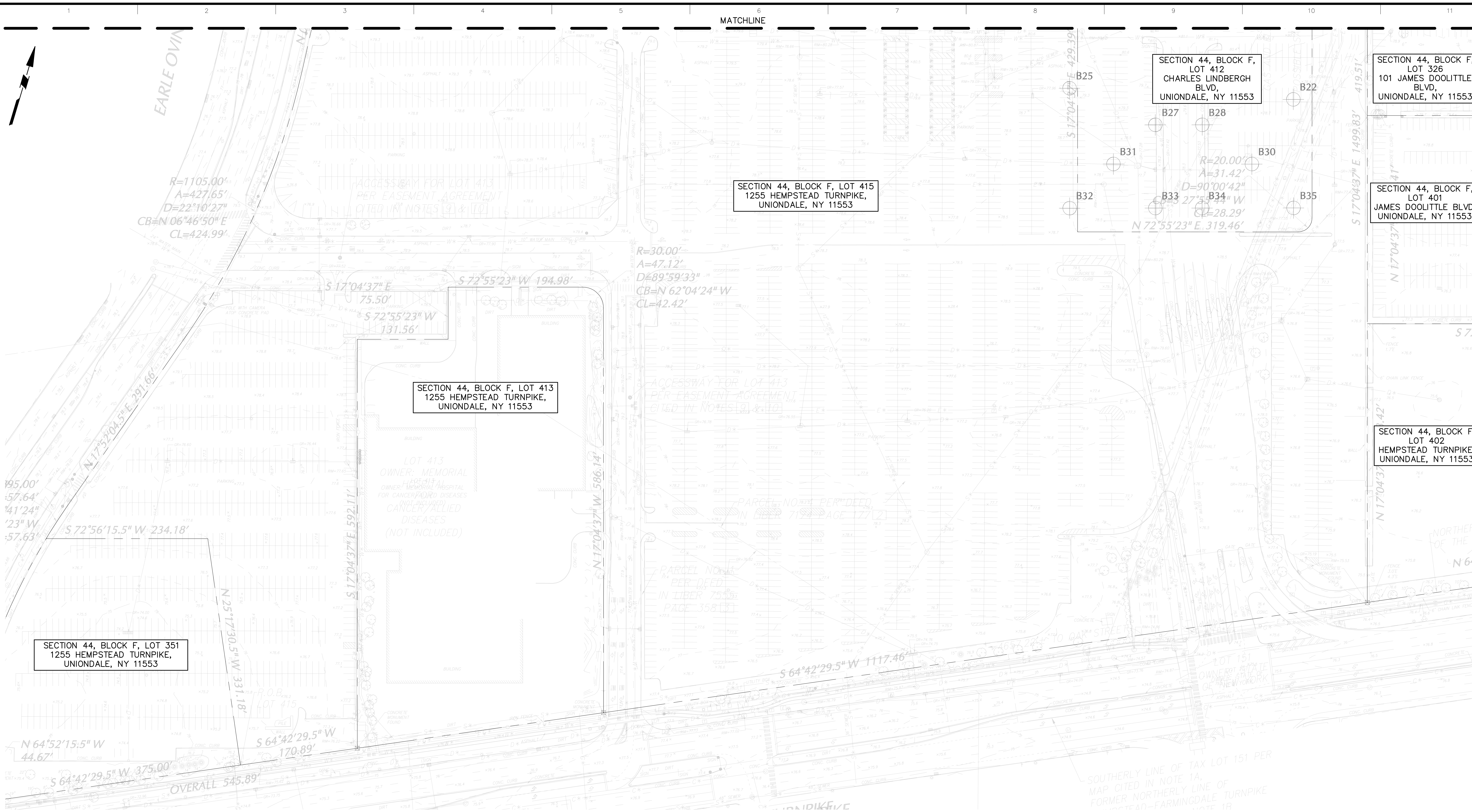
Project
SANDS NEW YORK
SECTION No. 44, BLOCK F
LOTS No. 411, 412, 415 AND 351
TOWN OF HEMPSTEAD
NASSAU COUNTY NEW YORK

Figure Title
SUBSURFACE INVESTIGATION PLAN - PART A

Project No.	170754501
Date	10/06/2023
Drawn By	JJL
Checked By	SS
Figure	3
Sheet	3 of 4

Filename: \\langan.com\data\NYC\data5\170754501\Project Data\CAD-Geotech\01\Sheet Files\Phase 1a GER\170754501-BI001-0101.dwg Date: 10/4/2023 Time: 09:49 User: jlangewis Style Table: Langan.stb Layout: Figure 3 - Subsurface Investigation Plan - Part A



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   NGVD = NAVD88 + 1.1 FEET
   NASSAU COUNTY DATUM = NAVD88 + 1.1 FEET

2. SURVEY BASE MAP TAKEN FROM SURVEY TITLED "ALTA/NSPS LAND TITLE SURVEY, PROJECT MAXIMUS, SECTION NO. 44, BLOCK F, LOTS NO. 326, 401, 402, 411, 412, 415 AND 351, TOWN OF HEMPSTEAD, NASSAU COUNTY, NEW YORK", PREPARED BY LANGAN ENGINEERING, ENVIRONMENTAL, SURVEYING, LANDSCAPE ARCHITECTURE AND GEOLOGY, D.P.C., DATED 22 MAY 2023.
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5. ALL BORING LOCATIONS WERE LAID OUT BY LANGAN REPRESENTATIVES BY MEASURING FROM EXISTING SITE FEATURES. ALL LOCATIONS SHOULD BE CONSIDERED APPROXIMATE.
6. THE MONITORING WELLS INSTALLED IN BORINGS DESIGNATED (OW) WERE USED TO MEASURE GROUNDWATER DEPTH DURING AND AFTER THE PERFORMANCE OF THE SUBSURFACE INVESTIGATION.
7. REFER TO APPENDIX A FOR BORING AND OBSERVATION WELL CONSTRUCTION LOGS.
8. REFER TO APPENDIX C FOR 1966 HISTORICAL BORINGS LOGS.
9. REFER TO APPENDIX D FOR 2014 HISTORICAL BORING LOGS.

LEGEND:

LB1A-#	LANGAN PHASE 1B BORING LOCATION
B#	2014 HISTORICAL BORING LOCATION BY OTHERS
B-#	1966 HISTORICAL BORING LOCATION BY OTHERS
(OW)	DENOTES OBSERVATION WELL
	PROPERTY LINE

100 0 50 100
SCALE IN FEET

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SECTION No. 44, BLOCK F
LOTS No. 411, 412, 415 AND 351
TOWN OF HEMPSTEAD
NASSAU COUNTY NEW YORK

Figure Title
SUBSURFACE INVESTIGATION PLAN - PART B

Project No. 170754501
Date 10/06/2023
Drawn By JJL
Checked By SS

Figure **4**

Filename: \\langan.com\data\NYC\data5\170754501\Project Data\CAD-Geotech\01\Sheet Files\Phase 1a GER\170754501-BI001-0101.dwg Date: 10/4/2023 Time: 09:50 User: jlangewis Style Table: Langan.stb Layout: Figure 4 - Subsurface Investigation Plan - Part B

APPENDIX A

(2023 LANGAN PHASE 1A BORING AND WELL LOGS)

LANGAN Log of Boring **LB1A-01(OW)** Sheet 1 of 2

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 54.6 ± (NAVD 88)	
Drilling Company: Wolf Drilling		Date Started: 9/14/2023	Date Finished: 9/15/2023
Drilling Equipment: Portable Electric Rig		Completion Depth: 51.3 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 11	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 5.0	Water Level (ft.): First N/A	Completion 8.2; 24 HR. N/A
Casing Hammer: Safety	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Fiad Khan	
Sampler: 2in OD Split Spoon			
Sampler Hammer: Donut	Weight (lbs): 140; Drop (in): 30	Field Engineer: Jonathan Negron	

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+54.6								
+54.1	6" CONCRETE	0						9/14/2023 Hand clear to 6 ft. Collect Grab Sample G-1 from 0.5ft to 6ft. -#4 = 80.2% -#200 = 3.0%
	Tannish brown to light gray coarse to fine SAND, some fine Gravel, trace Silt (moist) [FILL]	0.5–6						Drive casing to 5ft. Drill to 6ft. Smooth drilling, brown wash.
+48.6	Tannish brown to light gray coarse to fine SAND, some Silt (moist) [SP-SM]	6–8	S-1	SS	13	8, 11, 13, 14	14	Take S-1 from 6ft to 8ft. Drill to 8ft. Smooth drilling, brown wash.
	Tannish brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	8–10	S-2	SS	11	7, 9, 10, 10	11	Take S-2 from 8ft to 10ft. Drill to 10ft. Slight rig chatter, brown wash.
	Tannish brown medium to fine SAND, trace coarse Sand, trace fine Gravel, trace Silt (moist) [SP]	10–12	S-3	SS	10	9, 13, 10, 12	14	Take S-3 from 10ft to 12ft. -#4 = 93.2% -#200 = 2.4% Drill to 15ft. Moderate rig chatter, brown wash.
	Tannish brown medium to fine SAND, trace coarse Sand, trace fine Gravel, trace Silt (moist) [SP-SM]	15–17	S-4	SS	7	12, 20, 29, 33	31	Take S-4 from 15ft to 17ft. Drill to 20ft. Slight rig chatter, brown wash.
	Tannish brown medium to fine SAND, trace coarse Sand, trace Silt (moist) [SP-SM]	20–22	S-5	SS	12	13, 21, 26, 28	33	Take S-5 from 20ft to 22ft. Drill to 25ft. Moderate rig chatter, brown wash.

* Hammer correction factor of 0.75 used

LANGAN

Log of Boring **LB1A-01(OW)**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 54.6 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale (ft)	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+30.6		24						
	Tannish brown medium to fine SAND, trace coarse Sand, trace Silt (moist) [SP-SM]	25–27	S-6	SS	9	20, 52, 43, 32	68	Take S-6 from 25ft to 27ft. 9/15/2023 Drill to 30ft. Smooth drilling, brown wash.
	Tannish brown medium to fine SAND, trace Silt (wet) [SP-SM]	30–32	S-7	SS	11	15, 11, 12, 15	16	Take S-7 from 30ft to 32ft. Drill to 35ft. Smooth drilling, brown wash.
	Tannish brown to light gray fine SAND, some Silt (wet) [SM]	35–37	S-8	SS	18	8, 14, 16, 28	22	Take S-8 from 35ft to 37ft. -#4 = 100% -#200 = 26.5% Drill to 40ft. Smooth drilling, brown wash.
	Tannish orangish brown fine SAND, trace Silt, trace medium Sand (wet) [SP-SM]	40–42	S-9	SS	11	17, 22, 27, 32	37	Take S-9 from 40ft to 42ft. Drill to 45ft. Smooth drilling, brown wash.
	Tannish brown silty fine SAND, trace Clay (wet) [SM]	45–46	S-10A	SS	19	3, 14, 20, 26	26	Take S-10 from 45ft to 47ft.
	Tannish orangish brown fine SAND, trace Silt, trace medium Sand (wet) [SP-SM]	46–47	S-10B	SS				Drill to 50ft. Smooth drilling, brown wash.
+3.3	Tannish orangish brown fine SAND, trace Silt, trace medium Sand (wet) [SP-SM]	50–51.3	S-11	SS	9	30, 60, 80/4"	60/4"	Take S-11 from 50ft to 52ft. Refusal encountered at 51.3ft. Bottom of boring at 51.3ft. Installed observation well. Refer to Observation Well Construction Log.
	End of Boring at 51.3ft.	54						

* Hammer correction factor of 0.75 used

Project	Sands New York	Project No.	170754501
Location	Nassau Coliseum	Elevation and Datum	Approx. el. 54.6 ± (NAVD 88)
Drilling Company	Wolf Drilling	Date Started / Date Finished	8/31/2023 / 9/5/2023
Drilling Equipment	Portable Electric Rig	Completion Depth / Rock Depth	102.0 ft / N/E
Size and Type of Bit	3-7/8in Tricone Roller Bit	Number of Samples	Disturbed 25; Undisturbed 0; Core 0
Casing Diameter (in)	4 Flush Joint Steel; Casing Depth (ft) 5.0	Water Level (ft.)	First N/A; Completion N/A; 24 HR. N/A
Casing Hammer	Donut; Weight (lbs) 140; Drop (in) 30	Drilling Foreman	Fiad Khan
Sampler	2in OD Split Spoon	Field Engineer	Michael Gillooley
Sampler Hammer	Donut; Weight (lbs) 140; Drop (in) 30		

Elev. (ft) +54.6	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+54.1	6" CONCRETE	0						8/31/2023 Hand clear to 4ft.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (wet) [FILL]	1–4						Collect Grab Sample G-1 from 0.5ft to 4ft.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (wet) [FILL]	4–6	S-1	SS	12	10, 12, 14, 16	15	Take S-1 from 4ft to 6ft. Spin casing to 5ft. Drill to 6ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (wet) [FILL]	6–8	S-2	SS	8	2, 6, 9, 10	8	Take S-2 from 6ft to 8ft. Drill to 8ft. Smooth drilling, brown wash.
+46.6	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (wet) [SP-SM]	8–10	S-3	SS	5	8, 8, 10, 12	10	Take S-3 from 8ft to 10ft. Drill to 10ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace Silt (wet) [SP-SM]	10–12	S-4	SS	8	8, 11, 15, 16	16	Take S-4 from 10ft to 12ft. Drill to 15ft. Smooth drilling, brown wash.
	Light brown gravelly coarse to fine SAND, trace Silt (wet) [SP]	15–17	S-5	SS	7	11, 13, 16, 20	18	Take S-5 from 15ft to 17ft. -#4 = 60% -#200 = 4.1% Drill to 20ft. Smooth drilling, brown wash.
	Brown medium to fine SAND, trace Silt, trace coarse Sand, trace fine Gravel, clayey Sand pocket (wet) [SP-SM]	20–21	S-6A	SS	8	18, 20, 28, 41	34	Take S-6 from 20ft to 22ft.
	Light brown medium to fine SAND, trace Silt (wet) [SP-SM]	21–22	S-6B	SS				Drill to 25ft. Smooth drilling, brown wash.
		23–24						

* Hammer correction factor of 0.75 used

Project	Sands New York	Project No.	170754501
Location	Nassau Coliseum	Elevation and Datum	Approx. el. 54.6 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+30.6		24						
	Light brown medium to fine SAND, trace Silt, trace coarse Sand (wet) [SP-SM]	25	S-7	SS	8	16, 27, 47, 46	53	Take S-7 from 25ft to 27ft.
		27						9/1/2023 Drill to 30ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, some Silt (wet) [SM]	30	S-8A	SS	16	8, 8	13	Take S-8 from 30ft to 32ft. LL = 48% PL = 28% PI = 20%
+23.6	Light brown SILT, trace fine Sand (wet) [ML]	31	S-8B	SS		10, 17		
+22.6	Light brown to light gray clayey fine SAND, trace Silt (wet) [SC]	32	S-9	SS	16	12, 22, 22, 29	31	Take S-9 from 32ft to 34ft.
		34						Drill to 35ft. Smooth drilling, brown wash.
	Light brown to light gray clayey fine SAND, trace Silt (wet) [SC]	35	S-10	SS	10	10, 11, 25, 34	27	Take S-10 from 35ft to 37ft.
	Light brown to light gray clayey fine SAND, trace Silt (wet) [SC]	37	S-11	SS	8	4, 17, 33, 35	38	Take S-11 from 37ft to 39ft.
		39						Drill to 40ft. Smooth drilling, brown wash.
	Light brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	40	S-12	SS	7	29, 67, 50/3"	38/3"	Take S-12 from 40ft to 42ft. Refusal encountered at 41.3ft.
		42						Drill to 45ft. Smooth drilling, brown wash.
	Light brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	45	S-13	SS	10	12, 44, 53, 29	73	Take S-13 from 45ft to 47ft.
		47						Drill to 50ft. Smooth drilling, brown wash.
	Light brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	50	S-14	SS	7	16, 52, 50/3"	38/3"	Take S-14 from 50ft to 52ft. Refusal encountered at 51.3ft.
		52						Drill to 55ft. Smooth drilling, brown wash.
		54						

* Hammer correction factor of 0.75 used

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Log of Boring **LB1A-02**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 54.6 ± (NAVD 88)

Material Symbol	Elev. (ft) +0.6	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
			54						
		Light brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	55	S-15	SS	5	42 50/3"	38/3"	Take S-15 from 55ft to 57ft. Refusal encountered at 55.8ft.
			57						Drill to 60ft. Smooth drilling, brown wash.
		Light brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	60	S-16A	SS	8	27 24 26	38	Take S-16 from 60ft to 62ft. 9/5/2023 Drill to 62ft. Smooth drilling, brown wash.
		Light brown fine SAND, trace medium Sand, some Silt (wet) [SM]	61.5	S-16B	SS		30		
		Light brown clayey fine SAND, trace medium Sand, Clay lenses (wet) [SC]	62	S-17	SS	13	8 12 19 30	23	Take S-17 from 62ft to 64ft. -#4 = 100% -#200 = 38%
			64						Drill to 65ft. Smooth drilling, brown wash.
		Light brown clayey fine SAND, trace medium Sand, Clay lenses (wet) [SC]	65	S-18	SS	8	10 40 54 50/3"	70	Take S-18 from 65ft to 67ft.
			67						Refusal encountered at 66.75ft. Drill to 70ft. Smooth drilling, brown wash.
		Light brown clayey fine SAND, trace medium Sand, Clay lenses (wet) [SC]	70	S-19	SS	8	17 33 43 49	57	Take S-19 from 70ft to 72ft.
			72						Drill to 75ft. Smooth drilling, brown wash.
		Light brown fine SAND, trace medium Sand, trace Clay (wet) [SP-SC]	75	S-20A	SS	16	20 10	19	Take S-20 from 75ft to 77ft. -#4 = 100% -#200 = 34.3%
		Light brown clayey fine SAND, Clay lenses (wet) [SC]	75.7	S-20B	SS		15 22		
			77						Drill to 80ft. Smooth drilling, brown wash.
		Light gray clayey fine SAND (wet) [SC]	80	S-21A	SS	16	6 9 20	22	Take S-21 from 80ft to 82ft. -#4 = 99.2% -#200 = 41.9%
		Brown clayey fine SAND, Clay lenses [SC]	81.5	S-21B	SS		25		
			82						Drill to 85ft. Smooth drilling, brown wash.
			84						

* Hammer correction factor of 0.75 used

LANGAN Log of Boring **LB1A-02**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 54.6 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
-29.4		84						
	Light brown to light gray clayey fine SAND (wet) [SC]	85–87	S-22	SS	21	13, 16, 16, 19	24	Take S-22 from 85ft to 87ft. Drill to 90ft. Smooth drilling, brown wash.
	Light brown to light gray fine SAND, some Clay (wet) [SC]	90–92	S-23	SS	18	8, 15, 25, 27	30	Take S-23 from 90ft to 92ft. -#4 = 100% -#200 = 22.4% Drill to 95ft. Smooth drilling, brown wash.
	Brown to reddish red fine SAND, some Clay (wet) [SC]	95	S-24A	SS	15	15, 30, 29, 34	44	Take S-24 from 95ft to 97ft.
	Light brown medium to fine SAND, trace Clay, trace Silt [SP-SM]	96–97	S-24B	SS				Drill to 100ft. Smooth drilling, brown wash.
	Light brown to reddish brown medium to fine SAND, some Clay (wet) [SC]	100–102	S-25	SS	13	24, 28, 33, 34	46	Take S-25 from 100ft to 102ft. -#4 = 100% -#200 = 25.2%
-47.4	End of Boring at 102ft.	102						Bottom of boring at 102ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.

* Hammer correction factor of 0.75 used

LANGAN Log of Boring **LB1A-03** Sheet 1 of 2

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 58.6 ± (NAVD 88)	
Drilling Company: Wolf Drilling		Date Started: 9/6/2023	Date Finished: 9/7/2023
Drilling Equipment: Portable Electric Rig		Completion Depth: 51.8 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 13; Undisturbed 0; Core 0	
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 8.0	Water Level (ft.): First N/A; Completion N/A; 24 HR. N/A	
Casing Hammer: Donut; Weight (lbs): 140; Drop (in): 30		Drilling Foreman: Fiad Khan	
Sampler: 2in OD Split Spoon			
Sampler Hammer: Donut; Weight (lbs): 140; Drop (in): 30		Field Engineer: Michael Gillooley	

Elev. (ft)	Sample Description	Depth (ft)	Number	Type	Recov. (in)	Penetr. resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+58.6								
+58.1	6" CONCRETE	0						9/6/2023
	Light brown coarse to fine SAND, trace Silt (moist) [FILL]	0.5						Hand clear to 5ft.
		2.5						Collect Grab Sample G-1 from 0.5ft to 5ft.
		5						Drill to 6ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace Silt (moist) [FILL]	6–8	S-1	SS	16	10, 20, 23, 28	24	Take S-1 from 6ft to 8ft. Spin casing to 8ft. Drill to 8ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace Silt (moist) [FILL]	8–9.5	S-2A	SS	11	13, 18, 53, 50	40	Take S-2 from 8ft to 10ft. Drill to 10ft. Smooth drilling, brown wash.
+49.1	Light brown medium to fine SAND, trace Silt, trace coarse Sand (moist) [SP-SM]	9.5–10	S-2B	SS				
	Brown medium to fine SAND, trace Silt, trace coarse Sand, trace fine Gravel (moist) [SP-SM]	10–12	S-3	SS	7	13, 24, 30, 41	32	Take S-3 from 10ft to 12ft. -#4 = 90.5% -#200 = 6.7%. Drill to 15ft. Smooth drilling, brown wash.
	Dark brown to light brown medium to fine SAND, trace Silt (wet) [SP-SM]	15–17	S-4	SS	8	16, 20, 20, 27	26	Take S-4 from 15ft to 17ft. Drill to 20ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, trace Silt, trace coarse Sand (wet) [SP-SM]	20–22	S-5	SS	8	18, 39, 50, 53	63	Take S-5 from 20ft to 22ft. Drill to 25ft. Smooth drilling, brown wash.

* Hammer correction factor of 0.75 used

LANGAN Log of Boring **LB1A-03** Sheet 2 of 2

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 58.6 ± (NAVD 88)

Depth Scale (ft)	Elev. (ft)	Sample Description	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
24	+34.6							
25–27		Light brown medium to fine SAND, trace Silt, trace coarse Sand (wet) [SP-SM]	S-6	SS	10	16, 21, 31, 45	37	Take S-6 from 25ft to 27ft.
27								9/7/2023 Drill to 30ft. Smooth drilling, brown wash.
30–32		Light brown medium to fine SAND, trace Silt, trace coarse Sand (wet) [SP-SM]	S-7	SS	11	18, 22, 20, 24	30	Take S-7 from 30ft to 32ft.
32								Drill to 35ft. Smooth drilling, brown wash.
35–36		Light brown medium to fine SAND, trace Silt, trace coarse Sand (wet) [SP-SM]	S-8A	SS	10	6, 8, 11, 11	14	Take S-8 from 35ft to 37ft.
36–37		Brown silty fine SAND, trace Clay (wet) [SM]	S-8B	SS				
37–37.5		Light brown silty fine SAND, trace Clay (wet) [SM]	S-9A	SS	17	12, 13, 11, 12	18	Take S-9 from 37ft to 39ft.
37.5–39		Light gray clayey fine SAND, some Silt (wet) [SC]	S-9B	SS				
39								Drill to 40ft. Smooth drilling, brown wash.
40–41		Mottled gray clayey fine SAND, some Silt, Clay lenses (wet) [SC]	S-10A	SS	13	8, 9, 16, 19	19	Take S-10 from 40ft to 42ft.
41–42		Light gray clayey fine SAND, some Silt (wet) [SC]	S-10B	SS				
42–44		Light gray clayey fine SAND, some Silt (wet) [SC]	S-11	SS	9	12, 16, 25, 31	31	Take S-11 from 42ft to 44ft. -#4 = 100% -#200 = 37.8%
44								Drill to 45ft. Smooth drilling, brown wash.
45–46		Light gray fine SAND, trace Silt, some Clay (wet) [SC]	S-12A	SS	19	12, 15, 12, 14	20	Take S-12 from 45ft to 47ft.
46–47		Light gray clayey fine SAND, some Silt (wet) [SC]	S-12B	SS				Drill to 50ft. Smooth drilling, brown wash.
50–51.8	+6.8	Light brown medium to fine SAND, trace Silt (wet) [SP-SM]	S-13	SS	12	25, 36, 52, 50/3"	66	Take S-13 from 50ft to 52ft. Refusal encountered at 51.8ft. -#4 = 100% -#200 = 8.1% Bottom of boring at 51.75ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
51.8		End of Boring at 51.8ft.						
54								

* Hammer correction factor of 0.75 used

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Log of Boring **LB1A-04**

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 58.6 ± (NAVD 88)	
Drilling Company: Wolf Drilling		Date Started: 9/12/2023	Date Finished: 9/13/2023
Drilling Equipment: Portable Electric Rig		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 11	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 5.0	Water Level (ft.): First N/A	Completion N/A; 24 HR. N/A
Casing Hammer: Donut	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Find Khan	
Sampler: 2in OD Split Spoon			
Sampler Hammer: Donut	Weight (lbs): 140; Drop (in): 30	Field Engineer: Jonathan Negron	

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+58.6		0						9/12/2023 Hand clear to 6ft.
+58.1	6" CONCRETE							
	Light brown coarse to fine SAND, trace Silt (moist) [FILL]	0.5–6						Collect Grab Sample G-1 from 0.5ft to 3ft. Collect Grab Sample G-2 from 3ft to 6ft. Spin casing to 5ft.
+52.6	Tannish orangish brown coarse to fine SAND, trace fine Gravel, trace Silt (dry) [SP-SM]	6	S-1	SS	12	17, 20, 19, 21	22	Take S-1 from 6ft to 8ft. Drill to 8ft. Slight rig chatter, light brown wash.
	Tannish orangish brown coarse to fine SAND, trace Silt (moist) [SP-SM]	8	S-2	SS	6	14, 16, 24, 29	22	Take S-2 from 8ft to 10ft.
	Tannish orangish brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	10	S-3	SS	7	15, 18, 18, 22	22	Take S-3 from 10ft to 12ft.
		12						Drill to 15ft. Slight rig chatter, light brown wash.
	Tannish brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	15	S-4	SS	6	14, 14, 16, 24	19	Take S-4 from 15ft to 17ft. -#4 = 81% -#200 = 5.9%
		17						Drill to 20ft. Moderate rig chatter, light brown wash.
	Tannish brown medium to fine SAND, trace coarse Sand, trace fine Gravel, trace Silt (wet) [SP-SM]	20	S-5	SS	8	19, 18, 24, 22	30	Take S-5 from 20ft to 22ft.
		22						9/13/2023 Drill to 25ft. Moderate rig chatter, light brown wash.
		24						

* Hammer correction factor of 0.75 used

LANGAN Log of Boring **LB1A-04**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 58.6 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+34.6		24						
	Tannish brown medium to fine SAND, trace coarse Sand, trace Silt (wet) [SP-SM]	25–27	S-6	SS	11	20, 30, 42, 48	51	Take S-6 from 25ft to 27ft.
		27–30						Drill to 30ft. Moderate rig chatter, light brown wash.
	Tannish brown medium to fine SAND, trace coarse Sand, trace Silt (wet) [SP-SM]	30–32	S-7	SS	11	18, 20, 24, 32	31	Take S-7 from 30ft to 32ft.
		32–35						Drill to 35ft. Smooth drilling, light brown wash.
	Tannish brown medium to fine SAND, trace Silt (wet) [SP-SM]	35–37	S-8	SS	7	23, 19, 22, 33	31	Take S-8 from 35ft to 37ft.
		37–40						Drill to 40ft. Smooth drilling, light brown wash.
	Tannish orangish brown to light gray fine SAND, trace medium Sand, some Silt (wet) [SM]	40–42	S-9A	SS	18	11, 13, 18, 16	23	Take S-9 from 40ft to 42ft.
	Tannish orangish brown to light gray clayey fine SAND, trace medium Sand, trace Silt (wet) [SC]		S-9B	SS				
		42–45						Drill to 45ft. Smooth drilling, light brown wash.
	Tannish orangish brown to light gray clayey fine SAND, trace Silt (wet) [SC]	45–47	S-10	SS	19	9, 7, 21, 27	21	Take S-10 from 45ft to 47ft. -#4 = 100% -#200 = 32.7%
		47–50						Drill to 50ft. Smooth drilling, light brown wash.
	Tannish brown clayey medium to fine SAND, trace Silt (wet) [SC]	50–52	S-11	SS	20	11, 19, 23, 23	32	Take S-11 from 50ft to 52ft.
+6.6	End of Boring at 52ft.	52–54						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.

* Hammer correction factor of 0.75 used

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Log of Boring **LB1A-05** Sheet 1 of 4

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 58.6 ± (NAVD 88)	
Drilling Company: Wolf Drilling		Date Started: 8/21/2023	Date Finished: 8/24/2023
Drilling Equipment: Portable Electric Rig		Completion Depth: 100.8 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 25	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 4.0	Water Level (ft.): First N/A	Completion N/A; 24 HR. N/A
Casing Hammer: Donut; Weight (lbs): 140	Drop (in): 30	Drilling Foreman: Fiad Khan	
Sampler: 2in OD Split Spoon		Field Engineer: Michael Gillooley	
Sampler Hammer: Donut; Weight (lbs): 140	Drop (in): 30		

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+58.6		0						8/21/2023
+58.1	6" CONCRETE							Core through 6in concrete.
	Brown coarse to fine SAND, trace Silt (moist) [FILL]	1	S-1	SS	8	5, 12, 14	15	Take S-1 from 0.5ft to 2ft.
	Light brown coarse to fine SAND, trace Silt (moist) [FILL]	2–3	S-2	SS	2	15, 20, 30, 32	28	Take S-2 from 2ft to 4ft. Spoon tip lost. Shift hole 1ft east. Spin casing to 4ft. Drill to 4ft. Smooth drilling, brown wash.
	Brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [FILL]	4–5	S-3	SS	8	11, 14, 25, 27	22	Take S-3 from 4ft to 6ft. -#4 = 89.7% -#200 = 5.1%
+52.6	Brown coarse to fine SAND, trace Silt (moist) [SP-SM]	6–7	S-4	SS	7	16, 19, 21, 20	22	Take S-4 from 6ft to 8ft. Drill to 8ft. Smooth drilling, brown wash.
	Brown coarse to fine SAND, trace Silt, trace fine Gravel (wet) [SP-SM]	8–9	S-5	SS	5	20, 21, 24, 32	25	Take S-5 from 8ft to 10ft.
	Brown coarse to fine SAND, trace Silt (wet) [SP-SM]	10–11	S-6	SS	4	13, 16, 18, 23	20	Take S-6 from 10ft to 12ft.
		12–14						Drill to 15ft. Smooth drilling, brown wash, light rig chatter.
	Brown medium to fine SAND, trace Silt, trace fine Gravel, trace coarse Sand (wet) [SP]	15–16	S-7	SS	7	11, 10, 11, 14	13	Take S-7 from 15ft to 17ft. -#4 = 90.6% -#200 = 4.1%
		17–19						Drill to 20ft. Smooth drilling, brown wash.
	Brown medium to fine SAND, trace Silt, trace coarse Sand, trace fine Gravel (wet) [SP-SM]	20–21	S-8	SS	5	12, 16, 21, 25	26	Take S-8 from 20ft to 22ft.
		22–24						8/22/2023 Drill to 25ft. Smooth drilling, brown wash.

* Hammer correction factor of 0.75 used

Project	Sands New York	Project No.	170754501
Location	Nassau Coliseum	Elevation and Datum	Approx. el. 58.6 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth (ft)	Number	Type	Recov. (in)	Penetr. resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+34.6		24						
	Brown medium to fine SAND, trace Silt, trace coarse Sand, trace fine Gravel (wet) [SP-SM]	25–27	S-9	SS	8	14, 21, 18, 17	28	Take S-9 from 25ft to 27ft. Drill to 30ft. Smooth drilling, brown wash.
	Brown medium to fine SAND, trace Silt, trace coarse Sand (wet) [SP-SM]	30–32	S-10	SS	8	13, 16, 24, 26	28	Take S-10 from 30ft to 32ft. Drill to 35ft. Smooth drilling, brown wash.
	Brown medium to fine SAND, trace Silt (wet) [SP-SM]	35–37	S-11	SS	10	12, 13, 18, 19	23	Take S-11 from 35ft to 37ft. Drill to 40ft. Smooth drilling, brown wash.
+18.6	Light brown to brown sandy SILT, trace Clay (wet) [ML]	40	S-12A	SS				Take S-12 from 40ft to 42ft.
+18.1	Brown silty fine SAND (wet) [SM]		S-12B	SS	14	5, 9, 10, 13	14	
	Brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	–42	S-12C	SS				Drill to 45ft. Smooth drilling, brown wash.
	Light brown to gray fine SAND, some Silt, fine Gravel lenses (wet) [SM]	45–47	S-13	SS	16	14, 20, 27, 21	35	Take S-13 from 45ft to 47ft. -#4 = 95.5% -#200 = 16.9% Drill to 50ft. Smooth drilling, brown wash.
	Light brown to gray fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	50–51.8	S-14	SS	13	27, 33, 50, 50/3"	62	Take S-14 from 50ft to 52ft. Refusal encountered at 51.8ft. Drill to 55ft. Smooth drilling, brown wash.
		54						

* Hammer correction factor of 0.75 used

LANGAN Log of Boring **LB1A-05** Sheet 3 of 4

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 58.6 ± (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	+4.6		54						
	+3.6	Light brown to dark brown CLAY (wet) [CL]	55	S-15	SS	24	9 / 13 / 18 / 20	23	Take S-15 from 55ft to 57ft.
		Light brown to brown CLAY (wet) [CL]	57	S-16	SS	24	10 / 12 / 16 / 25	21	Take S-16 from 57ft to 59ft. LL = 43% PL = 22% PI = 21%
			59						8/23/2023 Drill to 60ft. Smooth drilling, brown wash.
	-1.4	Orangish brown to brown silty medium to fine SAND, trace Clay (wet) [SM]	60	S-17A	SS	16	9 / 16 / 20 / 28	27	Take S-17 from 60ft to 62ft.
		Light brown fine SAND, trace medium Sand, some Silt (wet) [SM]	61	S-17B	SS				Drill to 65ft. Smooth drilling, brown wash.
		Brown to light brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	65	S-18	SS	10	16 / 35 / 50 / 46	64	Take S-18 from 65ft to 67ft. Drill to 70ft. Smooth drilling, brown wash.
		Light brown medium to fine SAND, trace Silt (wet) [SP-SM]	70	S-19	SS	10	17 / 34 / 50/3"	38/3"	Take S-19 from 70ft to 72ft. Refusal encountered at 71.3ft. Drill to 75ft. Smooth drilling, brown wash.
		Brown medium to fine SAND, trace Silt (wet) [SP-SM]	75	S-20	SS	9	3 / 12 / 22 / 44	26	Take S-20 from 75ft to 77ft. -#4 = 99.9% -#200 = 9.8% Drill to 80ft. Smooth drilling, brown wash.
		Brown medium to fine SAND, trace Silt (wet) [SP-SM]	80	S-21	SS	9	46 / 70 / 50/3"	38/3"	Take S-21 from 80ft to 82ft. Refusal encountered at 81.3ft. Drill to 85ft. Smooth drilling, brown wash.
			84						

* Hammer correction factor of 0.75 used

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Log of Boring **LB1A-05**

Project: Sands New York	Project No.: 170754501
Location: Nassau Coliseum	Elevation and Datum: Approx. el. 58.6 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth (ft)	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
-25.4		84						
	Brown medium to fine SAND, trace Silt, Clay lenses (wet) [SP-SM]	85–86.3	S-22	SS	8	28, 50, 50/3"	38/3"	Take S-22 from 85ft to 87ft. Refusal encountered at 86.3ft. Drill to 90ft. Smooth drilling, brown wash.
	Brown medium to fine SAND, trace Silt, Clay lenses (wet) [SP-SM]	90–92	S-23	SS	7	51, 43, 37, 26	60	Take S-23 from 90ft to 92ft. 8/24/2023 Drill to 95ft. Smooth drilling, brown wash.
	Brown medium to fine SAND, trace Silt (wet) [SP-SM]	95–97	S-24	SS	13	35, 42, 34, 37	57	Take S-24 from 95ft to 97ft. -#4 = 100% -#200 = 6.7% Drill to 100ft. Smooth drilling, brown wash.
-42.2	Brown to light brown medium to fine SAND, trace Silt (wet) [SP-SM]	100–100.8	S-25	SS	8	42, 50/3"	38/3"	Take S-25 from 100ft to 102ft. Refusal encountered at 100.8ft. Bottom of boring at 100.8ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
	End of Boring at 100.8ft.							

* Hammer correction factor of 0.75 used

LANGAN

Log of Boring **LB1A-06(OW)**

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 58.6 ± (NAVD 88)	
Drilling Company: Wolf Drilling		Date Started: 8/25/2023	Date Finished: 8/28/2023
Drilling Equipment: Portable Electric Rig		Completion Depth: 58.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 15	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 4.0	Water Level (ft.): First N/A	Completion 8.5; 24 HR. N/A
Casing Hammer: Donut	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Fiad Khan	
Sampler: 2in OD Split Spoon			
Sampler Hammer: Donut	Weight (lbs): 140; Drop (in): 30	Field Engineer: Michael Gillooley	

Elev. (ft) +58.6	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	6" CONCRETE	0						8/25/2023 Hand clear to 4ft.
+57.6	Light brown coarse to fine SAND, trace Silt (moist) [FILL]	1						Collect Grab Sample G-1 from 1ft to 4ft.
		3						Spin casing to 4ft. Drill to 4ft. Smooth drilling, brown wash.
+54.6	Light brown coarse to fine SAND, trace Silt (moist) [SP-SM]	4	S-1	SS	8	17, 49, 50/3"	38/3"	Take S-1 from 4ft to 6ft. Refusal encountered at 5.3ft.
	Light brown coarse to fine SAND, trace Silt (moist) [SP-SM]	6	S-2	SS	5	32, 48, 50/3"	38/3"	Take S-2 from 6ft to 8ft. Refusal encountered at 7.3 ft. Drill to 8ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace Silt (moist) [SP-SM]	8	S-3	SS	6	19, 35, 39, 45	42	Take S-3 from 8ft to 10ft. Drill to 10ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	10	S-4	SS	5	30, 30, 40, 56	42	Take S-4 from 10ft to 12ft. -#4 = 71.8% -#200 = 9.7% Drill to 15ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, trace Silt, trace coarse Sand (wet) [SP-SM]	15	S-5	SS	5	10, 17, 21, 26	24	Take S-5 from 15ft to 17ft. Drill to 20ft. Smooth drilling, brown wash, moderate rig chatter.
	Light brown medium to fine SAND, trace Silt, trace coarse Sand, trace fine Gravel (wet) [SP-SM]	20	S-6	SS	7	16, 21, 25, 27	33	Take S-6 from 20ft to 22ft. Drill to 25ft. Smooth drilling, brown wash, moderate rig chatter.
		24						

* Hammer correction factor of 0.75 used

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 58.6 ± (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	+34.6		24						
		Light brown medium to fine SAND, trace Silt, trace coarse Sand, trace fine Gravel (wet) [SP]	25–27	S-7	SS	7	16 / 19 / 22 / 17	29	Take S-7 from 25ft to 27ft. -#4 = 93.1% -#200 = 4.4%
			27						Drill to 30ft. Smooth drilling, brown wash.
		Light brown medium to fine SAND, trace Silt, trace coarse Sand, trace fine Gravel (wet) [SP-SM]	30–32	S-8	SS	2	20 / 27 / 21 / 14	34	Take S-8 from 30ft to 32ft. Coarse gravel blocking spoon recovery.
			32						Drill to 35ft. Smooth drilling, brown wash.
		Light brown medium to fine SAND, trace Silt, trace coarse Sand (wet) [SP-SM]	35–37	S-9	SS	8	9 / 13 / 17 / 17	22	Take S-9 from 35ft to 37ft.
			37						Drill to 40ft. Smooth drilling, brown wash.
		Brown medium to fine SAND, some Silt (wet) [SM]	40	S-10A	SS	14	11 / 6 / 7 / 9	10	Take S-10 from 40ft to 42ft.
	+17.6	Light brown SILT, some fine Sand, trace Clay (wet) [ML]	41	S-10B	SS				
	+17.1	Light brown fine SAND, trace Silt (wet) [SP-SM]		S-10C	SS				
			42						Drill to 45ft. Smooth drilling, brown wash.
		Light brown fine SAND, trace Silt, trace coarse to medium Sand (wet) [SP-SM]	45–47	S-11	SS	10	19 / 25 / 22 / 23	35	Take S-11 from 45ft to 47ft.
			47						Drill to 50 ft. Smooth drilling, brown wash
	+8.6	Tan CLAY (wet) [CL]	50–52	S-12	SS	10	4 / 6 / 7 / 8	10	Take S-12 from 50ft to 52ft.
		Gray to tan CLAY (wet) [CL]	52–54	S-13	SS	24	12 / 14 / 17 / 17	23	Take S-13 from 52ft to 54ft. Drill to 54ft. Smooth drilling, brown wash.

* Hammer correction factor of 0.75 used

LANGAN Log of Boring **LB1A-06(OW)** Sheet 3 of 3

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 58.6 ± (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	+4.6	Gray to tan CLAY (wet) [CL]	54 – 56	S-14	SS	20	7 / 9 / 12 / 16	16	Take S-14 from 54ft to 56ft. LL = 47% PL = 26% PI = 21%
	+0.8	Gray to tan CLAY (wet) [CL]	56 – 57.8	S-15A	SS	15	14 / 19 / 39	44	Take S-15 from 56ft to 58ft.
	+0.6	Light brown fine SAND, trace Silt, trace Clay (wet) [SP-SM]	57.8 – 58	S-15B	SS		50		
		End of Boring at 58ft.	58						Bottom of boring at 58ft. Install observation well. Refer to Observation Well Construction Log.

Depth scale: 54 – 84 ft

* Hammer correction factor of 0.75 used

Template: Log-BH-NYC-GEO; Strip: BH-GEO (5); Printed on 10/06/2023

LANGAN Log of Boring **LB1A-07** Sheet 1 of 2

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 58.6 ± (NAVD 88)	
Drilling Company: Wolf Drilling		Date Started: 8/29/2023	Date Finished: 8/30/2023
Drilling Equipment: Portable Electric Rig		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 12	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 5.0	Water Level (ft.): First N/A	Completion N/A; 24 HR. N/A
Casing Hammer: Donut	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Fiad Khan	
Sampler: 2in OD Split Spoon		Field Engineer: Michael Gillooley	
Sampler Hammer: Donut	Weight (lbs): 140; Drop (in): 30		

Elev. (ft)	Sample Description	Depth Scale (ft)	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+58.6	6" CONCRETE	0						8/29/2023 Hand clear to 4ft.
+57.6	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (dry) [FILL]	1						Collect Grab Sample G-1 from 1ft to 4ft.
	Brown gravelly coarse to fine SAND, trace Silt (dry) [FILL]	4–6	S-1	SS	7	11, 14, 11, 12	14	Take S-1 from 4ft to 6ft. -#4 = 67.5% -#200 = 4.6% Spin casing to 5ft. Drill to 6ft. Smooth drilling, brown wash.
+52.6	Light brown medium to fine SAND, trace fine Gravel, trace coarse Sand, trace Silt (wet) [SP-SM]	6–8	S-2	SS	5	10, 22, 34, 44	32	Take S-2 from 6ft to 8ft. Drill to 8ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (wet) [SP-SM]	8–10	S-3	SS	6	13, 16, 21, 22	21	Take S-3 from 8ft to 10ft.
	Light brown medium to fine SAND, trace coarse Sand, trace Silt, trace fine Gravel (wet) [SP-SM]	10–12	S-4	SS	7	11, 16, 23, 28	23	Take S-4 from 10ft to 12ft. -#4 = 97.2% -#200 = 5.3% Drill to 15ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, trace coarse Sand, trace Silt (wet) [SP-SM]	15–17	S-5	SS	4	30, 29, 36, 36	41	Take S-5 from 15ft to 17ft. 8/30/2023 Drill to 20ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, trace coarse Sand, trace Silt, trace fine Gravel (wet) [SP-SM]	20–22	S-6	SS	5	19, 15, 18, 23	24	Take S-6 from 20ft to 22ft. Drill to 25ft. Smooth drilling, brown wash. Moderate rig chatter.
		24						

* Hammer correction factor of 0.75 used

LANGAN Log of Boring **LB1A-07**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 58.6 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+34.6		24						
	Light brown medium to fine SAND, trace coarse Sand, trace Silt, trace fine Gravel (wet) [SP-SM]	25–27	S-7	SS	6	21 / 21 / 25 / 27	33	Take S-7 from 25ft to 27ft. Drill to 30ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, trace coarse Sand, trace Silt, trace fine Gravel (wet) [SP]	30–32	S-8	SS	8	16 / 24 / 24 / 25	34	Take S-8 from 30ft to 32ft. -#4 = 93.8% -#200 = 4.7% Drill to 35ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, some Clay (wet) [SC]	35–37	S-9	SS	8	20 / 22 / 25 / 27	35	Take S-9 from 35ft to 37ft. Drill to 40ft. Smooth drilling, brown wash.
	Light brown fine SAND, some Clay, trace Silt (wet) [SC]	40–42	S-10	SS	16	17 / 22 / 26 / 31	36	Take S-10 from 40ft to 42ft. Drill to 45ft. Smooth drilling, brown wash.
	Light brown to light gray fine SAND, some Clay, trace Silt (wet) [SC]	45–47	S-11	SS	17	16 / 17 / 22 / 28	29	Take S-11 from 45ft to 47ft. -#4 = 100% -#200 = 24.8% Drill to 50ft. Smooth drilling, brown wash.
	Light brown to light gray fine SAND, some Clay, trace Silt (wet) [SC] Light brown fine SAND, trace Silt (wet) [SP-SM]	50–52	S-12A S-12B	SS SS	17	16 / 42 / 47 / 44	67	Take S-12 from 50ft to 52ft.
+6.6	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
		53–54						

* Hammer correction factor of 0.75 used

LANGAN

Log of Boring **LB1A-08**

Project: Sands New York	Project No.: 170754501
Location: Nassau Coliseum	Elevation and Datum: Approx. el. 58.6 ± (NAVD 88)
Drilling Company: Wolf Drilling	Date Started: 9/8/2023 ; Date Finished: 9/11/2023
Drilling Equipment: Portable Electric Rig	Completion Depth: 52.0 ft ; Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit	Number of Samples: Disturbed 12 ; Undisturbed 0 ; Core 0
Casing Diameter (in): 4 Flush Joint Steel ; Casing Depth (ft): 5.0	Water Level (ft.): First N/A ; Completion N/A ; 24 HR. N/A
Casing Hammer: Donut ; Weight (lbs): 140 ; Drop (in): 30	Drilling Foreman: Fiad Khan
Sampler: 2in OD Split Spoon	
Sampler Hammer: Donut ; Weight (lbs): 140 ; Drop (in): 30	Field Engineer: Michael Gillooley

Elev. (ft) +58.6	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	6" CONCRETE	0						9/8/2023 Hand clear to 5ft.
+57.6	Light brown coarse to fine SAND, trace Silt (moist) [FILL]	1						
		2						Collect Grab Sample G-1 from 1ft to 5ft.
		5						Spin casing to 5ft. Drill to 6ft. Smooth drilling, brown wash.
+52.6	Light brown coarse to fine SAND, trace Silt [SP-SM]	6	S-1	SS	8	8 / 12 / 16 / 17	16	Take S-1 from 6ft to 8ft. Drill to 8ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace Silt (wet) [SP-SM]	8	S-2	SS	8	10 / 16 / 20 / 23	20	Take S-2 from 8ft to 10ft. Drill to 10ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (wet) [SP]	10	S-3	SS	8	12 / 17 / 19 / 22	22	Take S-3 from 10ft to 12ft. -#4 = 90.6% -#200 = 4.3% Drill to 15ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (wet) [SP-SM]	15	S-4	SS	4	14 / 19 / 18 / 16	24	Take S-4 from 15ft to 17ft. Drill to 20ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, trace Silt, trace coarse Sand, trace fine Gravel (wet) [SP-SM]	20	S-5	SS	5	16 / 18 / 17 / 19	25	Take S-5 from 20ft to 22ft. Drill to 25ft. Smooth drilling, brown wash.
		24						

* Hammer correction factor of 0.75 used

LANGAN

Log of Boring **LB1A-08**

Project: Sands New York	Project No.: 170754501
Location: Nassau Coliseum	Elevation and Datum: Approx. el. 58.6 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+34.6		24						
	Light brown medium to fine SAND, trace Silt, trace coarse Sand, trace fine Gravel (wet) [SP-SM]	25–27	S-6	SS	6	14 16 25 33	29	Take S-6 from 25ft to 27ft. -#4 = 94.1% -#200 = 5.2%
		27						Drill to 30ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, trace Silt, trace coarse Sand, trace fine Gravel (wet) [SP-SM]	30–32	S-7	SS	6	12 25 27 31	37	Take S-7 from 30ft to 32ft.
		32						9/11/2023 Drill to 35ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, trace Silt, trace coarse Sand (wet) [SP-SM]	35–36	S-8A	SS	9	12 21 23 24	33	Take S-8 from 35ft to 37ft.
	Light brown medium to fine SAND, some Clay, trace Silt (wet) [SC]	36–37	S-8B	SS				
		37						Drill to 40ft. Smooth drilling, brown wash.
	Light brown to light gray fine SAND, some Clay, trace Silt (wet) [SC]	40–42	S-9	SS	17	11 18 23 27	31	Take S-9 from 40ft to 42ft. -#4 = 100% -#200 = 26%
	Light brown to light gray fine SAND, some Clay, trace Silt (wet) [SC]	42–44	S-10	SS	16	18 26 33 40	44	Take S-10 from 42ft to 44ft.
		44						Drill to 45ft. Smooth drilling, brown wash.
	Light brown to light gray fine SAND, some Clay, trace Silt (wet) [SC]	45–47	S-11	SS	18	18 17 18 21	26	Take S-11 from 45ft to 47ft.
		47						Drill to 50ft. Smooth drilling, brown wash.
	Light brown to light gray fine SAND, some Clay, trace medium Sand, trace Silt, trace fine Gravel (wet) [SC]	50–52	S-12	SS	15	12 17 24 24	31	Take S-12 from 50ft to 52ft. -#4 = 99.3% -#200 = 13.8%
+6.6	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
		54						

* Hammer correction factor of 0.75 used

Template: Log-BH-NYC-GEO; Strip: BH-GEO (5); Printed on 10/06/2023

OBSERVATION WELL CONSTRUCTION SUMMARY
Well No. LB1A-01(OW)

PROJECT Sands New York - Phase 1A	PROJECT NO. 170754501
LOCATION Uniondale, New York	ELEVATION AND DATUM 54.6 ±(NAVD88)
DRILLING AGENCY Wolf Drilling	DATE STARTED 9/15/2023 — DATE FINISHED 9/15/2023
DRILLING EQUIPMENT Portable Electric Rig	DRILLER Fiad Khan
SIZE AND TYPE OF BIT 3-7/8" tricone roller bit	INSPECTOR Jonathan Negron

METHOD OF INSTALLATION

10-ft of 2-in diameter PVC screen and 30-ft of riser were installed to a depth of 40-ft below grade; borehole casing was then removed. As the casing was removed, filter sand was packed to about 10ft above the screen section. A 2-ft bentonite seal was installed above the filter sand. The remainder of the annulus was backfilled with soil cuttings. Grout was placed at the top of the hole and a flush-mount well cap was installed.

METHOD OF WELL DEVELOPMENT

The well was developed by bailing.

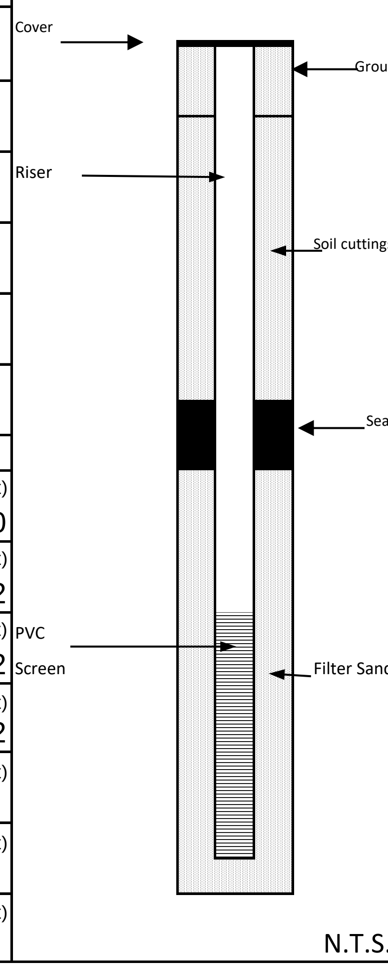
TYPE OF CASING 4" flush joint steel casing	DIAMETER 4.00 inches	TYPE OF BACKFILL MATERIAL Filter sand and Soil cuttings
TYPE OF SCREEN PVC	DIAMETER 2.00 inches	TYPE OF SEAL MATERIAL Bentonite pellets and grout
BOREHOLE NOMINAL DIAMETER 4 inches		TYPE OF FILTER MATERIAL No. 1 Filter Sand (Silica Quartz Sand)

	ELEVATION (ft)	DEPTH (ft)
TOP OF CASING	54.6	0
TOP OF SEAL	29.1	25.5
TOP OF FILTER	27.1	27.5
TOP OF SCREEN	24.6	30
BOTTOM OF BORING	14.6	40
SCREEN LENGTH	10 ft	
SLOT SIZE	0.01 in	

GROUNDWATER ELEVATIONS

ELEVATION (ft)	DATE	DEPTH TO WATER (ft)
41.60	9/15/2023 11:00AM Bail	13.0
46.40	9/15/2023 12:08PM	8.2
50.40	9/20/2023	4.2
50.40	9/21/2023	4.2

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
FILL	5.0
SAND	40.0

LANGAN Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
360 W 31st Street, 8th Floor , New York, NY 10001

OBSERVATION WELL CONSTRUCTION SUMMARY
Well No. LB1A-06(OW)

PROJECT Sands New York - Phase 1A	PROJECT NO. 170754501
LOCATION Uniondale, New York	ELEVATION AND DATUM 58.6 ±(NAVD88)
DRILLING AGENCY Wolf Drilling	DATE STARTED 8/29/2023 — DATE FINISHED 8/29/2023
DRILLING EQUIPMENT Portable Electric Rig	DRILLER Fiad Khan
SIZE AND TYPE OF BIT 3-7/8" tricone roller bit	INSPECTOR Michael Gillooley

METHOD OF INSTALLATION

10-ft of 2-in diameter PVC screen and 30-ft of riser were installed to a depth of 40-ft below grade; borehole casing was then removed. As the casing was removed, filter sand was packed to about 10ft above the screen section. A 2-ft bentonite seal was installed above the filter sand. The remainder of the annulus was backfilled with soil cuttings. Grout was placed at the top of the hole and a flush-mount well cap was installed.

METHOD OF WELL DEVELOPMENT

The well was developed by bailing.

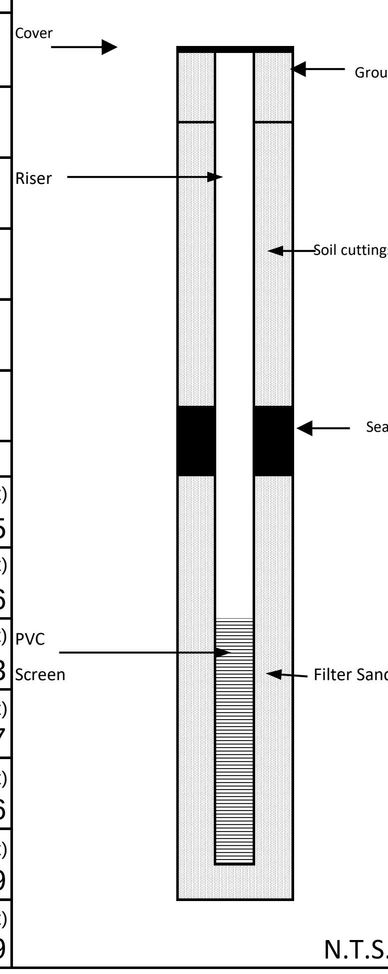
TYPE OF CASING 4" flush joint steel casing	DIAMETER 4.00 inches	TYPE OF BACKFILL MATERIAL Filter sand and Soil cuttings
TYPE OF SCREEN PVC	DIAMETER 2.00 inches	TYPE OF SEAL MATERIAL Bentonite pellets and grout
BOREHOLE NOMINAL DIAMETER 4 inches		TYPE OF FILTER MATERIAL No. 1 Filter Sand (Silica Quartz Sand)

	ELEVATION (ft)	DEPTH (ft)
TOP OF CASING	58.6	0
TOP OF SEAL	40.6	18
TOP OF FILTER	38.6	20
TOP OF SCREEN	28.6	30
BOTTOM OF BORING	18.6	40
SCREEN LENGTH	10 ft	
SLOT SIZE	0.01 in	

GROUNDWATER ELEVATIONS

ELEVATION (ft)	DATE		DEPTH TO WATER (ft)
50.10	8/29/2023		8.5
50.00	8/31/2023	6:45AM	8.6
49.30	8/31/2023	After Bailing	9.3
49.90	8/31/2023	7:15AM	8.7
50.00	9/1/2023		8.6
49.70	9/20/2023		8.9
49.70	9/21/2023		8.9

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
FILL	5.0
SAND	40.0

LANGAN Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
360 W 31st Street, 8th Floor , New York, NY 10001

APPENDIX B

(2023 LANGAN LABORATORY TESTING RESULTS)

RSA GEOLAB

1017 Greeley Ave N
Union, NJ 07083
908-964-0786
www.RSAGeolab.com

Letter of Transmittal

Date: 9-28-23 Job No.: 869 Lab Log: 23-2955

Attention: Julia Langewis
Langan Engineering & Environmental Services
360 West 31st Street, 8th Floor
New York, New York 10001

CC:

Re: Sands New York, Hempstead, NY
Langan# not provided

Sample(s) ID: **LB1A-01 G-1 thru LB1A-08 S-12**

Dear Julia,

Please find attached results for the samples referenced above. The following lab testing was performed:

- ASTM D422 Sieve Analysis (29 tests)
- ASTM D4318 Atterberg Limits (3 tests)

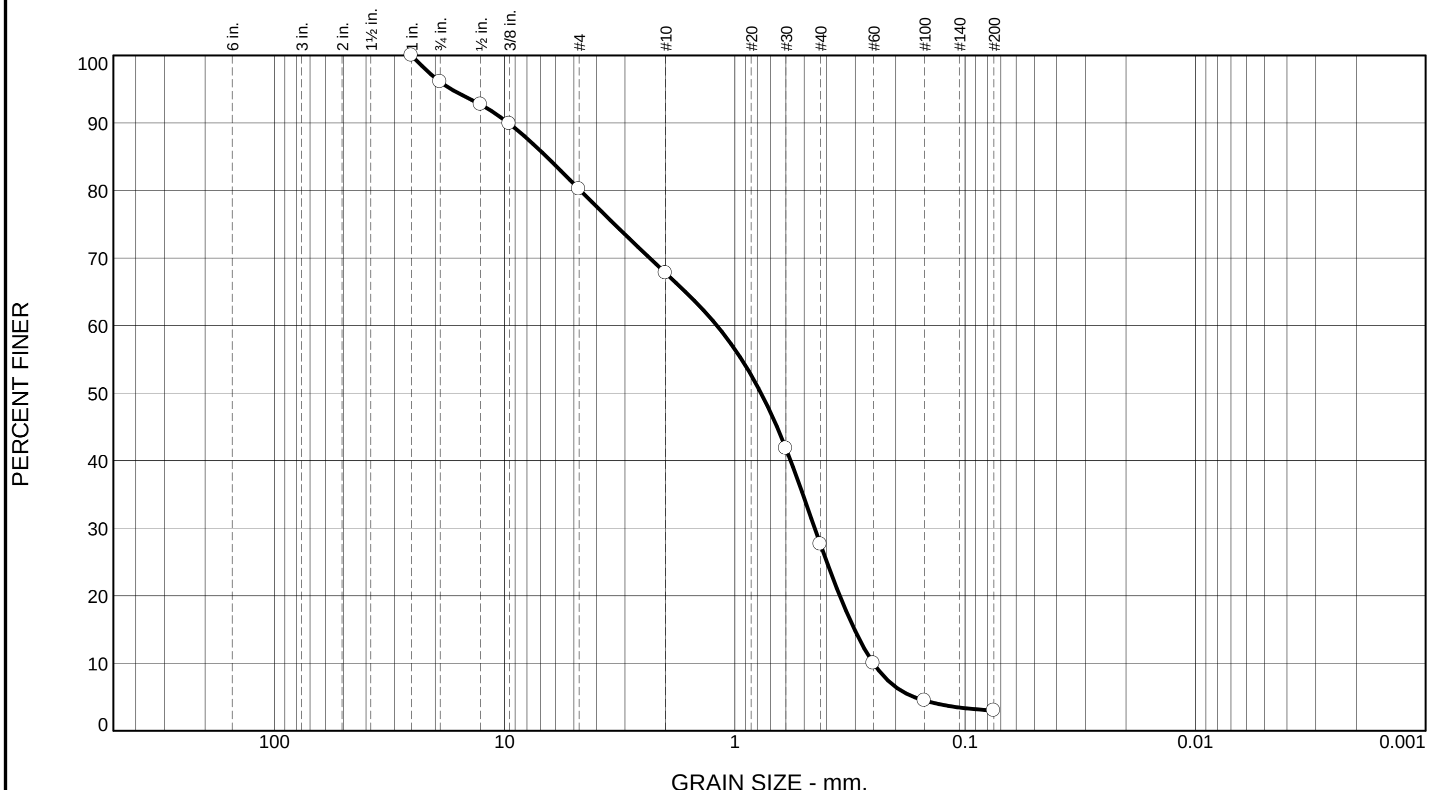
Regards,
RSA Geolab, LLC

Remarks: If you have any questions, please call 908-964-0786.

Signed: ____________________

Dr. Raza S. Ahmed
President RSA Geolab, LLC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.9	15.9	12.4	40.2	24.6	3.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	96.1		
.5	92.7		
.375	89.9		
#4	80.2		
#10	67.8		
#30	41.8		
#40	27.6		
#60	10.0		
#100	4.5		
#200	3.0		

* (no specification provided)

Material Description

Dark Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 9.6261 D_{85}= 6.5698 D_{60}= 1.1963
D_{50}= 0.7698 D_{30}= 0.4500 D_{15}= 0.3022
D_{10}= 0.2502 C_u= 4.78 C_c= 0.68

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1A-01 G-1 0.5-6

Date: 9-28-23

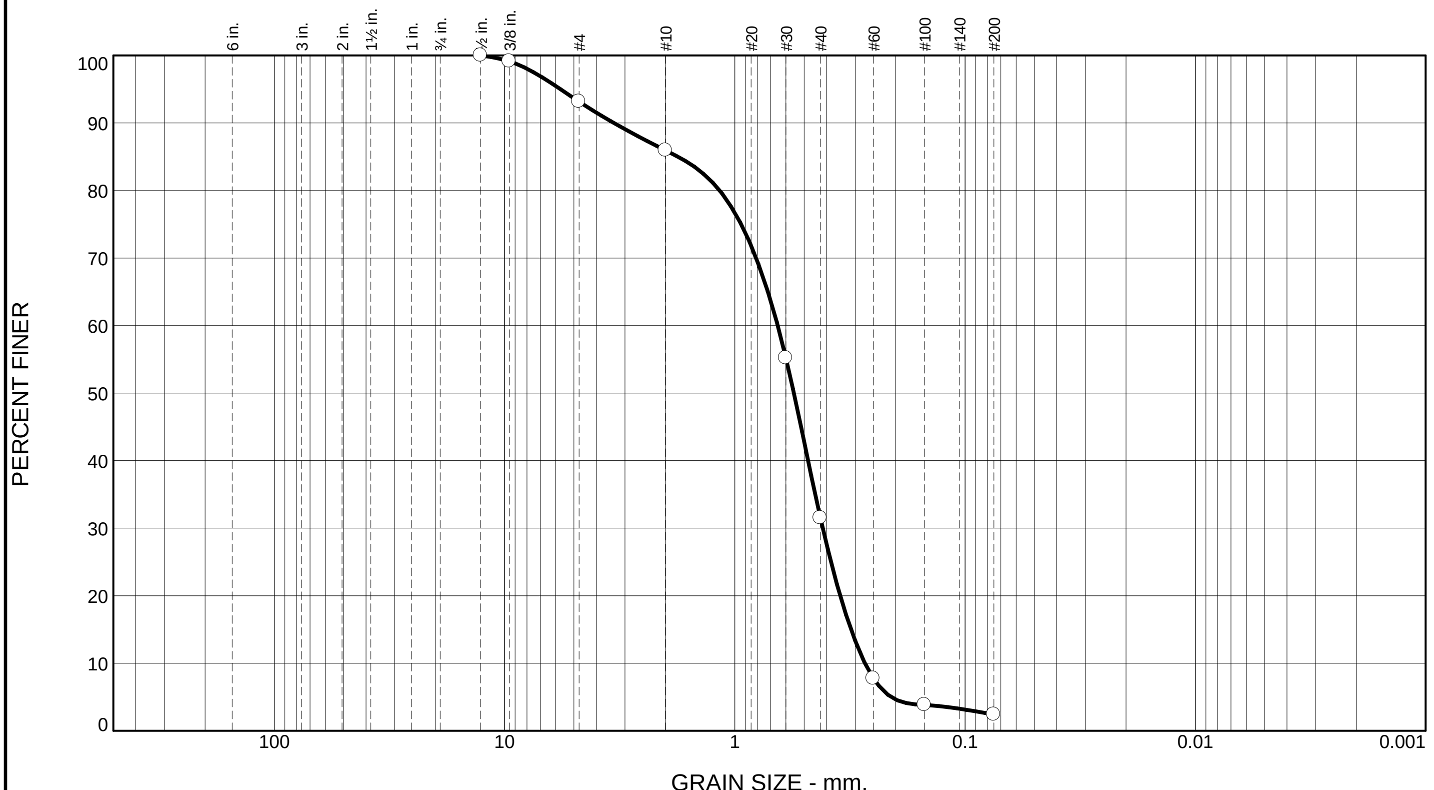
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.8	7.3	54.4	29.1	2.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	99.1		
#4	93.2		
#10	85.9		
#30	55.2		
#40	31.5		
#60	7.7		
#100	3.8		
#200	2.4		

* (no specification provided)

Material Description

Pale Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 3.3494 D_{85}= 1.7674 D_{60}= 0.6514
D_{50}= 0.5542 D_{30}= 0.4152 D_{15}= 0.3130
D_{10}= 0.2724 C_u= 2.39 C_c= 0.97

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1A-01 S-3 10-12

Date: 9-28-23

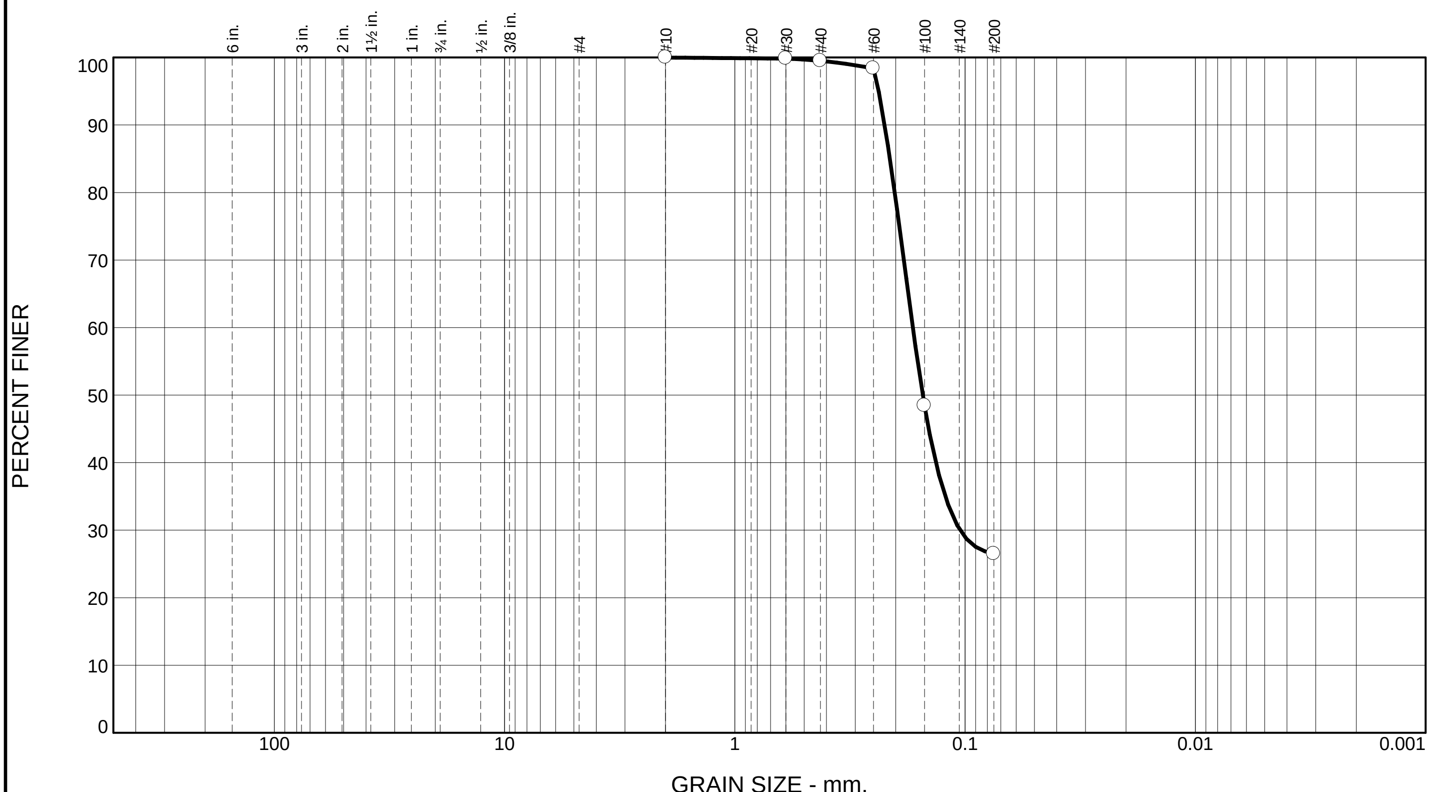
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
				0.5	73.0	26.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#30	99.8		
#40	99.5		
#60	98.4		
#100	48.4		
#200	26.5		

* (no specification provided)

Material Description

Gray, Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2234 D_{85}= 0.2120 D_{60}= 0.1686
D_{50}= 0.1527 D_{30}= 0.1052 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1A-01 S-8 35-37

Date: 9-28-23

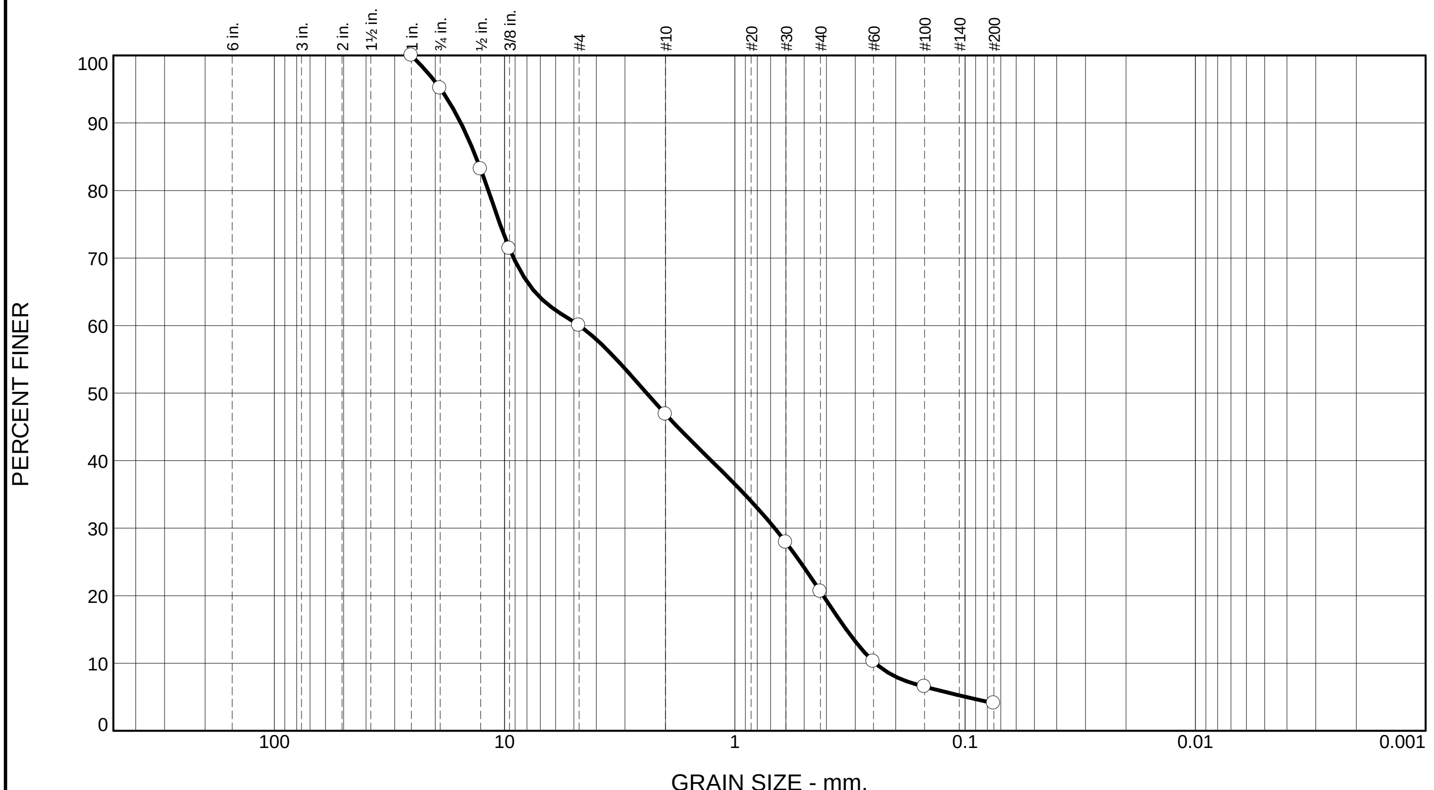
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.9	35.1	13.1	26.3	16.5	4.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	95.1		
.5	83.2		
.375	71.4		
#4	60.0		
#10	46.9		
#30	27.9		
#40	20.6		
#60	10.3		
#100	6.5		
#200	4.1		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 15.4889 D_{85}= 13.3242 D_{60}= 4.7358
D_{50}= 2.4157 D_{30}= 0.6717 D_{15}= 0.3280
D_{10}= 0.2453 C_u= 19.31 C_c= 0.39

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1A-02 S-5 15-17

Date: 9-28-23

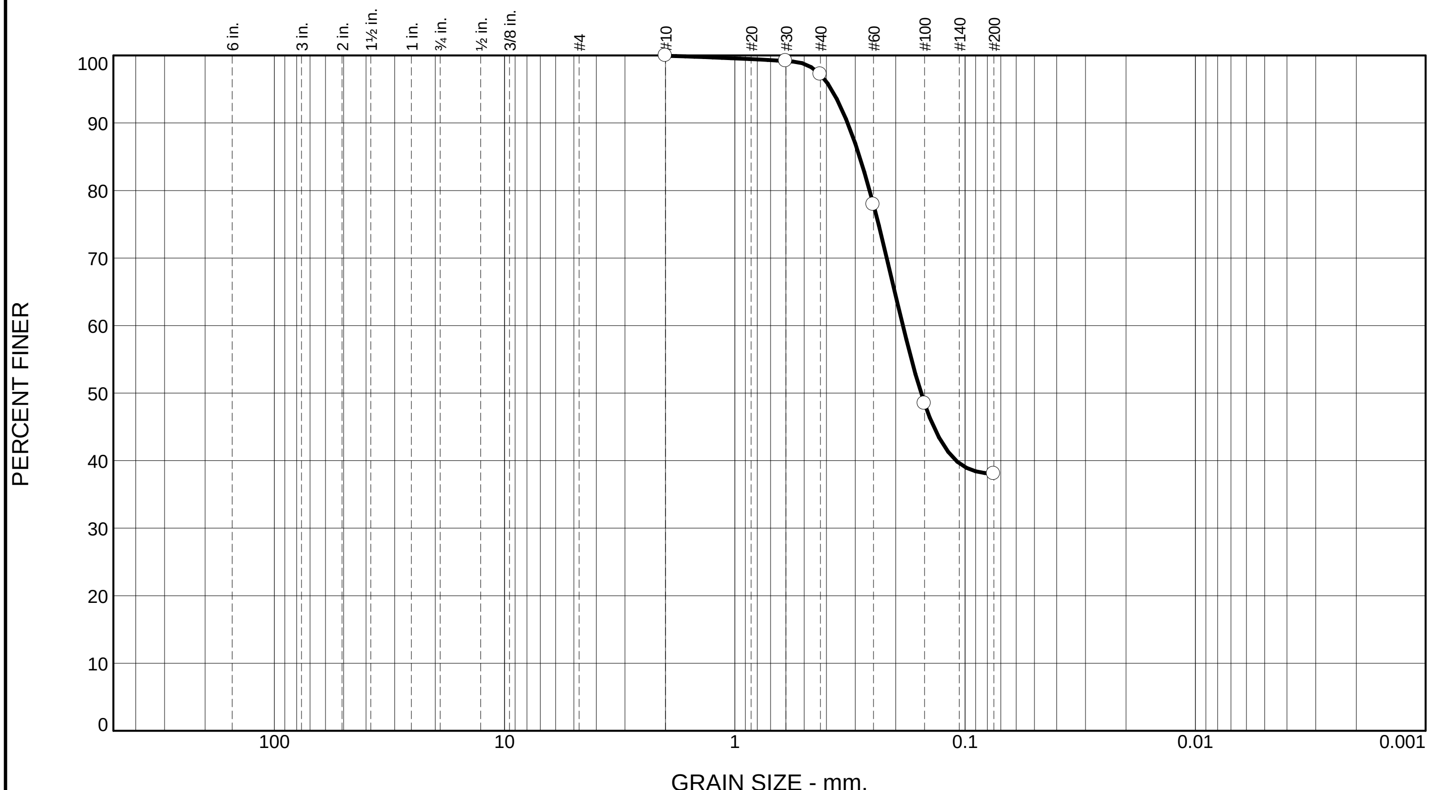
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
				2.8	59.2	38.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#30	99.2		
#40	97.2		
#60	77.9		
#100	48.5		
#200	38.0		

* (no specification provided)

Material Description

Reddish Yellow, Gray

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3238 D_{85}= 0.2872 D_{60}= 0.1863
D_{50}= 0.1552 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1A-02 S-17 62-64

Date: 9-28-23

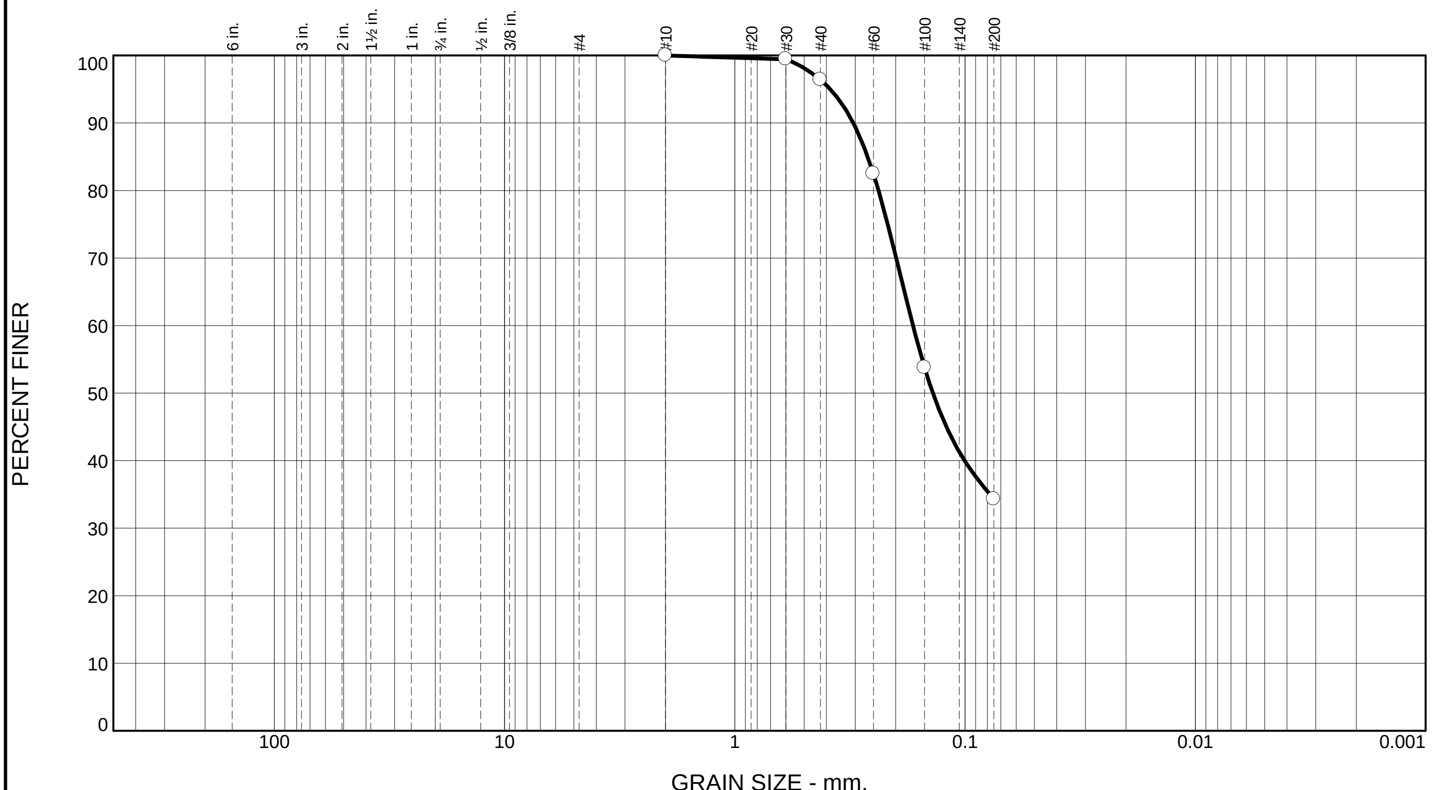
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
				3.6	62.1	34.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#30	99.4		
#40	96.4		
#60	82.5		
#100	53.8		
#200	34.3		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3059 D_{85}= 0.2648 D_{60}= 0.1684
D_{50}= 0.1381 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1A-02 S20B 75.5-77

Date: 9-28-23

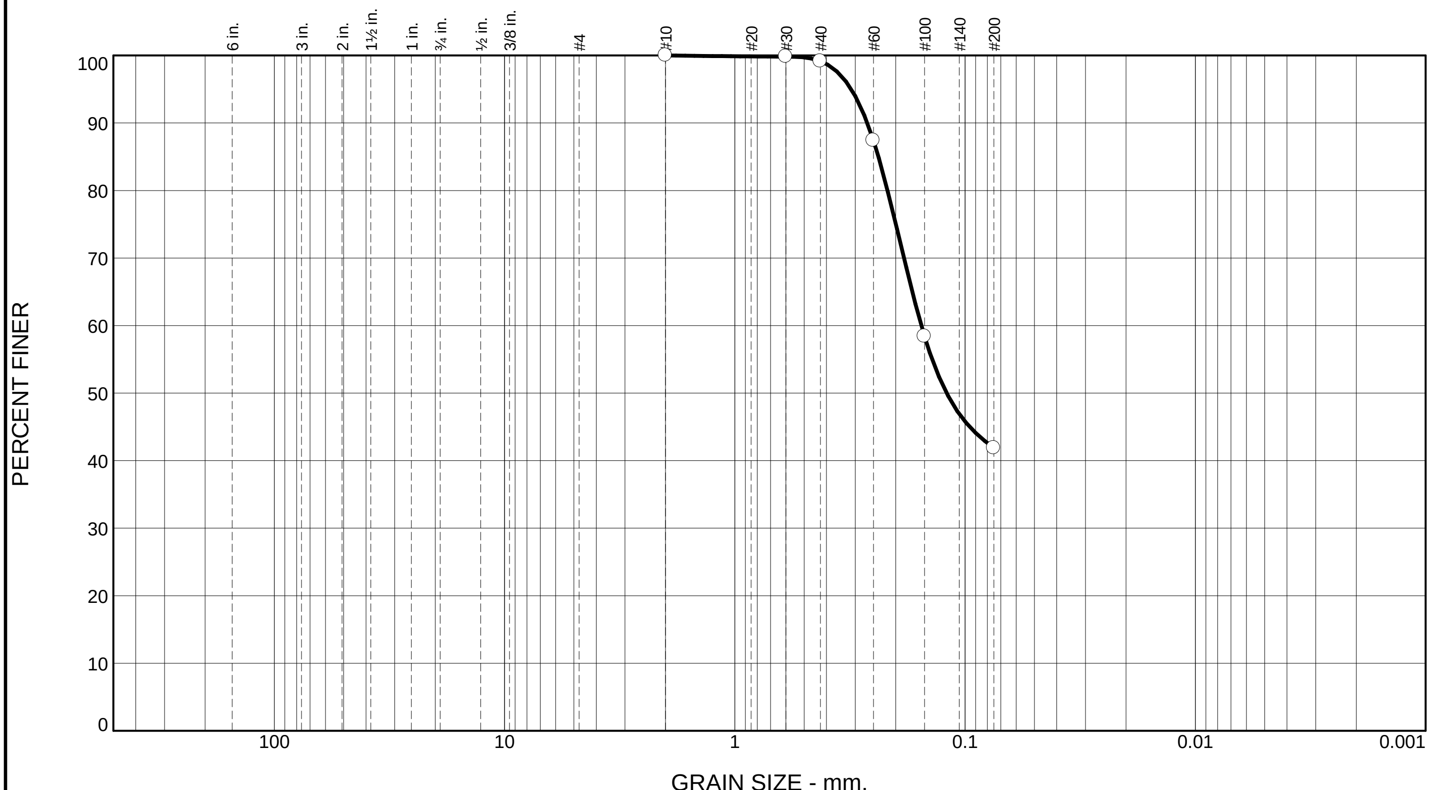
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.8	57.3	41.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#30	99.8		
#40	99.2		
#60	87.4		
#100	58.4		
#200	41.9		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2658 D_{85}= 0.2379 D_{60}= 0.1549
D_{50}= 0.1203 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1A-02 S21B 81.5-82

Date: 9-28-23

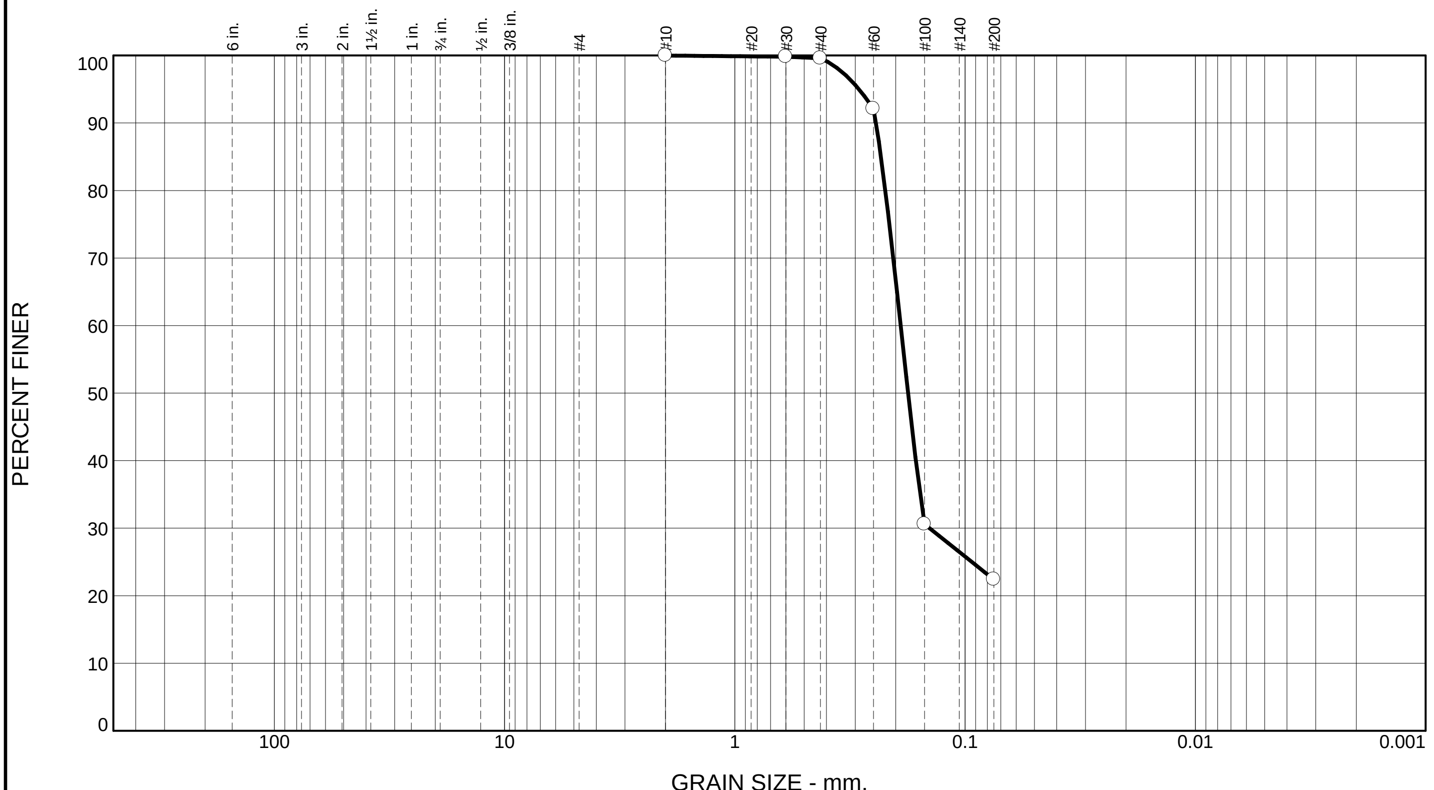
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
				0.4	77.2	22.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#30	99.8		
#40	99.6		
#60	92.1		
#100	30.6		
#200	22.4		

* (no specification provided)

Material Description

Gray, Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2439 D_{85}= 0.2319 D_{60}= 0.1905
D_{50}= 0.1770 D_{30}= 0.1428 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1A-02 S-23 90-92

Date: 9-28-23

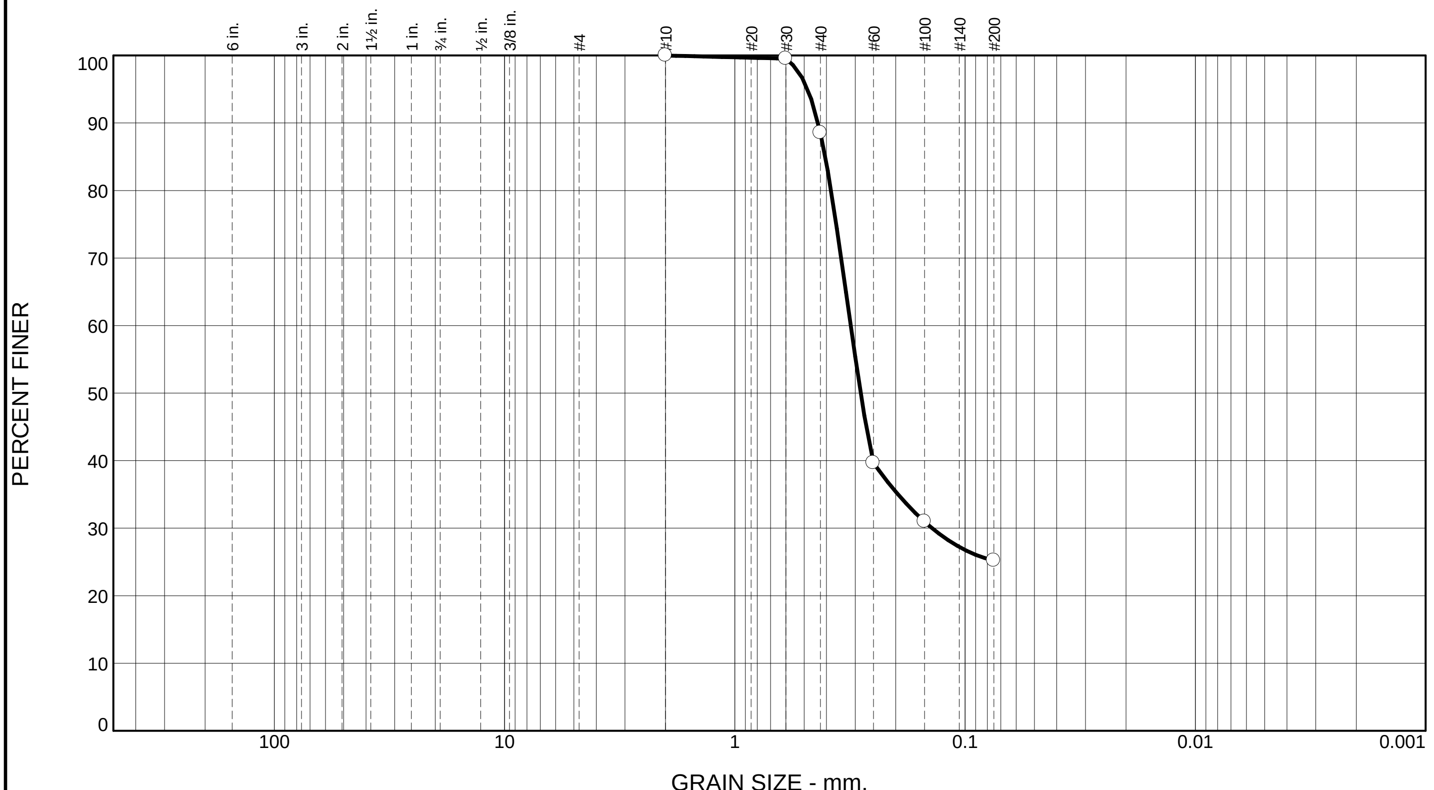
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
				11.5	63.3	25.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#30	99.5		
#40	88.5		
#60	39.7		
#100	31.0		
#200	25.2		

* (no specification provided)

Material Description

Yellowish Brown, Red

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.4349 D_{85}= 0.4051 D_{60}= 0.3140
D_{50}= 0.2841 D_{30}= 0.1391 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1A-02 S-25 100-102

Date: 9-28-23

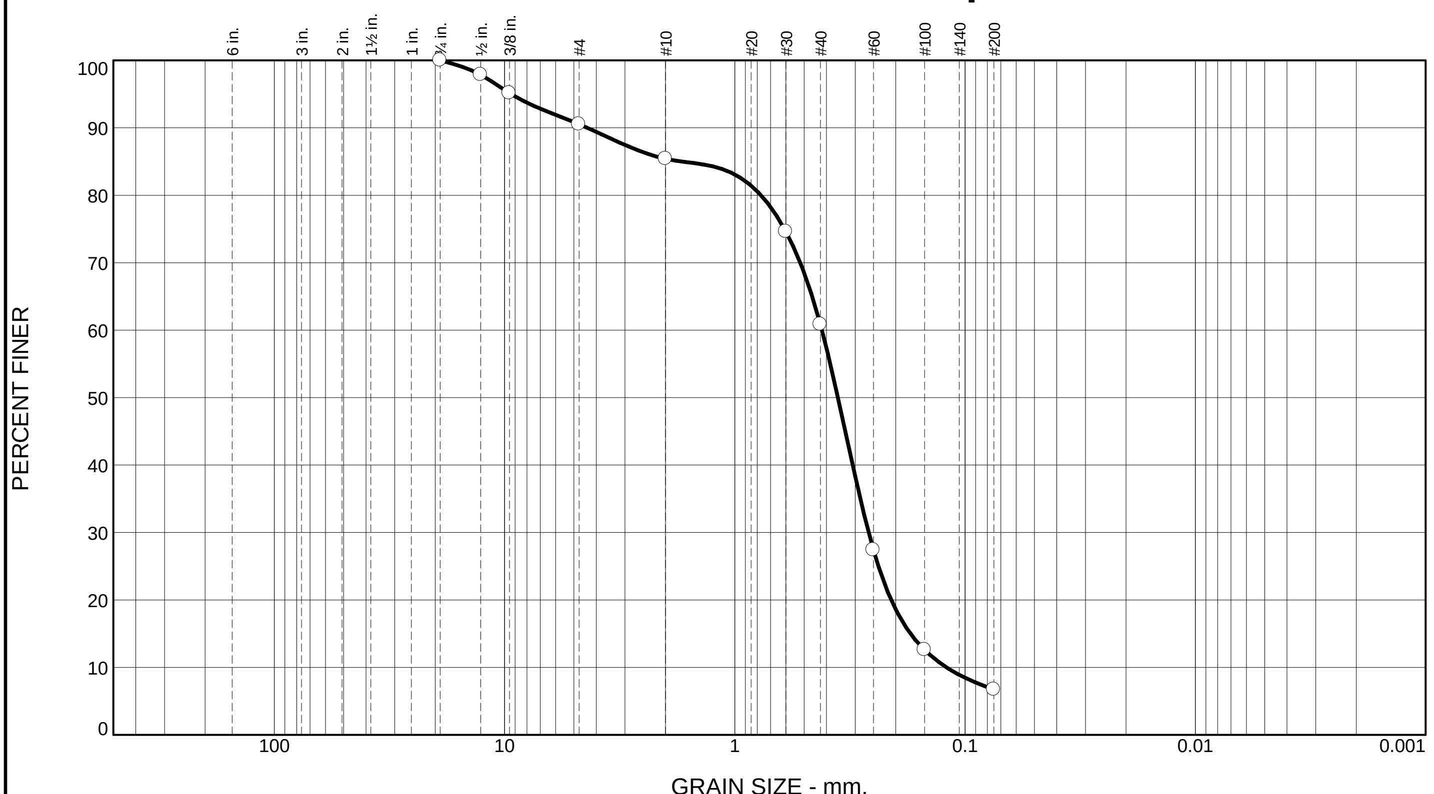
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	9.5	5.1	24.6	54.1	6.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	97.9		
.375	95.2		
#4	90.5		
#10	85.4		
#30	74.6		
#40	60.8		
#60	27.4		
#100	12.6		
#200	6.7		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 4.3729 D_{85}= 1.6954 D_{60}= 0.4187
D_{50}= 0.3568 D_{30}= 0.2623 D_{15}= 0.1728
D_{10}= 0.1205 C_u= 3.47 C_c= 1.36

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1A-03 S-3 10-12

Date: 9-28-23

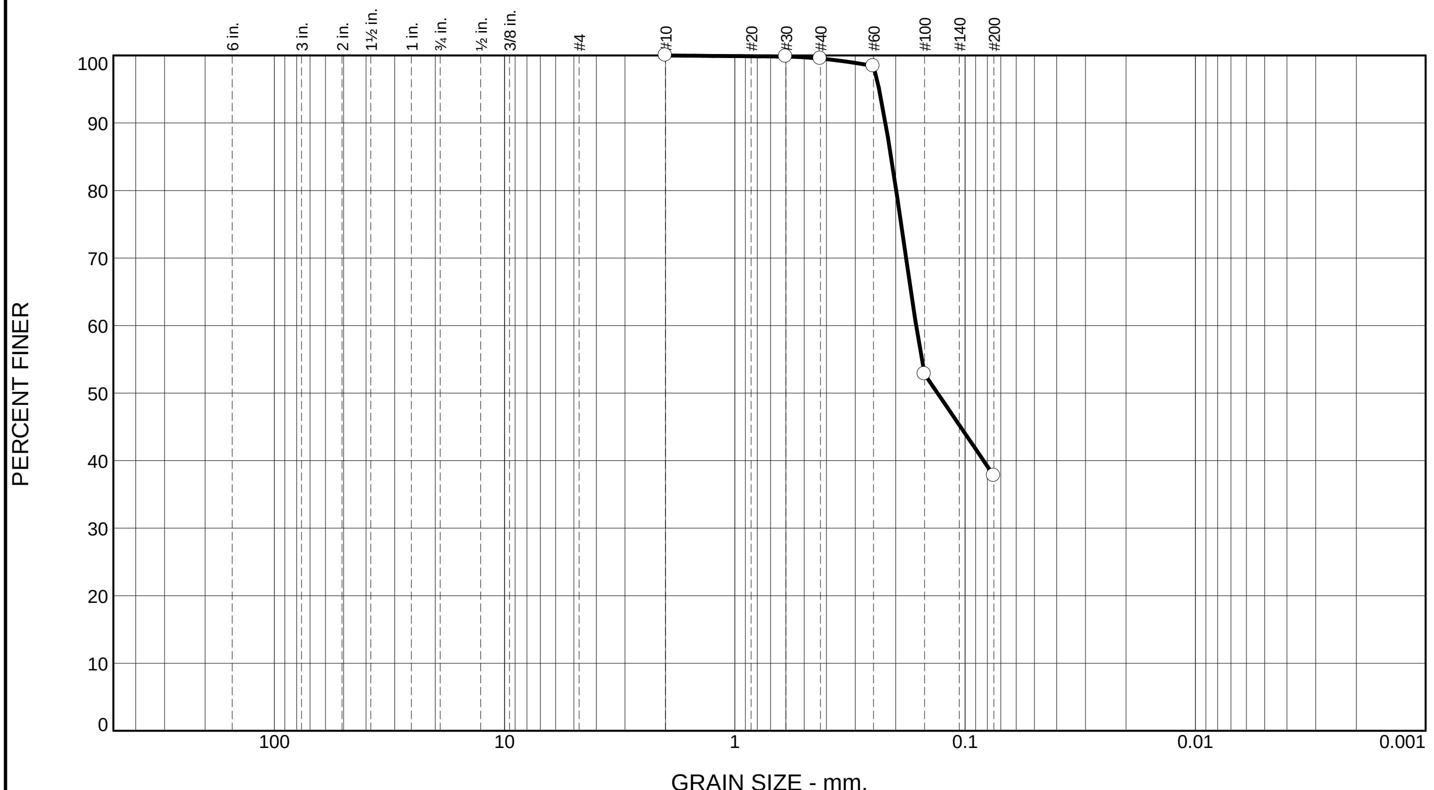
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
				0.5	61.7	37.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#30	99.8		
#40	99.5		
#60	98.4		
#100	52.8		
#200	37.8		

* (no specification provided)

Material Description

Gray

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2216 D_{85}= 0.2096 D_{60}= 0.1631
D_{50}= 0.1318 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1A-03 S-11 42-44

Date: 9-28-23

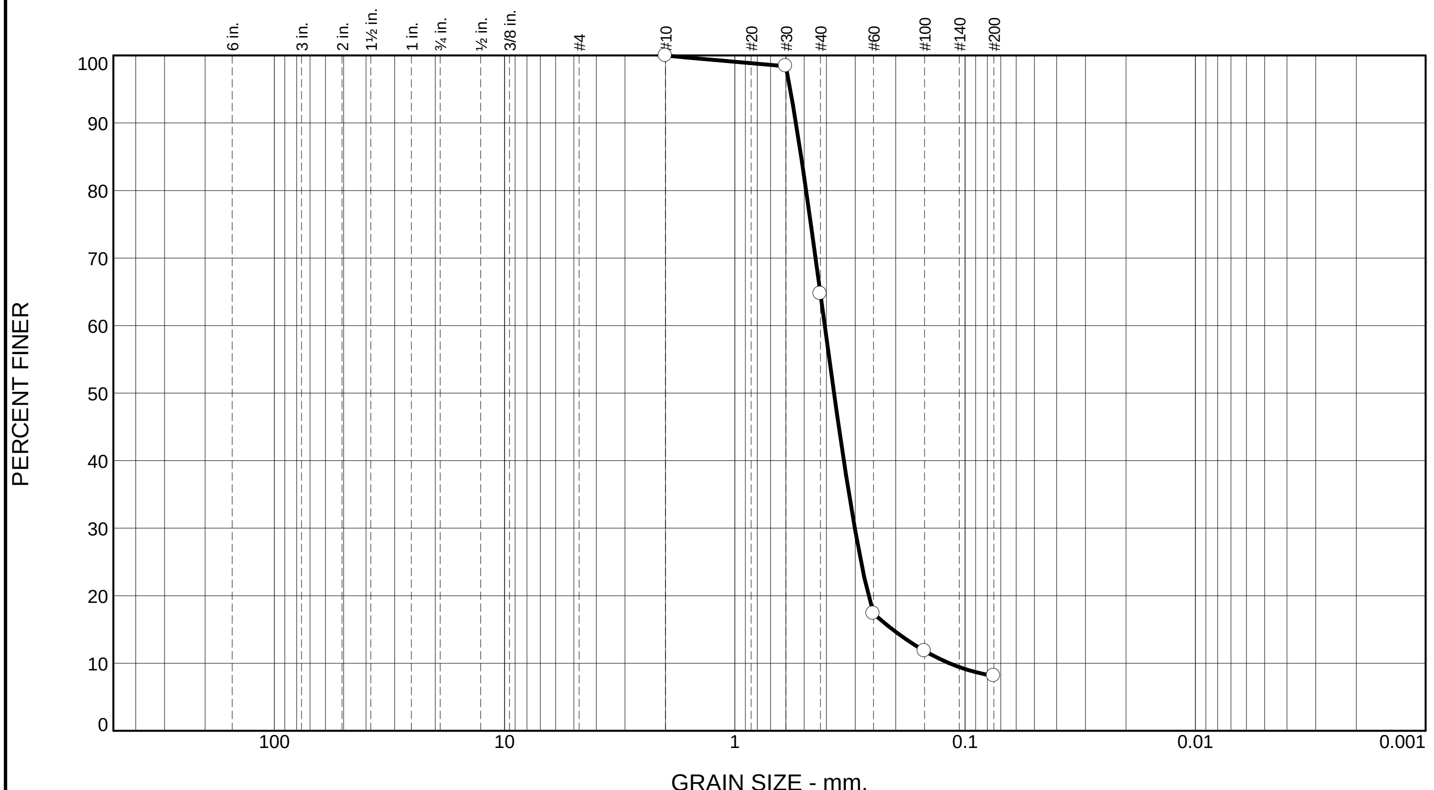
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
				35.3	56.6	8.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#30	98.4		
#40	64.7		
#60	17.4		
#100	11.8		
#200	8.1		

* (no specification provided)

Material Description

Reddish Yellow

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.5431 D_{85}= 0.5153 D_{60}= 0.4070
D_{50}= 0.3709 D_{30}= 0.3015 D_{15}= 0.2063
D_{10}= 0.1170 C_u= 3.48 C_c= 1.91

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1A-03 S-13 50-52

Date: 9-28-23

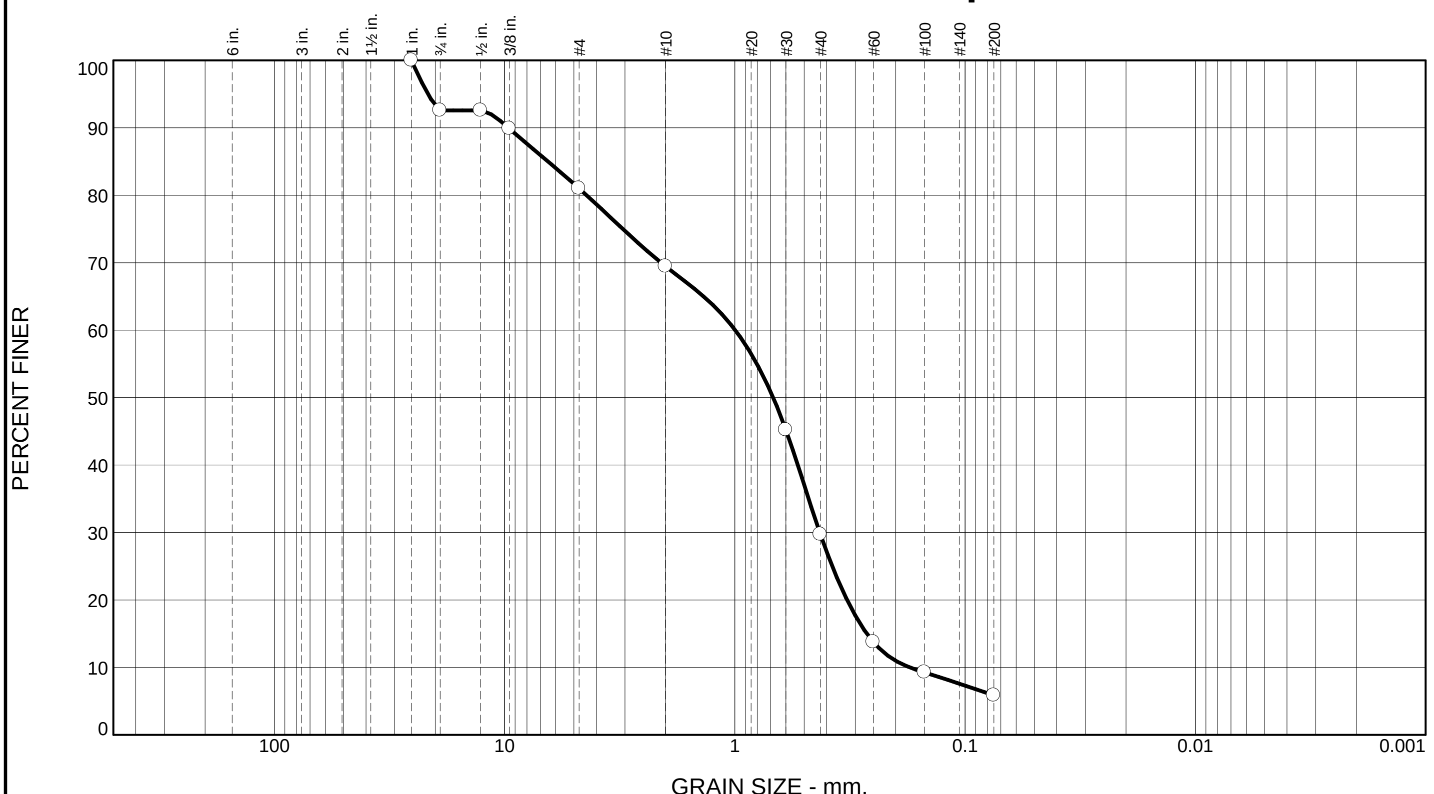
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.4	11.6	11.5	39.8	23.8	5.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	92.6		
.5	92.6		
.375	89.9		
#4	81.0		
#10	69.5		
#30	45.2		
#40	29.7		
#60	13.7		
#100	9.3		
#200	5.9		

* (no specification provided)

Material Description

Dark Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 9.6189 D_{85}= 6.4777 D_{60}= 0.9961
D_{50}= 0.6816 D_{30}= 0.4278 D_{15}= 0.2673
D_{10}= 0.1740 C_u= 5.73 C_c= 1.06

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1A-04 S-4 15-17

Date: 9-28-23

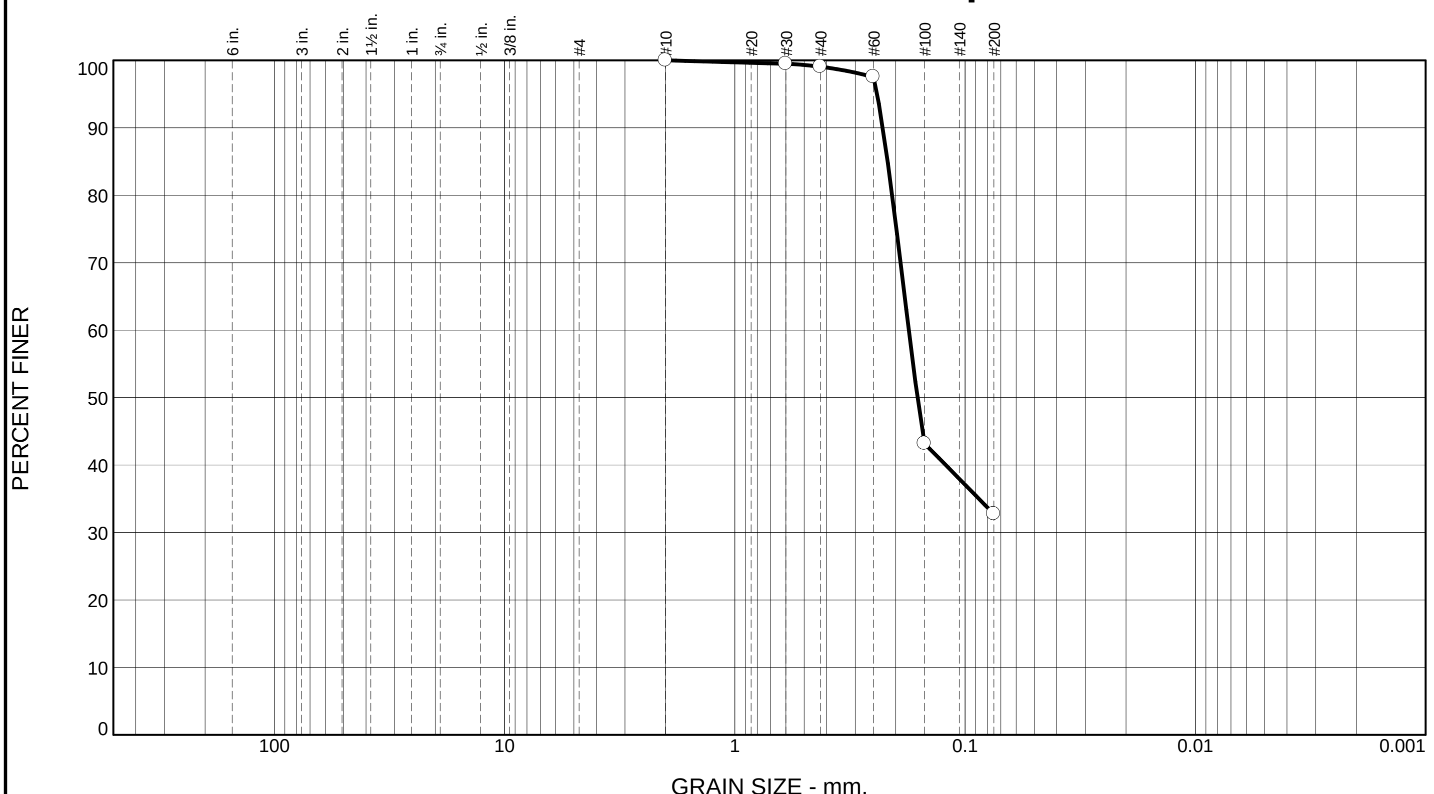
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.9	66.4	32.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#30	99.5		
#40	99.1		
#60	97.5		
#100	43.2		
#200	32.7		

* (no specification provided)

Material Description

Gray, Reddish Yellow

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2277 D_{85}= 0.2168 D_{60}= 0.1757
D_{50}= 0.1609 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1A-04 S-10 45-47

Date: 9-28-23

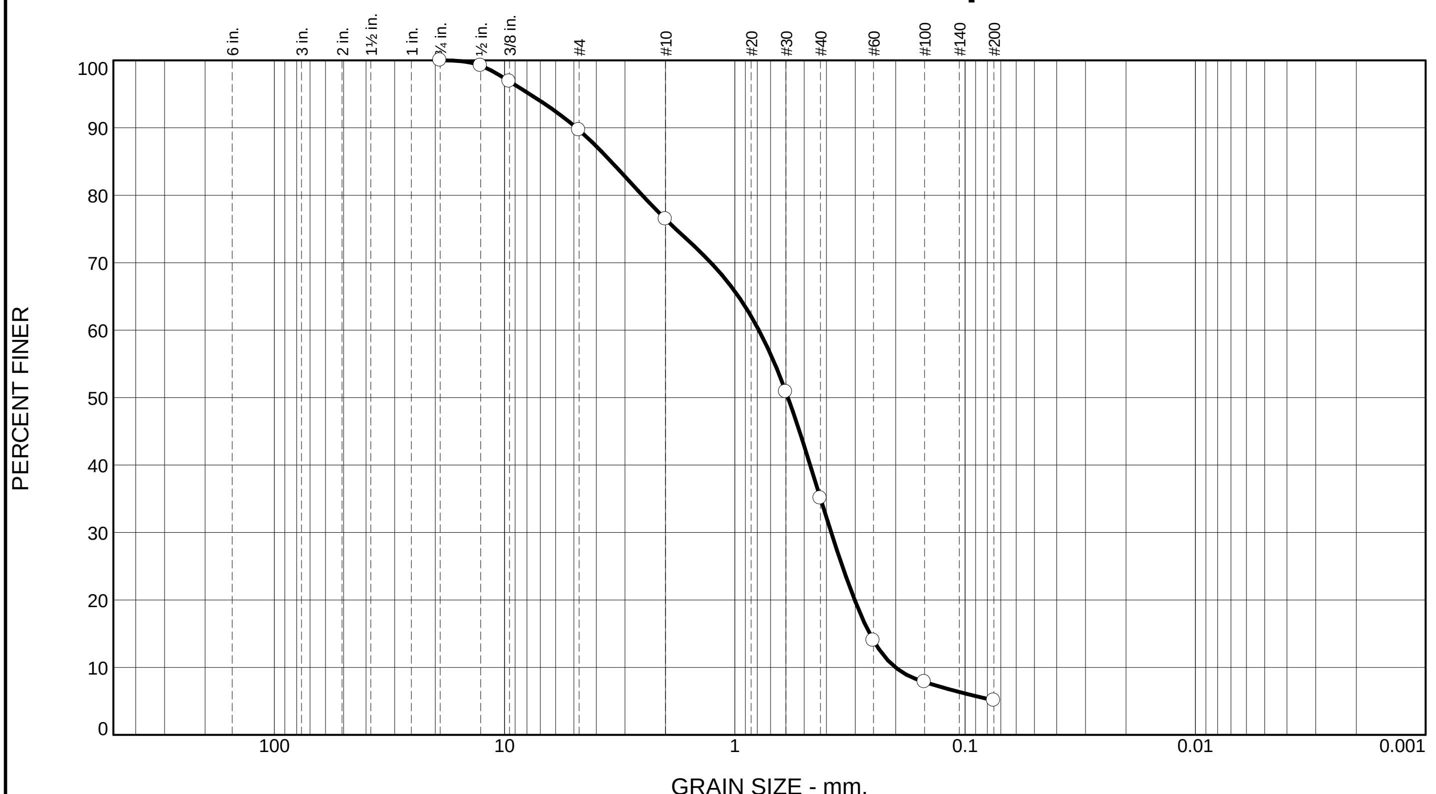
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	10.3	13.3	41.3	30.0	5.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	99.2		
.375	96.9		
#4	89.7		
#10	76.4		
#30	50.8		
#40	35.1		
#60	14.0		
#100	7.8		
#200	5.1		

* (no specification provided)

Material Description

Dark Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 4.8728 D_{85}= 3.4469 D_{60}= 0.7865
D_{50}= 0.5877 D_{30}= 0.3816 D_{15}= 0.2595
D_{10}= 0.2007 C_u= 3.92 C_c= 0.92

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1A-05 S-3 4-6

Date: 9-28-23

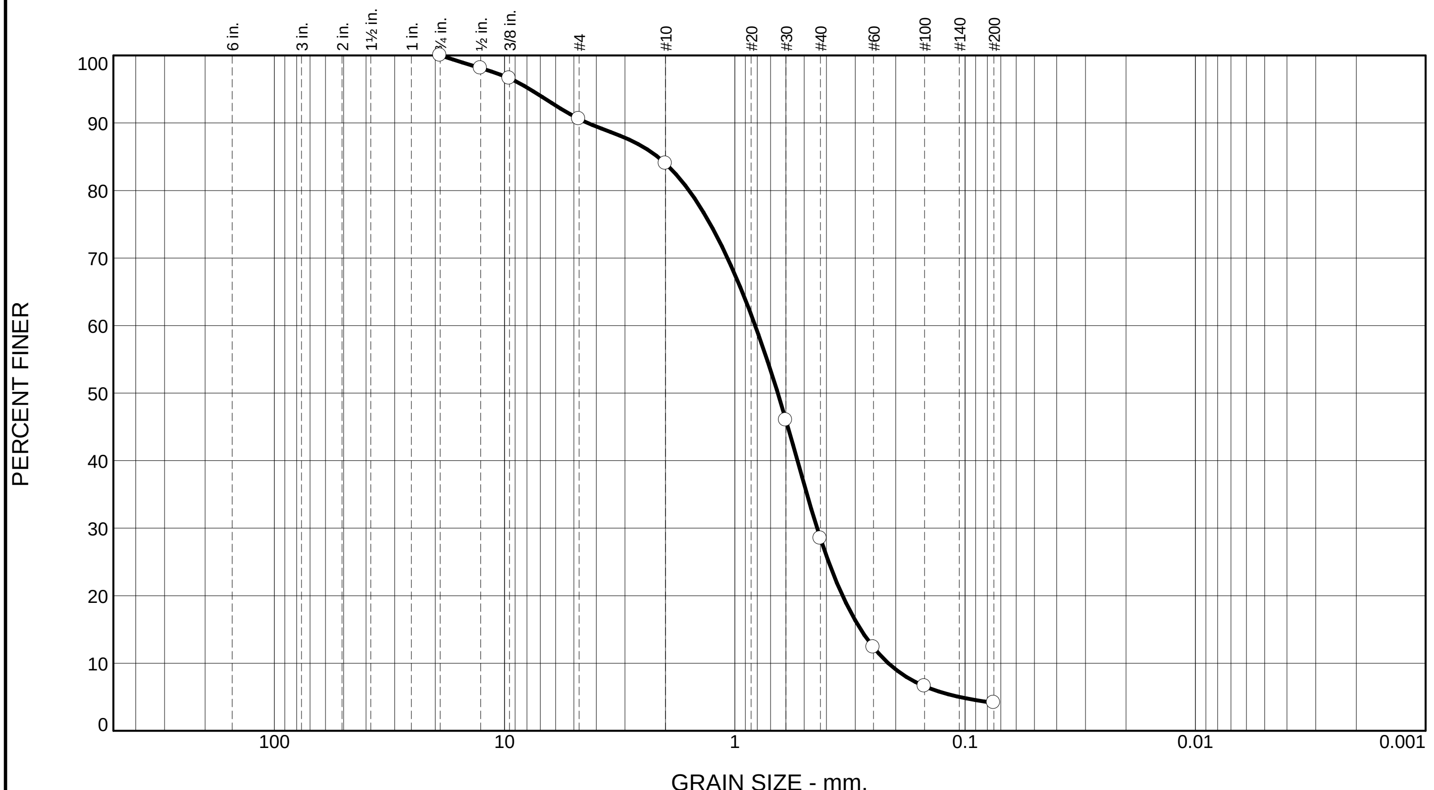
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	9.4	6.6	55.5	24.4	4.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	98.1		
.375	96.6		
#4	90.6		
#10	84.0		
#30	46.0		
#40	28.5		
#60	12.4		
#100	6.6		
#200	4.1		

* (no specification provided)

Material Description

Dark Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 4.3542 D_{85}= 2.1639 D_{60}= 0.8160
D_{50}= 0.6508 D_{30}= 0.4392 D_{15}= 0.2840
D_{10}= 0.2154 C_u= 3.79 C_c= 1.10

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1A-05 S-7 15-17

Date: 9-28-23

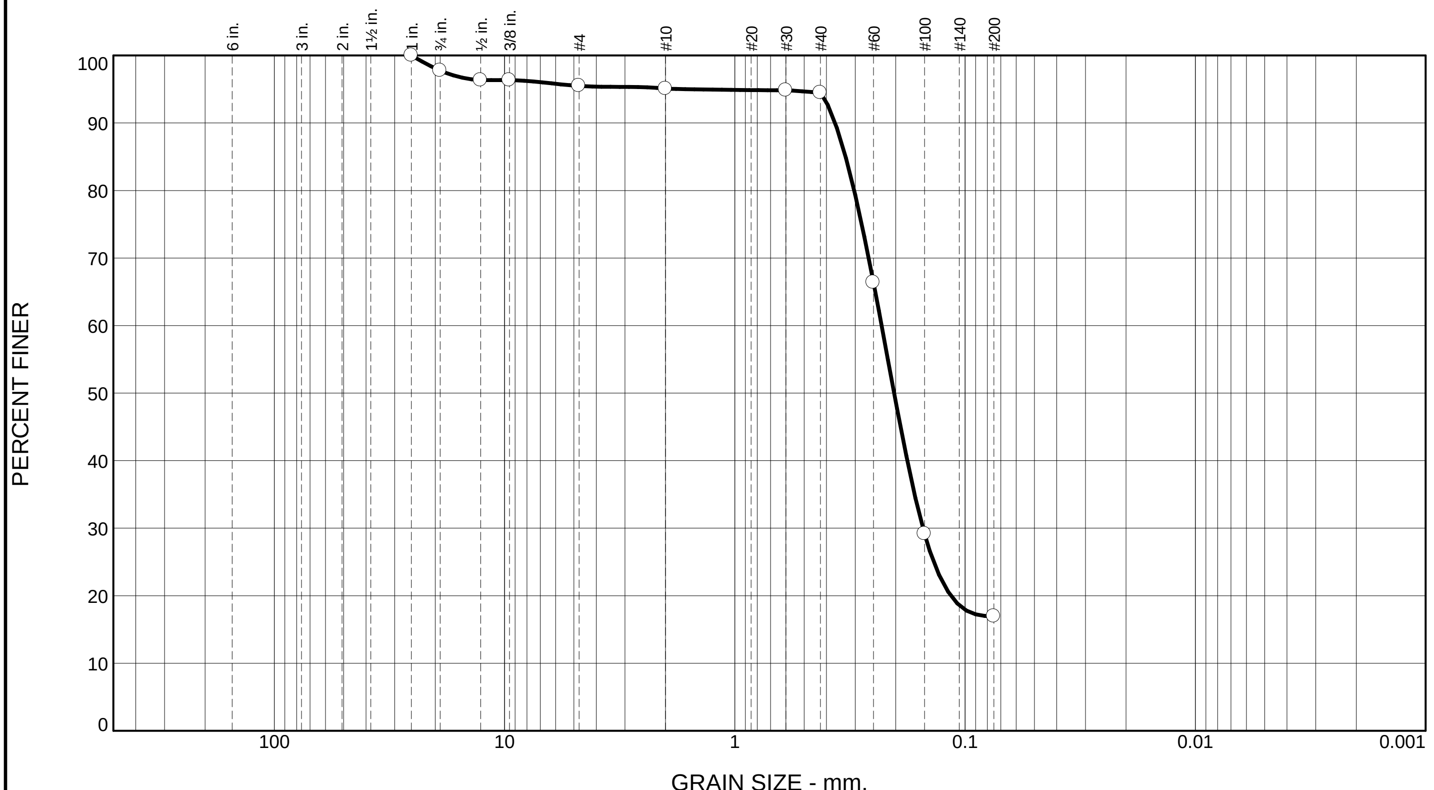
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.2	2.3	0.4	0.6	77.6	16.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	97.8		
.5	96.3		
.375	96.3		
#4	95.5		
#10	95.1		
#30	94.8		
#40	94.5		
#60	66.4		
#100	29.2		
#200	16.9		

* (no specification provided)

Material Description

Gray, Reddish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3668 D_{85}= 0.3304 D_{60}= 0.2305
D_{50}= 0.2033 D_{30}= 0.1524 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1A-05 S-13 45-47

Date: 9-28-23

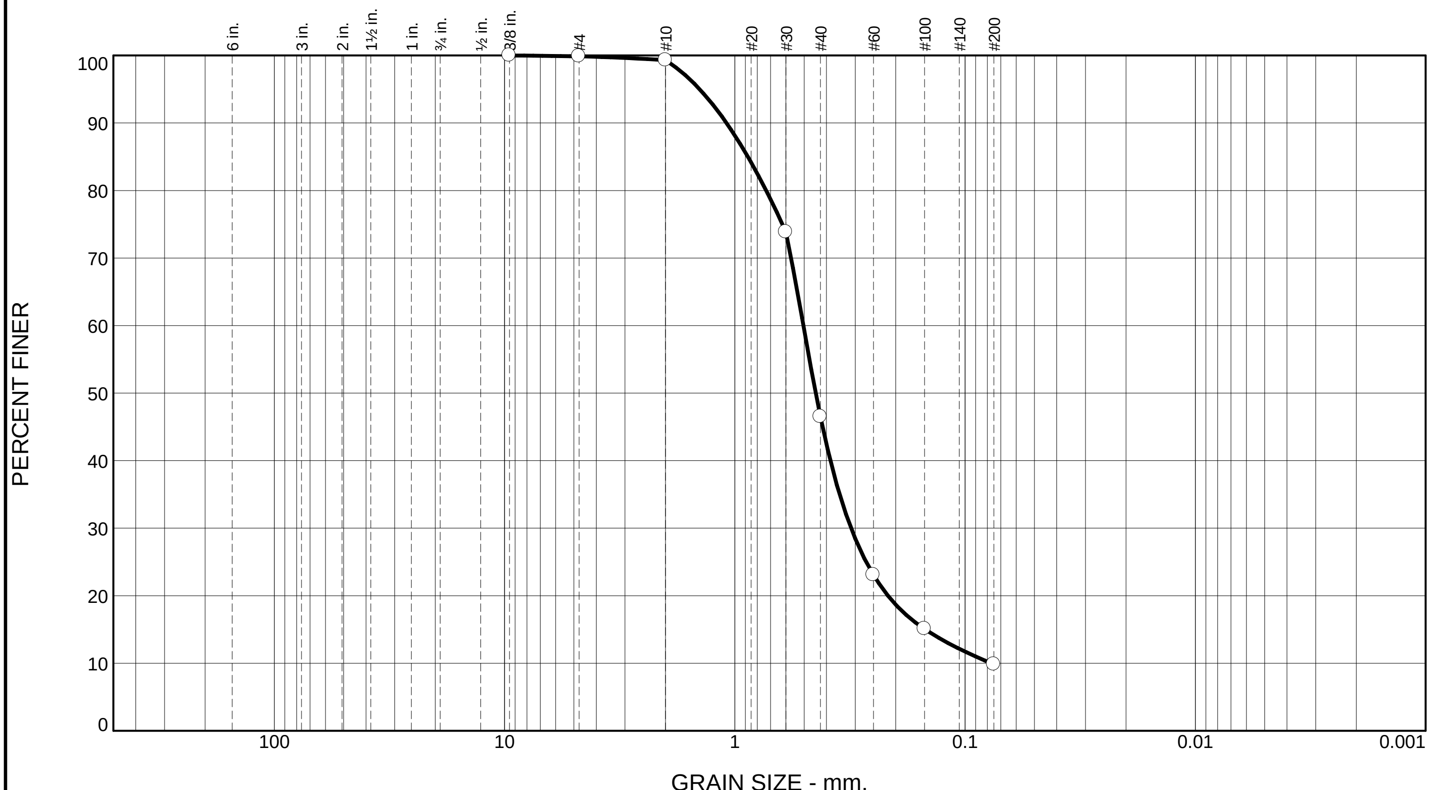
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.6	52.8	36.7	9.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	99.9		
#10	99.3		
#30	73.9		
#40	46.5		
#60	23.1		
#100	15.1		
#200	9.8		

* (no specification provided)

Material Description

Dark Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.0872 D_{85}= 0.8780 D_{60}= 0.5040
D_{50}= 0.4454 D_{30}= 0.3129 D_{15}= 0.1488
D_{10}= 0.0770 C_u= 6.54 C_c= 2.52

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1A-05 S-20 75-77

Date: 9-28-23

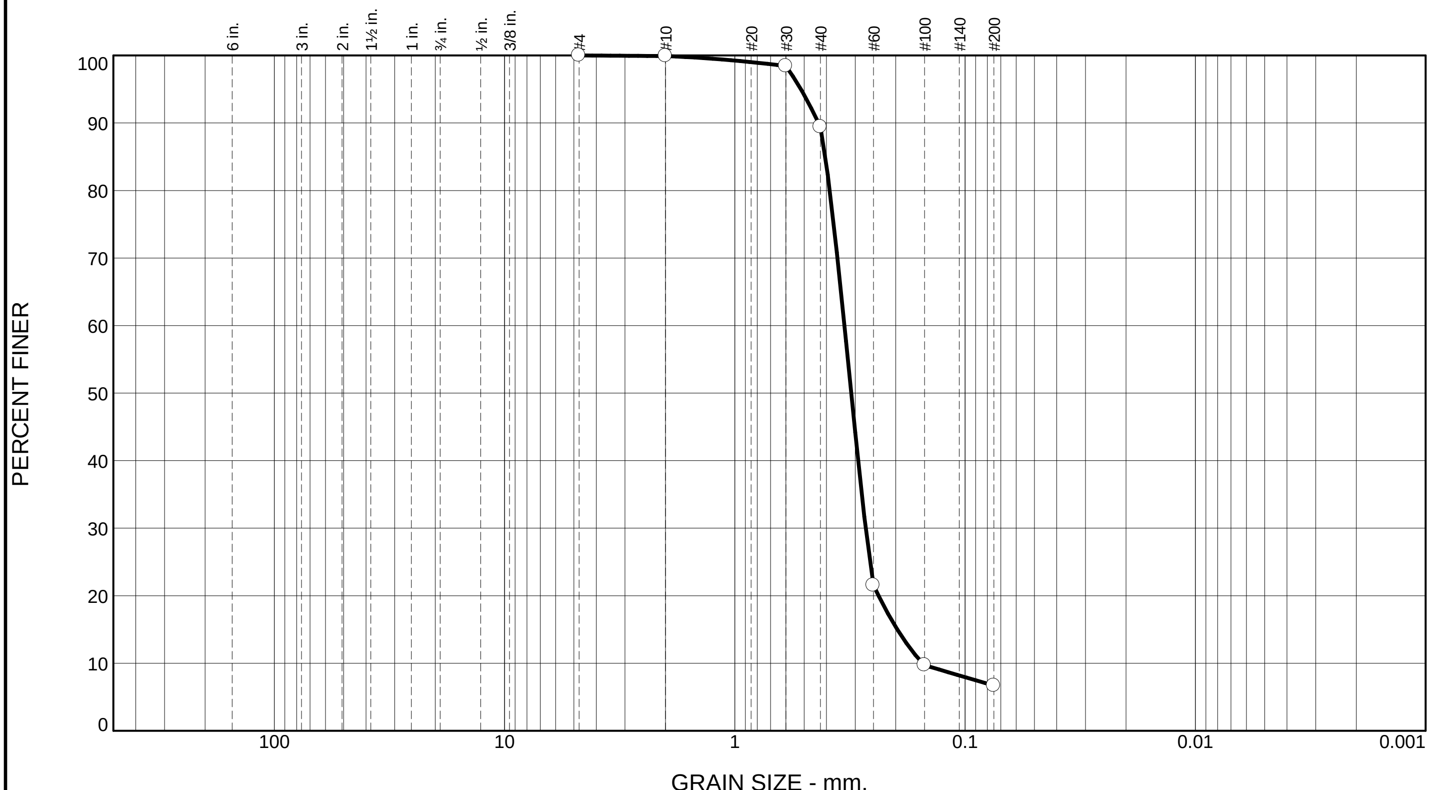
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	10.5	82.7	6.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#30	98.4		
#40	89.4		
#60	21.5		
#100	9.7		
#200	6.7		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.4329 D_{85}= 0.4051 D_{60}= 0.3342
D_{50}= 0.3124 D_{30}= 0.2702 D_{15}= 0.1970
D_{10}= 0.1529 C_u= 2.19 C_c= 1.43

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1A-05 S-24 95-97

Date: 9-28-23

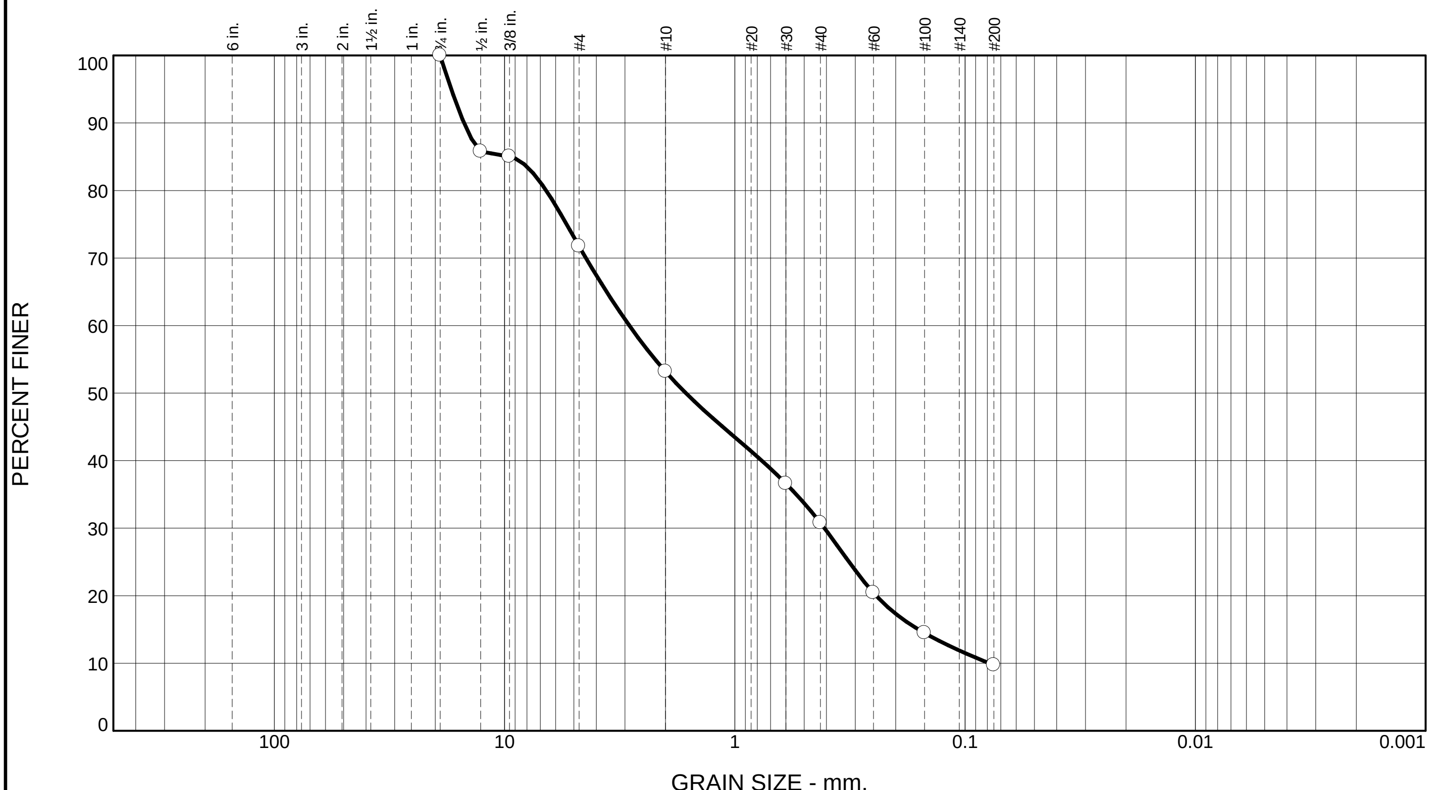
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	28.2	18.6	22.4	21.1	9.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	85.8		
.375	85.0		
#4	71.8		
#10	53.2		
#30	36.6		
#40	30.8		
#60	20.4		
#100	14.5		
#200	9.7		

* (no specification provided)

Material Description

Grayish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 15.0139 D_{85}= 9.4722 D_{60}= 2.8721
D_{50}= 1.6318 D_{30}= 0.4081 D_{15}= 0.1593
D_{10}= 0.0787 C_u= 36.51 C_c= 0.74

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1A-06 S-4 10-12

Date: 9-28-23

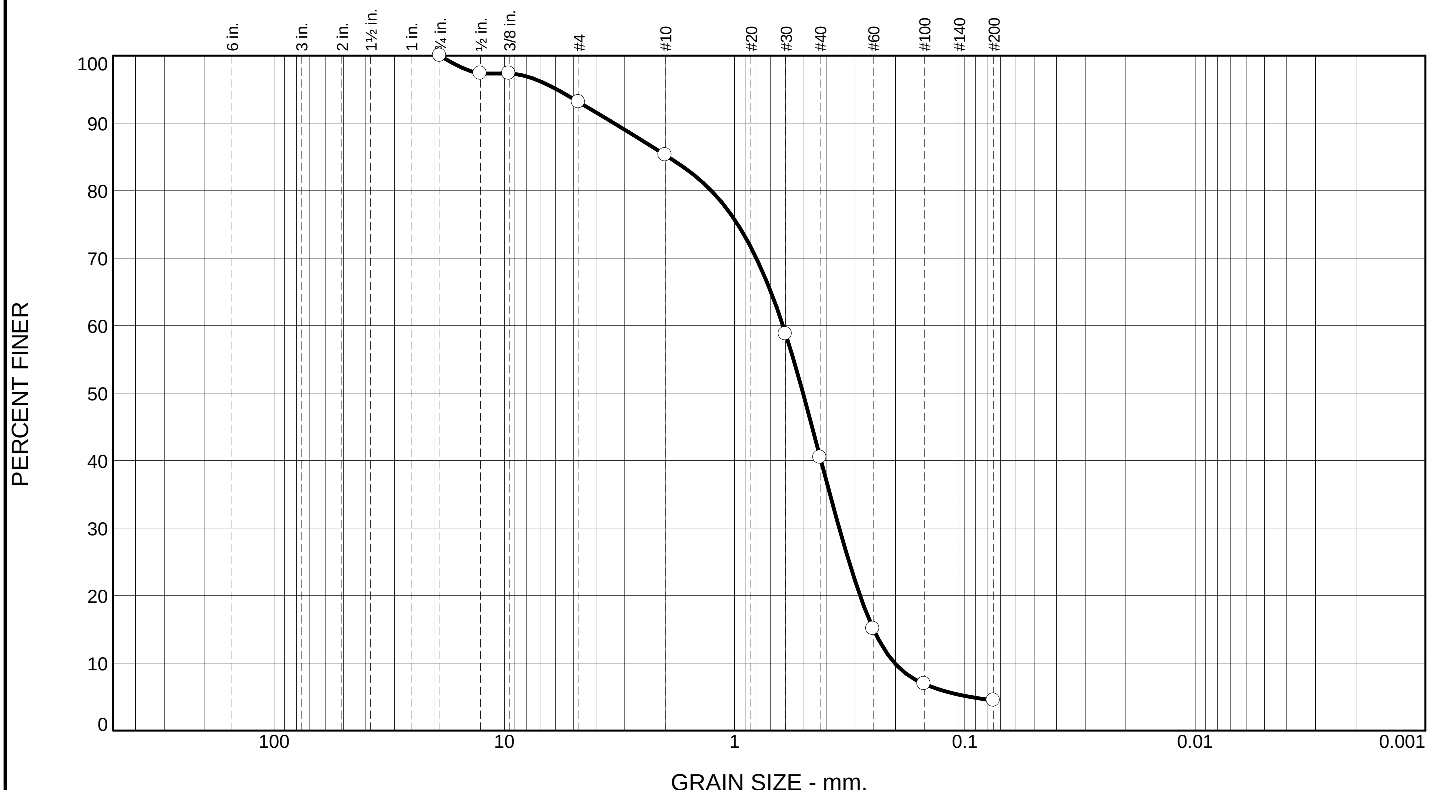
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.9	7.8	44.8	36.1	4.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	97.4		
.375	97.4		
#4	93.1		
#10	85.3		
#30	58.8		
#40	40.5		
#60	15.1		
#100	6.9		
#200	4.4		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 3.3443 D_{85}= 1.9433 D_{60}= 0.6164
D_{50}= 0.5046 D_{30}= 0.3513 D_{15}= 0.2494
D_{10}= 0.2019 C_u= 3.05 C_c= 0.99

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1A-06 S-7 25-27

Date: 9-28-23

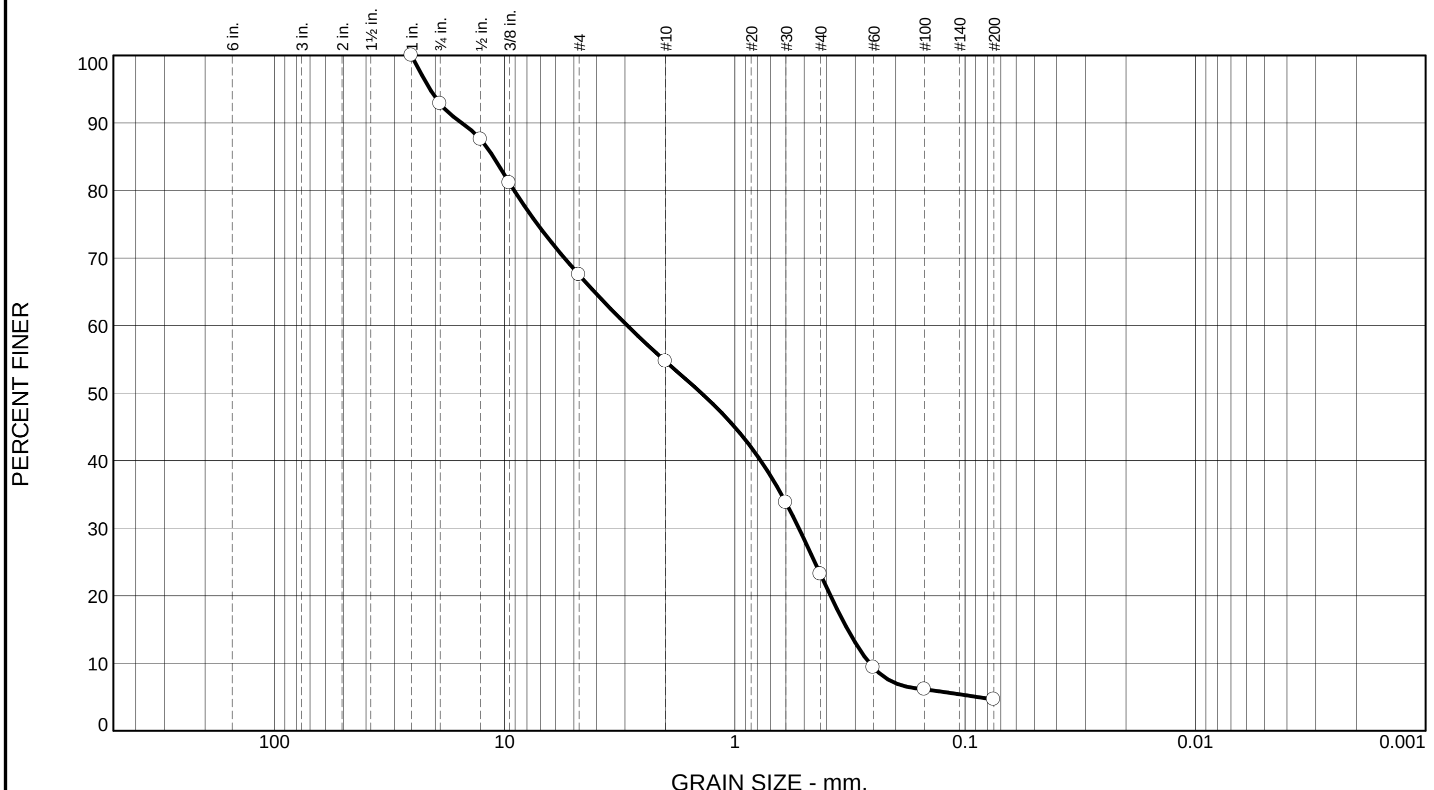
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.1	25.4	12.8	31.5	18.6	4.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	92.9		
.5	87.6		
.375	81.1		
#4	67.5		
#10	54.7		
#30	33.8		
#40	23.2		
#60	9.4		
#100	6.1		
#200	4.6		

* (no specification provided)

Material Description

Pale Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 15.3406 D_{85}= 11.1981 D_{60}= 2.9302
D_{50}= 1.3975 D_{30}= 0.5275 D_{15}= 0.3236
D_{10}= 0.2598 C_u= 11.28 C_c= 0.37

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1A-07 S-1 4-6

Date: 9-28-23

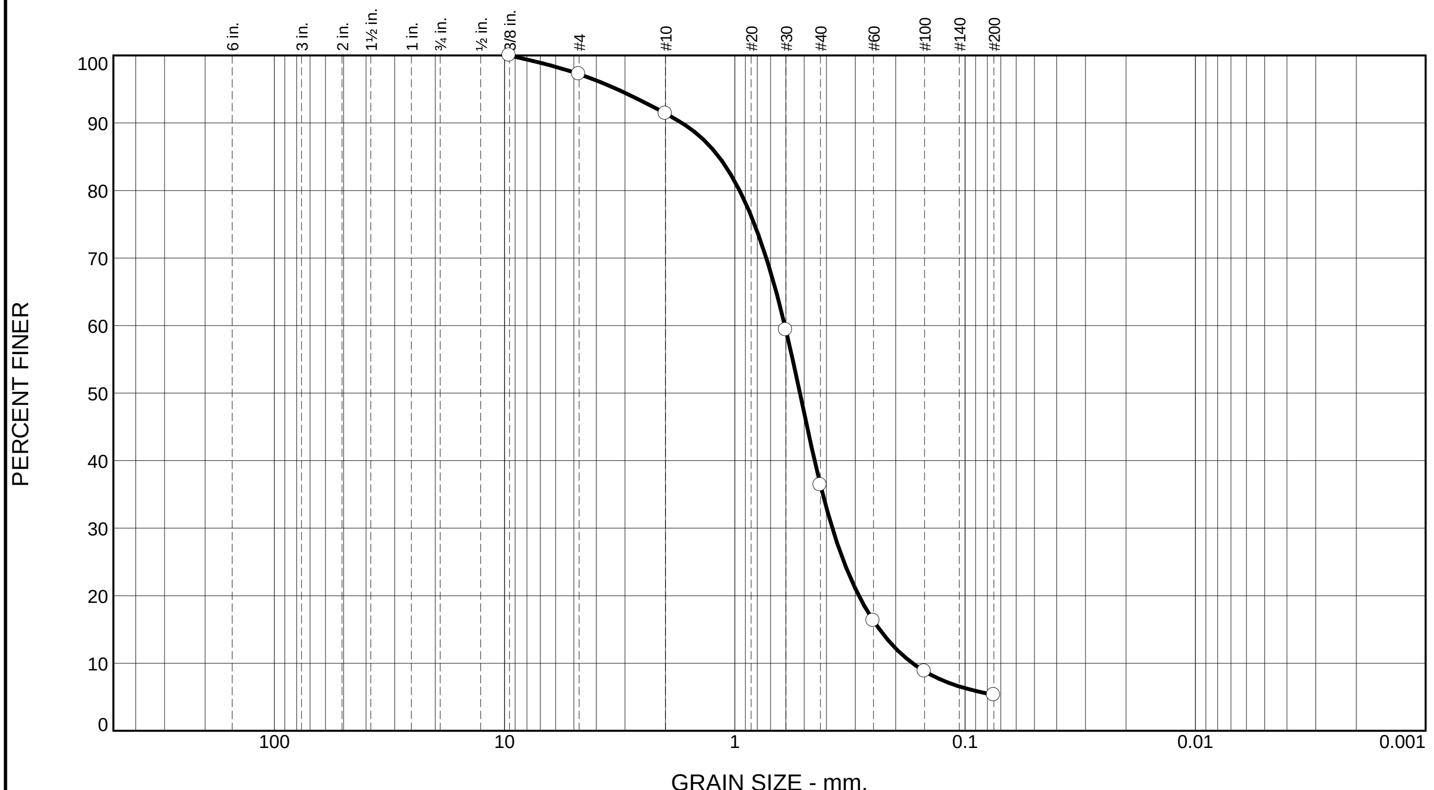
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.8	5.8	55.0	31.1	5.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	97.2		
#10	91.4		
#30	59.3		
#40	36.4		
#60	16.3		
#100	8.8		
#200	5.3		

* (no specification provided)

Material Description

Dark Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.6973 D_{85}= 1.1738 D_{60}= 0.6063
D_{50}= 0.5217 D_{30}= 0.3773 D_{15}= 0.2351
D_{10}= 0.1692 C_u= 3.58 C_c= 1.39

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1A-07 S-4 10-12

Date: 9-28-23

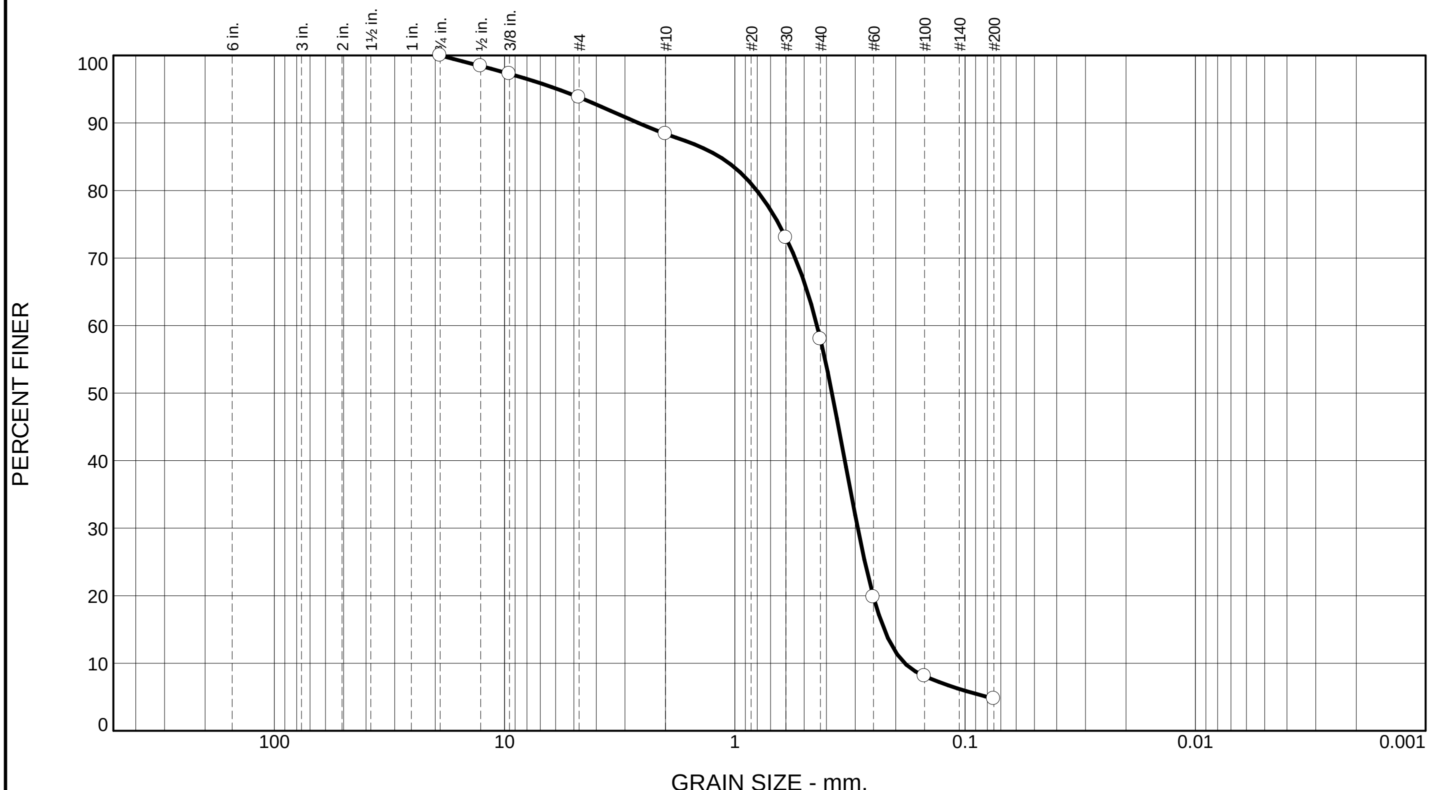
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.2	5.4	30.4	53.3	4.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	98.4		
.375	97.3		
#4	93.8		
#10	88.4		
#30	73.0		
#40	58.0		
#60	19.8		
#100	8.1		
#200	4.7		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 2.6222 D_{85}= 1.1645 D_{60}= 0.4393
D_{50}= 0.3786 D_{30}= 0.2926 D_{15}= 0.2245
D_{10}= 0.1830 C_u= 2.40 C_c= 1.07

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1A-07 S-8 30-32

Date: 9-28-23

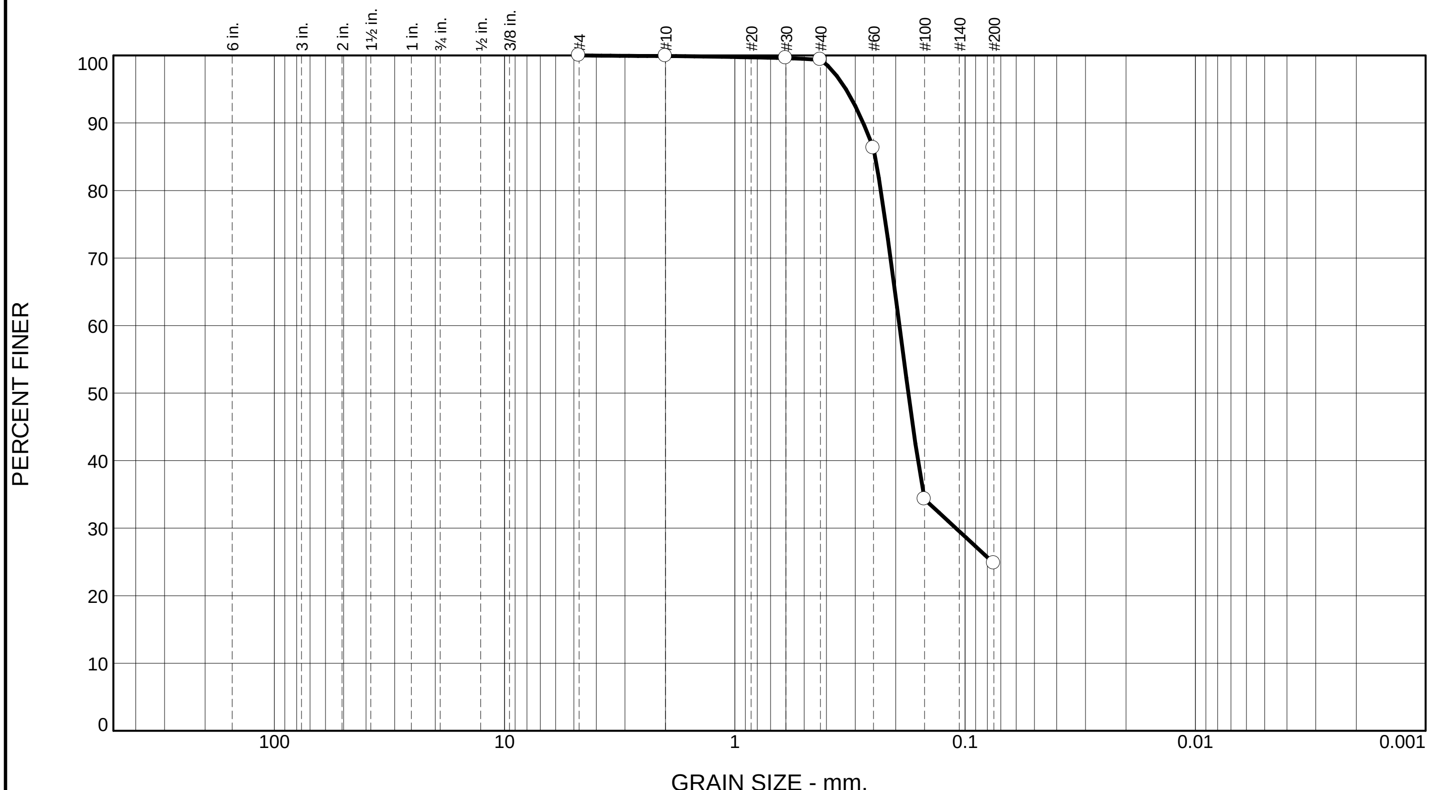
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	0.5	74.6	24.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#30	99.6		
#40	99.4		
#60	86.3		
#100	34.3		
#200	24.8		

* (no specification provided)

Material Description

Gray, Reddish Yellow

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2769 D_{85}= 0.2459 D_{60}= 0.1929
D_{50}= 0.1765 D_{30}= 0.1097 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1A-07 S-11 45-47

Date: 9-28-23

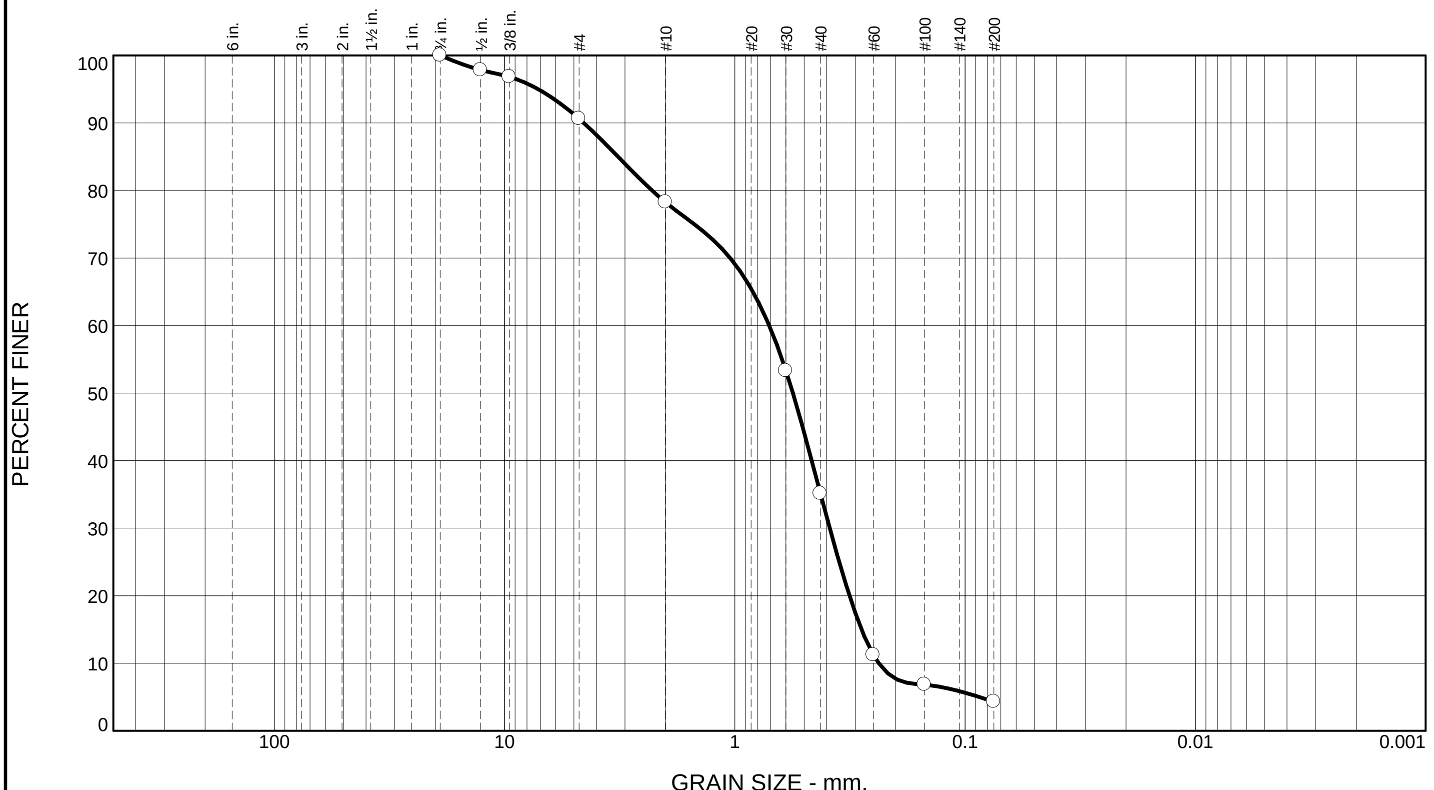
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	9.4	12.3	43.2	30.8	4.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	97.8		
.375	96.8		
#4	90.6		
#10	78.3		
#30	53.3		
#40	35.1		
#60	11.2		
#100	6.8		
#200	4.3		

* (no specification provided)

Material Description

Dark Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 4.5279 D_{85}= 3.2151 D_{60}= 0.7091
D_{50}= 0.5596 D_{30}= 0.3872 D_{15}= 0.2818
D_{10}= 0.2372 C_u= 2.99 C_c= 0.89

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1A-08 S-3 10-12

Date: 9-28-23

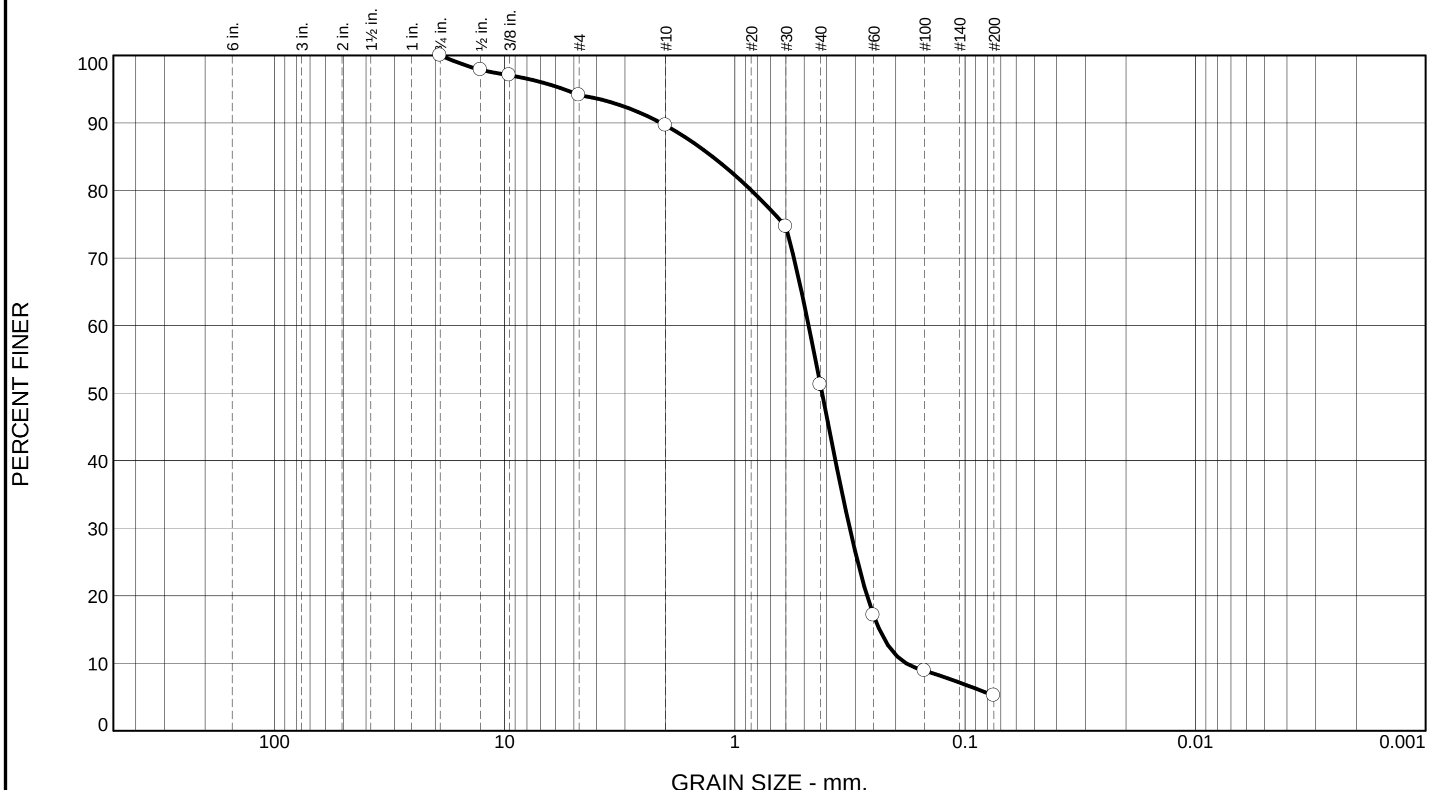
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.9	4.5	38.3	46.1	5.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	97.9		
.375	97.1		
#4	94.1		
#10	89.6		
#30	74.7		
#40	51.3		
#60	17.1		
#100	8.9		
#200	5.2		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 2.0889 D_{85}= 1.2483 D_{60}= 0.4781
D_{50}= 0.4180 D_{30}= 0.3171 D_{15}= 0.2357
D_{10}= 0.1806 C_u= 2.65 C_c= 1.16

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1A-08 S-6 25-27

Date: 9-28-23

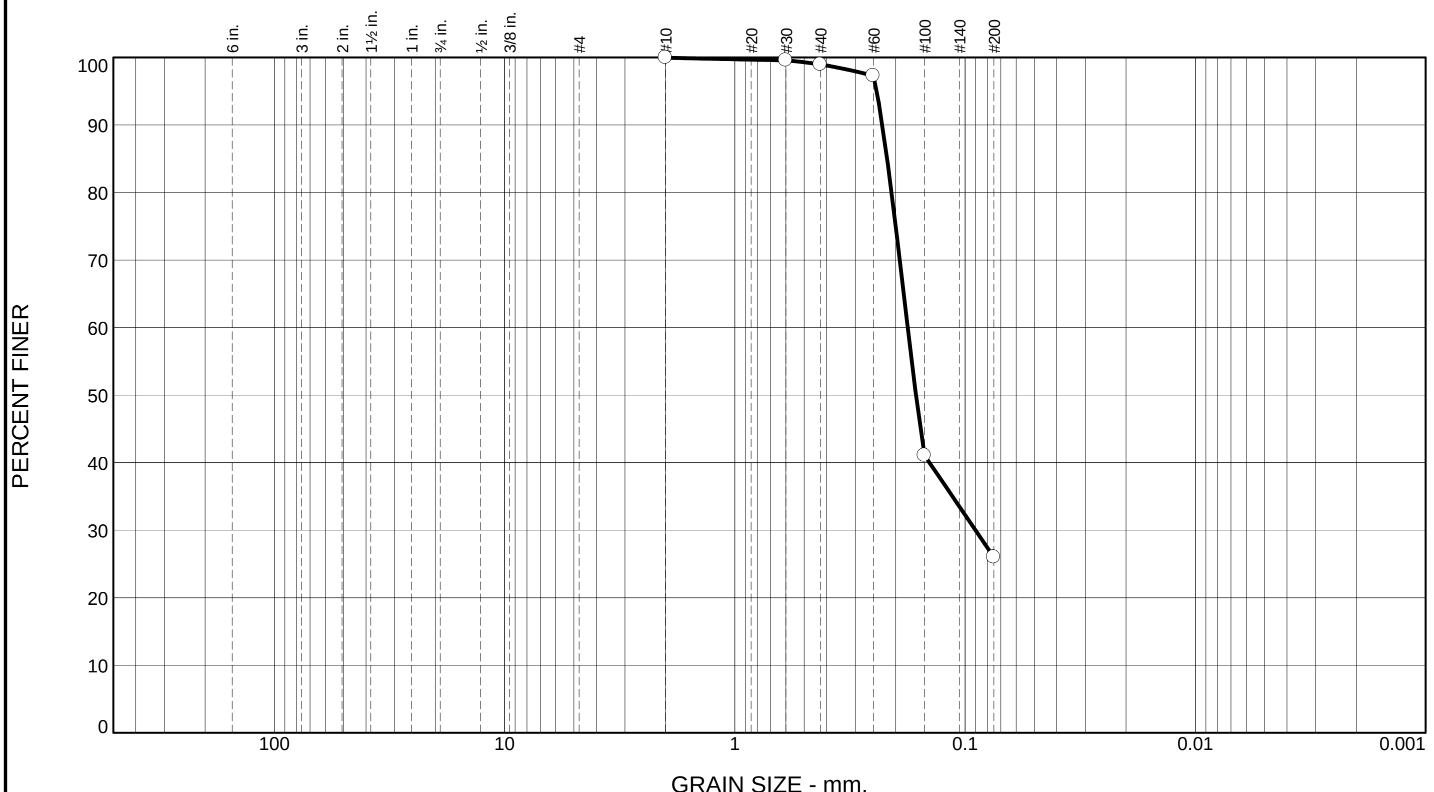
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
				1.0	73.0	26.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#30	99.6		
#40	99.0		
#60	97.3		
#100	41.1		
#200	26.0		

* (no specification provided)

Material Description

Gray, Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2288 D_{85}= 0.2180 D_{60}= 0.1776
D_{50}= 0.1634 D_{30}= 0.0902 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1A-08 S-9 40-42

Date: 9-28-23

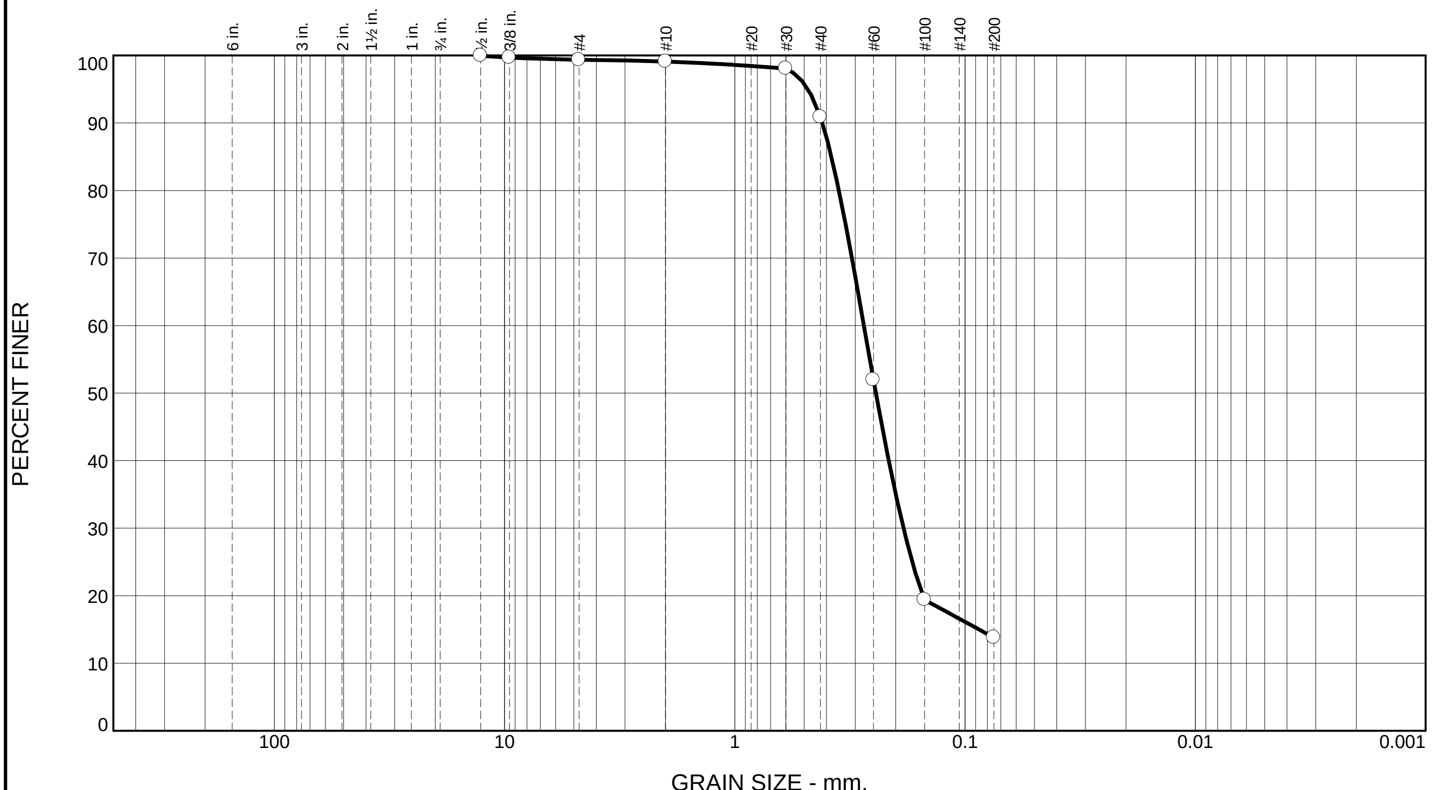
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			0.2	8.2	77.1	13.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	99.7		
#4	99.3		
#10	99.1		
#30	98.1		
#40	90.9		
#60	52.0		
#100	19.4		
#200	13.8		

* (no specification provided)

Material Description

Gray, Reddish Yellow

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.4170 D_{85}= 0.3807 D_{60}= 0.2752
D_{50}= 0.2441 D_{30}= 0.1852 D_{15}= 0.0870
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1A-08 S-12 50-52

Date: 9-28-23

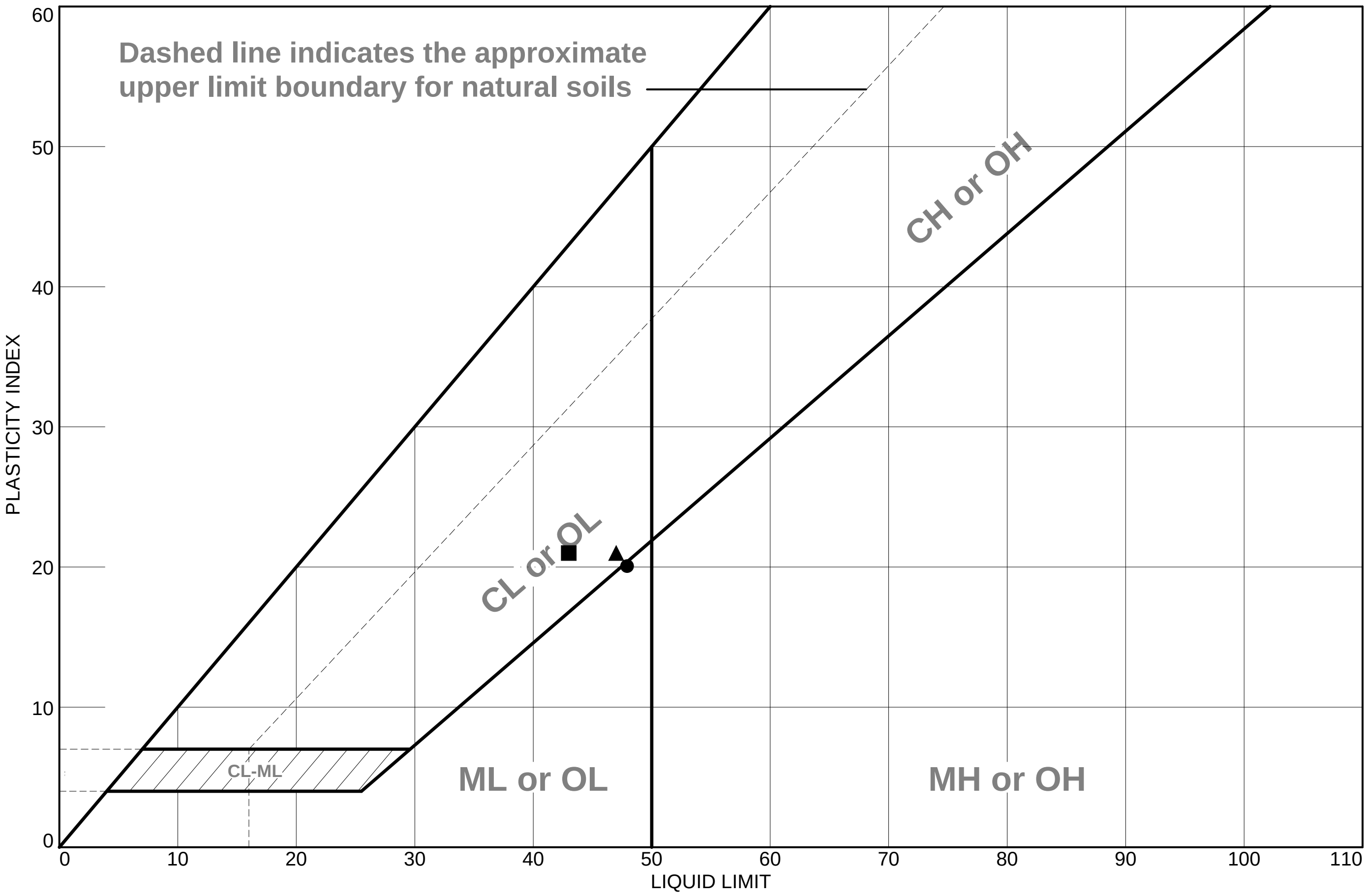
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: JK **Checked By:** KP

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Reddish Brown Clay & Silt, trace cmf Sand (visual)	48	28	20			
■	Pale Brown Clay & Silt, trace cmf Sand (visual)	43	22	21			
▲	Black, Pale Brown Clay & Silt, trace cmf Sand (visual)	47	26	21			

Project No. 869 **Client:** Langan Engineering

Project: Sands New York , Hempstead, NY

Project# not provided

● **Sample Number:** LB1A-02 S-8B 31-32

■ **Sample Number:** LB1A-05 S-16 57-59

▲ **Sample Number:** LB1A-06 S-14 54-56

Remarks:

●9-28-23

RSA Geolab

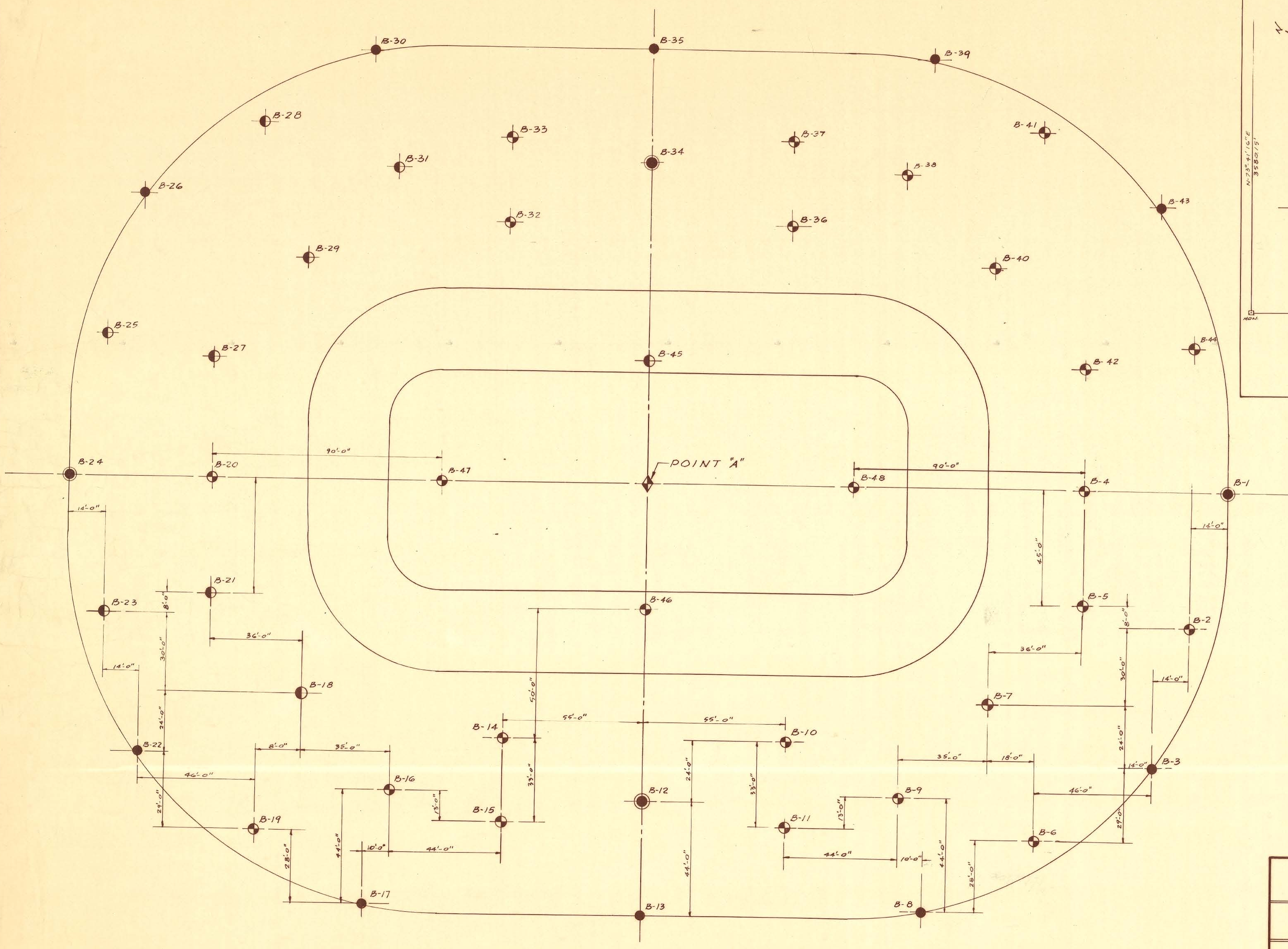
Union, New Jersey

Figure

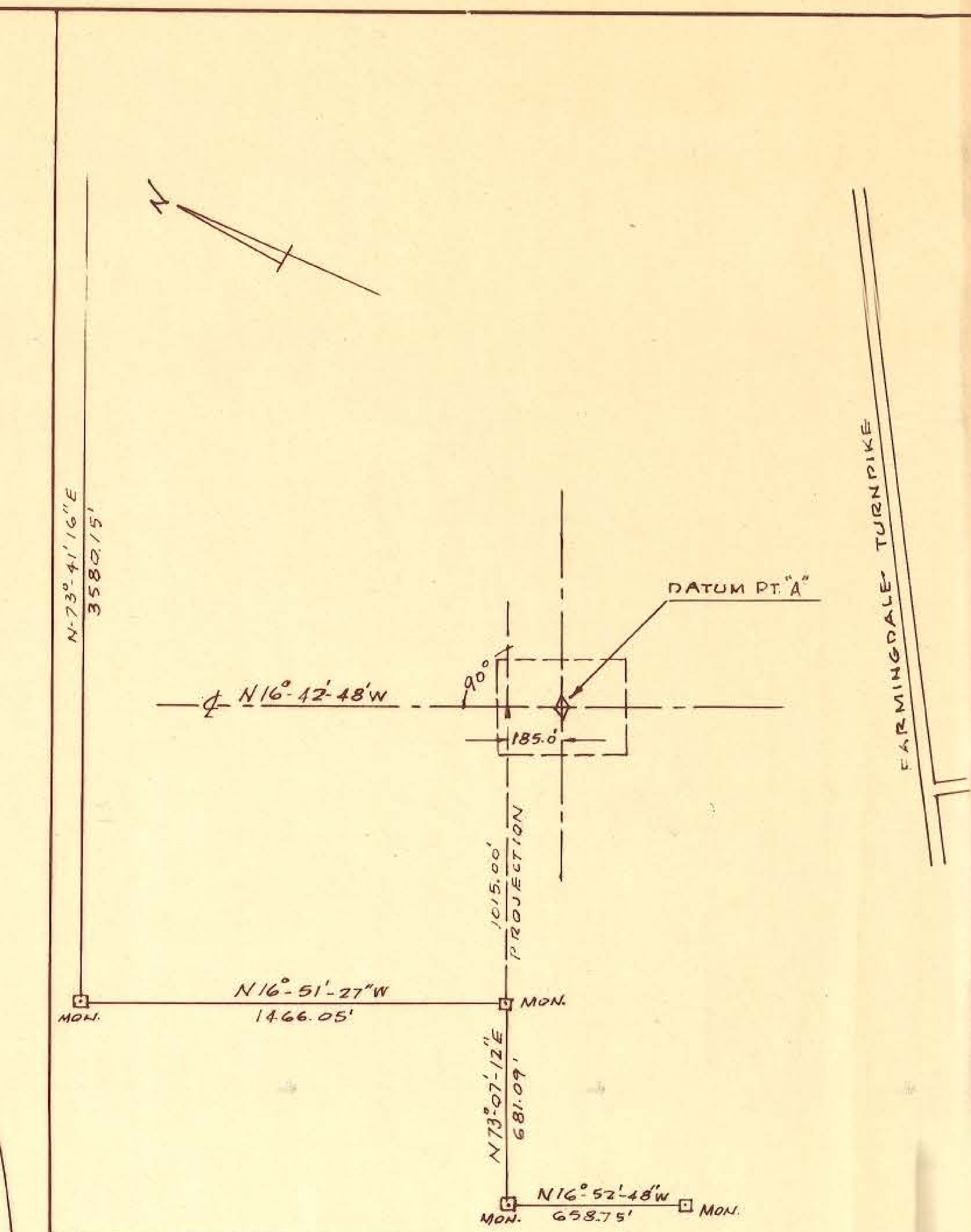
Tested By: NC **Checked By:** KP

APPENDIX C

(1966 HISTORICAL BORING LOGS BY OTHERS)



SCALE: 1/16 = 1'-0"



SITE PLAN

SCALE: 1" = 400'

SEE MITCHEL FIELD SURVEY DATED 10/63.

LEGEND

50.0' Below Datum.

76.5' Below Datum.

101.5' Below Datum

Water Hole 101.5' Below Datum.

Boring samples delivered to Nassau County Museum in Seaford Sept. 30, 1966.

See water readings sheet 7 of 7.

J.F.K. CULTURAL CENTER
COLISEUM
MITCHEL FIELD, L.I.

WELTON BECKET F.A.I.A.
ARCHITECT
300 PARK AVENUE NEW YORK, N.Y.

FARKAS & BARRON
CONSULTING ENGINEERS
301 WEST 23rd. STREET NEW YORK, N.Y.

BORING PLAN

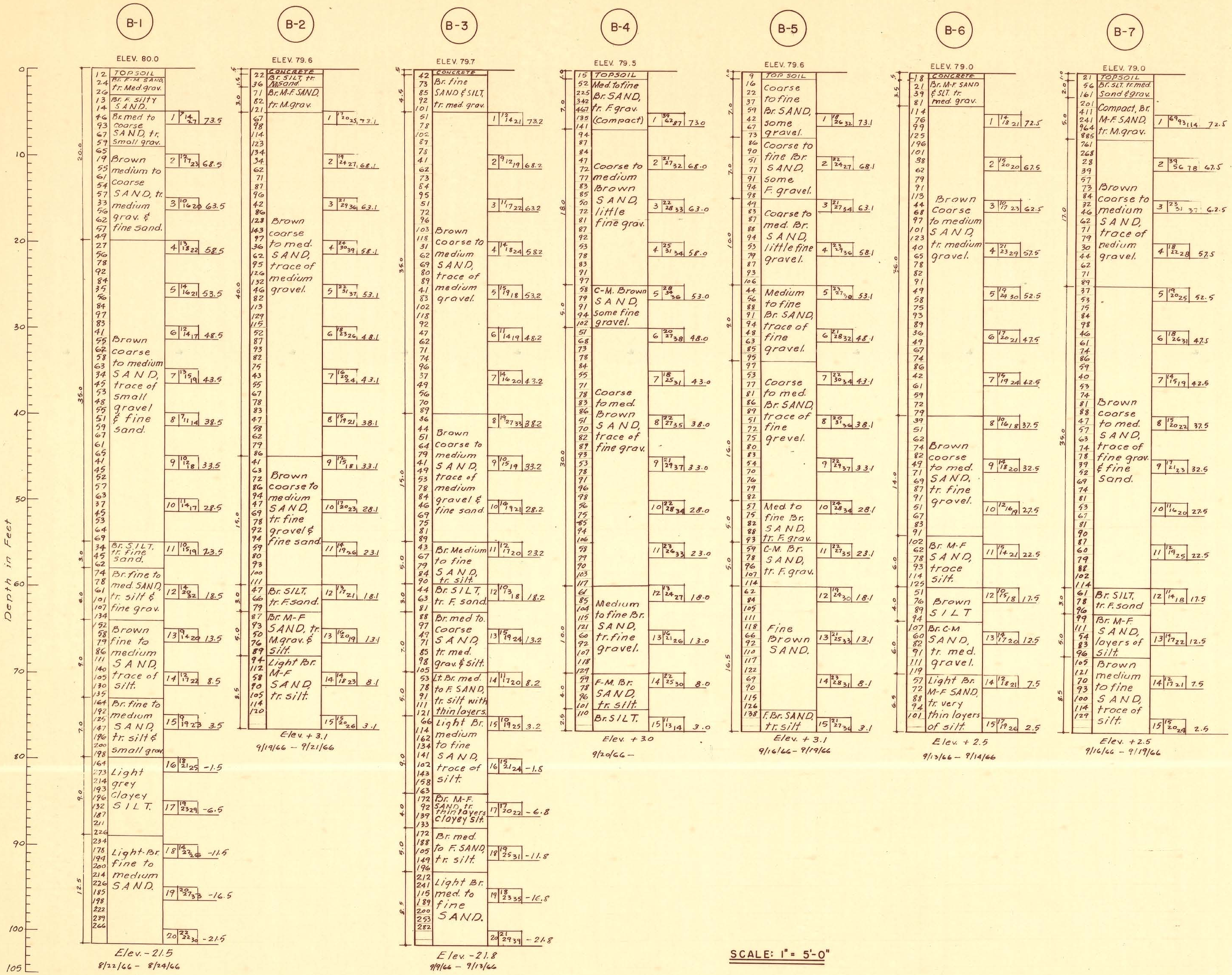
BORINGS BY RELIABLE DRILLING CORP.
34-16 61st. STREET WOODSIDE 77, N.Y.

LICENSED PROFESSIONAL ENGINEER · JULIUS D. EASTMAN · 38358 · STATE OF NEW YORK

Julius D. Eastman, P.E.

SCALE: AS SHOWN	BY: J.E./J.C.	JOB No. 66-47	DWG. No. 1 OF 7 DWGS.	DATE: 9/66

1



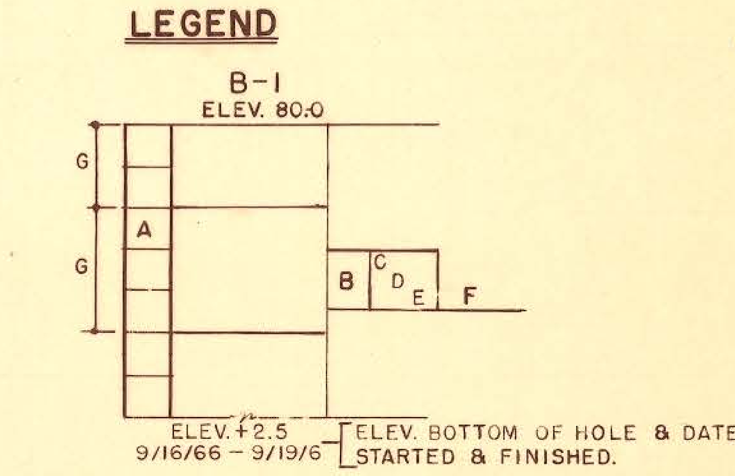
SCALE: 1" = 5'-0"

GENERAL NOTES

1. ELEVATIONS ARE BASED ON MITCHEL FIELD DATUM, BENCH MARK F.M. 16, ELEVATION 86.529 WHICH IS A SQUARE CUT ON CONCRETE APRON 3FT. SOUTH OF NORTH EDGE OF APRON AND WHICH LIES APPROXIMATELY MIDWAY BETWEEN HANGARS NO. 3 & 4 & APPROX. 500' THEREFROM.
2. BORING LOCATIONS ARE ALL TAKEN FROM ESTABLISHED POINT "A" FROM PROPERTY MAP AT MITCHEL FIELD, DATED 10/63 AND SHOWN IN PART ON SHEET NO. 1. POINT "A" IS LATITUDE 40°-43'-30" N AND LONGITUDE 73°-36'-00" W.
3. DRILLING FOREMAN__________ __________

SOILS ENGINEER__________

LEGEND



A — NUMBER OF BLOWS OF 300 lb HAMMER REQUIRED TO DRIVE A 3 IN. CASING ONE FOOT WHEN FALLING 18"

B — SAMPLE NUMBER

C, D, E — NUMBER OF BLOWS OF A 140 POUND HAMMER REQUIRED TO DRIVE A 2" SPLIT SAMPLER 6" WHEN FALLING 30 INCHES.

F — ELEVATION OF BOTTOM OF SAMPLER AT FINISH OF DRIVING.

G — THICKNESS OF STRATUM IN FEET.

CASING O.D. = 3" I.D. = 2½"

SAMPLER O.D. = 2" I.D. = 1⅜"

J.F.K. CULTURAL CENTER
COLISEUM
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FARKAS & BARRON
CONSULTING ENGINEERS
301 WEST 23rd. STREET NEW YORK, N.Y.

BORING SECTIONS

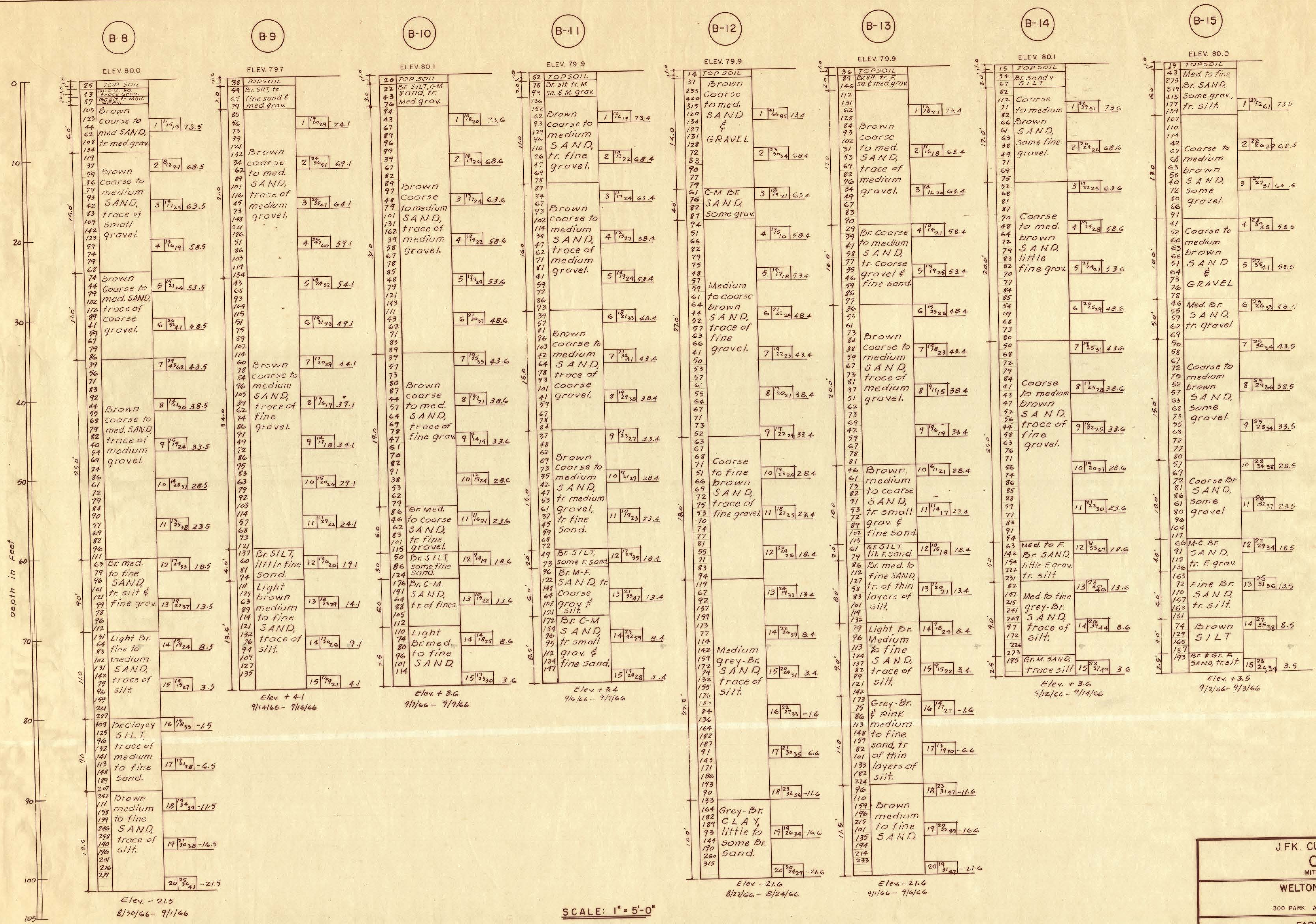
BORINGS BY RELIABLE DRILLING CORP.
34-16 61st. STREET WOODSIDE 77, N.Y.

Julius Rosenstein, P.E.

SCALE: AS SHOWN	BY:	JOB No.	DWG. No. 2 OF 7 DWGS.	DATE 9/66

I259-2

2



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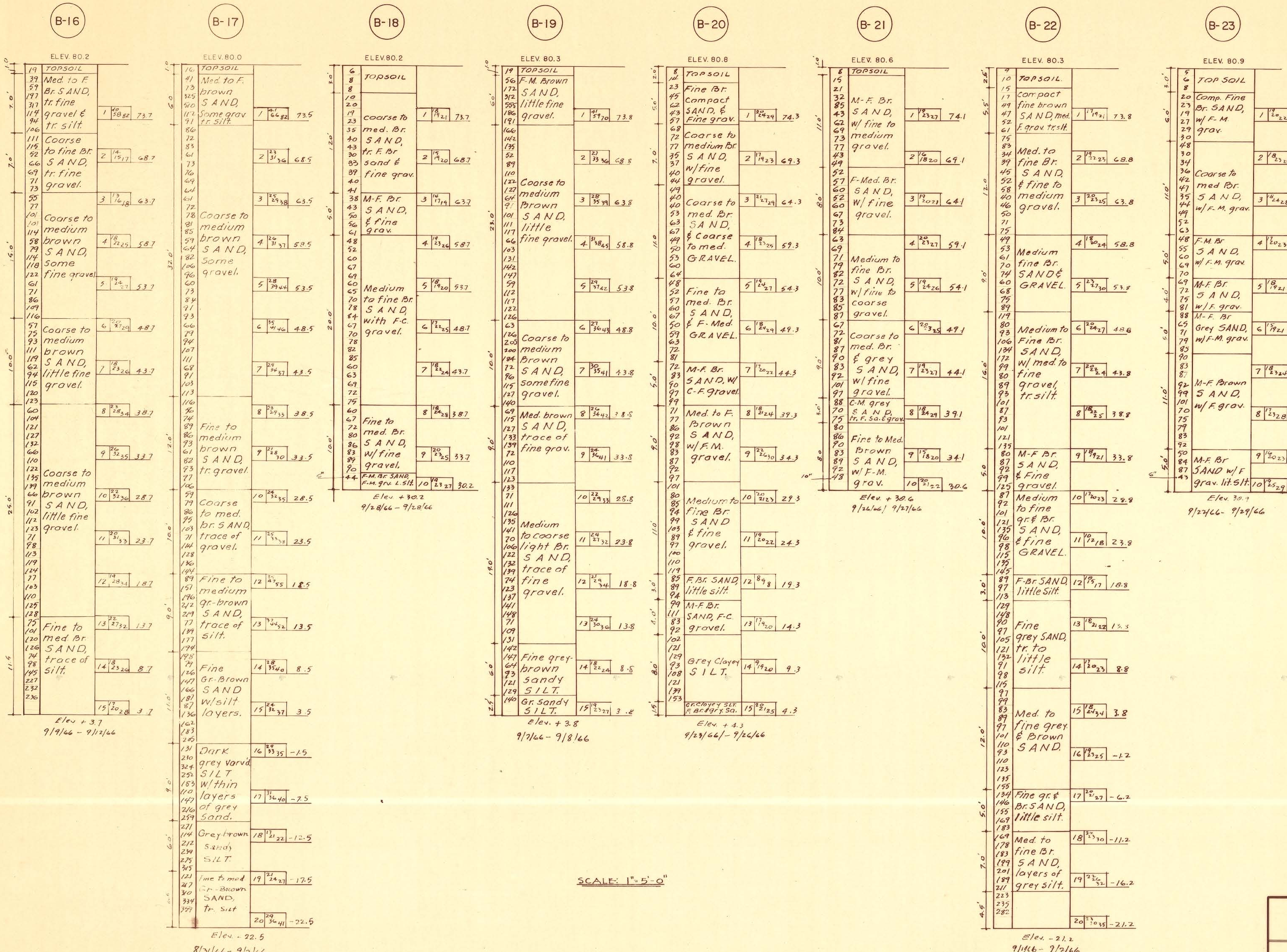
CONSULTING ENGINEERS
301 WEST 23rd. STREET NEW YORK, N.Y.

BORING SECTIONS

BORINGS BY RELIABLE DRILLING CORP.
34-16 61st. STREET WOODSIDE 77, N.Y.

SCALE: AS SHOWN | BY: | JOB No. 6457 | DWG No. 3 OF 7 DWGS. | DATE: 9/66

3



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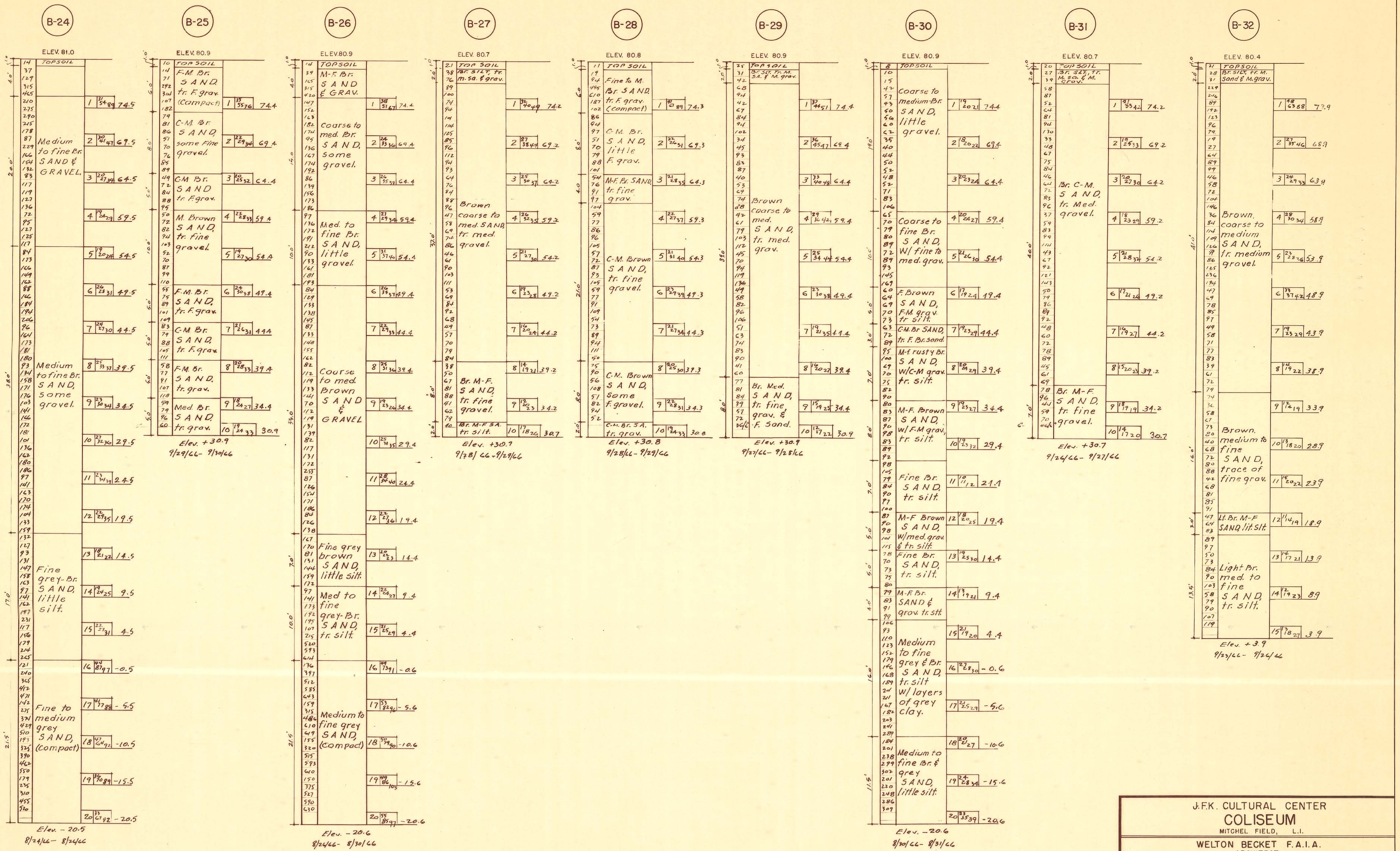
FARKAS & BARRON
CONSULTING ENGINEERS
301 WEST 23rd. STREET NEW YORK, N.Y.

BORING SECTIONS

BORINGS BY RELIABLE DRILLING CORP.
34-16 61st. STREET WOODSIDE 77, N.Y.

John [illegible], P.E.

SCALE: AS SHOWN	BY: [illegible]	JOB No. 66-17	DWG. No. 4 OF 7 DWGS.	DATE: 9/66



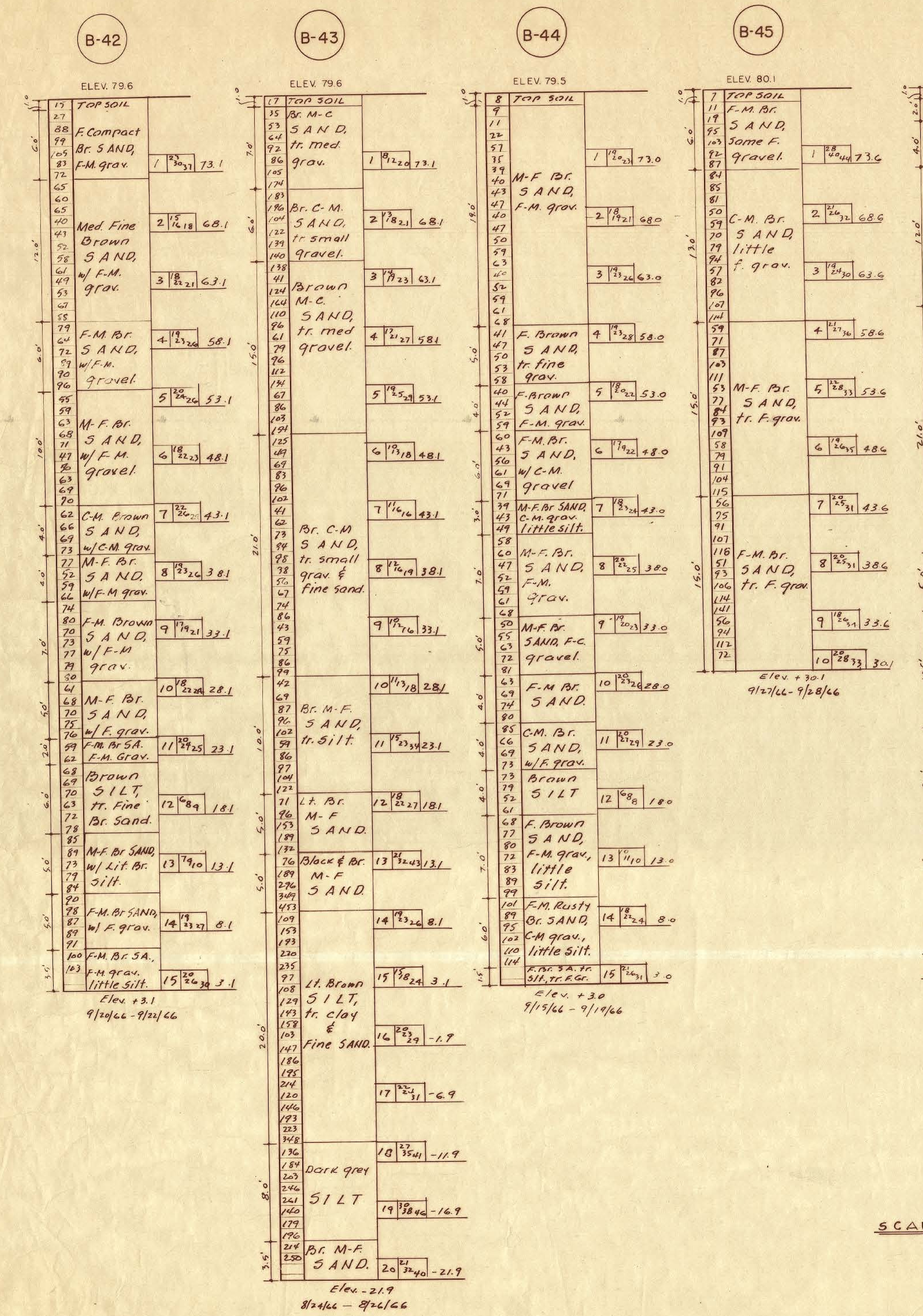
SCALE: 1" = 5'-0"

J.F.K. CULTURAL CENTER **COLISEUM** MITCHEL FIELD, L.I.
WELTON BECKET F.A.I.A. ARCHITECT 300 PARK AVENUE NEW YORK, N.Y.
FARKAS & BARRON CONSULTING ENGINEERS 301 WEST 23rd. STREET NEW YORK, N.Y.
BORING SECTIONS
BORINGS BY RELIABLE DRILLING CORP. 34-16 61st. STREET WOODSIDE 77, N.Y.
SCALE: AS SHOWN BY: [illegible] JOB No. [illegible] DWG. No. 5 OF 7 DWGS. DATE: 9/66

LICENSED PROFESSIONAL ENGINEER 38358 STATE OF NEW YORK

Julius [illegible], P.E.

5



SCALE: 1" = 5'-0"

DAILY WATER READINGS

DATE	B-1 A.M.	B-1 P.M.
8/25/66	50.7	50.7
26/66	50.9	51.0
29/66	50.8	50.9
30/66	50.9	50.7
31/66	50.7	50.7
9/1/66	50.6	50.5
9/2/66	50.3	50.3
9/6/66	50.7	50.6
9/7/66	50.6	50.5
9/8/66	50.4	50.4
9/9/66	50.2	50.2
9/12/66	50.2	50.2
9/13/66	50.3	50.3
9/14/66	50.2	50.2
9/15/66	50.2	50.2
9/16/66	50.2	50.2
9/19/66	50.4	50.3
9/20/66	50.2	50.2
9/21/66	50.2	50.2
9/22/66	50.1	50.1
9/23/66	50.0	50.0
9/26/66	50.7	50.7
9/27/66	50.6	50.5
9/28/66	50.4	50.5
9/29/66	50.3	50.2
9/30/66	50.2	50.2

DATE	B-12 A.M.	B-12 P.M.
8/25/66	50.9	50.9
26	50.7	50.9
29	50.9	50.8
30	50.8	50.6
31	50.6	50.7
9/1/66	50.6	50.6
2	50.8	50.5
6	50.4	50.3
7	49.9	49.9
8	49.8	49.7
9	49.7	49.8
12	49.9	49.9
13	50.1	49.9
14	50.8	49.8
15	49.9	49.9
16	50.0	49.8
19	49.9	49.8
20	49.7	49.7
21	49.9	49.7
22	49.6	49.8
23	49.7	49.7
26	49.9	49.7
27	49.7	49.7
28		49.7
29	49.6	
30	49.6	

DATE	B-24 A.M.	B-24 P.M.
8/29/66	51.6	51.7
30	51.7	51.5
31	50.9	50.7
9/1/66	50.7	50.6
2	50.6	50.4
6	50.3	50.3
7	50.3	50.2
8	50.2	50.3
9	50.3	50.2
12	50.3	50.3
13	50.2	50.3
14	50.2	50.3
15	50.3	50.3
16	50.4	50.3
19	50.3	50.2
20	50.2	50.4
21	50.3	50.4
22	50.5	50.5
23	50.4	50.4
26	50.3	50.4
27	50.5	50.4
28	50.4	50.3
29	50.3	50.3
30	50.2	

DATE	B-34 A.M.	B-34 P.M.
8/26/66	51.3	51.3
29	50.6	50.6
30	50.6	50.6
31	50.6	50.6
9/1/66	50.6	50.6
2	50.6	50.6
3		
4		
5		
6	50.5	50.5
7	50.5	50.5
8	50.5	50.6
12	50.6	50.6
13	50.6	50.6
14	50.6	50.6
15	50.5	50.5
16	50.5	50.5
19	50.6	50.5
20	50.5	50.5
21	50.5	50.5
22	50.5	50.5
23	50.5	50.5
26	50.5	50.5
27	50.5	50.5
28	50.5	50.5
29	50.5	50.5
30	50.5	50.5

LICENSED PROFESSIONAL ENGINEER · JULIUS D. EASTMAN · 38358 · STATE OF NEW YORK

Julius D. Eastman, P.E.

J.F.K. CULTURAL CENTER
COLISEUM
MITCHEL FIELD, L.I.

WELTON BECKET F.A.I.A.
ARCHITECT
300 PARK AVENUE NEW YORK, N.Y.

FARKAS & BARRON
CONSULTING ENGINEERS
301 WEST 23rd. STREET NEW YORK

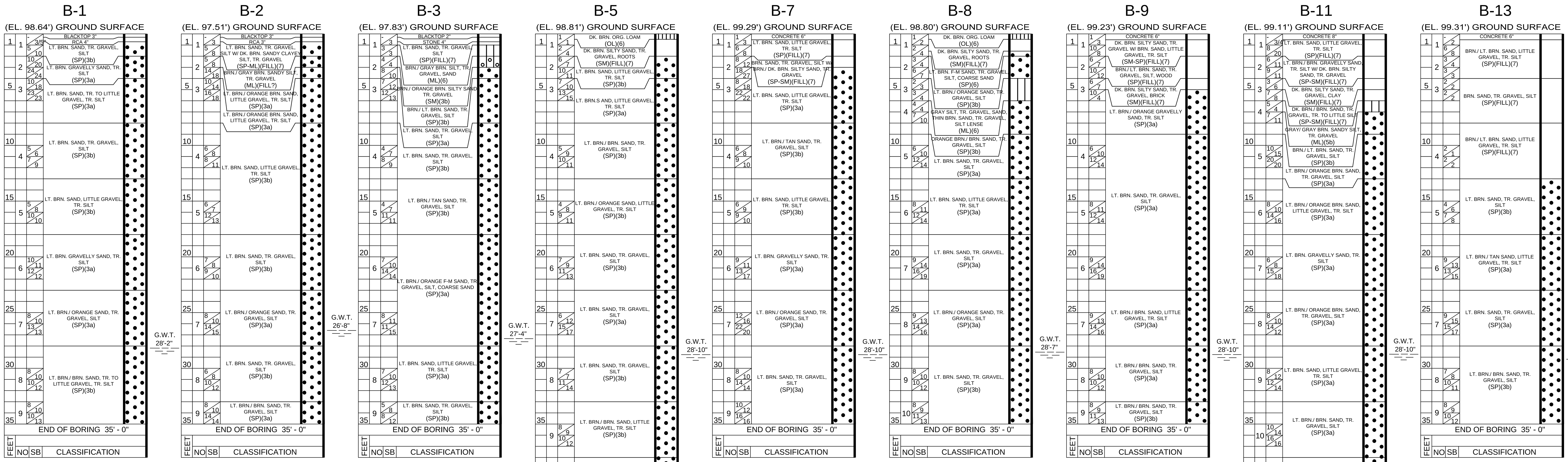
BORING SECTIONS

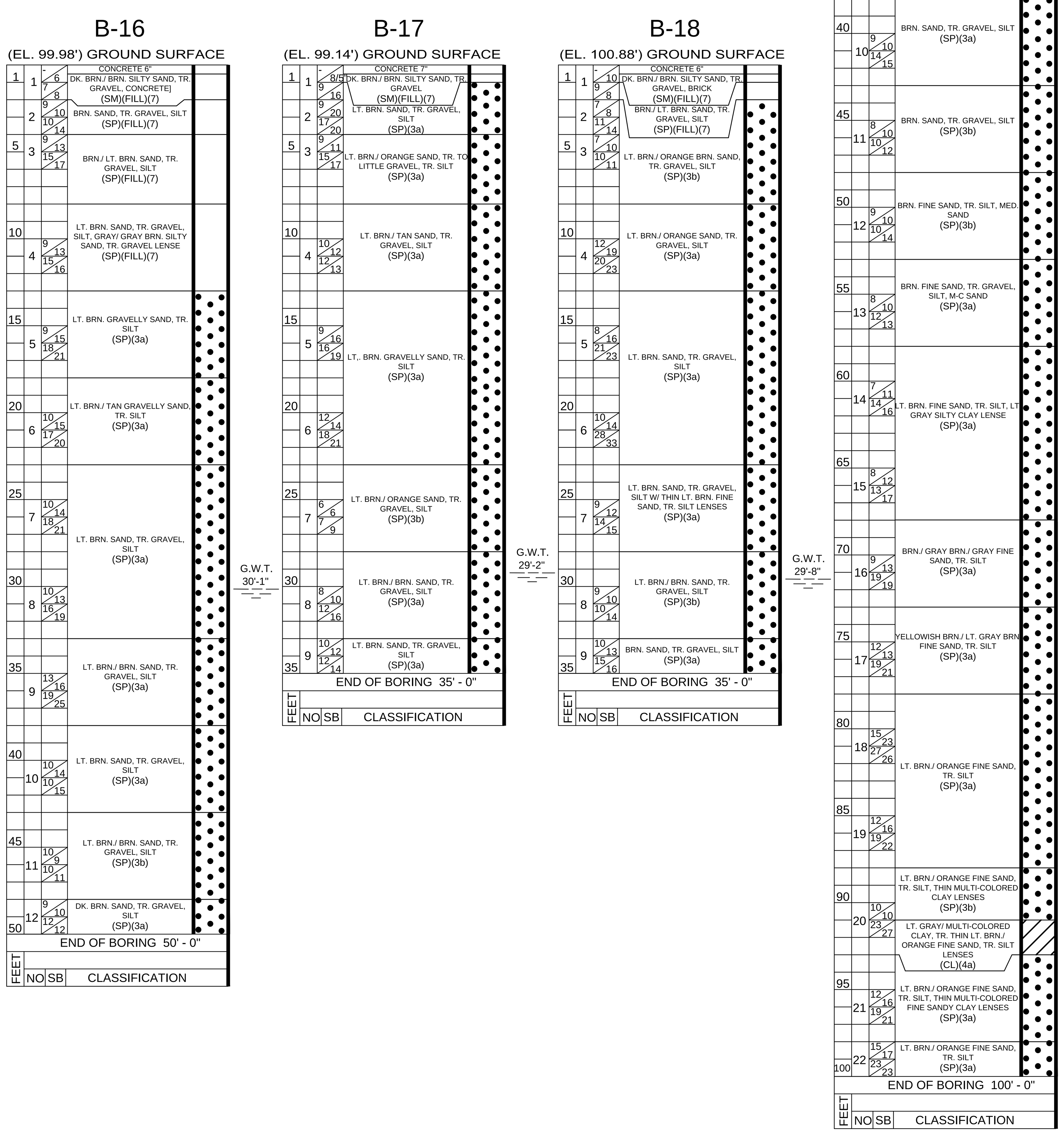
BORINGS BY RELIABLE DRILLING COR
34-16 61st. STREET WOODSIDE 7

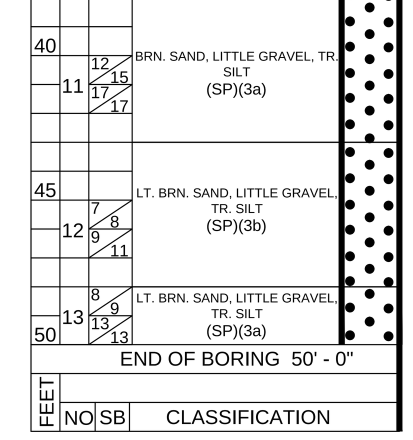
SCALE: AS SHOWN	BY: JDE/JRC	JOB No. 6647	DWG. No. 7 OF 7 DWG

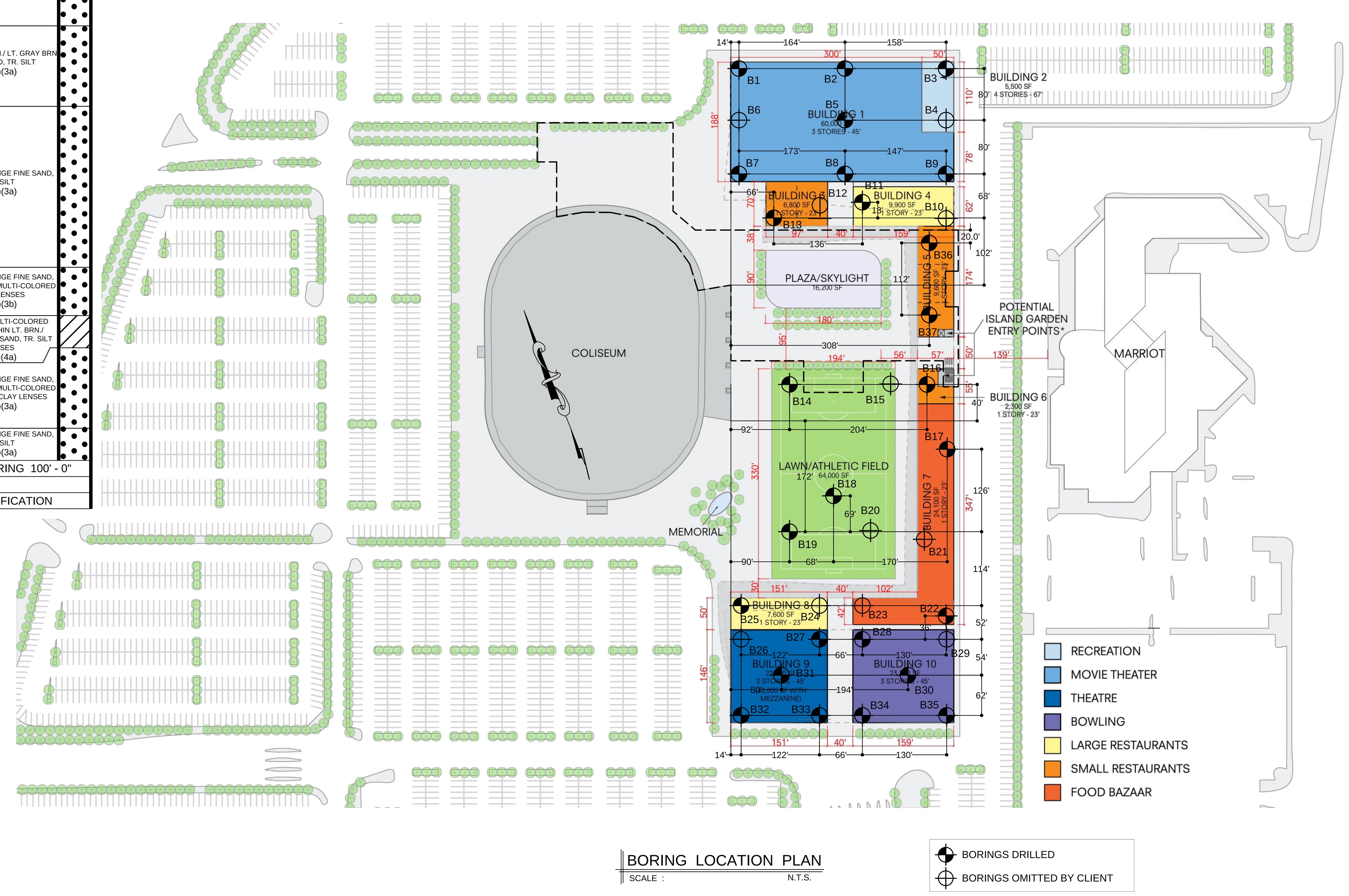
APPENDIX D

(2014 HISTORICAL BORING LOGS BY OTHERS)









BORING LOCATION PLAN

SCALE : N.T.S.

NOTES:

1. - SOIL DESCRIPTIONS ARE BY VISUAL EXAMINATION OF SOIL SAMPLES RECOVERED DURING DRILLING OPERATIONS.
2. - SOIL DESCRIPTIONS ARE IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.
3. - GROUND WATER WAS MEASURED INSIDE THE DRILL CASING AT THE COMPLETION OF EACH BOREHOLE.
4. - SOIL STRATIFICATIONS ARE ACCURATE TO WITHIN TWO FEET VERTICALLY.
5. - ELEVATIONS WERE REFERENCED TO B.M. - AT FINISHED FLOOR OF EXISTING COLISEUM STRUCTURE, AS SHOWN. ASSUMED ELEVATION AT 100.0' .
6. - SOIL SAMPLES WERE OBTAINED USING A CENTRAL MINE EQUIPMENT (CME) AUTOMATIC TRIP HAMMER.

UNIFIED SOIL CLASSIFICATION

SOIL GROUPS	TYPICAL NAMES AND SOIL SYMBOLS
GW	WELL GRADED GRAVELS, GRAVEL SAND MIXTURES, LITTLE OR NO FINES
GP	POORLY GRADED GRAVELS OR GRAVEL SAND MIXTURES. LITTLE OR NO FINES
GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURE
GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURE
SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
SP	POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
SM	SILTY SANDS, SAND - SILT MIXTURES
SC	CLAYEY SANDS, SAND - CLAY MIXTURES
ML	INORGANIC SILTS, VERY FINE SANDS, CLAYEY SILTS, SLIGHT PLASTICITY
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS SANDY CLAYS, SILTY CLAYS
OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

ALLOWABLE SOIL BEARING PRESSURES, N.Y.C. BLDG. CODE TABLE 1804.1

CLASS OF MATERIALS (Notes 1 & 3) *	MAXIMUM ALLOWABLE FOUNDATION PRESSURE (TSF)	MAXIMUM ALLOWABLE FOUNDATION PRESSURE (kPa)
1. BEDROCK (NOTES 2 & 7) *		
1a HARD SOUND ROCK - GNEISS, DIABASE, SCHIST	60	5,746
1b MEDIUM HARD ROCK - MARBLE, SERPENTINE	40	3,830
1c INTERMEDIATE ROCK - SHALE, SANDSTONE	20	1,915
1d SOFT ROCK - WEATHERED ROCK	8	766
2. SANDY GRAVEL & GRAVEL (GW, GP) (NOTES 3, 4, 8, & 9) *		
2a DENSE	10	958
2b MEDIUM	6	575
3. GRANULAR SOILS (GC, GM, SW, SP, SM, & SC)(NOTES 4, 5, 8, & 9) *		
3a DENSE	6	575
3b MEDIUM	3	287
4. CLAYS (SC, CL, & CH)(NOTES 4, 6, 8, & 9) *		
4a HARD	5	479
4b STIFF	3	287
4c MEDIUM	2	192
5. SILTS & SILTY SOILS (ML & MH)(NOTES 4, 8, & 9) *		
5a DENSE	3	287
5b MEDIUM	1.5	144
6. ORGANIC SILTS, ORGANIC CLAYS, PEATS, SOFT CLAYS, LOOSE GRANULAR SOILS, & VARVED SILTS	SEE 1804.2.1 *	SEE 1804.2.1 *
7. CONTROLLED & UNCONTROLLED FILLS	SEE 1804.2.2 OR 1804.2.3 *	SEE 1804.2.2 OR 1804.2.3 *

* REFER TO SECTION 18-4.2 OR NOTES FOLLOWING TABLE 1804.1 IN THE N.Y.C. BUILDING CODE FOR ADDITIONAL INFORMATION.

COMPACTION RELATED TO SPOON BLOWS PER FOOT

SAND		SILT & CLAY	
LOOSE	LESS THAN 10	SOFT	10 OR LESS
MEDIUM	10 TO 30	MEDIUM	11 TO 29
DENSE	GREATER THAN 30	HARD	30 OR MORE

" N "	STANDARD PENETRATION TEST (2" SPOON, 140lb HAMMER, 30" FALL)
6 8 9 12 N=17 BLOWS PER FOOT	SPOON BLOW COUNT IS GENERALLY SHOWN IN 6" INCREMENTS FOR 2' DRIVE TO OBTAIN BLOWS PER FOOT (N) USE THE 2ND & 3RD 6" INCREMENT

	ROTARY CASING	EXTRA HEAVY CASING	SAMPLE SPOON
SIZES, INCHES	2.5		2.0
HAMMER WEIGHT, POUNDS	___________		140
HAMMER FALL, INCHES	___________		30

CB - CASING BLOWSPER 1 FOOT DRIVE
SB - SPOON BLOWS PER 6 INCH DRIVE
P - PUSHED BY WEIGHT OF HAMMER
WOR - WEIGHT OF ROD
UD - UNDISTURBED SOIL SAMPLE
NO - SAMPLE NUMBER
FEET - DEPTH FROM GND. SUR. NOTED AT EACH 5'
WOH - WEIGHT OF HAMMER (INCLUDES ROD)

FOREST CITY RATNER COMPANIES
#1 METROTECH CENTER, BROOKLYN, NEW YORK 11201

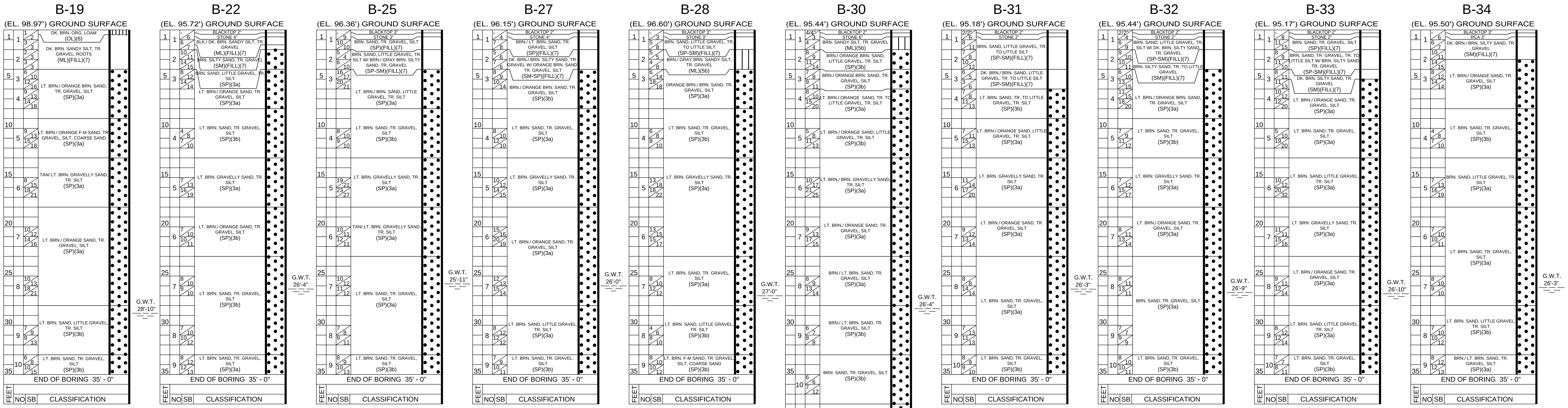
SOIL MECHANICS DRILLING CORP.
subsoil investigations
3770 MERRICK ROAD * SEAFORD, NEW YORK 11783 * 516 - 221-2333

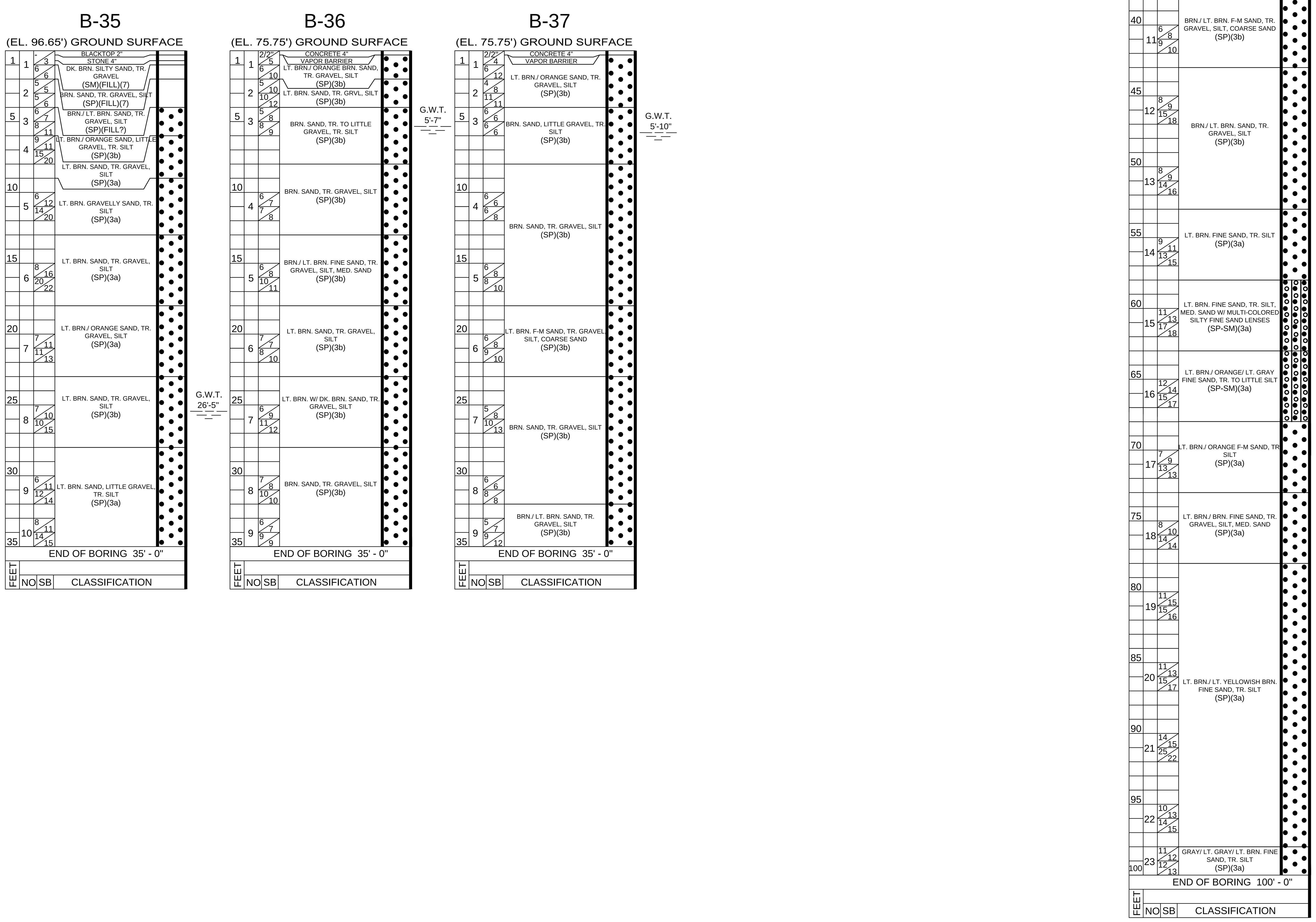
NASSAU COLISEUM - HEMPSTEAD TURNPIKE

-SUBSURFACE INVESTIGATION-

UNIONDALE, NEW YORK

VERTICAL BORING SCALE: 1/4"=1'-0"	DRAWING DATE: JUNE 26, 2014		DRAWING NUMBER 14L145-37
DATES OF BORING: JUNE 16-23, 2014	DWN. BY: JMR	CKD. BY: CV	SHEET 1 OF 2.





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FOREST CITY RATNER COMPANIES
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NASSAU COLISEUM - HEMPSTEAD TURNPIKE

-SUBSURFACE INVESTIGATION-

UNIONDALE, NEW YORK

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DATES OF BORING JUNE 16-23, 2014	DWN. BY: JMR	CKD. BY: CV	SHEET 2 OF 2.

GEOTECHNICAL ENGINEERING REPORT

for

SANDS NEW YORK
Phase 1B
Uniondale, New York

Prepared For:

Las Vegas Sands Corp.
3355 Las Vegas Blvd. South
Las Vegas, Nevada 89109

Prepared By:

Langan Engineering, Environmental, Surveying,
Landscape Architecture and Geology, D.P.C.
360 West 31st Street, 8th Floor
New York, New York 10001

Julia Langewis, P.E.

Saul Shapiro, P.E.
Professional Engineer License No. 082466-1

3 October 2023
170754501

LANGAN

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INTRODUCTION

This report presents the results of our subsurface investigation and provides geotechnical engineering recommendations for the design and construction of the proposed Phase 1B - Parking Garage A as part of the redevelopment of the Nassau Coliseum property in Uniondale, New York. All services were performed in general accordance with our Additional Services Request and Statement of Work under Master Service Agreement CW2785281, dated 07 July 2023.

Our understanding of the project is based on review of the documents provided, discussions with your office and the project team, and our general experience in the area. Architectural information was provided by the project architect (Populous Architect, PLLC) and structural information was provided by the project structural engineer (Thornton Tomasetti). All recommendations are in accordance with the 2020 New York State Building Code (NYSBC).

Elevations were interpolated from the survey titled "ALTA/NSPS Land Title Survey," Sheet VL103, prepared by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C., dated 14 March 2023 and updated 22 May 2023. All elevations contained herein are considered approximate and reference the North American Vertical Datum of 1988 (NAVD88)[1].

SITE DESCRIPTION

The project site consists of Nassau Coliseum and surrounding parking lots and is located at 1255 Hempstead Turnpike in Uniondale, New York. The property is comprised of multiple parcels referenced on the Nassau County Tax Maps as Section F, Block 44, Lots 351, 411, 412, and 415. The site is generally bound by Charles Lindbergh Boulevard to the north, James Doolittle Boulevard to the east, Hempstead Turnpike to the south, and Earle Ovington Boulevard to the west. A site location map is presented in Figure 1.

The proposed garage is located in the north-central area of the property and is currently occupied by on-grade asphalt parking lots. Surface grades in the vicinity of the garage vary from about el 79.5 ft to el 82.2 ft. Numerous utilities, including electric, drainage, chiller lines, gas, sanitary, and communication lines were reported in and immediately adjacent to the proposed footprint of the garage. All utilities to remain must be protected during construction.

PROPOSED DEVELOPMENT

We understand the proposed development includes construction of an approximately 270,000 square-foot six-story parking structure with a partial below grade level. The 50% Design Development drawings, dated 21 July 2023, show the below grade level (Level B) at el 56 ft. The parking structure will connect to the Nassau Coliseum via a pedestrian walkway and tunnel. The parking structure will be directly adjacent to the proposed Central Utility Plant (CUP). General excavation for the garage is generally expected to extend to depths of up to 35 feet below grade.

---

[1] Elevations are with respect to the North American Vertical Datum of 1988 (NAVD88), which is reported to be 1.092 feet above the Mean Sea Level at Sandy Hook, New Jersey, 1929 (NGVD 1929) and the Nassau County Datum.

Site improvements such as sidewalks, plantings, utilities, and roadways are anticipated in the areas adjacent to the garage.

ADJACENT STRUCTURES

Nassau Coliseum, 1255 Hempstead Turnpike (Section 44, Block F, Lot 415)

The Nassau Coliseum ("the Coliseum") is located south of the proposed garage and includes a concourse level, a below-grade event level, and multi-level event seating. The below-grade portion of the building includes a loading dock and ramp that extends north of the above-grade building limits and exhibition space that extends east of the above-grade building limits. Original design plans[2] show the Coliseum is supported by a shallow foundation system bearing on dense native sand soils with an allowable bearing pressure of 4 tons per square foot. The below-grade event level floor slab consists of a 6-inch-thick to 8-inch-thick concrete slab-on-grade. The top of the event level slab is located at about el 60 ft.

REVIEW OF PUBLISHED INFORMATION

FEMA Flood Maps

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), plate 36059C0227G, governs flood zone compliance for the project site. The subject FIRM shows that the proposed development falls within unshaded Zone X - Areas of Minimal Flooding. The unshaded Zone X designation corresponds to "Areas determined to be outside the 0.2 percent annual chance floodplain." Therefore, floodproofing is not required by the NYSBC. An excerpt of the FEMA FIRM map relative to the project site is shown in Figure 2.

SUBSURFACE INVESTIGATION

Our subsurface investigation included: 1) drilling 30 geotechnical test borings with in situ testing and sampling of soil; 2) installing two groundwater observation wells; 3) performing laboratory testing on representative soil samples; and 4) reviewing available historic boring data.

Geotechnical Test Borings

Thirty geotechnical test borings, identified as LB1B-01 through LB1B-30, were drilled by Craig Geotechnical Drilling Co., Inc. of Mays Landing, New Jersey between 22 August and 7 September 2023. All borings were drilled within the footprint of the proposed garage, with the exception of LB1B-14 and LB1B-22. To avoid utilities, LB1B-14 and LB1B-22 were drilled about 7 feet and 14 feet outside of the proposed footprint, respectively. All borings were drilled using a CME-75 truck-mounted drill rig. Langan provided full-time special inspection of all drilling operations in accordance with the NYSBC. The borings were generally advanced to depths between 52 feet and 102 feet below grade. The approximate locations of the borings are shown on the subsurface investigation plan in Figures 3 and 4.

---

[2] Design drawings include drawing numbers S-1 through S-3. All drawings are part of "John F. Kennedy Educational, Civic & Cultural Center Coliseum", prepared by Farkas & Barron Structural Engineers, dated 15 January 1969.

The borings were advanced through soil using mud-rotary drilling techniques with a tri-cone roller bit and drilling fluid. Temporary flush-joint steel casing was installed through soils, as required, to stabilize the boreholes and prevent fluid loss during drilling. The boring locations were initially cleared of utilities using ground penetrating radar (GPR). In addition, the first 5 feet of all borings were hand dug in an effort to clear the boreholes of utilities. The Standard Penetration Test (SPT)[3] was performed in general accordance with ASTM D1586. SPT N_{60}-values [4], visual soil classifications, and other field observations were recorded by a Langan's engineers. Soils were sampled using a standard 2-inch outer-diameter split-spoon sampler driven by an automatic hammer with a reported efficiency of 97.2% and 101.6%, respectively for each rig[5]. All recovered soil samples were visually classified in the field in accordance with ASTM D2487 and the Unified Soil Classification System (USCS). Soil classifications, SPT N_{60}-values, and other field observations were recorded on the boring logs presented in Appendix A.

Groundwater Observation Wells

Groundwater observation wells were installed in boreholes LB1B-05(OW) and LB1B-23(OW) and groundwater levels were measured periodically during and after our subsurface investigation. The observation wells were generally constructed using a 10-foot section of 2-inch-diameter Schedule 40 PVC slotted well screen below an approximately 30-foot section of solid riser pipe. The annulus was backfilled with No. 1 filter sand to within 2.5 feet of existing grade; a 2-foot-thick minimum bentonite-pellet seal was installed above the filter sand. The remainder of the annulus was grouted to prevent surface water from influencing the well readings. A protective steel flush-mounted well cap was installed at the ground surface at each well location. The observation well construction logs are included in Appendix A.

Laboratory Testing

Laboratory testing was performed on select soil samples to evaluate engineering properties and verify visual classifications made in the field. Laboratory testing of the soil samples included:

- Particle Size Distribution – ASTM D6913 (43 Tests)
- Atterberg Limits – ASTM D4318 (7 Tests)

The laboratory test results are provided in Appendix B.

[3] The Standard Penetration Test is a measure of soil density and consistency. The testing involves driving a 2-inch outer-diameter split-spoon sampler a distance of 2 feet, using a 140-lb hammer free falling from a height of 30 inches.

[4] N_{60}-value – The number of blows required to drive a 2-inch diameter split-spoon sampler 12 inches after an initial "seating" penetration of 6 inches, using a 140-lb hammer free falling from a height of 30 inches, corrected for the hammer's energy ratio. $N_{60} = N_{Field}$(Hammer Efficiency/60)

[5] Hammer calibrations performed by GRL Engineers, Inc. per provided signed and sealed report titled "SPT Energy Calibration", dated 29 September 2023. See Appendix A for a copy of the calibration report.

Previous Investigations by Others

Reliable Drilling Corp. (1966)

A subsurface investigation was completed for the original design of the Nassau Coliseum in 1966. The investigation consisted of 48 borings and four groundwater monitoring wells within the footprint of the Nassau Coliseum. Borings were advanced to depths varying between 50 feet and 101.5 feet below existing grade. In general, the subsurface conditions encountered in the 1966 investigation agree well with those encountered in the 2023 Langan investigation. Approximate locations of the historic borings are shown in Figures 3 and 4. A copy of the available historic boring logs from 1966 is included in Appendix C.

Soil Mechanics Drilling Corp. (2014)

A subsurface investigation comprised of 26 geotechnical borings was completed along the east side of the Coliseum in 2014. Borings were advanced to depths varying between 35 feet and 100 feet below existing grade. In general, the subsurface conditions encountered in the 2014 investigation agree well with those encountered in the 2023 Langan investigation. Approximate locations of the historic borings are shown in Figures 3 and 4. A copy of the historic boring logs from 2014 is included in Appendix D.

SUBSURFACE CONDITIONS

The general subsurface stratigraphy encountered in the Phase 1B borings consists of fill underlain by sand with variable gravel and silt content and lenses of silt and clay; in some cases, shallow and deep layers of silt and clay were present within the sand layer. Bedrock is known to be at great depth in the vicinity of the site. A brief description of each layer is presented below in order of increasing depth.

Stratum 1 – Fill

Fill was observed in all borings and generally consists of medium to fine, medium, or fine sand with variable concentrations of gravel, silt, and clayey silt. The fill soils generally appear to be comprised of reworked native soils. The fill layer is estimated to extend to depths of about 3 feet to 9 feet below the ground surface, corresponding to about el 77.9 ft and el 71 ft. SPT N_{60}-values typically varied from 16 to 60 bpf (blows per foot). The fill layer is generally considered to be in a medium dense to dense condition.

Three particle size distribution analyses were performed on a selected samples from the fill layer. The samples had fines contents varying from 16.5 percent to 26.2 percent.

The fill generally classifies as SP-SM (poorly graded sands with gravel and silt) or SM (silty sands, sand-silt mixtures) in accordance with ASTM D2487 and the USCS.

Stratum 2 – Granular Soil

A layer of granular soil was observed below the fill layer in all borings except LB1B-03, LB1B-06, and LB1B-08, where a thin layer of shallow silt and clay was observed above the granular soil.

The granular soil generally consists of coarse to fine, medium to fine, or fine sand with variable concentrations of gravel, silt, and clay. The soil stratum extends from the bottom of the fill layer (about el 77.9 ft to el 71 ft) or bottom of the shallow silt and clay layer in LB1B-03, LB1B-06, and LB1B-08 (about el 75.5 ft to el 74.6 ft) to the full depth of the boring (about el 30.9 ft to el -22.9 ft). SPT N_{60}-values varied from 5 to 118 bpf and were typically greater than 30 bpf. The granular soils are generally considered to be in a medium dense to dense condition.

Forty particle size distribution analyses were performed on selected samples from the granular soil layer. The samples had fines contents varying from 2.3 percent to 42 percent.

The dense granular soil layer generally classifies as SP (poorly graded sands, gravelly sands, little or no fines), SP-SM (poorly graded sands with gravel and silt), SM (silty sands, sand-silt mixtures), SP-SC (poorly graded sands with gravel and clay), or SC (clayey sands, sand-clay mixtures) in accordance with ASTM D2487 and the USCS.

Stratum 2a – Shallow Silt and Clay

A thin layer of shallow silt and clay was observed sporadically within granular soils of Stratum 2 in LB1B-03, LB1B-06, LB1B-08, LB1B-09 and LB1B-20. Where present, these soils generally consist of silt and clay with variable concentrations of sand and gravel.

The top of the silt and clay layer was encountered as shallow as 5 feet and as deep as 9 feet below existing grade, corresponding to about el 76.7 ft and el 72.4 ft. The layer thickness varied from about 0.8 feet to 2 feet. SPT N_{60}-values typically varied from 13 to 47 bpf and were typically greater than 30 bpf. The soil stratum is generally considered to be in a stiff condition for clay rich soils and in a medium dense condition for silt rich soils.

Four Atterberg Limits tests were performed on selected samples from the silt and clay layer. The samples had Liquid Limits varying from 26 percent to 36 percent, Plastic Limits varying from 18 percent to 26 percent, and Plasticity Indices varying from 8 to 13.

The silt and clay layer generally classifies as ML (non-plastic silt to medium plastic clayey silt) or CL (inorganic clays of low to medium plasticity) in accordance with ASTM D2487 and the USCS.

Stratum 2b – Deep Clay and Clayey Sand

Thin clayey sand and clay layers were observed interspersed within the Stratum 2 soils at a great depth in LB1B-11, LB1B-15, LB1B-26, and LB1B-30. These soils generally consist of clay with variable concentrations of fine sand and silt, or fine sands with high concentrations of clay and silt.

The top of the clay and clayey sand layer was encountered as shallow as 60 feet and as deep as 90 feet below existing grade, corresponding to about el 20 ft and el -11.1 ft. The layer thickness varied from about 3 feet to 10.5 feet. SPT N_{60}-values typically varied from 23 to 63 bpf. The soil stratum is generally considered to be in a stiff condition for clay rich soils and in a medium dense to dense condition for clayey sand soils.

Two particle size distribution analyses were performed on selected samples from the granular soil layer. The samples had fines contents varying from 35 percent to 42 percent. 3 Atterberg Limits tests were performed on selected samples from the silt and clay layer. The samples had Liquid Limits varying from 26 percent to 45 percent, Plastic Limits varying from 16 percent to 23 percent, and Plasticity Indices varying from 10 percent to 25 percent.

The deep clay layer generally classifies as CL (inorganic clays of low to medium plasticity) and the clayey sand layer generally classifies as SC (clayey sands, sand-clay mixtures) in accordance with ASTM D2487 and the USCS.

Groundwater

The groundwater level was measured in LB1B-05(OW) and LB1B-23(OW) during and after our subsurface investigation. The groundwater level varies across the project site but was typically between about el 46.7 ft and about el 51.4 ft. Groundwater level readings are summarized in Table 1 below. Please note that the groundwater level may vary seasonally and with changes in precipitation.

Table 1 – Groundwater Observation Well Data

Well No.	Approx. Surface Elevation (feet, NAVD88)	Date	Depth Below Grade (feet)	Approx. Elevation (feet, NAVD88)
LB1B-05(OW)	± 80.9	09/08/2023	29.5 ±	± 51.4
		09/14/2023	30.8 ±	± 50.1
		09/20/2023	29.9 ±	± 51.0
		09/21/2023	29.8 ±	± 51.1
LB1B-23(OW)	± 81.2	09/08/2023	34.5 ±	± 46.7
		09/14/2023	33.8 ±	± 47.4
		09/20/2023	31.4 ±	± 49.8
		09/21/2023	31.4 ±	± 49.8

SEISMIC ANALYSES

Seismic Design Parameters

Seismic design parameters were determined in accordance with Section 1613 of the NYSBC and ASCE 7-16. The subsurface investigation indicates that medium dense to dense soil is generally present at the site. Therefore, we recommend that the site be assigned to Site Class D. Per the 50% DD plans, we understand that the building is considered Risk Category III. The resulting design spectral acceleration at short periods (S_{DS}) is equal to 0.272g and the design spectral acceleration at 1-second (S_{D1}) is equal to 0.09g. Seismic design parameters are summarized in Table 2 below.

Table 2 - Seismic Design Parameters

Description	Parameter	Recommended Value	NYSBC/ASCE 7 Reference
Mapped Spectral Acceleration for short periods	S_S	0.256g	Figures 1613.2.1(1), (2) ***
Mapped Spectral Acceleration for 1-sec periods	S_1	0.056g	
Site Class	-	**D**	ASCE 7-16 Table 20.3-1
Site Coefficient	F_a	1.595	Tables 1613.2.3(1), (2)
Site Coefficient	F_v	2.4	Table 1613.3.3(2)
5 percent damped design spectral response acceleration at short periods:	$\mathbf{S_{DS}}$	**0.272g**	Section 1613.2.4
5 percent damped design spectral response acceleration at 1-sec period:	$\mathbf{S_{D1}}$	**0.09g**	
Risk Category (per Drawing #PA-S7-00)	-	**III**	Table 1604.5
Seismic Design Category	-	**B**	Table 1613.2.5(1) Table 1613.2.5(2)
Site Adjusted Peak Ground Acceleration	PGA_M	0.229g	ASCE 7-16 Section 11.8.3
*** ASCE Hazards Tool (https://asce7hazardtool.online/)			

Liquefaction Potential

The seismic provisions of the NYSBC require an evaluation of the liquefaction potential of sand, silt, and non-cohesive materials below the groundwater table, and up to a depth of 50 feet below the ground surface. Our evaluation indicates that the potential for liquefaction, liquefaction-induced settlement, and other seismic ground failure at the site is unlikely. Therefore, liquefaction need not be considered in design.

DESIGN AND CONSTRUCTION CONSIDERATIONS

The following section briefly summarizes significant design and construction considerations associated with foundations for the proposed development:

- The site lies outside of FEMA mapped flood hazard areas and does not require floodproofing.
- Groundwater is not anticipated to be encountered during excavation and construction of the proposed development. We recommend a design groundwater elevation of el 55 ft for the garage based on review of available data.
- The site should be designed assuming a seismic design category (SDC) of **B** for Risk Category III. Liquefaction need not be considered in the design.
- The granular soil below the building footprint is suitable for supporting the proposed building using a shallow foundation system (i.e., isolated spread footings and strip footings).
- Support of excavation (SOE) will be required where sufficient lateral clearance cannot be provided to permit OSHA compliant sloped/benched excavations.
- Existing structures and utilities to remain must be protected and monitored during excavation and construction activities.

DESIGN RECOMMENDATIONS

Foundations

The subsurface conditions are considered suitable for supporting the proposed development using shallow foundations. The following sections provide additional details for foundation design.

<u>Allowable Bearing Pressure</u>

We recommend that footings be designed assuming a gross allowable bearing pressure of four (4) tons per square foot (tsf). This recommended allowable bearing pressure exceeds the presumptive load bearing values prescribed in Table 1806.2 of the NYSBC and requires approval of the building official.

Continuous strip footings should have a minimum width of 2 feet and isolated spread footings should have a minimum width of 3 feet. All footings should bear at least 3 feet below adjacent exterior grade or 3 feet below the interior slabs. Footing subgrades should be prepared in accordance with the recommendations presented herein.

Footings must bear at or below the line of influence of existing footings from adjacent structures. The line of influence is defined by projecting an imaginary line from the edge of the lower footing upward and outward at an inclination of 1V:2H. Existing footing subgrades should be protected from disturbance or undermining that could result from nearby excavation.

Settlement

Column loads for the proposed structure have not been provided at the time of this report. Typical footings for the garage, varying from 7 feet to 24 feet wide, loaded to 4 tsf are estimated to settle between about 0.75 inches and 1.0 inch or less. The angular distortion (Δ/L) resulting from differential settlement between adjacent columns is estimated to be about 1/600 or less. The majority of the settlement is expected to occur during construction as dead load is applied.

Lateral Resistance

Lateral loads can be resisted by friction on the bottom of footings. We recommend an ultimate friction coefficient of 0.45 for mass concrete poured on medium dense to dense sand. A minimum factor of safety of 1.5 should be utilized when evaluating sliding. If additional resistance is needed, lateral loads can also be resisted by embedding footings deeper to develop passive resistance from the soil. The allowable passive resistance provided by the soil will be dictated by the depth of embedment, characteristics of the surrounding material, and the extent of backfill and compaction at a particular location. Alternatively, floor slabs can be used as diaphragms to transfer loads to the exterior walls.

Uplift Resistance

We expect that uplift forces can be accommodated by the dead load of the structure; however, resistance can be provided by ground anchors (tie-downs) or micropiles if needed. Where required, anchors must consider group effects and need to be evaluated on a case-by-case basis.

Floor Slabs

Where above the design groundwater elevation, we recommend that the floor slabs be designed as a slab-on-grade provided that proper subgrade preparation is implemented. For the purpose of design, we recommend that slab-on-grade floors be designed assuming a modulus of subgrade reaction equal to 200 psi-per-inch. Please note that the modulus of subgrade reaction noted above is not appropriate for use in the design of mat foundations. Slab-on-grade floors should bear atop a minimum 6-inch-thick layer of free draining ¾-inch crushed stone or gravel layer placed over a suitably compacted granular soil subgrade. A vapor barrier or waterproofing membrane should be installed below all moisture sensitive slabs (i.e., occupied interior spaces).

Where below the design groundwater elevation, we recommend that floor slabs be designed as pressure slabs. We recommend that pressure slabs be designed assuming hydrostatic uplift corresponding to the depth below the recommended design groundwater elevation (el 55 ft). Where possible, pressure slabs should be keyed into the building walls and should be cast with integral waterstops at all joints. Pressure slabs should be waterproofed as per the recommendations presented herein.

Below Grade Walls

Restrained Walls

We recommend that permanent below-grade walls or pits be designed to accommodate lateral pressure resulting from soil and surcharge loads. Permanent walls should be designed assuming a triangular distribution resulting from an equivalent fluid weight of 50 psf per foot of depth above the design groundwater table and 85 psf per foot below the design groundwater table. Lateral pressures from surcharge loads should be added as a uniform soil pressure equal to one-half the vertical pressure.

Unrestrained Walls

Walls free to rotate may be designed assuming active earth pressure conditions. Where applicable, we recommend walls be designed assuming an equivalent fluid weight of 30 psf per foot above the groundwater table and 77 psf per foot below the groundwater table.

Full passive earth pressure requires potentially significant translation or rotation of a retaining wall. In an effort to limit movement of walls, a reduced passive earth pressure distribution equal to 155 psf per foot is recommended above the groundwater table and 135 psf per foot below the groundwater table. Passive resistance should be ignored within the frost zone.

Waterproofing

For portions of the proposed structure not expected to extend below the design groundwater table, we recommend that a robust vapor barrier be provided beneath floor slabs and cellar walls. Concrete admixtures such as Krystol Internal Membrane, Xypex Admix, or Hycrete may also be used in conjunction with the robust vapor barrier to provide added assurance with respect to water leakage during periods of precipitation.

Portions of the structure extending below the design groundwater table should be completely encapsulated using a membrane-type waterproofing system that is fully bonded to the concrete. We recommend waterproofing such as those manufactured by GCP Applied Technologies, Carlisle Coatings and Waterproofing, and AVM Industries. We recommend that waterstops be installed at all concrete joints in addition to the waterproofing membrane. The use of bentonite waterproofing or negative side crystalline waterproofing is not recommended.

The selection of vapor barriers and waterproofing membranes should be coordinated with any environmental design/regulatory requirements (if any). New horizontally applied vapor barriers and waterproofing membranes should be installed on a suitable substrate. A 2-inch to 3-inch-thick mud slab placed over an approved subgrade to provide a smooth, uniform application surface is considered preferable, but the compact native soils are likely sufficient to meet manufacturers' standards for substrates. Vertically applied vapor barriers and waterproofing membranes should extend up to grade. Substrate preparation should be in accordance with the manufacturer's recommendation.

Quality control is critical to a successful waterproofing project. The vapor barrier and waterproofing installation should be inspected daily, especially during placement of reinforcement for the floor slabs and perimeter walls. Any holes or tears should be repaired in accordance with the manufacturer's recommendations and utility penetrations should be carefully sealed. All seams, including separations between wall and slab membranes should be checked for tightness. We recommend that the vapor barrier and waterproofing manufacturer inspect the waterproofing operations during construction and approve all work prior to placement of concrete. We also suggest discussing vapor barrier and waterproofing detailing with the selected manufacturer and recommend that a warrantee be obtained from both the manufacturer and installer to cover materials and workmanship.

CONSTRUCTION RECOMMENDATIONS

General Site Preparation

Prior to general excavation, the project site should be stripped of any vegetation and deleterious material. In addition, pavements, utilities, curbs, and near-surface remnant foundations should be completely removed within the proposed building footprint. Utilities may be abandoned in place outside the building footprint, provided they are properly filled to prevent void formation in the event of future breakage. Where utilities cannot be properly abandoned, they should be completely removed.

Loose near surface soils, and other soils containing appreciable amounts of organic matter or construction debris (bricks, concrete, metal, timber, etc.) should be stripped. Soils proposed for re-use, if any, should be stockpiled outside the limits of the excavation and should be segregated to avoid commingling of differing materials. Re-use of existing materials may require processing such as screening and may be restricted by environmental conditions. Measures for erosion and sediment control should be installed as required.

Excavation

General excavation is anticipated to typically extend to depths of up to 35 feet with local excavation for footings and pits extending deeper. We anticipate that excavation of soils can be accomplished with conventional earthmoving equipment (i.e., track-hoes, etc.). Obstructions such as remnant foundations, abandoned and live utilities, rubble, and other construction debris should be anticipated when excavating and may require larger demolition equipment.

All excavations should be benched or sloped in accordance with applicable OSHA standards. Where required, temporary excavation support should be installed as per the recommendations presented herein.

Temporary Support of Excavation

Temporary support of excavation (SOE) will be required to achieve the general excavation depths, which are currently estimated to extend up to about 35 feet below grade, with footings and pits extending deeper locally. Based on the subsurface conditions, we expect that a conventional soldier pile and lagging system with bracing is suitable. Bracing may consist of external bracing (i.e., tiebacks), internal bracing (i.e., rakers, corner braces, struts, etc.), or a combination thereof. External bracing is considered preferrable as it will likely improve construction logistics within the excavation.

The design of the SOE system should consider the following minimum design parameters included in Table 3 below and following minimum loading conditions:

- Braced Excavations - Free draining or dewatered walls should be designed using a uniform pressure distribution of 20H psf, where H is the total height of the wall.
- Lateral pressures from surcharge loads should be added to the lateral earth pressure load. Surface surcharges should be added as an inverted triangle having a maximum pressure at the ground surface equal to one-half of the vertical surface load (minimum 300 psf). Lateral surcharge pressure can be reduced to zero at a depth of 15 feet below the ground surface.
- Lateral pressures resulting from adjacent structures (applicable for areas exterior of the building) should be determined using elastic methods and should be added to the above loads.
- Temporary construction loads are not considered herein and must be assessed on a case-by-case basis.

Table 3 – Soil and Groundwater Design Parameters (SOE)

Material	Parameter	Recommended Value
Fill	Moist Unit Weight	120 pcf
	Friction Angle	34-36 degrees
	Cohesion	0 psf
Granular Soil	Moist Unit Weight	120 pcf
	Friction Angle	36-38 degrees
	Cohesion	0 psf

The SOE system must be designed by a professional engineer, licensed in the State of New York. Construction of the SOE system is subject to special inspection. The SOE system should not be installed until adequate controls for survey monitoring of pertinent adjacent structures are in place.

Temporary Construction Dewatering

Excavations are not anticipated to extend below groundwater and significant temporary construction dewatering is not expected. However, dewatering may be required to address surface water accumulation that may occur during precipitation events throughout construction. We anticipate that conventional sumps and pumps will be suitable for temporary groundwater control during construction.

Excavations are anticipated to extend below groundwater and temporary construction dewatering is anticipated to address the groundwater conditions. Conventional sumps and pumps may be used to control groundwater during excavation.

All groundwater discharges and withdrawals exceeding 45 gallons per minute (gpm) will require a Long Island Well Permit pursuant to 6 NYCRR Part 602. Treatment may be required where the groundwater is found insufficient for meeting water quality standards dictated by the regulatory agencies having jurisdiction. Permitting from the requisite agencies can often take three to four months.

Subgrade Preparation and Protection

Foundation bearing surfaces should be level and clear of debris, standing or frozen water, and other deleterious materials. Soils should be excavated with care to avoid disturbance below the bearing elevation. We recommend that the final 12 inches of excavation be performed with flat bladed buckets in open areas and by hand in confined areas. The subgrade should be protected from the effects of frost, precipitation, groundwater and surface water run-off and construction until concrete is cast. As such, we recommend that the Contractor limit the area of exposed subgrade to prevent deterioration of the bearing conditions.

Areas disturbed by excavation and other areas found to be unacceptable should be re-compacted, or if necessary, excavated and replaced with compacted structural fill, free draining gravel/crushed stone, Controlled Low Strength Material (CLSM), or lean concrete. The resulting subgrade following placement of fill and compaction should be firm and unyielding under the weight of heavy equipment without evidence of rutting, pumping, or heaving. Vibratory and impact compaction shall not be performed on soils that are not within 2% of optimum moisture content. Compaction should be discontinued in the event that soils are observed to “pump or heave” due to wet conditions. Following compaction, we recommend slab subgrades should be capped with crushed stone fill or a mud slab to protect the subgrade from construction disturbance.

We recommend that a Professional Engineer licensed in the state of New York inspect and approve foundation subgrades prior to placement of fill or concrete, to verify that the subgrade material is adequate to provide the recommended allowable bearing pressure. We recommend foundation subgrade be inspected by Langan to verify bearing capacity and that footing bottoms and slab subgrades have been adequately prepared.

Fill Materials, Placement, and Compaction

Structural fill placed to establish the finished subgrade beneath new foundations and floor slabs, or as backfill behind new walls, should consist of a well-graded durable granular material having a maximum particle size of 4 inches in any dimension and no more than 10 percent by dry weight passing the No. 200 sieve. The gradation for all structural fill should follow that identified in NYS DOT Item 733-0401. All fill materials should be free of organics, clay, and other deleterious or compressible materials. The on-site natural sand conforming to the above gradation criteria can be used as controlled fill. All fill materials should be approved by the Geotechnical Engineer prior to placement. Lean concrete or controlled low strength material (CLSM) may be substituted for structural fill.

Where wet subgrades are present from surface water runoff, we recommend that initial placement of fill consist of free draining gravel or crushed stone in an effort to stabilize the subgrade prior to installation of structural fill soils. Free draining gravel or crushed stone should conform to the requirements of New York State Department of Transportation Item 605.0901, Underdrain Filter Type I or AASHTO No. 57 stone. These materials can be utilized to stabilize subgrades prior to placement of structural fill in cases where the subgrade materials are not free draining and have the potential to be disturbed by compaction.

Fill should be placed in uniform loose lifts not exceeding 12-inches in open areas and 6-inches in confined areas. All fill placed below foundations and slabs should be compacted to at least 95% of its maximum dry density as determined by ASTM D1557. Compaction within 5 feet of foundation walls should be performed using hand operated equipment. The water content at the time of compaction should be within 2 percent of the optimum value determined by ASTM D1557. No fill should be placed on areas where free water is standing or on frozen subsoil areas.

Fill should not be placed on subgrades not inspected and approved by the Geotechnical Engineer.

ADDITIONAL RECOMMENDATIONS

Monitoring Program

We recommend that a monitoring program be developed and incorporated into the Contract Documents to evaluate performance of adjacent buildings during construction. Monitoring should include means to measure vibrations as well as structural and ground movement. The type and locations of specific monitoring equipment, threshold values, and durations should be developed based on review of the anticipated construction means and methods in conjunction with proximity to existing structures and utilities with relation to the project site. The purpose of performing monitoring is to provide reasonable feedback to the engineer as to performance of the contractor with respect to protecting existing structures and utilities, and to assess any necessary changes to means and methods of construction.

The monitoring program may include optical surveying, seismographs (vibration monitoring), and crack gauges where warranted. The monitoring plan should address means and methods for measuring ground and structural deformation, and vibration levels. We recommend that all monitoring be performed by a third-party consultant independent of the contractor; however, the contractor should reserve the right to perform additional monitoring. Monitoring should be performed, at a minimum, throughout excavation and foundation construction.

Preconstruction Conditions Documentation

Preconstruction conditions documentation should be conducted for all structures located within 75 feet of the project site as well as adjacent sidewalks, pavement, and utilities. The documentation should be made about one month prior to commencing any construction activities.

The purpose of these observations is to provide photographic and/or video documentation representative of general existing conditions, and to identify obvious visual deficiencies. The preconditions observations should also identify areas requiring specific monitoring during construction. Structural integrity is not addressed in such documentation. This baseline information is often critical in the event of future damage claims resulting from construction activities. The preconstruction conditions documentation should be used to inform an observational and instrumentation monitoring program that can be used to evaluate the performance of adjacent structures and construction procedures.

SPECIAL INSPECTIONS

Excavation and foundation work are subject to various Special Inspections as per the requirements outlined in Chapter 17 of the NYSBC. Construction activities that require geotechnical quality control inspections generally include support of excavation, foundation and slab subgrades, fill placement and compaction. This work must be performed under the inspection of a qualified geotechnical engineer and should be performed by Langan. The inspecting engineer should be familiar with the subsurface conditions, as well as the proposed and existing construction onsite. All inspectors must demonstrate competence and relevant experience or training. Written documentation of competence and relevant experience or training must be provided by an approved agency as required by NYSBC Section 1704.2.1. In addition, while not required by the NYSBC, we recommend that regular inspections of foundation waterproofing (where implemented) be made to mitigate the potential for leaks resulting from damaged or improperly installed materials.

CONSTRUCTION DOCUMENTS

Technical specifications and design drawings should incorporate our recommendations to ensure that subsurface conditions and other geotechnical issues at the site are adequately addressed in the construction documents. Langan can prepare specification sections related to geotechnical issues such as earthwork, waterproofing, monitoring, groundwater control, and excavation support. Langan should also review foundation drawings and details, and all contractor submittals and construction procedures related to geotechnical work.

LIMITATIONS

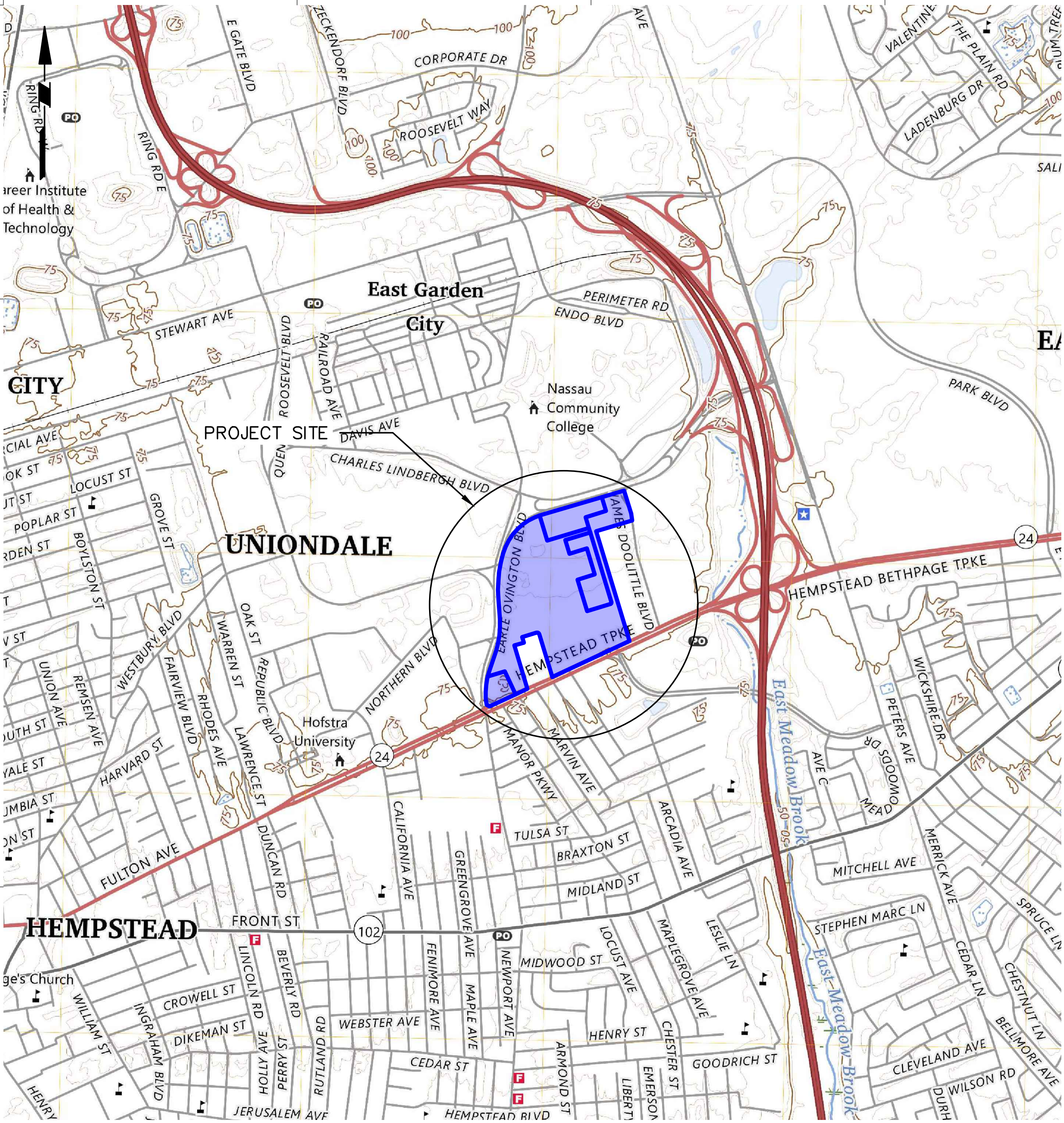
The conclusions and recommendations provided in this report are based on subsurface conditions inferred from a limited number of borings and in situ testing performed within the development parcel. The recommendations provided herein are dependent upon one another and no recommendation should be followed independent of the others.

This report has been prepared to assist the owner, architect, and structural engineer in the design process and is only applicable to the envisioned project discussed herein. Any proposed changes in structures or their locations should be brought to our attention so that we can determine whether such changes affect our recommendations. Langan cannot assume responsibility for use of this report for any areas beyond the limits of this study or for any projects not specifically discussed herein. This report shall not be used for the design of temporary works including scaffolding, construction hoists, and crane pads.

Information on subsurface strata and groundwater levels shown on the logs represents conditions encountered only at the locations indicated and at the time of investigation. If different conditions are encountered during construction, they should immediately be brought to our attention for evaluation as this may affect our recommendations.

Environmental issues (such as potentially contaminated soil and groundwater) are outside the scope of this study.

FIGURES



SOURCE: "FREEPORT QUADRANGLE MAP, NEW YORK–NASSAU COUNTY 7.5–MINUTE SERIES", U.S. GEOLOGICAL SURVEY, 2023.

NOTE: ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

2000 0 1000 2000

SCALE: 1 INCH = 2000 FEET

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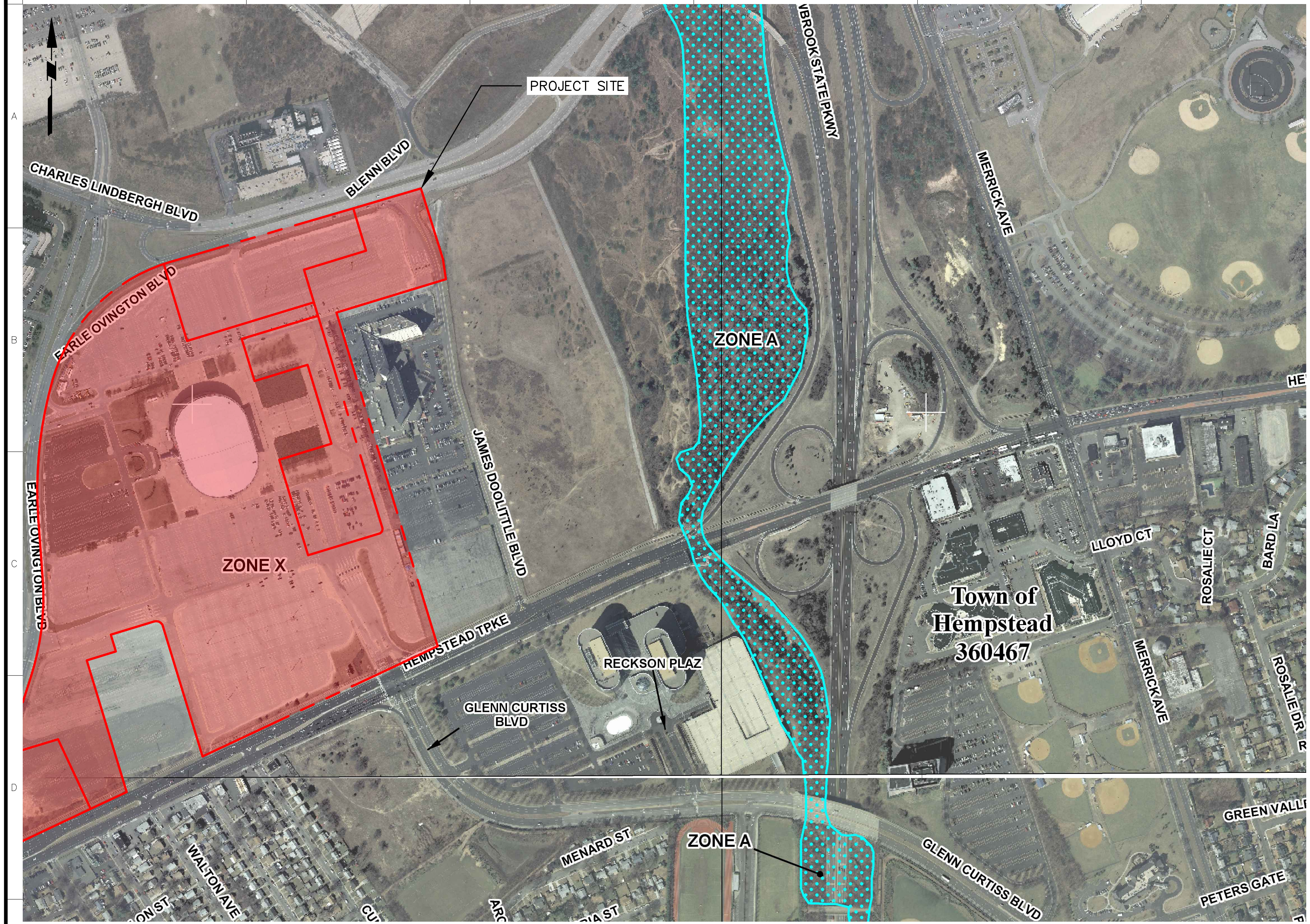
Project	Figure Title	Project No. 170754501	Figure
SANDS NEW YORK SECTION No. 44, BLOCK F LOTS No. 411, 412, 415, AND 351 TOWN OF HEMPSTEAD NASSAU COUNTY NEW YORK	SITE LOCATION MAP	Date 10/03/2023 Drawn By JJL Checked By SS	1 Sheet 1 of 4



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

Limit of Moderate Wave Action

513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
3 — 3	Limited detail cross section line
23 - - - 23	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
$^{24}76^{000m}$N	1000-meter Universal Transverse Mercator grid values, zone 18
600000 FT	5000-foot grid values: statename State Plane coordinate system, spzone (FIPSZONE fipszone), spherename projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

SOURCE: FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM), TOWN OF HEMPSTEAD, NEW YORK, PANELS 227 AND 229 OF 366 [36059C0227G AND 36059C0229G], MAP REVISED, EFFECTIVE, 11 SEPTEMBER 2009.

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

500 0 250 500
SCALE IN FEET

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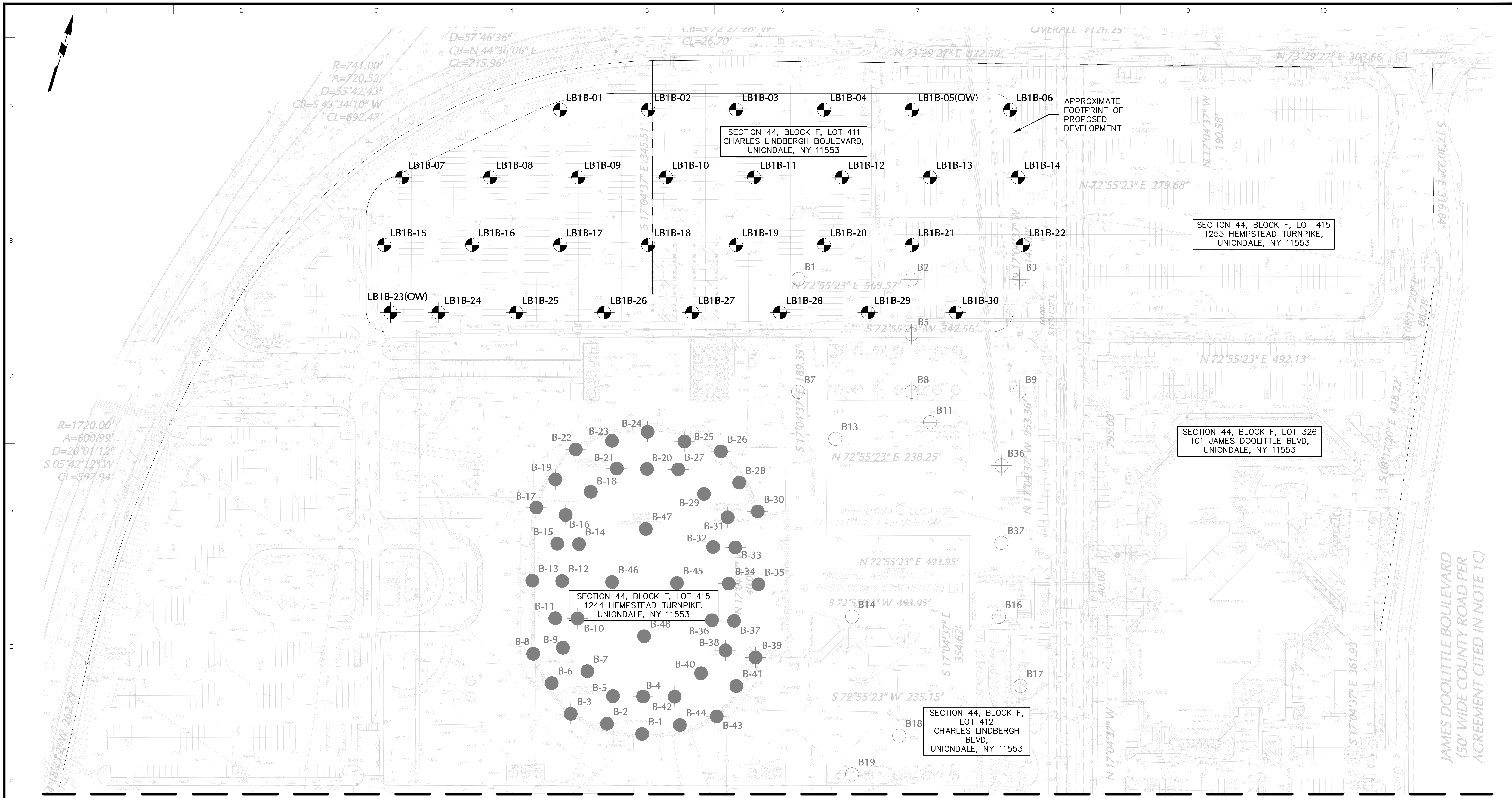
Project	Figure Title	Project No. 170754501	Figure
SANDS NEW YORK SECTION No. 44, BLOCK F LOTS No. 411, 412, 415, AND 351 TOWN OF HEMPSTEAD NASSAU COUNTY NEW YORK	EFFECTIVE FEMA FLOOD HAZARD MAP	Date 10/03/2023 Drawn By JJL Checked By SS	2 Sheet 2 of 4



GENERAL NOTES:

1. ALL ELEVATIONS SHOWN HEREIN ARE WITH RESPECT TO THE NORTH AMERICAN VERTICAL DATUM (NAVD88). TYPICAL DATUM CONVERSIONS ARE AS FOLLOWS:

   NGVD = NAVD88 + 1.1 FEET
   NASSAU COUNTY DATUM = NAVD88 + 1.1 FEET

2. SURVEY BASE MAP TAKEN FROM SURVEY TITLED "ALTA/NSPS LAND TITLE SURVEY, PROJECT MAXIMUS, SECTION NO. 44, BLOCK F, LOTS NO. 326, 401, 402, 411, 412, 415 AND 351, TOWN OF HEMPSTEAD, NASSAU COUNTY, NEW YORK", PREPARED BY LANGAN ENGINEERING, ENVIRONMENTAL, SURVEYING, LANDSCAPE ARCHITECTURE AND GEOLOGY, D.P.C., DATED 22 MAY 2023.
3. ALL LANGAN BORINGS WERE DRILLED UNDER THE FULL-TIME INSPECTION OF A LANGAN REPRESENTATIVE. ALL DRILLING WAS PERFORMED BY CRAIG GEOTECHNICAL DRILLING CO. INC. FROM 22 AUGUST 2023 TO 7 SEPTEMBER 2023.
4. DISTURBED SAMPLES WERE TAKEN USING A 2-INCH DIAMETER SPLIT-SPOON SAMPLER DRIVEN BY A 140-LB AUTOMATIC HAMMER FREE-FALLING 30-INCHES.
5. ALL BORING LOCATIONS WERE LAID OUT BY LANGAN REPRESENTATIVES BY MEASURING FROM EXISTING SITE FEATURES. ALL LOCATIONS SHOULD BE CONSIDERED APPROXIMATE.
6. THE MONITORING WELLS INSTALLED IN BORINGS DESIGNATED (OW) WERE USED TO MEASURE GROUNDWATER DEPTH DURING AND AFTER THE PERFORMANCE OF THE SUBSURFACE INVESTIGATION.
7. REFER TO APPENDIX A FOR BORING AND OBSERVATION WELL CONSTRUCTION LOGS.
8. REFER TO APPENDIX C FOR 1966 HISTORICAL BORINGS LOGS.
9. REFER TO APPENDIX D FOR 2014 HISTORICAL BORING LOGS.

LEGEND:

LB1B-#	LANGAN PHASE 1B BORING LOCATION
B#	2014 HISTORICAL BORING LOCATION BY OTHERS
B-#	1966 HISTORICAL BORING LOCATION BY OTHERS
(OW)	DENOTES OBSERVATION WELL
— — —	PROPERTY LINE

100 0 50 100
SCALE IN FEET

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Project
SANDS NEW YORK
SECTION No. 44, BLOCK F
LOTS No. 411, 412, 415 AND 351
TOWN OF HEMPSTEAD
NASSAU COUNTY NEW YORK

Figure Title
SUBSURFACE INVESTIGATION PLAN - PART A

Project No.	170754501
Date	10/03/2023
Drawn By	JJL
Checked By	SS
Figure	3
Sheet	3 of 4

LANGAN
PROJECT NO. 170754501

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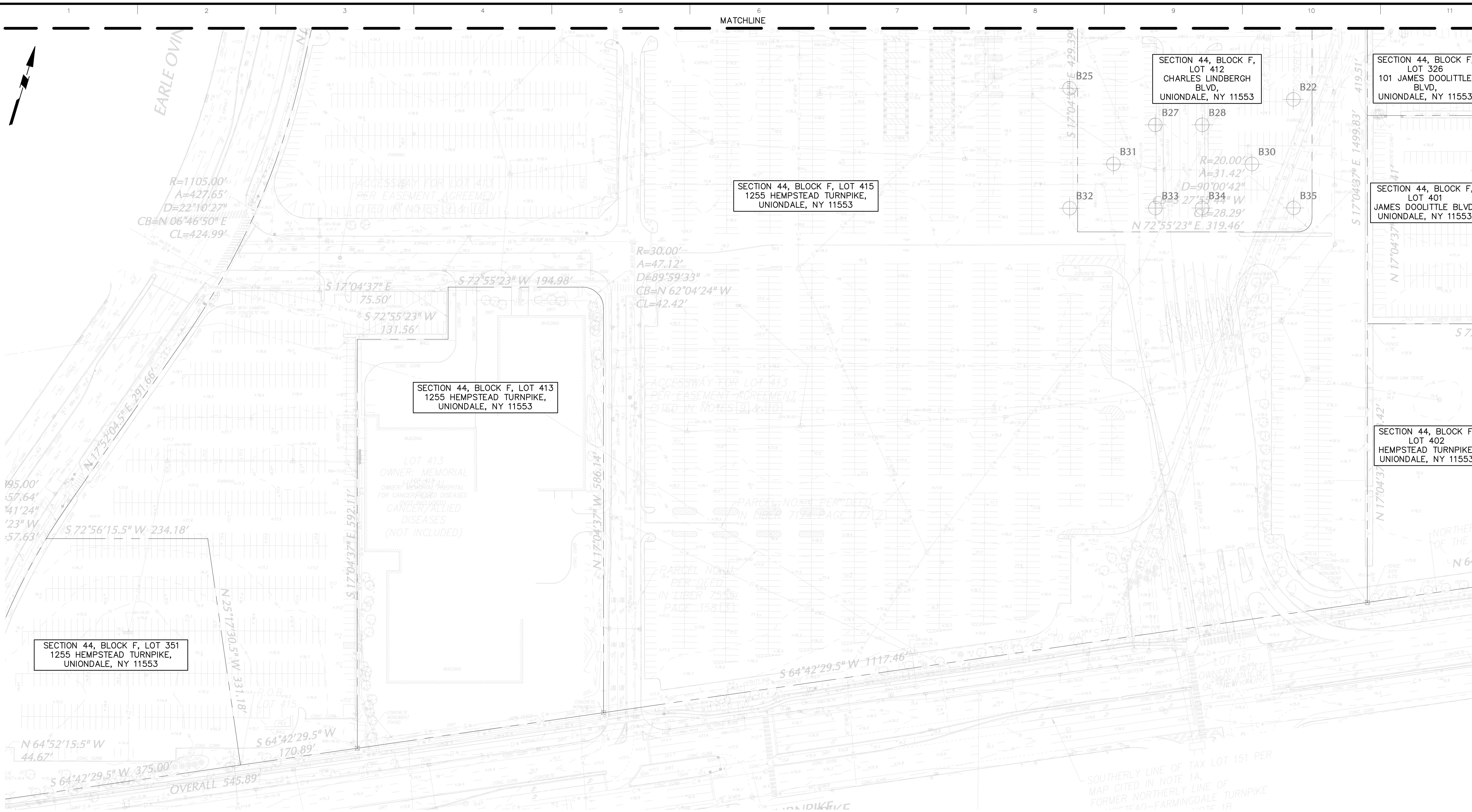

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   NASSAU COUNTY DATUM = NAVD88 + 1.1 FEET

2. SURVEY BASE MAP TAKEN FROM SURVEY TITLED "ALTA/NSPS LAND TITLE SURVEY, PROJECT MAXIMUS, SECTION NO. 44, BLOCK F, LOTS NO. 326, 401, 402, 411, 412, 415 AND 351, TOWN OF HEMPSTEAD, NASSAU COUNTY, NEW YORK", PREPARED BY LANGAN ENGINEERING, ENVIRONMENTAL, SURVEYING, LANDSCAPE ARCHITECTURE AND GEOLOGY, D.P.C., DATED 22 MAY 2023.
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7. REFER TO APPENDIX A FOR BORING AND OBSERVATION WELL CONSTRUCTION LOGS.
8. REFER TO APPENDIX C FOR 1966 HISTORICAL BORINGS LOGS.
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LEGEND:

LB1B-#	LANGAN PHASE 1B BORING LOCATION
B#	2014 HISTORICAL BORING LOCATION BY OTHERS
B-#	1966 HISTORICAL BORING LOCATION BY OTHERS
(OW)	DENOTES OBSERVATION WELL
	PROPERTY LINE

100 0 50 100
SCALE IN FEET

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Project	Figure Title	Project No.	Figure
SANDS NEW YORK SECTION No. 44, BLOCK F LOTS No. 411, 412, 415 AND 351 TOWN OF HEMPSTEAD NASSAU COUNTY NEW YORK	SUBSURFACE INVESTIGATION PLAN - PART B	170754501 Date: 10/03/2023 Drawn By: JJL Checked By: SS	4 Sheet 4 of 4

Filename: \\langan.com\data\NYC\data5\170754501\Project Data\CAD-Geotech\01\Sheet Files\Phase 1b GER\170754501-BI001-0101.dwg Date: 10/3/2023 Time: 11:47 User: mgillooley Style Table: Langan.stb Layout: Figure 4 - Subsurface Investigation Plan - Part B

APPENDIX A

(2023 LANGAN PHASE 1B BORING LOGS,
HAMMER EFFICIENCY, AND WELL LOGS)

LANGAN Log of Boring **LB1B-01** Sheet 1 of 4

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 81.0 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 8/22/2023	Date Finished: 8/22/2023
Drilling Equipment: CME75		Completion Depth: 102.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 21	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 11.0	Water Level (ft.): First N/A	Completion N/A; 24 HR. N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Shane Frick	
Sampler: 2in OD Split Spoon		Field Engineer: Thomas Keane	
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30		

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+81.0								
+80.5	6" ASPHALT	0						8/22/2023 Hand clear to 5ft. Collect Grab Sample G-1 from 0.5ft to 4ft. -#4 = 81.4% -#200 = 24.7%
	Dark gray coarse to fine SAND, some fine Gravel, some Silt (moist) [FILL]	0.5						
+77.0	Light brown coarse to fine SAND, trace Silt (moist) [SP-SM]	4						Collect Grab Sample G-2 from 4ft to 5ft.
	Light brown coarse to fine SAND, trace Silt (moist) [SP-SM]	5	S-1	SS	15	3, 7, 12, 11	23	Take S-1 from 5ft to 7ft.
+74.0	Light brown sandy SILT, trace fine Gravel (moist) [ML]	7	S-2	SS	16	5, 6, 6, 6	15	Take S-2 from 7ft to 9ft. -#4 = 96.2% -#200 = 61.7% Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
+72.0	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	9	S-3	SS	11	9, 15, 17, 12	39	Take S-3 from 9ft to 11ft.
		11						Drill to 15ft. Slight rig chatter, brown wash.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	15	S-4	SS	9	7, 11, 11, 11	30	Take S-4 from 15ft to 17ft.
		17						Drill to 20ft. Slight rig chatter, brown wash.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	20	S-5	SS	9	4, 18, 16, 15	52	Take S-5 from 20ft to 22ft.
		22						Drill to 25ft. Slight rig chatter, brown wash.
		24						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.0 ± (NAVD 88)

Elev. (ft): +57.0 at depth 24 ft

Depth (ft)	Sample Description	Sample Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
25–27	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	S-6	SS	10	8, 9, 9, 10	28	Take S-6 from 25ft to 27ft. Drill to 30ft. Slight rig chatter, brown wash.
30–32	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	S-7	SS	10	9, 10, 10, 9	31	Take S-7 from 30ft to 32ft. Drill to 35ft. Slight rig chatter, brown wash.
35–37	Light brown coarse to fine SAND, trace Silt (moist) [SP-SM]	S-8	SS	9	8, 6, 7, 7	21	Take S-8 from 35ft to 37ft. Drill to 40ft. Slight rig chatter, brown wash.
40–42	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	S-9	SS	10	12, 9, 10, 11	31	Take S-9 from 40ft to 42ft. Drill to 45ft. Slight rig chatter, brown wash.
45–47	Light brown medium to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	S-10	SS	10	5, 8, 8, 11	26	Take S-10 from 45ft to 47ft. Drill to 50ft. Slight rig chatter, brown wash.
50–52	Light brown medium to fine SAND, trace Silt, trace fine Gravel (wet) [SP-SM]	S-11	SS	10	14, 12, 14, 16	42	Take S-11 from 50ft to 52ft. Drill to 55ft. Heavy rig chatter, brown wash. Introduced drilling fluid.

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

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Log of Boring **LB1B-01** Sheet 3 of 4

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.0 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+27.0		54						
	Tan medium to fine SAND, trace Silt (wet) [SP-SM]	55	S-12	SS	14	20, 24, 27, 25	83	Take S-12 from 55ft to 57ft.
		57						Drill to 60ft. Slight rig chatter, brown wash.
	Yellowish tan fine SAND, trace Silt (wet) [SP-SM]	60	S-13	SS	15	24, 20, 28, 29	78	Take S-13 from 60ft to 62ft.
		62						Drill to 65ft. Smooth drilling, brown wash.
	Yellowish tan fine SAND, trace Silt (wet) [SP-SM]	65	S-14	SS	9	26, 21, 29, 22	81	Take S-14 from 65ft to 67ft.
		67						Drill to 70ft. Smooth drilling, light brown wash.
	Yellowish tan fine SAND, trace Silt (wet) [SP-SM]	70	S-15	SS	14	12, 10, 11, 9	34	Take S-15 from 70ft to 72ft.
		72						Drill to 75ft. Smooth drilling, light brown wash.
	Yellowish tan medium to fine SAND, trace Silt (wet) [SP-SM]	75	S-16	SS	15	18, 18, 20, 16	62	Take S-16 from 75ft to 77ft.
		77						Drill to 80ft. Smooth drilling, light brown wash. Introduced drilling fluid.
	Tan fine SAND, some Silt (wet) [SM]	80	S-17	SS	18	8, 14, 12, 14	42	Take S-17 from 80ft to 82ft.
		82						Drill to 85ft. Smooth drilling, light brown wash.
		84						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

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Log of Boring **LB1B-01** Sheet 4 of 4

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.0 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
-3.0		84						
	Tan medium to fine SAND, trace Silt (wet) [SP-SM]	85–87	S-18	SS	17	15, 25, 27, 26	84	Take S-18 from 85ft to 87ft. Drill to 90ft. Smooth drilling, light brown wash.
	Tan medium to fine SAND, trace Silt (wet) [SP-SM]	90–92	S-19	SS	16	14, 18, 16, 12	55	Take S-19 from 90ft to 92ft. Drill to 95ft. Smooth drilling, light brown wash.
	Tan medium to fine SAND, trace Silt (wet) [SP-SM]	95–97	S-20	SS	16	18, 20, 16, 14	58	Take S-20 from 95ft to 97ft. Drill to 100ft. Smooth drilling, light brown wash.
	Tan medium to fine SAND, trace Silt, trace fine Gravel (wet) [SP-SM]	100–102	S-21	SS	9	10, 22, 22, 12	71	Take S-21 from 100ft to 102ft.
-21.0	End of Boring at 102ft.	102						Bottom of boring at 102ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

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Log of Boring **LB1B-02**

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 80.5 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 8/30/2023	Date Finished: 8/30/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 12	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A	Completion N/A; 24 HR. N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Ed Flanagan	
Sampler: 2in OD Split Spoon			
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Field Engineer: Juan Baculima	

Elev. (ft)	Sample Description	Depth Scale (ft)	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+80.5	6" ASPHALT	0						8/30/2023 Hand clear to 5ft.
+80.0	Dark gray coarse to fine SAND, some fine Gravel, trace Silt (moist) [FILL]	0.5–5						
+75.5	Orangish brown silty coarse to fine SAND, some fine Gravel (dry) [SM]	5–7	S-1	SS	16	10, 14, 15, 17	37	Take S-1 from 5ft to 7ft.
	Orangish brown coarse to fine SAND, some fine Gravel, some Silt (dry) [SM]	7–9	S-2	SS	14	19, 13, 10, 16	29	Take S-2 from 7ft to 9ft. -#4 = 87.1% -#200 = 24.7% Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
	Orangish brown silty coarse to fine SAND, some fine Gravel (dry) [SM]	9–11	S-3	SS	11	18, 18, 18, 14	46	Take S-3 from 9ft to 11ft.
	Orangish brown silty coarse to fine SAND, some fine Gravel (dry) [SM]	11–13	S-4	SS	9	10, 18, 18, 17	49	Take S-4 from 11ft to 13ft. Drill to 15ft. Smooth drilling, brown wash.
	Grayish brown coarse to fine SAND, some Silt (wet) [SM]	15–17	S-5	SS	7	14, 15, 15, 11	43	Take S-5 from 15ft to 17ft. Drill to 20ft. Smooth drilling, brown wash.
	Light brown silty coarse to fine SAND, trace fine Gravel (wet) [SM]	20–22	S-6	SS	10	20, 31, 19, 20	80	Take S-6 from 20ft to 22ft. Drill to 25ft. Smooth drilling, brown wash.

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN Log of Boring **LB1B-02**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 80.5 ± (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	+56.5		24						
		Light brown fine gravelly coarse to fine SAND, trace Silt (wet) [SP-SM]	25–27	S-7	SS	10	19, 17, 17, 15	55	Take S-7 from 25ft to 27ft. Drill to 30ft. Smooth drilling, brown wash.
		Light brown coarse to fine SAND, some Silt, trace fine Gravel (wet) [SM]	30–32	S-8	SS	9	10, 7, 18, 7	40	Take S-8 from 30ft to 32ft. Drill to 35ft. Smooth drilling, brown wash.
		Light brown coarse to fine SAND, some Silt (wet) [SM]	35–37	S-9	SS	12	11, 10, 14, 12	41	Take S-9 from 35ft to 37ft. Drill to 40ft. Smooth drilling, light rig chatter, brown wash.
		Light brown medium to fine SAND, trace Silt, trace fine Gravel (wet) [SP-SM]	40–42	S-10	SS	8	10, 10, 11, 11	35	Take S-10 from 40ft to 42ft. Drill to 45ft. Smooth drilling, brown wash.
		Light brown medium to fine SAND, trace Silt, trace fine Gravel (wet) [SP-SM]	45–47	S-11	SS	11	9, 11, 14, 10	42	Take S-11 from 45ft to 47ft. Drill to 50ft. Smooth drilling, brown wash.
	+28.5	Light brown to orangish brown medium to fine SAND, some Silt, trace fine Gravel (wet) [SM]	50–52	S-12	SS	11	6, 9, 11, 13	34	Take S-12 from 50ft to 52ft.
		End of Boring at 52ft.	52–54						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN Log of Boring **LB1B-03**

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 81.6 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 8/31/2023	Date Finished: 8/31/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 12	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A	Completion N/A; 24 HR. N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Ed Flanagan	
Sampler: 2in OD Split Spoon			
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Field Engineer: Juan Baculima	

Elev. (ft) +81.6	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+81.1	6" ASPHALT	0						8/31/2023 Hand clear to 5ft.
	FILL	0.5						
+76.6	Brownish gray CLAY, trace fine Gravel, some fine Sand, some Silt (dry) [CL]	5	S-1	SS	12	6, 8, 12, 12	25	Take S-1 from 5ft to 7ft. LL = 28% PL =19% PI = 9%
+74.6	Dark gray to black silty coarse to fine SAND, trace Clay, some fine Gravel (dry) [SM]	7	S-2A	SS	22	20, 31, 28, 29	75	Take S-2 from 7ft to 9ft.
	Light brown silty coarse to fine SAND, some fine Gravel (dry) [SM]	8	S-2B	SS				Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
	Brown silty coarse to fine SAND (wet) [SM]	9	S-3	SS	12	19, 21, 20, 15	52	Take S-3 from 9ft to 11ft.
	Brown coarse to fine SAND, trace Silt, trace fine Gravel (wet) [SP-SM]	11	S-4	SS	6	3, 9, 15, 13	32	Take S-4 from 11ft to 13ft. -#4 = 95.6% -#200 = 5.9%
		13						Drill to 15ft. Smooth drilling, brown wash.
	Grayish brown coarse to fine SAND, some Silt (wet) [SM]	15	S-5	SS	7	13, 13, 13, 15	37	Take S-5 from 15ft to 17ft.
		17						Drill to 20ft. Smooth drilling, brown wash.
	Grayish brown coarse to fine SAND, some Silt, some fine Gravel (wet) [SM]	20	S-6	SS	9	10, 18, 26, 21	71	Take S-6 from 20ft to 22ft.
		22						Drill to 25ft. Smooth drilling, brown wash.
		24						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN

Log of Boring **LB1B-03**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.6 ± (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	+57.6		24						
		Grayish brown coarse to fine SAND, some Silt, trace fine Gravel (wet) [SM]	25–27	S-7	SS	5	9, 11, 14, 15	40	Take S-7 from 25ft to 27ft. Drill to 30ft. Smooth drilling, brown wash.
		Grayish brown silty coarse to fine SAND, trace fine Gravel (wet) [SM]	30–32	S-8	SS	9	10, 10, 11, 11	34	Take S-8 from 30ft to 32ft. Drill to 35ft. Smooth drilling, brown wash.
		Grayish brown coarse to fine SAND, some fine Gravel, some Silt (wet) [SM]	35–37	S-9	SS	9	9, 7, 11, 12	30	Take S-9 from 35ft to 37ft. Drill to 40ft. Smooth drilling, brown wash.
		Grayish brown medium to fine SAND, some fine Gravel, some Silt (wet) [SM]	40–42	S-10	SS	9	13, 9, 10, 12	32	Take S-10 from 40ft to 42ft. Drill to 45ft. Smooth drilling, brown wash.
		Grayish brown medium to fine SAND, some Silt, trace fine Gravel (wet) [SM]	45–47	S-11	SS	4	12, 15, 12, 13	46	Take S-11 from 45ft to 47ft. Drill to 50ft. Smooth drilling, brown wash.
		Grayish brown medium to fine SAND, some Silt, some fine Gravel (wet) [SM]	50–52	S-12	SS	10	11, 10, 11, 14	35	Take S-12 from 50ft to 52ft.
	+29.6	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
			54						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

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Log of Boring LB1B-04

Project	Sands New York	Project No.	170754501
Location	Nassau Coliseum	Elevation and Datum	Approx. el. 81.0 ± (NAVD 88)
Drilling Company	Craig Geotechnical Drilling	Date Started / Date Finished	8/23/2023 / 8/23/2023
Drilling Equipment	CME75	Completion Depth / Rock Depth	52.0 ft / N/E
Size and Type of Bit	3-7/8in Tricone Roller Bit	Number of Samples	Disturbed 12; Undisturbed 0; Core 0
Casing Diameter (in)	4 Flush Joint Steel; Casing Depth (ft) 14.0	Water Level (ft.)	First N/A; Completion N/A; 24 HR. N/A
Casing Hammer	Automatic; Weight (lbs) 140; Drop (in) 30	Drilling Foreman	Shane Frick
Sampler	2in OD Split Spoon	Field Engineer	Thomas Keane
Sampler Hammer	Automatic; Weight (lbs) 140; Drop (in) 30		

Elev. (ft) +81.0	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+80.5	6" ASPHALT	0						8/23/2023 Hand clear to 5ft. Collect Grab Sample G-1 from 0.5ft to 4ft.
	Dark gray coarse to fine SAND, some fine Gravel, trace Silt (moist) [FILL]	0.5						
+78.0	Tan coarse to fine SAND, trace Silt (moist) [SP-SM]	3						Collect Grab Sample G-2 from 3ft to 5ft.
	Light brown coarse to fine SAND, trace Silt (moist) [SP-SM]	5	S-2	SS	20	12 / 24 / 21 / 23	55	Take S-1 from 5ft to 7ft.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	7	S-1	SS	20	16 / 15 / 22 / 18	45	Take S-2 from 7ft to 9ft. Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP]	9	S-3	SS	10	8 / 10 / 12 / 8	27	Take S-3 from 9ft to 11ft. -#4 = 90.6% -#200 = 4.0%
	Brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	11	S-4	SS	14	10 / 14 / 16 / 14	39	Take S-4 from 11ft to 13ft. Drive casing to 14ft. Drill to 15ft. Slight rig chattering, brown wash.
	Brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	15	S-5	SS	9	10 / 14 / 14 / 16	39	Take S-5 from 15ft to 17ft. Drill to 20ft. Slight rig chattering, brown wash.
	Light brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	20	S-6	SS	11	10 / 16 / 19 / 11	54	Take S-6 from 20ft to 22ft. Drill to 25ft. Slight rig chatter, brown wash.

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

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Log of Boring **LB1B-04**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.0 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+57.0		24						
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	25–27	S-7	SS	9	10, 9, 14, 9	35	Take S-7 from 25ft to 27ft.
		27–30						Drill to 30ft. Slight rig chatter, brown wash.
	Light brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	30–32	S-8	SS	9	6, 6, 10, 9	25	Take S-8 from 30ft to 32ft.
		32–35						Drill to 35ft. Slight rig chatter, brown wash.
	No Recovery	35–37	S-9	SS	0	7, 8, 10, 6	29	Take S-9 from 35ft to 35ft.
		37–40						Drill to 40ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, some fine Gravel, trace Silt (wet) [SP-SM]	40–42	S-10	SS	9	12, 9, 8, 8	28	Take S-10 from 40ft to 42ft.
		42–45						Drill to 45ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace fine Gravel, trace Silt (wet) [SP-SM]	45–47	S-11	SS	10	8, 7, 9, 10	26	Take S-11 from 45ft to 47ft.
		47–50						Drill to 50ft. Moderate rig chatter, brown wash.
	Tan medium to fine SAND, trace Silt (wet) [SP-SM]	50–52	S-12	SS	6	16, 12, 14, 9	42	Take S-12 from 50ft to 52ft.
+29.0	End of Boring at 52ft.	52–54						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

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Log of Boring LB1B-05(OW)

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 81.0 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 9/7/2023	Date Finished: 9/7/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 12	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A	Completion N/A; 24 HR. N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Ed Flanagan	
Sampler: 2in OD Split Spoon			
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Field Engineer: Jonathan Negron	

Elev. (ft)	Sample Description	Depth (ft)	Number	Type	Recov. (in)	Penetr. resist BL/6in	N60-Value* (Blows/ft)
+81.0	6" ASPHALT	0					
+80.5	Dark gray coarse to fine SAND, some fine Gravel, trace Silt (moist) [FILL]	0.5					
+76.0	Tannish orangish brown coarse to fine SAND, some fine Gravel, trace Silt (dry) [SP-SM]	5	S-1	SS	16	19, 15, 20, 25	44
	Tannish orangish brown coarse to fine SAND, some fine Gravel, trace Silt (dry) [SP-SM]	7	S-2	SS	21	28, 22, 22, 19	56
	Tannish orangish brown coarse to fine SAND, some fine Gravel, trace Silt (dry) [SP]	9	S-3	SS	10	8, 8, 10, 10	23
	Tannish brown coarse to fine SAND, some fine Gravel, trace Silt (dry) [SP-SM]	11	S-4	SS	11	10, 11, 13, 13	32
	Tannish brown coarse to fine SAND, some fine Gravel, trace Silt (dry) [SP]	15	S-5	SS	10	6, 5, 10, 10	22
	Tannish brown coarse to fine SAND, some fine Gravel, trace Silt (dry) [SP-SM]	20	S-6	SS	6	16, 16, 20, 21	58

Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)

- 0 ft: 9/7/2023 Hand clear to 5ft.
- 3 ft: Collect Grab Sample G-1 from 0.5ft to 5ft.
- 5 ft: Take S-1 from 5ft to 7ft.
- 7 ft: Take S-2 from 7ft to 9ft.
- 8 ft: Drive casing to 9ft. Drill to 9ft. Slight rig chatter, brown wash.
- 9 ft: Take S-3 from 9ft to 11ft. -#4 = 81.3% -#200 = 4.1%
- 11 ft: Take S-4 from 11ft to 13ft.
- 13 ft: Drill to 15ft. Smooth drilling, brown wash.
- 15 ft: Take S-5 from 15ft to 17ft. -#4 = 91.7% -#200 = 3.2%
- 17 ft: Drill to 20ft. Smooth drilling, brown wash.
- 20 ft: Take S-6 from 20ft to 22ft.
- 22 ft: Drill to 25ft. Smooth drilling, brown wash.

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

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Log of Boring **LB1B-05(OW)** Sheet 2 of 2

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.0 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+57.0		24						
	Tannish brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	25–27	S-7	SS	9	9, 9, 13, 14	35	Take S-7 from 25ft to 27ft. Drill to 30ft. Smooth drilling, brown wash.
	Tannish brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	30–32	S-8	SS	11	11, 11, 13, 11	39	Take S-8 from 30ft to 32ft. Drill to 35ft. Smooth drilling, brown wash.
	Tannish brown medium to fine SAND, trace coarse Sand, some fine Gravel, trace Silt (wet) [SP-SM]	35–37	S-9	SS	12	9, 9, 8, 11	29	Take S-9 from 35ft to 37ft. Drill to 40ft. Smooth drilling, brown wash.
	Tannish brown medium to fine SAND, trace coarse Sand, some fine Gravel, trace Silt (wet) [SP-SM]	40–42	S-10	SS	13	9, 7, 7, 9	24	Take S-10 from 40ft to 42ft. Drill to 45ft. Smooth drilling, brown wash.
	Tannish brown medium to fine SAND, trace coarse Sand, trace fine Gravel, trace Silt (wet) [SP-SM]	45–47	S-11	SS	12	12, 8, 13, 13	35	Take S-11 from 45ft to 47ft. Drill to 50ft. Smooth drilling, brown wash.
	Tannish brown medium to fine SAND, trace coarse Sand, trace Silt, trace fine Gravel (wet) [SP-SM]	50–52	S-12	SS	13	6, 4, 6, 7	17	Take S-12 from 50ft to 52ft. -#4 = 96.8% -#200 = 7.9%
+29.0	End of Boring at 52ft.	52						Bottom of boring at 52ft. Install observation well, refer to Observation Well Construction Log.
		54						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

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Log of Boring **LB1B-06**

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 81.7 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 8/23/2023	Date Finished: 8/24/2023
Drilling Equipment: CME75		Completion Depth: 102.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 22	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 15.0	Water Level (ft.): First N/A	Completion N/A; 24 HR. N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Shane Frick	
Sampler: 2in OD Split Spoon		Field Engineer: Thomas Keane	
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30		

Elev. (ft) +81.7	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	6" ASPHALT	0						8/23/2023 Hand clear to 5ft. Collect Grab Sample G-1 from 0.5ft to 5ft.
+81.2	Dark gray silty coarse to fine SAND (moist) [FILL]	0.5						
+76.7	Light brown silty CLAY, trace fine Sand (moist) [CL]	5	S-2	SS	10	5 / 14 / 15 / 18	35	Take S-1 from 5ft to 7ft. LL = 26% PL = 18% PI = 8%
+74.7	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	7	S-1	SS	19	18 / 23 / 22 / 25	55	Take S-2 from 7ft to 9ft. Drive casing to 9ft. Drill to 9ft. Slight rig chatter, brown wash.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	9	S-3	SS	11	12 / 20 / 18 / 12	46	Take S-3 from 9ft to 11ft.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	11	S-4	SS	14	14 / 18 / 17 / 19	45	Take S-4 from 11ft to 13ft.
		13						Drive casing to 14ft. Drill to 15ft. Slight rig chatter, brown wash.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	15	S-5	SS	8	17 / 10 / 11 / 9	29	Take S-5 from 15ft to 17ft. -#4 = 71.8% -#200 = 5.6%
		17						Drill to 20ft. Slight rig chatter, brown wash.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	20	S-6	SS	12	7 / 18 / 24 / 21	65	Take S-6 from 20ft to 22ft.
		22						Drill to 25ft. Moderate rig chatter, brown wash.
		24						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN Log of Boring **LB1B-06**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.7 ± (NAVD 88)

Depth (ft)	Elev. (ft)	Sample Description	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
24	+57.7							
25–27		Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	S-7	SS	12	14, 19, 18, 21	57	Take S-7 from 25ft to 27ft.
27								Drill to 30ft. Slight rig chatter, brown wash.
30–32		Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	S-8	SS	14	14, 13, 12, 10	38	Take S-8 from 30ft to 32ft.
32								Drill to 35ft. Slight rig chatter, brown wash.
35–37		Light brown medium to fine SAND, trace coarse Sand, some fine Gravel, trace Silt (moist) [SP-SM]	S-9	SS	14	12, 9, 12, 14	34	Take S-9 from 35ft to 37ft.
37								Drill to 40ft. Moderate rig chatter, brown wash.
40–42		Light brown medium to fine SAND, trace coarse Sand, trace Silt, trace fine Gravel (moist) [SP-SM]	S-10	SS	14	14, 9, 11, 11	32	Take S-10 from 40ft to 42ft.
42								Drill to 45ft. Slight rig chatter, brown wash.
45–47		Tan medium to fine SAND, trace Silt (moist) [SP-SM]	S-11	SS	10	12, 11, 12, 14	37	Take S-11 from 45ft to 47ft.
47								Drill to 50ft. Slight rig chatter, brown wash.
50–52		Light brown medium to fine SAND, trace Silt (wet) [SP-SM]	S-12	SS	15	9, 10, 12, 8	36	Take S-12 from 50ft to 52ft.
52								Drill to 55ft. Slight rig chatter, brown wash.
54								

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.7 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+27.7		54						
	Light brown medium to fine SAND, trace Silt (wet) [SP-SM]	55–57	S-13	SS	18	5 / 9 / 14 / 14	37	Take S-13 from 55ft to 57ft. Drill to 60ft. Slight rig chatter, brown wash.
	Light brown fine SAND, trace Silt (wet) [SP-SM]	60–62	S-14	SS	16	15 / 18 / 16 / 14	55	Take S-14 from 60ft to 62ft. Drill to 65ft. Slight rig chatter, brown wash.
	Light brown fine SAND, trace Silt (wet) [SP-SM]	65–67	S-15	SS	17	11 / 13 / 15 / 12	45	Take S-15 from 65ft to 67ft. 8/24/2023 Drill to 70ft. Slight rig chatter, brown wash.
	Light brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	70–72	S-16	SS	11	14 / 19 / 21 / 17	65	Take S-16 from 70ft to 72ft. Drill to 75ft. Slight rig chatter, brown wash.
	Light brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	75–77	S-17	SS	12	11 / 9 / 17 / 15	42	Take S-17 from 75ft to 77ft. Drill to 80ft. Slight rig chatter, brown wash.
	Light brown fine SAND, trace medium Sand, trace Silt, trace Clay (wet) [SP-SM]	80–82	S-18	SS	16	9 / 12 / 16 / 10	45	Take S-18 from 80ft to 82ft. Drill to 85ft. Smooth drilling, brown wash.
		84						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

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Log of Boring **LB1B-06**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.7 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
-2.3		84						
	Light brown fine SAND, trace Silt (wet) [SP-SM]	85–87	S-19	SS	11	25 / 23 / 26 / 19	79	Take S-19 from 85ft to 87ft.
		87–90						Drill to 90ft. Smooth drilling, light brown wash.
	Light brown fine SAND, trace Silt (wet) [SP-SM]	90–92	S-20	SS	8	7 / 9 / 9 / 7	29	Take S-20 from 90ft to 92ft.
		92–95						Drill to 95ft. Smooth drilling, light brown wash.
	Light brown fine SAND, trace Silt (wet) [SP-SM]	95–97	S-21	SS	12	8 / 8 / 17 / 10	40	Take S-21 from 95ft to 97ft.
		97–100						Drill to 100ft. Smooth drilling, light brown wash.
	Light brown fine SAND, trace Silt (wet) [SP-SM]	100–102	S-22	SS	14	12 / 10 / 9 / 10	31	Take S-22 from 100ft to 102ft.
-20.3	End of Boring at 102ft.	102						Bottom of boring at 102ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

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Log of Boring **LB1B-07**

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 81.6 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 8/28/2023	Date Finished: 8/28/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 14	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A	Completion N/A; 24 HR. N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Mike Gorski	
Sampler: 2in OD Split Spoon		Field Engineer: Juan Baculima	
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30		

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+81.6								
+81.1	6" ASPHALT	0						8/28/2023 Hand clear to 5ft.
	Brown silty coarse to fine SAND, some fine Gravel (moist) [FILL]	1						
		2						Collect Grab Sample G-1 from 2ft to 4ft.
+76.6		5						Take S-1 from 5ft to 7ft.
	Orangish brown to brown coarse to fine SAND, trace Silt (dry) [SP-SM]	5	S-1A	SS	20	28, 24	68	
	Grayish brown coarse to fine SAND, trace fine Gravel, some Silt (dry) [SM]	6	S-1B	SS		30, 30		
	Light brown coarse to fine SAND, some Silt (dry) [SM]	7	S-2	SS	18	37, 30, 26, 27	71	Take S-2 from 7ft to 9ft. Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (wet) [SP-SM]	9	S-3	SS	12	12, 13, 13, 10	33	Take S-3 from 9ft to 11ft. -#4 = 88.2% -#200 = 5.4%
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (wet) [SP-SM]	11	S-4	SS	14	14, 15, 14, 10	39	Take S-4 from 11ft to 13ft. Drill to 15ft. Smooth drilling, brown wash.
	Brown coarse to fine SAND, trace Silt, some fine Gravel (wet) [SP-SM]	15	S-5	SS	8	10, 12, 15, 12	39	Take S-5 from 15ft to 17ft. Drill to 20ft. Moderate rig chatter, brown wash.
	Light brown coarse to fine SAND, some fine Gravel, some Silt (wet) [SM]	20	S-6	SS	13	23, 24, 28, 27	83	Take S-6 from 20ft to 22ft. Drill to 25ft. Light rig chatter. Smooth drilling, brown wash.
		24						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN

Log of Boring **LB1B-07**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.6 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Sample Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+57.6		24						
	Light brown coarse to fine SAND, some fine Gravel, some Silt (wet) [SM]	25–27	S-7	SS	8	12, 17, 17, 26	55	Take S-7 from 25ft to 27ft.
		27–30						Drill to 30ft. Smooth drilling, dark brown wash.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (wet) [SP-SM]	30–32	S-8	SS	12	11, 15, 20, 18	56	Take S-8 from 30ft to 32ft.
		32–35						Drill to 35ft. Smooth drilling, dark brown wash.
	No Recovery	35–37	S-9	SS	0	16, 19, 15, 12	57	Take S-9 from 35ft to 37ft.
	Light brown medium to fine SAND, trace Silt, some fine Gravel, trace coarse Sand (wet) [SP-SM]	37–39	S-10	SS	15	10, 16, 20, 15	61	Take S-10 from 37ft to 39ft.
		39–40						Drill to 40ft. Smooth drilling, light rig chatter, brown wash.
	Brown fine gravelly medium to fine SAND, some Silt (wet) [SM]	40–42	S-11	SS	10	11, 9, 10, 6	32	Take S-11 from 40ft to 42ft.
		42–45						Drill to 45ft. Smooth drilling, brown wash.
	Light brown fine gravelly coarse to fine SAND, trace Silt (wet) [SP]	45–47	S-12	SS	9	8, 5, 4, 4	15	Take S-12 from 45ft to 47ft. -#4 = 65.1% -#200 = 2.3%
	Light brown medium to fine SAND, some fine Gravel, trace coarse Sand, trace Silt (wet) [SP-SM]	47–49	S-13	SS	13	7, 14, 15, 15	49	Take S-13 from 47ft to 49ft.
		49–50						Drill to 50ft. Smooth drilling, brown wash.
	Grayish brown medium to fine SAND, trace fine Gravel, trace Silt (wet) [SP-SM]	50–52	S-14	SS	11	13, 12, 14, 11	44	Take S-14 from 50ft to 52ft.
+29.6	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
		53–54						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN

Log of Boring LB1B-08

Project	Sands New York	Project No.	170754501
Location	Nassau Coliseum	Elevation and Datum	Approx. el. 81.2 ± (NAVD 88)
Drilling Company	Craig Geotechnical Drilling	Date Started / Date Finished	8/28/2023 / 8/28/2023
Drilling Equipment	CME75	Completion Depth / Rock Depth	52.0 ft / N/E
Size and Type of Bit	3-7/8in Tricone Roller Bit	Number of Samples	Disturbed 12; Undisturbed 0; Core 0
Casing Diameter (in)	4 Flush Joint Steel; Casing Depth (ft) 9.0	Water Level (ft.)	First N/A; Completion N/A; 24 HR. N/A
Casing Hammer	Automatic; Weight (lbs) 140; Drop (in) 30	Drilling Foreman	Mike Gorski
Sampler	2in OD Split Spoon	Field Engineer	Juan Baculima
Sampler Hammer	Automatic; Weight (lbs) 140; Drop (in) 30		

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr- resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+81.2	6" ASPHALT	0						8/28/2023 Hand clear to 5ft.
+80.7	Dark gray coarse to fine SAND, some fine Gravel, trace Silt (moist) [FILL]	0.5						Collect Grab Sample G-1 from 2ft to 4ft.
+76.2	Black clayey SILT, trace fine Sand (dry) [ML]	5	S-1A	SS	22	6 / 10 / 16 / 14	33	Take S-1 from 5ft to 7ft. LL = 36% PL = 26% PI = 10%
+75.4	Orangish brown silty coarse to fine SAND, trace fine Gravel (dry) [SM]	5.8	S-1B	SS				
	Orangish brown silty coarse to fine SAND, trace fine Gravel (dry) [SM]	7	S-2	SS	18	21 / 28 / 25 / 18	67	Take S-2 from 7ft to 9ft. Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
	Orangish brown silty coarse to fine SAND (dry) [SM]	9	S-3	SS	13	19 / 23 / 22 / 16	57	Take S-3 from 9ft to 11ft.
	Orangish brown silty coarse to fine SAND, trace fine Gravel (wet) [SM]	11	S-4	SS	11	19 / 19 / 20 / 14	53	Take S-4 from 11ft to 13ft. Drill to 15ft. Smooth drilling, brown wash.
	Light greenish brown coarse to fine SAND, trace Silt (wet) [SP-SM]	15	S-5	SS	12	12 / 11 / 15 / 16	37	Take S-5 from 15ft to 17ft. -#4 = 86.7% -#200 = 5.1% Drill to 20ft. Smooth drilling, brown wash.
	Brown silty coarse to fine SAND, some fine Gravel (wet) [SM]	20	S-6	SS	11	18 / 18 / 25 / 22	69	Take S-6 from 20ft to 22ft. Drill to 25ft. Smooth drilling, light rig chatter, brown wash.

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN Log of Boring **LB1B-08**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.2 ± (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	+57.2		24						
		Brown silty coarse to fine SAND, some fine Gravel (wet) [SM]	25–27	S-7	SS	10	18 / 12 / 14 / 11	42	Take S-7 from 25ft to 27ft. Drill to 30ft. Smooth drilling, brown wash.
		Brown silty coarse to fine SAND, some fine Gravel (wet) [SM]	30–32	S-8	SS	11	13 / 13 / 19 / 18	51	Take S-8 from 30ft to 32ft. Drill to 35ft. Smooth drilling, brown wash.
		Brown coarse to fine SAND, some fine Gravel, trace Silt (wet) [SP-SM]	35–37	S-9	SS	12	9 / 11 / 11 / 7	37	Take S-9 from 35ft to 37ft. Drill to 40ft. Smooth drilling, brown wash.
		Brown fine gravelly coarse to fine SAND, some Silt (wet) [SM]	40–42	S-10	SS	12	11 / 6 / 10 / 7	27	Take S-10 from 40ft to 42ft. Drill to 45ft. Smooth drilling, brown wash.
		Brown fine gravelly coarse to fine SAND, some Silt (wet) [SM]	45–47	S-11	SS	12	10 / 8 / 10 / 10	30	Take S-11 from 45ft to 47ft. Drill to 50ft. Smooth drilling, brown wash.
		Grayish brown medium to fine SAND, trace fine Gravel, trace Silt (wet) [SP-SM]	50–52	S-12	SS	11	19 / 17 / 16 / 15	56	Take S-12 from 50ft to 52ft.
	+29.2	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
			54						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

Template: Log-BH-NYC-GEO; Strip: BH-GEO (5); Printed on 10/02/2023

LANGAN Log of Boring **LB1B-09**

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 81.4 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 8/28/2023	Date Finished: 8/29/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 12; Undisturbed 0; Core 0	
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A; Completion N/A; 24 HR. N/A	
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Shane Frick	
Sampler: 2in OD Split Spoon		Field Engineer: Juan Baculima	
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30		

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+81.4								
+80.9	6" ASPHALT	0						8/28/2023 Hand clear to 5ft.
	Dark gray coarse to fine SAND, some fine Gravel, trace Silt (moist) [FILL]	1						
+76.4	Orangish brown silty coarse to fine SAND, trace fine Gravel (moist) [SM] Dark brown silty coarse to fine SAND, some Clay, trace fine Gravel (moist) [SM]	5	S-1A / S-1B	SS	17	9, 3, 3, 8	8	Take S-1 from 5ft to 7ft.
	Gray coarse to fine SAND, some Silt, some fine Gravel, trace Clay (wet) [SM]	7	S-2	SS	19	2, 2, 3, 3	6	Take S-2 from 7ft to 9ft. -#4 = 82.7% -#200 = 25.4% Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
+72.4	Orangish brown sandy CLAY (wet) [CL]	9	S-3	SS	20	3, 4, 4, 10	10	Take S-3 from 9ft to 11ft. LL = 35% PL = 22% PI = 13%
+70.4	Orangish brown silty coarse to fine SAND, trace fine Gravel (wet) [SM]	11	S-4	SS	15	14, 16, 18, 15	46	Take S-4 from 11ft to 13ft.
		13						8/29/2023 Drill to 15ft. Smooth drilling, brown wash.
	Light brown to grayish brown coarse to fine SAND, some Silt, some fine Gravel (wet) [SM]	15	S-5	SS	11	9, 10, 11, 10	30	Take S-5 from 15ft to 17ft.
		17						Drill to 20ft. Smooth drilling, moderate rig chatter, brown wash.
	Brownish gray gravelly coarse to fine SAND, trace Silt (wet) [SP-SM]	20	S-6	SS	7	6, 12, 17, 17	47	Take S-6 from 20ft to 22ft.
		22						Drill to 25ft. Smooth drilling, light rig chatter, brown wash.
		24						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN Log of Boring **LB1B-09**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.4 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+57.4		24						
	Brownish gray fine gravelly coarse to fine SAND, trace Silt (wet) [SP-SM]	25–27	S-7	SS	11	15, 12, 10, 11	35	Take S-7 from 25ft to 27ft. Drill to 30ft. Smooth drilling, brown wash.
	Orangish brown coarse to fine SAND, some Silt (wet) [SM]	30–32	S-8	SS	8	15, 15, 17, 21	51	Take S-8 from 30ft to 32ft. Drill to 35ft. Smooth drilling, brown wash.
	Grayish brown medium to fine SAND, some Silt, trace fine Gravel (wet) [SM]	35–37	S-9	SS	10	15, 16, 18, 17	57	Take S-9 from 35ft to 37ft. Drill to 40ft. Smooth drilling, brown wash.
	Reddish brown medium to fine SAND, some Silt (wet) [SM]	40–42	S-10	SS	11	12, 14, 13, 15	46	Take S-10 from 40ft to 42ft. Drill to 45ft. Smooth drilling, brown wash.
	Brownish gray medium to fine SAND, trace coarse Sand, some Silt, trace fine Gravel (wet) [SM]	45–47	S-11	SS	9	17, 20, 19, 16	66	Take S-11 from 45ft to 47ft. Drill to 50ft. Smooth drilling, brown wash.
	Brownish gray medium to fine SAND, some Silt, trace fine Gravel (wet) [SM]	50–52	S-12	SS	19	21, 21, 24, 34	76	Take S-12 from 50ft to 52ft.
+29.4	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
		54						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN Log of Boring **LB1B-10** Sheet 1 of 2

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 81.8 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 8/30/2023	Date Finished: 8/30/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 12	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A	Completion N/A; 24 HR. N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Ed Flanagan	
Sampler: 2in OD Split Spoon			
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Field Engineer: Juan Baculima	

Elev. (ft) +81.8	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+81.3	6" ASPHALT	0						8/30/2023 Hand clear to 5ft.
	Dark gray coarse to fine SAND, some fine Gravel, trace Silt (moist) [FILL]	1						
	Dark brown coarse to fine SAND, some Silt, some fine Gravel (dry) [FILL]	5	S-1	SS	11	6 5 6 9	14	Take S-1 from 5ft to 7ft. -#4 = 86.4% -#200 = 22%
+74.8	Brown silty coarse to fine SAND, trace Clay, some fine Gravel (dry) [SM]	7	S-2	SS	17	12 10 8 6	23	Take S-2 from 7ft to 9ft. Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
	Orangish brown coarse to fine SAND, some Silt, trace fine Gravel (wet) [SM]	9	S-3	SS	13	22 20 22 20	53	Take S-3 from 9ft to 11ft.
	Orangish brown silty coarse to fine SAND, trace fine Gravel (wet) [SM]	11	S-4	SS	10	7 18 20 18	51	Take S-4 from 11ft to 13ft. Drill to 15ft. Smooth drilling, brown wash.
	Brownish gray coarse to fine SAND, trace Silt, some fine Gravel (wet) [SP-SM]	15	S-5	SS	11	14 15 20 15	50	Take S-5 from 15ft to 17ft. Drill to 20ft. Smooth drilling, brown wash.
	Grayish brown coarse to fine SAND, trace fine Gravel, some Silt (wet) [SM]	20	S-6	SS	10	19 16 17 18	53	Take S-6 from 20ft to 22ft. Drill to 25ft. Smooth drilling, brown wash.
		24						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN Log of Boring **LB1B-10**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.8 ± (NAVD 88)

Material Symbol	Elev. (ft) +57.8	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
		Grayish brown silty coarse to fine SAND, some fine Gravel (wet) [SM]	25–27	S-7	SS	10	16 / 15 / 17 / 15	51	Take S-7 from 25ft to 27ft. Drill to 30ft. Smooth drilling, light rig chatter, brown wash.
		Orangish brown silty coarse to fine SAND, trace fine Gravel [SM]	30–32	S-8	SS	11	15 / 14 / 16 / 12	48	Take S-8 from 30ft to 32ft. Drill to 35ft. Smooth drilling, brown wash.
		Orangish brown silty medium to fine SAND, trace fine Gravel, trace coarse Sand (wet) [SM]	35–37	S-9	SS	11	14 / 15 / 18 / 15	56	Take S-9 from 35ft to 37ft. Drill to 40ft. Smooth drilling, brown wash.
		Orangish brown medium to fine SAND, trace fine Gravel, some Silt (wet) [SM]	40–42	S-10	SS	12	15 / 14 / 15 / 14	49	Take S-10 from 40ft to 42ft. Drill to 45ft. Smooth drilling, brown wash.
		Orangish brown medium to fine SAND, trace fine Gravel, some Silt (wet) [SM]	45–47	S-11	SS	12	18 / 14 / 17 / 15	52	Take S-11 from 45ft to 47ft. Drill to 50ft. Smooth drilling, brown wash.
	+29.8	Grayish brown medium to fine SAND, trace fine Gravel, trace coarse Sand, some Silt (wet) [SM]	50–52	S-12	SS	10	14 / 16 / 17 / 20	56	Take S-12 from 50ft to 52ft.
		End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.

Depth scale: 24–54 ft. N60 scale: 10, 20, 30, 40.

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

Template: Log-BH-NYC-GEO; Strip: BH-GEO (5); Printed on 10/02/2023

LANGAN

Log of Boring **LB1B-11**

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 82.0 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 8/29/2023	Date Finished: 8/30/2023
Drilling Equipment: CME75		Completion Depth: 102.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 23	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A	Completion N/A; 24 HR. N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Ed Flanagan	
Sampler: 2in OD Split Spoon			
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Field Engineer: Juan Baculima	

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+82.0		0						
+81.5	6" ASPHALT	0						8/30/2023 Hand clear to 5ft.
	Light brown silty coarse to fine SAND (moist) [FILL]	1–5						Collect Grab Sample G-1 from 3ft to 5ft.
+77.0	Orangish brown silty coarse to fine SAND, trace fine Gravel (dry) [SM]	5–7	S-1	SS	20	10, 12, 21, 28	42	Take S-1 from 5ft to 7ft.
	Light brown to brown coarse to fine SAND, some fine Gravel, trace Silt (dry) [SP]	7–9	S-2	SS	23	24, 37, 36, 33	93	Take S-2 from 7ft to 9ft. -#4 = 81.9% -#200 = 4.7% Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash. Take S-3 from 9ft to 11ft.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (dry) [SP-SM]	9–11	S-3	SS	15	24, 23, 28, 33	65	
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (dry) [SP-SM]	11–13	S-4	SS	9	40, 32, 32, 28	87	Take S-4 from 11ft to 13ft. Drill to 15ft. Smooth drilling, brown wash.
	Grayish brown coarse to fine SAND, some fine Gravel, trace Silt (wet) [SP-SM]	15–17	S-5	SS	12	8, 11, 17, 19	40	Take S-5 from 15ft to 17ft. Drill to 20ft. Smooth drilling, brown wash
	Grayish brown coarse to fine SAND, some fine Gravel, trace Silt (wet) [SP-SM]	20–22	S-6	SS	10	19, 15, 30, 32	72	Take S-6 from 20ft to 22ft. Drill to 25ft. Smooth drilling, brown wash.
		24						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN Log of Boring **LB1B-11** Sheet 2 of 4

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 82.0 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale (ft)	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+58.0		24						
	Orange silty coarse to fine SAND, trace fine Gravel (wet) [SM]	25	S-7	SS	10	9, 14, 19, 15	53	Take S-7 from 25ft to 27ft. Drill to 30ft. Smooth drilling, brown wash.
	Orangish brown coarse to fine SAND, some Silt, trace fine Gravel (wet) [SM]	30	S-8	SS	8	14, 14, 15, 12	47	Take S-8 from 30ft to 32ft. Drill to 35ft. Smooth drilling, brown wash.
	Orangish brown coarse to fine SAND, some Silt, trace fine Gravel (wet) [SM]	35	S-9	SS	9	13, 13, 12, 11	42	Take S-9 from 35ft to 37ft. Drill to 40ft. Smooth drilling, brown wash.
	Grayish brown medium to fine SAND, trace fine Gravel, trace Silt (wet) [SP-SM]	40	S-10	SS	6	15, 19, 16, 13	59	Take S-10 from 40ft to 42ft. Drill to 45ft. Smooth drilling, brown wash.
	Grayish brown medium to fine SAND, some fine Gravel, trace Silt (wet) [SP-SM]	45	S-11	SS	13	15, 13, 14, 14	46	Take S-11 from 45ft to 47ft. Drill to 50ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, some fine Gravel, some Silt (wet) [SM]	50	S-12	SS	11	15, 11, 11, 11	37	Take S-12 from 50ft to 52ft. Drill to 55ft. Smooth drilling, brown wash.
		54						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN

Log of Boring **LB1B-11**

Project: Sands New York	Project No.: 170754501
Location: Nassau Coliseum	Elevation and Datum: Approx. el. 82.0 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+28.0		54						
	Brownish gray silty fine SAND, some Clay (wet) [SM]	55–57	S-13	SS	9	13, 24, 23, 14	79	Take S-13 from 55ft to 57ft. Drill to 60ft. Smooth drilling, brown wash.
	Tannish gray fine SAND, trace Silt (wet) [SP-SM]	60–62	S-14	SS	13	18, 27, 26, 34	90	Take S-14 from 60ft to 62ft. Drill to 65ft. Smooth drilling, brown wash.
	Gray fine SAND, trace Silt (wet) [SP-SM]	65–67	S-15	SS	10	14, 16, 16, 12	54	Take S-15 from 65ft to 67ft. Drill to 70ft. Smooth drilling, brown wash.
	Tannish gray fine SAND, some Silt (wet) [SM]	70–72	S-16	SS	14	10, 18, 17, 17	59	Take S-16 from 70ft to 72ft. Drill to 75ft. Smooth drilling, moderate rig chatter, brown wash.
	Tannish gray fine SAND, some Silt (wet) [SM]	75–77	S-17	SS	10	14, 19, 17, 16	61	Take S-17 from 75ft to 77ft. Drill to 80ft. Smooth drilling, brown wash.
+2.0	Dark gray CLAY, some Silt, some fine Sand (wet) [CL]	80–82	S-18	SS	24	5, 10, 11, 15	35	Take S-18 from 80ft to 82ft. LL = 45% PL = 23% PI = 22% 8/30/2023 Drill to 82ft. Smooth drilling, brown wash.
	Dark gray CLAY, some Silt, some fine Sand (wet) [CL]	82–82.5	S-19A	SS	20	8, 10, 10, 13	34	Take S-19 from 82ft to 84ft.
-0.5	Grayish brown to orangish brown fine SAND, some Clay (wet) [SC]	82.5–84	S-19B	SS				
		84						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN Log of Boring **LB1B-11** Sheet 4 of 4

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 82.0 ± (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	-2.0		84						Drill to 85ft. Smooth drilling, brown wash.
		Grayish brown to orangish brown fine SAND, some Silt (wet) [SM]	85	S-20	SS	12	3, 9, 10, 9	32	Take S-20 from 85ft to 87ft.
			87						Drill to 90ft. Smooth drilling, brown wash.
		Grayish brown to orangish brown silty fine SAND (wet) [SM]	90	S-21	SS	12	10, 12, 16, 13	47	Take S-21 from 90ft to 92ft.
			92						Drill to 95ft. Smooth drilling, brown wash.
		Orangish brown to mottled brown silty fine SAND, trace Clay (wet) [SM]	95	S-22	SS	17	22, 21, 19, 20	68	Take S-22 from 95ft to 97ft.
			97						Drill to 100ft. Smooth drilling, brown wash.
		Orangish gray silty fine SAND, trace medium Sand (wet) [SM]	100	S-23	SS	14	12, 16, 15, 17	52	Take S-23 from 100ft to 102ft.
	-20.0	End of Boring at 102ft.	102						Bottom of boring at 102ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN

Log of Boring **LB1B-12** Sheet 1 of 2

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 81.4 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 8/31/2023	Date Finished: 8/31/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 12	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A	Completion N/A; 24 HR. N/A
Casing Hammer: Automatic; Weight (lbs): 140	Drop (in): 30	Drilling Foreman: Ed Flanagan	
Sampler: 2in OD Split Spoon		Field Engineer: Juan Baculima	
Sampler Hammer: Automatic; Weight (lbs): 140	Drop (in): 30		

Material Symbol	Elev. (ft) +81.4	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	+80.9	6" ASPHALT	0						8/31/2023 Hand clear to 5ft.
		Light brown silty coarse to fine SAND, some fine Gravel (dry) [FILL]	1–4						Collect Grab Sample G-1 from 3ft to 5ft.
	+76.4	Brown silty coarse to fine SAND, some fine Gravel (dry) [SM]	5–7	S-1	SS	17	6 6 8 6	18	Take S-1 from 5ft to 7ft.
		Brown coarse to fine SAND, some fine Gravel, some Silt (dry) [SM]	7–9	S-2	SS	15	13 12 14 14	33	Take S-2 from 7ft to 9ft. Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
		Orangish brown silty coarse to fine SAND, trace fine Gravel (wet) [SM]	9–11	S-3	SS	12	16 15 15 17	38	Take S-3 from 9ft to 11ft.
		Brown coarse to fine SAND, some fine Gravel, trace Silt (wet) [SP-SM]	11–13	S-4	SS	9	9 11 11 16	30	Take S-4 from 11ft to 13ft. -#4 = 75.5% -#200 = 7.6%
			13–15						Drill to 15ft. Smooth drilling, brown wash.
		Light brown coarse to fine SAND, trace fine Gravel, trace Silt (wet) [SP-SM]	15–17	S-5	SS	12	10 10 12 12	32	Take S-5 from 15ft to 17ft.
			17–20						Drill to 20ft. Smooth drilling, brown wash.
		Light brown coarse to fine SAND, trace fine Gravel, trace Silt (wet) [SP-SM]	20–22	S-6	SS	11	11 14 24 19	61	Take S-6 from 20ft to 22ft.
			22–24						Drill to 25ft. Smooth drilling,brown wash.

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN Log of Boring **LB1B-12**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.4 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+57.4		24						
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (wet) [SP-SM]	25–27	S-7	SS	11	15 / 15 / 19 / 21	55	Take S-7 from 25ft to 27ft. Drill to 30ft. Smooth drilling,brown wash.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (wet) [SP-SM]	30–32	S-8	SS	9	13 / 11 / 15 / 11	42	Take S-8 from 30ft to 32ft. Drill to 35ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (wet) [SP-SM]	35–37	S-9	SS	10	9 / 9 / 11 / 10	34	Take S-9 from 35ft to 37ft. Drill to 40ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, trace Silt, trace fine Gravel (wet) [SP-SM]	40–42	S-10	SS	11	6 / 10 / 11 / 7	35	Take S-10 from 40ft to 42ft. Drill to 45ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, trace Silt (wet) [SP-SM]	45–47	S-11	SS	11	13 / 13 / 12 / 18	42	Take S-11 from 45ft to 47ft. Drill to 50ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, trace Silt, trace coarse Sand (wet) [SP-SM]	50–52	S-12	SS	12	8 / 13 / 13 / 10	44	Take S-12 from 50ft to 52ft.
+29.4	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
		54						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN Log of Boring **LB1B-13** Sheet 1 of 2

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 81.6 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 8/24/2023	Date Finished: 8/24/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 12	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A	Completion N/A; 24 HR. N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Brian Gregor	
Sampler: 2in OD Split Spoon			
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Field Engineer: Sebastian Baculima	

Elev. (ft) +81.6	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+81.1	6" ASPHALT	0						8/24/2023
	Dark brown to brown coarse to fine SAND, some Silt, trace fine Gravel (dry) [FILL]	0–5						Hand clear to 5ft. Collect Grab Sample G-1 from 2ft to 4ft. -#4 = 78.1% -#200 = 16.5%
+76.6	Orangish brown coarse to fine SAND, some Silt, some fine Gravel (dry) [SM]	5–7	S-1	SS	13	8, 21, 20, 18	52	Take S-1 from 5ft to 7ft.
	Orangish brown coarse to fine SAND, trace Silt, some fine Gravel (most) [SP]	7–9	S-2	SS	16	22, 18, 19, 16	47	Take S-2 from 7ft to 9ft. -#4 = 70.2% -#200 = 4.1% Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
	Orangish brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	9–11	S-3	SS	13	16, 20, 17, 18	47	Take S-3 from 9ft to 11ft.
	Orangish brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	11–13	S-4	SS	9	17, 16, 17, 21	45	Take S-4 from 11ft to 13ft. Drill to 15ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace Silt, some fine Gravel (wet) [SP-SM]	15–17	S-5	SS	11	11, 13, 15, 13	40	Take S-5 from 15ft to 17ft. -#4 = 82.9% -#200 = 5.9% Drill to 20ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace Silt, some fine Gravel (wet) [SP-SM]	20–22	S-6	SS	8	23, 30, 27, 22	92	Take S-6 from 20ft to 22ft. Drill to 25ft. Smooth drilling, light rig chatter at 22.5ft, brown wash.

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN Log of Boring **LB1B-13**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.6 ± (NAVD 88)

Elev. (ft) +57.6	Sample Description	Depth Scale (ft)	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	Brown coarse to fine SAND, some Silt, trace fine Gravel (wet) [SM]	25–27	S-7	SS	11	16, 18, 20, 15	61	Take S-7 from 25ft to 27ft. Drill to 30ft. Smooth drilling, brown wash.
	Brown coarse to fine SAND, some Silt, trace fine Gravel (wet) [SM]	30–32	S-8	SS	12	13, 17, 18, 22	56	Take S-8 from 30ft to 32ft. Drill to 35ft. Smooth drilling, brown wash.
	Orangish brown coarse to fine SAND, some Silt, trace fine Gravel (wet) [SM]	35–37	S-9	SS	11	11, 10, 18, 14	47	Take S-9 from 35ft to 37ft. Drill to 40ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, some fine Gravel, trace Silt (wet) [SP-SM]	40–42	S-10	SS	11	13, 15, 13, 11	47	Take S-10 from 40ft to 42ft. Drill to 45ft. Smooth drilling, dark brown wash.
	Light brown medium to fine SAND, trace fine Gravel, trace Silt (wet) [SP-SM]	45–47	S-11	SS	14	18, 19, 18, 22	63	Take S-11 from 45ft to 47ft. Drill to 50ft. Smooth drilling, brown wash.
+29.6	Light brown medium to fine SAND, some Silt (wet) [SM]	50–52	S-12	SS	12	12, 13, 17, 14	51	Take S-12 from 50ft to 52ft.
	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

Template: Log-BH-NYC-GEO; Strip: BH-GEO (5); Printed on 10/02/2023

LANGAN Log of Boring **LB1B-14**

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 82.9 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 8/24/2023	Date Finished: 8/24/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 12	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A	Completion N/A; 24 HR. N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Brian Gregor	
Sampler: 2in OD Split Spoon		Field Engineer: Sebastian Baculima	
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30		

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+82.9								
+82.4	6" ASPHALT	0						8/24/2023 Hand clear to 5ft.
	Dark brown to brown coarse to fine SAND, some Silt, trace fine Gravel (dry) [FILL]	1–4						Collect Grab Sample G-1 from 2ft to 4ft.
+77.9	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	5–7	S-1	SS	22	20, 29, 28, 26	72	Take S-1 from 5ft to 7ft.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	7–9	S-2	SS	23	32, 29, 18, 18	60	Take S-2 from 7ft to 9ft. Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, some Silt, trace fine Gravel (moist) [SM]	9–11	S-3	SS	12	9, 15, 16, 15	39	Take S-3 from 9ft to 11ft.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP]	11–13	S-4	SS	15	19, 15, 17, 16	43	Take S-4 from 11ft to 13ft. -#4 = 95.8% -#200 = 4.7%
		13						Drill to 15ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace Silt (moist) [SP-SM]	15–17	S-5	SS	6	13, 15, 15, 17	43	Take S-5 at 15ft to 17ft.
		17						Drill to 20ft. Smooth drilling, light rig chatter, brown wash.
	Brown coarse to fine SAND, trace Silt, some fine Gravel (wet) [SP-SM]	20–22	S-6	SS	7	8, 6, 8, 10	22	Take S-6 from 20ft to 22ft.
		22–24						Drill to 25ft. Smooth drilling, light rig chatter, brown wash.

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 82.9 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+58.9		24						
	Orangish brown coarse to fine SAND, trace Silt (wet) [SP-SM]	25–27	S-7	SS	6	9, 16, 21, 22	59	Take S-7 from 25ft to 27ft. Drill to 30ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (wet) [SP-SM]	30–32	S-8	SS	9	8, 10, 9, 8	31	Take S-8 from 30ft to 32ft. Drill to 35ft. Smooth drilling, dark brown wash.
	Gray coarse to fine SAND, trace Silt, some fine Gravel (wet) [SP-SM]	35–37	S-9	SS	4	13, 10, 12, 11	37	Take S-9 from 35ft to 37ft. Drill to 40ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, trace Silt, some fine Gravel (wet) [SP-SM]	40–42	S-10	SS	8	8, 6, 9, 7	25	Take S-10 from 40ft to 42ft. Drill to 45ft. Smooth drilling, light brown wash.
	Light brown medium to fine SAND, trace Silt, some fine Gravel (wet) [SP-SM]	45–47	S-11	SS	3	17, 15, 18, 12	56	Take S-11 from 45ft to 47ft. Drill to 50ft. Smooth drilling, light brown wash.
	Orangish brown medium to fine SAND, some Silt, some fine Gravel (wet) [SM]	50–52	S-12	SS	11	19, 20, 17, 12	63	Take S-12 from 50ft to 52ft.
+30.9	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
		54						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

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Log of Boring **LB1B-15** Sheet 1 of 4

Project	Sands New York	Project No.	170754501
Location	Nassau Coliseum	Elevation and Datum	Approx. el. 81.5 ± (NAVD 88)
Drilling Company	Craig Geotechnical Drilling	Date Started / Date Finished	8/28/2023 / 8/29/2023
Drilling Equipment	CME75	Completion Depth / Rock Depth	102.0 ft / N/E
Size and Type of Bit	3-7/8in Tricone Roller Bit	Number of Samples	Disturbed 23; Undisturbed 0; Core 0
Casing Diameter (in)	4 Flush Joint Steel; Casing Depth (ft) 9.0	Water Level (ft.)	First N/A; Completion N/A; 24 HR. N/A
Casing Hammer	Automatic; Weight (lbs) 140; Drop (in) 30	Drilling Foreman	Shane Frick
Sampler	2in OD Split Spoon	Field Engineer	Thomas Keane
Sampler Hammer	Automatic; Weight (lbs) 140; Drop (in) 30		

Elev. (ft) +81.5	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	6" ASPHALT	0						8/28/2023 Hand clear to 5ft. Collect Grab Sample G-1 from 0.5ft to 5ft.
+81.0	Dark gray coarse to fine SAND, some Silt, trace fine Gravel (moist) [FILL]							
+76.5	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	5	S-1	SS	15	12, 15, 29, 21	53	Take S-1 from 5ft to 7ft.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	7	S-2	SS	16	29, 31, 34, 37	79	Take S-2 from 7ft to 9ft. Drive casing to 9ft. Drill to 9ft. Slight rig chatter, brown wash.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	9	S-3	SS	16	6, 11, 14, 11	30	Take S-3 from 9ft to 11ft.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP]	11	S-4	SS	14	14, 14, 12, 13	34	Take S-4 from 11ft to 13ft. -#4 = 92.6% -#200 = 4.3% Drive casing to 12ft. Drill to 15ft. Smooth drilling, gray wash.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	15	S-5	SS	15	16, 9, 21, 22	41	Take S-5 from 15ft to 17ft. Drill to 20ft. Slight rig chatter, brown wash.
	Light brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	20	S-6	SS	12	15, 19, 23, 15	65	Take S-6 from 20ft to 22ft. Drill to 25ft. Slight rig chatter, brown wash.
		24						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

Project: Sands New York	Project No.: 170754501
Location: Nassau Coliseum	Elevation and Datum: Approx. el. 81.5 ± (NAVD 88)

Material Symbol	Elev. (ft) +57.5	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
			24						
		Light brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	25–27	S-7	SS	12	10, 11, 13, 14	37	Take S-7 from 25ft to 27ft. Drill to 30ft. Slight rig chatter, brown wash.
		Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	30–32	S-8	SS	8	5, 18, 18, 14	55	Take S-8 from 30ft to 32ft. Drill to 35ft. Slight rig chatter, brown wash.
		Light brown medium to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	35–37	S-9	SS	8	10, 11, 11, 9	36	Take S-9 from 35ft to 37ft. Drill to 40ft. Slight rig chatter, brown wash.
		Light brown medium to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	40–42	S-10	SS	18	6, 11, 11, 10	36	Take S-10 from 40ft to 42ft. Drill to 45ft. Slight rig chatter, brown wash.
		Light brown medium to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	45–47	S-11	SS	7	11, 9, 9, 10	29	Take S-11 from 45ft to 47ft. Drill to 50ft. Slight rig chatter, brown wash.
		Light brown medium to fine SAND, trace Silt, trace fine Gravel (wet) [SP-SM]	50–52	S-12	SS	12	14, 10, 20, 14	49	Take S-12 from 50ft to 52ft. Drill to 55ft. Slight rig chatter, brown wash.
			54						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN Log of Boring **LB1B-15** Sheet 3 of 4

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.5 ± (NAVD 88)

Elev. (ft): +27.5

Depth Scale	Sample Description	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
55–57	Light brown medium to fine SAND, trace Silt, trace fine Gravel (wet) [SP-SM]	S-13	SS	12	9, 7, 14, 12	34	Take S-13 from 55ft to 57ft.
57–60							Drill to 60ft. Smooth drilling, brown wash.
60–62	Light brown fine SAND, trace medium Sand, trace Silt, trace fine Gravel (wet) [SP-SM]	S-14	SS	15	8, 10, 10, 11	32	Take S-14 from 60ft to 62ft.
62–65							Drill to 65ft. Slight rig chatter, brown wash.
65–67	Light brown clayey fine SAND, trace Silt (wet) [SC]	S-15	SS	21	4, 6, 8, 8	23	8/29/2023 Take S-15 from 65ft to 67ft. -#4 = 100% -#200 = 42%
67–68	Light brown clayey fine SAND, trace Silt (wet) [SC]	S-16A	SS	18	5, 8, 15, 15	37	Take S-16 from 67ft to 69ft.
68–69	Light brown fine SAND, trace Silt (wet) [SP-SM]	S-16B	SS				
69–70							Drill to 70ft. Smooth drilling, brown wash.
70–72	Light brown fine SAND, trace Silt (wet) [SP-SM]	S-17	SS	12	9, 16, 12, 12	45	Take S-17 from 70ft to 72ft.
72–75							Drill to 75ft. Smooth drilling, light brown wash.
75–77	Light brown fine SAND, trace Silt (wet) [SP-SM]	S-18	SS	12	7, 16, 15, 19	50	Take S-18 from 75ft to 77ft.
77–80							Drill to 80ft. Smooth drilling, light brown wash.
80–82	Light brown fine SAND, trace Silt (wet) [SP-SM]	S-19	SS	16	21, 19, 19, 18	62	Take S-19 from 80ft to 82ft.
82–84							Drill to 85ft. Smooth drilling, light brown wash.

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN Log of Boring **LB1B-15** Sheet 4 of 4

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.5 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth (ft)	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
-2.5		84						
	Light brown fine SAND, trace Silt, trace Clay (wet) [SP-SM]	85–87	S-20	SS	14	9, 9, 17, 12	42	Take S-20 from 85ft to 87ft.
		87–90						Drill to 90ft. Smooth drilling, light brown wash.
	Light brown fine SAND, trace Silt, trace medium Sand (wet) [SP-SM]	90–92	S-21	SS	9	20, 29, 19, 15	78	Take S-21 from 90ft to 92ft.
		92–95						Drill to 95ft. Smooth drilling, light brown wash.
	Light brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	95–97	S-22	SS	14	9, 14, 12, 16	42	Take S-22 from 95ft to 97ft.
		97–100						Drill to 100ft. Smooth drilling, light brown wash.
	Light brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	100–102	S-23	SS	17	6, 12, 14, 12	42	Take S-23 from 100ft to 102ft.
-20.5	End of Boring at 102ft.	102						Bottom of boring at 102ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

Template: Log-BH-NYC-GEO; Strip: BH-GEO (5); Printed on 10/02/2023

Project	Sands New York	Project No.	170754501
Location	Nassau Coliseum	Elevation and Datum	Approx. el. 80.0 ± (NAVD 88)
Drilling Company	Craig Geotechnical Drilling	Date Started / Date Finished	8/30/2023 / 8/30/2023
Drilling Equipment	CME75	Completion Depth / Rock Depth	52.0 ft / N/E
Size and Type of Bit	3-7/8in Tricone Roller Bit	Number of Samples	Disturbed 12; Undisturbed 0; Core 0
Casing Diameter (in)	4 Flush Joint Steel; Casing Depth (ft) 9.0	Water Level (ft.)	First N/A; Completion N/A; 24 HR. N/A
Casing Hammer	Automatic; Weight (lbs) 140; Drop (in) 30	Drilling Foreman	Shane Frick
Sampler	2in OD Split Spoon	Field Engineer	Thomas Keane
Sampler Hammer	Automatic; Weight (lbs) 140; Drop (in) 30		

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+80.0								
+79.5	6" ASPHALT	0						8/30/2023 Hand clear to 5ft. Collect Grab Sample G-1 from 0.5ft to 5ft.
	Dark brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [FILL]	0.5						
	Brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [FILL]	5	S-1	SS	14	5, 9, 9, 11	22	Take S-1 from 5ft to 7ft.
	Brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [FILL]	7	S-2	SS	20	10, 15, 22, 19	45	Take S-2 from 7ft to 9ft. Drive casing to 9ft. Drill to 9ft. Slight rig chatter, brown wash.
+71.0	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	9	S-3	SS	12	12, 24, 22, 14	56	Take S-3 from 9ft to 11ft.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	11	S-4	SS	9	16, 20, 22, 17	54	Take S-4 from 11ft to 13ft. Drive casing to 12ft. Drill to 15ft. Moderate rig chatter, gray wash.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	15	S-5	SS	10	11, 11, 15, 12	36	Take S-5 from 15ft to 17ft. -#4 = 71.2% -#200 = 5.3% Drill to 20ft. Slight rig chatter, brown wash.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	20	S-6	SS	7	9, 23, 16, 21	60	Take S-6 from 20ft to 22ft. Drill to 25ft. Slight rig chatter, brown wash.
		24						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN Log of Boring **LB1B-16**

Project: Sands New York	Project No.: 170754501
Location: Nassau Coliseum	Elevation and Datum: Approx. el. 80.0 ± (NAVD 88)

Material Symbol	Elev. (ft) +56.0	Sample Description	Depth Scale (ft)	Sample Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
			24						
		Light brown coarse to fine SAND, trace Silt (moist) [SP-SM]	25–27	S-7	SS	8	16, 23, 21, 19	68	Take S-7 from 25ft to 27ft. Drill to 30ft. Slight rig chatter, brown wash.
		Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	30–32	S-8	SS	7	7, 14, 13, 14	42	Take S-8 from 30ft to 32ft. Drill to 35ft. Smooth drilling, brown wash.
		Light brown medium to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	35–37	S-9	SS	6	14, 7, 8, 6	24	Take S-9 from 35ft to 37ft. Drill to 40ft. Slight rig chatter, brown wash.
		Light brown medium to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	40–42	S-10	SS	8	8, 16, 16, 15	52	Take S-10 from 40ft to 42ft. Drill to 45ft. Slight rig chatter, brown wash.
		Light brown to brown medium to fine SAND, trace Silt (wet) [SP-SM]	45–47	S-11	SS	6	13, 12, 10, 8	36	Take S-11 from 45ft to 47ft. Drill to 50ft. Slight rig chatter, brown wash. Loss of water.
		Light brown medium to fine SAND, trace Silt (wet) [SP-SM]	50–52	S-12	SS	11	9, 9, 16, 17	40	Take S-12 from 50ft to 52ft.
	+28.0	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
			53						
			54						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN Log of Boring **LB1B-17** Sheet 1 of 2

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 81.5 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 9/1/2023	Date Finished: 9/1/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 11	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A	Completion N/A; 24 HR. N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Shane Frick	
Sampler: 2in OD Split Spoon		Field Engineer: Thomas Keane	
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30		

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+81.5	6" ASPHALT	0						9/1/2023 Hand clear to 5ft. Collect Grab Sample G-1 from 0.5ft to 5ft.
+81.0	Dark brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [FILL]							
+76.5	Brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	5	S-1	SS	16	8, 12, 9, 7	26	Take S-1 from 5ft to 7ft. -#4 = 78.9% -#200 = 11.3%
	Brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	7	S-2	SS	20	10, 13, 7, 8	24	Take S-2 from 7ft to 9ft. Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
	Brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	9	S-3	SS	14	15, 30, 23, 22	64	Take S-3 from 9ft to 11ft. Drive casing to 12ft. Drill to 15ft. Smooth drilling, gray wash.
	Brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	15	S-4	SS	11	12, 12, 14, 15	36	Take S-4 from 15ft to 17ft. Drill to 20ft. Slight rig chatter, brown wash.
	Brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	20	S-5	SS	10	9, 12, 16, 11	43	Take S-5 from 20ft to 22ft. Drill to 25ft. Slight rig chatter, brown wash.
		24						

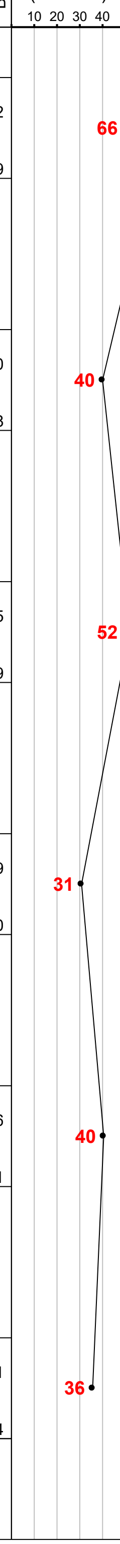
* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

Template: Log-BH-NYC-GEO; Strip: BH-GEO (5); Printed on 10/02/2023

LANGAN Log of Boring **LB1B-17**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.5 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+57.5		24						
	Brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	25	S-6	SS	6	18 22 21 19	66	Take S-6 from 25ft to 27ft. Drill to 30ft. Slight rig chatter, brown wash.
	Brown coarse to fine SAND, trace Silt (moist) [SP-SM]	30	S-7	SS	9	10 10 16 18	40	Take S-7 from 30ft to 32ft. Drill to 35ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace Silt (moist) [SP-SM]	35	S-8	SS	9	15 15 17 19	52	Take S-8 from 35ft to 37ft. Drill to 40ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace Silt (moist) [SP-SM]	40	S-9	SS	7	9 9 10 10	31	Take S-9 from 40ft to 42ft. Drill to 45ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, trace Silt (moist) [SP-SM]	45	S-10	SS	8	11 16 9 11	40	Take S-10 from 45ft to 47ft. Drill to 50ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace Silt (moist) [SP-SM]	50	S-11	SS	10	10 11 11 14	36	Take S-11 from 50ft to 52ft.
+29.5	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
		54						



* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN Log of Boring **LB1B-18**

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 81.0 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 9/1/2023	Date Finished: 9/1/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 12	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A	Completion N/A; 24 HR. N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Shane Frick	
Sampler: 2in OD Split Spoon		Field Engineer: Thomas Keane	
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30		

Elev. (ft) +81.0	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+80.5	6" ASPHALT	0						9/1/2023 Hand clear to 5ft. Collect Grab Sample G-1 from 0.5ft to 5ft.
	Dark gray coarse to fine SAND, some Silt, trace fine Gravel (moist) [FILL]	1						
	Brown to gray gravelly coarse to fine SAND, trace Silt (moist) [FILL]	5	S-1	SS	18	6, 7, 9, 11	19	Take S-1 from 5ft to 7ft.
	Brown to gray gravelly coarse to fine SAND, trace Silt (moist) [FILL]	7	S-2	SS	24	12, 11, 11, 14	27	Take S-2 from 7ft to 9ft. -#4 = 64.1% -#200 = 11.4% Drive casing to 9ft. Drill to 9ft. Slight rig chatter, brown wash.
+72.0	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	9	S-3	SS	12	15, 26, 19, 20	55	Take S-3 from 9ft to 11ft.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	11	S-4	SS	10	22, 26, 23, 29	64	Take S-4 from 11ft to 13ft.
		13						Drive casing to 12ft. Drill to 15ft. Moderate rig chatter, gray wash.
	Light brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP]	15	S-5	SS	11	11, 18, 19, 19	51	Take S-5 from 15ft to 17ft. -#4 = 76.6% -#200 = 4.3%
		17						Drill to 20ft. Slight rig chatter, brown wash.
	Light brown fine gravelly coarse to fine SAND, trace Silt (moist) [SP-SM]	20	S-6	SS	10	19, 28, 25, 24	82	Take S-6 from 20ft to 22ft.
		22						Drill to 25ft. Slight rig chatter, brown wash.
		24						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.0 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+57.0		24						
	Light brown fine gravelly coarse to fine SAND, trace Silt (moist) [SP-SM]	25–27	S-7	SS	11	11 / 11 / 14 / 15	38	Take S-7 from 25ft to 27ft. Drill to 30ft. Slight rig chatter, brown wash.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	30–32	S-8	SS	11	9 / 19 / 26 / 27	69	Take S-8 from 30ft to 32ft. Drill to 35ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	35–37	S-9	SS	12	17 / 17 / 19 / 17	58	Take S-9 from 35ft to 37ft. Drill to 40ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	40–42	S-10	SS	11	10 / 20 / 21 / 24	66	Take S-10 from 40ft to 42ft. Drill to 45ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	45–47	S-11	SS	14	16 / 14 / 24 / 22	62	Take S-11 from 45ft to 47ft. Drill to 50ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	50–52	S-12	SS	16	21 / 18 / 24 / 31	68	Take S-12 from 50ft to 52ft.
+29.0	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
		54						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN Log of Boring **LB1B-19**

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 82.0 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 9/1/2023	Date Finished: 9/1/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 12	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A	Completion N/A; 24 HR. N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Ed Flanagan	
Sampler: 2in OD Split Spoon			
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Field Engineer: Juan Baculima	

Elev. (ft)	Sample Description	Depth (ft)	Number	Type	Recov. (in)	Penetr. resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+82.0	6" ASPHALT	0						9/1/2023 Hand clear to 5ft.. Collect Grab Sample G-1 from 0.5ft to 5ft.
+81.5	Brown to gray silty coarse to fine SAND, some fine Gravel (moist) [FILL]	0.5						
+77.0	Light brown to brown silty coarse to fine SAND, some fine Gravel, trace Clay (dry) [SM]	5–7	S-1	SS	17	5 / 10 / 21 / 15	39	Take S-1 from 5ft to 7ft.
	Light brown silty coarse to fine SAND, some fine Gravel (dry) [SM]	7–9	S-2	SS	20	37 / 28 / 29 / 20	72	Take S-2 from 7ft to 9ft. Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
	Light brown to gray coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	9–10	S-3A	SS	14	5 / 16 / 19 / 15	44	Take S-3 from 9ft to 11ft.
	Brown silty coarse to fine SAND, some fine Gravel (moist) [SM]	10–11	S-3B	SS				
	Brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP]	11–13	S-4	SS	7	18 / 17 / 16 / 20	45	Take S-4 from 11ft to 13ft. -#4 = 90.6% -#200 = 3.6% Drill to 15ft. Smooth drilling, brown wash.
	Grayish brown coarse to fine SAND, some fine Gravel, trace Silt (wet) [SP-SM]	15–17	S-5	SS	11	12 / 11 / 13 / 17	34	Take S-5 from 15ft to 17ft. Drill to 20ft. Smooth drilling, light rig chatter, brown wash.
	Grayish brown gravelly coarse to fine SAND, trace Silt (wet) [SP-SM]	20–22	S-6	SS	8	6 / 13 / 15 / 13	45	Take S-6 from 20ft to 22ft. Drill to 25ft. Smooth drilling, brown wash.

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN Log of Boring **LB1B-19**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 82.0 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+58.0		24						
	Grayish brown coarse to fine SAND, trace Silt, trace fine Gravel (wet) [SP-SM]	25–27	S-7	SS	5	7, 11, 14, 16	40	Take S-7 from 25ft to 27ft. Drill to 30ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace Silt, some fine Gravel (wet) [SP-SM]	30–32	S-8	SS	10	17, 14, 15, 13	47	Take S-8 from 30ft to 32ft. Drill to 35ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, trace Silt, some fine Gravel (wet) [SP-SM]	35–37	S-9	SS	10	7, 6, 8, 9	24	Take S-9 from 35ft to 37ft. Drill to 40ft. Smooth drilling, brown wash.
	Dark brown to brown medium to fine SAND, some fine Gravel, trace Silt (wet) [SP-SM]	40–42	S-10	SS	9	14, 10, 8, 10	30	Take S-10 from 40ft to 42ft. LAB. Drill to 45ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, trace Silt, trace coarse Sand (wet) [SP-SM]	45–47	S-11	SS	11	4, 6, 11, 15	29	Take S-11 from 45ft to 47ft. Drill to 50ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, some Silt, trace coarse Sand, trace fine Gravel (wet) [SM]	50–52	S-12	SS	12	13, 9, 11, 14	34	Take S-12 from 50ft to 52ft.
+30.0	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
		54						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

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Log of Boring **LB1B-19**

Project: Sands New York	Project No.: 170754501
Location: Nassau Coliseum	Elevation and Datum: Approx. el. 82.0 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale (ft)	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+58.0		24						
	Grayish brown coarse to fine SAND, trace Silt, trace fine Gravel (wet) [SP-SM]	25–27	S-7	SS	5	7, 11, 14, 16	40	Take S-7 from 25ft to 27ft. Drill to 30ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace Silt, some fine Gravel (wet) [SP-SM]	30–32	S-8	SS	10	17, 14, 15, 13	47	Take S-8 from 30ft to 32ft. Drill to 35ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, trace Silt, some fine Gravel (wet) [SP-SM]	35–37	S-9	SS	10	7, 6, 8, 9	24	Take S-9 from 35ft to 37ft. Drill to 40ft. Smooth drilling, brown wash.
	Dark brown to brown medium to fine SAND, some fine Gravel, trace Silt (wet) [SP-SM]	40–42	S-10	SS	9	14, 10, 8, 10	30	Take S-10 from 40ft to 42ft. LAB. Drill to 45ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, trace Silt, trace coarse Sand (wet) [SP-SM]	45–47	S-11	SS	11	4, 6, 11, 15	29	Take S-11 from 45ft to 47ft. Drill to 50ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, some Silt, trace coarse Sand, trace fine Gravel (wet) [SM]	50–52	S-12	SS	12	13, 9, 11, 14	34	Take S-12 from 50ft to 52ft.
+30.0	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

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Log of Boring **LB1B-20** Sheet 1 of 2

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 81.4 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 9/1/2023	Date Finished: 9/1/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 13	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A	Completion N/A; 24 HR. N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Ed Flanagan	
Sampler: 2in OD Split Spoon			
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Field Engineer: Juan Baculima	

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+81.4		0						9/1/2023 Hand clear to 5ft. Collect Grab Sample G-1 from 0.5ft to 5ft.
	6" ASPHALT							
+80.9	Gray to brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [FILL]							
+76.4	Orangish brown silty coarse to fine SAND, some fine Gravel, trace Clay (dry) [SM]	5	S-1	SS	20	5, 7, 8, 7	19	Take S-1 from 5ft to 7ft.
+74.4	Mottled gray clayey SILT, some coarse to fine Sand, some fine Gravel (dry) [ML]	7	S-2A	SS	19	8, 14	30	Take S-2 from 7ft to 9ft. -#4 = 83.8% -#200 = 67% Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
+73.6	Orangish brown silty coarse to fine SAND, some fine Gravel (dry) [SM]		S-2B	SS		10, 12		
	Light brown coarse to fine SAND, some Silt, trace fine Gravel (wet) [SM]	9	S-3	SS	10	14, 13, 11, 9	30	Take S-3 from 9ft to 11ft.
	Brown coarse to fine SAND, trace Silt (wet) [SP-SM]	11	S-4	SS	6	1, 6, 13, 16	26	Take S-4 from 11ft to 13ft. Drill to 15ft. Smooth drilling, brown wash.
	Brown coarse to fine SAND, trace Silt, trace fine Gravel (wet) [SP-SM]	15	S-5	SS	8	7, 7, 9, 10	23	Take S-5 from 15ft to 17ft. Drill to 20ft. Smooth drilling, brown wash.
	Grayish brown coarse to fine SAND, trace Silt, some fine Gravel (wet) [SP-SM]	20	S-6	SS	11	19, 21, 1, 1	35	Take S-6 from 20ft to 22ft. -#4 = 72.3% -#200 = 6.3% Drill to 25ft. Smooth drilling, moderate rig chatter, brown wash.
		24						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

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Log of Boring **LB1B-20**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.4 ± (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	+57.4		24						
		Light brown coarse to fine SAND, trace Silt, some fine Gravel (wet) [SP-SM]	25–27	S-7	SS	10	17 15 18 12	53	Take S-7 from 25ft to 27ft.
			27–30						Drill to 30ft. Smooth drilling, brown wash.
		Light brown coarse to fine SAND, trace Silt, some fine Gravel (wet) [SP-SM]	30–32	S-8	SS	9	6 9 10 17	31	Take S-8 from 30ft to 32ft.
			32–35						Drill to 35ft. Smooth drilling, brown wash.
		Light brown coarse to fine SAND, trace Silt, some fine Gravel (wet) [SP-SM]	35–37	S-9	SS	10	7 3 5 12	14	Take S-9 from 35ft to 37ft.
		Light brown to brown coarse to fine SAND, some fine Gravel, trace Clay (wet) [SP-SC]	37–39	S-10	SS	14	4 6 9 9	25	Take S-10 from 37ft to 39ft.
			39–40						Drill to 40ft. Smooth drilling, brown wash.
		Light brown to brown medium to fine SAND, some fine Gravel, some Silt (wet) [SM]	40–42	S-11	SS	11	20 14 10 12	41	Take S-11 from 40ft to 42ft.
			42–45						Drill to 45ft. Smooth drilling, brown wash.
		Light brown medium to fine SAND, some fine Gravel, some Silt (wet) [SM]	45–47	S-12	SS	13	9 13 12 9	42	Take S-12 from 45ft to 47ft.
			47–50						Drill to 50ft. Smooth drilling, brown wash.
		Light brown medium to fine SAND, some fine Gravel, trace Silt (wet) [SP-SM]	50–52	S-13	SS	13	15 16 12 17	47	Take S-13 from 50ft to 52ft.
	+29.4	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
			53–54						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN Log of Boring **LB1B-21** Sheet 1 of 2

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 80.5 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 9/6/2023	Date Finished: 9/6/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 12; Undisturbed 0; Core 0	
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A; Completion N/A; 24 HR. N/A	
Casing Hammer: Automatic; Weight (lbs): 140; Drop (in): 30		Drilling Foreman: Mark Keir	
Sampler: 2in OD Split Spoon		Field Engineer: Jonathan Negron	
Sampler Hammer: Automatic; Weight (lbs): 140; Drop (in): 30			

Elev. (ft) +80.5	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	6" ASPHALT	0						9/6/2023 Hand clear to 5ft. Collect Grab Sample G-1 from 0.5ft to 5ft.
+80.0	Gray to black coarse to fine SAND, trace Silt, trace fine Gravel (moist) [FILL]							
+75.5	Tannish brown coarse to fine SAND, trace Silt, some fine Gravel (dry) [SP-SM]	5	S-1	SS	15	13, 14, 16, 20	38	Take S-1 from 5ft to 7ft.
	Tannish orangish brown coarse to fine SAND, trace Silt, some fine Gravel (dry) [SP-SM]	7	S-2	SS	21	36, 22, 27, 52	62	Take S-2 from 7ft to 9ft. Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
	Tannish orangish brown coarse to fine SAND, trace Silt, trace fine Gravel (dry) [SP]	9	S-3	SS	10	11, 10, 9, 10	24	Take S-3 from 9ft to 11ft. -#4 = 92.4% -#200 = 3.6%
	Tannish brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	11	S-4	SS	14	14, 12, 13, 14	34	Take S-4 from 11ft to 13ft. Drill to 15ft. Smooth drilling, brown wash.
	Tannish brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	15	S-5	SS	10	8, 7, 7, 11	20	Take S-5 from 15ft to 17ft. Drill to 20ft. Moderate rig chatter, brown wash.
	Tannish brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	20	S-6	SS	9	13, 12, 12, 12	39	Take S-6 from 20ft to 22ft. Drill to 25ft. Moderate rig chatter, brown wash.
		24						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

Template: Log-BH-NYC-GEO; Strip: BH-GEO (5); Printed on 10/02/2023

LANGAN Log of Boring **LB1B-21** Sheet 2 of 2

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 80.5 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+56.5		24						
	Tannish brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	25–27	S-7	SS	11	14, 13, 14, 15	43	Take S-7 from 25ft to 27ft. Drill to 30ft. Slight rig chatter, brown wash.
	Tannish orangish brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	30–32	S-8	SS	10	7, 9, 12, 12	34	Take S-8 from 30ft to 32ft. Drill to 35ft. Smooth drilling, brown wash.
	Tannish orangish brown medium to fine SAND, trace Silt, trace coarse Sand, some fine Gravel (wet) [SP-SM]	35–37	S-9	SS	10	7, 4, 6, 6	17	Take S-9 from 35ft to 37ft. Drill to 40ft. Smooth drilling, brown wash.
	Tannish orangish brown medium to fine SAND, trace Silt, trace coarse Sand, trace fine Gravel (wet) [SP-SM]	40–42	S-10	SS	10	9, 8, 12, 11	34	Take S-10 from 40ft to 42ft. Drill to 45ft. Smooth drilling, brown wash.
	Tannish brown medium to fine SAND, trace Silt, trace coarse Sand, trace fine Gravel (wet) [SP-SM]	45–47	S-11	SS	9	9, 9, 9, 11	30	Take S-11 from 45ft to 47ft. Drill to 50ft. Smooth drilling, brown wash.
	Tannish brown medium to fine SAND, trace Silt, trace coarse Sand, trace fine Gravel (wet) [SP-SM]	50–52	S-12	SS	12	6, 5, 6, 8	19	Take S-12 from 50ft to 52ft.
+28.5	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
		54						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

Template: Log-BH-NYC-GEO; Strip: BH-GEO (5); Printed on 10/02/2023

LANGAN

Log of Boring LB1B-22

Project	Sands New York	Project No.	170754501
Location	Nassau Coliseum	Elevation and Datum	Approx. el. 81.1 ± (NAVD 88)
Drilling Company	Craig Geotechnical Drilling	Date Started / Date Finished	8/24/2023 / 8/24/2023
Drilling Equipment	CME75	Completion Depth / Rock Depth	52.0 ft / N/E
Size and Type of Bit	3-7/8in Tricone Roller Bit	Number of Samples	Disturbed 12; Undisturbed 0; Core 0
Casing Diameter (in)	4 Flush Joint Steel; Casing Depth (ft) 9.0	Water Level (ft.)	First N/A; Completion N/A; 24 HR. N/A
Casing Hammer	Automatic; Weight (lbs) 140; Drop (in) 30	Drilling Foreman	Shane Frick
Sampler	2in OD Split Spoon	Field Engineer	Thomas Keane
Sampler Hammer	Automatic; Weight (lbs) 140; Drop (in) 30		

Elev. (ft) +81.1	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	ASPHALT	0						8/24/2023 Hand clear to 5 ft. Collect Grab Sample G-1 from 0.5ft to 5ft.
+80.6	Dark gray silty coarse to fine SAND, trace fine Gravel (moist) [FILL]							
+76.1	Brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	5	S-1	SS	14	6, 12, 17, 21	35	Take S-1 from 5ft to 7ft.
	Brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	7	S-2	SS	15	51, 39, 26, 21	79	Take S-2 from 7ft to 9ft. Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
	Brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	9	S-3	SS	10	13, 13, 12, 10	30	Take S-3 from 9ft to 11ft.
	Brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP]	11	S-4	SS	14	14, 14, 11, 9	32	Take S-4 from 11ft to 13ft. -#4 = 89.7% -#200 = 3.2%
		13						Drill to 15ft. Smooth drilling, brown wash. Introduced drilling fluid.
	Brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	15	S-5	SS	9	14, 14, 14, 9	39	Take S-5 from 15ft to 17ft.
		17						Drill to 20ft. Slight rig chatter, brown wash.
	Light brown gravelly coarse to fine SAND, trace Silt (moist) [SP-SM]	20	S-6	SS	8	14, 25, 30, 21	85	Take S-6 from 20ft to 22ft.
		22						Drill to 25ft. Slight rig chatter, brown wash.
		24						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

Project	Sands New York	Project No.	170754501
Location	Nassau Coliseum	Elevation and Datum	Approx. el. 81.1 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+57.1		24						
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	25–27	S-7	SS	10	17 21 21 18	65	Take S-7 from 25ft to 27ft. Drill to 30ft. Slight rig chatter, brown wash.
	Light brown coarse to fine SAND, trace Silt (moist) [SP-SM]	30–32	S-8	SS	12	9 11 12 14	35	Take S-8 from 30ft to 32ft. Drill to 35ft. Slight rig chatter, brown wash.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	35–37	S-9	SS	12	10 19 14 16	53	Take S-9 from 35ft to 37ft. Drill to 40ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	40–42	S-10	SS	14	11 14 17 15	50	Take S-10 from 40ft to 42ft. Drill to 45ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	45–47	S-11	SS	9	15 22 20 17	68	Take S-11 from 45ft to 47ft. Drill to 50ft. Slight rig chatter, brown wash.
+29.1	Light brown medium to fine SAND, trace Silt, trace fine Gravel (wet) [SP-SM]	50–52	S-12	SS	14	17 15 21 18	58	Take S-12 from 50ft to 52ft. Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
	End of Boring at 52ft.	52–54						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN Log of Boring **LB1B-23(OW)** Sheet 1 of 2

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 81.5 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 8/29/2023	Date Finished: 8/29/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 12; Undisturbed 0; Core 0	
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A; Completion N/A; 24 HR. N/A	
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Shane Frick	
Sampler: 2in OD Split Spoon		Field Engineer: Thomas Keane	
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30		

Elev. (ft) +81.5	Sample Description	Depth Scale (ft)	Number	Type	Recov. (in)	Penetr. resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	6" ASPHALT	0						8/29/2023 Hand clear to 5ft. Collect Grab Sample G-1 from 0.5ft to 5ft.
+81.0	Brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [FILL]	0.5						
	Dark gray sandy fine GRAVEL (moist) [FILL]	5	S-1A	SS	20	11 / 22	46	Take S-1 from 5ft to 7ft.
+76.0	Tan coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	5.5	S-1B	SS		16 / 37		
	Tan coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	7	S-2	SS	16	20 / 34 / 35 / 18	84	Take S-2 from 7ft to 9ft. Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	9	S-3	SS	10	11 / 10 / 14 / 12	29	Take S-3 from 9ft to 11ft. -#4 = 88.5% -#200 = 6.5%
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	11	S-4	SS	14	12 / 17 / 11 / 11	36	Take S-4 from 11ft to 13ft. Drive casing to 12ft. Drill to 15ft. Smooth drilling, gray wash.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	15	S-5	SS	10	6 / 12 / 14 / 16	36	Take S-5 from 15ft to 17ft. Drill to 20ft. Slight rig chatter, brown wash.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	20	S-6	SS	9	12 / 19 / 18 / 16	57	Take S-6 from 20ft to 22ft. Drill to 25ft. Slight rig chatter, brown wash.
		24						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

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Log of Boring **LB1B-23(OW)**

Project: Sands New York	Project No.: 170754501
Location: Nassau Coliseum	Elevation and Datum: Approx. el. 81.5 ± (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	+57.5		24						
		Light brown coarse to fine SAND, trace Silt (moist) [SP-SM]	25–27	S-7	SS	8	6, 10, 11, 11	32	Take S-7 from 25ft to 27ft.
			27–30						Drill to 30ft. Slight rig chatter, brown wash.
		Light brown coarse to fine SAND, trace Silt (moist) [SP-SM]	30–32	S-8	SS	8	9, 12, 12, 10	37	Take S-8 from 30ft to 32ft.
			32–35						Drill to 35ft. Slight rig chatter, brown wash.
		Light brown coarse to fine SAND, trace Silt (moist) [SP-SM]	35–37	S-9	SS	8	5, 5, 9, 8	23	Take S-9 from 35ft to 37ft.
			37–40						Drill to 40ft. Slight rig chatter, brown wash.
		Light brown medium to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	40–42	S-10	SS	9	7, 9, 10, 11	31	Take S-10 from 40ft to 42ft.
			42–45						Drill to 45ft. Slight rig chatter, brown wash.
		Light brown medium to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	45–47	S-11	SS	8	11, 12, 11, 10	37	Take S-11 from 45ft to 47ft.
			47–50						Drill to 50ft. Slight rig chatter, brown wash. Loss of water.
		Light brown medium to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	50–52	S-12	SS	10	12, 12, 14, 16	42	Take S-12 from 50ft to 52ft.
	+29.5	End of Boring at 52ft.	52–54						Bottom of boring at 52ft. Install observation well, refer to Observation Well Construction Log.

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN

Log of Boring **LB1B-24**

Project: Sands New York	Project No.: 170754501
Location: Nassau Coliseum	Elevation and Datum: Approx. el. 80.4 ± (NAVD 88)
Drilling Company: Craig Geotechnical Drilling	Date Started: 8/28/2023 — Date Finished: 8/28/2023
Drilling Equipment: CME75	Completion Depth: 52.0 ft — Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit	Number of Samples: Disturbed 12 — Undisturbed 0 — Core 0
Casing Diameter (in): 4 Flush Joint Steel — Casing Depth (ft): 9.0	Water Level (ft.): First N/A — Completion N/A — 24 HR. N/A
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Shane Frick
Sampler: 2in OD Split Spoon	Field Engineer: Thomas Keane
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Elev. (ft) +80.4	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+79.9	6" ASPHALT	0						8/28/2023
	Light brown coarse to fine SAND, some Silt, trace fine Gravel (moist) [FILL]	0.5–5						Hand clear to 5 ft. Collect Grab Sample G-1 from 0.5ft to 5ft.
+75.4	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	5–7	S-1	SS	19	12 / 19 / 24 / 18	52	Take S-1 from 5ft to 7ft.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP]	7–9	S-2	SS	24	23 / 29 / 32 / 27	74	Take S-2 from 7ft to 9ft. -#4 = 88.1% -#200 = 4.9% Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	9–11	S-3	SS	11	15 / 17 / 18 / 16	43	Take S-3 from 9ft to 11ft.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	11–13	S-4	SS	11	20 / 14 / 12 / 16	34	Take S-4 from 11ft to 13ft.
		13–15						Drive casing to 12ft. Drill to 15ft. Smooth drilling, brown wash.
	Light brown medium to fine SAND, trace coarse Sand, trace fine Gravel, trace Silt (moist) [SP]	15–17	S-5	SS	14	12 / 14 / 14 / 10	39	Take S-5 from 15ft to 17ft. -#4 = 88.2% -#200 = 4.7%
		17–20						Drill to 20ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace coarse Sand, trace fine Gravel, trace Silt (moist) [SP-SM]	20–22	S-6	SS	12	11 / 23 / 24 / 16	72	Take S-6 from 20ft to 22ft.
		22–24						Drill to 25ft. Slight rig chatter, brown wash.

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN Log of Boring **LB1B-24** Sheet 2 of 2

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 80.4 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+56.4		24						
	Light brown medium to fine SAND, trace coarse Sand, trace fine Gravel, trace Silt (moist) [SP-SM]	25–27	S-7	SS	9	6, 12, 17, 11	45	Take S-7 from 25ft to 27ft. Drill to 30ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace coarse Sand, trace Silt (moist) [SP-SM]	30–32	S-8	SS	8	9, 14, 10, 10	37	Take S-8 from 30ft to 32ft. Drill to 35ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	35–37	S-9	SS	17	6, 10, 11, 12	34	Take S-9 from 35ft to 37ft. Drill to 40ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace Silt, trace fine Gravel (wet) [SP-SM]	40–42	S-10	SS	8	6, 8, 9, 9	28	Take S-10 from 40ft to 42ft. Drill to 45ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace Silt, some fine Gravel (wet) [SP-SM]	45–47	S-11	SS	11	10, 12, 8, 7	32	Take S-11 from 45ft to 47ft. Drill to 50ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace Silt, trace fine Gravel (wet) [SP-SM]	50–52	S-12	SS	10	15, 12, 17, 11	47	Take S-12 from 50ft to 52ft.
+28.4	End of Boring at 52ft.	52–54						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 80.9 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 8/30/2023	Date Finished: 8/30/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 12	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A	Completion N/A; 24 HR. N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Shane Frick	
Sampler: 2in OD Split Spoon			
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Field Engineer: Thomas Keane	

Elev. (ft) +80.9	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+80.4	6" ASPHALT	0						8/30/2023 Hand cleared to 5ft. Collect Grab Sample G-1 from 0.5ft to 5ft.
	Brown coarse to fine SAND, some Silt, trace fine Gravel (moist) [FILL]	1						
	Brown coarse to fine SAND, some Silt, trace fine Gravel (moist) [FILL]	5–7	S-1	SS	14	6, 6, 7, 7	16	Take S-1 from 5ft to 7ft.
	Light brown coarse to fine SAND, some Silt, trace fine Gravel (moist) [FILL]	7–9	S-2	SS	24	11, 12, 14, 12	32	Take S-2 from 7ft to 9ft. Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
+71.9	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	9–11	S-3	SS	12	14, 18, 23, 16	50	Take S-3 from 9ft to 11ft. -#4 = 84.6% -#200 = 5.6%
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	11–13	S-4	SS	11	15, 21, 24, 21	58	Take S-4 from 11ft to 13ft. Drive casing to 12ft. Drill to 15ft. Smooth drilling, gray wash.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	15–17	S-5	SS	11	15, 16, 19, 23	48	Take S-5 from 15ft to 17ft. Drill to 20ft. Moderate rig chatter, brown wash.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	20–22	S-6	SS	9	8, 21, 23, 25	68	Take S-6 from 20ft to 22ft. Drill to 25ft. Slight rig chatter, brown wash.
		24						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN

Log of Boring **LB1B-25** Sheet 2 of 2

Project: Sands New York	Project No.: 170754501
Location: Nassau Coliseum	Elevation and Datum: Approx. el. 80.9 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+56.9		24						
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	25–27	S-7	SS	8	6, 5, 7, 11	18	Take S-7 from 25ft to 27ft.
		27–30						Drill to 30ft. Slight rig chatter, brown wash.
	Tan gravelly coarse to fine SAND, trace Silt (moist) [SP-SM]	30–32	S-8	SS	10	10, 14, 11, 11	38	Take S-8 from 30ft to 32ft.
		32–35						Drill to 35ft. Slight rig chatter, brown wash.
	Light brown coarse to fine SAND, trace Silt (moist) [SP-SM]	35–37	S-9	SS	8	9, 17, 15, 14	52	Take S-9 from 35ft to 37ft.
		37–40						Drill to 40ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace coarse Sand, trace Silt (wet) [SP-SM]	40–42	S-10	SS	7	8, 14, 13, 10	44	Take S-10 from 40ft to 42ft.
		42–45						Drill to 45ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace Silt (wet) [SP-SM]	45–47	S-11	SS	8	8, 8, 9, 8	28	Take S-11 from 45ft to 47ft.
		47–50						Drill to 50ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace Silt (wet) [SP-SM]	50–52	S-12	SS	8	15, 16, 15, 9	50	Take S-12 from 50ft to 52ft.
+28.9	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
		53–54						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN

Log of Boring **LB1B-26**

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 80.0 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 8/31/2023	Date Finished: 8/31/2023
Drilling Equipment: CME75		Completion Depth: 102.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 22; Undisturbed 0; Core 0	
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A; Completion N/A; 24 HR. N/A	
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Shane Frick	
Sampler: 2in OD Split Spoon		Field Engineer: Thomas Keane	
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30		

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+80.0								
+79.5	6" ASPHALT	0						8/31/2023 Hand clear to 5ft. Collect Grab Sample G-1 from 0.5ft to 3ft. -#4 = 89.1% -#200 = 26.2%
	Brown coarse to fine SAND, some Silt, some fine Gravel (moist) [FILL]	1–2						
+77.0	Light coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	3–4						Collect Grab Sample G-2 from 3ft to 5ft.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	5–7	S-1	SS	10	11, 11, 16, 15	33	Take S-1 from 5ft to 7ft.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	7–9	S-2	SS	15	12, 17, 21, 18	46	Take S-2 from 7ft to 9ft. Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	9–11	S-3	SS	14	15, 21, 16, 15	45	Take S-3 from 9ft to 11ft.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP]	11–13	S-4	SS	10	17, 21, 18, 16	51	Take S-4 from 11ft to 13ft. -#4 = 90.2% -#200 = 4.8%
		13–15						Drive casing to 12ft. Drill to 15ft. Smooth drilling, gray wash.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	15–17	S-5	SS	10	8, 8, 12, 11	28	Take S-5 from 15ft to 17ft.
		17–20						Drill to 20ft. Slight rig chatter, brown wash.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	20–22	S-6	SS	9	14, 17, 19, 21	55	Take S-6 from 20ft to 22ft.
		22–24						Drill to 25ft. Slight rig chatter, brown wash.

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN

Log of Boring **LB1B-26**

Project: Sands New York	Project No.: 170754501
Location: Nassau Coliseum	Elevation and Datum: Approx. el. 80.0 ± (NAVD 88)

Material Symbol	Elev. (ft) +56.0	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
		Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	25–27	S-7	SS	6	9 / 10 / 12 / 10	34	Take S-7 from 25ft to 27ft. Drill to 30ft. Slight rig chatter, brown wash.
		Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	30–32	S-8	SS	8	10 / 16 / 12 / 11	43	Take S-8 from 30ft to 32ft. Drill to 35ft. Slight rig chatter, brown wash.
		Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	35–37	S-9	SS	8	6 / 8 / 18 / 9	42	Take S-9 from 35ft to 37ft. Drill to 40ft. Slight rig chatter, brown wash.
		Light brown medium to fine SAND, trace coarse Sand, trace Silt (moist) [SP-SM]	40–42	S-10	SS	11	20 / 17 / 17 / 15	55	Take S-10 from 40ft to 42ft. Drill to 45ft. Slight rig chatter, brown wash.
		Light brown medium to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	45–47	S-11	SS	9	14 / 14 / 13 / 12	44	Take S-11 from 45ft to 47ft. Drill to 50ft. Slight rig chatter, brown wash.
		Light brown medium to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	50–52	S-12	SS	11	16 / 19 / 17 / 18	58	Take S-12 from 50ft to 52ft. Drill to 55ft. Slight rig chatter, brown wash.

Depth scale: 24 to 54 ft. N60 axis: 10 20 30 40

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 80.0 ± (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	+26.0		54						
		Light brown medium to fine SAND, trace Silt (wet) [SP-SM]	55–57	S-13	SS	11	9 / 14 / 20 / 19	55	Take S-13 from 55ft to 57ft. Drill to 60ft. Slight rig chatter, brown wash.
		Light brown clayey fine SAND, trace Silt (wet) [SC]	60–62	S-14	SS	17	10 / 10 / 10 / 9	32	Take S-14 from 60ft to 62ft. -#4 = 100% -#200 = 35% Drill to 65ft. Smooth drilling, brown wash.
		Light brown clayey fine SAND, trace Silt (wet) [SC]	65–67	S-15	SS	18	14 / 16 / 14 / 15	49	Take S-15 from 65ft to 67ft. Drill to 70ft. Smooth drilling, light brown wash.
	+10.0	Light brown sandy CLAY, trace Silt (wet) [CL]	70	S-16A	SS	15	17 / 18 / 21 / 18	63	Take S-16 from 70ft to 72ft. LL = 26% PL = 16% PI = 10% Drill to 75ft. Smooth drilling, light brown wash.
	+9.5	Light brown fine SAND, trace Silt (wet) [SP-SM]	71	S-16B	SS				
		Light brown fine SAND, trace medium Sand, trace Silt, trace Clay (wet) [SP-SM]	75–77	S-17	SS	14	15 / 14 / 14 / 12	45	Take S-17 from 75ft to 77ft. Drill to 80ft. Smooth drilling, brown wash.
		Light brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	80–82	S-18	SS	16	11 / 11 / 10 / 9	34	Take S-18 from 80ft to 82ft. Drill to 85ft. Smooth drilling, light brown wash.
			84						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN

Log of Boring **LB1B-26**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 80.0 ± (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale (ft)	Sample Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	-4.0		84						
		Light brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	85–87	S-19	SS	12	13, 25, 21, 18	75	Take S-19 from 85ft to 87ft.
			87–90						Drill to 90ft. Smooth drilling, light brown wash.
		Tan to gray medium to fine SAND, trace Silt (wet) [SP-SM]	90–92	S-20	SS	17	16, 16, 9, 11	40	Take S-20 from 90ft to 92ft.
			92–95						Drill to 95ft. Smooth drilling, light brown wash.
		Tan to gray silty fine SAND, trace medium Sand, trace Clay (wet) [SM]	95–97	S-21	SS	18	9, 9, 13, 15	36	Take S-21 from 95ft to 97ft.
			97–100						Drill to 100ft. Smooth drilling, light brown wash.
		Tan to gray medium to fine SAND, trace Silt (wet) [SP-SM]	100–102	S-22	SS	15	5, 12, 15, 14	44	Take S-22 from 100ft to 102ft.
	-22.0	End of Boring at 102ft.	102						Bottom of boring at 102ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.

N60-Value scale: 10 20 30 40

Depth scale: 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN

Log of Boring **LB1B-27**

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 81.0 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 9/5/2023	Date Finished: 9/5/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 12	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First ▽ N/A	Completion ▼ N/A; 24 HR. ▼ N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Shane Frick	
Sampler: 2in OD Split Spoon			
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Field Engineer: Thomas Keane	

Elev. (ft) +81.0	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	6" ASPHALT	0						9/5/2023 Hand clear to 5ft.
+80.5	Dark gray coarse to fine SAND, some fine Gravel, trace Silt (moist) [FILL]	0.5						
	Gray to tan sandy fine GRAVEL (moist) [FILL]	5	S-1	SS	8	6, 5, 5, 5	12	Take S-1 from 5ft to 7ft.
+74.0	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	7	S-2	SS	11	7, 8, 9, 8	21	Take S-2 from 7ft to 9ft. Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
	Gray to tan gravelly coarse to fine SAND, trace Silt (moist) [SP-SM]	9	S-3	SS	6	8, 16, 12, 11	34	Take S-3 from 9ft to 11ft. -#4 = 50.7% -#200 = 6.9%
	Gray to tan gravelly coarse to fine SAND, trace Silt (moist) [SP-SM]	11	S-4	SS	16	12, 12, 11, 14	30	Take S-4 from 11ft to 13ft. Drive casing to 12ft. Drill to 15ft. Smooth drilling, gray wash.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP]	15	S-5	SS	11	12, 14, 12, 12	36	Take S-5 from 15ft to 17ft. -#4 = 71.7% -#200 = 4.4% Drill to 20ft. Slight rig chatter, brown wash.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	20	S-6	SS	9	18, 20, 14, 14	52	Take S-6 from 20ft to 22ft. Drill to 25ft. Slight rig chatter, brown wash.
		24						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN Log of Boring **LB1B-27**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.0 ± (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	+57.0		24						
		Light brown coarse to fine SAND, trace Silt (moist) [SP-SM]	25	S-7	SS	9	11 / 11 / 14 / 14	38	Take S-7 from 25ft to 27ft.
			27						Drill to 30ft. Slight rig chatter, brown wash.
		Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	30	S-8	SS	9	11 / 9 / 15 / 8	37	Take S-8 from 30ft to 32ft.
			32						Drill to 35ft. Slight rig chatter, brown wash.
		Light brown medium to fine SAND, trace coarse Sand, trace Silt, trace fine Gravel (moist) [SP-SM]	35	S-9	SS	10	14 / 11 / 11 / 16	36	Take S-9 from 35ft to 37ft.
			37						Drill to 40ft. Slight rig chatter, brown wash.
		Light brown medium to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	40	S-10	SS	10	14 / 14 / 12 / 15	42	Take S-10 from 40ft to 42ft.
			42						Drill to 45ft. Slight rig chatter, brown wash.
		Light brown medium to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	45	S-11	SS	15	15 / 18 / 18 / 19	58	Take S-11 from 45ft to 47ft.
			47						Drill to 50ft. Slight rig chatter, brown wash.
		Light brown medium to fine SAND, trace Silt (moist) [SP-SM]	50	S-12	SS	18	16 / 11 / 11 / 10	36	Take S-12 from 50ft to 52ft.
	+29.0	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
			54						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN

Log of Boring **LB1B-28**

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 81.0 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 9/6/2023	Date Finished: 9/6/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 12	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First ▽ N/A	Completion ▼ N/A; 24 HR. ▼ N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Mike Gorski	
Sampler: 2in OD Split Spoon			
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Field Engineer: Jonathan Negron	

Material Symbol	Elev. (ft) +81.0	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	+80.5	6" ASPHALT	0						9/6/2023 Hand clear to 5ft.
		Dark gray coarse to fine SAND, some fine Gravel, trace Silt (moist) [FILL]	1–4						Collect Grab Sample G-1 from 0.5ft to 5ft.
	+76.0	Tannish brown coarse to fine SAND, trace Silt, some fine Gravel (dry) [SP-SM]	5–7	S-1	SS	17	17, 18, 19, 20	47	Take S-1 from 5ft to 7ft.
		Tannish orangish brown coarse to fine SAND, trace Silt, some fine Gravel (dry) [SP-SM]	7–9	S-2	SS	15	23, 24, 22, 22	58	Take S-2 from 7ft to 9ft. Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
		Tannish brown coarse to fine SAND, trace Silt, some fine Gravel (dry) [SP-SM]	9–11	S-3	SS	12	7, 7, 10, 8	22	Take S-3 from 9ft to 11ft.
		Tannish brown coarse to fine SAND, trace Silt, some fine Gravel (dry) [SP-SM]	11–13	S-4	SS	12	14, 10, 14, 14	32	Take S-4 from 11ft to 13ft. Drill to 15ft. Smooth drilling, brown wash.
		Tannish brown coarse to fine SAND, trace Silt, some fine Gravel (dry) [SP]	15–17	S-5	SS	9	8, 7, 10, 12	24	Take S-5 from 15ft to 17ft. -#4 = 69.5% -#200 = 4.1% Drill to 20ft. Slight rig chatter, brown wash.
		Tannish brown coarse to fine SAND, trace Silt, some fine Gravel (dry) [SP-SM]	20–22	S-6	SS	9	14, 22, 19, 18	66	Take S-6 from 20ft to 22ft. Drill to 25ft. Slight rig chatter, brown wash.
			24						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

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Log of Boring **LB1B-28** Sheet 2 of 2

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.0 ± (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	+57.0		24						
		Tannish brown coarse to fine SAND, trace Silt, some fine Gravel (dry) [SP-SM]	25–27	S-7	SS	11	19 19 18 18	59	Take S-7 from 25ft to 27ft.
			27–30						Drill to 30ft. Slight rig chatter, brown wash.
		Tannish brown coarse to fine SAND, trace Silt, some fine Gravel (dry) [SP-SM]	30–32	S-8	SS	10	11 11 10 11	34	Take S-8 from 30ft to 32ft.
			32–35						Drill to 35ft. Smooth drilling, brown wash.
		Tannish brown medium to fine SAND, trace Silt, trace coarse Sand, some fine Gravel (moist) [SP-SM]	35–37	S-9	SS	10	8 5 5 9	17	Take S-9 from 35ft to 37ft.
			37–40						Drill to 40ft. Smooth drilling, brown wash.
		Tannish brown medium to fine SAND, trace Silt, trace coarse Sand, trace fine Gravel (wet) [SP-SM]	40–42	S-10	SS	13	12 12 13 14	42	Take S-10 from 40ft to 42ft.
			42–45						Drill to 45ft. Smooth drilling, brown wash.
		Tannish brown medium to fine SAND, trace Silt, trace coarse Sand, trace fine Gravel (wet) [SP-SM]	45–47	S-11	SS	9	6 7 7 6	24	Take S-11 from 45ft to 47ft.
			47–50						Drill to 50ft. Smooth drilling, brown wash.
		Tannish brown medium to fine SAND, trace Silt, trace coarse Sand, trace fine Gravel (moist) [SP-SM]	50–52	S-12	SS	14	19 16 21 22	63	Take S-12 from 50ft to 52ft.
	+29.0	End of Boring at 52ft.	52–54						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

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Log of Boring **LB1B-29** Sheet 1 of 2

Project: Sands New York	Project No.: 170754501
Location: Nassau Coliseum	Elevation and Datum: Approx. el. 80.5 ± (NAVD 88)
Drilling Company: Craig Geotechnical Drilling	Date Started: 9/5/2023; Date Finished: 9/5/2023
Drilling Equipment: CME75	Completion Depth: 52.0 ft; Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit	Number of Samples: Disturbed 11; Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel; Casing Depth (ft): 9.0	Water Level (ft.): First N/A; Completion N/A; 24 HR. N/A
Casing Hammer: Automatic; Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Shane Frick
Sampler: 2in OD Split Spoon	Field Engineer: Thomas Keane
Sampler Hammer: Automatic; Weight (lbs): 140; Drop (in): 30	

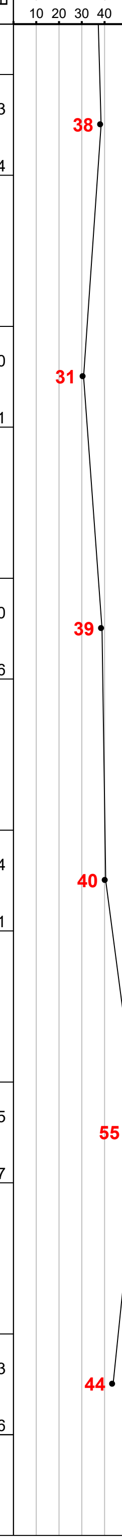
Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+80.5	6" ASPHALT	0						9/5/2023 Hand clear to 5ft.
+80.0	Dark gray coarse to fine SAND, some fine Gravel, trace Silt (moist) [FILL]	0.5–5						
+75.5	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	5	S-1	SS	5	3 / 2 / 1 / 1	4	Take S-1 from 5ft to 7ft.
	Tan to gray gravelly coarse to fine SAND, trace Silt (moist) [SP-SM]	7	S-2	SS	18	5 / 7 / 9 / 8	19	Take S-2 from 7ft to 9ft. Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP]	9	S-3	SS	11	16 / 18 / 16 / 12	41	Take S-3 from 9ft to 11ft. -#4 = 83.5% -#200 = 4.6% Drive casing to 12ft. Drill to 15ft. Smooth drilling, gray wash.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	15	S-4	SS	12	17 / 17 / 15 / 16	44	Take S-4 from 15ft to 17ft. Drill to 20ft. Slight rig chatter, brown wash.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	20	S-5	SS	9	11 / 11 / 12 / 16	35	Take S-5 from 20ft to 22ft. Drill to 25ft. Slight rig chatter, brown wash.
		24						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN Log of Boring **LB1B-29** Sheet 2 of 2

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 80.5 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+56.5		24						
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	25–27	S-6	SS	11	14, 13, 12, 14	38	Take S-6 from 25ft to 27ft.
		27–30						Drill to 30ft. Slight rig chatter, brown wash.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	30–32	S-7	SS	11	16, 10, 10, 11	31	Take S-7 from 30ft to 32ft.
		32–35						Drill to 35ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace coarse Sand, trace fine Gravel, trace Silt (moist) [SP-SM]	35–37	S-8	SS	0	7, 10, 14, 16	39	Take S-8 from 35ft to 37ft.
		37–40						Drill to 40ft. Slight rig chatter, brown wash.
	Brown medium to fine SAND, trace Silt, trace fine Gravel (wet) [SP-SM]	40–42	S-9	SS	12	12, 14, 11, 11	40	Take S-9 from 40ft to 42ft.
		42–45						Drill to 45ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace Silt (wet) [SP-SM]	45–47	S-10	SS	13	8, 15, 19, 17	55	Take S-10 from 45ft to 47ft.
		47–50						Drill to 50ft. Slight rig chatter, brown wash.
	Light brown medium to fine SAND, trace Silt (wet) [SP-SM]	50–52	S-11	SS	16	12, 13, 14, 16	44	Take S-11 from 50ft to 52ft.
+28.5	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
		53–54						



* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN

Log of Boring **LB1B-30** Sheet 1 of 4

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 78.9 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 9/5/2023	Date Finished: 9/5/2023
Drilling Equipment: CME75		Completion Depth: 102.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 22; Undisturbed 0; Core 0	
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A; Completion N/A; 24 HR. N/A	
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Shane Frick	
Sampler: 2in OD Split Spoon		Field Engineer: Jonathan Negron	
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30		

Elev. (ft) +78.9	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+78.4	6" ASPHALT	0						9/5/2023 Hand clear to 5ft.
	Dark gray coarse to fine SAND, some fine Gravel, trace Silt (moist) [FILL]	1–4						Collect Grab Sample G-1 taken from 0.5ft to 5ft.
+73.9	Orangish tannish brown coarse to fine SAND, some fine Gravel, trace Silt (dry) [SP-SM]	5–7	S-1	SS	14	21, 17, 17, 18	41	Take S-1 from 5ft to 7ft.
	Orangish tannish brown coarse to fine SAND, some fine Gravel, trace Silt (dry) [SP-SM]	7–9	S-2	SS	22	24, 17, 14, 15	38	Take S-2 from 7ft to 9ft. Drive casing to 9ft. Drill to 9ft. Slight rig chatter, light brown wash.
	Tannish brown coarse to fine SAND, trace fine Gravel, trace Silt (dry) [SP]	9–11	S-3	SS	7	5, 7, 8, 11	18	Take S-3 from 9ft to 11ft. -#4 = 92.6% -#200 = 4.3%
	Tannish brown coarse to fine SAND, some fine Gravel, trace Silt (dry) [SP-SM]	11–13	S-4	SS	10	10, 11, 12, 13	30	Take S-4 from 11ft to 13ft. Drill to 15ft. Slight rig chatter, light brown wash.
	Tannish brown coarse to fine SAND, some fine Gravel, trace Silt (dry) [SP-SM]	15–17	S-5	SS	9	3, 10, 18, 20	39	Take S-5 from 15ft to 17ft. Drill to 20ft. Smooth drilling, light brown wash.
	Tannish brown coarse to fine SAND, some fine Gravel, trace Silt (dry) [SP-SM]	20–22	S-6	SS	11	12, 14, 12, 15	40	Take S-6 from 20ft to 22ft. Drill to 25ft. Slight rig chatter, light brown wash.

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 78.9 ± (NAVD 88)

Material Symbol	Elev. (ft) +54.9	Sample Description	Depth Scale (ft)	Sample Number	Type	Recov. (in)	Penetr. resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
			24						
		Tannish brown coarse to fine SAND, some fine Gravel, trace Silt (dry) [SP-SM]	25–27	S-7	SS	9	8, 9, 11, 12	31	Take S-7 from 25ft to 27ft. Drill to 30ft. Slight rig chatter, light brown wash.
		Tannish orangish brown coarse to fine SAND, some fine Gravel, trace Silt (dry) [SP-SM]	30–32	S-8	SS	10	7, 6, 8, 11	22	Take S-8 from 30ft to 32ft. Drill to 35ft. Slight rig chatter, light brown wash.
		Tannish orangish brown medium to fine SAND, trace fine Gravel, trace coarse Sand, trace Silt (moist) [SP-SM]	35–37	S-9	SS	10	9, 11, 11, 13	36	Take S-9 from 35ft to 37ft. Drill to 40ft. Moderate rig chatter, light brown wash.
		Tannish brown medium to fine SAND, trace fine Gravel, trace coarse Sand, trace Silt (moist) [SP-SM]	40–42	S-10	SS	10	10, 9, 11, 11	32	Take S-10 from 40ft to 42ft. Drill to 45ft. Slight rig chatter, light brown wash.
		Tannish brown medium to fine SAND, trace fine Gravel, trace coarse Sand, trace Silt (moist) [SP-SM]	45–47	S-11	SS	12	12, 10, 12, 10	36	Take S-11 from 45ft to 47ft. Drill to 50ft. Smooth drilling, light brown wash.
		Tannish brown medium to fine SAND, trace fine Gravel, trace coarse Sand, trace Silt (moist) [SP-SM]	50–52	S-12	SS	15	16, 7, 14, 12	34	Take S-12 from 50ft to 52ft. Drill to 55ft. Smooth drilling, light brown wash.
			54						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 78.9 ± (NAVD 88)

Material Symbol	Elev. (ft) +24.9	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
		Orangish brown medium to fine SAND, trace coarse Sand, trace Silt (moist) [SP-SM]	55–57	S-13	SS	14	14 14 14 13	45	Take S-13 from 55ft to 57ft. Drill to 60ft. Smooth drilling, light brown wash.
		Orangish tannish brown fine SAND, trace coarse to medium Sand, trace Silt (moist) [SP-SM]	60–62	S-14	SS	15	10 11 13 10	39	Take S-14 from 60ft to 62ft. Drill to 65ft. Slight rig chatter, light brown wash.
		Light gray fine SAND, trace Silt, trace medium Sand (moist) [SP-SM]	65–67	S-15	SS	16	8 7 7 10	23	Take S-15 from 65ft to 67ft. Drill to 70ft. Smooth drilling, light brown wash.
		Orangish brown fine SAND, trace Silt, trace medium Sand (wet) [SP-SM]	70–72	S-16	SS	16	16 17 19 18	58	Take S-16 from 70ft to 72ft. Drill to 75ft. Smooth drilling, light brown wash.
		Orangish tannish brown fine SAND, trace Silt, trace medium Sand (wet) [SP-SM]	75–77	S-17	SS	13	21 27 37 30	104	Take S-17 from 75ft to 77ft. Drill to 80ft. Smooth drilling, light brown wash.
		Orangish tannish brown fine SAND, trace Silt (wet) [SP-SM]	80–82	S-18	SS	14	27 25 34 36	96	Take S-18 from 80ft to 82ft. Drill to 85ft. Smooth drilling, light brown wash.

Depth scale: 54 to 84 ft. N60 axis: 10 20 30 40.

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN

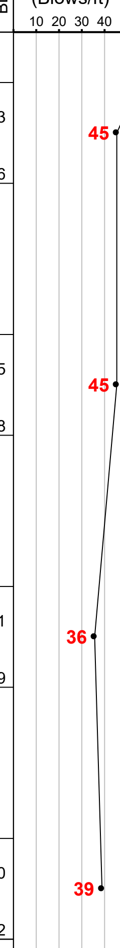
Log of Boring **LB1B-30**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 78.9 ± (NAVD 88)

Elev. (ft)	Depth (ft)	Sample Description
-5.1	84	
-6.6	85.5	Tannish brown fine SAND, trace Silt (wet) [SP-SM]
		Tannish gray sandy CLAY, Sand lenses (wet) [CL]
-11.1	90	Tannish gray to brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]
	95	Tannish gray to brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]
-21.1	100	Dark gray to black SILT, trace fine Sand (moist) [ML]
-21.4		Tannish brown fine SAND, some Silt, trace medium Sand (moist) [SM]
-23.1	102	End of Boring at 102ft.

Sample Data

Depth (ft)	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
85	S-19A	SS	18	14		Take S-19 from 85ft to 87ft. LL = 44% PL = 19% PI = 25%
86	S-19B	SS		13, 15, 26	45	Drill to 90ft. Smooth drilling, light brown wash.
90–92	S-20	SS	14	18, 15, 13, 18	45	Take S-20 from 90ft to 92ft. Drill to 95ft. Smooth drilling, light brown wash.
95–97	S-21	SS	14	9, 11, 11, 9	36	Take S-21 from 95ft to 97ft. Drill to 100ft. Smooth drilling, light brown wash.
100	S-22A	SS	15	10		Take S-22 from 100ft to 102ft.
101	S-22B	SS		10, 14, 12	39	Bottom of boring at 102ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.



* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

GRL engineers, inc.
Dynamic Measurements and Analyses

September 29, 2023

Attn: Kevin Craig of Craig Test Boring Co. Inc.
PO Box 427; Mays Landing, NJ 08330

Re: SPT Energy Calibration
Mays Landing, NJ

GRL Job No. 2023PA00056-1R

Dear Mr. Craig:

This report summarizes the results from the Standard Penetration Test (SPT) energy measurements performed on four (4) drill rigs. The drills rigs tested included CME 75 (Rig 30, SN 410597), CME 75 (Rig 18, SN 404887), CME 75 (Rig 5, SN 396967), and CME 75 (Rig 38, SN 375017). The field work associated with the energy measurements summarized in this report was performed on September 15, 2023, and the data was recorded during sampling events from two holes (BH 1 and BH 2), which were specifically drilled in the yard of Craig Test Boring Co. Inc., located in Mays Landing, NJ.

The purpose in collecting the SPT energy measurements was to compute the energy transfer to the drill rods and the energy transfer ratio for the SPT hammers. To meet this objective, a model 8G Pile Driving Analyzer (PDA) was used to acquire and process the dynamic test data. Additional information regarding the testing equipment and analytical procedures is provided in Appendix A.

The energy measurements were performed in general accordance with the procedures set forth in ASTM D4633-16, Standard Test Method for Energy Measurements for Dynamic Penetrometers. This ASTM standard suggests that the SPT N value should range between 10 and 50 blows per foot to limit the effect of extra potential energy due to the set per blow.

Test Sequence

An instrumented NWJ drill rod was used to acquire energy measurements during several SPT sampling events. This 2-foot-long instrumented section was placed between the SPT hammer and the top of the drill string. The measurement location on the instrumented NWJ rod section added an additional 9-in to the reported rod length. The rod length also included the 3.25-foot-long split-barrel sampler.

For the CME 75 (Rig 30, SN 410597), six sampling events were monitored in a single borehole (BH 1) between sampling depths of 25 to 37 feet. For each SPT sampling event, the SPT split-spoon sampler was driven 24 inches while blows were recorded for each of the four 6-inch increments. The SPT N value for each sampling event was then calculated as the number of blows for the second and third sampling increments. The N values for six of the six sampling events were within the ASTM D4633 suggested range of 10 to 50. Including the instrumented section, drill rods, split spoon and adapter, the instrumented length ranged from 29.00 to 39.00 feet.

For the CME 75 (Rig 18, SN 404887), five sampling events were monitored in a single borehole (BH 1) between sampling depths of 37 to 49 feet. For each SPT sampling event, the SPT split-spoon sampler was driven 24 inches while blows were recorded for each of the four 6-inch increments. The SPT N value for each sampling event was then calculated as the number of blows for the second and third sampling increments. The SPT N value for each sampling event was then calculated as the number of blows for the second and third sampling increments. The N values for five of the six sampling events were within the ASTM D4633 suggested range of 10 to 50, while the other one event was below an N value of 10. Including the instrumented section, drill rods, split spoon and adapter, the instrumented length ranged from 41.00 to 51.00 feet.

For the CME 75 (Rig 5, SN 396967), five sampling events were monitored in a single borehole (BH 2) between sampling depths of 20 to 30 feet. For each SPT sampling event, the SPT split-spoon sampler was driven 24 inches while blows were recorded for each of the four 6-inch increments. The SPT N value for each sampling event was then calculated as the number of blows for the second and third sampling increments. The N values for five of the five sampling events were within the ASTM D4633 suggested range of 10 to 50. Including the instrumented section, drill rods, split spoon and adapter, the instrumented length ranged from 24.00 to 32.00 feet.

For the CME 75 (Rig 38, SN 375017), five sampling events were monitored in a single borehole between sampling depths of 30 to 40 feet. For each SPT sampling event, the SPT split-spoon sampler was driven 24 inches while blows were recorded for each of the four 6-inch increments. The SPT N value for each sampling event was then calculated as the number of blows for the second and third sampling increments. The N values for five of the five sampling events were within the ASTM D4633 suggested range of 10 to 50. Including the instrumented section, drill rods, split spoon and adapter, the instrumented length ranged from 34.00 to 42.00 feet.

Energy Transfer Measurements

Strain and acceleration measurements were made on the instrumented NWJ drill rod. The strain and acceleration signals were conditioned and converted to force and velocities by an 8G model Pile Driving Analyzer. The PDA interprets the measured dynamic data according to the Case Method equations. Force and velocity records were viewed graphically on the PDA screen during data acquisition to assess data quality and were then digitally stored.

The maximum energy transferred to the rod (EFV) was calculated by integrating both the force and velocity records over time as follows:

$$EFV = \int F(t)V(t)dt$$

Where: $F(t)$ = the force at time t
$V(t)$ = the velocity at time t

The energy transfer ratio is computed by dividing the maximum transferred energy by the theoretical SPT hammer energy of 350 ft-lbs. (computed from the product of the hammer weight, assumed to be 140 lbs, and the fall height, assumed to be 2.5 ft). The SPT N values can then be corrected for a nominal 60% transfer efficiency, $N_{60,}$ as follows:

$$N_{60} = (e_m / 60)\ N_m$$

Where: e_m = the measured energy transfer ratio (ETR)
N_m = the measured SPT N value

Conclusions

Appendix B presents the average transferred energies and the energy transfer ratios for each sampling event calculated using the *EFV* equation. Average values of the hammer operating rate (BPM), maximum impact force (FMX), and maximum velocity (VMX) are also included along with the maximum, minimum, and standard deviation for each sampling event. The overall energy transfer ratio for all sampling events weighted by N-value is presented in Table 1 below for each calibrated drill rig.

Table 1. Summary of Average Energy Transfer and Energy Transfer Ratio

Drill Rig (*Serial Number*)	Samples Reported	Average Hammer Speed (blows/min)	Average Energy Transfer (ft-lbs)	Energy Transfer Ratio (%)
CME 75$^{(1)}$ (Rig 30, SN: 410597)	6	51	340	97.2
CME 75$^{(1)}$ (Rig 18, SN: 404887)	5	54	349	99.6
CME 75$^{(2)}$ *(Rig 18, SN: 404887)*	*6*	*54*	*348*	*99.5*
CME 75$^{(1)}$ (Rig 5, SN: 396967)	5	55	356	101.6
CME 75$^{(1)}$ (Rig 38, SN: 375017)	5	51	351	100.3

Notes: (1) All data sets with N values within the ASTM recommended range of 10 to 50.
(2) Includes one data set with an N value lower than recommended minimum of 10.

We appreciate the opportunity to be of assistance to you. Please do not hesitate to contact us if you have any questions regarding this report, or if we may be of further service.

Sincerely,
GRL Engineers, Inc.

Dennis K Kiptoo

Alex Ryberg
Professional Engineer

OBSERVATION WELL CONSTRUCTION SUMMARY
Well No. LB1B-05(OW)

PROJECT Sands New York - Phase 1B	PROJECT NO. 170754501
LOCATION Uniondale, New York	ELEVATION AND DATUM 80.9 ±(NAVD88)
DRILLING AGENCY Craig Geotechnical Drilling, Inc.	DATE STARTED 9/7/2023 — DATE FINISHED 9/7/2023
DRILLING EQUIPMENT CME 75 Truck Rig	DRILLER Ed Flanagan
SIZE AND TYPE OF BIT 3-7/8" tricone roller bit	INSPECTOR Jonathan Negron

METHOD OF INSTALLATION

10-ft of 2-in diameter PVC screen and 30-ft of riser were installed to a depth of 40-ft below grade; borehole casing was then removed. As the casing was removed 38-ft of sand filter was packed. A 2-ft bentonite seal was installed above the filter sand. Grout was placed at the top of the hole and a flush-mount well cap was installed.

METHOD OF WELL DEVELOPMENT

The well was pumped until there was no water.

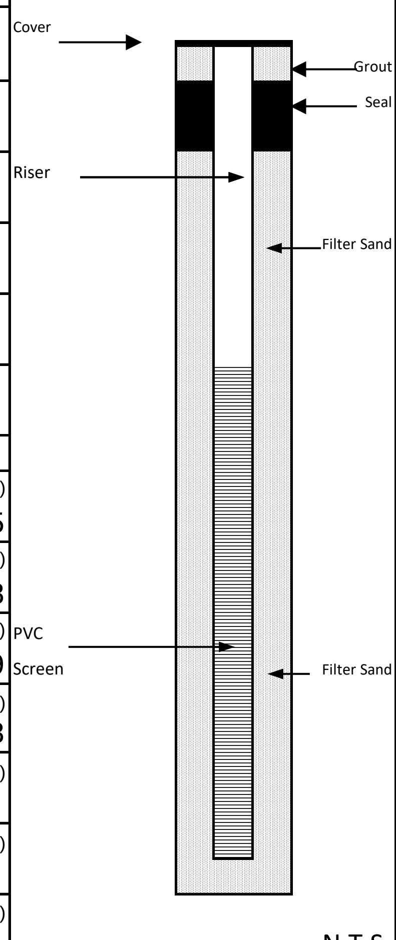
TYPE OF CASING 4" flush joint steel casing	DIAMETER 4.00 inches	TYPE OF BACKFILL MATERIAL Filter sand
TYPE OF SCREEN PVC	DIAMETER 2.00 inches	TYPE OF SEAL MATERIAL Bentonite pellets and grout
BOREHOLE NOMINAL DIAMETER 4 inches		TYPE OF FILTER MATERIAL No. 1 Filter Sand (Silica Quartz Sand)

	ELEVATION (ft)	DEPTH (ft)
TOP OF CASING	80.9	0
TOP OF SEAL	80.4	0.5
TOP OF FILTER	78.4	2.5
TOP OF SCREEN	70.9	10
BOTTOM OF BORING	40.9	40
SCREEN LENGTH	10 ft	
SLOT SIZE	0.01 in	

GROUNDWATER ELEVATIONS

ELEVATION (ft)	DATE	DEPTH TO WATER (ft)
51.40	9/8/2023	29.5
50.10	9/14/2023	30.8
51.00	9/20/2023	29.9
51.10	9/21/2023	29.8
80.90		
80.90		
80.90		

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
FILL	5.0
SAND	10.0
	40.0

LANGAN Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
360 W 31st Street, 8th Floor , New York, NY 10001

OBSERVATION WELL CONSTRUCTION SUMMARY
Well No. LB1B-23(OW)

PROJECT Sands New York - Phase 1B	PROJECT NO. 170754501
LOCATION Uniondale, New York	ELEVATION AND DATUM 81.2 ±(NAVD88)
DRILLING AGENCY Craig Geotechnical Drilling, Inc.	DATE STARTED 8/29/2023 DATE FINISHED 8/29/2023
DRILLING EQUIPMENT CME 75 Truck Rig	DRILLER Shane Frick
SIZE AND TYPE OF BIT 3-7/8" tricone roller bit	INSPECTOR Thomas Keane

METHOD OF INSTALLATION

10-ft of 2-in diameter PVC screen and 30-ft of riser were installed to a depth of 40-ft below grade; borehole casing was then removed. As the casing was removed 38-ft of sand filter was packed. A 2-ft bentonite seal was installed above the filter sand. Grout was placed at the top of the hole and a flush-mount well cap was installed.

METHOD OF WELL DEVELOPMENT

The well was pumped until there was no water.

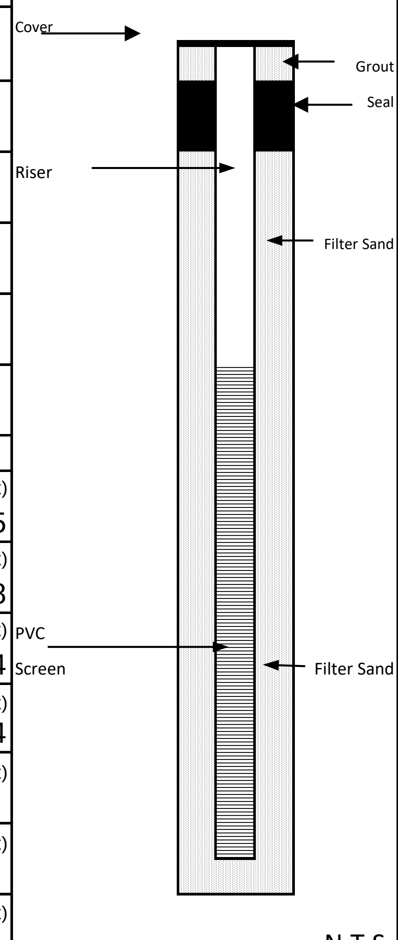
TYPE OF CASING 4" flush joint steel casing	DIAMETER 4.00 inches	TYPE OF BACKFILL MATERIAL Filter sand
TYPE OF SCREEN PVC	DIAMETER 2.00 inches	TYPE OF SEAL MATERIAL Bentonite pellets and grout
BOREHOLE NOMINAL DIAMETER 4 inches		TYPE OF FILTER MATERIAL No. 1 Filter Sand (Silica Quartz Sand)

	ELEVATION (ft)	DEPTH (ft)
TOP OF CASING	81.2	0
TOP OF SEAL	80.7	0.5
TOP OF FILTER	78.7	2.5
TOP OF SCREEN	71.2	10
BOTTOM OF BORING	41.2	40
SCREEN LENGTH	10 ft	
SLOT SIZE	0.01 in	

GROUNDWATER ELEVATIONS

ELEVATION (ft)	DATE	DEPTH TO WATER (ft)
46.70	9/8/2023	34.5
47.40	9/14/2023	33.8
49.80	9/20/2023	31.4
49.80	9/21/2023	31.4
81.20		
81.20		
81.20		

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
FILL	5.0
SAND	10.0
	40.0

LANGAN Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
360 W 31st Street, 8th Floor , New York, NY 10001

APPENDIX B

(2023 LANGAN LABORATORY TESTING
RESULTS)

RSA GEOLAB

1017 Greeley Ave N
Union, NJ 07083
908-964-0786
www.RSAGeolab.com

Letter of Transmittal

Date: 9-28-23 Job No.: 869 Lab Log: 23-2956

Attention: Julia Langewis
Langan Engineering & Environmental Services
360 West 31st Street, 8th Floor
New York, New York 10001

CC:

Re: Sands New York, Hempstead, NY
Langan# not provided

Sample(s) ID: **LB1B-01 S-2 thru LB1B-13 G-1** (43 samples)

Dear Julia,

Please find attached results for the samples referenced above. The following lab testing was performed:

- ASTM D422 Sieve Analysis (43 tests)

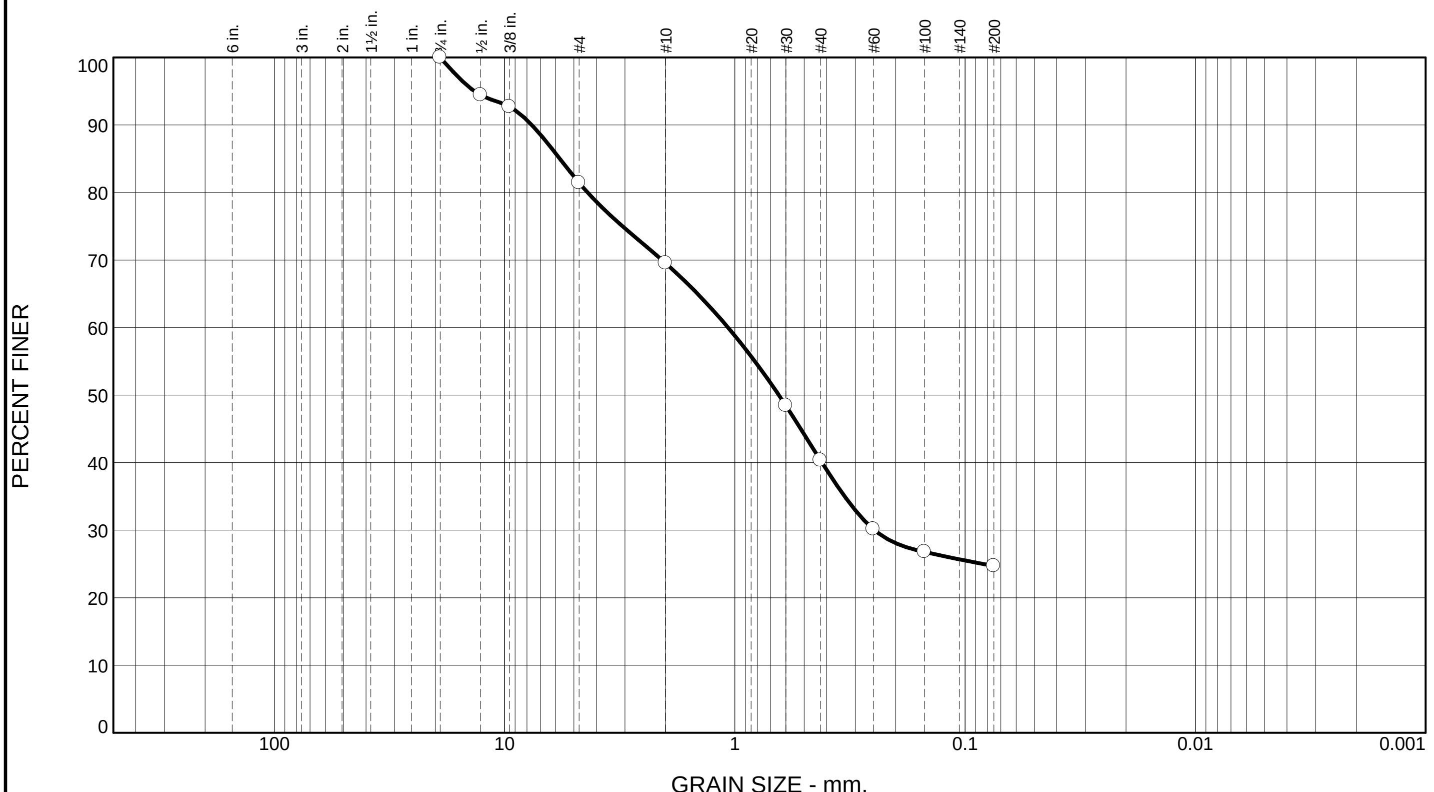
Regards,
RSA Geolab, LLC

Remarks: If you have any questions, please call 908-964-0786.

Signed: ______________

Dr. Raza S. Ahmed
President RSA Geolab, LLC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	18.6	11.9	29.1	15.7	24.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	94.4		
.375	92.7		
#4	81.4		
#10	69.5		
#30	48.4		
#40	40.4		
#60	30.1		
#100	26.8		
#200	24.7		

* (no specification provided)

Material Description

Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 7.6223 D_{85}= 5.7566 D_{60}= 1.0702

D_{50}= 0.6439 D_{30}= 0.2473 D_{15}=

D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-01 G-1 0.5-4

Date: 9-28-23

RSA Geolab

Union, New Jersey

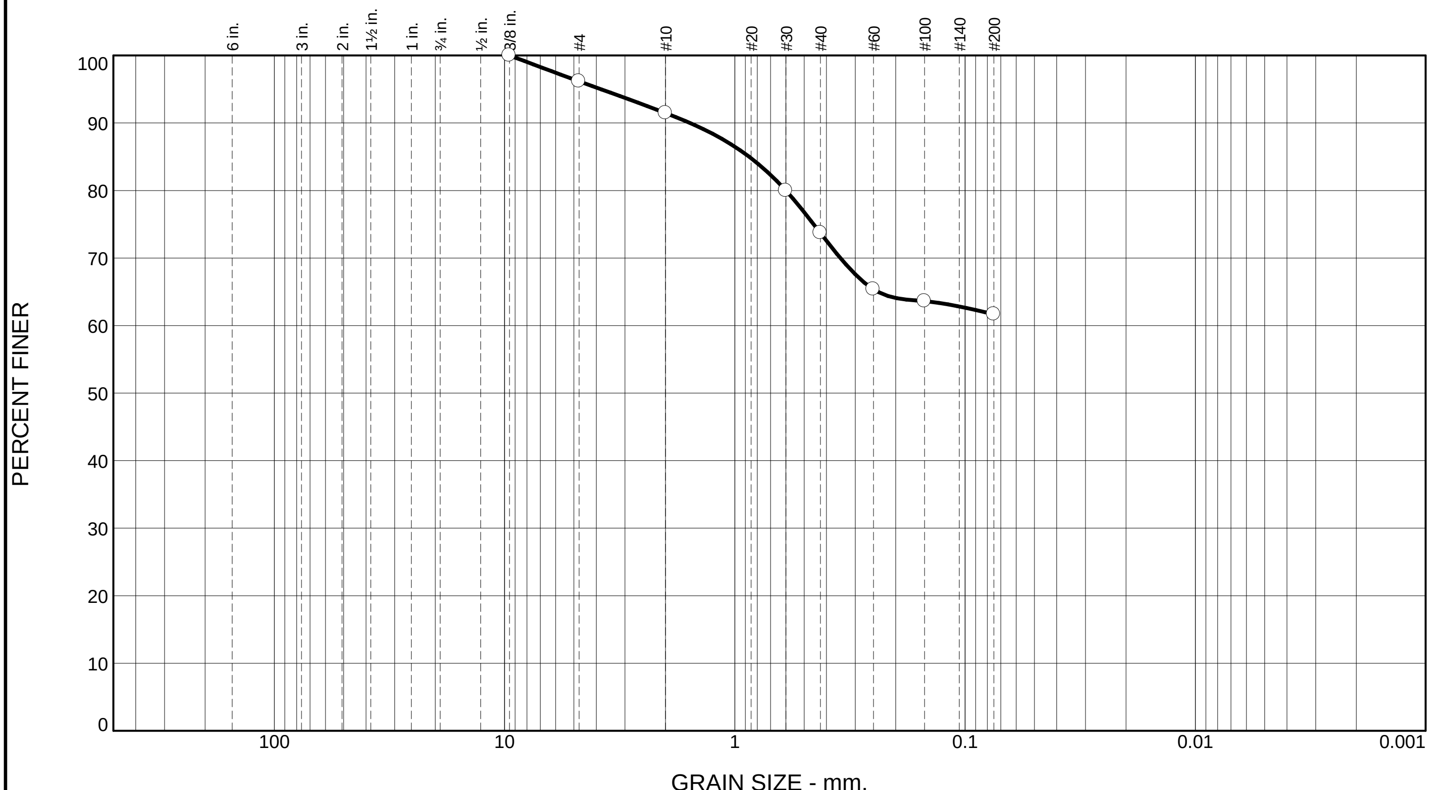
Client: Langan Engineering

Project: Sands New York , Hempstead, NY
Project# not provided

Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.8	4.7	17.8	12.0	61.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	96.2		
#10	91.5		
#30	80.0		
#40	73.7		
#60	65.4		
#100	63.6		
#200	61.7		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.5674 D_{85}= 0.8668 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-01 S-2 7-9

Date: 9-28-23

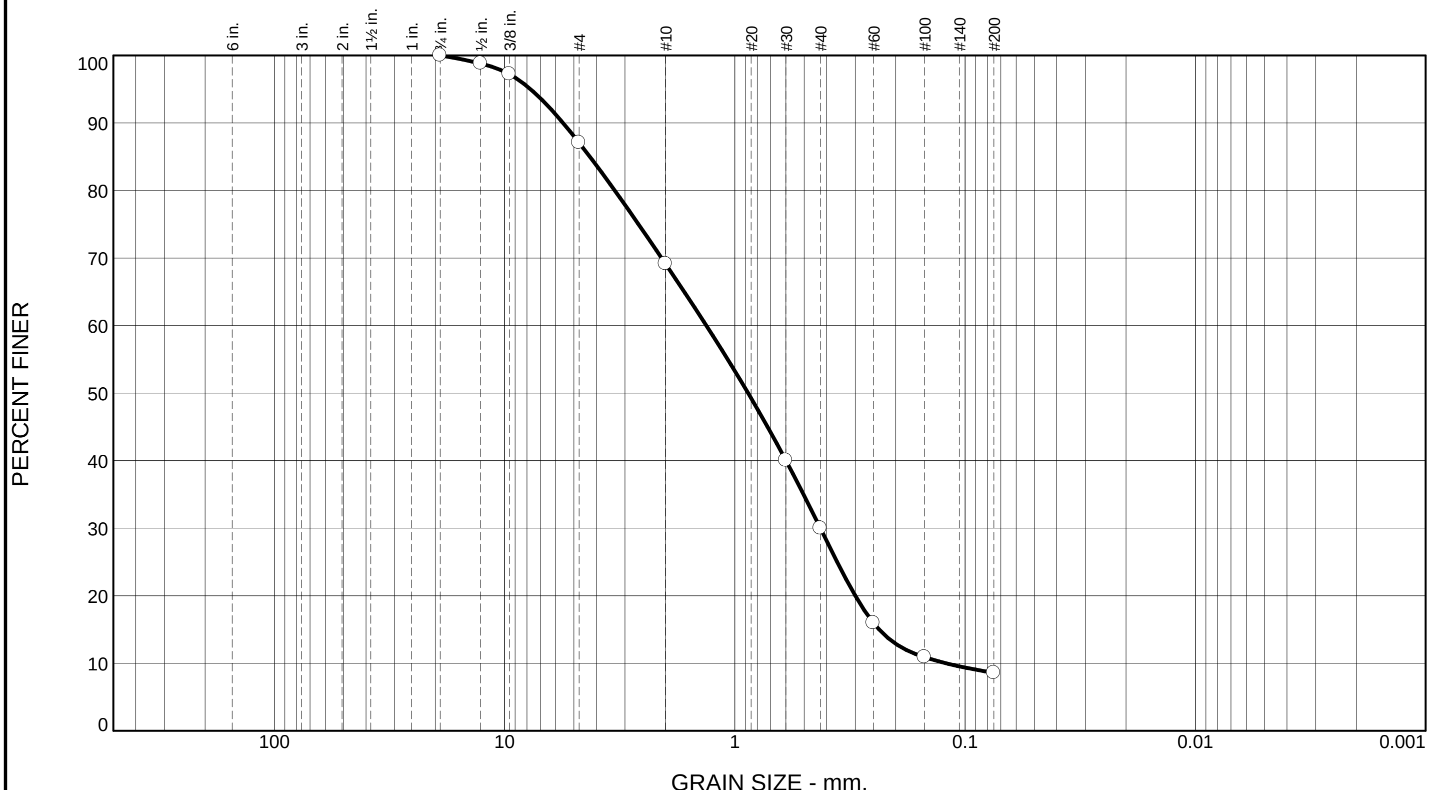
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	12.9	18.0	39.1	21.4	8.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	98.8		
.375	97.2		
#4	87.1		
#10	69.1		
#30	40.0		
#40	30.0		
#60	16.0		
#100	10.9		
#200	8.6		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 5.5744 D_{85}= 4.2613 D_{60}= 1.3300
D_{50}= 0.8757 D_{30}= 0.4251 D_{15}= 0.2364
D_{10}= 0.1211 C_u= 10.98 C_c= 1.12

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-02 S-2 7-9

Date: 9-28-23

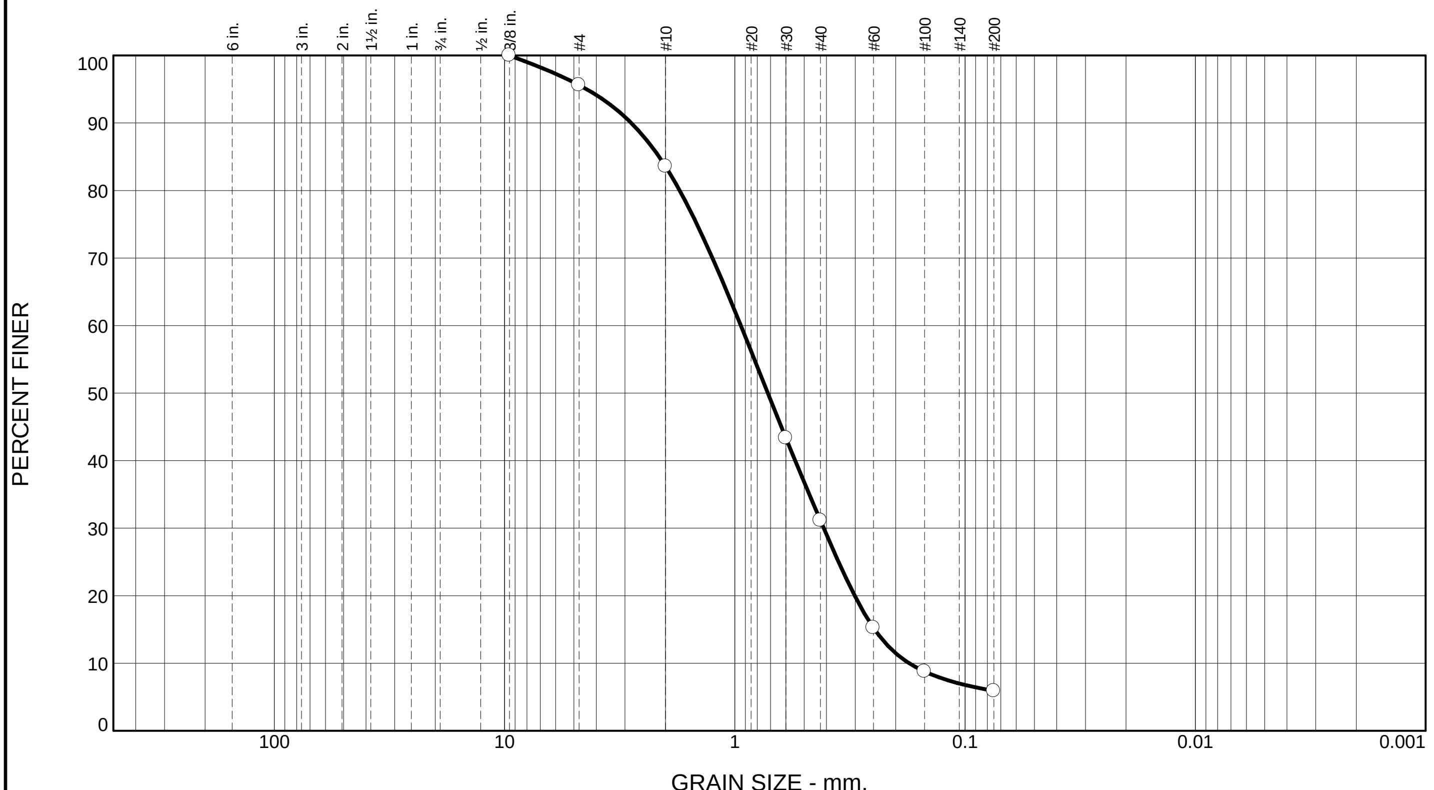
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.4	12.0	52.5	25.2	5.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	95.6		
#10	83.6		
#30	43.3		
#40	31.1		
#60	15.2		
#100	8.8		
#200	5.9		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 2.8167 D_{85}= 2.1319 D_{60}= 0.9419
D_{50}= 0.7190 D_{30}= 0.4111 D_{15}= 0.2472
D_{10}= 0.1750 C_u= 5.38 C_c= 1.03

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-03 S-4 11-13

Date: 9-28-23

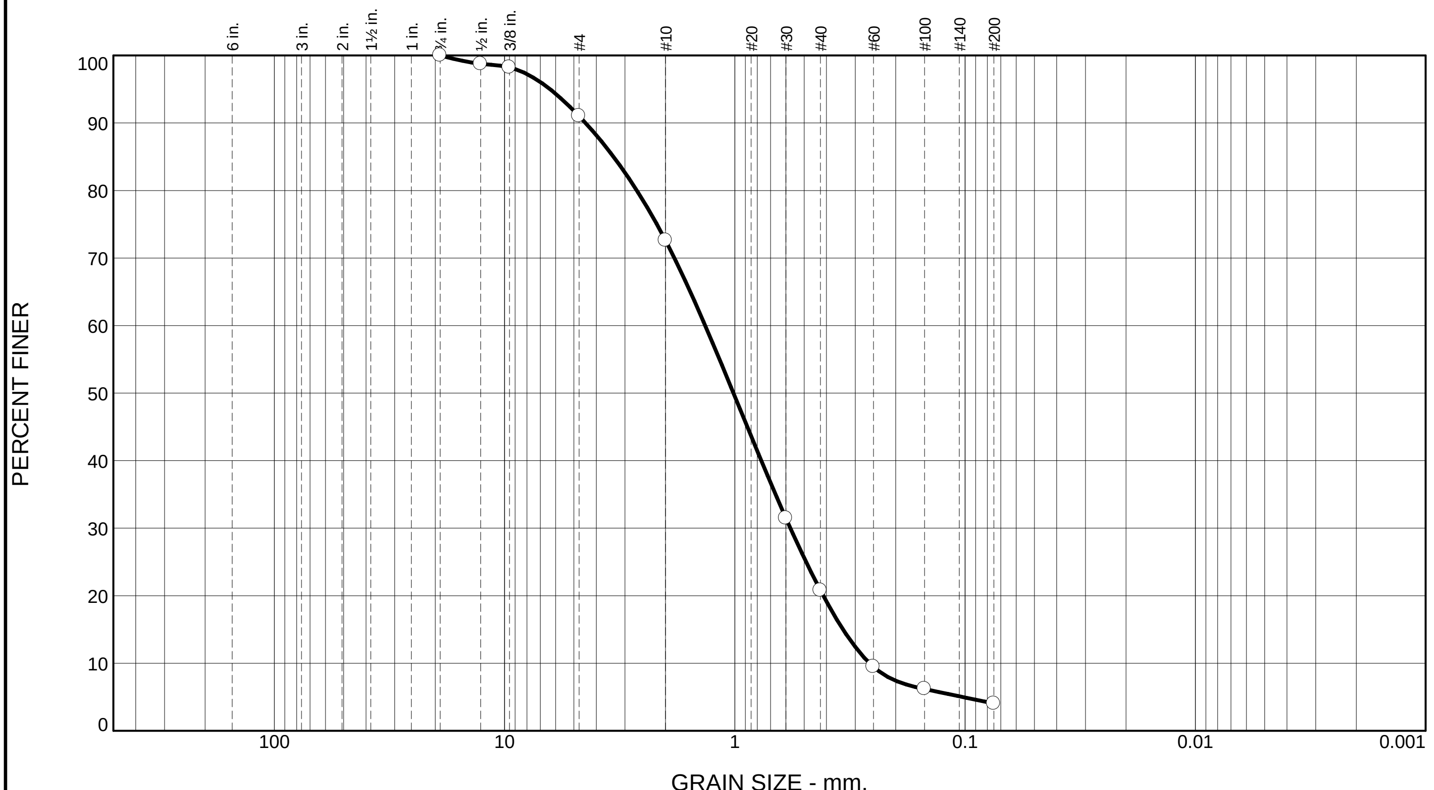
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	9.0	18.4	51.8	16.8	4.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	98.8		
.375	98.2		
#4	91.0		
#10	72.6		
#30	31.5		
#40	20.8		
#60	9.5		
#100	6.2		
#200	4.0		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 4.4537 D_{85}= 3.3648 D_{60}= 1.3453
D_{50}= 1.0139 D_{30}= 0.5740 D_{15}= 0.3390
D_{10}= 0.2599 C_u= 5.18 C_c= 0.94

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1B-04 S-3 9-11

Date: 9-28-23

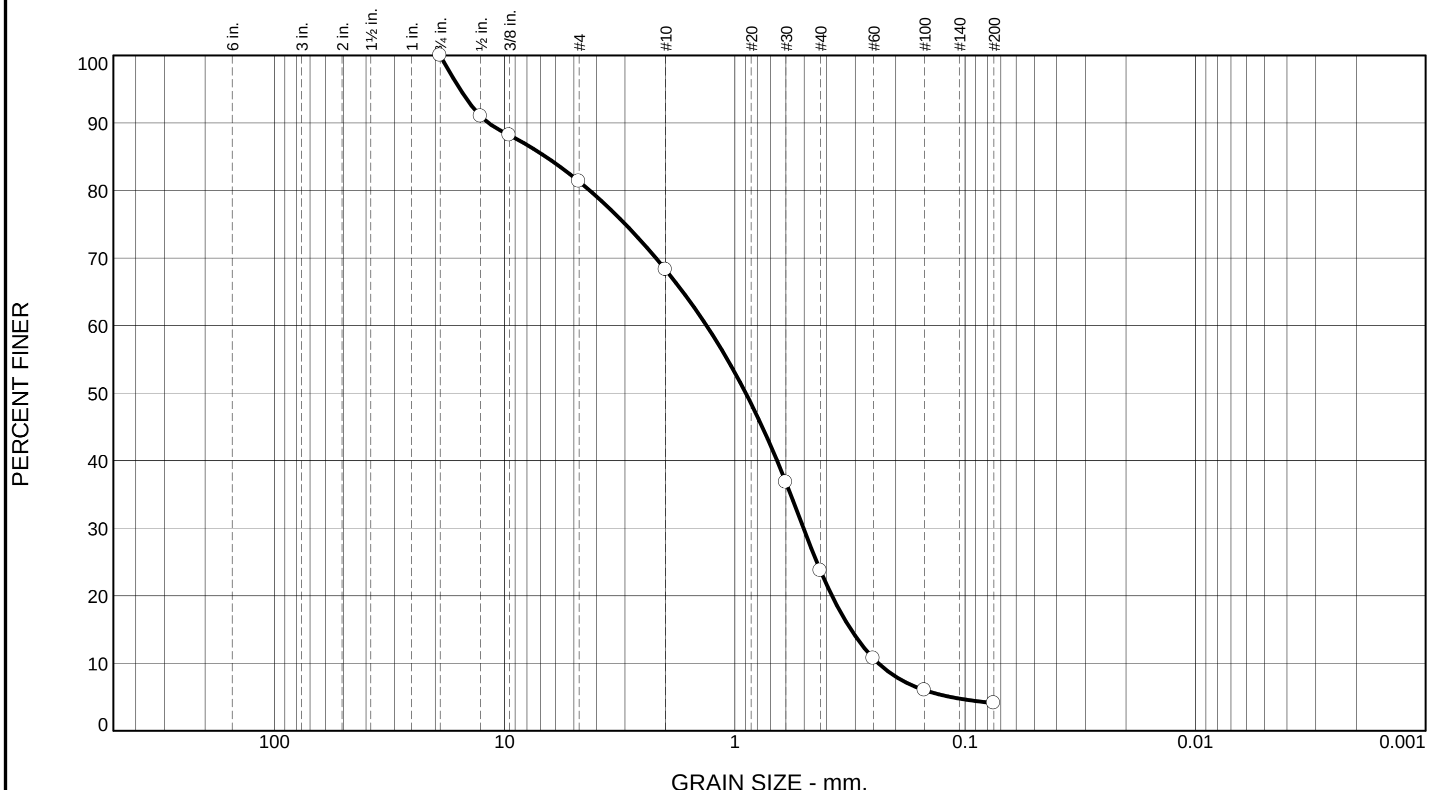
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	18.7	13.0	44.6	19.6	4.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	91.0		
.375	88.2		
#4	81.3		
#10	68.3		
#30	36.8		
#40	23.7		
#60	10.7		
#100	6.0		
#200	4.1		

* (no specification provided)

Material Description

Grayish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 11.7550 D_{85}= 6.6245 D_{60}= 1.3273
D_{50}= 0.8964 D_{30}= 0.5034 D_{15}= 0.3132
D_{10}= 0.2380 C_u= 5.58 C_c= 0.80

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1B-05 S-3 9-11

Date: 9-28-23

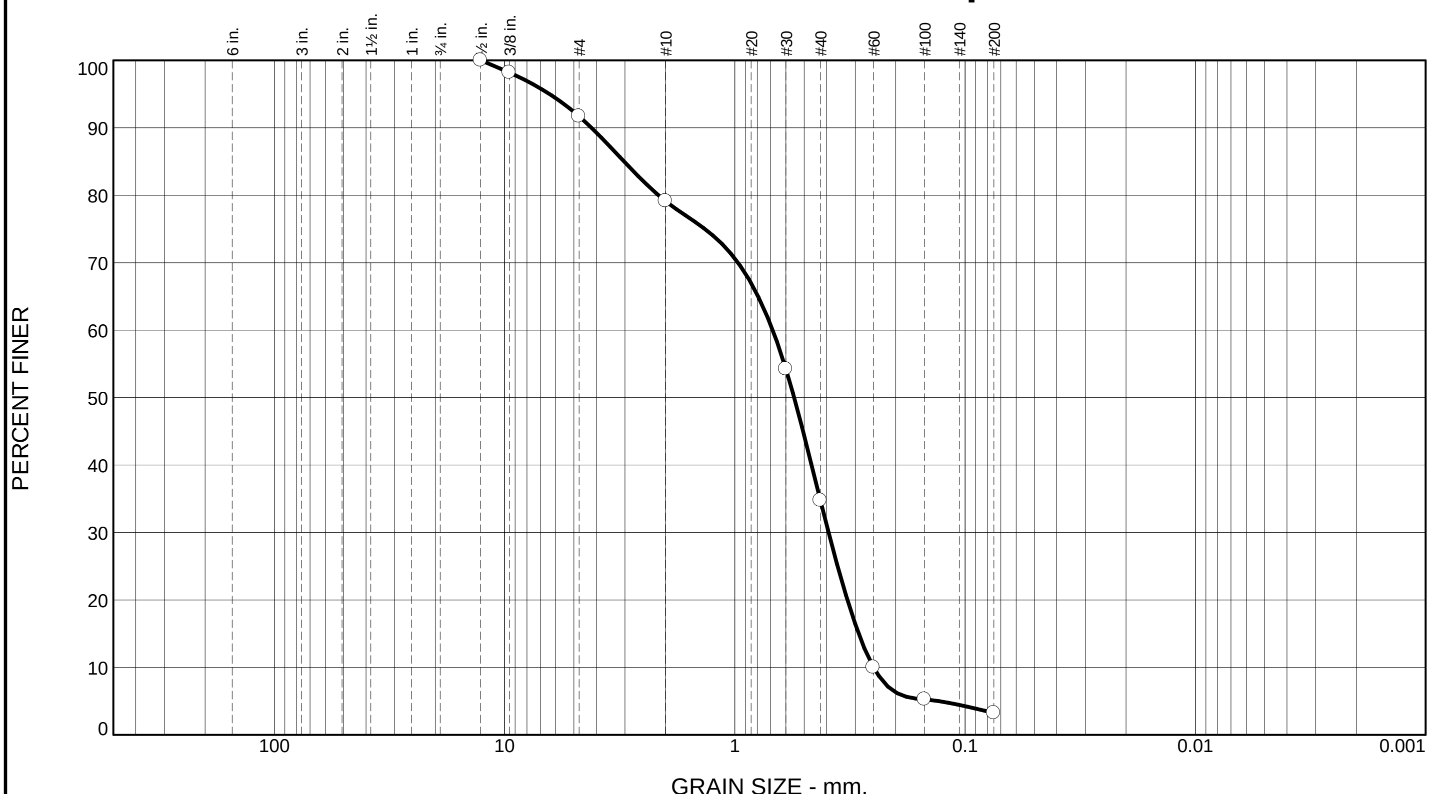
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	8.3	12.6	44.4	31.5	3.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	98.2		
#4	91.7		
#10	79.1		
#30	54.2		
#40	34.7		
#60	10.0		
#100	5.3		
#200	3.2		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 4.1939 D_{85}= 3.0260 D_{60}= 0.6848
D_{50}= 0.5527 D_{30}= 0.3916 D_{15}= 0.2899
D_{10}= 0.2499 C_u= 2.74 C_c= 0.90

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1B-05 S-5 15-17

Date: 9-28-23

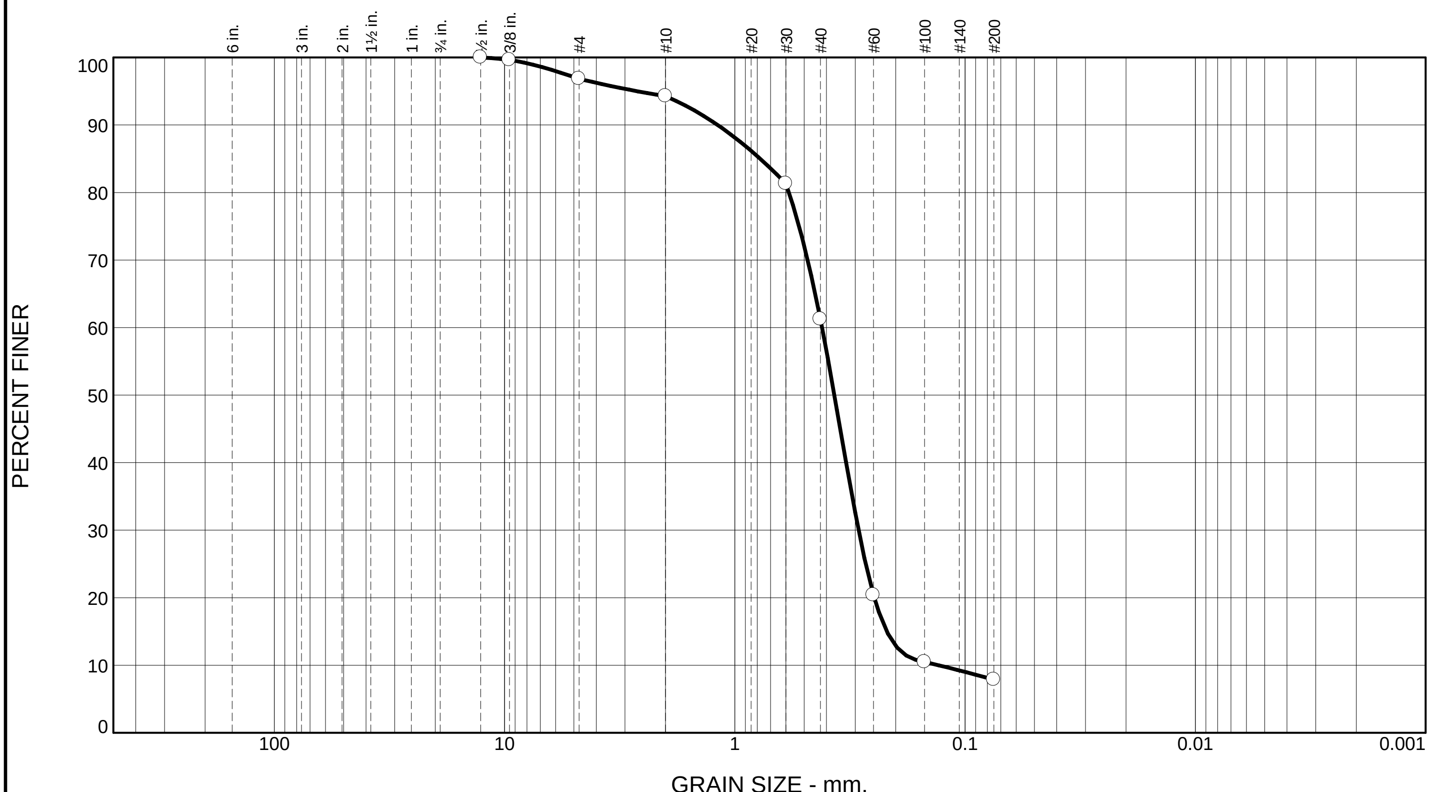
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.2	2.5	33.0	53.4	7.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	99.6		
#4	96.8		
#10	94.3		
#30	81.3		
#40	61.3		
#60	20.4		
#100	10.5		
#200	7.9		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.1881 D_{85}= 0.7764 D_{60}= 0.4181
D_{50}= 0.3698 D_{30}= 0.2901 D_{15}= 0.2187
D_{10}= 0.1305 C_u= 3.20 C_c= 1.54

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-05 S-12 50-52

Date: 9-28-23

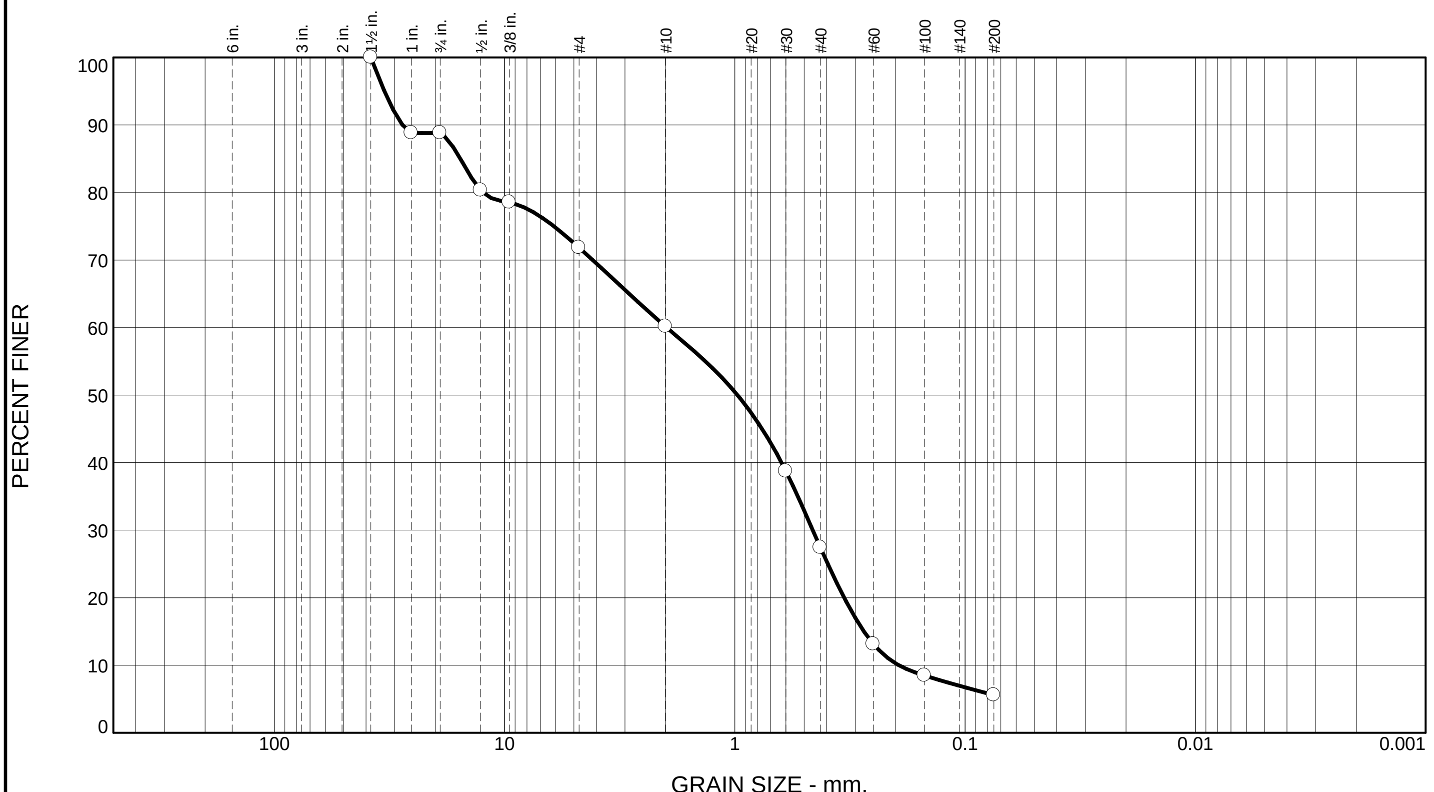
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	11.2	17.0	11.6	32.8	21.8	5.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	88.8		
.75	88.8		
.5	80.3		
.375	78.5		
#4	71.8		
#10	60.2		
#30	38.7		
#40	27.4		
#60	13.1		
#100	8.5		
#200	5.6		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 27.7653 D_{85}= 15.5609 D_{60}= 1.9760
D_{50}= 0.9738 D_{30}= 0.4588 D_{15}= 0.2751
D_{10}= 0.1941 C_u= 10.18 C_c= 0.55

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-06 S-5 15-17

Date: 9-28-23

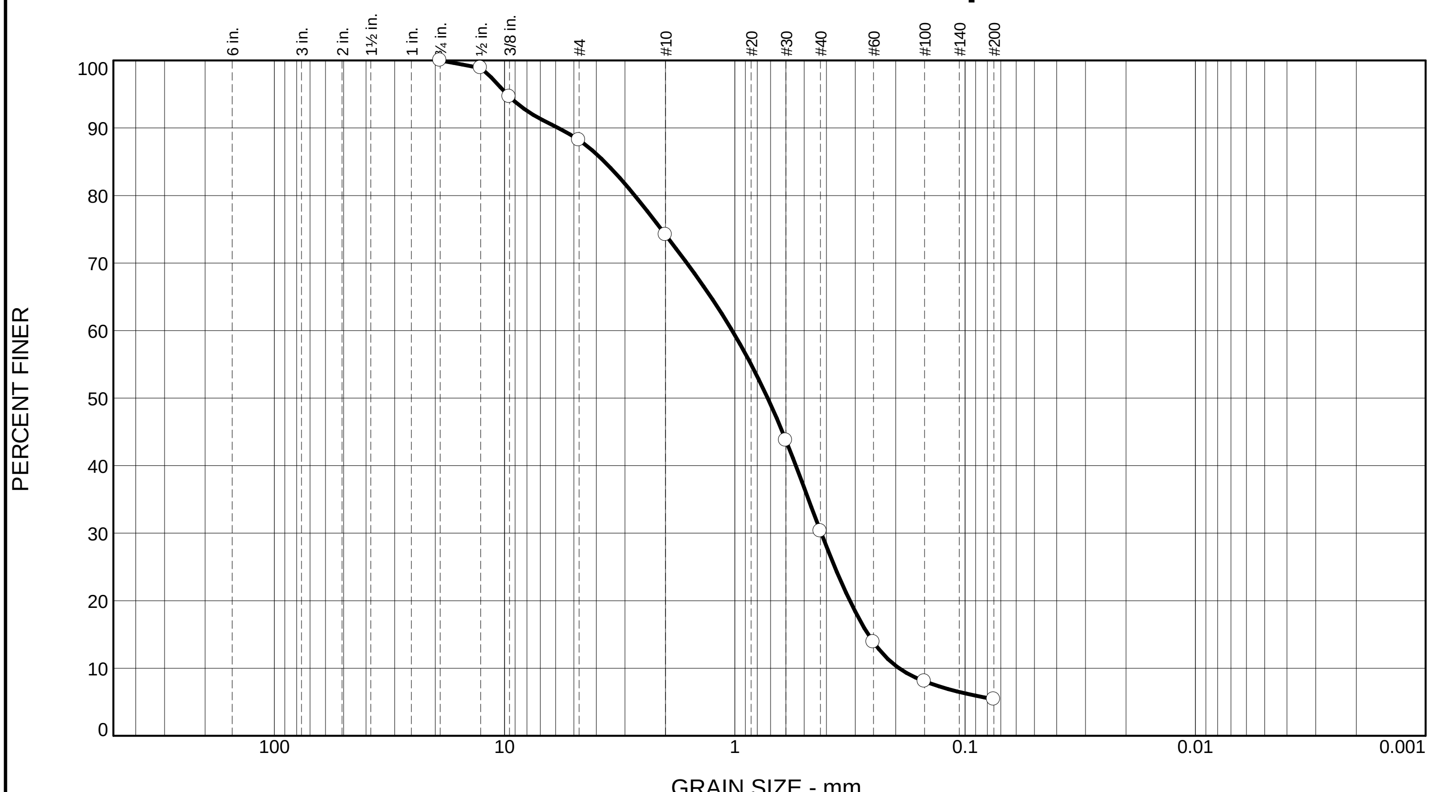
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	11.8	14.0	43.9	24.9	5.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	98.9		
.375	94.6		
#4	88.2		
#10	74.2		
#30	43.7		
#40	30.3		
#60	13.9		
#100	8.1		
#200	5.4		

* (no specification provided)

Material Description

Grayish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 5.8459 D_{85}= 3.6798 D_{60}= 1.0270
D_{50}= 0.7202 D_{30}= 0.4215 D_{15}= 0.2634
D_{10}= 0.1935 C_u= 5.31 C_c= 0.89

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-07 S-3 9-11

Date: 9-28-23

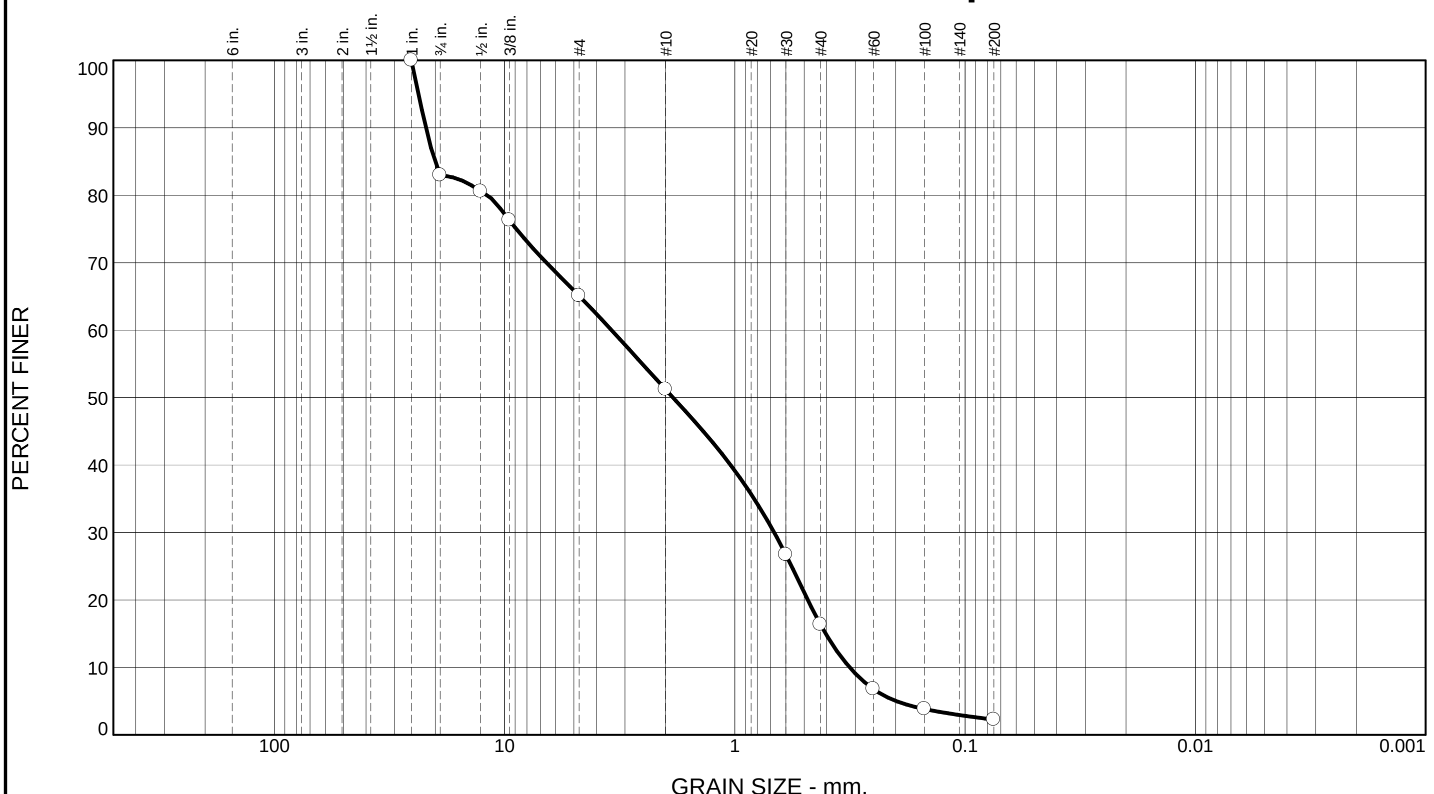
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	17.0	17.9	13.9	34.8	14.1	2.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	83.0		
.5	80.6		
.375	76.3		
#4	65.1		
#10	51.2		
#30	26.7		
#40	16.4		
#60	6.8		
#100	3.8		
#200	2.3		

* (no specification provided)

Material Description

Grayish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 21.9591 D_{85}= 20.0429 D_{60}= 3.4314
D_{50}= 1.8550 D_{30}= 0.6748 D_{15}= 0.4032
D_{10}= 0.3172 C_u= 10.82 C_c= 0.42

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1B-07 S-12 45-47

Date: 9-28-23

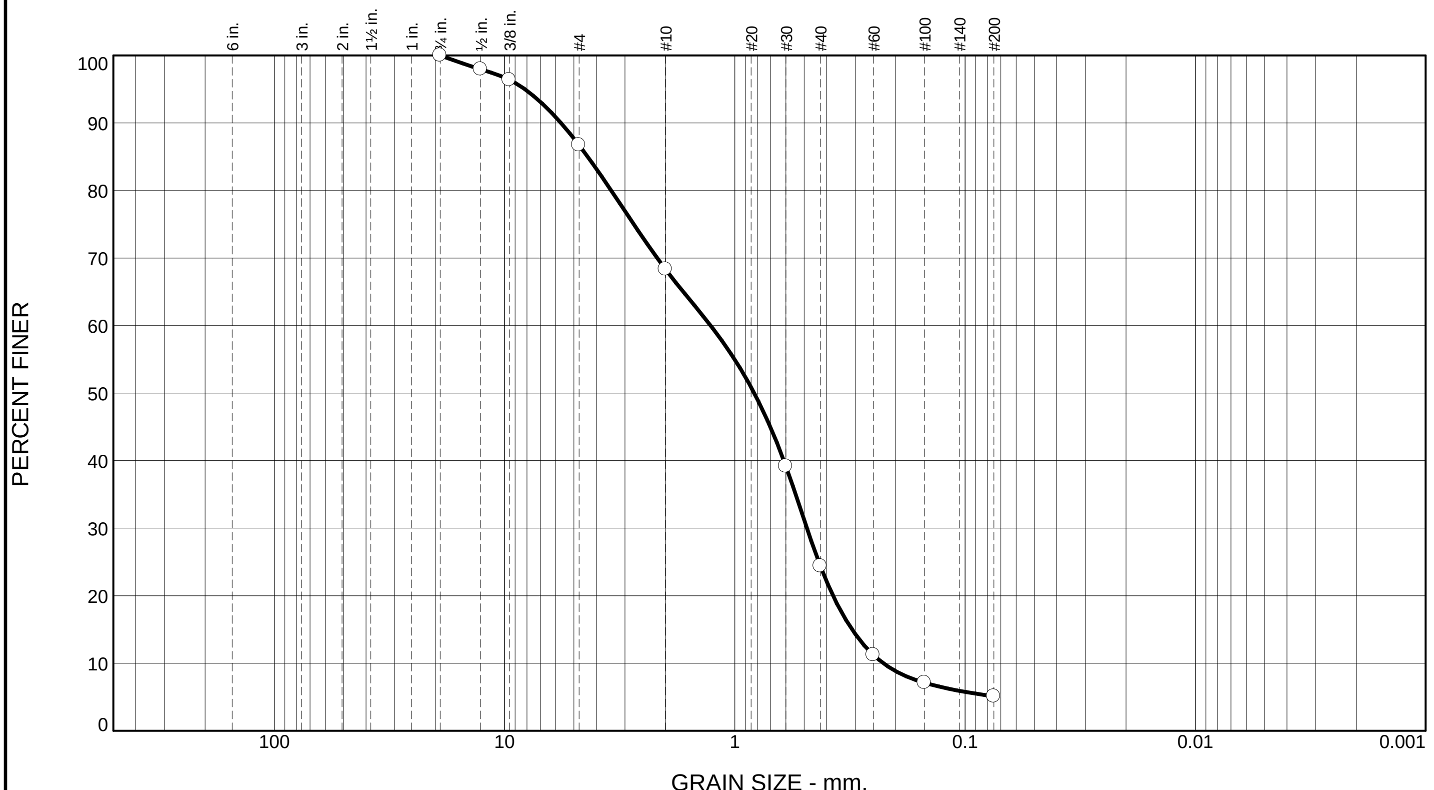
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	13.3	18.4	43.9	19.3	5.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	97.9		
.375	96.4		
#4	86.7		
#10	68.3		
#30	39.2		
#40	24.4		
#60	11.2		
#100	7.1		
#200	5.1		

* (no specification provided)

Material Description

Light Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 5.6897 D_{85}= 4.3547 D_{60}= 1.2746
D_{50}= 0.8239 D_{30}= 0.4864 D_{15}= 0.3098
D_{10}= 0.2266 C_u= 5.63 C_c= 0.82

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-08 S-5 15-17

Date: 9-28-23

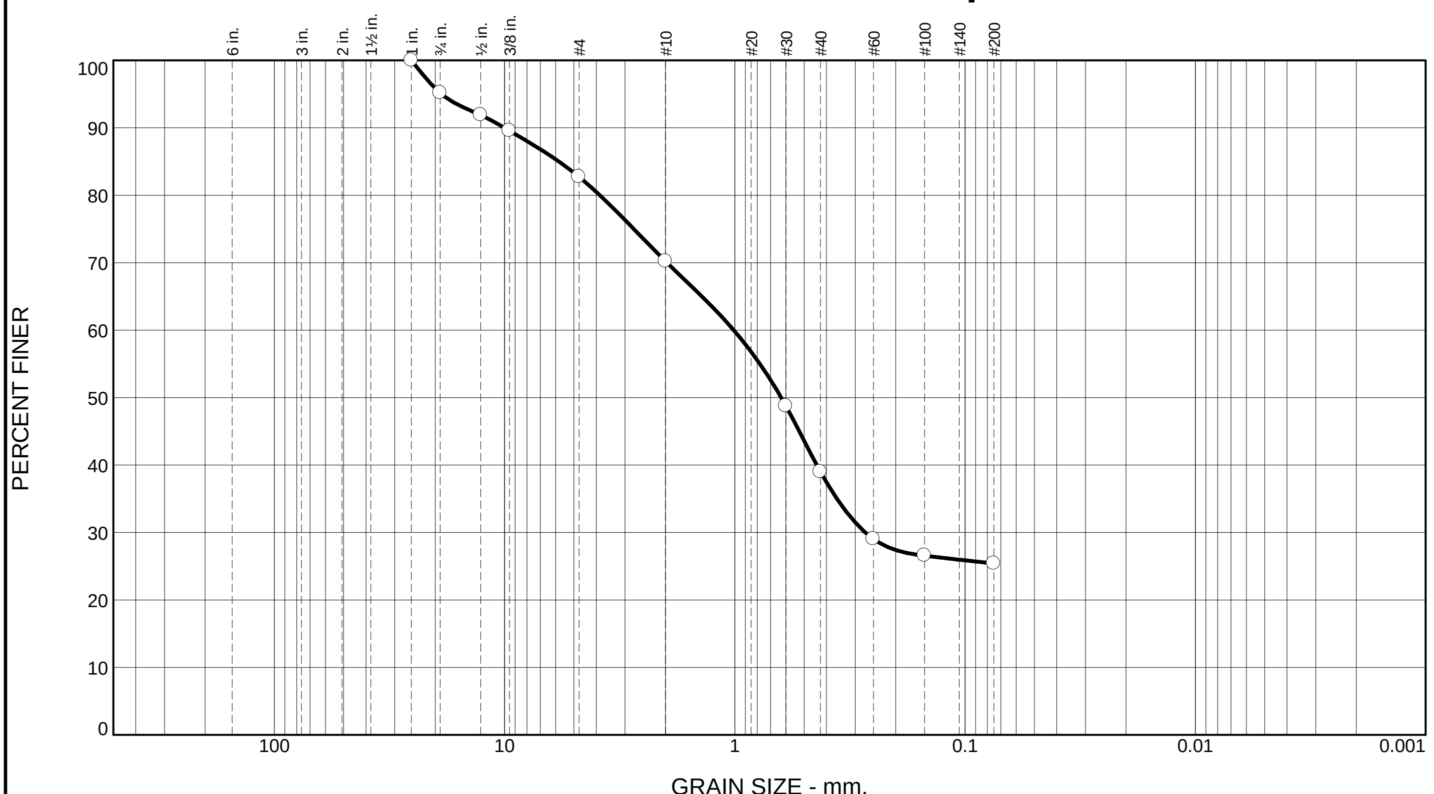
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.8	12.5	12.5	31.2	13.6	25.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	95.2		
.5	91.9		
.375	89.6		
#4	82.7		
#10	70.2		
#30	48.8		
#40	39.0		
#60	29.0		
#100	26.6		
#200	25.4		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 10.0188 D_{85}= 5.8121 D_{60}= 1.0114
D_{50}= 0.6290 D_{30}= 0.2712 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-09 S-2 7-9

Date: 9-28-23

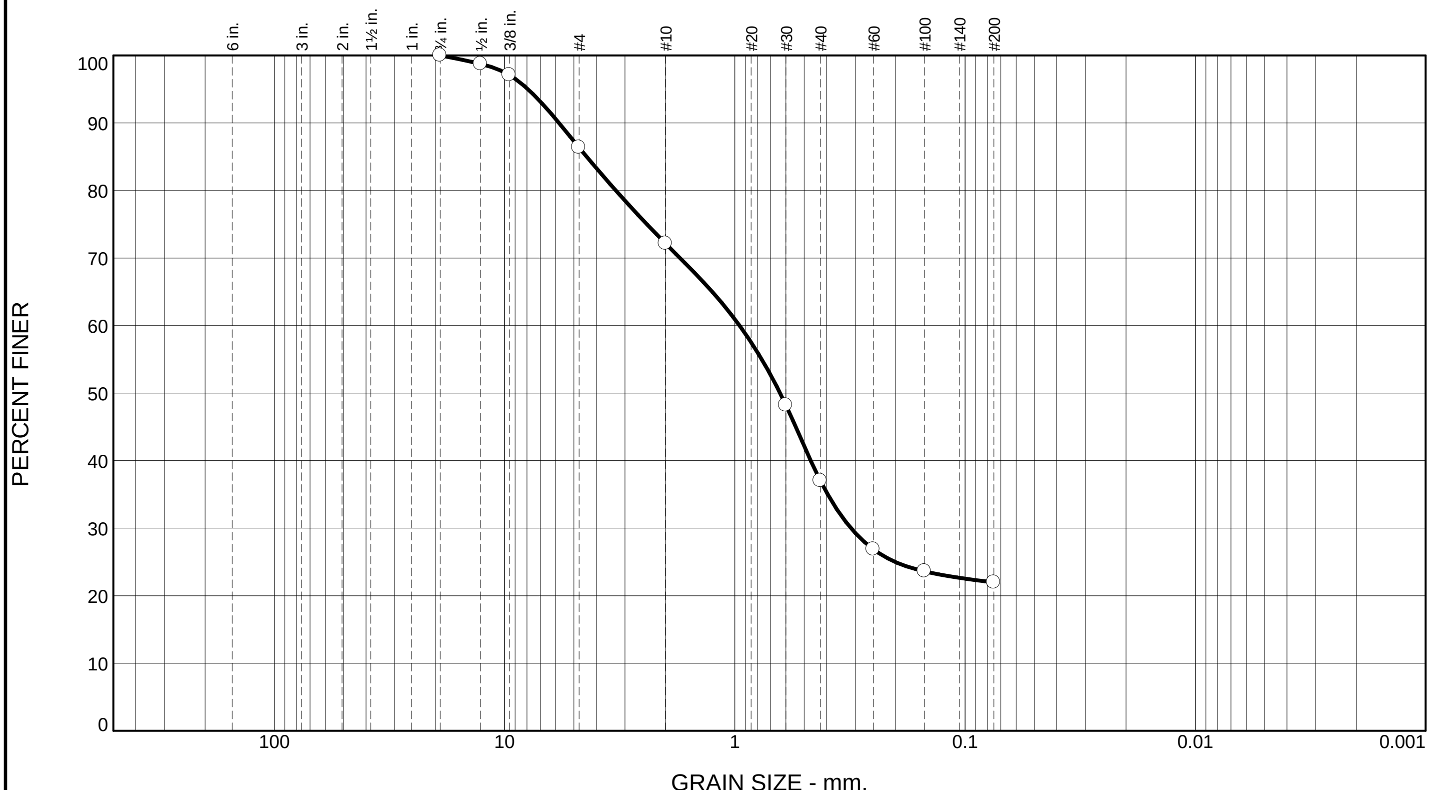
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	13.6	14.2	35.2	15.0	22.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	98.7		
.375	97.1		
#4	86.4		
#10	72.2		
#30	48.2		
#40	37.0		
#60	26.9		
#100	23.6		
#200	22.0		

* (no specification provided)

Material Description

Very Dark Grayish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 5.8033 D_{85}= 4.3965 D_{60}= 0.9538
D_{50}= 0.6363 D_{30}= 0.3130 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-10 S-1 5-7

Date: 9-28-23

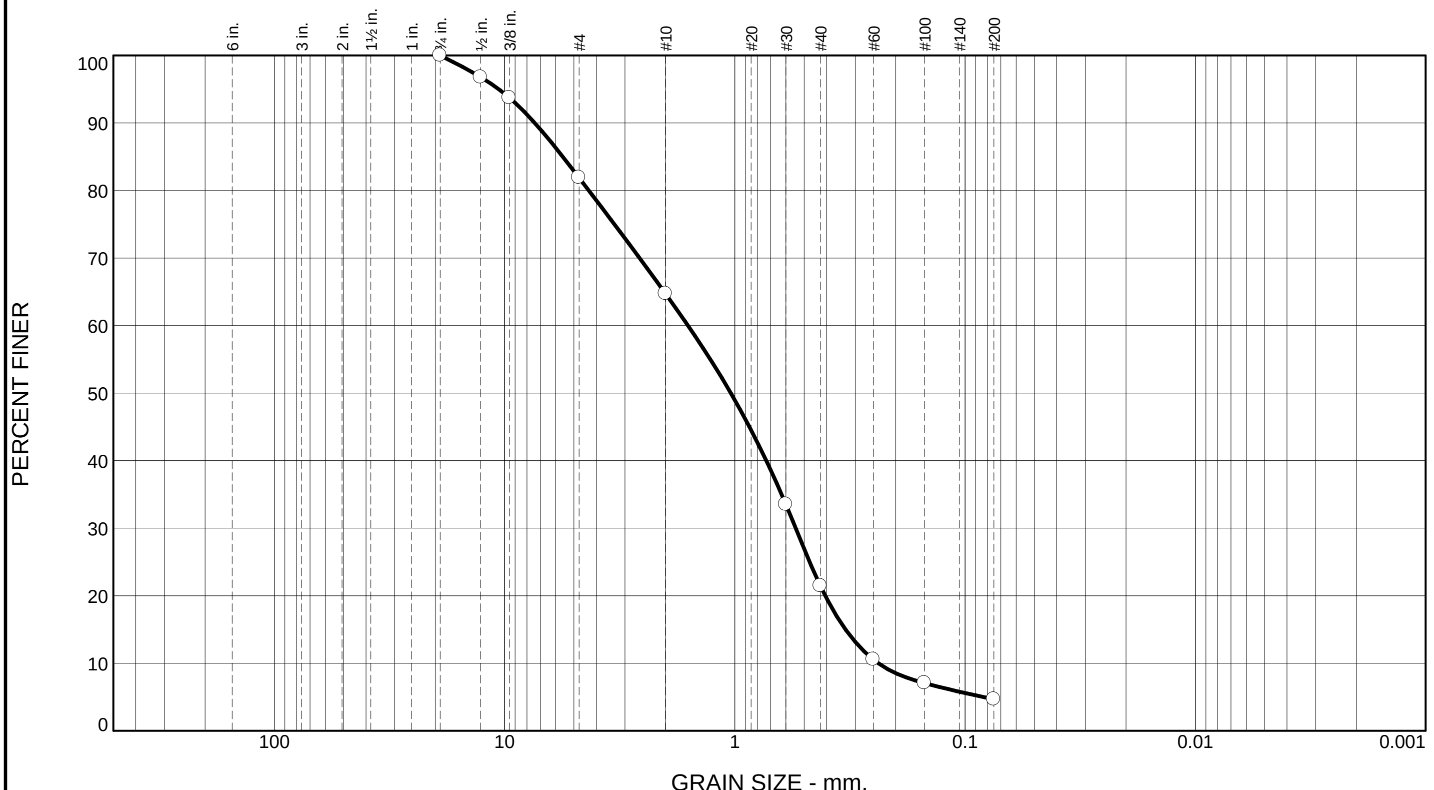
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	18.1	17.2	43.3	16.7	4.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	96.8		
.375	93.7		
#4	81.9		
#10	64.7		
#30	33.5		
#40	21.4		
#60	10.5		
#100	7.1		
#200	4.7		

* (no specification provided)

Material Description

Grayish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 7.3964 D_{85}= 5.5881 D_{60}= 1.5982
D_{50}= 1.0411 D_{30}= 0.5441 D_{15}= 0.3307
D_{10}= 0.2381 C_u= 6.71 C_c= 0.78

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1B-11 S-2 7-9

Date: 9-28-23

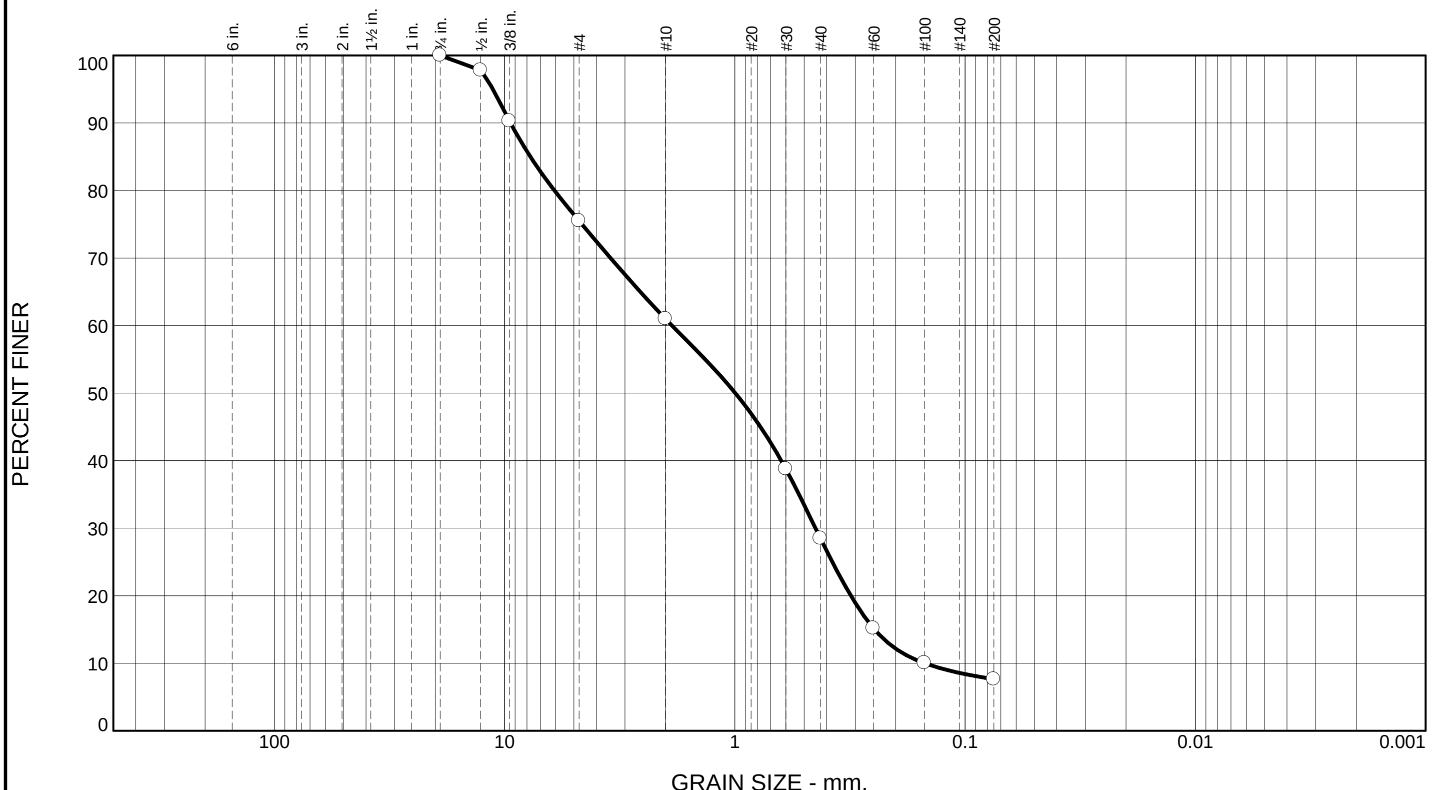
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	24.5	14.5	32.5	20.9	7.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	97.8		
.375	90.3		
#4	75.5		
#10	61.0		
#30	38.7		
#40	28.5		
#60	15.2		
#100	10.0		
#200	7.6		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 9.4280 D_{85}= 7.7263 D_{60}= 1.8746
D_{50}= 0.9955 D_{30}= 0.4466 D_{15}= 0.2474
D_{10}= 0.1495 C_u= 12.54 C_c= 0.71

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-12 S-4 11-13

Date: 9-28-23

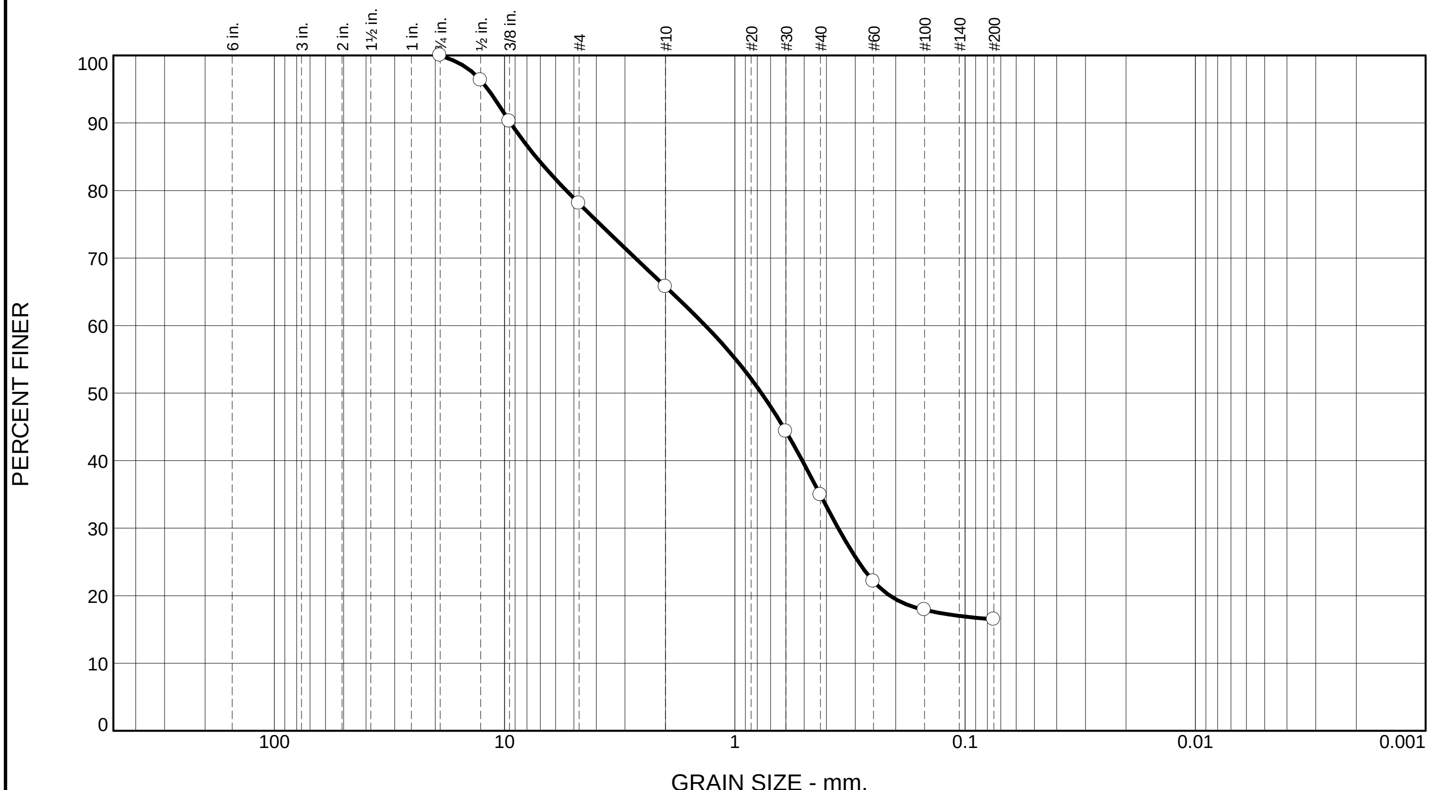
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	21.9	12.3	30.9	18.4	16.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	96.3		
.375	90.2		
#4	78.1		
#10	65.8		
#30	44.3		
#40	34.9		
#60	22.1		
#100	17.9		
#200	16.5		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 9.4202 D_{85}= 7.3153 D_{60}= 1.3426

D_{50}= 0.7663 D_{30}= 0.3558 D_{15}=

D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-13 G-1 2-4

Date: 9-28-23

RSA Geolab

Union, New Jersey

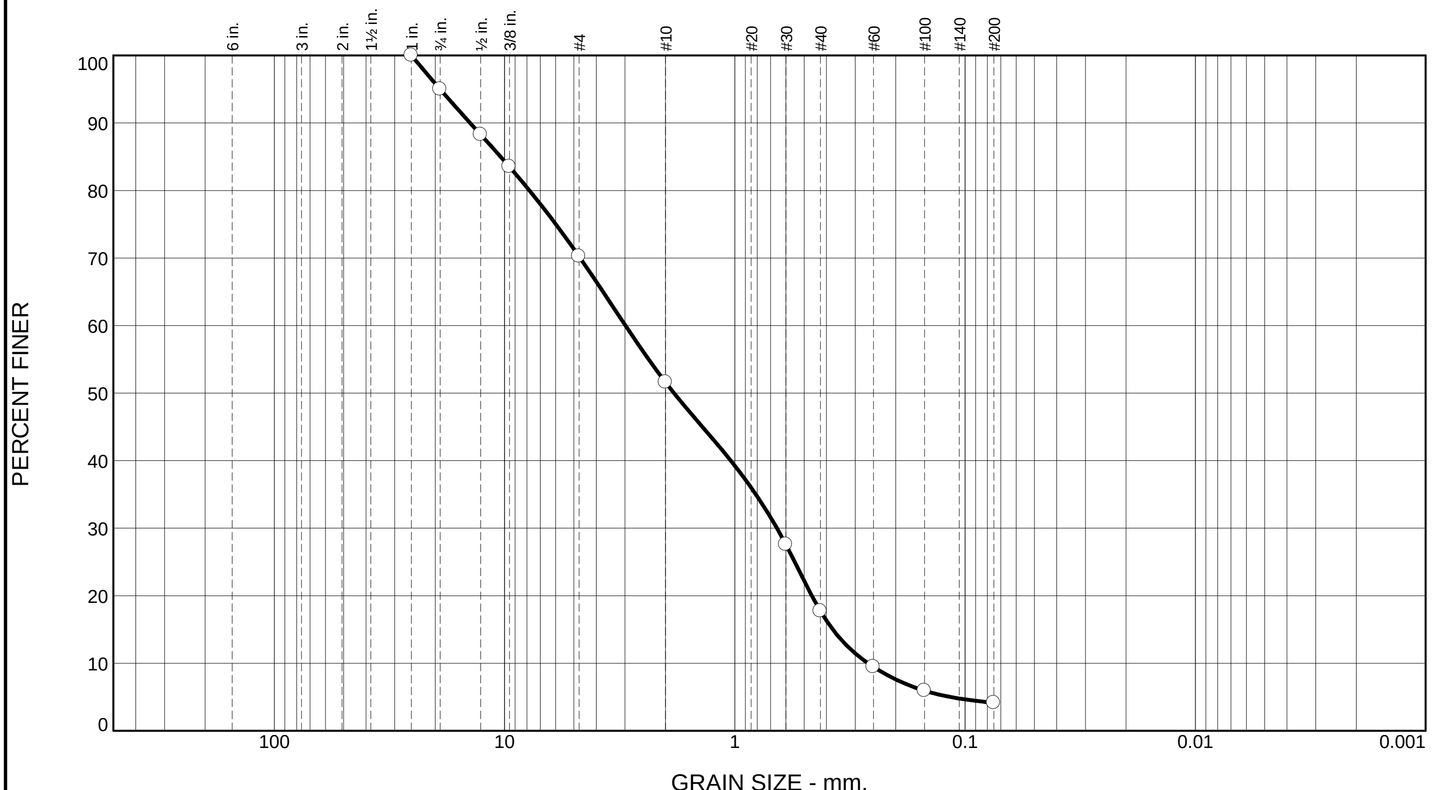
Client: Langan Engineering

Project: Sands New York, Hempstead, NY
Project# not provided

Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.0	24.8	18.6	33.9	13.6	4.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	95.0		
.5	88.3		
.375	83.5		
#4	70.2		
#10	51.6		
#30	27.6		
#40	17.7		
#60	9.5		
#100	5.9		
#200	4.1		

* (no specification provided)

Material Description

Grayish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 14.1185 D_{85}= 10.4063 D_{60}= 2.9851
D_{50}= 1.8370 D_{30}= 0.6565 D_{15}= 0.3757
D_{10}= 0.2641 C_u= 11.30 C_c= 0.55

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1B-13 S-2 7-9

Date: 9-28-23

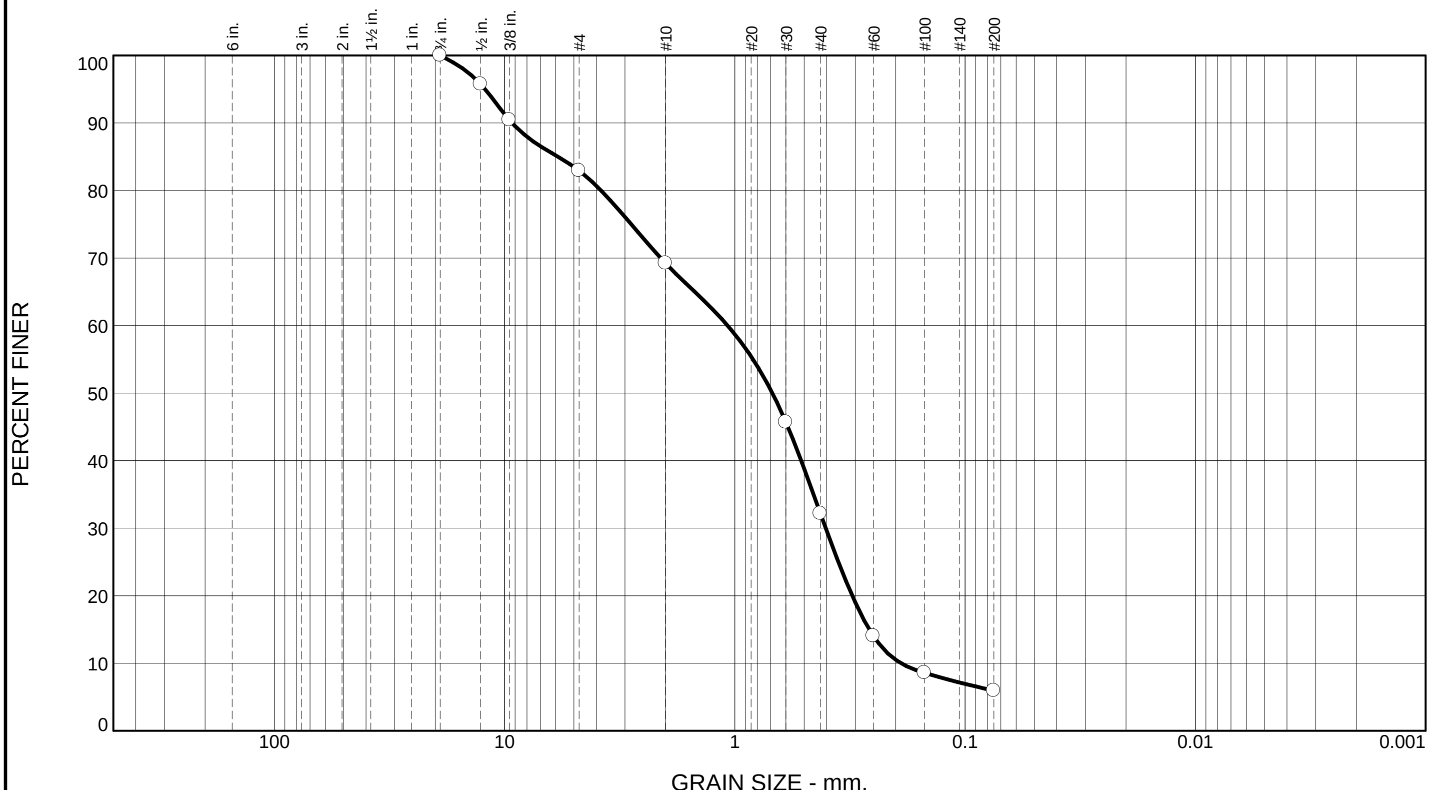
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	17.1	13.7	37.0	26.3	5.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	95.7		
.375	90.4		
#4	82.9		
#10	69.2		
#30	45.7		
#40	32.2		
#60	14.0		
#100	8.6		
#200	5.9		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 9.2798 D_{85}= 5.8628 D_{60}= 1.0748
D_{50}= 0.6872 D_{30}= 0.4030 D_{15}= 0.2607
D_{10}= 0.1898 C_u= 5.66 C_c= 0.80

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-13 S-5 15-17

Date: 9-28-23

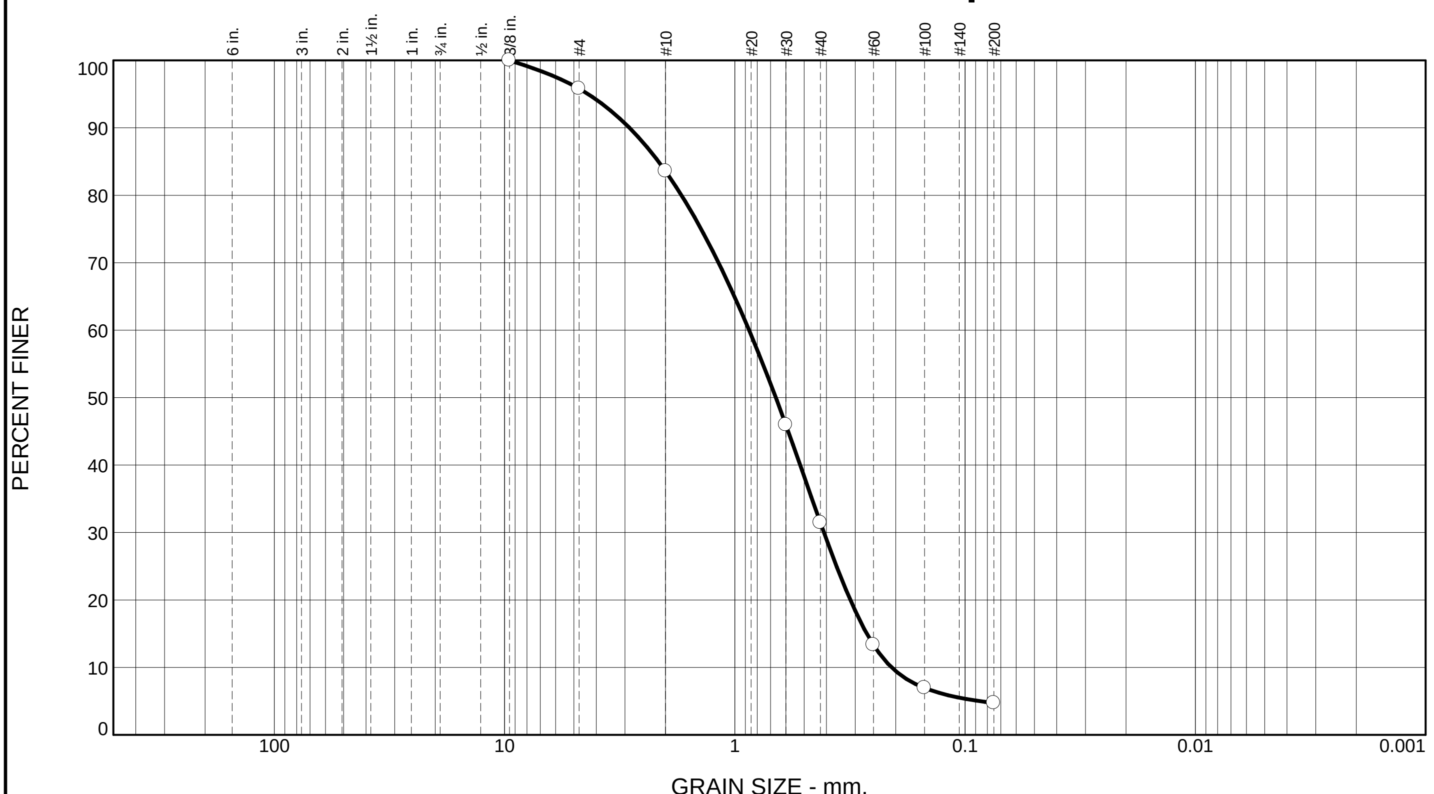
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.2	12.2	52.1	26.8	4.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	95.8		
#10	83.6		
#30	45.9		
#40	31.5		
#60	13.3		
#100	7.0		
#200	4.7		

* (no specification provided)

Material Description

Grayish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 2.8694 D_{85}= 2.1467 D_{60}= 0.8674
D_{50}= 0.6637 D_{30}= 0.4103 D_{15}= 0.2673
D_{10}= 0.2086 C_u= 4.16 C_c= 0.93

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1B-14 S-4 11-13

Date: 9-28-23

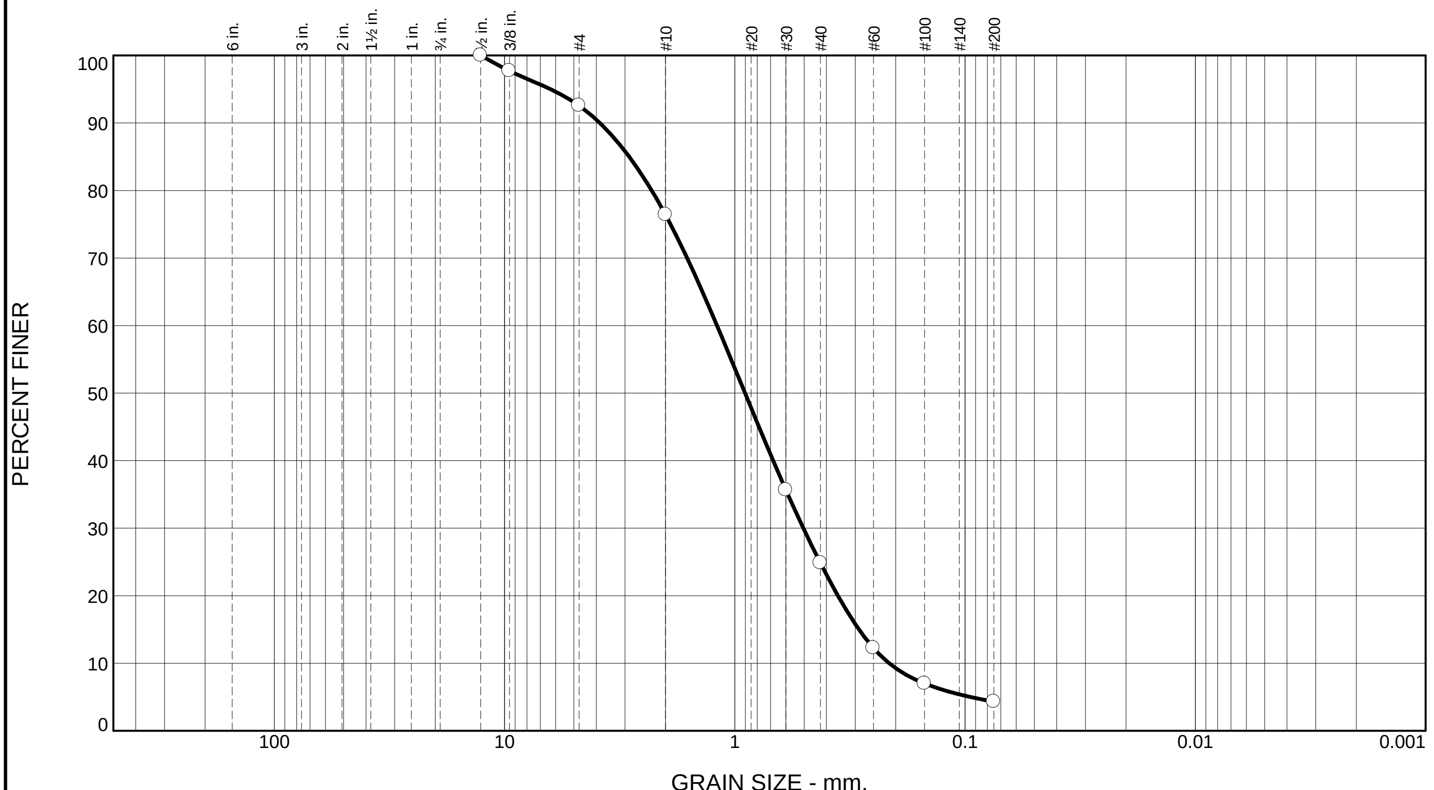
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.4	16.2	51.6	20.5	4.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	97.7		
#4	92.6		
#10	76.4		
#30	35.6		
#40	24.8		
#60	12.2		
#100	7.0		
#200	4.3		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 3.8570 D_{85}= 2.8759 D_{60}= 1.1953
D_{50}= 0.9033 D_{30}= 0.5041 D_{15}= 0.2892
D_{10}= 0.2137 C_u= 5.59 C_c= 0.99

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1B-15 S-4 11-13

Date: 9-28-23

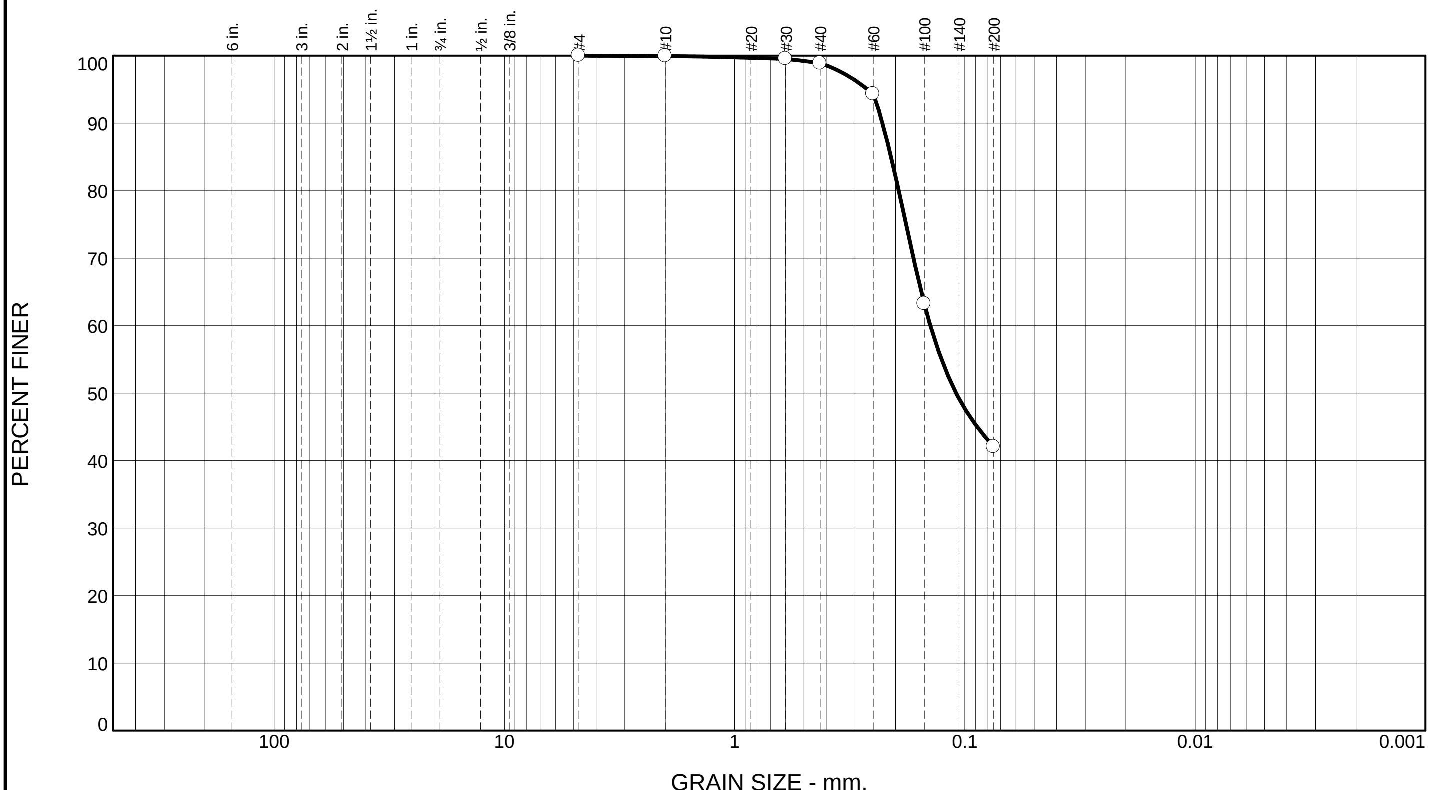
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	1.0	56.9	42.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#30	99.5		
#40	98.9		
#60	94.3		
#100	63.2		
#200	42.0		

* (no specification provided)

Material Description

Yellow

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2279 D_{85}= 0.2092 D_{60}= 0.1412
D_{50}= 0.1092 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-15 S-15 65-67

Date: 9-28-23

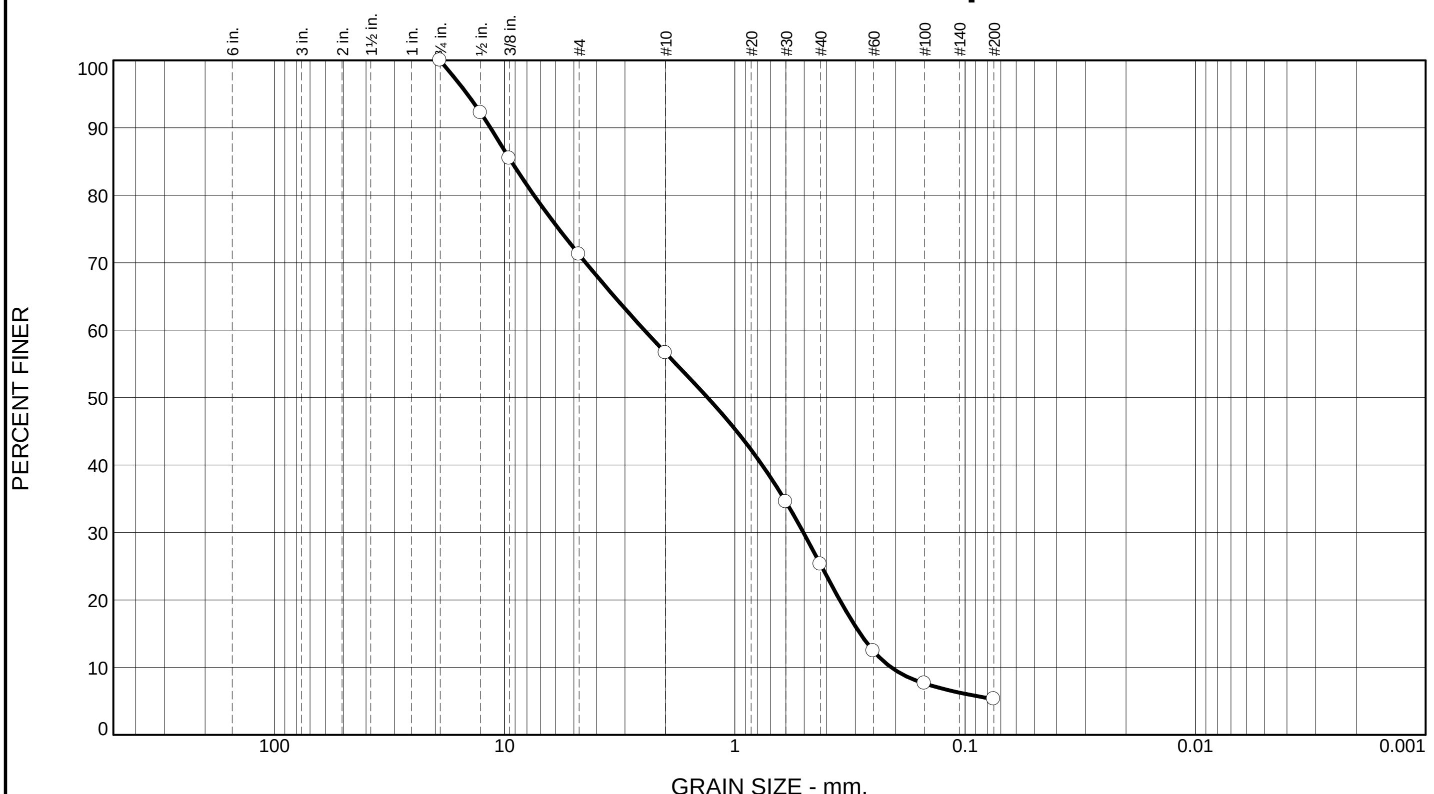
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	28.8	14.6	31.3	20.0	5.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	92.2		
.375	85.5		
#4	71.2		
#10	56.6		
#30	34.5		
#40	25.3		
#60	12.4		
#100	7.6		
#200	5.3		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 11.5244 D_{85}= 9.3431 D_{60}= 2.4700
D_{50}= 1.3126 D_{30}= 0.5041 D_{15}= 0.2854
D_{10}= 0.2094 C_u= 11.80 C_c= 0.49

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-16 S-5 15-17

Date: 9-28-23

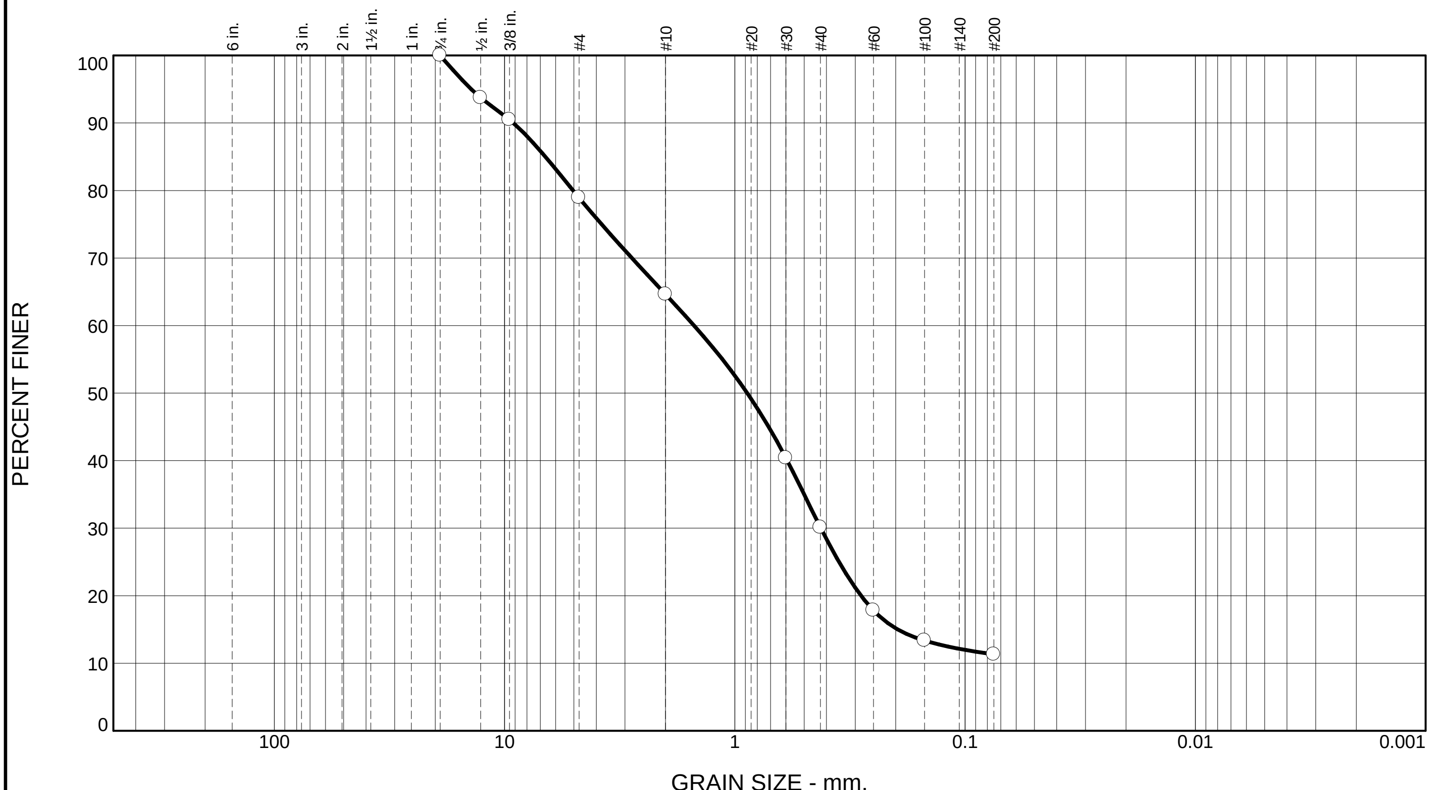
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	21.1	14.3	34.5	18.8	11.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	93.7		
.375	90.5		
#4	78.9		
#10	64.6		
#30	40.4		
#40	30.1		
#60	17.8		
#100	13.4		
#200	11.3		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 9.1693 D_{85}= 6.6511 D_{60}= 1.5035
D_{50}= 0.8837 D_{30}= 0.4233 D_{15}= 0.1961
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-17 S-1 5-7

Date: 9-28-23

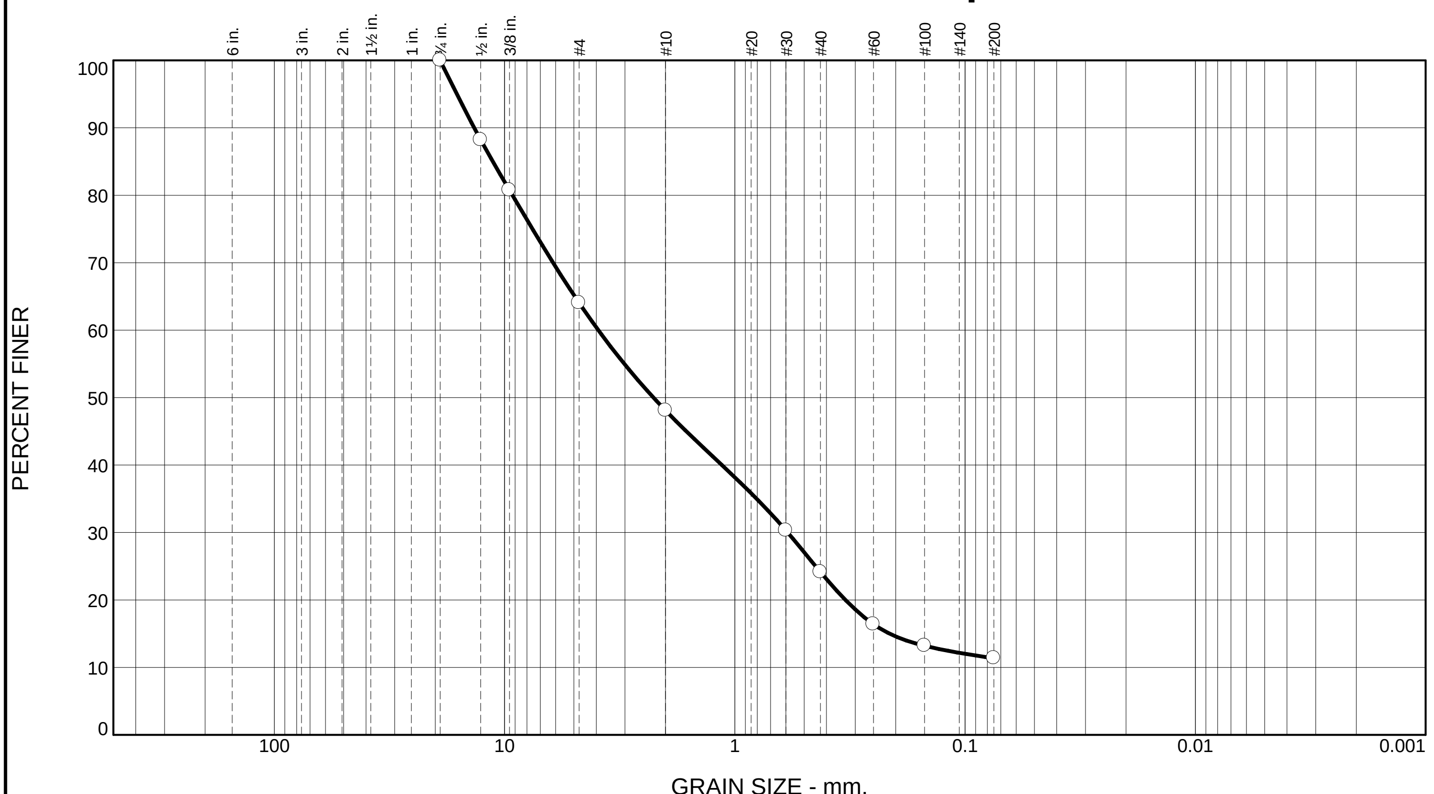
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	35.9	16.0	24.0	12.7	11.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	88.2		
.375	80.8		
#4	64.1		
#10	48.1		
#30	30.3		
#40	24.1		
#60	16.4		
#100	13.2		
#200	11.4		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 13.5499 D_{85}= 11.2537 D_{60}= 3.9165
D_{50}= 2.2563 D_{30}= 0.5894 D_{15}= 0.2128
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-18 S-2 7-9

Date: 9-28-23

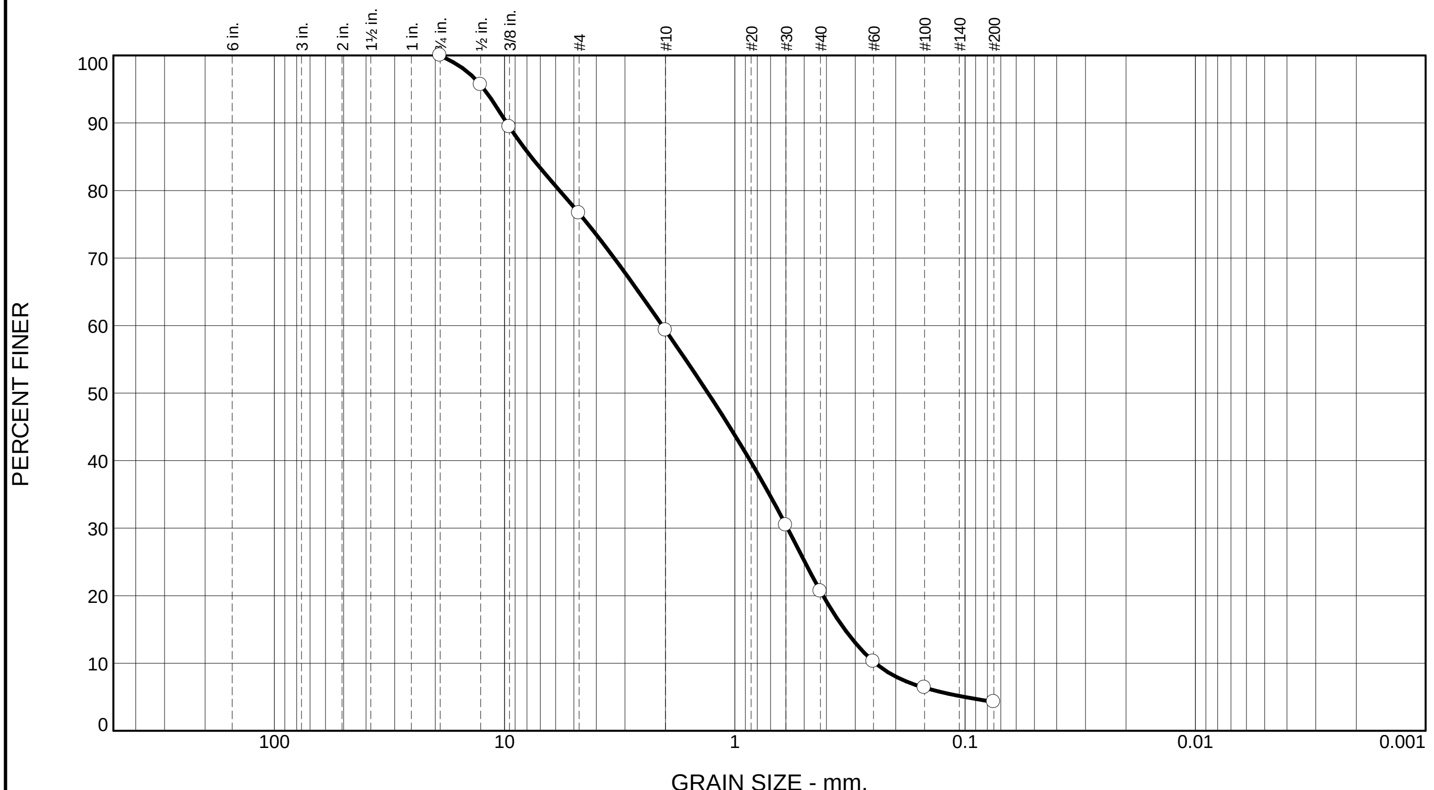
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	23.4	17.3	38.6	16.4	4.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	95.6		
.375	89.4		
#4	76.6		
#10	59.3		
#30	30.4		
#40	20.7		
#60	10.3		
#100	6.4		
#200	4.3		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 9.7839 D_{85}= 7.6714 D_{60}= 2.0660
D_{50}= 1.3073 D_{30}= 0.5907 D_{15}= 0.3331
D_{10}= 0.2450 C_u= 8.43 C_c= 0.69

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1B-18 S-5 15-17

Date: 9-28-23

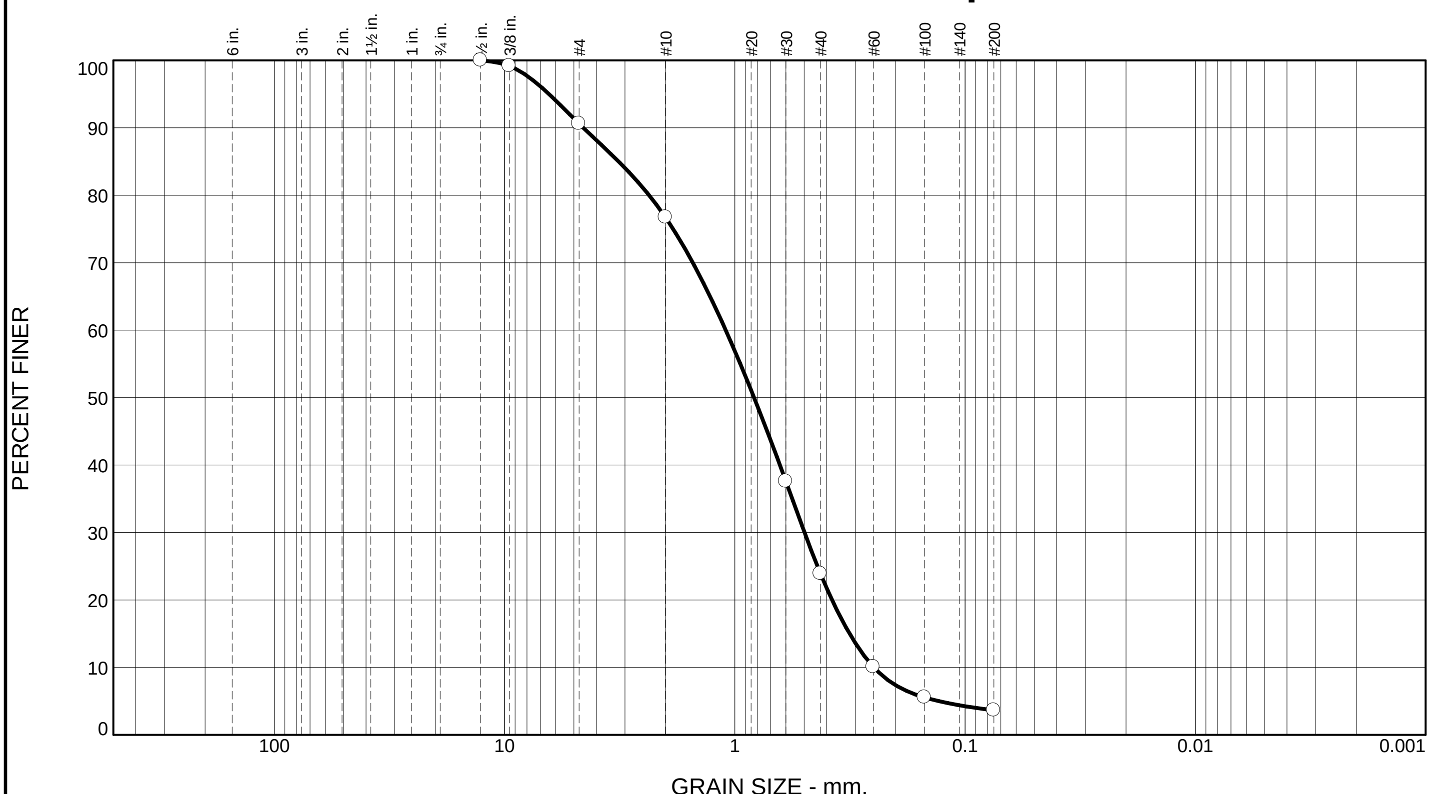
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	9.4	13.9	52.8	20.3	3.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	99.2		
#4	90.6		
#10	76.7		
#30	37.6		
#40	23.9		
#60	10.1		
#100	5.6		
#200	3.6		

* (no specification provided)

Material Description

Grayish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 4.5500 D_{85}= 3.1986 D_{60}= 1.0956
D_{50}= 0.8251 D_{30}= 0.4982 D_{15}= 0.3175
D_{10}= 0.2489 C_u= 4.40 C_c= 0.91

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1B-19 S-4 11-13

Date: 9-28-23

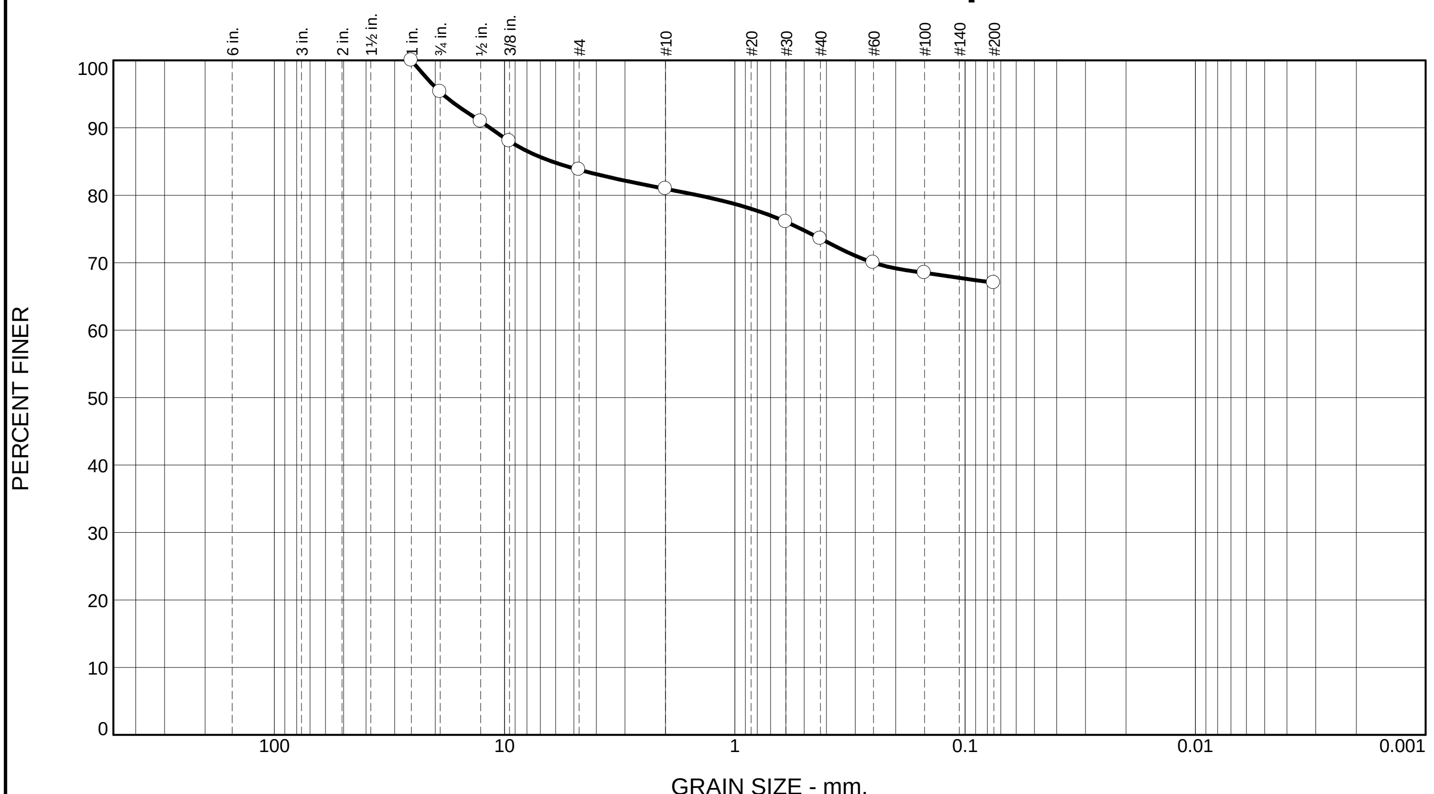
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.7	11.5	2.8	7.4	6.6	67.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	95.3		
.5	91.0		
.375	88.0		
#4	83.8		
#10	81.0		
#30	76.1		
#40	73.6		
#60	70.0		
#100	68.5		
#200	67.0		

* (no specification provided)

Material Description

Light Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 11.5800 D_{85}= 6.2132 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-20 S-2A 7-8

Date: 9-28-23

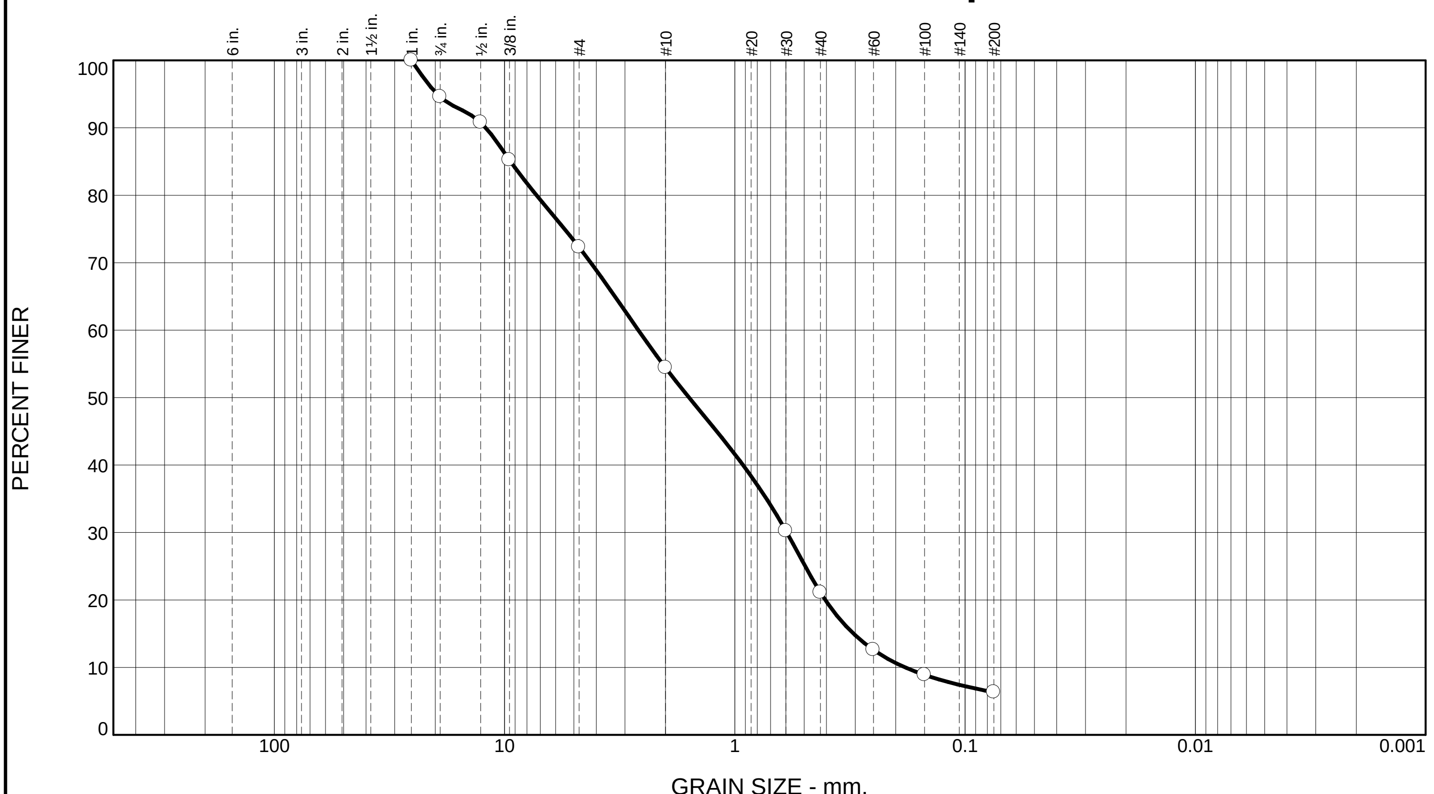
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.4	22.3	17.9	33.3	14.8	6.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	94.6		
.5	90.8		
.375	85.2		
#4	72.3		
#10	54.4		
#30	30.2		
#40	21.1		
#60	12.6		
#100	8.9		
#200	6.3		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 12.0644 D_{85}= 9.4189 D_{60}= 2.6246
D_{50}= 1.5804 D_{30}= 0.5945 D_{15}= 0.3051
D_{10}= 0.1822 C_u= 14.40 C_c= 0.74

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-20 S-6 20-22

Date: 9-28-23

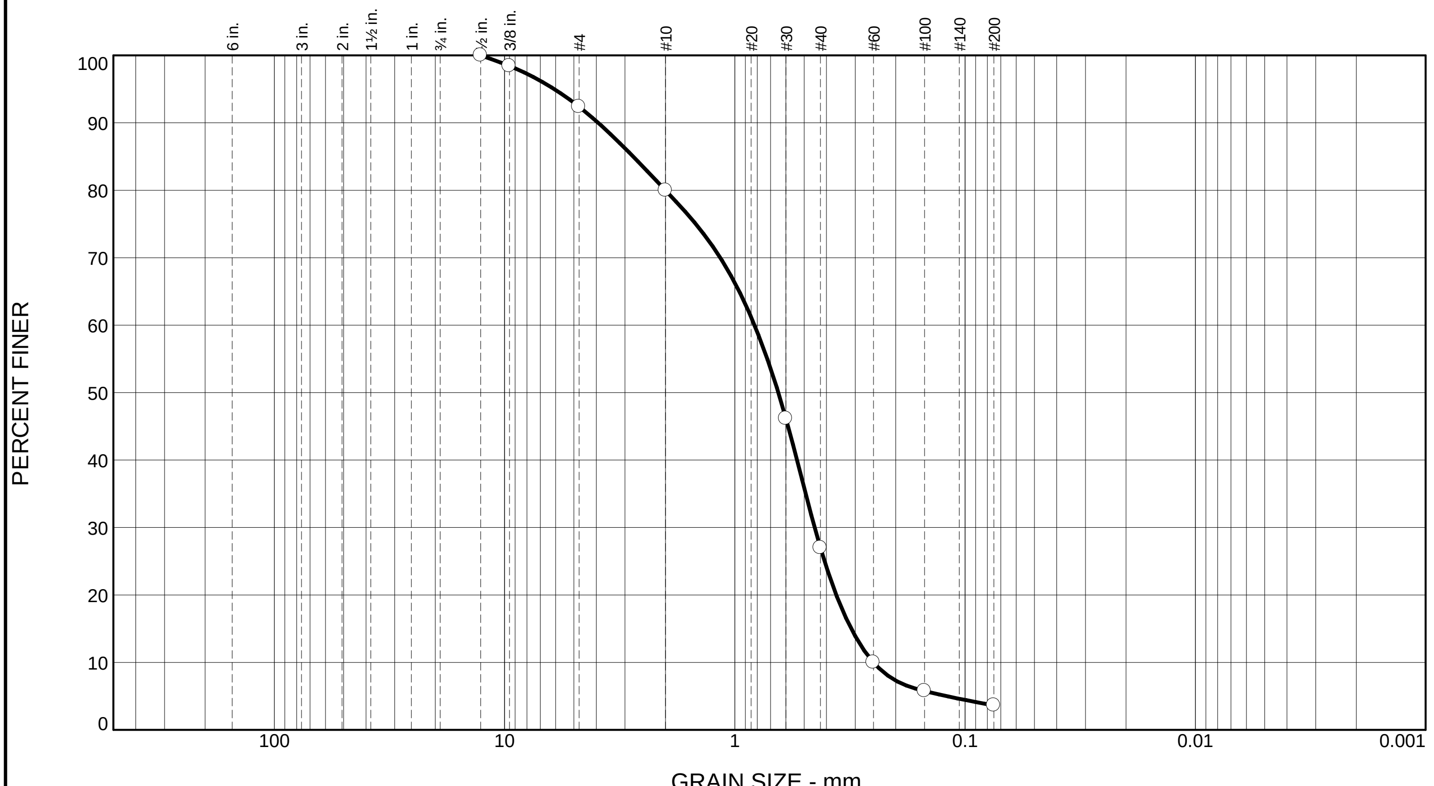
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.6	12.4	53.0	23.4	3.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	98.4		
#4	92.4		
#10	80.0		
#30	46.2		
#40	27.0		
#60	10.0		
#100	5.8		
#200	3.6		

* (no specification provided)

Material Description

Grayish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 3.9220 D_{85}= 2.7649 D_{60}= 0.8214
D_{50}= 0.6473 D_{30}= 0.4502 D_{15}= 0.3124
D_{10}= 0.2501 C_u= 3.28 C_c= 0.99

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1B-21 S-3 9-11

Date: 9-28-23

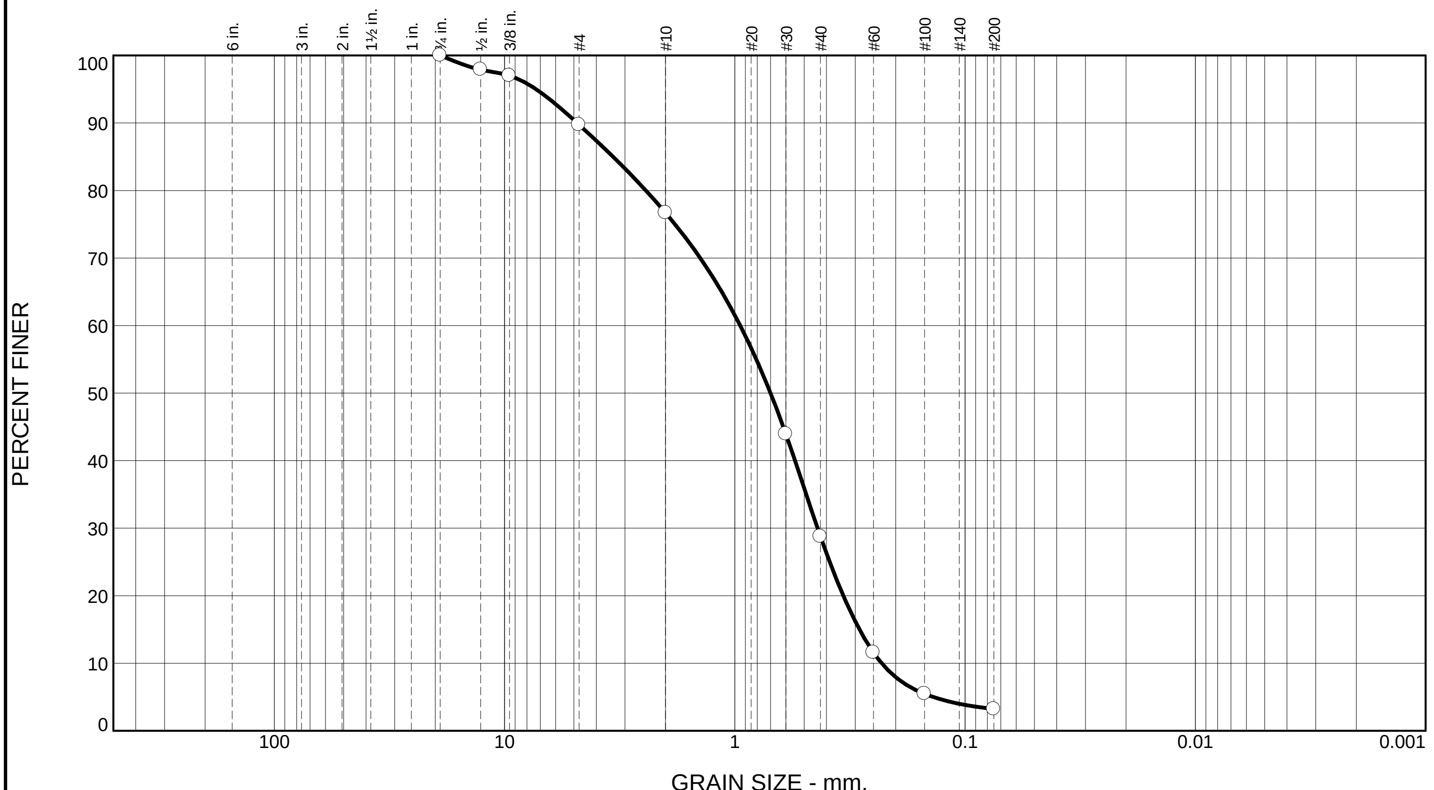
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	10.3	13.0	47.9	25.6	3.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	97.9		
.375	97.0		
#4	89.7		
#10	76.7		
#30	43.9		
#40	28.8		
#60	11.6		
#100	5.5		
#200	3.2		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 4.8414 D_{85}= 3.3797 D_{60}= 0.9476
D_{50}= 0.6997 D_{30}= 0.4374 D_{15}= 0.2877
D_{10}= 0.2304 C_u= 4.11 C_c= 0.88

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1B-22 S-4 11-13

Date: 9-28-23

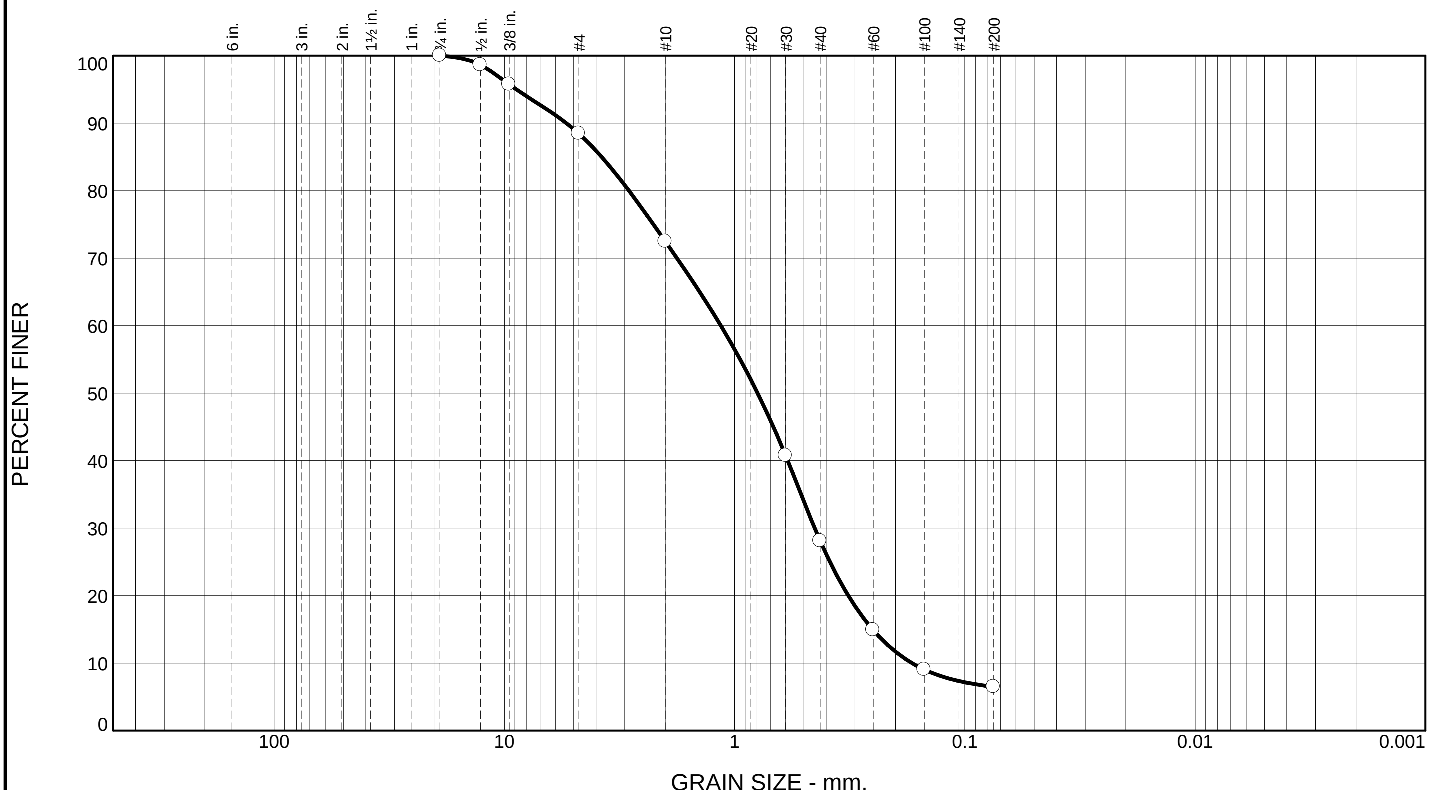
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	11.5	16.0	44.4	21.6	6.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	98.6		
.375	95.7		
#4	88.5		
#10	72.5		
#30	40.7		
#40	28.1		
#60	14.9		
#100	9.0		
#200	6.5		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 5.3785 D_{85}= 3.7799 D_{60}= 1.1478
D_{50}= 0.7947 D_{30}= 0.4490 D_{15}= 0.2517
D_{10}= 0.1699 C_u= 6.76 C_c= 1.03

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-23 S-3 9-11

Date: 9-28-23

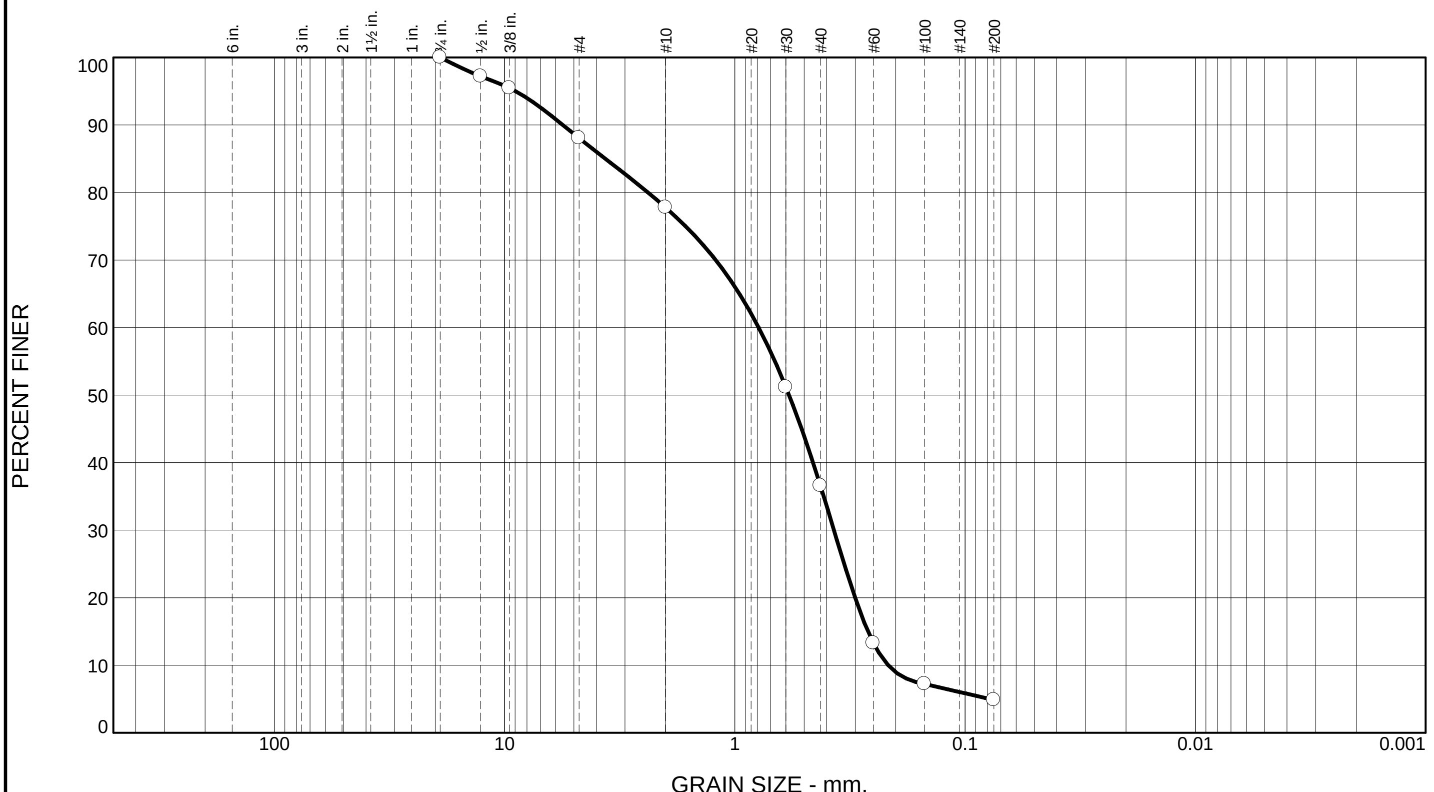
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	11.9	10.3	41.2	31.7	4.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	97.2		
.375	95.5		
#4	88.1		
#10	77.8		
#30	51.2		
#40	36.6		
#60	13.3		
#100	7.2		
#200	4.9		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 5.5850 D_{85}= 3.6517 D_{60}= 0.7880
D_{50}= 0.5815 D_{30}= 0.3713 D_{15}= 0.2641
D_{10}= 0.2157 C_u= 3.65 C_c= 0.81

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1B-24 S-2 7-9

Date: 9-28-23

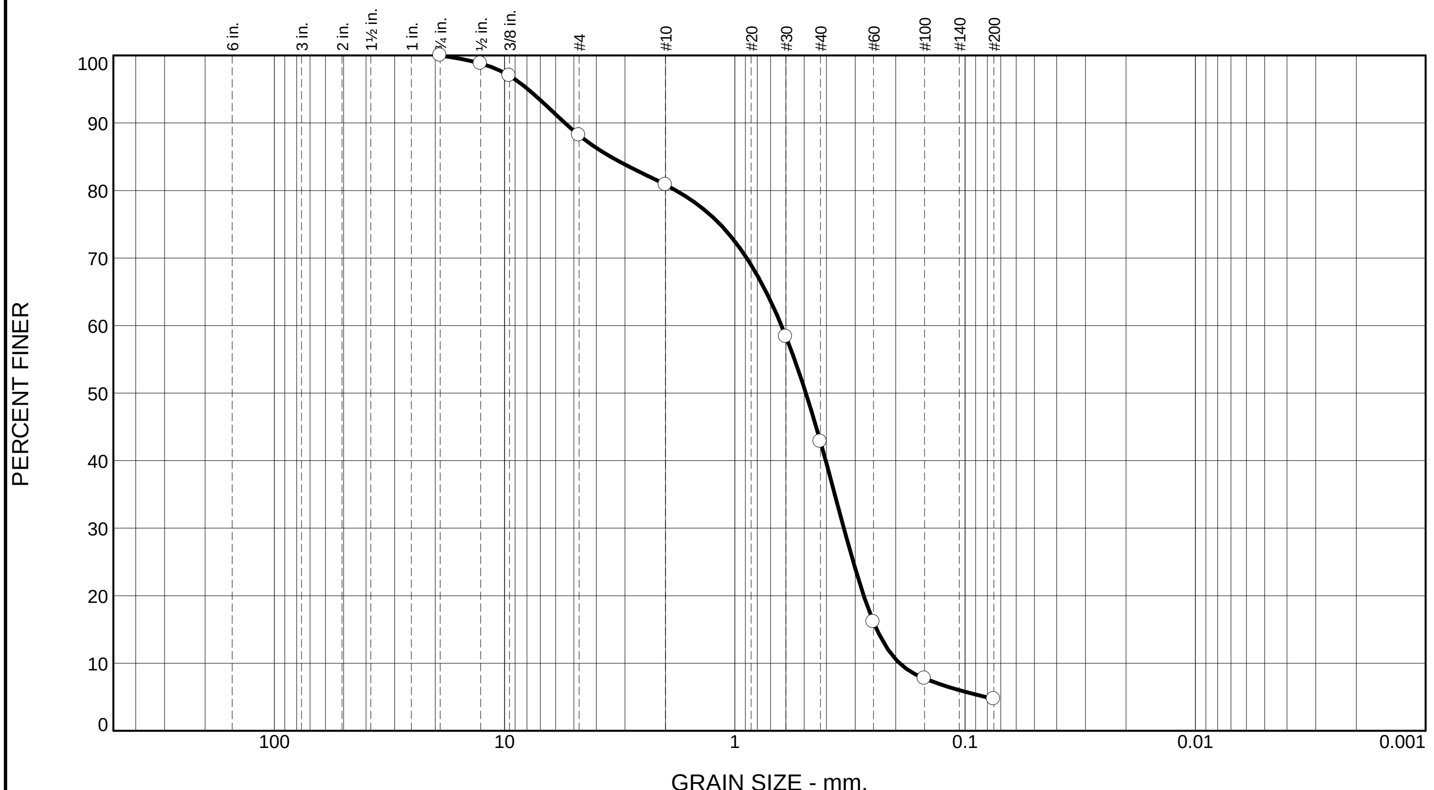
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	11.8	7.4	38.0	38.1	4.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	98.8		
.375	97.0		
#4	88.2		
#10	80.8		
#30	58.4		
#40	42.8		
#60	16.1		
#100	7.8		
#200	4.7		

* (no specification provided)

Material Description

Grayish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 5.4705 D_{85}= 3.4603 D_{60}= 0.6272
D_{50}= 0.4915 D_{30}= 0.3363 D_{15}= 0.2419
D_{10}= 0.1927 C_u= 3.26 C_c= 0.94

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1B-24 S-5 15-17

Date: 9-28-23

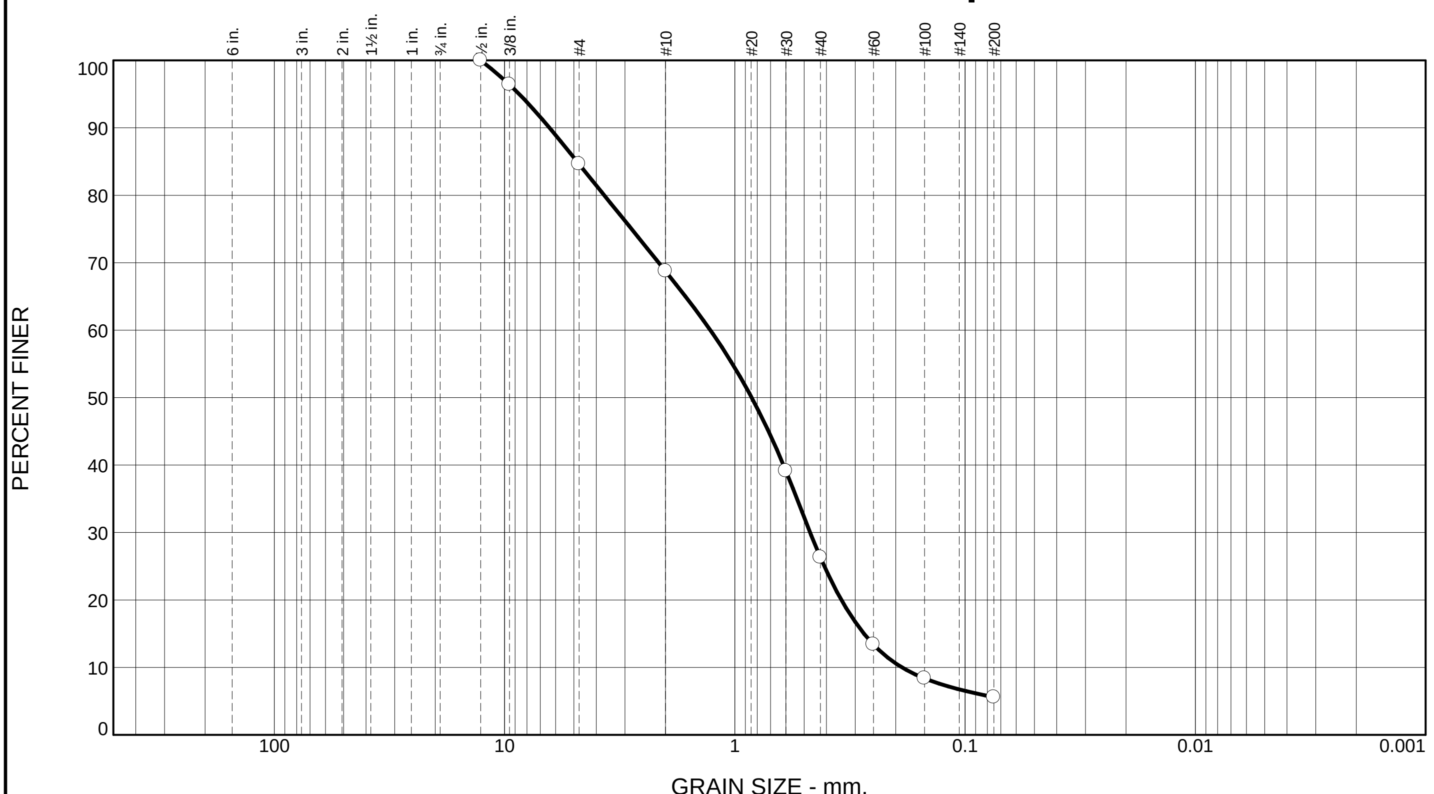
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	15.4	15.9	42.4	20.7	5.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	96.4		
#4	84.6		
#10	68.7		
#30	39.1		
#40	26.3		
#60	13.4		
#100	8.4		
#200	5.6		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 6.3838 D_{85}= 4.8474 D_{60}= 1.2777
D_{50}= 0.8449 D_{30}= 0.4712 D_{15}= 0.2749
D_{10}= 0.1881 C_u= 6.79 C_c= 0.92

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-25 S-3 9-11

Date: 9-28-23

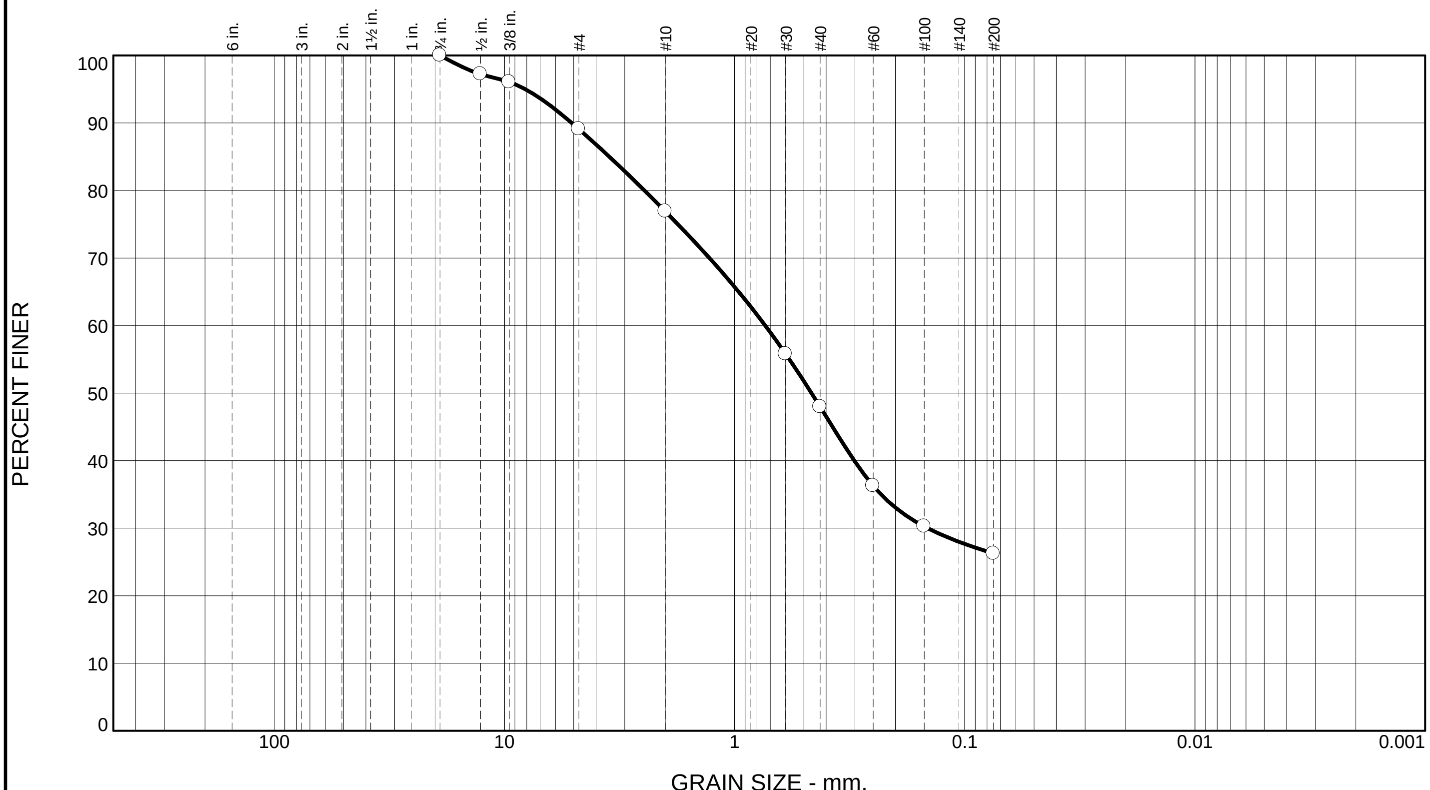
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	10.9	12.2	28.9	21.8	26.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	97.2		
.375	96.1		
#4	89.1		
#10	76.9		
#30	55.8		
#40	48.0		
#60	36.3		
#100	30.3		
#200	26.2		

* (no specification provided)

Material Description

Yellow

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 5.0962 D_{85}= 3.4995 D_{60}= 0.7357
D_{50}= 0.4633 D_{30}= 0.1449 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-26 G-1 0.5-3

Date: 9-28-23

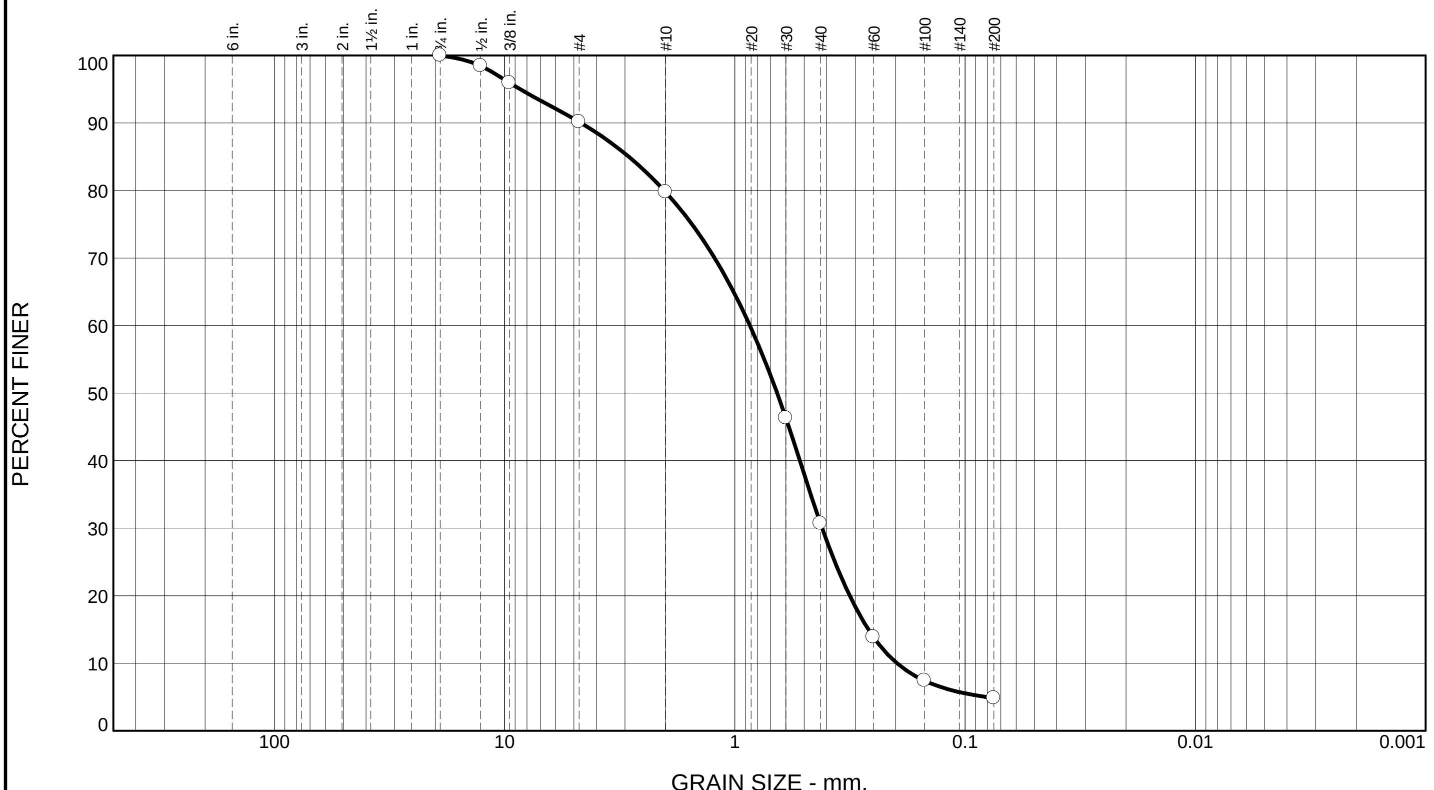
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	9.8	10.4	49.1	25.9	4.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	98.5		
.375	95.9		
#4	90.2		
#10	79.8		
#30	46.3		
#40	30.7		
#60	13.9		
#100	7.4		
#200	4.8		

* (no specification provided)

Material Description

Grayish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 4.6544 D_{85}= 2.8865 D_{60}= 0.8601
D_{50}= 0.6548 D_{30}= 0.4178 D_{15}= 0.2632
D_{10}= 0.1976 C_u= 4.35 C_c= 1.03

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1B-26 S-4 11-13

Date: 9-28-23

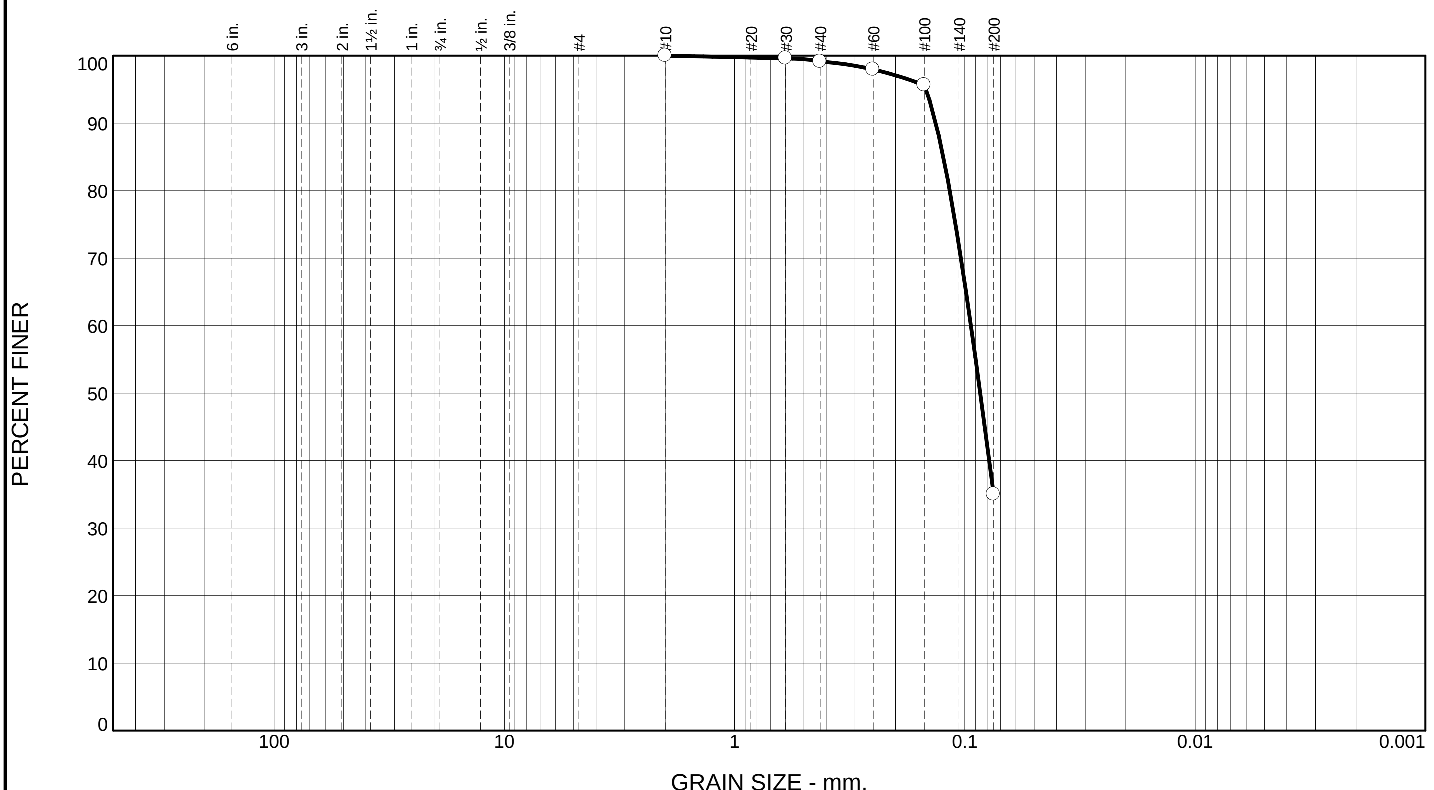
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.9	64.1	35.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#30	99.6		
#40	99.1		
#60	98.0		
#100	95.6		
#200	35.0		

* (no specification provided)

Material Description

White

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1337 D_{85}= 0.1240 D_{60}= 0.0941
D_{50}= 0.0858 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-26 S-14 60-62

Date: 9-28-23

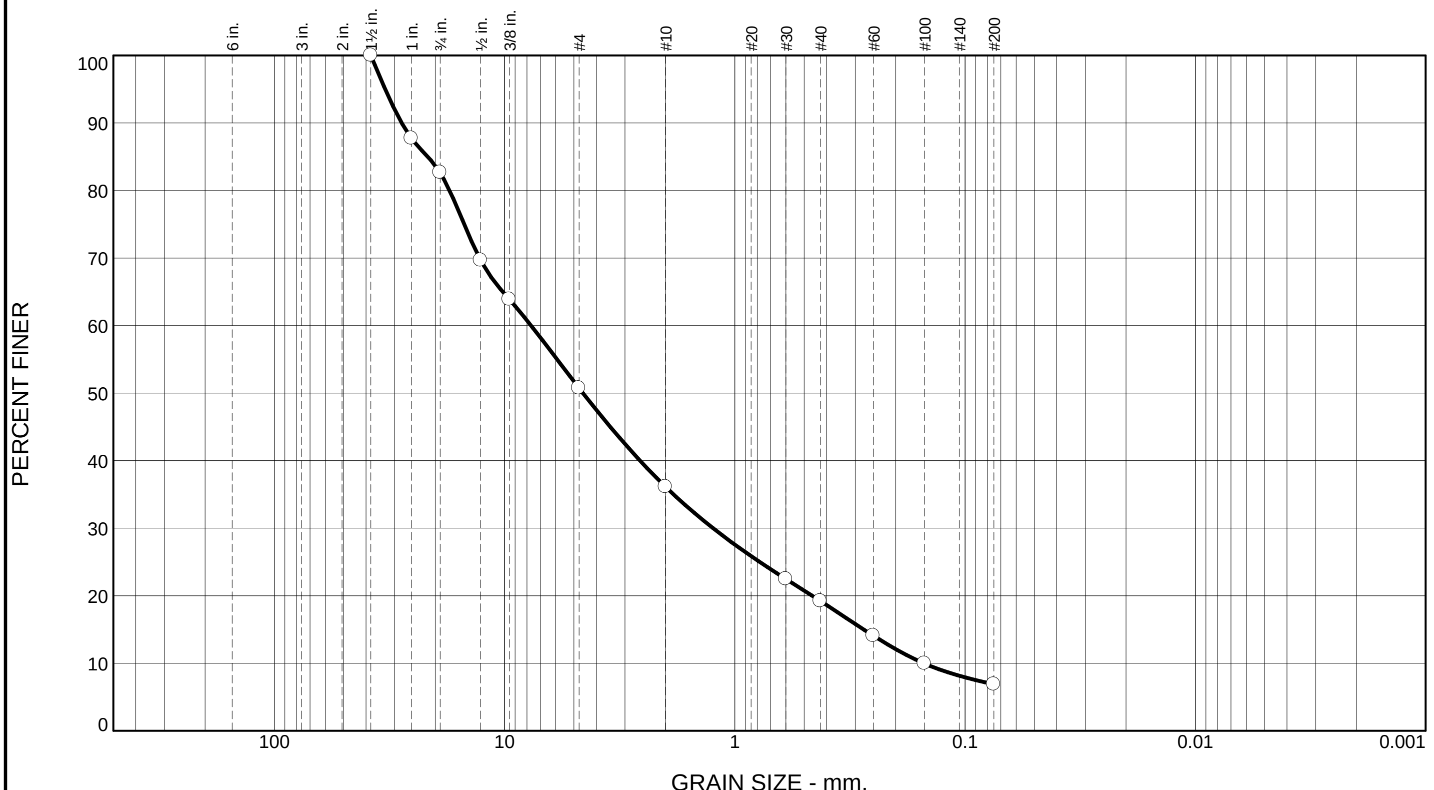
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York, Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	17.4	31.9	14.6	16.9	12.3	6.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	87.7		
.75	82.6		
.5	69.7		
.375	63.9		
#4	50.7		
#10	36.1		
#30	22.5		
#40	19.2		
#60	14.1		
#100	9.9		
#200	6.9		

* (no specification provided)

Material Description

White

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 27.9977 D_{85}= 21.5526 D_{60}= 7.6783
D_{50}= 4.5673 D_{30}= 1.2437 D_{15}= 0.2757
D_{10}= 0.1513 C_u= 50.76 C_c= 1.33

Classification

USCS= AASHTO=

Remarks

Sample Number: LB1B-27 S-3 9-11

Date: 9-28-23

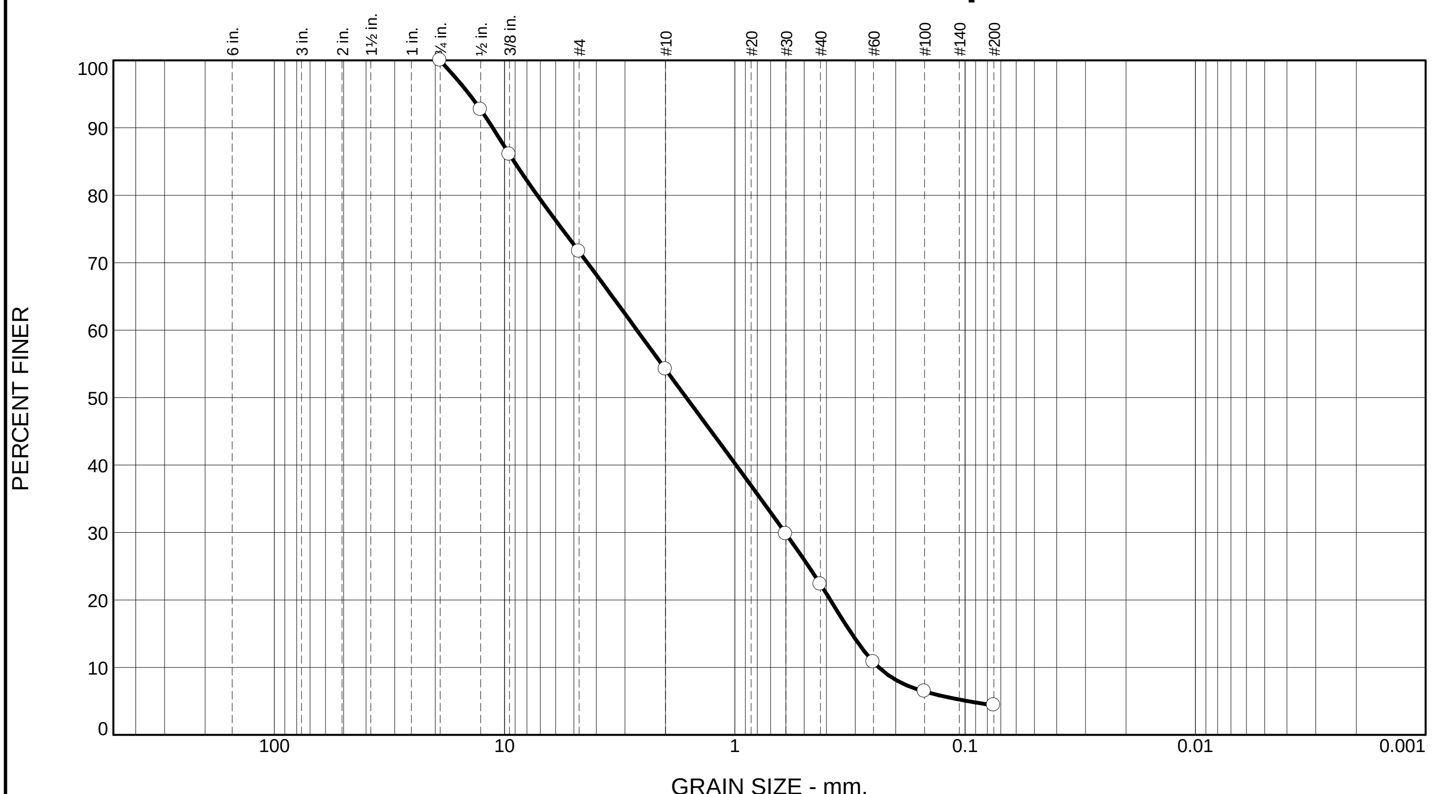
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	28.3	17.5	31.9	17.9	4.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	92.7		
.375	86.1		
#4	71.7		
#10	54.2		
#30	29.8		
#40	22.3		
#60	10.8		
#100	6.4		
#200	4.4		

* (no specification provided)

Material Description

Grayish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 11.2626 D_{85}= 9.0943 D_{60}= 2.6623
D_{50}= 1.6244 D_{30}= 0.6057 D_{15}= 0.3108
D_{10}= 0.2368 C_u= 11.24 C_c= 0.58

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1B-27 S-5 15-17

Date: 9-28-23

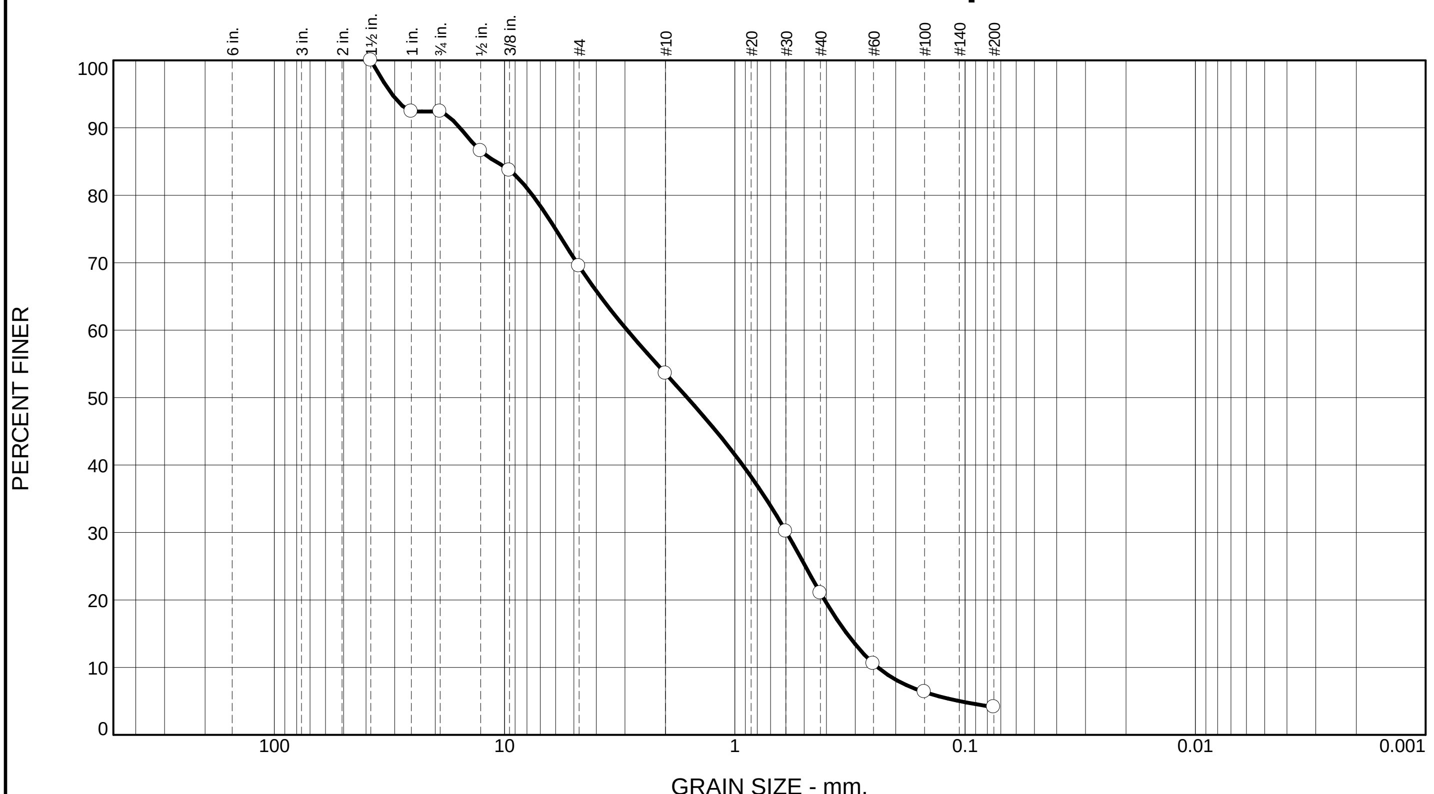
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.6	22.9	15.9	32.6	16.9	4.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	92.4		
.75	92.4		
.5	86.6		
.375	83.7		
#4	69.5		
#10	53.6		
#30	30.2		
#40	21.0		
#60	10.6		
#100	6.3		
#200	4.1		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 15.6288 D_{85}= 10.9204 D_{60}= 2.9345
D_{50}= 1.6099 D_{30}= 0.5961 D_{15}= 0.3259
D_{10}= 0.2393 C_u= 12.26 C_c= 0.51

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1B-28 S-5 15-17

Date: 9-28-23

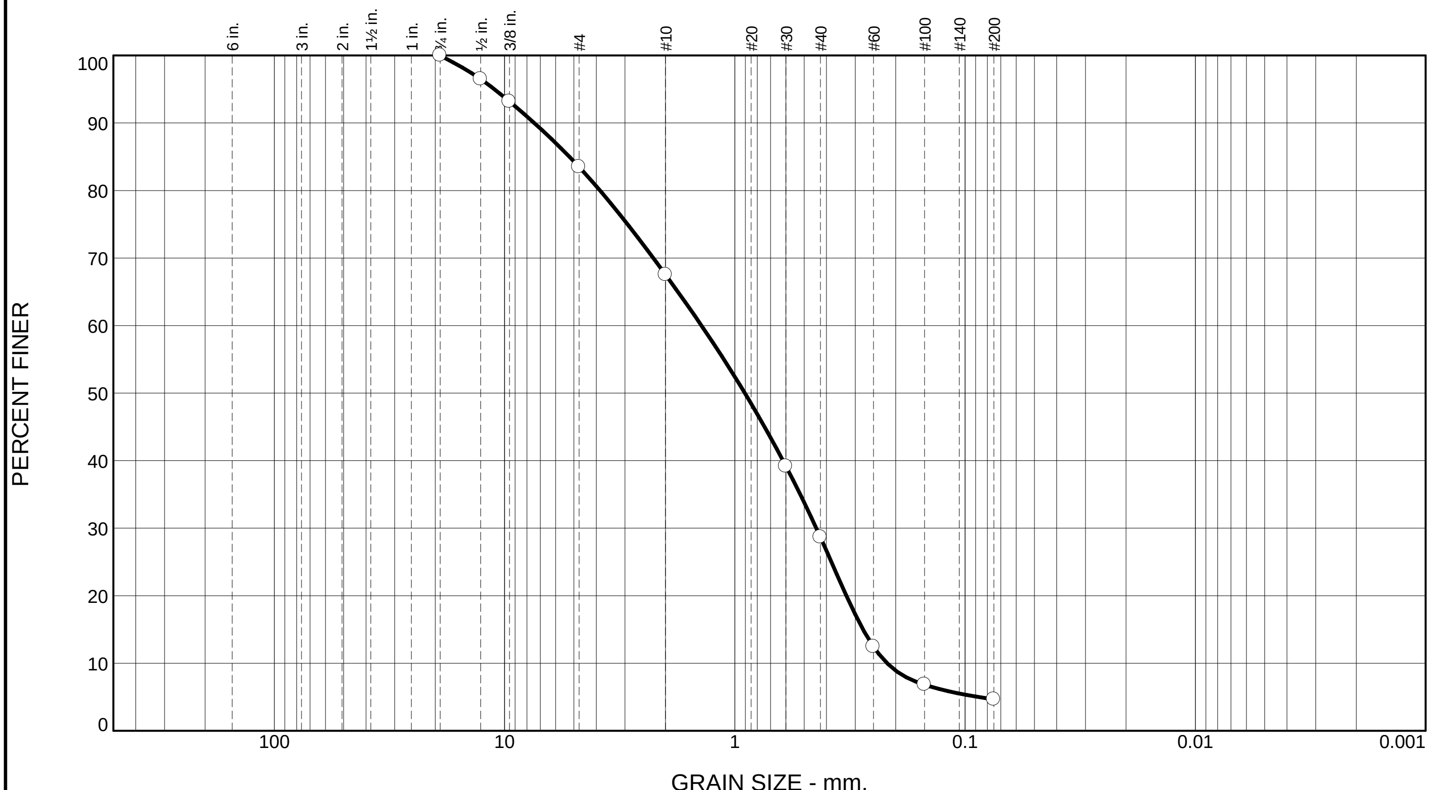
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	16.5	16.0	38.8	24.1	4.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	96.5		
.375	93.2		
#4	83.5		
#10	67.5		
#30	39.2		
#40	28.7		
#60	12.5		
#100	6.8		
#200	4.6		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 7.4315 D_{85}= 5.2314 D_{60}= 1.3960
D_{50}= 0.9049 D_{30}= 0.4428 D_{15}= 0.2775
D_{10}= 0.2180 C_u= 6.40 C_c= 0.64

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1B-29 S-3 9-11

Date: 9-28-23

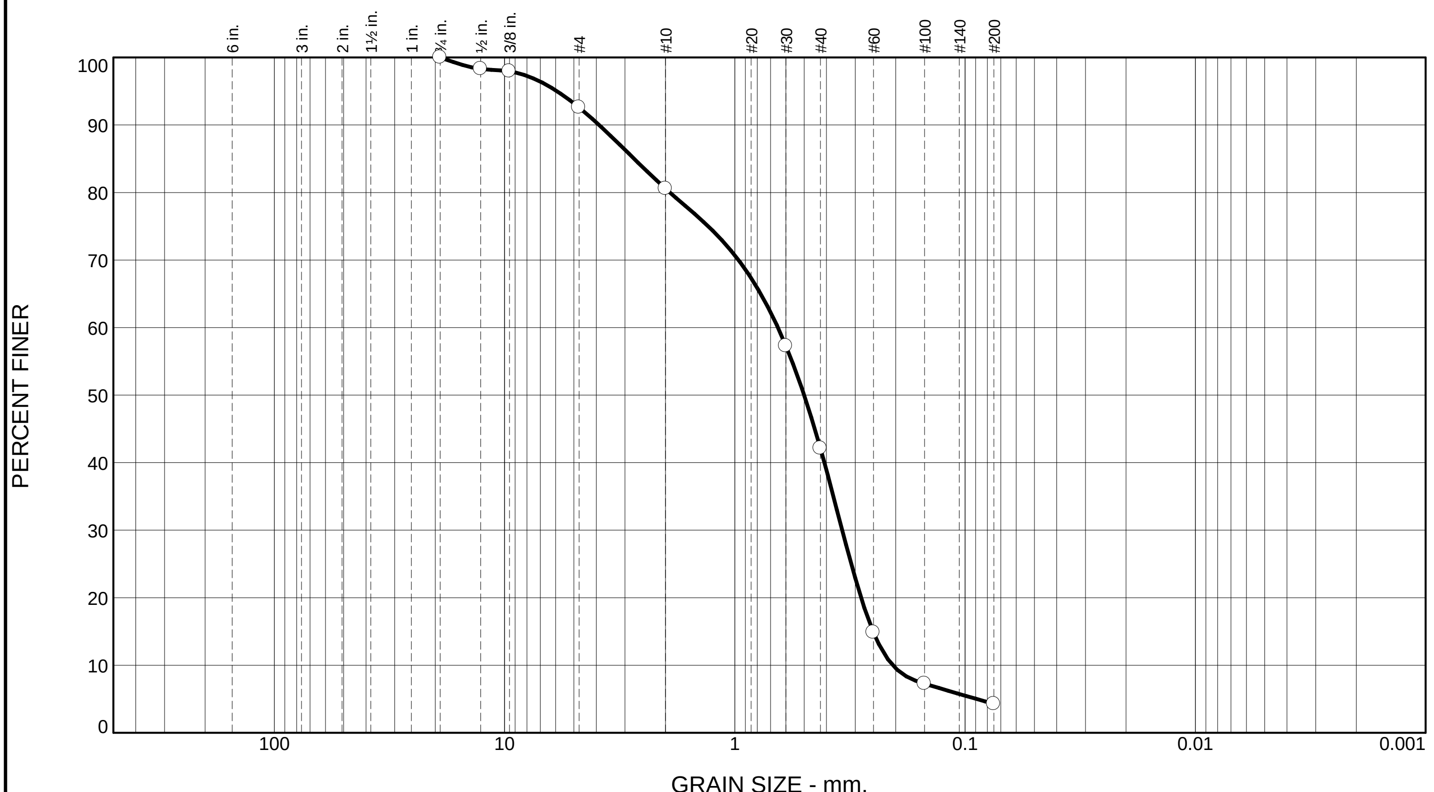
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.4	12.0	38.5	37.8	4.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	98.3		
.375	97.9		
#4	92.6		
#10	80.6		
#30	57.3		
#40	42.1		
#60	14.8		
#100	7.3		
#200	4.3		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 3.8866 D_{85}= 2.7392 D_{60}= 0.6501
D_{50}= 0.5001 D_{30}= 0.3419 D_{15}= 0.2511
D_{10}= 0.2062 C_u= 3.15 C_c= 0.87

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB1B-30 S-3 9-11

Date: 9-28-23

RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

RSA GEOLAB

1017 Greeley Ave N
Union, NJ 07083
908-964-0786
www.RSAGeolab.com

Letter of Transmittal

Date: 9-28-23 Job No.: 869 Lab Log: 23-2956

Attention: Julia Langewis
Langan Engineering & Environmental Services
360 West 31st Street, 8th Floor
New York, New York 10001

CC:

Re: Sands New York, Hempstead, NY
Langan# not provided

Sample(s) ID: **LB1B-03 S-1 thru LB1B-30 S-19B** (7 samples)

Dear Julia,

Please find attached results for the samples referenced above. The following lab testing was performed:

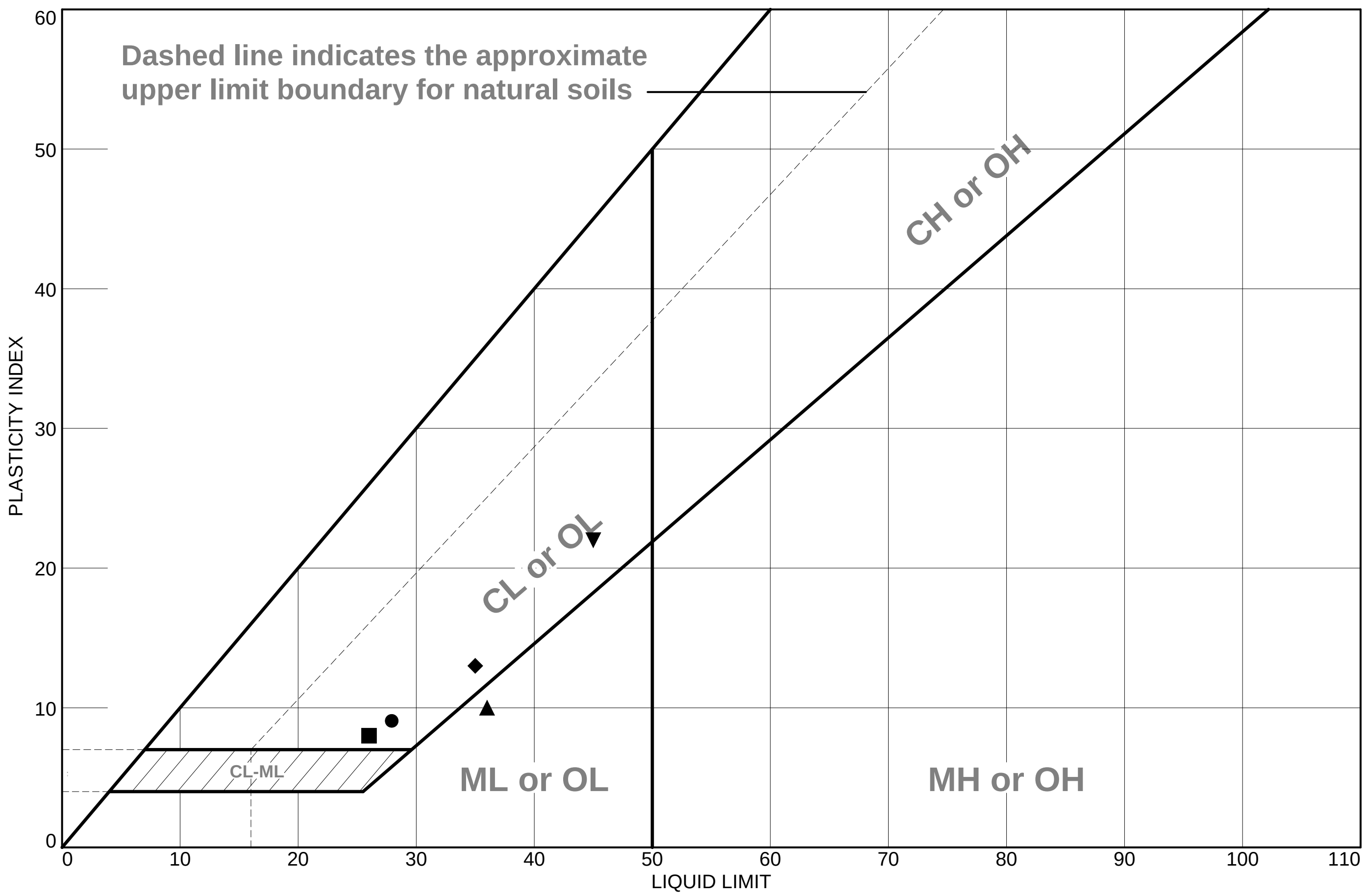
- ASTM D4318 Atterberg Limits (7 tests)

Regards,
RSA Geolab, LLC

Remarks: If you have any questions, please call 908-964-0786.

Signed: ____________________
Dr. Raza S. Ahmed
President RSA Geolab, LLC

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Yellowish Brown Clay & Silt, trace cmf Sand (visual)	28	19	9			
■	Yellowish Brown Clay & Silt, trace cmf Sand (visual)	26	18	8			
▲	Dark Grayish Brown Clay & Silt, trace cmf Sand (visual)	36	26	10			
◆	Brownish Yellow Clay & Silt, little cmf Sand (visual)	35	22	13			
▼	Very Dark Grayish Brown Clay & Silt, trace cmf Sand (visual)	45	23	22			

Project No. 869 **Client:** Langan Engineering

Project: Sands New York , Hempstead, NY

Project# not provided

●**Sample Number:** LB1B-03 S-1 5-7

■**Sample Number:** LB1B-06 S-1 5-7

▲**Sample Number:** LB1B-08 S-1A 5-6

◆**Sample Number:** LB1B-09 S-3 9-11

▼**Sample Number:** LB1B-11 S-18 80-82

Remarks:

●9-28-23

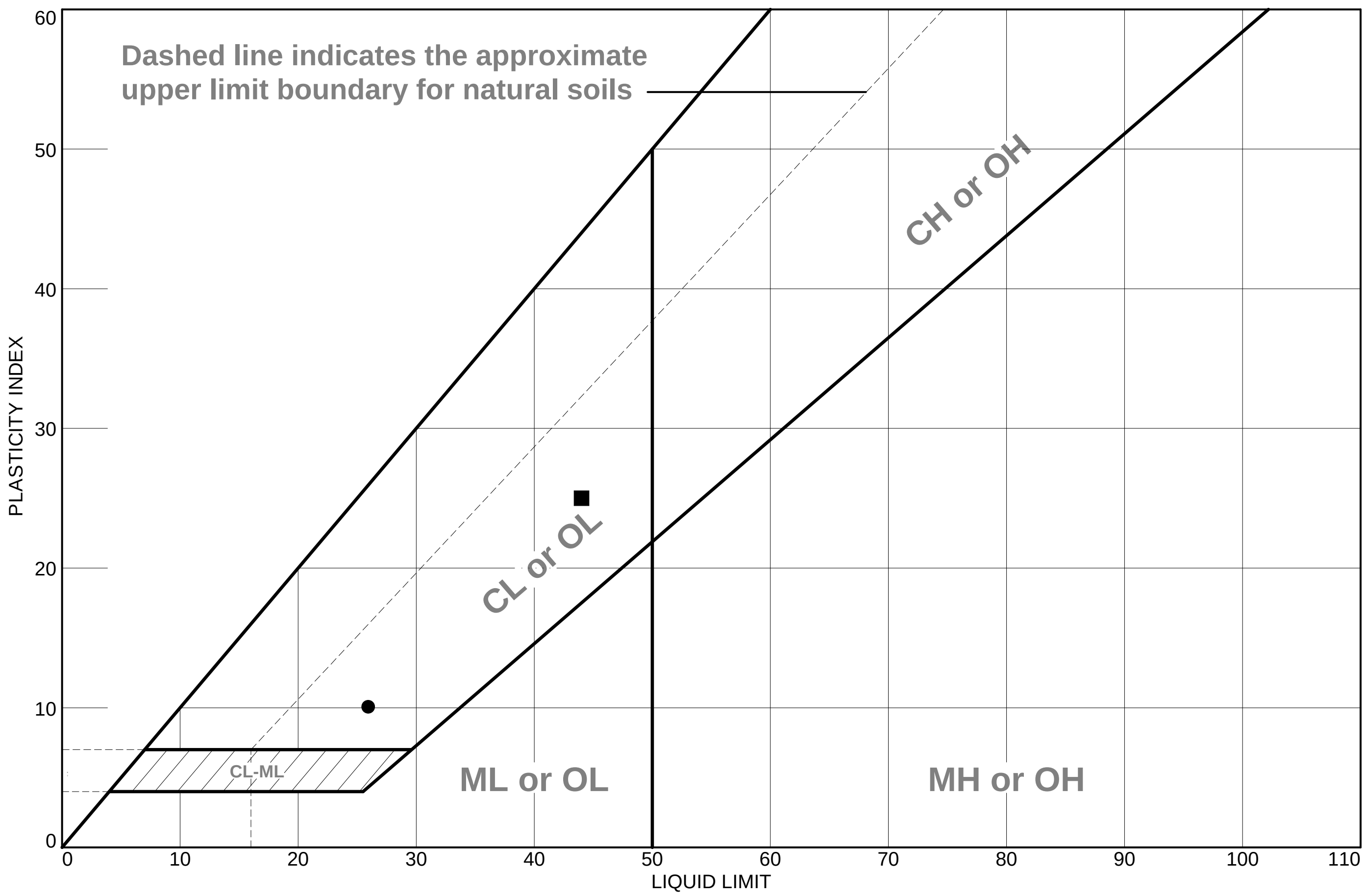
RSA Geolab

Union, New Jersey

Figure

Tested By: ER/JK **Checked By:** KP

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Very Pale Brown Clay & Silt, trace cmf Sand (visual)	26	16	10			
■	Yellow Clay & Silt, trace cmf Sand (visual)	44	19	25			

Project No. 869 **Client:** Langan Engineering

Project: Sands New York , Hempstead, NY

Project# not provided

● **Sample Number:** LB1B26 S-16A 70-70.5

■ **Sample Number:** LB1B-30 S-19B 85-87

Remarks:
●9-28-23

RSA Geolab

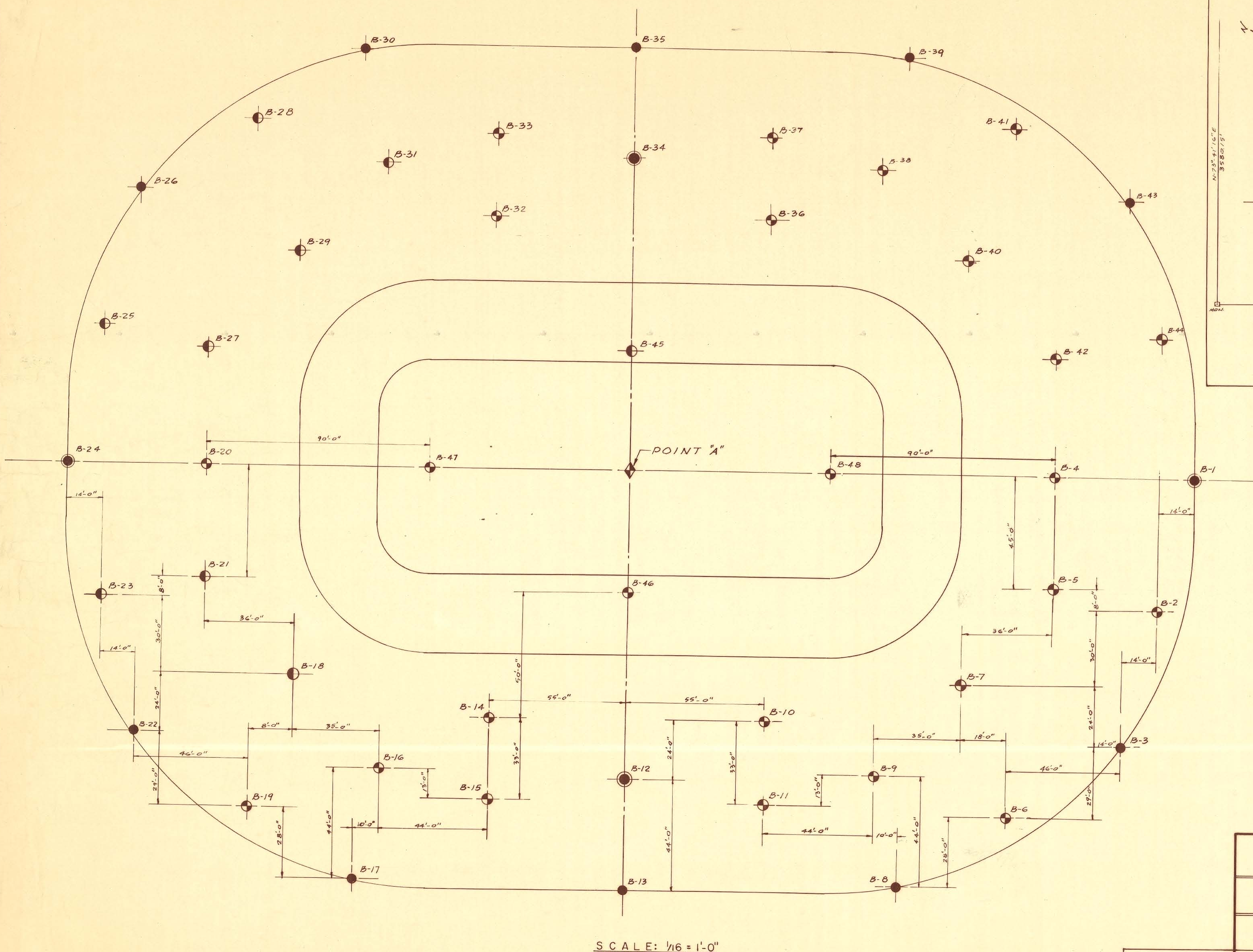
Union, New Jersey

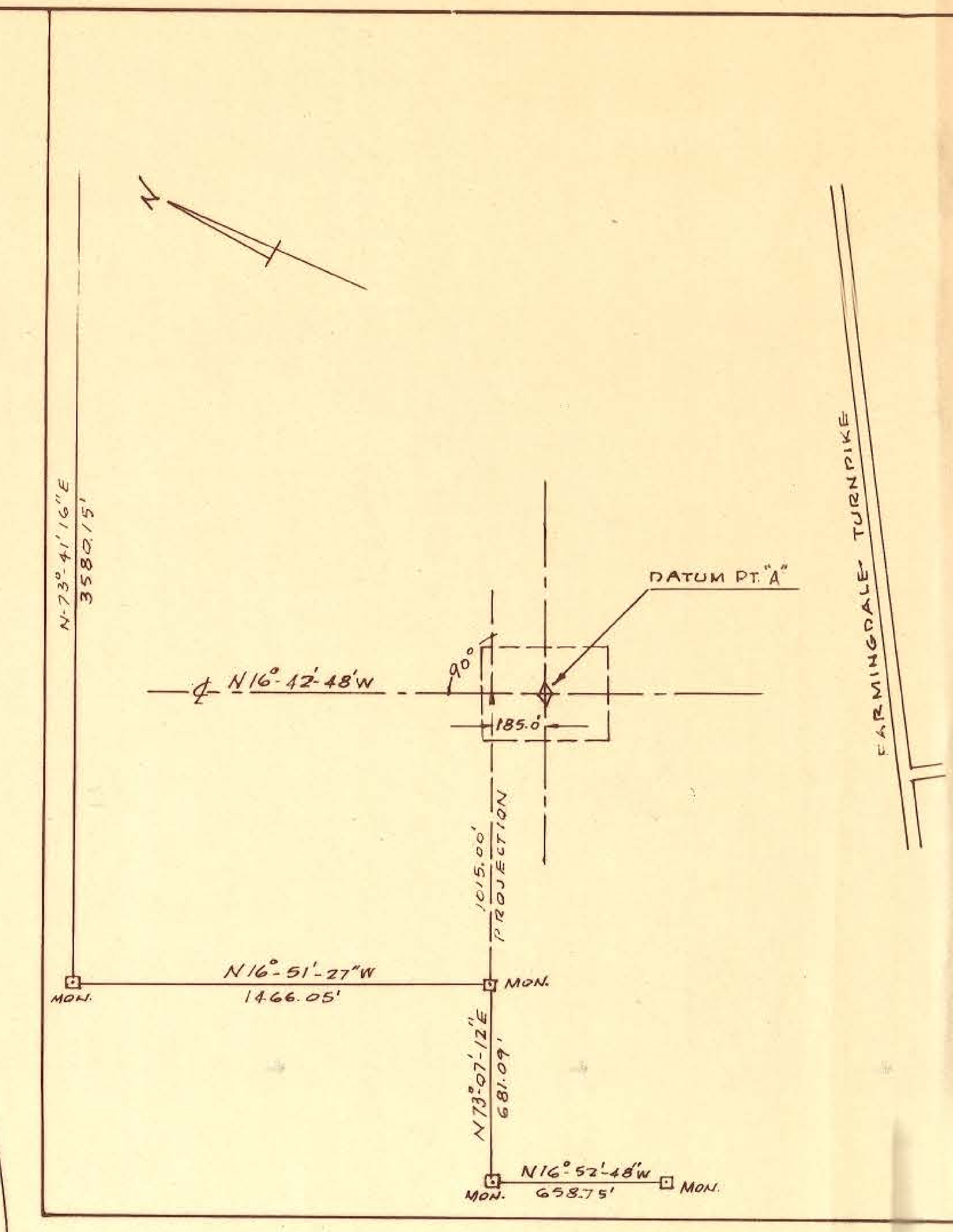
Figure

Tested By: ER/JK **Checked By:** KP

APPENDIX C

(1966 HISTORICAL BORING LOGS BY OTHERS)





SITE PLAN

SCALE: 1" = 400'

SEE MITCHEL FIELD SURVEY DATED 1963

LEGEND

50.0' Below Datum.

76.5' Below Datum.

101.5' Below Datum

Water Hole 101.5' Below Datum.

Boring samples delivered to Nassau County Museum in Seaford Sept. 30, 1966.

See water readings sheet 7 of 7.

SCALE: 1/16 = 1'-0"

J.F.K. CULTURAL CENTER
COLISEUM
MITCHEL FIELD, L.I.

WELTON BECKET F.A.I.A.
ARCHITECT
300 PARK AVENUE NEW YORK, N.Y.

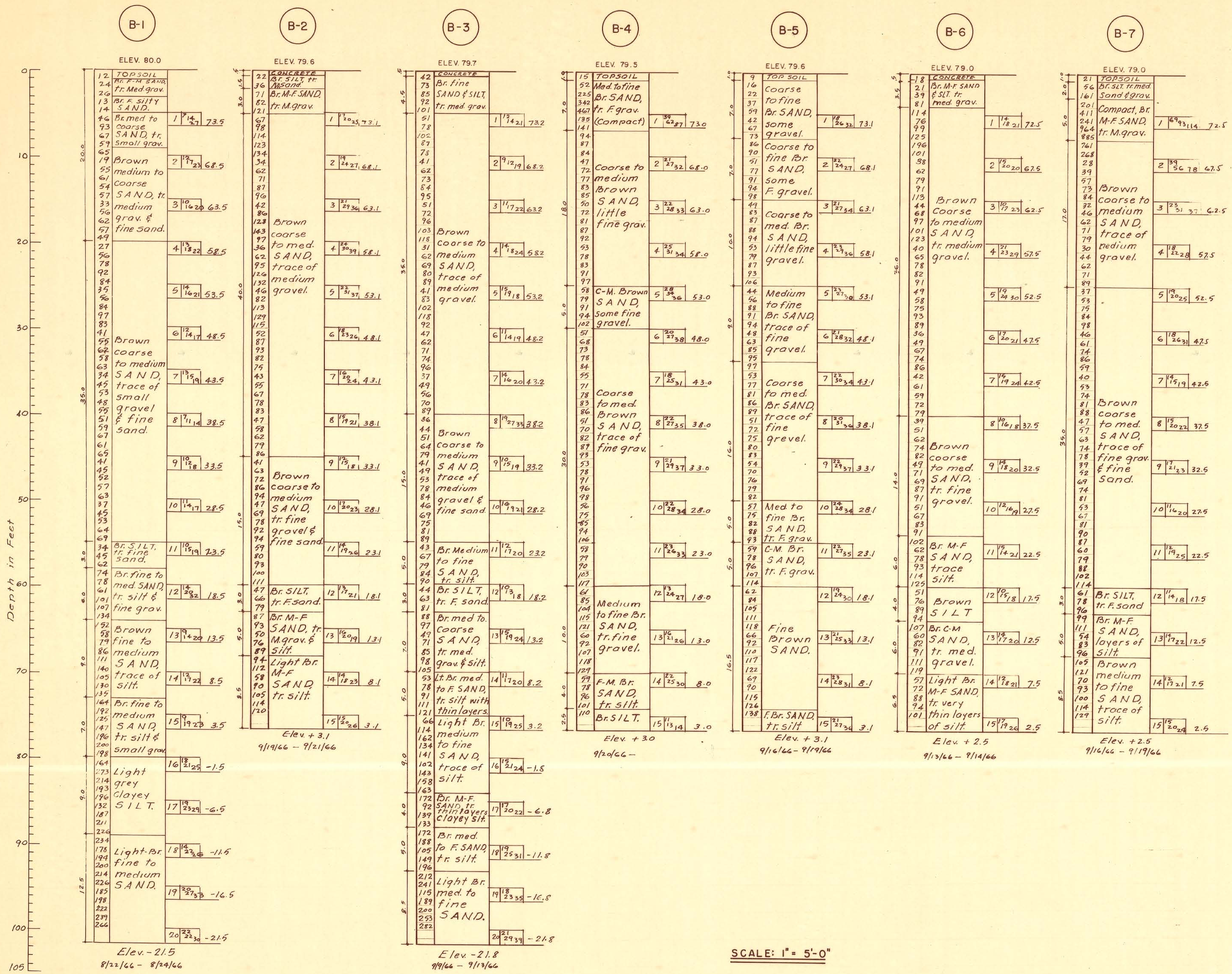
FARKAS & BARRON
CONSULTING ENGINEERS
301 WEST 23rd. STREET NEW YORK, N.Y.

BORING PLAN

BORINGS BY RELIABLE DRILLING CORP.
34-16 61st. STREET WOODSIDE 77, N.Y.

Julius Kashner, P.E.

SCALE: AS SHOWN	BY:	JOB No.	DWG. No. 1 OF 7 DWGS.	DATE: 9/66



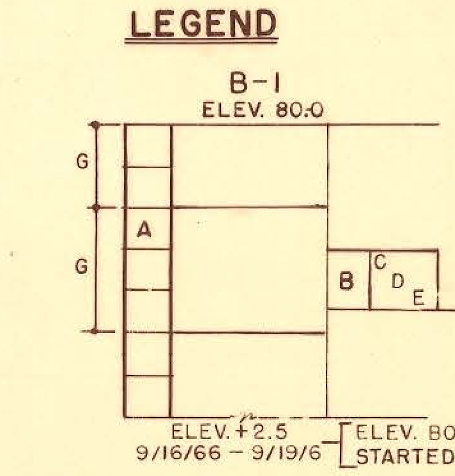
SCALE: 1" = 5'-0"

GENERAL NOTES

1. ELEVATIONS ARE BASED ON MITCHEL FIELD DATUM, BENCH MARK F.M. 16, ELEVATION 86.529 WHICH IS A SQUARE CUT ON CONCRETE APRON 3FT. SOUTH OF NORTH EDGE OF APRON AND WHICH LIES APPROXIMATELY MIDWAY BETWEEN HANGARS NO. 3 & 4 & APPROX. 500' THEREFROM.
2. BORING LOCATIONS ARE ALL TAKEN FROM ESTABLISHED POINT "A" FROM PROPERTY MAP AT MITCHEL FIELD, DATED 10/63 AND SHOWN IN PART ON SHEET NO. 1. POINT "A" IS LATITUDE 40°-43'-30" N AND LONGITUDE 73°-36'-00" W.
3. DRILLING FOREMAN ____________ ____________

SOILS ENGINEER ____________

LEGEND



A — NUMBER OF BLOWS OF 300 lb HAMMER REQUIRED TO DRIVE A 3 IN. CASING ONE FOOT WHEN FALLING 18"

B — SAMPLE NUMBER

C, D, E — NUMBER OF BLOWS OF A 140 POUND HAMMER REQUIRED TO DRIVE A 2" SPLIT SAMPLER 6" WHEN FALLING 30 INCHES.

F — ELEVATION OF BOTTOM OF SAMPLER AT FINISH OF DRIVING.

G — THICKNESS OF STRATUM IN FEET.

CASING O.D. = 3" I.D. = 2½"

SAMPLER O.D. = 2" I.D. = 1⅜"

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CONSULTING ENGINEERS
301 WEST 23rd. STREET NEW YORK, N.Y.

BORING SECTIONS

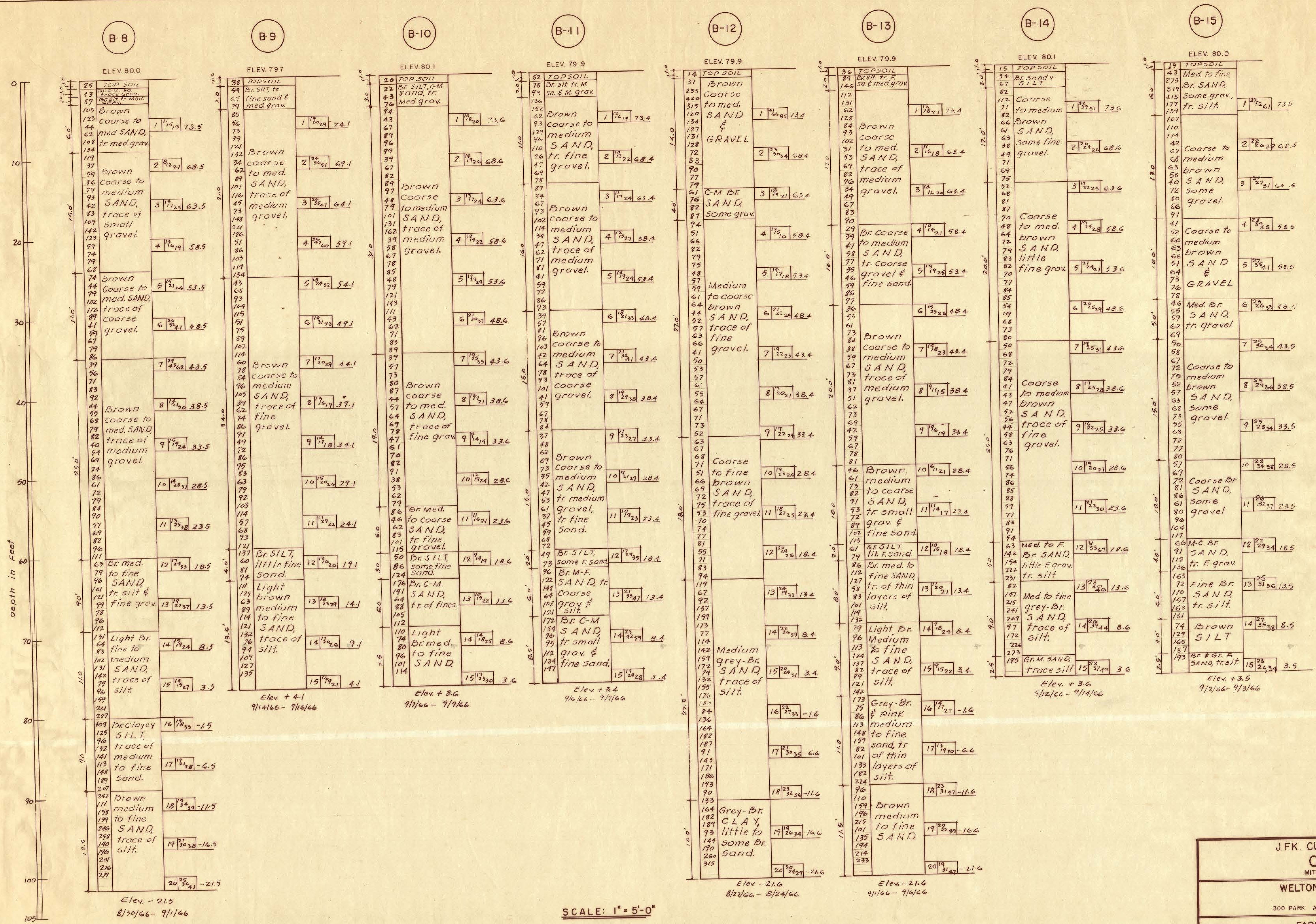
BORINGS BY RELIABLE DRILLING CORP.
34-16 61st. STREET WOODSIDE 77, N.Y.

Julius Rosenthal P.E.

SCALE: AS SHOWN	BY:	JOB No.	DWG. No. 2 OF 7 DWGS.	DATE 9/66

2

I259-2



SCALE: 1" = 5'-0"

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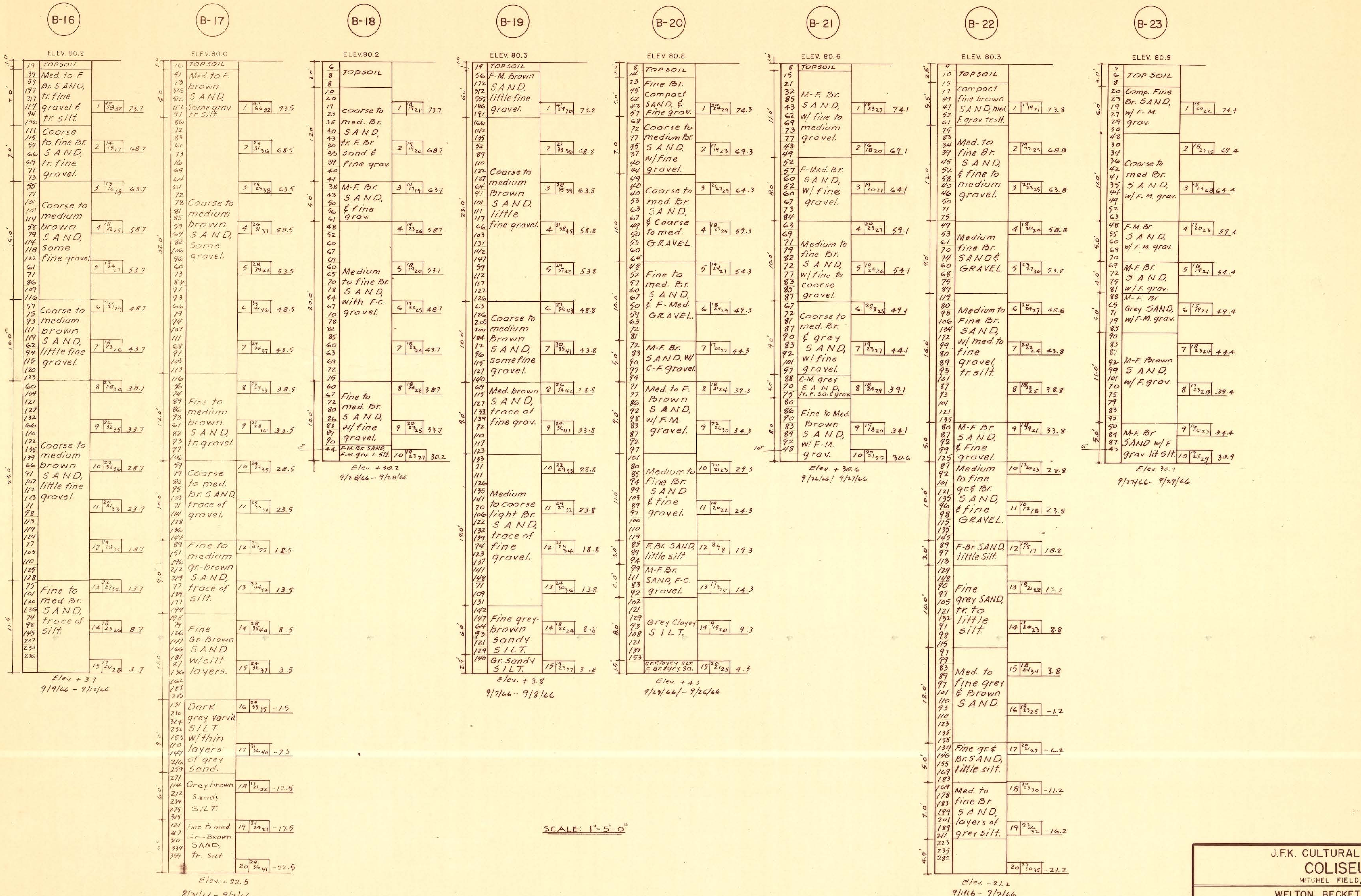
301 WEST 23rd. STREET NEW YORK, N.Y.

BORING SECTIONS

BORINGS BY RELIABLE DRILLING CORP.
34-16 61st. STREET WOODSIDE 77, N.Y.

SCALE: AS SHOWN	BY:	JOB No. 66-47	DWG. No. 3 OF 7 DWGS.	DATE: 9/66

3



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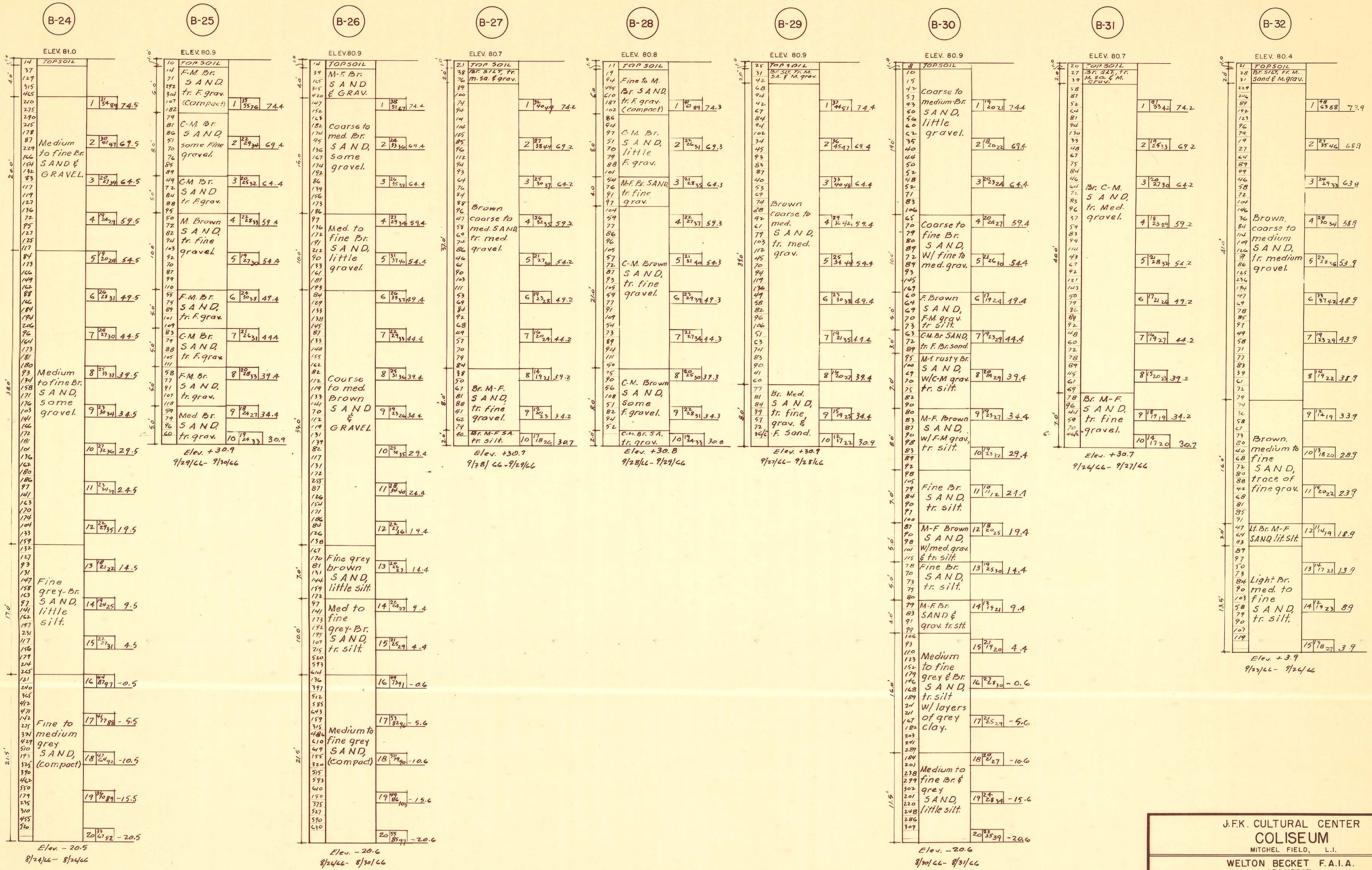
301 WEST 23rd. STREET NEW YORK, N.Y.

BORING SECTIONS

BORINGS BY RELIABLE DRILLING CORP.
34-16 61st. STREET WOODSIDE 77, N.Y.

SCALE: AS SHOWN | BY: | JOB No. 66-17 | DWG. No. 4 OF 7 DWGS. | DATE: 9/66



SCALE: 1" = 5'-0"

J.F.K. CULTURAL CENTER
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MITCHEL FIELD, L.I.

WELTON BECKET F.A.I.A.
ARCHITECT
300 PARK AVENUE NEW YORK, N.Y.

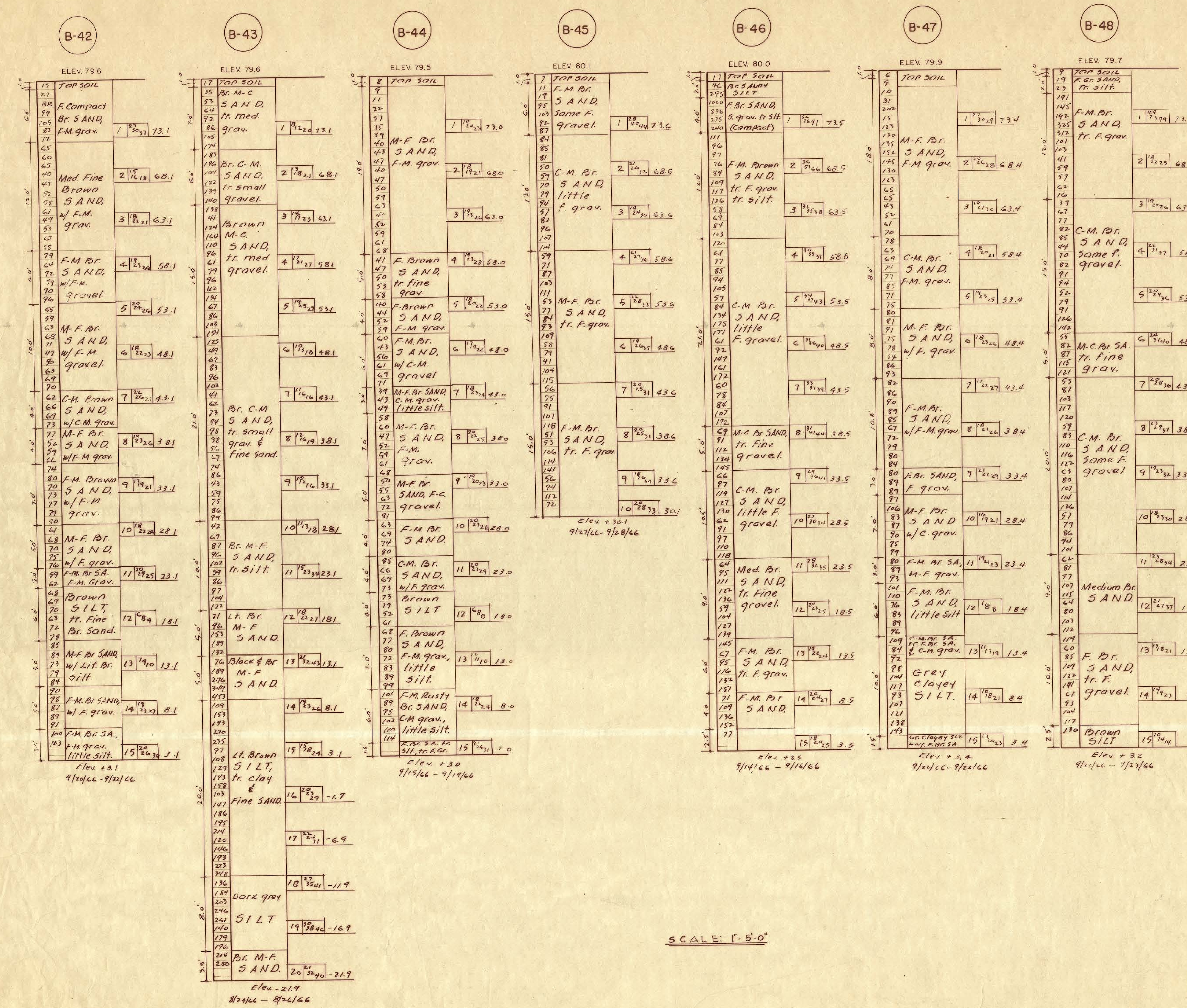
FARKAS & BARRON
CONSULTING ENGINEERS
301 WEST 23rd. STREET NEW YORK, N.Y.

BORING SECTIONS

BORINGS BY RELIABLE DRILLING CORP.
34-16 61st. STREET WOODSIDE 77, N.Y.

SCALE: AS SHOWN BY: J.O.E. R.G. JOB No. 4647 DWG. No. 5 OF 7 DWGS. DATE: 9/66

5



SCALE: 1"=5'-0"

DAILY WATER READINGS

DATE	B-1 A.M.	B-1 P.M.
8/25/66	50.7	50.7
26/66	50.9	51.0
29/66	50.8	50.9
30/66	50.9	50.7
31/66	50.7	50.7
9/1/66	50.6	50.5
9/2/66	50.3	50.3
9/6/66	50.7	50.6
9/7/66	50.6	50.5
9/8/66	50.4	50.4
9/9/66	50.2	50.2
9/12/66	50.2	50.2
9/13/66	50.3	50.3
9/14/66	50.2	50.2
9/15/66	50.2	50.2
9/16/66	50.2	50.2
9/19/66	50.4	50.3
9/20/66	50.2	50.2
9/21/66	50.2	50.2
9/22/66	50.1	50.1
9/23/66	50.0	50.0
9/26/66	50.7	50.7
9/27/66	50.6	50.5
9/28/66	50.4	50.5
9/29/66	50.3	50.2
9/30/66	50.2	50.2

DATE	B-12 A.M.	B-12 P.M.
8/25/66	50.9	50.9
26	50.7	50.9
29	50.9	50.8
30	50.8	50.6
31	50.6	50.7
9/1/66	50.6	50.6
2	50.8	50.5
6	50.4	50.3
7	49.9	49.9
8	49.8	49.7
9	49.7	49.8
12	49.9	49.9
13	50.1	49.9
14	50.8	49.8
15	49.9	49.9
16	50.0	49.8
19	49.9	49.8
20	49.7	49.7
21	49.9	49.7
22	49.6	49.8
23	49.7	49.7
26	49.9	49.7
27	49.7	49.7
28		49.7
29	49.6	
30	49.6	

DATE	B-24 A.M.	B-24 P.M.
8/29/66	51.6	51.7
30	51.7	51.5
31	50.9	50.7
9/1/66	50.7	50.6
2	50.6	50.4
6	50.3	50.3
7	50.3	50.2
8	50.2	50.3
9	50.3	50.2
12	50.3	50.3
13	50.2	50.3
14	50.2	50.3
15	50.3	50.3
16	50.4	50.3
19	50.3	50.2
20	50.2	50.4
21	50.3	50.4
22	50.5	50.5
23	50.4	50.4
26	50.3	50.4
27	50.5	50.4
28	50.4	50.3
29	50.3	50.3
30	50.2	

DATE	B-34 A.M.	B-34 P.M.
8/26/66	51.3	51.3
29	50.6	50.6
30	50.6	50.6
31	50.6	50.6
9/1/66	50.6	50.6
2	50.6	50.6
3		
4		
5		
6	50.5	50.5
7	50.5	50.5
8	50.5	50.6
12	50.6	50.6
13	50.6	50.6
14	50.6	50.6
15	50.5	50.5
16	50.5	50.5
19	50.6	50.5
20	50.5	50.5
21	50.5	50.5
22	50.5	50.5
23	50.5	50.5
26	50.5	50.5
27	50.5	50.5
28	50.5	50.5
29	50.5	50.5
30	50.5	50.5

J.F.K. CULTURAL CENTER
COLISEUM
MITCHEL FIELD, L.I.

WELTON BECKET F.A.I.A.
ARCHITECT
300 PARK AVENUE NEW YORK, N.Y.

FARKAS & BARRON
CONSULTING ENGINEERS
301 WEST 23rd. STREET NEW YORK

LICENSED PROFESSIONAL ENGINEER
JULIAN D. EASTMAN
38358
STATE OF NEW YORK

Julian D. Eastman, P.E.

BORING SECTIONS

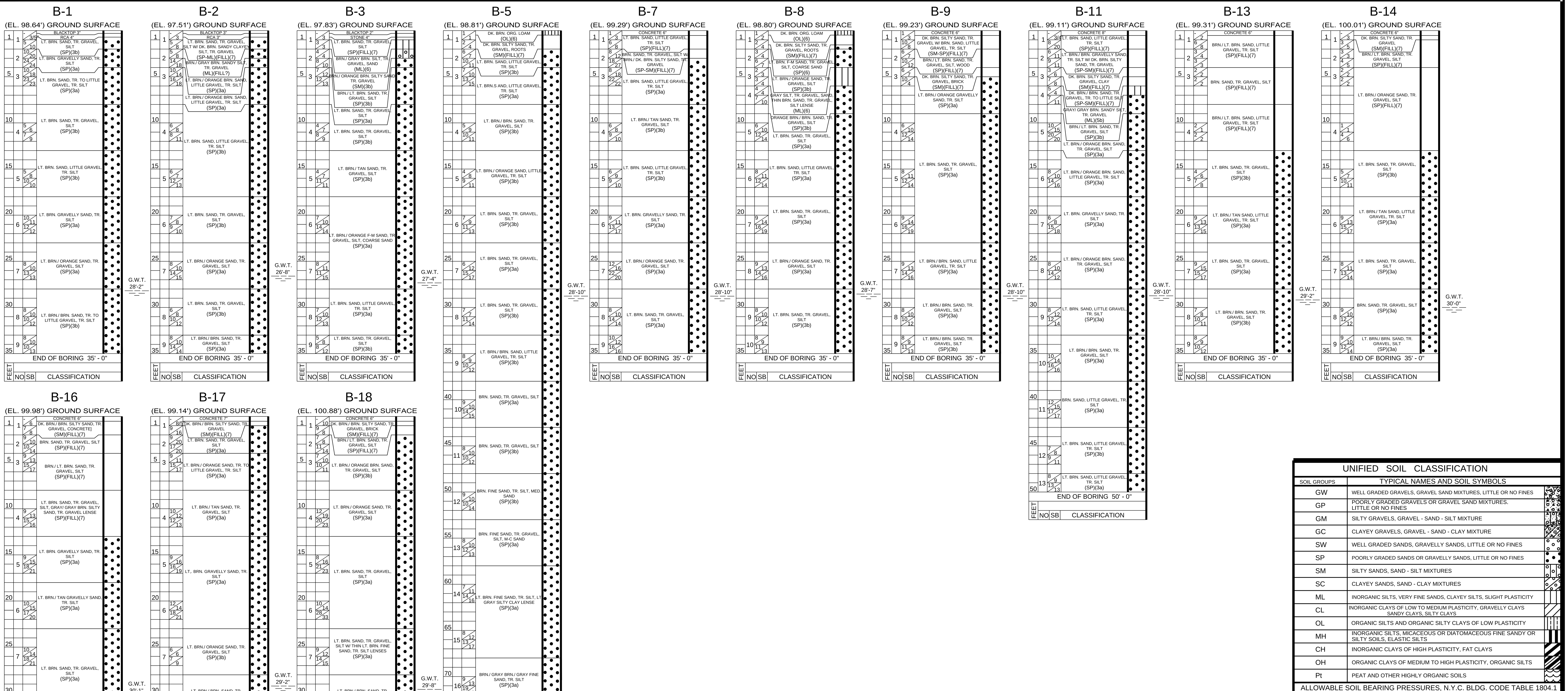
BORINGS BY RELIABLE DRILLING COR
34-16 61st. STREET WOODSIDE 7

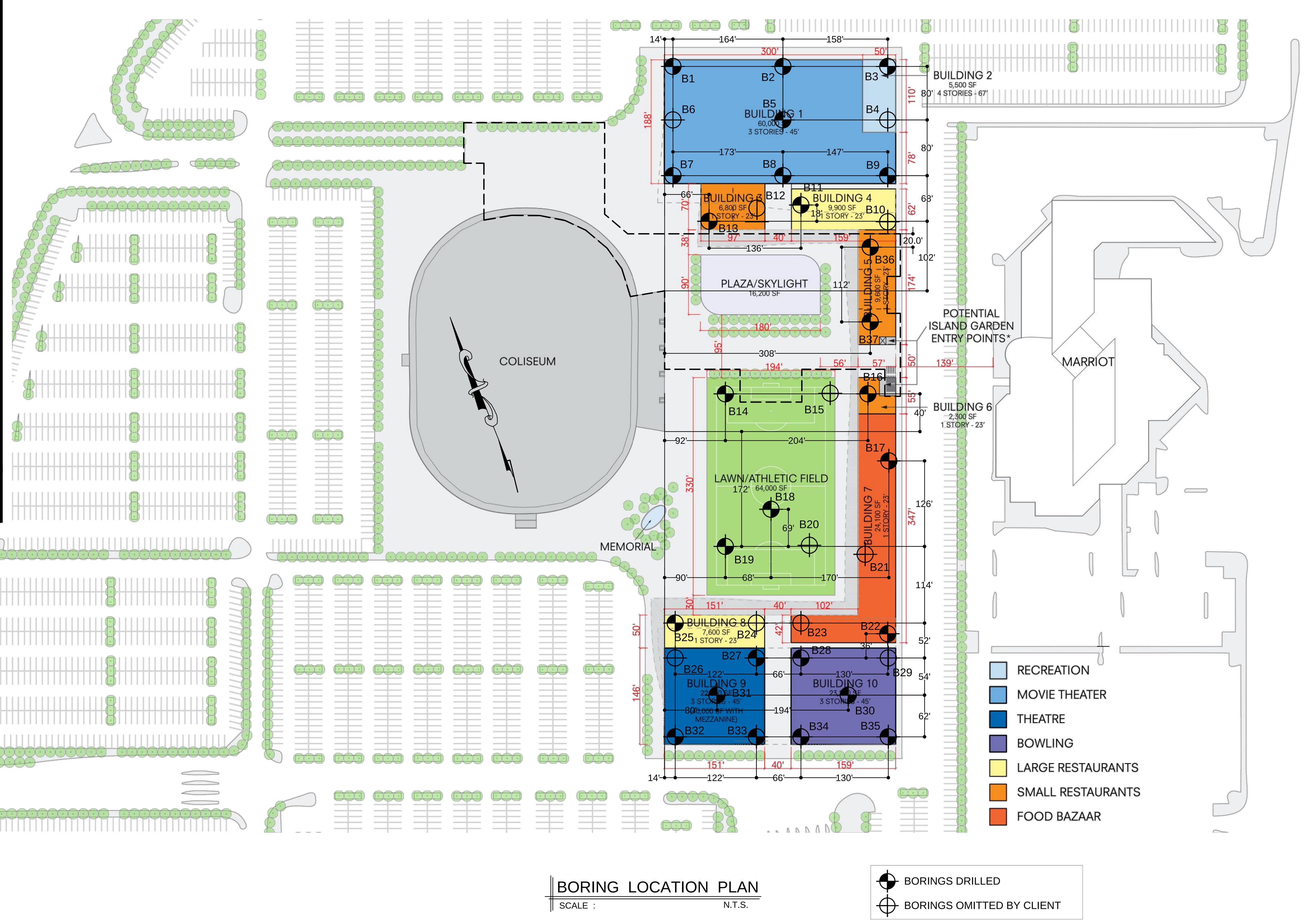
SCALE: AS SHOWN | BY: | JOB No. 6647 | DWG. No. 2 OF 2 DWG

I259-2

APPENDIX D

(2014 HISTORICAL BORING LOGS BY OTHERS)





NOTES:

1. - SOIL DESCRIPTIONS ARE BY VISUAL EXAMINATION OF SOIL SAMPLES RECOVERED DURING DRILLING OPERATIONS.
2. - SOIL DESCRIPTIONS ARE IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.
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4. - SOIL STRATIFICATIONS ARE ACCURATE TO WITHIN TWO FEET VERTICALLY.
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6. - SOIL SAMPLES WERE OBTAINED USING A CENTRAL MINE EQUIPMENT (CME) AUTOMATIC TRIP HAMMER.

UNIFIED SOIL CLASSIFICATION

SOIL GROUPS	TYPICAL NAMES AND SOIL SYMBOLS
GW	WELL GRADED GRAVELS, GRAVEL SAND MIXTURES, LITTLE OR NO FINES
GP	POORLY GRADED GRAVELS OR GRAVEL SAND MIXTURES. LITTLE OR NO FINES
GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURE
GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURE
SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
SP	POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
SM	SILTY SANDS, SAND - SILT MIXTURES
SC	CLAYEY SANDS, SAND - CLAY MIXTURES
ML	INORGANIC SILTS, VERY FINE SANDS, CLAYEY SILTS, SLIGHT PLASTICITY
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS SANDY CLAYS, SILTY CLAYS
OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

ALLOWABLE SOIL BEARING PRESSURES, N.Y.C. BLDG. CODE TABLE 1804.1

CLASS OF MATERIALS (Notes 1 & 3) *	MAXIMUM ALLOWABLE FOUNDATION PRESSURE (TSF)	MAXIMUM ALLOWABLE FOUNDATION PRESSURE (kPa)
1. BEDROCK (NOTES 2 & 7) *		
1a HARD SOUND ROCK - GNEISS, DIABASE, SCHIST	60	5,746
1b MEDIUM HARD ROCK - MARBLE, SERPENTINE	40	3,830
1c INTERMEDIATE ROCK - SHALE, SANDSTONE	20	1,915
1d SOFT ROCK - WEATHERED ROCK	8	766
2. SANDY GRAVEL & GRAVEL (GW, GP) (NOTES 3, 4, 8, & 9) *		
2a DENSE	10	958
2b MEDIUM	6	575
3. GRANULAR SOILS (GC, GM, SW, SP, SM, & SC)(NOTES 4, 5, 8, & 9) *		
3a DENSE	6	575
3b MEDIUM	3	287
4. CLAYS (SC, CL, & CH)(NOTES 4, 6, 8, & 9) *		
4a HARD	5	479
4b STIFF	3	287
4c MEDIUM	2	192
5. SILTS & SILTY SOILS (ML & MH)(NOTES 4, 8, & 9) *		
5a DENSE	3	287
5b MEDIUM	1.5	144
6. ORGANIC SILTS, ORGANIC CLAYS, PEATS, SOFT CLAYS, LOOSE GRANULAR SOILS, & VARVED SILTS	SEE 1804.2.1 *	SEE 1804.2.1 *
7. CONTROLLED & UNCONTROLLED FILLS	SEE 1804.2.2 OR 1804.2.3 *	SEE 1804.2.2 OR 1804.2.3 *

* REFER TO SECTION 18-4.2 OR NOTES FOLLOWING TABLE 1804.1 IN THE N.Y.C. BUILDING CODE FOR ADDITIONAL INFORMATION.

COMPACTION RELATED TO SPOON BLOWS PER FOOT

SAND		SILT & CLAY	
LOOSE	LESS THAN 10	SOFT	10 OR LESS
MEDIUM	10 TO 30	MEDIUM	11 TO 29
DENSE	GREATER THAN 30	HARD	30 OR MORE

" N "	STANDARD PENETRATION TEST (2" SPOON, 140lb HAMMER, 30" FALL)
6 8 9 12 N=17 BLOWS PER FOOT	SPOON BLOW COUNT IS GENERALLY SHOWN IN 6" INCREMENTS FOR 2' DRIVE TO OBTAIN BLOWS PER FOOT (N) USE THE 2ND & 3RD 6" INCREMENT

	ROTARY CASING	EXTRA HEAVY CASING	SAMPLE SPOON
SIZES, INCHES	2.5		2.0
HAMMER WEIGHT, POUNDS	___________		140
HAMMER FALL, INCHES	___________		30

CB - CASING BLOWSPER 1 FOOT DRIVE
SB - SPOON BLOWS PER 6 INCH DRIVE
P - PUSHED BY WEIGHT OF HAMMER
WOR - WEIGHT OF ROD
UD - UNDISTURBED SOIL SAMPLE
NO - SAMPLE NUMBER
FEET - DEPTH FROM GND. SUR. NOTED AT EACH 5'
WOH - WEIGHT OF HAMMER (INCLUDES ROD)

FOREST CITY RATNER COMPANIES
#1 METROTECH CENTER, BROOKLYN, NEW YORK 11201

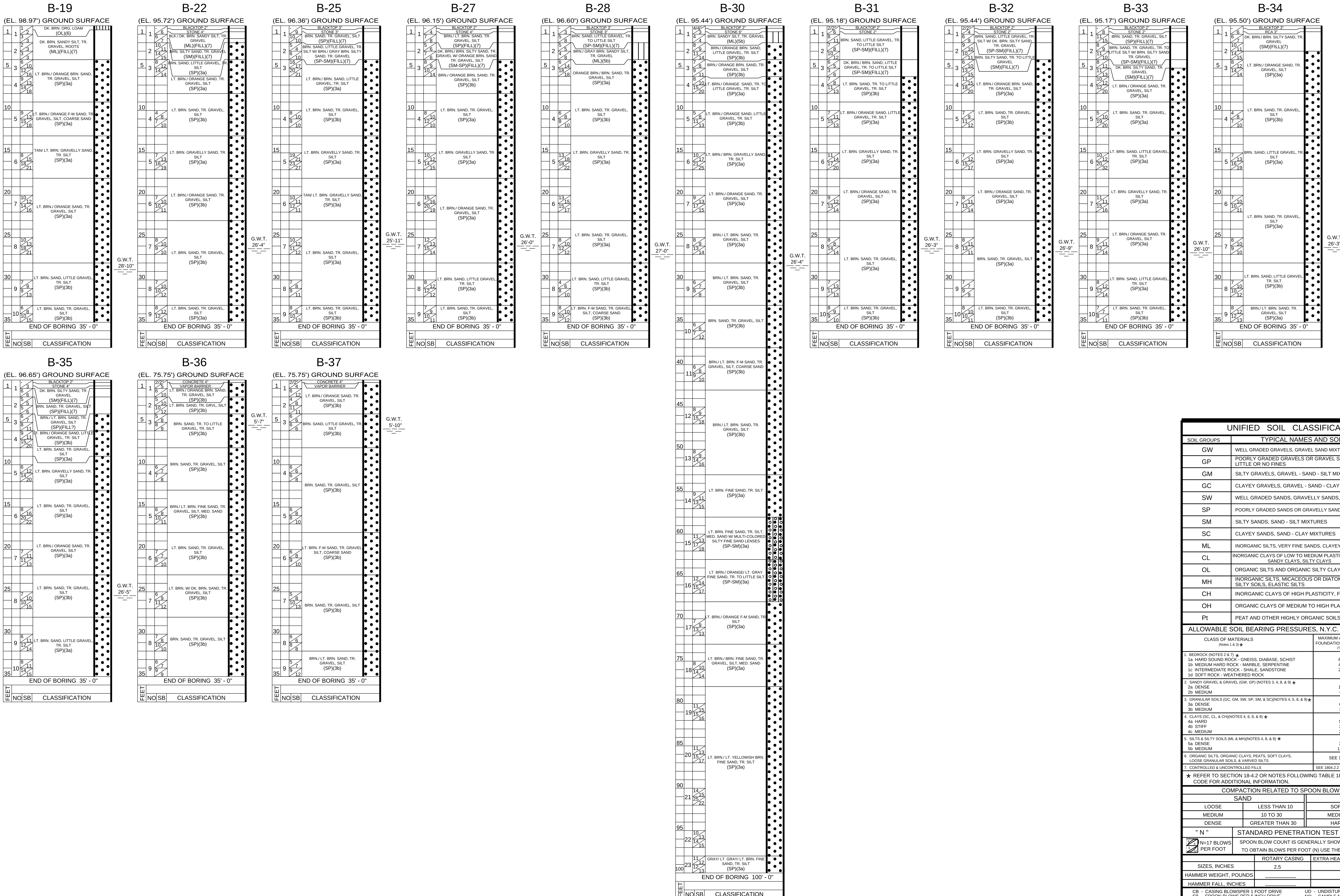
SOIL MECHANICS DRILLING CORP.
subsoil investigations
3770 MERRICK ROAD * SEAFORD, NEW YORK 11783 * 516 - 221-2333

NASSAU COLISEUM - HEMPSTEAD TURNPIKE

-SUBSURFACE INVESTIGATION-

UNIONDALE, NEW YORK

VERTICAL BORING SCALE: 1/4"=1'-0"	DRAWING DATE JUNE 26, 2014		DRAWING NUMBER 14L145-37 SHEET 1 OF 2.
DATES OF BORING JUNE 16-23, 2014	DWN. BY: JMR	CKD. BY: CV	



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HAMMER WEIGHT, POUNDS	________		140
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CB - CASING BLOWSPER 1 FOOT DRIVE
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-SUBSURFACE INVESTIGATION-

UNIONDALE, NEW YORK

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DATES OF BORING JUNE 16-23, 2014	DWN. BY: JMR	CKD. BY: CV	SHEET 2 OF 2.

PRELIMINARY GEOTECHNICAL ENGINEERING REPORT

for

SANDS NEW YORK
Phase 2 – Building and Site Improvements
Uniondale, New York

Prepared For:

Las Vegas Sands Corp.
3355 Las Vegas Blvd. South
Las Vegas, Nevada 89109

Prepared By:

Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
360 West 31st Street, 8th Floor
New York, New York 10001

Julia Langewis, P.E.

Saul Shapiro, P.E.
Professional Engineer License No. 082466-1

13 October 2023
170754501

LANGAN

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INTRODUCTION

This report presents the results of our preliminary subsurface investigation and provides preliminary geotechnical engineering recommendations for the design and construction of the proposed Phase 2 - Buildings and Site Improvements as part of the redevelopment of the Nassau Coliseum property in Uniondale, New York. All services were performed in general accordance with our Additional Services Request and Statement of Work under Master Service Agreement CW2785281, dated 07 July 2023.

Our understanding of the project is based on review of the documents provided, discussions with your office and the project team, and our general experience in the area. Architectural information was provided by the project architect (Populous Architects, PLLC). Structural information was not available at the time of this report. All recommendations are in accordance with the 2020 New York State Building Code (NYSBC).

Elevations were interpolated from the survey titled "ALTA/NSPS Land Title Survey," Sheet VL103, prepared by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C., dated 14 March 2023 and updated 22 May 2023. All elevations contained herein are considered approximate and reference the North American Vertical Datum of 1988 (NAVD88)[1].

SITE DESCRIPTION

The project site consists of Nassau Coliseum ("the Coliseum") and surrounding parking lots and is located at 1255 Hempstead Turnpike in Uniondale, New York. The property is comprised of multiple parcels referenced on the Nassau County Tax Maps as Section F, Block 44, Lots 351, 411, 412, and 415. The site is generally bound by Charles Lindbergh Boulevard to the north, James Doolittle Boulevard to the east, Hempstead Turnpike to the south, and Earle Ovington Boulevard to the west. A site location map is presented in Figure 1.

The proposed Phase 2 improvements are typically located immediately west, south, and east of the existing Coliseum building. The Phase 2 development area is currently occupied by on-grade asphalt parking lots. Surface grades in the area vary from about el 75.0 ft to el 84.7 ft. Numerous utilities, including electric, drainage, chiller lines, gas, sanitary, and communication lines were reported in and adjacent to the proposed extents of the Phase 2 development. All utilities to remain must be protected during construction.

PROPOSED DEVELOPMENT

We understand that Phase 2 is expected to include a casino gaming and resort facility with several new buildings and site improvements (i.e., sidewalks, plantings, utilities, and roadways). The new buildings generally include parking garages, a hotel, a theater, a casino, conference and event space, and associated amenities. The extent of the Phase 2 development and footprints of the proposed structures are shown on the drawing "P2-001 Site Plan" by Populous, dated

[1] Elevations are with respect to the North American Vertical Datum of 1988 (NAVD88), which is reported to be 1.092 feet above the Mean Sea Level at Sandy Hook, New Jersey, 1929 (NGVD 1929) and the Nassau County Datum.

23 June 2023. Phase 2 is to be constructed using a phased approach, with each sub-phase described in greater detail below.

Phase 2A – New Casino and Amenity Space

A new casino and amenity space is proposed south of the Coliseum. Amenities generally include a spa and fitness center, an indoor/outdoor pool, and back of the house space. The proposed Phase 2A development is anticipated to consist of a three-story structure with a single below grade level and a footprint of approximately 365,000 square-feet.

Phase 2B – New Hotel Tower 1

A new hotel tower, herein referred to as Tower 1, is proposed east of the Coliseum. Tower 1 is anticipated have a footprint of about 55,000 square feet and will be approximately 300-feet-tall; a partial cellar is contemplated on the southern-most wing of the building.

Phase 2C – New Hotel Tower 2

A second hotel tower, herein referred to as Tower 2, is proposed west of the Coliseum. Tower 2 is anticipated to have a footprint of about 45,000 square-feet and will be approximately 250-feet-tall; a partial cellar is contemplated on the southern-most wing of the building.

Phase 2D – New Theater and Parking Garage

A new theater and parking garage are proposed south of the Coliseum and south of the Phase 2A and Phase 2B structures. The proposed Phase 2D development is anticipated to have a footprint of about 235,000 square feet and will consist of a three-story structure with a single cellar.

Phase 2E – New Parking and Hotel Spaces

Additional parking and hotel spaces are proposed west of the Coliseum and west of Phases 2A and 2C. The proposed Phase 2E development is anticipated to have a footprint of approximately 230,000 square-feet and will consist of a three-story structure with a single cellar.

ADJACENT STRUCTURES

Long Island Marriott, 101 James Doolittle Boulevard (Section 44, Block F, Lot 326)

The Long Island Marriott hotel, an 11-story building with one cellar level, is located to the east of the Coliseum. The top of the cellar slab is shown in approximate existing conditions drawings to be about 12.7 feet below the ground floor slab (about el 68.4 ft). Foundation drawings were not available at the time of this report, and no formal inspection was made from within the building. The type and extents of the foundations supporting the building are unknown.

Memorial Sloan Kettering Cancer Center, 1101 Hempstead Turnpike (Section 44, Block F, Lot 413)

The Memorial Sloan Kettering Cancer Center is located to the south of the proposed development. Nassau County Land Records[2] indicate the Memorial Sloan Kettering Cancer Center consists of a two-story building and associated four-story parking garage. Foundation drawings were not available at the time of this report, and no formal inspection was made from within the building. The type and extents of the foundations supporting the buildings are unknown but are presumed to be shallow foundations.

Nassau Coliseum, 1255 Hempstead Turnpike (Section 44, Block F, Lot 415)

The existing Coliseum building is located within the proposed development area and will be modified as part of the overall site development scheme. The Coliseum includes a concourse level, a below-grade event level, and multi-level event seating. The below-grade portion of the building includes a loading dock and ramp that extends north of the above-grade building limits and exhibition space that extends east of the above-grade building limits. Original design plans[3] show the Coliseum is supported by a shallow foundation system bearing on dense native sand soils with an allowable bearing pressure of 4 tons per square foot. The below-grade event level floor slab consists of a 6-inch-thick to 8-inch-thick concrete slab-on-grade. The top of the event level slab is located at about el 58.6 ft and the top of the loading dock floor slab is located at about el 54.6 ft.

REVIEW OF PUBLISHED INFORMATION

FEMA Flood Maps

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), plate 36059C0227G, governs flood zone compliance for the site. The subject FIRM shows that the proposed development falls within unshaded Zone X - Areas of Minimal Flooding. The unshaded Zone X designation corresponds to "Areas determined to be outside the 0.2 percent annual chance floodplain." Therefore, floodproofing is not required by the NYSBC. An excerpt of the FEMA FIRM map relative to the project site is shown in Figure 2.

PRELIMINARY SUBSURFACE INVESTIGATION

Our preliminary subsurface investigation included: 1) drilling 14 geotechnical test borings with in situ testing and sampling of soil; 2) installing two groundwater observation wells; 3) performing laboratory testing on representative soil samples; and 4) reviewing available historic boring data.

Geotechnical Test Borings

Fourteen geotechnical test borings, identified as LB2-01 through LB2-14, were drilled by Craig Geotechnical Drilling Co., Inc. of Mays Landing, New Jersey between 6 and 15 September 2023.

[2] https://lrv.nassaucountyny.gov/

[3] Design drawings include drawing numbers S-1 through S-3. All drawings are part of "John F. Kennedy Educational, Civic & Cultural Center Coliseum", prepared by Farkas & Barron Structural Engineers, dated 15 January 1969.

All borings were drilled within the footprint of the proposed structures within the Phase 2 development. All borings were drilled using a CME-75 truck-mounted drill rig. Langan provided full-time special inspection of all drilling operations in accordance with the NYSBC. The borings were generally advanced to depths between 52 feet and 102 feet below grade. The approximate locations of the borings are shown on the subsurface investigation plan in Figures 3 and 4.

The borings were advanced through soil using mud-rotary drilling techniques with a tri-cone roller bit and drilling fluid. Temporary flush-joint steel casing was installed through soils, as required, to stabilize the boreholes and prevent fluid loss during drilling. The boring locations were initially cleared of utilities using ground penetrating radar (GPR). In addition, the first 5 feet of all borings were hand dug in an effort to clear the boreholes of utilities. The Standard Penetration Test (SPT)[4] was performed in general accordance with ASTM D1586. SPT N_{60}-values[5], visual soil classifications, and other field observations were recorded by a Langan engineer. Soils were sampled using a standard 2-inch outer-diameter split-spoon sampler driven by an automatic hammer with a reported efficiency of 97.2% and 101.6%, respectively for each rig[6]. All recovered soil samples were visually classified in the field in accordance with ASTM D2487 and the Unified Soil Classification System (USCS). Soil classifications, SPT N_{60}-values, and other field observations were recorded on the boring logs presented in Appendix A.

Groundwater Observation Wells

Groundwater observation wells were installed in boreholes LB2-03(OW) and LB2-13(OW) and groundwater levels were measured periodically during and after our subsurface investigation. The observation wells were generally constructed using a 10-foot section of 2-inch-diameter Schedule 40 PVC slotted well screen below an approximately 30-foot section of solid riser pipe. The annulus was backfilled with No. 1 filter sand to within 2.5 feet of existing grade; a minimum 2-foot-thick bentonite-pellet seal was installed above the filter sand. The remainder of the annulus was grouted to prevent surface water from influencing the well readings. A protective steel flush-mounted well cap was installed at the ground surface at each well location. The observation well construction logs are included in Appendix A.

Laboratory Testing

Laboratory testing was performed on select soil samples to evaluate engineering properties and verify visual classifications made in the field. Laboratory testing of the soil samples included:

- Particle Size Distribution – ASTM D6913 (30 Tests)
- Atterberg Limits – ASTM D4318 (3 Tests)

---

[4] The Standard Penetration Test is a measure of soil density and consistency. The testing involves driving a 2-inch outer-diameter split-spoon sampler a distance of 2 feet, using a 140-lb hammer free falling from a height of 30 inches.

[5] N_{60}-value – The number of blows required to drive a 2-inch diameter split-spoon sampler 12 inches after an initial "seating" penetration of 6 inches, using a 140-lb hammer free falling from a height of 30 inches, corrected for the hammer's energy ratio. $N_{60} = N_{Field}$(Hammer Efficiency/60)

[6] Hammer calibrations performed by GRL Engineers, Inc. per provided signed and sealed report titled "SPT Energy Calibration", dated 29 September 2023. See Appendix A for a copy of the calibration report.

The laboratory test results are provided in Appendix B.

Previous Investigations by Others

Reliable Drilling Corp. (1966)

A subsurface investigation was completed for the original design of the Nassau Coliseum in 1966. The investigation consisted of 48 borings and four groundwater monitoring wells within the footprint of the Nassau Coliseum. Borings were advanced to depths varying between 50 feet and 101.5 feet below existing grade. In general, the subsurface conditions encountered in the 1966 investigation agree well with those encountered in the 2023 Langan investigation. Approximate locations of the historic borings are shown in Figures 3 and 4. A copy of the available historic boring logs from 1966 is included in Appendix C; we note that some of the historic boring records were missing from the file.

Soil Mechanics Drilling Corp. (2014)

A subsurface investigation comprised of 26 geotechnical borings was completed along the east side of the Coliseum in 2014. Borings were advanced to depths varying between 35 feet and 100 feet below existing grade. In general, the subsurface conditions encountered in the 2014 investigation agree well with those encountered in the 2023 Langan investigation. Approximate locations of the historic borings are shown in Figures 3 and 4. A copy of the historic boring logs from 2014 is included in Appendix D.

SUBSURFACE CONDITIONS

The general subsurface stratigraphy encountered in the Phase 2 borings consists of fill underlain by sand with variable gravel, silt, and clay content; in some cases, layers of clay were present within the sand strata. Bedrock is known to be at great depth in the vicinity of the site. A brief description of each layer is presented below in order of increasing depth.

Stratum 1 – Fill

Fill was observed in all borings and generally consists of coarse to fine sand with variable concentrations of gravel and silt. The fill soils generally appear to be comprised of reworked native soils. The fill layer is estimated to extend to depths of about 5 feet to 7 feet below the ground surface, corresponding to about el 76.2 ft and el 70.9 ft. SPT N_{60}-values typically varied from 13 to 35 bpf (blows per foot). The fill layer is generally considered to be in a medium dense to dense condition.

One particle size distribution analysis was performed on a selected sample from the fill layer. The sample had a fines content of 4.8 percent.

The fill generally classifies as SP (poorly graded sands, gravelly sands, little or no fines), SP-SM (poorly graded sands with gravel and silt), or SM (silty sands, sand-silt mixtures) in accordance with ASTM D2487 and the USCS.

Stratum 2 – Granular Soil

Granular soil was observed below the fill layer in all borings. The granular soil generally consists of coarse to fine, medium to fine, or fine sand with variable concentrations of gravel, silt, and clay. The soil stratum extends from the bottom of the fill layer (about el 76.2 ft to el 70.9 ft) to the full depth of the boring (about el 29.9 ft to el -24.6 ft). SPT N_{60}-values varied from 8 to 79 bpf and were typically greater than 30 bpf. The granular soils are generally considered to be in a medium dense to very dense condition.

Twenty-nine particle size distribution analyses were performed on selected samples from the granular soil layer. The samples had fines contents varying from 3.0 percent to 17.1 percent.

The dense granular soil layer generally classifies as SP (poorly graded sands, gravelly sands, little or no fines), SP-SM (poorly graded sands with gravel and silt), SM (silty sands, sand-silt mixtures), SP-SC (poorly graded sands with gravel and clay), or SC (clayey sands, sand-clay mixtures) in accordance with ASTM D2487 and the USCS.

Stratum 2a – Clay and Clayey Sand

Thin clayey sand and clay layers were observed interspersed within the Stratum 2 soils in LB2-01, LB2-04, and LB2-09. These soils generally consist of clay with variable concentrations of fine sand and silt, or fine sands with high concentrations of clay and silt.

Where encountered, the top of the clay and clayey sand layer was observed as shallow as 60 feet and as deep as 102 feet below existing grade, corresponding to about el 20.8 ft and el -20.8 ft. The layer thickness varied from about 2 feet to 12 feet. SPT N_{60}-values typically varied from 17 to 52 bpf. The soil stratum is generally considered to be in a stiff to very stiff condition for clay rich soils and in a medium dense to dense condition for clayey sand soils.

Three Atterberg Limits tests were performed on select clay samples. The samples had Liquid Limits varying from 35 percent to 41 percent, Plastic Limits varying from 16 percent to 24 percent, and Plasticity Indices varying from 17 to 19.

The clay soils generally classify as CL (inorganic clays of low to medium plasticity) and the clayey sand layer generally classifies as SC (clayey sands, sand-clay mixtures) in accordance with ASTM D2487 and the USCS.

Groundwater

The groundwater level was measured in LB2-03(OW) and LB2-13(OW) during and after our subsurface investigation. The stabilized groundwater level varied from about el 46.5 ft and about el 49.0 ft. These readings are consistent with the data collected during the 1966 investigation and are about 2 feet lower than those reported in during the 2014 investigation. Groundwater level readings from the 2023 investigation are summarized in Table 1 below. Please note that the groundwater level may vary seasonally and with changes in precipitation.

Table 1 – Groundwater Observation Well Data

Well No.	Approx. Surface Elevation (feet, NAVD88)	Date	Depth Below Grade (feet)	Approx. Elevation (feet, NAVD88)
LB2-03(OW)	± 80.2	09/14/2023	34.5 ±	± 45.7
		09/14/2023	33.5 ±	± 46.7
		09/20/2023	31.2 ±	± 49.0
		09/21/2023	31.2 ±	± 49.0
LB2-13(OW)	± 77.0	09/14/2023	34.5 ±	± 42.5
		09/14/2023	30.5 ±	± 46.5
		09/20/2023	28.0 ±	± 49.0
		09/21/2023	28.0 ±	± 49.0

SEISMIC ANALYSES

Preliminary Seismic Design Parameters

Preliminary seismic design parameters were determined in accordance with Section 1613 of the NYSBC and ASCE 7-16. The subsurface investigation indicates that medium dense to very dense soil is generally present at the site. Therefore, we recommend that the site be assigned to Site Class D. For the purpose of this preliminary report, we assume that the proposed structures within the Phase 2 development will be assigned to Risk Categories II and III. The resulting design spectral acceleration at short periods (S_{DS}) is equal to 0.272g and the design spectral acceleration at 1-second (S_{D1}) is equal to 0.09g. Preliminary seismic design parameters are summarized in Table 2 below.

Table 2 – Preliminary Seismic Design Parameters

Description	Parameter	Recommended Value	NYSBC/ASCE 7 Reference
Mapped Spectral Acceleration for short periods	S_S	0.256g	Figures 1613.2.1(1), (2) ***
Mapped Spectral Acceleration for 1-sec periods	S_1	0.056g	
Site Class	-	**D**	ASCE 7-16 Table 20.3-1
Site Coefficient	F_a	1.595	Tables 1613.2.3(1), (2)
Site Coefficient	F_v	2.4	Table 1613.3.3(2)
5 percent damped design spectral response acceleration at short periods:	$\mathbf{S_{DS}}$	**0.272g**	Section 1613.2.4
5 percent damped design spectral response acceleration at 1-sec period:	$\mathbf{S_{D1}}$	**0.09g**	
Risk Category (to be verified for each building prior to final design)	-	**II and III**	Table 1604.5
Seismic Design Category	-	**B**	Table 1613.2.5(1) Table 1613.2.5(2)
Site Adjusted Peak Ground Acceleration	PGA_M	0.229g	ASCE 7-16 Section 11.8.3
*** ASCE Hazards Tool (https://asce7hazardtool.online/)			

Liquefaction Potential

The seismic provisions of the NYSBC require an evaluation of the liquefaction potential of sand, silt, and non-cohesive materials below the groundwater table, and up to a depth of 50 feet below the ground surface. Our preliminary evaluation indicates that the potential for liquefaction, liquefaction-induced settlement, and other seismic ground failure at the site is unlikely. Therefore, liquefaction need not be considered in design.

DESIGN AND CONSTRUCTION CONSIDERATIONS

The following section briefly summarizes significant design and construction considerations associated with foundations for the proposed development:

- The site lies outside of FEMA mapped flood hazard areas and does not require floodproofing.
- Groundwater is not anticipated to be encountered during excavation and construction of the proposed Phase 2 development. We recommend a design groundwater elevation of el 54 ft for preliminary design purposes based on review of available data.
- The site should be designed assuming a preliminary seismic design category (SDC) of **B** for Risk Categories II and III (note, Risk Category must be confirmed for each building prior to final design). Liquefaction need not be considered in the design.
- The granular soil below the footprint of the proposed structures is suitable for supporting low-rise structures (Phases 2A, 2D, and 2E) using a shallow foundation system (i.e., isolated spread footings and strip footings) and is suitable for supporting high-rise structures (Phases 2B and 2C) using a deep foundation system (i.e., driven or drilled piles).
- Support of excavation (SOE) will be required where sufficient lateral clearance cannot be provided to permit OSHA compliant sloped/benched excavations.
- Existing structures and utilities to remain must be protected and monitored during excavation and construction activities.

DESIGN RECOMMENDATIONS

Shallow Foundations

The subsurface conditions are considered suitable for supporting low-rise structures (Phases 2A, 2D, and 2E) using shallow foundations. The following sections provide additional details for shallow foundation design.

<u>Allowable Bearing Pressure</u>

We recommend that footings be designed assuming a gross allowable bearing pressure of four (4) tons per square foot (tsf). This recommended allowable bearing pressure exceeds the presumptive load bearing values prescribed in Table 1806.2 of the NYSBC and requires approval of the building official.

Continuous strip footings should have a minimum width of 2 feet and isolated spread footings should have a minimum width of 3 feet. All footings should bear at least 3 feet below adjacent exterior grade or 3 feet below interior slabs. Footing subgrades should be prepared in accordance with the recommendations presented herein.

Footings must bear at or below the line of influence of existing footings from adjacent structures. The line of influence is defined by projecting an imaginary line from the edge of the lower footing upward and outward at an inclination of 1V:2H. Existing footing subgrades should be protected from disturbance or undermining that could result from nearby excavation.

Settlement

Column loads for the proposed Phase 2A, 2D, and 2E structures have not been provided at the time of this report; however, we expect that footings for these buildings will generally settle less than 1-inch based on our evaluation of similarly sized structures in the area. The angular distortion (Δ/L) resulting from differential settlement between adjacent columns is estimated to be about 1/600 or less based our evaluation of similarly sized structures in the area. The majority of the settlement is expected to occur during construction as dead load is applied.

Lateral Resistance

Lateral loads can be resisted by friction on the bottom of footings. We recommend an ultimate friction coefficient of 0.45 for mass concrete poured on medium dense to dense sand. A minimum factor of safety of 1.5 should be utilized when evaluating sliding. If additional resistance is needed, lateral loads can also be resisted by embedding footings deeper to develop passive resistance from the soil. The allowable passive resistance provided by the soil will be dictated by the depth of embedment, characteristics of the surrounding material, and the extent of backfill and compaction at a particular location. Alternatively, floor slabs can be used as diaphragms to transfer loads to the exterior walls.

Uplift Resistance

We expect that uplift forces can be accommodated by the dead load of the structures; however, resistance can be provided by ground anchors (tie-downs) or micropiles if needed. Where required, anchors must consider group effects and need to be evaluated on a case-by-case basis.

Deep Foundations

Deep foundations are anticipated to be required to accommodate the more heavily loaded hotel towers. While driven piles are technically feasible, we expect that drilled pile options may be advisable given project phasing and proximity to existing structures. Driven piles will generate elevated noise and vibration levels, which while not necessarily detrimental to the structural performance of existing buildings (e.g., converted Coliseum gaming area), may be disruptive to patrons which are likely to be present throughout Phase 2 construction.

Final design and layout of the piles should be predicated on the final service loading developed by the project structural engineer. Furthermore, lateral capacities must be evaluated for potential group effects. The following sections provide additional details for deep foundation design.

Continuous Flight Auger (CFA) Piles

Continuous flight auger (CFA) piles are considered a feasible deep foundation alternative for the Phase 2 development. CFA piles are a drilled foundation element in which the pile is drilled to the final depth in one continuous process using an auger. The auger is then gradually withdrawn, during which grout is placed through the hollow center of the auger to the base (i.e., bottom-up grouting). Reinforcing is placed into the fluid grout immediately after withdrawal of the auger, creating the pile. These piles would be designed as friction piles in the soil, and their tips would likely terminate in medium dense to dense soils.

We estimate an axial compressive capacity of up to about 150 tons for an 18-inch-diameter, 50-foot-long CFA pile. Should CFA piles be chosen as a preferred foundation alternative, additional design parameters can be estimated and provided based on site-specific loading and layout.

Micropiles

Micropiles consist of open-ended steel casing sections that are drilled into place with an uncased bond zone located within the required soil bearing stratum. The construction sequence includes drilling the casing full depth to the bottom of the bond zone. Once the required depth is reached and the spoils have been removed, the entire shaft is filled with cement grout and steel reinforcement. The steel casing is then extracted incrementally to create the bond zone and the grout is pressurized. Upon reaching the top of the bond zone, the casing is plunged back into the grouted socket a distance of at least 5 feet.

Micropiles develop axial load capacity solely through peripheral shear resistance between the grout and soil. For the purpose of preliminary design, we recommend an allowable peripheral bond strength of 20 pounds per square inch (psi) in compression and 10 psi for in tension. These values assume the bond zone is formed in medium dense to dense granular soils.

Using a typical 13.375-inch outer-diameter casing and 14-inch-diameter (nominal) soil bond zone, we expect that an allowable compressive capacity of 150 tons can be reasonably achieved for micropiles for a bond zone of about 30 feet. We recommend that permanent casing extend a minimum of 10 feet below finished grade or the lowest slab level, whichever is deeper. Note that reinforcement, grout strength and bond zone length can be adjusted as necessary to accommodate a range of capacities. Larger diameters and other alternatives such as cased CFA piles are also possible to achieve a variety of loading conditions.

Estimated Settlements

Single pile settlements for the options presented above are estimated to be less than 0.5 inches. The majority of the settlement is expected to occur during construction as dead load is applied.

Load Tests

Load testing should be performed to optimize pile designs and to verify final design parameters. At a minimum, each building should include a minimum of two successful compression load tests and two successful tension (uplift) load tests for each pile type selected. In addition, at least two lateral load tests should be performed for each building. The final number of load tests should be selected based on the footprint of each building. All load testing should be in accordance with the requirements of the NYSBC and applicable ASTM standards. We recommend the use of instrumented load tests such that load transfer mechanisms can be verified and that pile design parameters can be optimized for use in installing production piles.

Floor Slabs

Where above the design groundwater elevation, we recommend that the floor slabs be designed as a slab-on-grade provided that proper subgrade preparation is implemented. For the purpose of design, we recommend that slab-on-grade floors be designed assuming a modulus of subgrade reaction equal to 200 psi-per-inch. Please note that the modulus of subgrade reaction noted above is not appropriate for use in the design of mat foundations. Slab-on-grade floors should bear atop a minimum 6-inch-thick layer of free draining ¾-inch crushed stone or gravel layer placed over a suitably compacted granular soil subgrade. A vapor barrier or waterproofing membrane should be installed below all moisture sensitive slabs (i.e., occupied interior spaces).

Where below the design groundwater elevation, we recommend that floor slabs be designed as pressure slabs. We recommend that pressure slabs be designed assuming hydrostatic uplift corresponding to the depth below the recommended design groundwater elevation (el 54 ft). Where possible, pressure slabs should be keyed into the building walls and should be cast with integral waterstops at all joints. Pressure slabs should be waterproofed as per the recommendations presented herein.

Below Grade Walls

Restrained Walls

We recommend that permanent below-grade walls or pits be designed to accommodate lateral pressure resulting from soil and surcharge loads. Permanent walls should be designed assuming a triangular distribution resulting from an equivalent fluid weight of 50 psf per foot of depth above the design groundwater table and 85 psf per foot below the design groundwater table. Lateral pressures from surcharge loads should be added as a uniform soil pressure equal to one-half the vertical pressure.

Unrestrained Walls

Walls free to rotate may be designed assuming active earth pressure conditions. Where applicable, we recommend walls be designed assuming an equivalent fluid weight of 30 psf per foot above the groundwater table and 77 psf per foot below the groundwater table. Full passive earth pressure requires potentially significant translation or rotation of a retaining wall. In an effort to limit movement of walls, a reduced passive earth pressure distribution equal to 155 psf per foot is recommended above the groundwater table and 135 psf per foot below the groundwater table. Passive resistance should be ignored within the frost zone.

Waterproofing

For portions of the proposed development not expected to extend below the design groundwater table, we recommend that a robust vapor barrier be provided beneath floor slabs and below-grade walls. Concrete admixtures such as Krystol Internal Membrane, Xypex Admix, or Hycrete may also be used in conjunction with the robust vapor barrier to provide added assurance with respect to water leakage during periods of precipitation.

Portions of the proposed structures extending below the design groundwater table should be completely encapsulated using a membrane-type waterproofing system that is fully bonded to the concrete. We recommend waterproofing such as those manufactured by GCP Applied Technologies, Carlisle Coatings and Waterproofing, and AVM Industries. We recommend that waterstops be installed at all concrete joints in addition to the waterproofing membrane. The use of bentonite waterproofing or negative side crystalline waterproofing is not recommended.

The selection of vapor barriers and waterproofing membranes should be coordinated with any environmental design/regulatory requirements (if any). New horizontally applied vapor barriers and waterproofing membranes should be installed on a suitable substrate. A 2-inch to 3-inch-thick mud slab placed over an approved subgrade to provide a smooth, uniform application surface is considered preferable, but the compact native soils are likely sufficient to meet the manufacturer’s standards for substrates. Vertically applied vapor barriers and waterproofing membranes should extend up to grade. Substrate preparation should be in accordance with the manufacturer’s recommendation.

Quality control is critical to a successful waterproofing project. The vapor barrier and waterproofing installation should be inspected daily, especially during placement of reinforcement for the floor slabs and pit walls. Any holes or tears should be repaired in accordance with the manufacturer’s recommendations and utility penetrations should be carefully sealed. All seams, including separations between wall and slab membranes should be checked for tightness. We recommend that the vapor barrier and waterproofing manufacturer inspect the waterproofing operations during construction and approve all work prior to placement of concrete. We also suggest discussing vapor barrier and waterproofing detailing with the selected manufacturer and recommend that a warrantee be obtained from both the manufacturer and installer to cover materials and workmanship.

CONSTRUCTION RECOMMENDATIONS

General Site Preparation

Prior to general excavation, the project site should be stripped of any vegetation and deleterious material. In addition, pavements, utilities, curbs, and near-surface remnant foundations should be completely removed within the proposed building footprint. Utilities may be abandoned in place outside the building footprint, provided they are properly filled to prevent void formation in the event of future breakage. Where utilities cannot be properly abandoned, they should be completely removed.

Loose near surface soils, and other soils containing appreciable amounts of organic matter or construction debris (bricks, concrete, metal, timber, etc.) should be stripped. Soils proposed for re-use, if any, should be stockpiled outside the limits of the excavation and should be segregated to avoid commingling of differing materials. Re-use of existing materials may require processing such as screening and may be restricted by environmental conditions. Measures for erosion and sediment control should be installed as required.

Excavation

General excavation is anticipated to typically extend to depths of between about 5 feet and 15 feet below grade. Local excavation for footings and pits may extending deeper. We anticipate that excavation of soils can be accomplished with conventional earthmoving equipment (i.e., track-hoes, etc.). Obstructions such as remnant foundations, abandoned and live utilities, rubble, and other construction debris should be anticipated when excavating and may require larger demolition equipment.

All excavations should be benched or sloped in accordance with applicable OSHA standards. Where required, temporary excavation support should be installed as per the recommendations presented herein.

Temporary Support of Excavation and Underpinning

Temporary support of excavation (SOE) will be required to achieve the general excavation depths, which are currently estimated to extend up to about 15 feet below grade, with footings and pits extending deeper locally. Based on the subsurface conditions, we expect that a conventional soldier pile and lagging system with bracing is suitable. Bracing may consist of external bracing (i.e., tiebacks), internal bracing (i.e., rakers, corner braces, struts, etc.), or a combination thereof. External bracing is considered preferrable as it will likely improve construction logistics within the excavation.

The design of the SOE system should consider the following minimum design parameters included in Table 3 below and following minimum loading conditions:

- Braced Excavations - Free draining or dewatered walls should be designed using a uniform pressure distribution of 20H psf, where H is the total height of the wall.
- Lateral pressures from surcharge loads should be added to the lateral earth pressure load. Surface surcharges should be added as an inverted triangle having a maximum pressure at the ground surface equal to one-half of the vertical surface load (minimum 300 psf). Lateral surcharge pressure can be reduced to zero at a depth of 15 feet below the ground surface.
- Lateral pressures resulting from adjacent structures (applicable for areas exterior of the building) should be determined using elastic methods and should be added to the above loads.
- Temporary construction loads are not considered herein and must be assessed on a case-by-case basis.

Table 3 – Soil and Groundwater Design Parameters (SOE)

Material	Parameter	Recommended Value
Fill	Moist Unit Weight	120 pcf
	Friction Angle	34-36 degrees
	Cohesion	0 psf
Dense Granular Soil	Moist Unit Weight	125 pcf
	Friction Angle	36-38 degrees
	Cohesion	0 psf

The SOE system must be designed by a professional engineer, licensed in the State of New York. Construction of the SOE system is subject to special inspection. The SOE system should not be installed until adequate controls for survey monitoring of pertinent adjacent structures are in place.

Temporary Construction Dewatering

Excavations are not anticipated to extend below groundwater and significant temporary construction dewatering is not expected. However, dewatering may be required to address surface water accumulation that may occur during precipitation events throughout construction. We anticipate that conventional sumps and pumps will be suitable for temporary groundwater control during construction.

Should excavations extend below groundwater, temporary construction dewatering will be needed to address the groundwater conditions. Conventional sumps and pumps may be used to control groundwater during excavation.

All groundwater discharges to municipal sewers exceeding 45 gpm will require a Long Island Well Permit pursuant to 6 NYCRR Part 602. Treatment may be required where the groundwater is found insufficient for meeting water quality standards dictated by the regulatory agencies having jurisdiction. Permitting from the requisite agencies can often take three to four months.

Subgrade Preparation and Protection

Foundation bearing surfaces should be level and clear of debris, standing or frozen water, and other deleterious materials. Soils should be excavated with care to avoid disturbance below the bearing elevation. We recommend that the final 12 inches of excavation be performed with flat bladed buckets in open areas and by hand in confined areas. The subgrade should be protected from the effects of frost, precipitation, groundwater and surface water run-off and construction until concrete is cast. As such, we recommend that the Contractor limit the area of exposed subgrade to prevent deterioration of the bearing conditions.

Areas disturbed by excavation and other areas found to be unacceptable should be re-compacted, or if necessary, excavated and replaced with compacted structural fill, free draining gravel/crushed stone, Controlled Low Strength Material (CLSM), or lean concrete. The resulting subgrade following placement of fill and compaction should be firm and unyielding under the weight of heavy equipment without evidence of rutting, pumping, or heaving. Vibratory and impact compaction shall not be performed on soils that are not within 2% of optimum moisture content. Compaction should be discontinued in the event that soils are observed to "pump or heave" due to wet conditions. Following compaction, we recommend slab subgrades should be capped with crushed stone fill or a mud slab to protect the subgrade from construction disturbance.

We recommend that a Professional Engineer licensed in the state of New York inspect and approve foundation subgrades prior to placement of fill or concrete, to verify that the subgrade material is adequate to provide the recommended allowable bearing pressure. We recommend foundation subgrade be inspected by Langan to verify bearing capacity and that footing bottoms and slab subgrades have been adequately prepared.

Fill Materials, Placement, and Compaction

Structural fill placed to establish the finished subgrade beneath new foundations and floor slabs, or as backfill behind new walls, should consist of a well-graded durable granular material having a maximum particle size of 4 inches in any dimension and no more than 10 percent by dry weight passing the No. 200 sieve. The gradation for all structural fill should follow that identified in NYS DOT Item 733-0401. All fill materials should be free of organics, clay, and other deleterious or compressible materials. The on-site natural sand conforming to the above gradation criteria can be used as controlled fill. All fill materials should be approved by the Geotechnical Engineer prior to placement. Lean concrete or controlled low strength material (CLSM) may be substituted for structural fill.

Where wet subgrades are present from surface water runoff, we recommend that initial placement of fill consist of free draining gravel or crushed stone in an effort to stabilize the subgrade prior to installation of structural fill soils. Free draining gravel or crushed stone should conform to the requirements of New York State Department of Transportation Item 605.0901, Underdrain Filter Type I or AASHTO No. 57 stone. These materials can be utilized to stabilize subgrades prior to placement of structural fill in cases where the subgrade materials are not free draining and have the potential to be disturbed by compaction.

Fill should be placed in uniform loose lifts not exceeding 12-inches in open areas and 6-inches in confined areas. All fill placed below foundations and slabs should be compacted to at least 95% of its maximum dry density as determined by ASTM D1557. Compaction within 5 feet of foundation walls should be performed using hand operated equipment. The water content at the time of compaction should be within 2 percent of the optimum value determined by ASTM D1557. No fill should be placed on areas where free water is standing or on frozen subsoil areas.

Fill should not be placed on subgrades not inspected and approved by the Geotechnical Engineer.

ADDITIONAL RECOMMENDATIONS

Additional Geotechnical Investigation

Additional geotechnical investigation will be needed to finalize geotechnical recommendations and to satisfy the NYSBC requirements for subsurface investigations. The recommended number of additional borings for each sub-phase are as follows:

- Phase 2A - 33 borings; 8 @ 100 feet and 25 @ 50 feet
- Phase 2B - 9 borings; 9 @ 100 feet
- Phase 2C - 8 borings; 8 @ 100 feet
- Phase 2D - 22 borings; 4 @ 100 feet and 18 @ 50 feet
- Phase 2E - 19 borings; 4 @ 100 feet and 15 @ 50 feet

Borings beyond those listed above may be required if proposed structure footprints change drastically or if supplemental borings are needed to supplement the available subsurface data for parking lots, roadway areas, and planting areas. We recommend installing additional groundwater wells within several of the completed borings to investigate any groundwater variations across the Phase 2 development site.

Monitoring Program

We recommend that a monitoring program be developed and incorporated into the Contract Documents to evaluate performance of adjacent buildings during construction. Monitoring should include means to measure vibrations as well as structural and ground movement. The type and locations of specific monitoring equipment, threshold values, and durations should be developed based on review of the anticipated construction means and methods in conjunction with proximity to existing structures and utilities with relation to the project site. The purpose of performing monitoring is to provide reasonable feedback to the engineer as to performance of the contractor with respect to protecting existing structures and utilities, and to assess any necessary changes to means and methods of construction.

The monitoring program may include optical surveying, seismographs (vibration monitoring), and crack gauges where warranted. The monitoring plan should address means and methods for measuring ground and structural deformation, and vibration levels. We recommend that all monitoring be performed by a third-party consultant independent of the contractor; however, the contractor should reserve the right to perform additional monitoring. Monitoring should be performed, at a minimum, throughout excavation and foundation construction.

Preconstruction Conditions Documentation

Preconstruction conditions documentation should be conducted for all structures located within 75 feet of the project site as well as adjacent sidewalks, pavement, and utilities. The documentation should be made about one month prior to commencing any construction activities.

The purpose of these observations is to provide photographic and/or video documentation representative of general existing conditions, and to identify obvious visual deficiencies. The preconditions observations should also identify areas requiring specific monitoring during construction. Structural integrity is not addressed in such documentation. This baseline information is often critical in the event of future damage claims resulting from construction activities. The preconstruction conditions documentation should be used to inform an observational and instrumentation monitoring program that can be used to evaluate the performance of adjacent structures and construction procedures.

SPECIAL INSPECTIONS

Excavation and foundation work are subject to various Special Inspections as per the requirements outlined in Chapter 17 of the NYSBC. Construction activities that require geotechnical quality control inspections generally include support of excavation, foundation and slab subgrades, fill placement and compaction. This work must be performed under the inspection of a qualified geotechnical engineer and should be performed by Langan. The inspecting engineer should be familiar with the subsurface conditions, as well as the proposed and existing construction onsite. All inspectors must demonstrate competence and relevant experience or training. Written documentation of competence and relevant experience or training must be provided by an approved agency as required by NYSBC Section 1704.2.1. In addition, while not required by the NYSBC, we recommend that regular inspections of foundation waterproofing (where implemented) be made to mitigate the potential for leaks resulting from damaged or improperly installed materials.

CONSTRUCTION DOCUMENTS

Technical specifications and design drawings should incorporate our recommendations to ensure that subsurface conditions and other geotechnical issues at the site are adequately addressed in the construction documents. Langan can prepare specification sections related to geotechnical issues such as earthwork, waterproofing, monitoring, groundwater control, and excavation support. Langan should also review foundation drawings and details, and all contractor submittals and construction procedures related to geotechnical work.

LIMITATIONS

The preliminary conclusions and recommendations provided in this report are based on subsurface conditions inferred from a limited number of borings and in situ testing performed within the development parcel. The recommendations provided herein are dependent upon one another and no recommendation should be followed independent of the others. The recommendations provided herein are considered preliminary. Design of each Phase 2 structure must include and be based on a complete, detailed investigation and geotechnical evaluation.

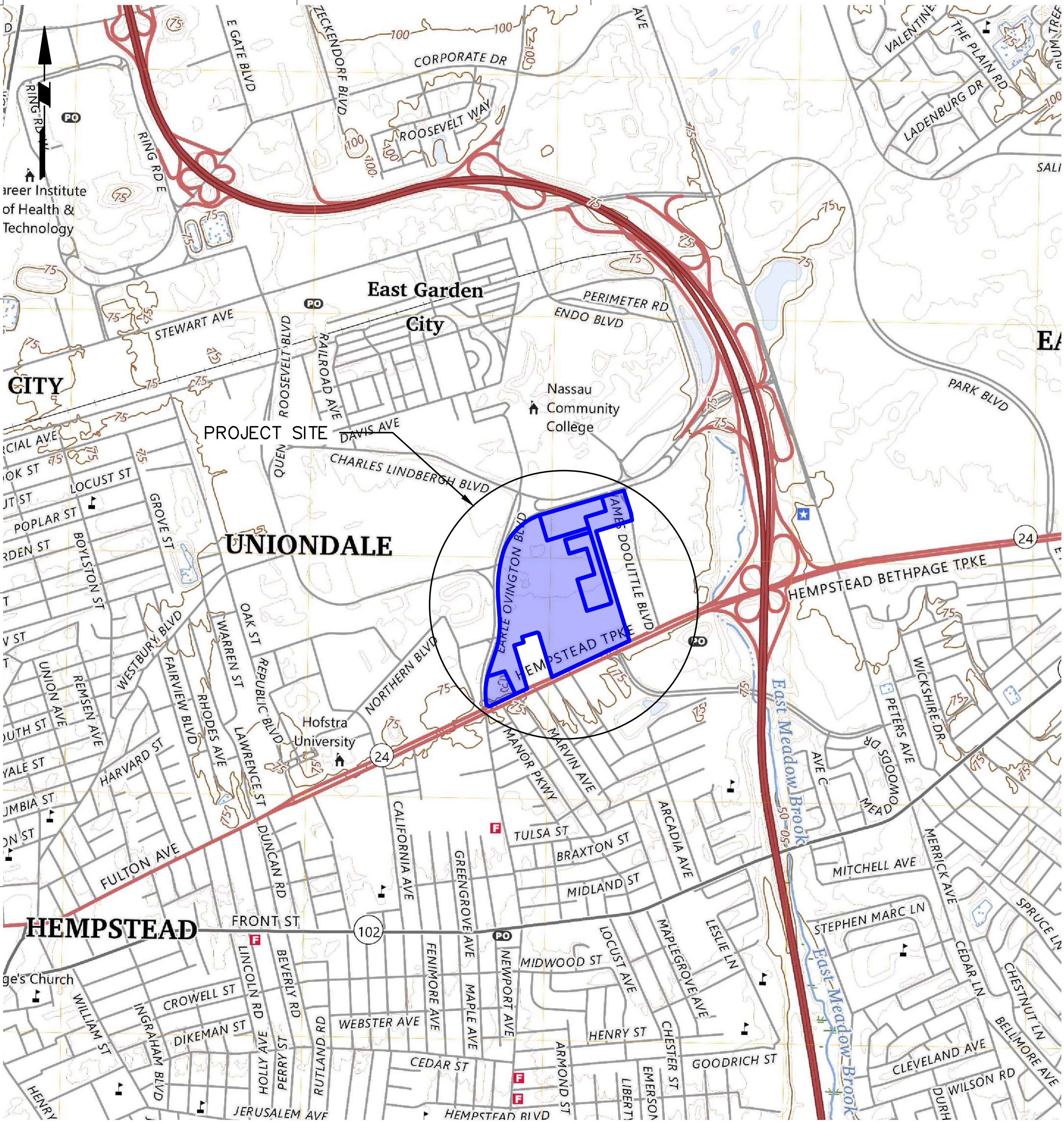
This report has been prepared to assist the owner, architect, and structural engineer in the preliminary design process and is only applicable to the envisioned project discussed herein. Any proposed changes in structures or their locations should be brought to our attention so that we can determine whether such changes affect our recommendations. Langan cannot assume responsibility for use of this report for any areas beyond the limits of this study or for any projects not specifically discussed herein. This report shall not be used for the design of temporary works including scaffolding, construction hoists, and crane pads.

Information on subsurface strata and groundwater levels shown on the logs represents conditions encountered only at the locations indicated and at the time of investigation. If different conditions are encountered during construction, they should immediately be brought to our attention for evaluation as this may affect our recommendations.

This report is not suitable for use in meeting the requirements outlined in the NYSBC for new building filings or alterations. Additional investigation and a full geotechnical engineering report will be required for filing purposes.

Environmental issues (such as potentially contaminated soil and groundwater) are outside the scope of this study.

FIGURES



SOURCE: "FREEPORT QUADRANGLE MAP, NEW YORK–NASSAU COUNTY 7.5–MINUTE SERIES", U.S. GEOLOGICAL SURVEY, 2023.

NOTE: ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

2000 0 1000 2000

SCALE: 1 INCH = 2000 FEET

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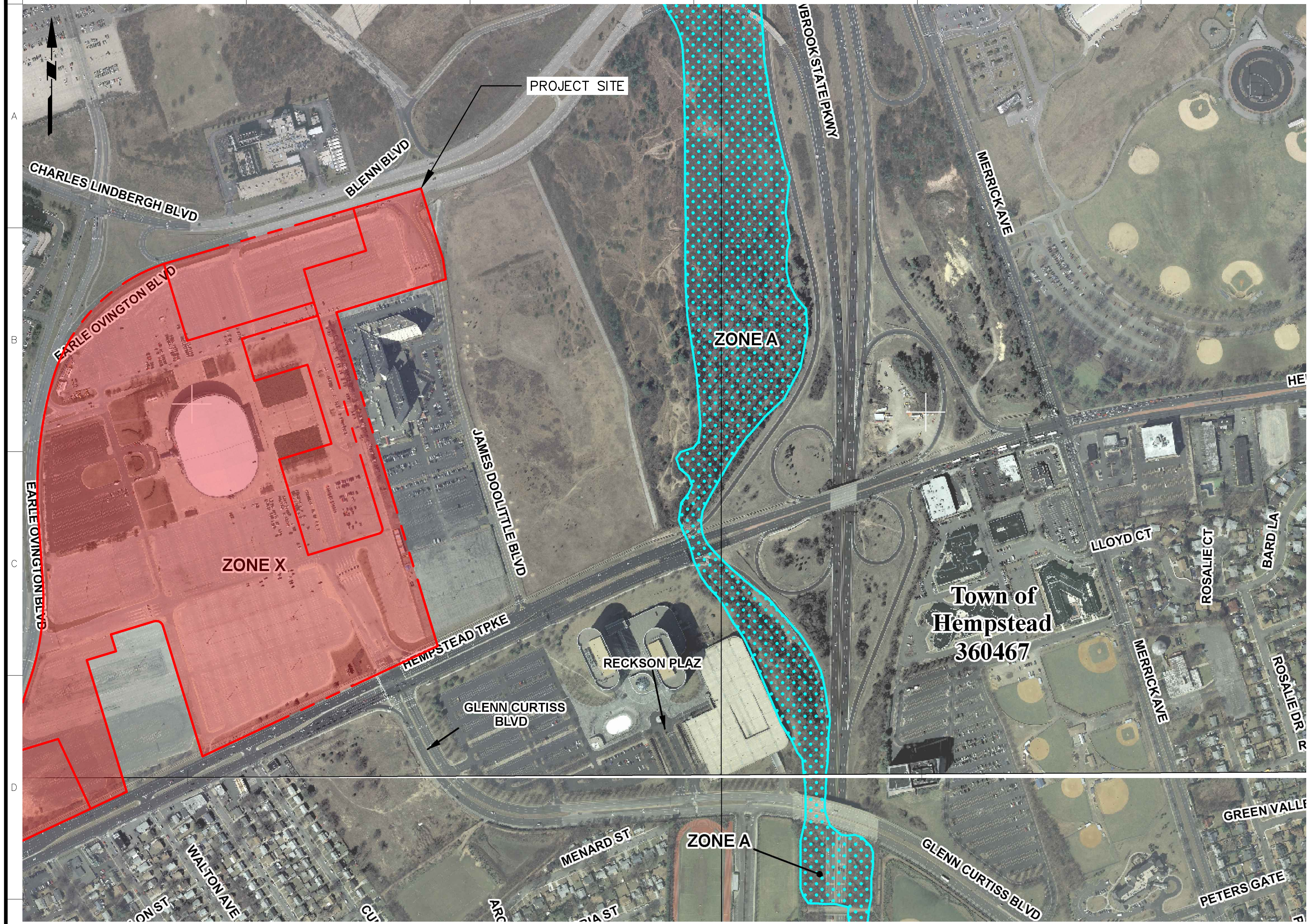
Project	Figure Title	Project No.	Figure
SANDS NEW YORK SECTION No. 44, BLOCK F LOTS No. 411, 412, 415, AND 351 TOWN OF HEMPSTEAD NASSAU COUNTY NEW YORK	SITE LOCATION MAP	170754501 Date: 10/13/2023 Drawn By: JJL Checked By: SS	1 Sheet 1 of 4

Filename: \\langan.com\data\NYC\data5\170754501\Project Data\CAD-Geotech\01\Sheet Files\Phase 2 GER\170754501-BI001-0101.dwg Date: 10/9/2023 Time: 23:32 User: mgillooley Style Table: Langan.stb Layout: Figure 1 - Site Location Map



SOURCE: FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM), TOWN OF HEMPSTEAD, NEW YORK, PANELS 227 AND 229 OF 366 [36059C0227G AND 36059C0229G], MAP REVISED, EFFECTIVE, 11 SEPTEMBER 2009.

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

Limit of Moderate Wave Action

513 Base Flood Elevation line and value; elevation in feet*

(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A Cross section line

3 — 3 Limited detail cross section line

23 - - - 23 Transect line

87°07'45", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere

$^{24}76^{000m}$N 1000-meter Universal Transverse Mercator grid values, zone 18

600000 FT 5000-foot grid values: statename State Plane coordinate system, spzone (FIPSZONE fipszone), spherename projection

DX5510 × Bench mark (see explanation in Notes to Users section of this FIRM panel)

• M1.5 River Mile

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

500 0 250 500

SCALE IN FEET

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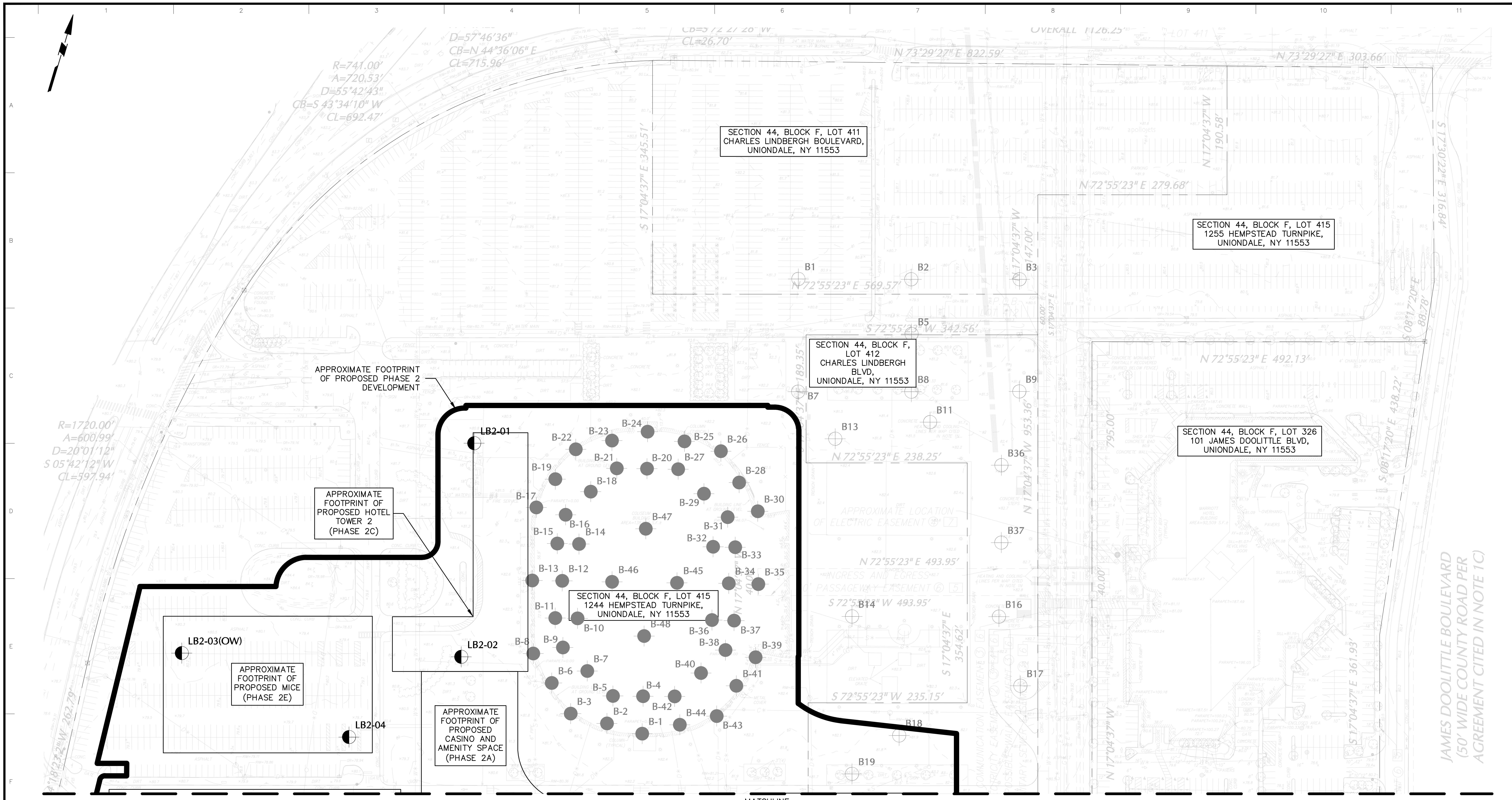
Project	Figure Title		Figure
SANDS NEW YORK SECTION No. 44, BLOCK F LOTS No. 411, 412, 415, AND 351 TOWN OF HEMPSTEAD NASSAU COUNTY NEW YORK	EFFECTIVE FEMA FLOOD HAZARD MAP	Project No. 170754501 Date 10/13/2023 Drawn By JJL Checked By SS	2 Sheet 2 of 4



GENERAL NOTES:

1. ALL ELEVATIONS SHOWN HEREIN ARE WITH RESPECT TO THE NORTH AMERICAN VERTICAL DATUM (NAVD88). TYPICAL DATUM CONVERSIONS ARE AS FOLLOWS:

   NGVD = NAVD88 + 1.1 FEET
   NASSAU COUNTY DATUM = NAVD88 + 1.1 FEET

2. SURVEY BASE MAP TAKEN FROM SURVEY TITLED "ALTA/NSPS LAND TITLE SURVEY, PROJECT MAXIMUS, SECTION NO. 44, BLOCK F, LOTS NO. 326, 401, 402, 411, 412, 415 AND 351, TOWN OF HEMPSTEAD, NASSAU COUNTY, NEW YORK", PREPARED BY LANGAN ENGINEERING, ENVIRONMENTAL, SURVEYING, LANDSCAPE ARCHITECTURE AND GEOLOGY, D.P.C., DATED 22 MAY 2023.
3. PHASE 2 FOOTPRINTS APPROXIMATED FROM ARCHITECTURAL PLAN TITLED "SANDS NEW YORK, 1255 HEMPSTEAD TURNPIKE, UNIONDALE, NY 11553, PHASE 2, ARCHITECTURAL SHEET P2-001 – SITE PLAN" PREPARED BY POPULOUS DATED 23 JUNE 2023.
4. ALL LANGAN BORINGS WERE DRILLED UNDER THE FULL-TIME INSPECTION OF A LANGAN REPRESENTATIVE. ALL DRILLING WAS PERFORMED BY CRAIG GEOTECHNICAL DRILLING CO. INC. FROM 6 SEPTEMBER 2023 TO 15 SEPTEMBER 2023.
5. DISTURBED SAMPLES WERE TAKEN USING A 2-INCH DIAMETER SPLIT-SPOON SAMPLER DRIVEN BY A 140-LB AUTOMATIC HAMMER FREE-FALLING 30-INCHES.
6. ALL BORING LOCATIONS WERE LAID OUT BY LANGAN REPRESENTATIVES BY MEASURING FROM EXISTING SITE FEATURES. ALL LOCATIONS SHOULD BE CONSIDERED APPROXIMATE.
7. THE MONITORING WELLS INSTALLED IN BORINGS DESIGNATED (OW) WERE USED TO MEASURE GROUNDWATER DEPTH DURING AND AFTER THE PERFORMANCE OF THE SUBSURFACE INVESTIGATION.
8. REFER TO APPENDIX A FOR BORING AND OBSERVATION WELL CONSTRUCTION LOGS.
9. REFER TO APPENDIX C FOR 1966 HISTORICAL BORINGS LOGS.
10. REFER TO APPENDIX D FOR 2014 HISTORICAL BORING LOGS.

LEGEND:

LB2-#	LANGAN PHASE 2 BORING LOCATION
B#	2014 HISTORICAL BORING LOCATION BY OTHERS
B-#	1966 HISTORICAL BORING LOCATION BY OTHERS
(OW)	DENOTES OBSERVATION WELL
	PROPERTY LINE

100 0 50 100
SCALE IN FEET

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Project
SANDS NEW YORK
SECTION No. 44, BLOCK F
LOTS No. 411, 412, 415 AND 351
TOWN OF HEMPSTEAD
NASSAU COUNTY NEW YORK

Figure Title
SUBSURFACE INVESTIGATION PLAN - PART A

Project No. 170754501
Date 10/13/2023
Drawn By JJL
Checked By SS
Figure 3
Sheet 3 of 4

PROJECT NO. 170754501
LANGAN

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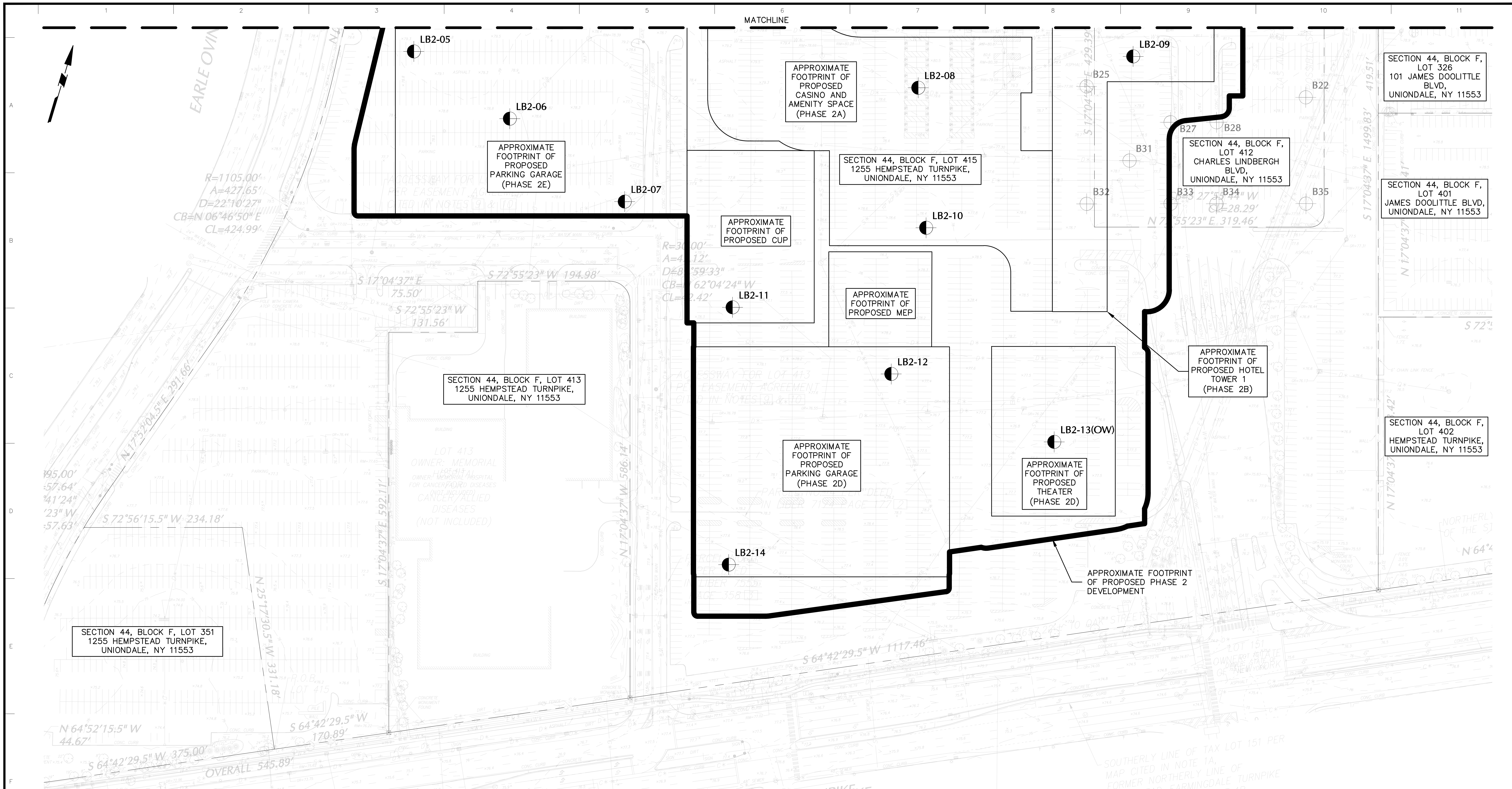

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6. ALL BORING LOCATIONS WERE LAID OUT BY LANGAN REPRESENTATIVES BY MEASURING FROM EXISTING SITE FEATURES. ALL LOCATIONS SHOULD BE CONSIDERED APPROXIMATE.
7. THE MONITORING WELLS INSTALLED IN BORINGS DESIGNATED (OW) WERE USED TO MEASURE GROUNDWATER DEPTH DURING AND AFTER THE PERFORMANCE OF THE SUBSURFACE INVESTIGATION.
8. REFER TO APPENDIX A FOR BORING AND OBSERVATION WELL CONSTRUCTION LOGS.
9. REFER TO APPENDIX C FOR 1966 HISTORICAL BORINGS LOGS.
10. REFER TO APPENDIX D FOR 2014 HISTORICAL BORING LOGS.

LEGEND:

LB2-#	LANGAN PHASE 2 BORING LOCATION
B#	2014 HISTORICAL BORING LOCATION BY OTHERS
B-#	1966 HISTORICAL BORING LOCATION BY OTHERS
(OW)	DENOTES OBSERVATION WELL
	PROPERTY LINE

100 0 50 100
SCALE IN FEET

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Project
SANDS NEW YORK
SECTION No. 44, BLOCK F
LOTS No. 411, 412, 415 AND 351
TOWN OF HEMPSTEAD
NASSAU COUNTY NEW YORK

Figure Title
SUBSURFACE INVESTIGATION PLAN - PART B

Project No. 170754501
Date 10/13/2023
Drawn By JJL
Checked By SS
Figure 4
Sheet 4 of 4

PROJECT NO. 170754501

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APPENDIX A

(2023 LANGAN PHASE 2 BORING LOGS,
HAMMER EFFICIENCY, AND WELL LOGS)

LANGAN Log of Boring **LB2-01** Sheet 1 of 4

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 81.2 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 9/11/2023	Date Finished: 9/11/2023
Drilling Equipment: CME75		Completion Depth: 102.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 22	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A	Completion N/A; 24 HR. N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Ed Flanagan	
Sampler: 2in OD Split Spoon		Field Engineer: Jonathan Negron	
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30		

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+81.2								
+80.7	6" TOPSOIL	0						9/11/2023 Hand clear to 5ft. Collect Grab Sample G-1 from 0.5ft to 5ft.
	Tannish reddish brown to light gray silty coarse to fine SAND (moist) [FILL]	0.5						
+76.2	Tannish brown coarse to fine SAND, some Silt, some fine Gravel (moist) [SM]	5	S-1	SS	14	6, 10, 13, 12	29	Take S-1 from 5ft to 7ft.
	Tannish orangish brown coarse to fine SAND, some Silt, some fine Gravel (moist) [SM]	7	S-2	SS	13	8, 10, 6, 9	20	Take S-2 from 7ft to 9ft. -#4 = 74.4% -#200 = 17.1% Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
	Tannish orangish brown coarse to fine SAND, some Silt, some fine Gravel (dry) [SM]	9	S-3	SS	12	12, 12, 16, 18	35	Take S-3 from 9ft to 11ft.
	Tannish orangish brown coarse to fine SAND, trace Silt, trace fine Gravel (dry) [SP-SM]	11	S-4	SS	6	18, 22, 19, 19	55	Take S-4 from 11ft to 13ft. Drill to 15ft. Smooth drilling, brown wash.
	Tannish orangish brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	15	S-5	SS	9	8, 9, 13, 12	32	Take S-5 from 15ft to 17ft. Drill to 20ft. Slight rig chatter, brown wash.
	Tannish brown coarse to fine SAND, trace Silt (moist) [SP-SM]	20	S-6	SS	9	13, 13, 17, 16	48	Take S-6 from 20ft to 22ft. Drill to 25ft. Slight rig chatter, brown wash.

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

Template: Log-BH-NYC-GEO; Strip: BH-GEO (5); Printed on 10/11/2023

LANGAN

Log of Boring **LB2-01**

Project	Sands New York	Project No.	170754501
Location	Nassau Coliseum	Elevation and Datum	Approx. el. 81.2 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+57.2		24						
	Tannish brown gravelly coarse to fine SAND, trace Silt (moist) [SP]	25–27	S-7	SS	8	5, 5, 7, 8	19	Take S-7 from 25ft to 27ft. -#4 = 57.8% -#200 = 3% Drill to 30ft. Smooth drilling, brown wash.
	Tannish brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	30–32	S-8	SS	11	9, 10, 12, 14	35	Take S-8 from 30ft to 32ft. Drill to 35ft. Slight rig chatter, brown wash.
	Tannish brown medium to fine SAND, trace Silt, trace coarse Sand, trace fine Gravel (wet) [SP-SM]	35–37	S-9	SS	11	10, 8, 8, 9	27	Take S-9 from 35ft to 37ft. Drill to 40ft. Smooth drilling, brown wash.
	Tannish brown medium to fine SAND, trace coarse Sand, trace Silt, trace fine Gravel (wet) [SP-SM]	40–42	S-10	SS	11	9, 7, 8, 9	25	Take S-10 from 40ft to 42ft. Drill to 45ft. Smooth drilling, brown wash.
	Tannish brown medium to fine SAND, trace coarse Sand, trace Silt, some fine Gravel (wet) [SP]	45–47	S-11	SS	13	9, 7, 9, 12	27	Take S-11 from 45ft to 47ft. -#4 = 85.5% -#200 = 3.2% Drill to 50ft. Smooth drilling, brown wash.
	Tannish brown medium to fine SAND, trace Silt, trace coarse Sand, trace fine Gravel (wet) [SP-SM]	50–52	S-12	SS	13	16, 10, 13, 13	39	Take S-12 from 50ft to 52ft. Drill to 55ft. Smooth drilling, brown wash.
		54						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN

Log of Boring **LB2-01**

Project: Sands New York	Project No.: 170754501
Location: Nassau Coliseum	Elevation and Datum: Approx. el. 81.2 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+27.2		54						
	Tannish brown medium to fine SAND, trace Silt, trace coarse Sand (wet) [SP-SM]	55–57	S-13	SS	12	9 / 9 / 10 / 9	32	Take S-13 from 55ft to 57ft. Drill to 60ft. Smooth drilling, brown wash.
	Tannish brown fine SAND, trace Silt, trace coarse to medium Sand (wet) [SP-SM]	60–62	S-14	SS	13	9 / 9 / 16 / 18	42	Take S-14 from 60ft to 62ft. Drill to 65ft. Smooth drilling, brown wash.
	Tannish reddish brown to light gray silty fine SAND, trace medium Sand (wet) [SM]	65–67	S-15	SS	17	3 / 4 / 8 / 10	20	Take S-15 from 65ft to 67ft. Drill to 70ft. Smooth drilling, brown wash.
	Tannish reddish brown to light gray silty fine SAND (wet) [SM]	70–72	S-16	SS	16	9 / 7 / 8 / 11	25	Take S-16 from 70ft to 72ft. Drill to 75ft. Smooth drilling, brown wash.
	Tannish brown fine SAND, trace Silt, trace medium Sand (wet) [SP-SM]	75–77	S-17	SS	18	14 / 14 / 13 / 10	46	Take S-17 from 75ft to 77ft. Drill to 80ft. Slight rig chatter, brown wash.
	Tannish brown fine SAND, trace Silt, trace medium Sand (wet) [SP-SM]	80–82	S-18	SS	14	17 / 13 / 15 / 15	47	Take S-18 from 80ft to 82ft. Drill to 85ft. Smooth drilling, brown wash.
		84						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN

Log of Boring **LB2-01**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.2 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr- resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
-2.8		84						
	Tannish brown fine SAND, trace Silt, trace medium Sand (wet) [SP-SM]	85–87	S-19	SS	15	15, 12, 19, 22	52	Take S-19 from 85ft to 87ft.
		87–90						Drill to 90ft. Smooth drilling, brown wash.
-8.8	Reddish tannish brown to dark gray CLAY, fine Sand lenses, trace Silt (wet) [CL]	90–92	S-20	SS	16	4, 5, 9, 12	24	Take S-20 from 90ft to 92ft. LL = 38% PL = 21% PI = 17%
		92–95						Drill to 95ft. Smooth drilling, brown wash.
	Dark gray CLAY, fine Sand lenses, trace Silt (wet) [CL]	95–96	S-21A	SS	21	16, 14, 17, 16	52	Take S-21 from 95ft to 97ft.
	Reddish tannish brown CLAY, fine Sand lenses, trace Silt (wet) [CL]	96–97	S-21B	SS				
		97–100						Drill to 100ft. Smooth drilling, brown wash.
-18.8	Tannish orangish brown clayey fine SAND, some Silt, trace medium Sand (wet) [SC]	100	S-22A	SS	24	7, 4, 11, 18	25	Take S-22 from 100ft to 102ft.
-19.5	Tannish orangish brown to gray CLAY, trace Silt (wet) [CL]	101	S-22B	SS				
	Dark gray CLAY, fine Sand lenses, trace Silt (wet) [CL]	101–102	S-22C	SS				
-20.8	End of Boring at 102ft.	102						Bottom of boring at 102ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
		103–114						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

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Log of Boring **LB2-02** Sheet 1 of 2

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 81.9 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 9/8/2023	Date Finished: 9/8/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 11	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 14.0	Water Level (ft.): First N/A	Completion N/A; 24 HR. N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Shane Frick	
Sampler: 2in OD Split Spoon			
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Field Engineer: Thomas Keane	

Elev. (ft) +81.9	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	6" ASPHALT	0						9/8/2023 Hand clear to 6ft.
+81.4	Dark gray coarse to fine SAND, some fine Gravel, trace Silt (moist) [FILL]	0.5						Collect Grab Sample G-1 from 0.5ft to 6ft.
+75.9	Dark gray coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	6	S-1A	SS	17	5, 7	22	Take S-1 from 6ft to 8ft.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	7	S-1B	SS		11, 10		
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	8	S-2	SS	9	10, 14, 18, 21	39	Take S-2 from 8ft to 10ft.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	10	S-3	SS	14	16, 19, 21, 13	52	Take S-3 from 10ft to 12ft.
		12						Drive casing to 14ft. Drill to 15ft. Smooth drilling, brown wash.
	Light brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP]	15	S-4	SS	9	7, 13, 10, 12	32	Take S-4 from 15ft to 17ft. -#4 = 86.1% -#200 = 3.4%
		17						Drill to 20ft. Slight rig chatter. Brown wash.
	Light brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	20	S-5	SS	8	9, 15, 17, 19	49	Take S-5 from 20ft to 22ft.
		22						Drill to 25ft. Slight rig chatter. Brown wash.
		24						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN Log of Boring **LB2-02**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 81.9 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale (ft)	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+57.9		24						
	Light brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	25–27	S-6	SS	8	9, 8, 8, 11	25	Take S-6 from 25ft to 27ft.
		27–30						Drill to 30ft. Slight rig chatter. Brown wash.
	Light brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	30–32	S-7	SS	6	8, 9, 13, 14	34	Take S-7 from 30ft to 32ft.
		32–35						Drill to 35ft. Slight rig chatter. Brown wash.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	35–37	S-8	SS	10	4, 7, 8, 9	24	Take S-8 from 35ft to 37ft.
		37–40						Drill to 40ft. Slight rig chatter. Brown wash.
	Light brown medium to fine SAND, trace coarse Sand, trace Silt, trace fine Gravel (moist) [SP-SM]	40–42	S-9	SS	8	6, 10, 14, 11	39	Take S-9 from 40ft to 42ft.
		42–45						Drill to 45ft. Slight rig chatter. Brown wash.
	Light brown medium to fine SAND, trace Silt, trace coarse Sand (moist) [SP-SM]	45–47	S-10	SS	9	6, 9, 10, 10	31	Take S-10 from 45ft to 47ft.
		47–50						Drill to 50ft. Smooth drilling. Brown wash.
	Light brown medium to fine SAND, trace Silt, trace coarse Sand (moist) [SP-SM]	50–52	S-11	SS	12	15, 14, 16, 15	49	Take S-11 from 50ft to 52ft.
+29.9	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
		53–54						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 80.2 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 9/8/2023	Date Finished: 9/8/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 12	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 14.0	Water Level (ft.): First N/A	Completion 33.5; 24 HR. N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Shane Frick	
Sampler: 2in OD Split Spoon			
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Field Engineer: Thomas Keane	

Elev. (ft) +80.2	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+79.7	ASPHALT	0						9/8/2023 Hand clear to 5ft.
	Dark gray to brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [FILL]	1–4						Collect Grab Sample G-1 from 0.5ft to 5ft.
+75.2	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	5–7	S-1	SS	9	9, 10, 9, 14	23	Take S-1 from 5ft to 7ft.
	Light brown sandy fine GRAVEL, trace Silt (moist) [GP]	7–9	S-2	SS	24	16, 19, 27, 31	56	Take S-2 from 7ft to 9ft.
	Light brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	9–11	S-3	SS	9	11, 9, 9, 7	22	Take S-3 from 9ft to 11ft.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP]	11–13	S-4	SS	10	12, 12, 11, 11	30	Take S-4 from 11ft to 13ft. -#4 = 89.3% -#200 = 4.6%
		13–15						Drive casing to 14ft. Drill to 15ft. Smooth drilling, gray wash.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	15–17	S-5	SS	8	11, 12, 12, 12	33	Take S-5 from 15ft to 17ft.
		17–20						Drill to 20ft. Slight rig chatter. Brown wash.
	Light brown gravelly coarse to fine SAND, trace Silt (moist) [SP-SM]	20–22	S-6	SS	9	9, 12, 10, 10	34	Take S-6 from 20ft to 22ft. -#4 = 66.5% -#200 = 6.5%
		22–24						Drill to 25ft. Slight rig chatter. Brown wash.

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN Log of Boring **LB2-03(OW)**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 80.2 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+56.2		24						
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	25–27	S-7	SS	6	5, 6, 10, 10	25	Take S-7 from 25ft to 27ft.
		27–30						Drill to 30ft. Slight rig chatter. Brown wash.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	30–32	S-8	SS	10	12, 16, 12, 10	43	Take S-8 from 30ft to 32ft.
		32–35						Drill to 35ft. Slight rig chatter. Brown wash.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	35–37	S-9	SS	9	6, 6, 7, 8	21	Take S-9 from 35ft to 37ft.
		37–40						Drill to 40ft. Slight rig chatter. Brown wash.
	Light brown medium to fine SAND, trace coarse Sand, trace Silt (moist) [SP-SM]	40–42	S-10	SS	11	7, 12, 9, 9	34	Take S-10 from 40ft to 42ft.
		42–45						Drill to 45ft. Slight rig chatter. Brown wash.
	Light brown medium to fine SAND, trace coarse Sand, trace Silt (moist) [SP-SM]	45–47	S-11	SS	14	6, 14, 19, 16	53	Take S-11 from 45ft to 47ft.
		47–50						Drill to 50ft. Slight rig chatter. Brown wash.
	Light brown medium to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	50–52	S-12	SS	15	9, 11, 11, 11	36	Take S-12 from 50ft to 52ft.
+28.2	End of Boring at 52ft.	52–54						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN

Log of Boring **LB2-04**

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 80.8 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 9/8/2023	Date Finished: 9/8/2023
Drilling Equipment: CME75		Completion Depth: 102.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 22; Undisturbed 0; Core 0	
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A; Completion N/A; 24 HR. N/A	
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Ed Flanagan	
Sampler: 2in OD Split Spoon		Field Engineer: Jonathan Negron	
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30		

Elev. (ft) +80.8	Sample Description	Depth Scale
	6" ASPHALT	0
+80.3	Tannish orangish brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [FILL]	0.5
+75.8	Tannish orangish brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	5
	Tannish orangish brown coarse to fine SAND, trace Silt, some fine Gravel (dry) [SP]	7
	Tannish orangish brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	9
	Tannish orangish brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	11
	Tannish orangish brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	15
	Tannish orangish brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	20

Sample Data

Depth	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)
5–7	S-1	SS	23	1, 1, 5, 17	8
7–9	S-2	SS	16	24, 18, 24, 24	53
9–11	S-3	SS	12	10, 11, 12, 13	29
11–13	S-4	SS	9	8, 13, 13, 21	35
15–17	S-5	SS	5	11, 19, 21, 20	57
20–22	S-6	SS	7	11, 13, 17, 20	48

Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)

9/8/2023
Hand clear to 5ft.
Collect Grab Sample G-1 from 0.5ft to 5ft.
Take S-1 from 5ft to 7ft.
Take S-2 from 7ft to 9ft.
-#4 = 80.2%
-#200 = 4.1%
Drive casing to 9ft.
Drill to 9ft. Smooth drilling, brown wash.
Take S-3 from 9ft to 11ft.
Take S-4 from 11ft to 13ft.
Drill to 15ft. Smooth drilling, brown wash.
Take S-5 from 15ft to 17ft.
Drill to 20ft. Smooth drilling, brown wash.
Take S-6 from 20ft to 22ft.
-#4 = 76.8%
-#200 = 5.4%
Drill to 25ft. Smooth drilling, brown wash.

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN Log of Boring **LB2-04** Sheet 2 of 4

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 80.8 ± (NAVD 88)

Elev. (ft) +56.8	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	Tannish brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	25–27	S-7	SS	7	8 8 8 10	26	Take S-7 from 25ft to 27ft. Drill to 30ft. Smooth drilling, brown wash.
	Tannish orangish brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	30–32	S-8	SS	10	10 14 19 24	53	Take S-8 from 30ft to 32ft. Drill to 35ft. Smooth drilling, brown wash.
	Tannish orangish brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	35–37	S-9	SS	10	11 10 13 12	39	Take S-9 from 35ft to 37ft. Drill to 40ft. Smooth drilling, brown wash.
	Tannish orangish brown medium to fine SAND, trace coarse Sand, trace Silt (moist) [SP-SM]	40–42	S-10	SS	11	13 14 14 13	47	Take S-10 from 40ft to 42ft. Drilled to 45 feet. Smooth drilling, brown wash.
	Tannish orangish brown medium to fine SAND, trace coarse Sand, trace Silt (wet) [SP-SM]	45–47	S-11	SS	10	14 13 15 14	47	Take S-11 from 45ft to 47ft. Drill to 50ft. Smooth drilling, brown wash.
	Tannish orangish brown medium to fine SAND, trace coarse Sand, trace Silt (wet) [SP-SM]	50–52	S-12	SS	12	12 12 16 14	47	Take S-12 from 50ft to 52ft. Drill to 55ft. Smooth drilling, brown wash.

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN Log of Boring **LB2-04**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 80.8 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+26.8		54						
	Tannish orangish brown medium to fine SAND, trace coarse Sand, trace Silt (wet) [SP-SM]	55–57	S-13	SS	14	11, 11, 12, 11	39	Take S-13 from 55ft to 57ft. Drill to 60ft. Smooth drilling, brown wash.
+20.8	Tannish brown silty CLAY, fine Sand lenses (wet) [CL]	60–62	S-14	SS	21	3, 4, 6, 6	17	Take S-14 from 60ft to 62ft. LL = 41% PL = 24% PI = 17% Drill to 65ft. Smooth drilling, brown wash.
+15.8	Tannish orangish brown clayey fine SAND, trace Silt (wet) [SC]	65–67	S-15	SS	17	9, 12, 14, 16	44	Take S-15 from 65ft to 67ft. Drill to 70ft. Smooth drilling, brown wash.
	Tannish brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	70–72	S-16	SS	14	8, 8, 9, 9	29	Take S-16 from 70ft to 72ft. Drill to 75ft. Smooth drilling, brown wash.
	Tannish brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	75–77	S-17	SS	14	14, 14, 16, 16	51	Take S-17 from 75ft to 77ft. Drill to 80ft. Smooth drilling, brown wash.
	Tannish brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	80–82	S-18	SS	16	15, 16, 20, 23	61	Take S-18 from 80ft to 82ft. Drill to 85ft. Smooth drilling, brown wash.
		84						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

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Log of Boring **LB2-04** Sheet 4 of 4

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 80.8 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
-3.2		84						
	Tannish brown to grayish brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	85–87	S-19	SS	16	10, 9, 10, 12	32	Take S-19 from 85ft to 87ft. Drill to 90ft. Smooth drilling, brown wash.
	Tannish orangish brown fine SAND, trace Silt, trace medium Sand (wet) [SP-SM]	90–92	S-20	SS	17	7, 8, 19, 18	46	Take S-20 from 90ft to 92ft. Drill to 95ft. Smooth drilling, brown wash.
	Tannish orangish brown to grayish brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	95–97	S-21	SS	17	7, 5, 7, 12	20	Take S-21 from 95ft to 97ft. -#4 = 100% -#200 = 12% Drill to 100ft. Smooth drilling, brown wash.
	Tannish orangish brown to grayish brown fine SAND, trace Silt (wet) [SP-SM]	100–102	S-22	SS	17	7, 9, 9, 10	30	Take S-22 from 100ft to 102ft.
-21.2	End of Boring at 102ft.	102						Bottom of boring at 102ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

Template: Log-BH-NYC-GEO; Strip: BH-GEO (5); Printed on 10/11/2023

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Log of Boring LB2-05

Project	Sands New York	Project No.	170754501
Location	Nassau Coliseum	Elevation and Datum	Approx. el. 79.6 ± (NAVD 88)
Drilling Company	Craig Geotechnical Drilling	Date Started / Date Finished	9/7/2023 / 9/7/2023
Drilling Equipment	CME75	Completion Depth / Rock Depth	52.0 ft / N/E
Size and Type of Bit	3-7/8in Tricone Roller Bit	Number of Samples	Disturbed 12; Undisturbed 0; Core 0
Casing Diameter (in)	4 Flush Joint Steel; Casing Depth (ft) 9.0	Water Level (ft.)	First N/A; Completion N/A; 24 HR. N/A
Casing Hammer	Automatic; Weight (lbs) 140; Drop (in) 30	Drilling Foreman	Ed Flanagan
Sampler	2in OD Split Spoon	Field Engineer	Jonathan Negron
Sampler Hammer	Automatic; Weight (lbs) 140; Drop (in) 30		

Elev. (ft) at top: +79.6

Elev. (ft)	Depth (ft)	Sample Description
+79.1	0	6" ASPHALT
	0.5	Tannish orangish brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [FILL]
+74.6	5	Tannish orangish brown coarse to fine SAND, trace Silt, some fine Gravel (dry) [SP]
	7	Tannish orangish brown coarse to fine SAND, trace Silt, some fine Gravel (dry) [SP-SM]
	9	Tannish orangish brown coarse to fine SAND, trace Silt, some fine Gravel (dry) [SP-SM]
	11	Tannish orangish brown coarse to fine SAND, trace Silt, some fine Gravel (dry) [SP-SM]
	15	Tannish orangish brown gravelly coarse to fine SAND, trace Silt (dry) [SP]
	20	Tannish orangish brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]

Depth (ft)	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
0						9/7/2023 Hand clear to 5ft.
3						Collect Grab Sample G-1 from 0.5 ft to 5ft.
5–7	S-1	SS	14	18, 15, 15, 15	38	Take S-1 from 5ft to 7ft. -#4 = 74.4% -#200 = 3.8%
7–9	S-2	SS	17	18, 17, 18, 16	44	Take S-2 from 7ft to 9ft. Drive casing to 9ft. Drill to 9ft. Smooth drilling, brown wash.
9–11	S-3	SS	11	9, 10, 10, 12	25	Take S-3 from 9ft to 11ft.
11–13	S-4	SS	9	11, 12, 13, 14	34	Take S-4 from 11ft to 13ft.
13						Drill to 15ft. Smooth drilling, brown wash.
15–17	S-5	SS	10	11, 9, 10, 12	27	Take S-5 from 15ft to 17ft. -#4 = 67.6% -#200 = 4.4%
17						Drill to 20ft. Smooth drilling, brown wash.
20–22	S-6	SS	11	13, 11, 12, 16	37	Take S-6 from 20ft to 22ft.
22						Drill to 25ft. Smooth drilling, brown wash.

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

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Log of Boring **LB2-05**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 79.6 ± (NAVD 88)

Elev. (ft) at 24 ft: +55.6

Depth (ft)	Sample Description	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
25–27	Tannish orangish brown coarse to fine SAND, trace Silt, some fine Gravel (dry) [SP-SM]	S-7	SS	10	13, 10, 14, 13	39	Take S-7 from 25ft to 27ft. Drill to 30ft. Smooth drilling, brown wash.
30–32	Tannish orangish brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	S-8	SS	11	10, 12, 12, 13	39	Take S-8 from 30ft to 32ft. Drill to 35ft. Slight rig chatter, brown wash.
35–37	Tannish orangish brown coarse to fine SAND, trace Silt (moist) [SP-SM]	S-9	SS	9	5, 7, 7, 6	24	Take S-9 from 35ft to 37ft. Drill to 40ft. Smooth drilling, brown wash.
40–42	Tannish brown medium to fine SAND, trace Silt, trace coarse Sand (wet) [SP-SM]	S-10	SS	9	19, 8, 10, 7	30	Take S-10 from 40ft to 42ft. Drill to 45ft. Smooth drilling, brown wash.
45–47	Tannish brown medium to fine SAND, trace Silt, trace coarse Sand, trace fine Gravel (wet) [SP]	S-11	SS	9	7, 5, 6, 5	19	Take S-11 from 45ft to 47ft. -#4 = 96.6% -#200 = 3.7%. Drill to 50ft. Smooth drilling, brown wash.
50–52	Tannish brown medium to fine SAND, trace Silt, trace coarse Sand (wet) [SP-SM]	S-12	SS	11	13, 11, 10, 10	35	Take S-12 from 50ft to 52ft.
52	End of Boring at 52ft. (Elev. +27.6)						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN Log of Boring **LB2-06** Sheet 1 of 2

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 78.7 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 9/7/2023	Date Finished: 9/7/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 12; Undisturbed 0; Core 0	
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 14.0	Water Level (ft.): First N/A; Completion N/A; 24 HR. N/A	
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Shane Frick	
Sampler: 2in OD Split Spoon		Field Engineer: Thomas Keane	
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30		

Elev. (ft) +78.7	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+78.2	6" ASPHALT	0						9/7/2023 Hand clear to 5ft. Collect Grab Sample G-1 from 0.5ft to 5ft.
	Dark gray coarse to fine SAND, trace Silt, trace fine Gravel [FILL]	0.5						
+73.7	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	5	S-1	SS	14	18, 21, 24, 27	55	Take S-1 from 5ft to 7ft.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	7	S-2	SS	10	31, 29, 36, 38	79	Take S-2 from 7ft to 9ft.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	9	S-3	SS	11	16, 12, 11, 11	28	Take S-3 from 9ft to 11ft.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	11	S-4	SS	13	16, 18, 21, 14	51	Take S-4 from 11ft to 13ft. -#4 = 90.7% -#200 = 6.1%
		13						Drive casing to 14ft. Drill to 15ft. Heavy rig chattering, gray wash.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	15	S-5	SS	8	6, 8, 8, 7	22	Take S-5 from 15ft to 17ft.
		17						Drill to 20ft. Slight rig chatter. Brown wash.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	20	S-6	SS	9	18, 23, 16, 12	60	Take S-6 from 20ft to 22ft.
		22						Drill to 25ft. Heavy rig chatter. Brown wash.

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN Log of Boring **LB2-06**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 78.7 ± (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	+54.7		24						
		Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	25–27	S-7	SS	6	11, 16, 15, 14	48	Take S-7 from 25ft to 27ft. Drill to 30ft. Slight rig chatter. Brown wash.
		Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP]	30–32	S-8	SS	4	6, 7, 7, 10	22	Take S-8 from 30ft to 32ft. -#4 = 71.3% -#200 = 4% Drill to 35ft. Slight rig chatter. Brown wash.
		Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	35–37	S-9	SS	9	9, 12, 13, 9	40	Take S-9 from 35ft to 37ft. Drill to 40ft. Slight rig chatter. Brown wash.
		Light brown medium to fine SAND, trace coarse Sand, trace Silt (moist) [SP-SM]	40–42	S-10	SS	11	9, 14, 15, 14	47	Take S-10 from 40ft to 42ft. Drill to 45ft. Slight rig chatter. Brown wash.
		Light brown medium to fine SAND, trace coarse Sand, trace Silt (moist) [SP-SM]	45–47	S-11	SS	10	11, 11, 8, 9	31	Take S-11 from 45ft to 47ft. Drill to 50ft. Slight rig chatter. Brown wash.
		Light brown medium to fine SAND, trace coarse Sand, trace Silt (moist) [SP-SM]	50–52	S-12	SS	11	9, 11, 11, 12	36	Take S-12 from 50ft to 52ft.
	+26.7	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
			54						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN

Log of Boring **LB2-07**

Project: Sands New York	Project No.: 170754501
Location: Nassau Coliseum	Elevation and Datum: Approx. el. 77.7 ± (NAVD 88)
Drilling Company: Craig Geotechnical Drilling	Date Started: 9/7/2023 — Date Finished: 9/7/2023
Drilling Equipment: CME75	Completion Depth: 52.0 ft — Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit	Number of Samples: Disturbed 11 — Undisturbed 0 — Core 0
Casing Diameter (in): 4 Flush Joint Steel — Casing Depth (ft): 14.0	Water Level (ft.): First N/A — Completion N/A — 24 HR. N/A
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Shane Frick
Sampler: 2in OD Split Spoon	Field Engineer: Thomas Keane
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Elev. (ft) +77.7	Depth (ft)	Sample Description
+77.2	0	ASPHALT
		Dark gray sandy fine GRAVEL, trace Silt (moist) [FILL]
+72.7	5	Brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]
	7	Brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]
	9	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP]
	15	Light brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]
	20	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]

Depth (ft)	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
0						9/7/2023 Hand clear to 5ft.
3						Collect Grab Sample G-1 from 0.5ft to 5ft.
5–7	S-1	SS	15	29, 32, 31, 18	77	Take S-1 from 5ft to 7ft.
7–9	S-2	SS	24	21, 23, 17, 15	49	Take S-2 from 7ft to 9ft.
9–11	S-3	SS	10	14, 15, 16, 16	38	Take S-3 from 9ft to 11ft. -#4 = 92.2% -#200 = 3.6%
11						Drive casing to 14ft. Drill to 15ft. Smooth drilling, gray wash.
15–17	S-4	SS	8	10, 16, 9, 10	34	Take S-4 from 15ft to 17ft.
17						Drill to 20ft. Slight rig chatter. Brown wash.
20–22	S-5	SS	11	14, 18, 21, 23	60	Take S-5 from 20ft to 22ft.
22						Drill to 25ft. Slight rig chatter. Brown wash.

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN Log of Boring **LB2-07** Sheet 2 of 2

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 77.7 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+53.7		24						
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	25–27	S-6	SS	6	4 / 8 / 9 / 8	26	Take S-6 from 25ft to 27ft.
		27–30						Drill to 30ft. Slight rig chatter. Brown wash.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	30–32	S-7	SS	10	8 / 13 / 12 / 12	38	Take S-7 from 30ft to 32ft.
		32–35						Drill to 35ft. Slight rig chatter. Brown wash.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	35–37	S-8	SS	6	8 / 9 / 10 / 10	31	Take S-8 from 35ft to 37ft.
		37–40						Drill to 40ft. Slight rig chatter. Brown wash.
	Light brown medium to fine SAND, trace coarse Sand, trace fine Gravel, trace Silt (moist) [SP-SM]	40–42	S-9	SS	10	9 / 6 / 6 / 5	19	Take S-9 from 40ft to 42ft.
		42–45						Drill to 45ft. Slight rig chatter. Brown wash.
	Light brown medium to fine SAND, trace coarse Sand, trace Silt (moist) [SP-SM]	45–47	S-10	SS	9	4 / 10 / 10 / 11	32	Take S-10 from 45ft to 47ft.
		47–50						Drill to 50ft. Slight rig chatter. Brown wash.
	Light brown medium to fine SAND, trace Silt, trace coarse Sand, some fine Gravel (moist) [SP-SM]	50–52	S-11	SS	9	7 / 7 / 6 / 8	21	Take S-11 from 50ft to 52ft. -#4 = 74.8% -#200 = 5.4%
+25.7	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
		53–54						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN Log of Boring **LB2-08**

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 79.5 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 9/11/2023	Date Finished: 9/11/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 11; Undisturbed 0; Core 0	
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 14.0	Water Level (ft.): First N/A; Completion N/A; 24 HR. N/A	
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Shane Frick	
Sampler: 2in OD Split Spoon		Field Engineer: Thomas Keane	
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30		

Elev. (ft) +79.5	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+79.0	6" ASPHALT	0						9/11/2023 Hand clear to 6ft.
	Dark gray coarse to fine SAND, trace Silt, some fine Gravel (moist) [FILL]	0.5–6						Collect Grab Sample G-1 from 0.5ft to 5ft.
+73.5	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	6–8	S-1	SS	14	9 / 8 / 8 / 9	19	Take S-1 from 6ft to 8ft.
	Light brown gravelly coarse to fine SAND, trace Silt (moist) [SP-SM]	8–10	S-2	SS	24	18 / 21 / 19 / 24	49	Take S-2 from 8ft to 10ft. -#4 = 59.3% -#200 = 7.8%
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	10–12	S-3	SS	12	6 / 15 / 14 / 12	38	Take S-3 from 10ft to 12ft.
		12						Drive casing to 14ft. Drill to 15ft. Smooth drilling, gray wash.
	Light brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	15–17	S-4	SS	11	9 / 16 / 15 / 12	43	Take S-4 from 15ft to 17ft.
		17						Drill to 20ft. Slight rig chatter. Brown wash.
	Tan coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP]	20–22	S-5	SS	7	8 / 9 / 9 / 12	28	Take S-5 from 20ft to 22ft. -#4 = 96.7% -#200 = 4.7%
		22–24						Drill to 25ft. Slight rig chatter. Brown wash.

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

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Log of Boring **LB2-08**

Project	Project No.
Sands New York	170754501

Location	Elevation and Datum
Nassau Coliseum	Approx. el. 79.5 ± (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	+55.5		24						
		Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	25–27	S-6	SS	9	6, 10, 16, 9	40	Take S-6 from 25ft to 27ft.
			27–30						Drill to 30ft. Slight rig chatter. Brown wash.
		Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	30–32	S-7	SS	6	9, 10, 10, 14	31	Take S-7 from 30ft to 32ft.
			32–35						Drill to 35ft. Slight rig chatter. Brown wash.
		Light brown medium to fine SAND, trace coarse Sand, trace Silt (moist) [SP-SM]	35–37	S-8	SS	9	7, 10, 12, 12	36	Take S-8 from 35ft to 37ft.
			37–40						Drill to 40ft. Slight rig chatter. Brown wash.
		Light brown medium to fine SAND, trace coarse Sand, trace Silt (moist) [SP-SM]	40–42	S-9	SS	8	9, 9, 9, 10	29	Take S-9 from 40ft to 42ft.
			42–45						Drill to 45ft. Slight rig chatter. Brown wash.
		Light brown medium to fine SAND, trace coarse Sand, trace Silt (moist) [SP-SM]	45–47	S-10	SS	12	9, 9, 11, 16	32	Take S-10 from 45ft to 47ft.
			47–50						Drill to 50ft. Slight rig chatter. Brown wash.
		Light brown medium to fine SAND, trace coarse Sand, trace Silt (moist) [SP-SM]	50–52	S-11	SS	5	6, 8, 11, 12	31	Take S-11 from 50ft to 52ft.
	+27.5	End of Boring at 52ft.	52–54						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN Log of Boring **LB2-09**

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 80.5 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 9/12/2023	Date Finished: 9/12/2023
Drilling Equipment: CME75		Completion Depth: 102.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 22 / Undisturbed 0	Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 14.0	Water Level (ft.): First N/A / Completion N/A	24 HR. N/A
Casing Hammer: Automatic	Weight (lbs): 140 / Drop (in): 30	Drilling Foreman: Shane Frick	
Sampler: 2in OD Split Spoon		Field Engineer: Thomas Keane	
Sampler Hammer: Automatic	Weight (lbs): 140 / Drop (in): 30		

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+80.5								
+80.0	6" ASPHALT	0						9/12/2023 Hand clear to 5ft.
	Dark gray coarse to fine SAND, some Silt, some fine Gravel (moist) [FILL]	0.5–5						Collect Grab Sample G-1 from 0.5ft to 5ft.
+75.5	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	5–7	S-1	SS	12	5, 4, 6, 6	12	Take S-1 from 5ft to 7ft.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	7–9	S-2	SS	20	16, 19, 20, 26	47	Take S-2 from 7ft to 9ft.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	9–11	S-3	SS	16	11, 12, 15, 28	33	Take S-3 from 9ft to 11ft.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	11–13	S-4	SS	18	10, 11, 18, 16	38	Take S-4 from 11ft to 13ft.
		13–15						Drive casing to 14ft. Drill to 15ft. Heavy rig chatter, brown wash.
	Light brown sandy fine GRAVEL, trace Silt (moist) [GP]	15–17	S-5	SS	8	7, 7, 10, 12	23	Take S-5 from 15ft to 17ft. -#4 = 40% -#200 = 3.4%
		17–20						Drill to 20ft. Slight rig chatter. Brown wash.
	No Recovery	20–22	S-6	SS	0	8, 9, 9, 12	28	Take S-6 from 20ft to 22ft.
		22–24						Drill to 25ft. Slight rig chatter. Brown wash.

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN

Log of Boring **LB2-09**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 80.5 ± (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	+56.5		24						
		Light brown coarse to fine SAND, trace Silt (moist) [SP-SM]	25–27	S-7	SS	10	6, 9, 9, 6	28	Take S-7 from 25ft to 27ft. Drill to 30ft. Slight rig chatter. Brown wash.
		Light brown coarse to fine SAND, trace Silt (moist) [SP-SM]	30–32	S-8	SS	5	6, 6, 5, 7	17	Take S-8 from 30ft to 32ft. Drill to 35ft. Slight rig chatter. Brown wash.
		Light brown medium to fine SAND, trace Silt, trace coarse Sand (moist) [SP-SM]	35–37	S-9	SS	9	8, 6, 7, 9	21	Take S-9 from 35ft to 37ft. Drill to 40ft. Slight rig chatter. Brown wash.
		Light brown medium to fine SAND, trace Silt, trace coarse Sand (moist) [SP-SM]	40–42	S-10	SS	10	7, 7, 9, 7	26	Take S-10 from 40ft to 42ft. Drill to 45ft. Slight rig chatter. Brown wash.
		Light brown medium to fine SAND, trace Silt (moist) [SP-SM]	45–47	S-11	SS	11	12, 11, 14, 16	40	Take S-11 from 45ft to 47ft. Drill to 50ft. Slight rig chatter. Brown wash.
		Light brown medium to fine SAND, trace Silt (moist) [SP-SM]	50–52	S-12	SS	12	12, 13, 13, 14	42	Take S-12 from 50ft to 52ft. Drill to 55ft. Slight rig chatter. Brown wash.
			54						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

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Log of Boring **LB2-09** Sheet 3 of 4

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 80.5 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+26.5		54						
	Light brown medium to fine SAND, trace Silt, trace coarse Sand (wet) [SP-SM]	55–57	S-13	SS	14	9, 11, 11, 19	36	Take S-13 from 55ft to 57ft. Drill to 60ft. Slight rig chatter. Brown wash.
	Light brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	60–62	S-14	SS	2	7, 8, 11, 10	31	Take S-14 from 60ft to 62ft. Drill to 65ft. Slight rig chatter. Brown wash.
	Light brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	65–67	S-15	SS	2	7, 8, 11, 10	31	Take S-15 from 65ft to 67ft. Drill to 70ft. Slight rig chatter. Brown wash.
	Light brown fine SAND, trace medium Sand, some Silt (wet) [SM]	70–72	S-16	SS	12	5, 7, 5, 9	19	Take S-16 from 70ft to 72ft. -#4 = 100% -#200 = 15.8% Drill to 75ft. Slight rig chatter. Brown wash.
	Gray fine SAND, trace Silt (wet) [SP-SM]	75–77	S-17	SS	15	6, 6, 7, 9	21	Take S-17 from 75ft to 77ft. Drill to 80ft. Slight rig chatter. Brown wash.
+0.5	Gray CLAY, some fine Sand (wet) [CL]	80–81	S-18A	SS	22	7, 9, 8, 10	28	Take S-18 from 80ft to 82ft. LL = 35% PL = 16% PI = 19%
-0.8	Gray fine SAND, trace Clay, trace Silt (wet) [SP-SC]	81–82	S-18B	SS				Drill to 85ft. Slight rig chatter. Brown wash.
		84						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

Project	Sands New York	Project No.	170754501
Location	Nassau Coliseum	Elevation and Datum	Approx. el. 80.5 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
-3.5		84						
	Gray to tan fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	85–87	S-19	SS	15	12, 8, 10, 11	29	Take S-19 from 85ft to 87ft. Drill to 90ft. Slight rig chatter. Brown wash.
	Gray to tan medium to fine SAND, trace Silt (wet) [SP-SM]	90–92	S-20	SS	14	17, 14, 15, 16	47	Take S-20 from 90ft to 92ft. -#4 = 100% -#200 = 9.9% Drill to 95ft. Slight rig chatter. Brown wash.
	Light brown fine SAND, some Silt (wet) [SM]	95–97	S-21	SS	15	14, 14, 16, 12	49	Take S-21 from 95ft to 97ft. Drill to 100ft. Slight rig chatter. Brown wash.
-21.5	Light brown medium to fine SAND, trace Silt (wet) [SP-SM]	100–102	S-22	SS	18	19, 18, 18, 21	58	Take S-22 from 100ft to 102ft.
	End of Boring at 102ft.	102						Bottom of boring at 102ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN Log of Boring **LB2-10**

Project: Sands New York	Project No.: 170754501
Location: Nassau Coliseum	Elevation and Datum: Approx. el. 78.5 ± (NAVD 88)
Drilling Company: Craig Geotechnical Drilling	Date Started: 9/11/2023 — Date Finished: 9/11/2023
Drilling Equipment: CME75	Completion Depth: 52.0 ft — Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit	Number of Samples: Disturbed 11; Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel — Casing Depth (ft): 14.0	Water Level (ft.): First N/A; Completion N/A; 24 HR. N/A
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Shane Frick
Sampler: 2in OD Split Spoon	Field Engineer: Thomas Keane
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Elev. (ft) +78.5	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+78.0	6" ASPHALT	0						9/11/2023 Hand clear to 6ft. Take G-1 from 0.5ft to 5ft.
	Dark gray coarse to fine SAND, trace Silt, trace fine Gravel [FILL]	0.5						
+72.5	Gray to tan sandy fine GRAVEL, trace Silt (moist) [GP-GM]	6	S-1	SS	22	10 / 10 / 10 / 19	24	Take S-1 from 6ft to 8ft.
	Tan to gray coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	8	S-2	SS	24	19 / 23 / 24 / 31	57	Take S-2 from 8ft to 10ft. -#4 = 71.3% -#200 = 5.8%
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	10	S-3	SS	14	9 / 9 / 11 / 13	26	Take S-3 from 10ft to 12ft.
		12						Drive casing to 14ft. Drill to 15ft. Smooth drilling, gray wash.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	15	S-4	SS	8	14 / 12 / 18 / 21	41	Take S-4 from 15ft to 17ft.
		17						Drill to 20ft. Slight rig chatter. Brown wash.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	20	S-5	SS	10	21 / 26 / 24 / 30	77	Take S-5 from 20ft to 22ft. -#4 = 80.2% -#200 = 5.7%
		22						Drill to 25ft. Slight rig chatter. Brown wash.
		24						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

Template: Log-BH-NYC-GEO; Strip: BH-GEO (5); Printed on 10/11/2023

LANGAN Log of Boring **LB2-10**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 78.5 ± (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	+54.5		24						
		Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	25–27	S-6	SS	11	11, 9, 9, 10	28	Take S-6 from 25ft to 27ft.
			27–30						Drill to 30ft. Slight rig chatter. Brown wash.
		Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	30–32	S-7	SS	10	11, 12, 11, 10	35	Take S-7 from 30ft to 32ft.
			32–35						Drill to 35ft. Slight rig chatter. Brown wash.
		Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	35–37	S-8	SS	10	18, 17, 14, 11	50	Take S-8 from 35ft to 37ft.
			37–40						Drill to 40ft. Slight rig chatter. Brown wash.
		Light brown medium to fine SAND, trace coarse Sand, trace Silt (moist) [SP-SM]	40–42	S-9	SS	11	8, 9, 8, 8	28	Take S-9 from 40ft to 42ft.
			42–45						Drill to 45ft. Slight rig chatter. Brown wash.
		Light brown medium to fine SAND, trace coarse Sand, trace Silt (moist) [SP-SM]	45–47	S-10	SS	11	12, 13, 14, 10	44	Take S-10 from 45ft to 47ft.
			47–50						Drill to 50ft. Slight rig chatter. Brown wash.
		Light brown medium to fine SAND, trace coarse Sand, trace Silt, trace fine Gravel (moist) [SP-SM]	50–52	S-11	SS	10	10, 9, 10, 14	31	Take S-11 from 50ft to 52ft.
	+26.5	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
			53–54						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN

Log of Boring LB2-11

Project: Sands New York	Project No.: 170754501
Location: Nassau Coliseum	Elevation and Datum: Approx. el. 80.2 ± (NAVD 88)
Drilling Company: Craig Geotechnical Drilling	Date Started: 9/6/2023; Date Finished: 9/6/2023
Drilling Equipment: CME75	Completion Depth: 52.0 ft; Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit	Number of Samples: Disturbed 12; Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel; Casing Depth (ft): 14.0	Water Level (ft.): First N/A; Completion N/A; 24 HR. N/A
Casing Hammer: Automatic; Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Shane Frick
Sampler: 2in OD Split Spoon	Field Engineer: Thomas Keane
Sampler Hammer: Automatic; Weight (lbs): 140; Drop (in): 30	

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+80.2								
+79.7	6" ASPHALT	0						9/6/2023 Hand clear to 5ft.
	Light gray to tan sandy fine GRAVEL, trace Silt (moist) [FILL]	1						
		3						Collect Grab Sample G-1 from 0.5ft to 5ft.
	Light gray to tan gravelly coarse to fine SAND, trace Silt (moist) [FILL]	5–7	S-1	SS	24	5, 5, 6, 7	13	Take S-1 from 5ft to 7ft. -#4 = 55.9% -#200 = 4.8%
+73.2	Light brown to gray coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	7–9	S-2	SS	10	4, 6, 4, 5	12	Take S-2 from 7ft to 9ft.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	9–11	S-3	SS	8	4, 8, 12, 9	24	Take S-3 from 9ft to 11ft.
	Light brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	11–13	S-4	SS	15	11, 14, 13, 12	35	Take S-4 from 11ft to 13ft.
		13						Drive casing to 14ft. Drill to 15ft. Moderate rig chatter, gray wash.
	Light brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP]	15–17	S-5	SS	7	9, 9, 8, 9	23	Take S-5 from 15ft to 17ft. -#4 = 78.6% -#200 = 3.7%
		17						Drill to 20ft. Slight rig chatter. Brown wash.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	20–22	S-6	SS	8	11, 13, 14, 14	42	Take S-6 from 20ft to 22ft.
		22						Drill to 25ft. Slight rig chatter. Brown wash.
		24						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN Log of Boring **LB2-11** Sheet 2 of 2

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 80.2 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+56.2		24						
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	25–27	S-7	SS	7	7, 8, 16, 18	37	Take S-7 from 25ft to 27ft.
		27–30						Drill to 30ft. Slight rig chatter. Brown wash.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	30–32	S-8	SS	11	7, 8, 8, 10	25	Take S-8 from 30ft to 32ft.
		32–35						Drill to 35ft. Slight rig chatter. Brown wash.
	Light brown medium to fine SAND, trace Silt, trace coarse Sand (moist) [SP-SM]	35–37	S-9	SS	9	8, 8, 10, 10	29	Take S-9 from 35ft to 37ft.
		37–40						Drill to 40ft. Slight rig chatter. Brown wash.
	Light brown medium to fine SAND, trace Silt (moist) [SP-SM]	40–42	S-10	SS	10	6, 6, 11, 14	28	Take S-10 from 40ft to 42ft.
		42–45						Drill to 45ft. Slight rig chatter. Brown wash.
	Light brown medium to fine SAND, trace Silt, trace coarse Sand (moist) [SP-SM]	45–47	S-11	SS	9	9, 11, 11, 15	36	Take S-11 from 45ft to 47ft.
		47–50						Drill to 50ft. Slight rig chatter. Brown wash.
	Light brown medium to fine SAND, trace Silt (moist) [SP-SM]	50–52	S-12	SS	11	11, 14, 13, 16	44	Take S-12 from 50ft to 52ft.
+28.2	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
		53–54						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN Log of Boring **LB2-12** Sheet 1 of 2

Project	Sands New York	Project No.	170754501
Location	Nassau Coliseum	Elevation and Datum	Approx. el. 77.6 ± (NAVD 88)
Drilling Company	Craig Geotechnical Drilling	Date Started / Date Finished	9/14/2023 / 9/14/2023
Drilling Equipment	CME75	Completion Depth / Rock Depth	52.0 ft / N/E
Size and Type of Bit	3-7/8in Tricone Roller Bit	Number of Samples	Disturbed 11; Undisturbed 0; Core 0
Casing Diameter (in)	4 Flush Joint Steel; Casing Depth (ft) 14.0	Water Level (ft.)	First N/A; Completion N/A; 24 HR. N/A
Casing Hammer	Automatic; Weight (lbs) 140; Drop (in) 30	Drilling Foreman	Ed Flanagan
Sampler	2in OD Split Spoon	Field Engineer	Thomas Keane
Sampler Hammer	Automatic; Weight (lbs) 140; Drop (in) 30		

Elev. (ft) +77.6	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	6" ASPHALT	0						9/14/2023 Hand clear to 5ft. Collect Grab Sample G-1 from 0.5ft to 5ft.
+77.1	Dark gray coarse to fine SAND, some Silt, trace fine Gravel (moist) [FILL]	0.5						
+71.6	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	6	S-1	SS	17	16, 14, 18, 19	41	Take S-1 from 6ft to 8ft.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	8	S-2	SS	24	12, 12, 14, 17	33	Take S-2 from 8ft to 10ft.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	10	S-3	SS	12	6, 9, 8, 8	23	Take S-3 from 10ft to 12ft.
		12						Drive casing to 14ft. Drill to 15ft. Smooth drilling, gray wash.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	15	S-4	SS	11	6, 6, 9, 12	22	Take S-4 from 15ft to 17ft. -#4 = 74.6% -#200 = 5.3%
		17						Drill to 20ft. Slight rig chatter. Brown wash.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	20	S-5	SS	10	9, 10, 10, 14	32	Take S-5 from 20ft to 22ft.
		22						Drill to 25ft. Slight rig chatter. Brown wash.
		24						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN Log of Boring **LB2-12**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 77.6 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale (ft)	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+53.6		24						
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	25–27	S-6	SS	10	10 / 10 / 7 / 9	27	Take S-6 from 25ft to 27ft. Drill to 30ft. Slight rig chatter. Brown wash.
	Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	30–32	S-7	SS	9	9 / 9 / 8 / 9	27	Take S-7 from 30ft to 32ft. Drill to 35ft. Slight rig chatter. Brown wash.
	Light brown medium to fine SAND, trace coarse Sand, trace Silt (moist) [SP-SM]	35–37	S-8	SS	10	14 / 9 / 10 / 9	32	Take S-8 from 35ft to 37ft. Drill to 40ft. Slight rig chatter. Brown wash.
	Light brown medium to fine SAND, trace Silt, trace coarse Sand (moist) [SP-SM]	40–42	S-9	SS	8	8 / 7 / 5 / 6	20	Take S-9 from 40ft to 42ft. Drill to 45ft. Slight rig chatter. Brown wash.
	Light brown medium to fine SAND, trace Silt, trace coarse Sand (moist) [SP-SM]	45–47	S-10	SS	5	3 / 6 / 6 / 5	20	Take S-10 from 45ft to 47ft. Drill to 50ft. Slight rig chatter. Brown wash.
	Light brown medium to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	50–52	S-11	SS	8	6 / 5 / 7 / 8	20	Take S-11 from 50ft to 52ft.
+25.6	End of Boring at 52ft.	52						Bottom of boring at 52ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.
		53						
		54						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN

Log of Boring **LB2-13(OW)**

Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 77.0 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 9/14/2023	Date Finished: 9/14/2023
Drilling Equipment: CME75		Completion Depth: 52.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 11	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First N/A	Completion 30.5; 24 HR. N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Shane Frick	
Sampler: 2in OD Split Spoon		Field Engineer: Thomas Keane	
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30		

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+77.0	ASPHALT	0						9/14/2023 Hand clear to 5ft. Take G-1 from 0.5ft to 5ft. Drill to 6ft. Smooth drilling, brown wash.
+76.5	Dark gray coarse to fine SAND, some fine Gravel, trace Silt (moist) [FILL]							
+71.0	Light brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	6	S-1	SS	18	15 / 14 / 16 / 22	36	Take S-1 from 6ft to 8ft.
	Orangish brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	8	S-2	SS	16	12 / 15 / 18 / 18	40	Take S-2 from 8ft to 10ft.
	Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	10	S-3	SS	12	7 / 8 / 8 / 9	21	Take S-3 from 10ft to 12ft.
		12						Drive casing to 14ft. Drill to 15ft. Heavy rig chatter, brown wash.
	Tan gravelly coarse to fine SAND, trace Silt (moist) [SP-SM]	15	S-4	SS	9	10 / 11 / 10 / 9	29	Take S-4 from 15ft to 17ft. -#4 = 65.4% -#200 = 10%
		17						Drill to 20ft. Slight rig chatter. Brown wash.
	Tan coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	20	S-5	SS	6	8 / 10 / 13 / 16	35	Take S-5 from 20ft to 22ft.
		22						Drill to 25ft. Slight rig chatter. Brown wash.
		24						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN

Log of Boring **LB2-13(OW)**

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 77.0 ± (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	+53.0		24						
		Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	25	S-6	SS	8	5, 9, 10, 11	29	Take S-6 from 25ft to 27ft.
			27						Drill to 30ft. Slight rig chatter. Brown wash.
		Light brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	30	S-7	SS	9	7, 9, 9, 9	28	Take S-7 from 30ft to 32ft.
			32						Drill to 35ft. Slight rig chatter. Brown wash.
		Light brown medium to fine SAND, trace Silt, trace coarse Sand (moist) [SP-SM]	35	S-8	SS	8	6, 10, 11, 7	34	Take S-8 from 35ft to 37ft.
			37						Drill to 40ft. Slight rig chatter. Brown wash.
		Light brown medium to fine SAND, trace Silt, trace coarse Sand (moist) [SP-SM]	40	S-9	SS	8	5, 5, 6, 5	18	Take S-9 from 40ft to 42ft.
			42						Drill to 45ft. Slight rig chatter. Brown wash.
		Light brown medium to fine SAND, trace Silt, trace coarse Sand (moist) [SP-SM]	45	S-10	SS	8	4, 6, 6, 7	19	Take S-10 from 45ft to 47ft.
			47						Drill to 50ft. Slight rig chatter. Brown wash.
		Light brown medium to fine SAND, trace coarse Sand, trace fine Gravel, trace Silt (wet) [SP-SM]	50	S-11	SS	10	6, 6, 7, 8	21	Take S-11 from 50ft to 52ft.
	+25.0	End of Boring at 52ft.	52						Bottom of boring at 52ft. Install observation well. Refer to Observation Well Construction Log.
			54						

* Hammer correction factor of 1.62 used, based on calibration results for Rig 30

LANGAN

Log of Boring **LB2-14**

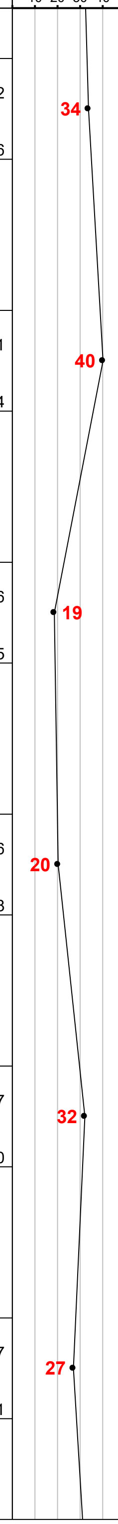
Project: Sands New York		Project No.: 170754501	
Location: Nassau Coliseum		Elevation and Datum: Approx. el. 77.4 ± (NAVD 88)	
Drilling Company: Craig Geotechnical Drilling		Date Started: 9/15/2023	Date Finished: 9/15/2023
Drilling Equipment: CME75		Completion Depth: 102.0 ft	Rock Depth: N/E
Size and Type of Bit: 3-7/8in Tricone Roller Bit		Number of Samples: Disturbed 21	Undisturbed 0; Core 0
Casing Diameter (in): 4 Flush Joint Steel	Casing Depth (ft): 9.0	Water Level (ft.): First ▽ N/A	Completion ▼ N/A; 24 HR. ▼ N/A
Casing Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Drilling Foreman: Ed Flanagan	
Sampler: 2in OD Split Spoon		Field Engineer: Thomas Keane	
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30		

Elev. (ft) +77.4	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
+76.9	ASPHALT	0						9/15/2023 Hand clear to 5ft. Collect Grab Sample G-1 from 0.5ft to 5ft.
	Brown coarse to fine SAND, trace Silt, trace fine Gravel [FILL]	0.5						
+70.9	Dark brown silty coarse to fine SAND, trace fine Gravel (moist) [FILL]	6	S-1A	SS	18	5 / 14		Take S-1 from 6ft to 8ft.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	7	S-1B	SS		14 / 12	35	
	Brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	8	S-2	SS	19	5 / 5 / 6 / 6	14	Take S-2 from 8ft to 10ft. -#4 = 75.8% -#200 = 9.8%
	Brown coarse to fine SAND, trace fine Gravel, trace Silt (moist) [SP-SM]	10	S-3	SS	10	10 / 18 / 16 / 16	46	Take S-3 from 10ft to 12ft.
		12						Drive casing to 14ft. Drill to 15ft. Smooth drilling, gray wash.
	Light brown coarse to fine SAND, some fine Gravel, trace Silt (moist) [SP-SM]	15	S-4	SS	7	11 / 11 / 12 / 14	33	Take S-4 from 15ft to 17ft.
		17						Drill to 20ft. Slight rig chatter. Brown wash.
	Light brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	20	S-5	SS	8	9 / 9 / 10 / 9	31	Take S-5 from 20ft to 22ft.
		22						Drill to 50ft. Slight rig chatter. Brown wash.
		24						

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 77.4 ± (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
	+53.4		24						
		Light brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	25–27	S-6	SS	10	12, 12, 9, 6	34	Take S-6 from 25ft to 27ft. -#4 = 84.1% -#200 = 5.5% Drill to 30ft. Slight rig chatter. Brown wash.
		Light brown coarse to fine SAND, trace Silt, some fine Gravel (moist) [SP-SM]	30–32	S-7	SS	9	16, 11, 14, 14	40	Take S-7 from 30ft to 32ft. Drill to 35ft. Slight rig chatter. Brown wash.
		Light brown coarse to fine SAND, trace Silt, trace fine Gravel (moist) [SP-SM]	35–37	S-8	SS	7	6, 6, 5, 5	19	Take S-8 from 35ft to 37ft. Drill to 40ft. Slight rig chatter. Brown wash.
		Light brown medium to fine SAND, trace Silt, trace coarse Sand (wet) [SP-SM]	40–42	S-9	SS	9	8, 6, 6, 8	20	Take S-9 from 40ft to 42ft. Drill to 45ft. Slight rig chatter. Brown wash.
		Light brown medium to fine SAND, trace Silt, trace coarse Sand (wet) [SP-SM]	45–47	S-10	SS	11	5, 7, 12, 10	32	Take S-10 from 45ft to 47ft. Drill to 50ft. Slight rig chatter. Brown wash.
		Light brown medium to fine SAND, trace Silt, trace coarse Sand (wet) [SP-SM]	50–52	S-11	SS	12	7, 7, 9, 11	27	Take S-11 from 50ft to 52ft. Drill to 55ft. Slight rig chatter. Brown wash.
			54						



* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN Log of Boring **LB2-14** Sheet 3 of 4

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 77.4 ± (NAVD 88)

Elev. (ft): +23.4

Sample Description	Depth Scale (ft)	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
Light brown medium to fine SAND, trace Silt, trace coarse Sand (wet) [SP-SM]	55–57	S-12	SS	10	8, 6, 14, 12	34	Take S-12 from 55ft to 57ft. Drill to 60ft. Slight rig chatter. Brown wash.
Light brown fine SAND, trace Silt, trace coarse to medium Sand (wet) [SP-SM]	60–62	S-13	SS	14	12, 10, 10, 12	34	Take S-13 from 60ft to 62ft. Drill to 65ft. Slight rig chatter. Brown wash.
Light brown to gray silty fine SAND (wet) [SM]	65–67	S-14A	SS	15	10, 11, 9, 10	34	Take S-14 from 65ft to 67ft. Drill to 70ft. Slight rig chatter. Brown wash.
Light brown fine SAND, trace Silt, trace medium Sand (wet) [SP-SM]		S-14B	SS				
Light brown fine SAND, trace Silt (wet) [SP-SM]	70–72	S-15	SS	12	9, 14, 18, 15	54	Take S-15 from 70ft to 72ft. Drill to 75ft. Slight rig chatter. Brown wash.
Tan to light brown fine SAND, trace Silt (wet) [SP-SM]	75–77	S-16	SS	15	9, 7, 8, 11	25	Take S-16 from 75ft to 77ft. -#4 = 100% -#200 = 12% Drill to 80ft. Slight rig chatter. Brown wash.
Tan to light brown fine SAND, trace Silt (wet) [SP-SM]	80–82	S-17	SS	11	8, 15, 17, 21	54	Take S-17 from 80ft to 82ft. Drill to 85ft. Slight rig chatter. Brown wash.

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

LANGAN Log of Boring **LB2-14** Sheet 4 of 4

Project	Project No.
Sands New York	170754501
Location	**Elevation and Datum**
Nassau Coliseum	Approx. el. 77.4 ± (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Number	Type	Recov. (in)	Penetr-resist BL/6in	N60-Value* (Blows/ft)	Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
-6.6		84						
	Light brown fine SAND, trace Silt (wet) [SP-SM]	85–87	S-18	SS	10	12, 22, 21, 23	73	Take S-18 from 85ft to 87ft.
		87–90						Drill to 90ft. Slight rig chatter. Brown wash.
	Reddish light brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	90–92	S-19	SS	14	20, 21, 20, 22	69	Take S-19 from 90ft to 92ft.
		92–95						Drill to 95ft. Smooth drilling. Brown wash.
	Light brown fine SAND, trace Silt (wet) [SP-SM]	95–97	S-20	SS	10	7, 9, 9, 8	30	Take S-20 from 95ft to 97ft.
		97–100						Drill to 100ft. Smooth drilling. Light brown wash.
	Light brown fine SAND, trace medium Sand, trace Silt (wet) [SP-SM]	100–102	S-21	SS	15	12, 16, 15, 11	52	Take S-21 from 100ft to 102ft.
-24.6	End of Boring at 102ft.	102						Bottom of boring at 102ft. Extract casing. Backfill hole with cuttings. Patch to match existing surface.

* Hammer correction factor of 1.69 used, based on calibration results for Rig 5

September 29, 2023

Attn: Kevin Craig of Craig Test Boring Co. Inc.
PO Box 427; Mays Landing, NJ 08330

Re: SPT Energy Calibration
Mays Landing, NJ

GRL Job No. 2023PA00056-1R

Dear Mr. Craig:

This report summarizes the results from the Standard Penetration Test (SPT) energy measurements performed on four (4) drill rigs. The drills rigs tested included CME 75 (Rig 30, SN 410597), CME 75 (Rig 18, SN 404887), CME 75 (Rig 5, SN 396967), and CME 75 (Rig 38, SN 375017). The field work associated with the energy measurements summarized in this report was performed on September 15, 2023, and the data was recorded during sampling events from two holes (BH 1 and BH 2), which were specifically drilled in the yard of Craig Test Boring Co. Inc., located in Mays Landing, NJ.

The purpose in collecting the SPT energy measurements was to compute the energy transfer to the drill rods and the energy transfer ratio for the SPT hammers. To meet this objective, a model 8G Pile Driving Analyzer (PDA) was used to acquire and process the dynamic test data. Additional information regarding the testing equipment and analytical procedures is provided in Appendix A.

The energy measurements were performed in general accordance with the procedures set forth in ASTM D4633-16, Standard Test Method for Energy Measurements for Dynamic Penetrometers. This ASTM standard suggests that the SPT N value should range between 10 and 50 blows per foot to limit the effect of extra potential energy due to the set per blow.

Test Sequence

An instrumented NWJ drill rod was used to acquire energy measurements during several SPT sampling events. This 2-foot-long instrumented section was placed between the SPT hammer and the top of the drill string. The measurement location on the instrumented NWJ rod section added an additional 9-in to the reported rod length. The rod length also included the 3.25-foot-long split-barrel sampler.

For the CME 75 (Rig 30, SN 410597), six sampling events were monitored in a single borehole (BH 1) between sampling depths of 25 to 37 feet. For each SPT sampling event, the SPT split-spoon sampler was driven 24 inches while blows were recorded for each of the four 6-inch increments. The SPT N value for each sampling event was then calculated as the number of blows for the second and third sampling increments. The N values for six of the six sampling events were within the ASTM D4633 suggested range of 10 to 50. Including the instrumented section, drill rods, split spoon and adapter, the instrumented length ranged from 29.00 to 39.00 feet.

For the CME 75 (Rig 18, SN 404887), five sampling events were monitored in a single borehole (BH 1) between sampling depths of 37 to 49 feet. For each SPT sampling event, the SPT split-spoon sampler was driven 24 inches while blows were recorded for each of the four 6-inch increments. The SPT N value for each sampling event was then calculated as the number of blows for the second and third sampling increments. The SPT N value for each sampling event was then calculated as the number of blows for the second and third sampling increments. The N values for five of the six sampling events were within the ASTM D4633 suggested range of 10 to 50, while the other one event was below an N value of 10. Including the instrumented section, drill rods, split spoon and adapter, the instrumented length ranged from 41.00 to 51.00 feet.

For the CME 75 (Rig 5, SN 396967), five sampling events were monitored in a single borehole (BH 2) between sampling depths of 20 to 30 feet. For each SPT sampling event, the SPT split-spoon sampler was driven 24 inches while blows were recorded for each of the four 6-inch increments. The SPT N value for each sampling event was then calculated as the number of blows for the second and third sampling increments. The N values for five of the five sampling events were within the ASTM D4633 suggested range of 10 to 50. Including the instrumented section, drill rods, split spoon and adapter, the instrumented length ranged from 24.00 to 32.00 feet.

For the CME 75 (Rig 38, SN 375017), five sampling events were monitored in a single borehole between sampling depths of 30 to 40 feet. For each SPT sampling event, the SPT split-spoon sampler was driven 24 inches while blows were recorded for each of the four 6-inch increments. The SPT N value for each sampling event was then calculated as the number of blows for the second and third sampling increments. The N values for five of the five sampling events were within the ASTM D4633 suggested range of 10 to 50. Including the instrumented section, drill rods, split spoon and adapter, the instrumented length ranged from 34.00 to 42.00 feet.

Energy Transfer Measurements

Strain and acceleration measurements were made on the instrumented NWJ drill rod. The strain and acceleration signals were conditioned and converted to force and velocities by an 8G model Pile Driving Analyzer. The PDA interprets the measured dynamic data according to the Case Method equations. Force and velocity records were viewed graphically on the PDA screen during data acquisition to assess data quality and were then digitally stored.

The maximum energy transferred to the rod (EFV) was calculated by integrating both the force and velocity records over time as follows:

$$EFV = \int F(t)V(t)dt$$

Where: $F(t)$ = the force at time t
$V(t)$ = the velocity at time t

The energy transfer ratio is computed by dividing the maximum transferred energy by the theoretical SPT hammer energy of 350 ft-lbs. (computed from the product of the hammer weight, assumed to be 140 lbs, and the fall height, assumed to be 2.5 ft). The SPT N values can then be corrected for a nominal 60% transfer efficiency, N_{60}, as follows:

$$N_{60} = (e_m / 60)\ N_m$$

Where: e_m = the measured energy transfer ratio (ETR)
N_m = the measured SPT N value

Conclusions

Appendix B presents the average transferred energies and the energy transfer ratios for each sampling event calculated using the *EFV* equation. Average values of the hammer operating rate (BPM), maximum impact force (FMX), and maximum velocity (VMX) are also included along with the maximum, minimum, and standard deviation for each sampling event. The overall energy transfer ratio for all sampling events weighted by N-value is presented in Table 1 below for each calibrated drill rig.

Table 1. Summary of Average Energy Transfer and Energy Transfer Ratio

Drill Rig (*Serial Number*)	Samples Reported	Average Hammer Speed (blows/min)	Average Energy Transfer (ft-lbs)	Energy Transfer Ratio (%)
CME 75[1] (Rig 30, SN: 410597)	6	51	340	97.2
CME 75[1] (Rig 18, SN: 404887)	5	54	349	99.6
CME 75[2] *(Rig 18, SN: 404887)*	*6*	*54*	*348*	*99.5*
CME 75[1] (Rig 5, SN: 396967)	5	55	356	101.6
CME 75[1] (Rig 38, SN: 375017)	5	51	351	100.3

Notes: (1) All data sets with N values within the ASTM recommended range of 10 to 50.
(2) Includes one data set with an N value lower than recommended minimum of 10.

We appreciate the opportunity to be of assistance to you. Please do not hesitate to contact us if you have any questions regarding this report, or if we may be of further service.

Sincerely,
GRL Engineers, Inc.

Dennis K Kiptoo

Alex Ryberg
Professional Engineer

OBSERVATION WELL CONSTRUCTION SUMMARY
Well No. LB2-03(OW)

PROJECT Sands New York - Phase 2	PROJECT NO. 170754501
LOCATION Uniondale, New York	ELEVATION AND DATUM 80.2 ±(NAVD88)
DRILLING AGENCY Craig Geotechnical Drilling, Inc.	DATE STARTED 9/8/2023 / DATE FINISHED 9/8/2023
DRILLING EQUIPMENT CME 75 Truck Rig	DRILLER Shane Frick
SIZE AND TYPE OF BIT 3-7/8" tricone roller bit	INSPECTOR Thomas Keane

METHOD OF INSTALLATION

10-ft of 2-in diameter PVC screen and 30-ft of riser were installed to a depth of 40-ft below grade; borehole casing was then removed. As the casing was removed 38-ft of sand filter was packed. A 2-ft bentonite seal was installed above the filter sand. Grout was placed at the top of the hole and a flush-mount well cap was installed.

METHOD OF WELL DEVELOPMENT

The well was pumped until there was no water.

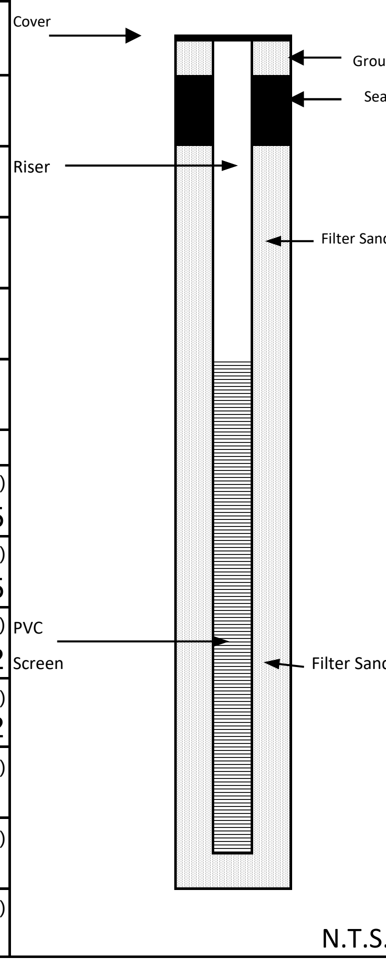
TYPE OF CASING 4" flush joint steel casing	DIAMETER 4.00 inches	TYPE OF BACKFILL MATERIAL Filter sand
TYPE OF SCREEN PVC	DIAMETER 2.00 inches	TYPE OF SEAL MATERIAL Bentonite pellets and grout
BOREHOLE NOMINAL DIAMETER 4 inches		TYPE OF FILTER MATERIAL No. 1 Filter Sand (Silica Quartz Sand)

	ELEVATION (ft)	DEPTH (ft)
TOP OF CASING	80.2	0
TOP OF SEAL	79.7	0.5
TOP OF FILTER	77.7	2.5
TOP OF SCREEN	70.2	10
BOTTOM OF BORING	40.2	40
SCREEN LENGTH	10 ft	
SLOT SIZE	0.01 in	

GROUNDWATER ELEVATIONS

ELEVATION (ft)	DATE	DEPTH TO WATER (ft)
45.70	9/14/2023	34.5
46.70	9/14/2023	33.5
49.00	9/20/2023	31.2
49.00	9/21/2023	31.2

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
FILL	5.0
	10.0
SAND	40.0

LANGAN Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
360 W 31st Street, 8th Floor , New York, NY 10001

OBSERVATION WELL CONSTRUCTION SUMMARY
Well No. LB2-13(OW)

PROJECT Sands New York - Phase 2	PROJECT NO. 170754501
LOCATION Uniondale, New York	ELEVATION AND DATUM 77 ±(NAVD88)
DRILLING AGENCY Craig Geotechnical Drilling, Inc.	DATE STARTED 9/14/2023 — DATE FINISHED 9/14/2023
DRILLING EQUIPMENT CME 75 Truck Rig	DRILLER Ed Flanagan
SIZE AND TYPE OF BIT 3-7/8" tricone roller bit	INSPECTOR Thomas Keane

METHOD OF INSTALLATION

10-ft of 2-in diameter PVC screen and 30-ft of riser were installed to a depth of 40-ft below grade; borehole casing was then removed. As the casing was removed 38-ft of sand filter was packed. A 2-ft bentonite seal was installed above the filter sand. Grout was placed at the top of the hole and a flush-mount well cap was installed.

METHOD OF WELL DEVELOPMENT

The well was pumped until there was no water.

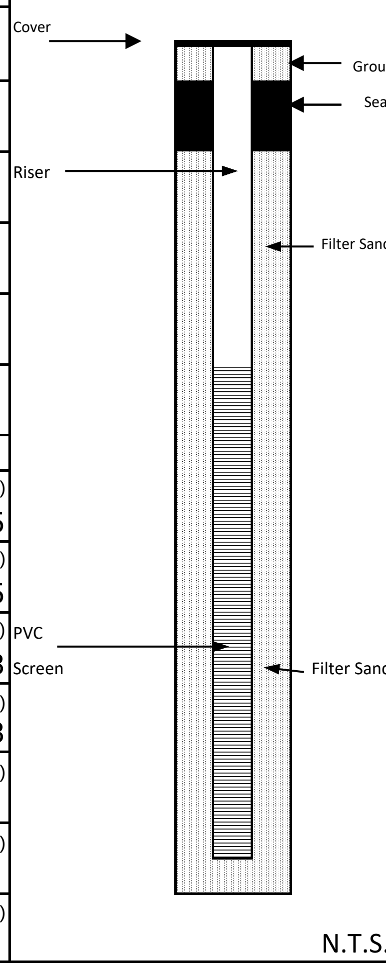
TYPE OF CASING 4" flush joint steel casing	DIAMETER 4.00 inches	TYPE OF BACKFILL MATERIAL Filter sand
TYPE OF SCREEN PVC	DIAMETER 2.00 inches	TYPE OF SEAL MATERIAL Bentonite pellets and grout
BOREHOLE NOMINAL DIAMETER 4 inches		TYPE OF FILTER MATERIAL No. 1 Filter Sand (Silica Quartz Sand)

	ELEVATION (ft)	DEPTH (ft)
TOP OF CASING	77	0
TOP OF SEAL	76.5	0.5
TOP OF FILTER	74.5	2.5
TOP OF SCREEN	67	10
BOTTOM OF BORING	37	40
SCREEN LENGTH	10 ft	
SLOT SIZE	0.01 in	

GROUNDWATER ELEVATIONS

ELEVATION (ft)	DATE	DEPTH TO WATER (ft)
42.50	9/14/2023	34.5
46.50	9/14/2023	30.5
49.00	9/20/2023	28
49.00	9/21/2023	28

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
FILL	5.0
	10.0
SAND	40.0

LANGAN Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
360 W 31st Street, 8th Floor , New York, NY 10001

APPENDIX B

(2023 LANGAN LABORATORY TESTING RESULTS)

RSA GEOLAB
1017 Greeley Ave N
Union, NJ 07083
908-964-0786
www.RSAGeolab.com

Letter of Transmittal

Date: 9-27-23 Job No.: 869 Lab Log: 23-2957

Attention: Julia Langewis
Langan Engineering & Environmental Services
360 West 31st Street, 8th Floor
New York, New York 10001

CC:

Re: Sands New York, Hempstead, NY
Langan# not provided

Sample(s) ID: **LB2-01 S-2 thru LB2-14 S-16** (30 samples)

Dear Julia,

Please find attached results for the samples referenced above. The following lab testing was performed:

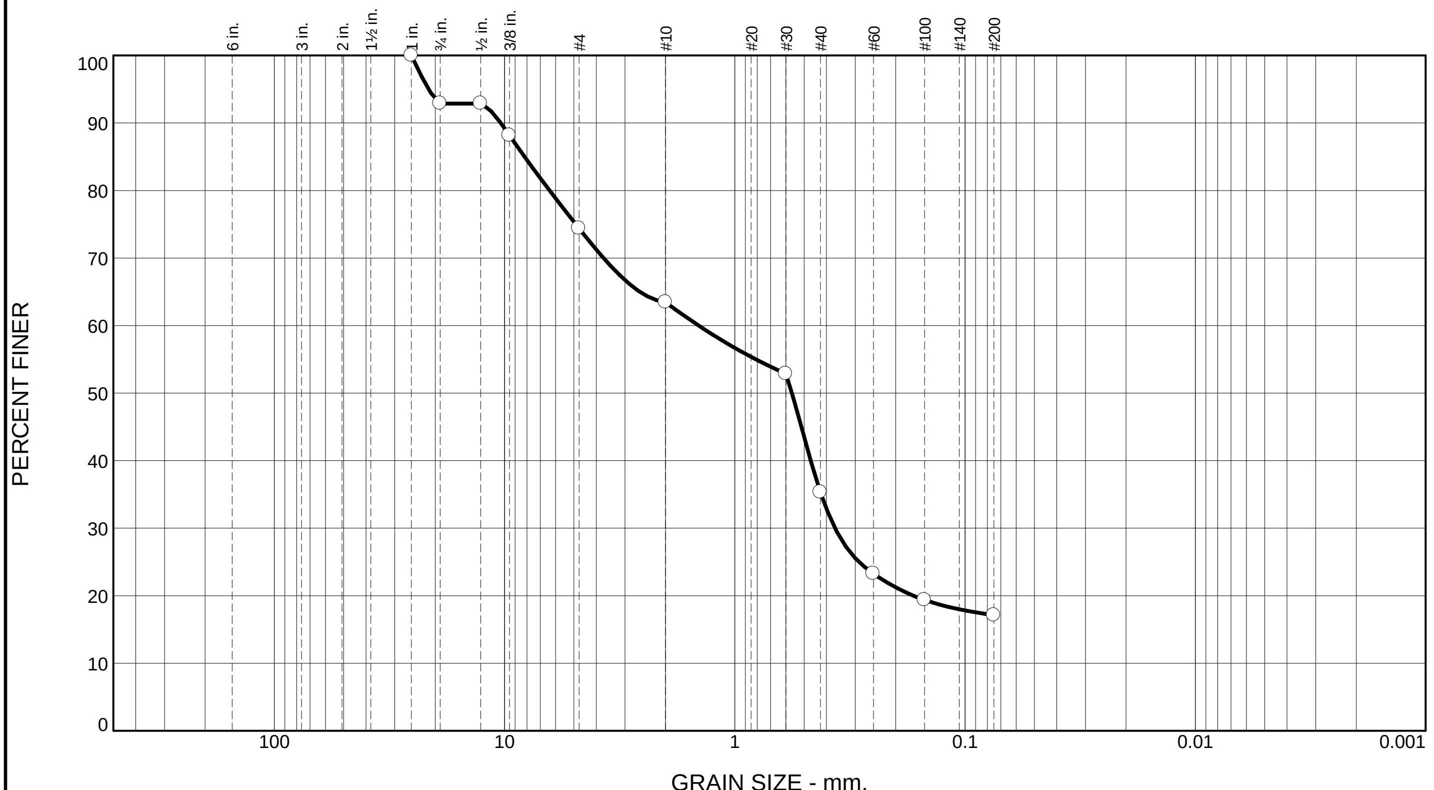
- ASTM D422 Sieve Analysis (30 tests)

Regards,
RSA Geolab, LLC

Remarks: If you have any questions, please call 908-964-0786.

Signed: ______________
Dr. Raza S. Ahmed
President RSA Geolab, LLC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.1	18.5	10.9	28.2	18.2	17.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	92.9		
.5	92.9		
.375	88.2		
#4	74.4		
#10	63.5		
#30	52.9		
#40	35.3		
#60	23.3		
#100	19.4		
#200	17.1		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 10.3958 D_{85}= 8.1880 D_{60}= 1.4359
D_{50}= 0.5652 D_{30}= 0.3673 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB2-01 S-2 7-9

Date: 9-27-23

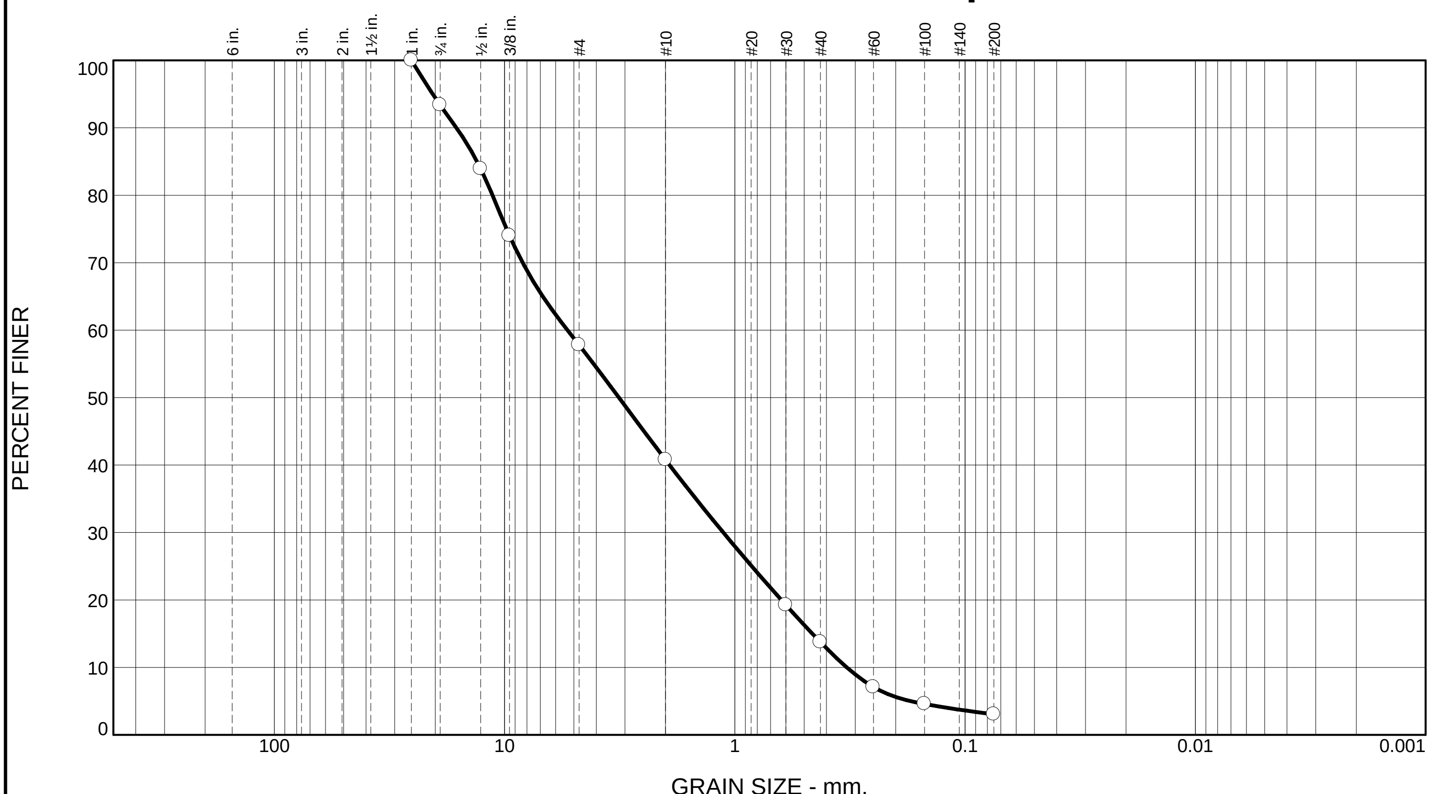
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.6	35.6	17.0	27.0	10.8	3.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	93.4		
.5	83.9		
.375	74.0		
#4	57.8		
#10	40.8		
#30	19.3		
#40	13.8		
#60	7.1		
#100	4.6		
#200	3.0		

* (no specification provided)

Material Description

Brownish Yellow

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 16.1938 D_{85}= 13.1647 D_{60}= 5.3325
D_{50}= 3.1864 D_{30}= 1.1225 D_{15}= 0.4606
D_{10}= 0.3265 C_u= 16.33 C_c= 0.72

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB2-01 S-7 25-27

Date: 9-27-23

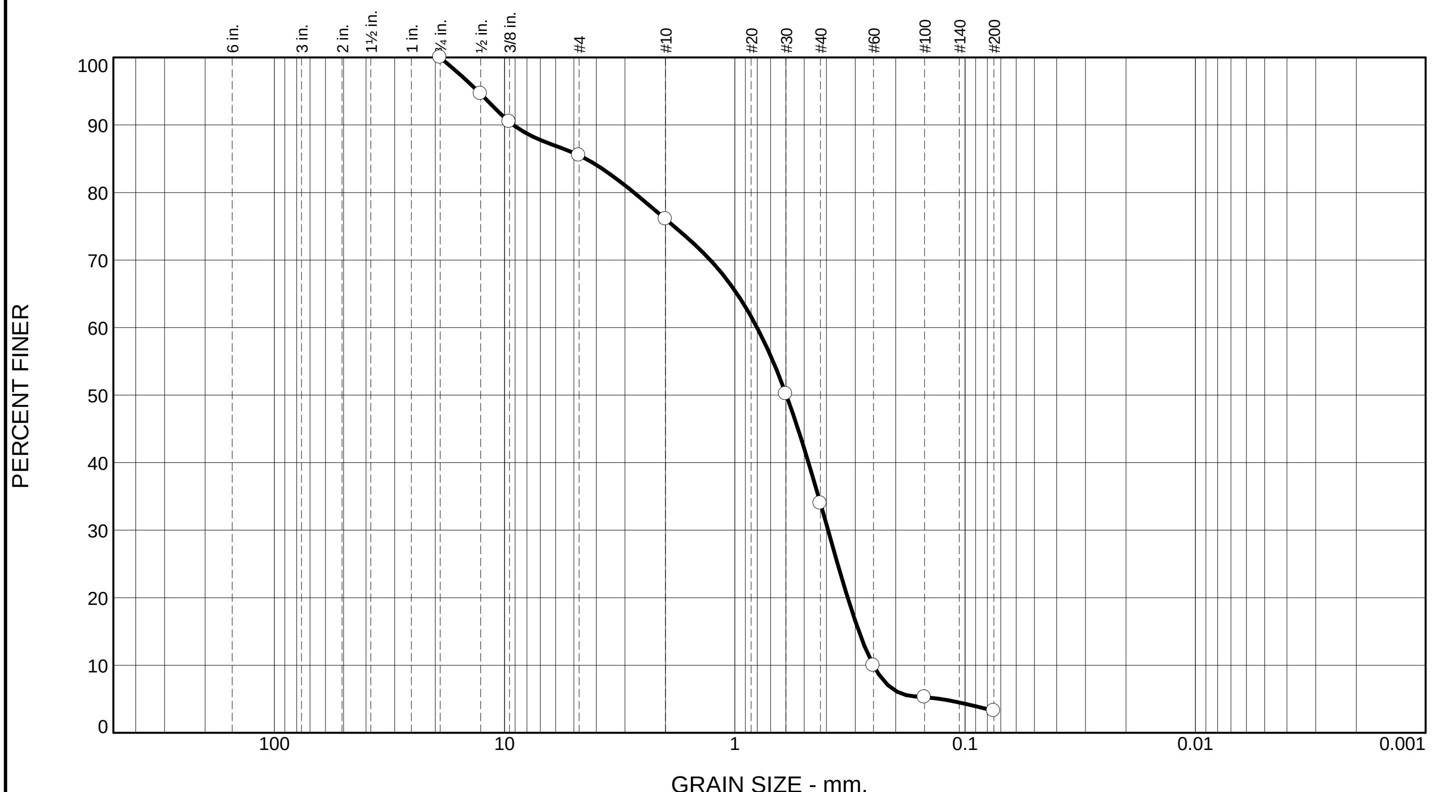
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	14.5	9.4	42.1	30.8	3.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	94.6		
.375	90.5		
#4	85.5		
#10	76.1		
#30	50.2		
#40	34.0		
#60	10.0		
#100	5.3		
#200	3.2		

* (no specification provided)

Material Description

Brownish Yellow

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 9.1502 D_{85}= 4.4433 D_{60}= 0.8004
D_{50}= 0.5973 D_{30}= 0.3938 D_{15}= 0.2893
D_{10}= 0.2504 C_u= 3.20 C_c= 0.77

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB2-01 S-11 45-47

Date: 9-27-23

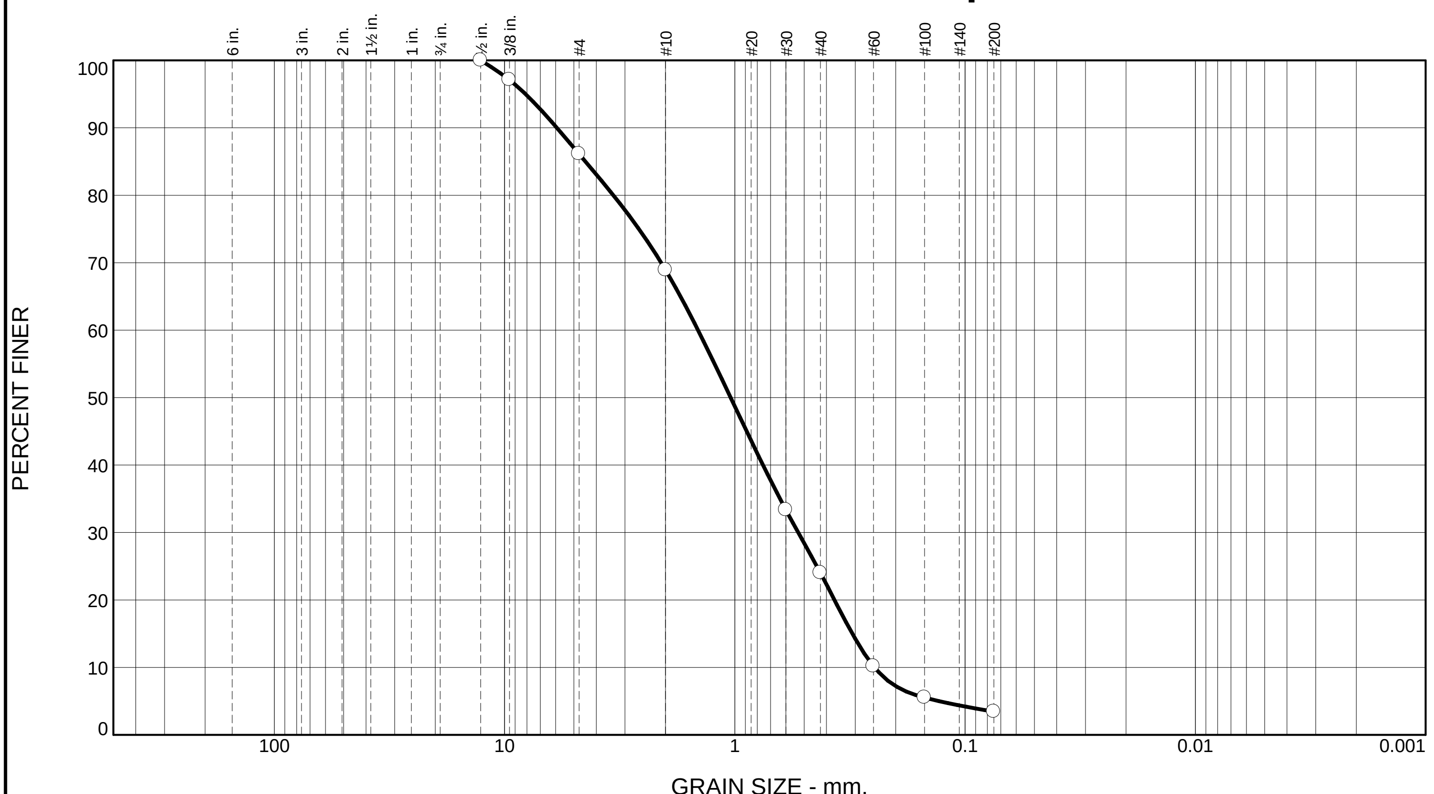
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	13.9	17.2	44.9	20.6	3.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	97.1		
#4	86.1		
#10	68.9		
#30	33.3		
#40	24.0		
#60	10.2		
#100	5.5		
#200	3.4		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 5.9290 D_{85}= 4.4561 D_{60}= 1.4454
D_{50}= 1.0426 D_{30}= 0.5306 D_{15}= 0.3090
D_{10}= 0.2476 C_u= 5.84 C_c= 0.79

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB2-02 S-4 15-17

Date: 9-27-23

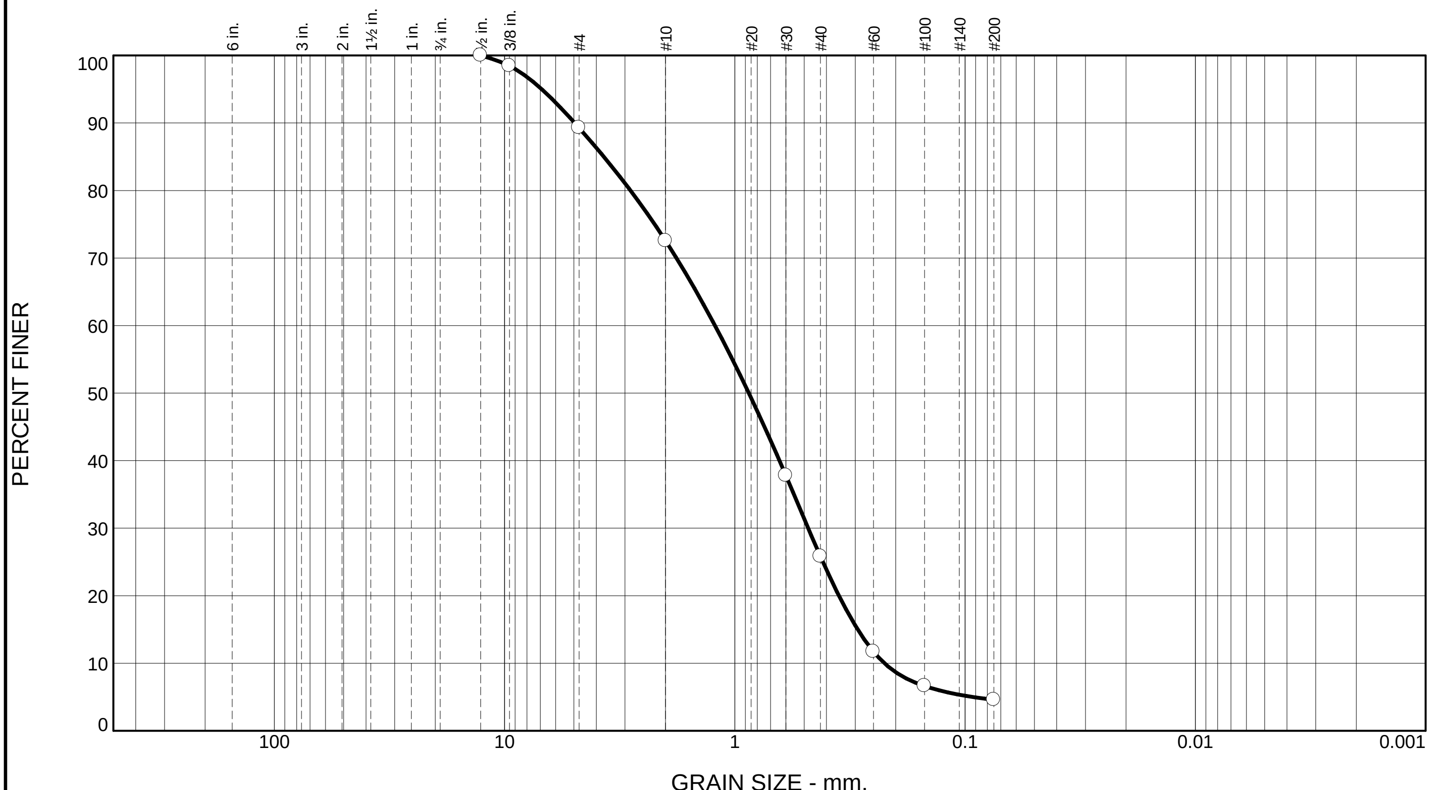
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	10.7	16.7	46.8	21.2	4.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	98.5		
#4	89.3		
#10	72.6		
#30	37.8		
#40	25.8		
#60	11.7		
#100	6.6		
#200	4.6		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 4.9600 D_{85}= 3.7067 D_{60}= 1.2198
D_{50}= 0.8695 D_{30}= 0.4804 D_{15}= 0.2928
D_{10}= 0.2240 C_u= 5.45 C_c= 0.84

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB2-03 S-4 11-13

Date: 9-27-23

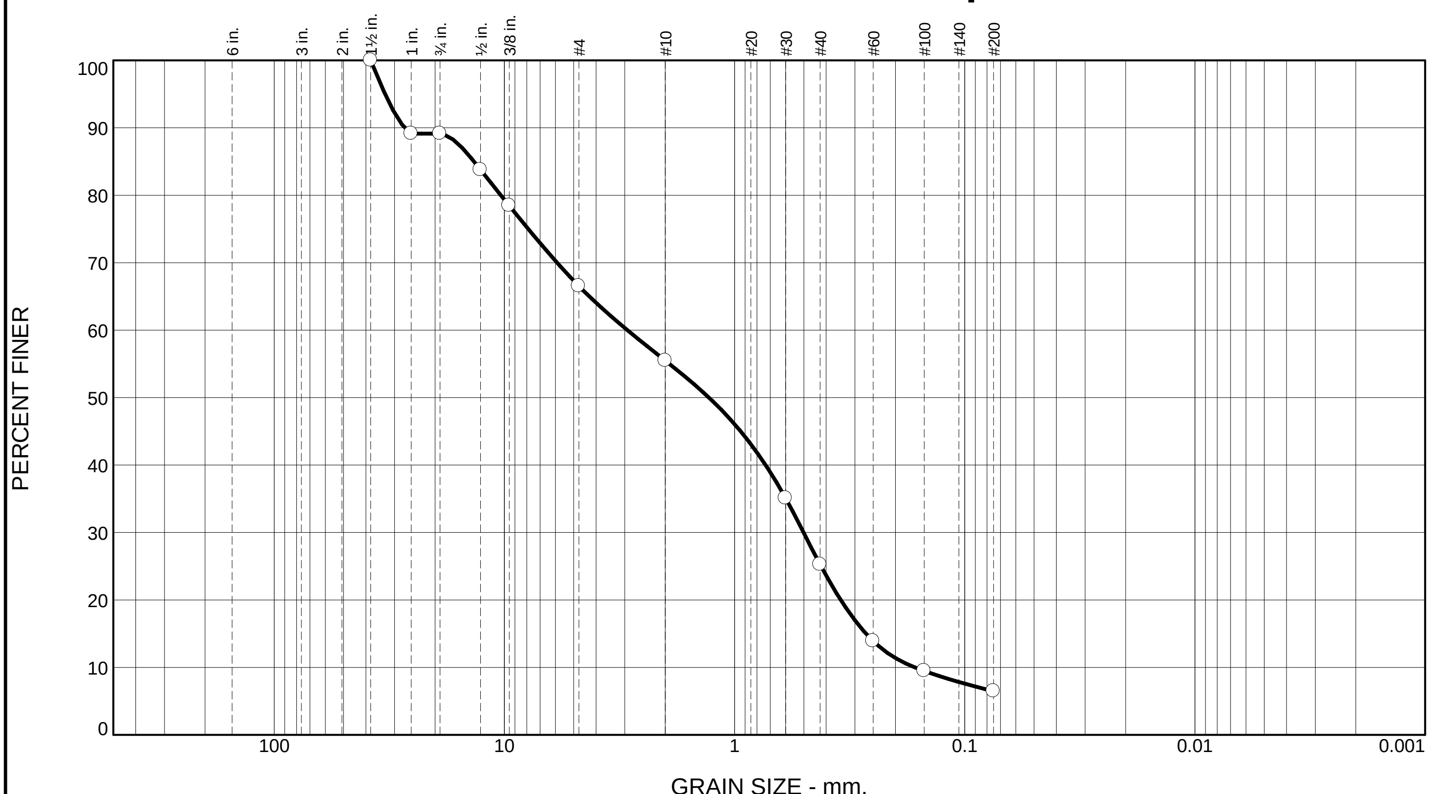
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	10.9	22.6	11.0	30.3	18.7	6.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	89.1		
.75	89.1		
.5	83.8		
.375	78.5		
#4	66.5		
#10	55.5		
#30	35.1		
#40	25.2		
#60	13.9		
#100	9.5		
#200	6.5		

* (no specification provided)

Material Description

Pale Yellow

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 27.1388 D_{85}= 13.5577 D_{60}= 2.9220
D_{50}= 1.2919 D_{30}= 0.5016 D_{15}= 0.2686
D_{10}= 0.1648 C_u= 17.73 C_c= 0.52

Classification

USCS= AASHTO=

Remarks

Sample Number: LB2-03 S-6 20-22

Date: 9-27-23

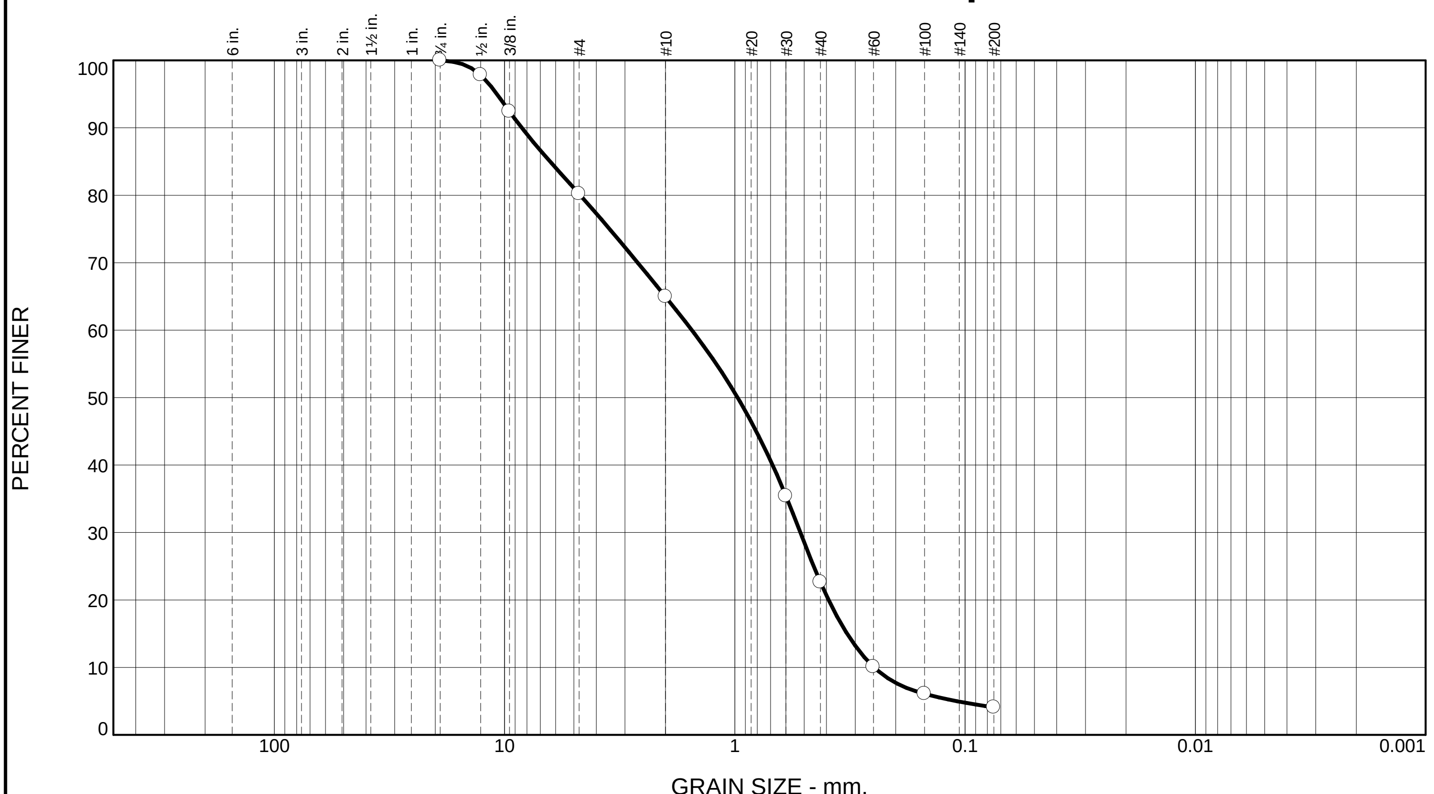
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	19.8	15.3	42.3	18.5	4.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	97.8		
.375	92.4		
#4	80.2		
#10	64.9		
#30	35.4		
#40	22.6		
#60	10.1		
#100	6.1		
#200	4.1		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 8.4206 D_{85}= 6.3453 D_{60}= 1.5372
D_{50}= 0.9726 D_{30}= 0.5194 D_{15}= 0.3255
D_{10}= 0.2484 C_u= 6.19 C_c= 0.71

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB2-04 S-2 7-9

Date: 9-27-23

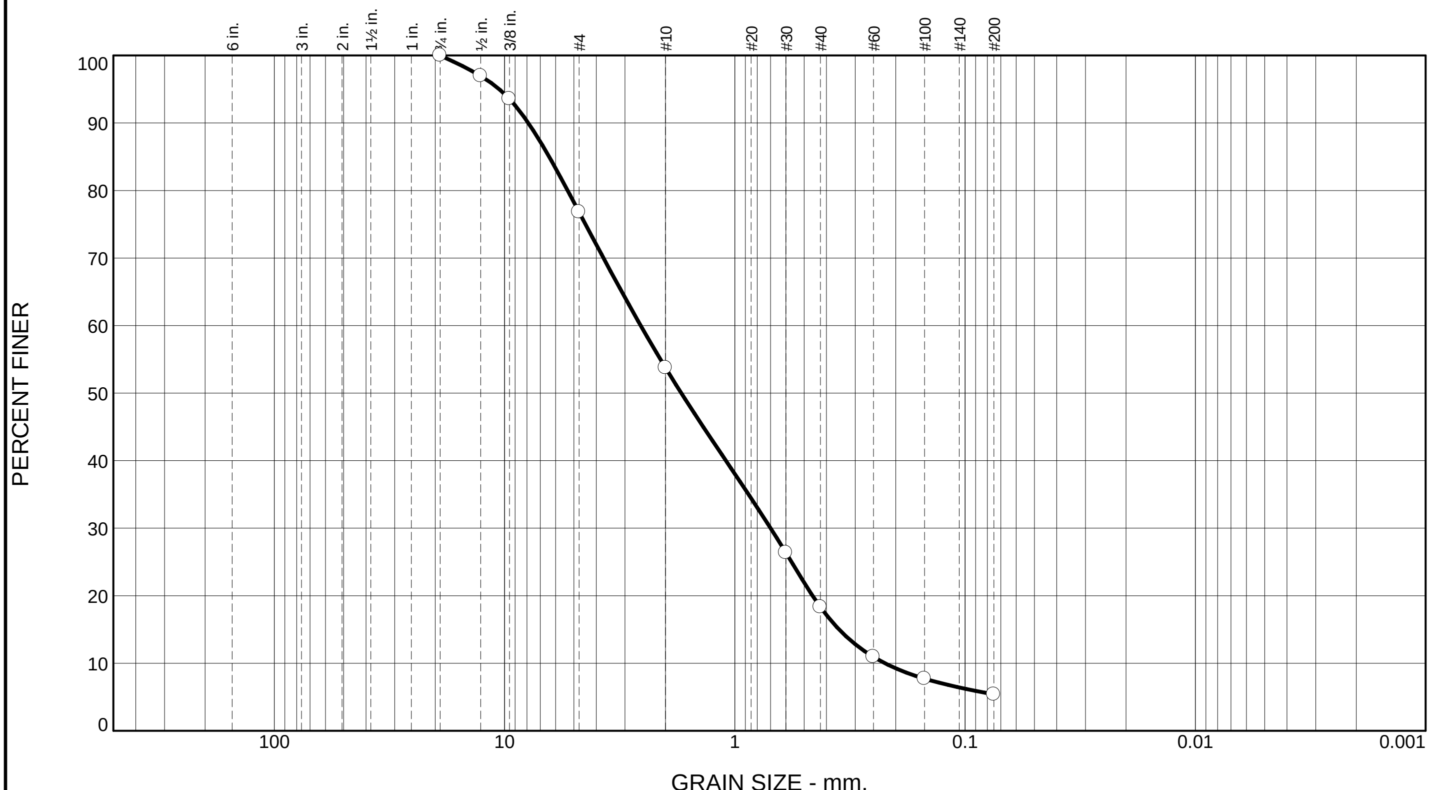
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	23.2	23.0	35.5	12.9	5.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	96.9		
.375	93.6		
#4	76.8		
#10	53.8		
#30	26.4		
#40	18.3		
#60	10.9		
#100	7.7		
#200	5.4		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 7.8893 D_{85}= 6.4051 D_{60}= 2.5632
D_{50}= 1.7079 D_{30}= 0.6994 D_{15}= 0.3526
D_{10}= 0.2231 C_u= 11.49 C_c= 0.86

Classification

USCS= AASHTO=

Remarks

Sample Number: LB2-04 S-6 20-22

Date: 9-27-23

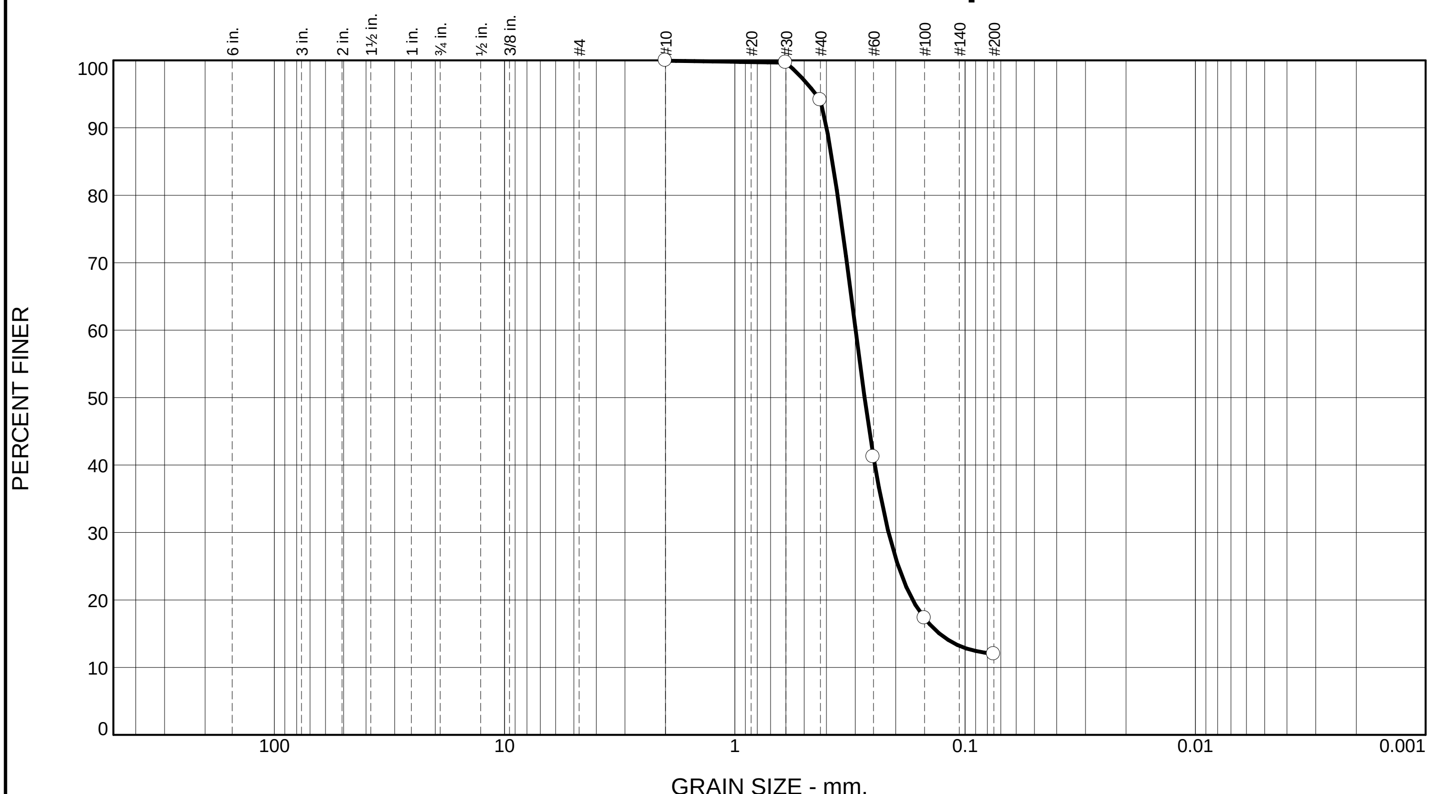
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
				5.9	82.1	12.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#30	99.7		
#40	94.1		
#60	41.2		
#100	17.3		
#200	12.0		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3997 D_{85}= 0.3768 D_{60}= 0.2989
D_{50}= 0.2732 D_{30}= 0.2150 D_{15}= 0.1291
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB2-04 S-21 95-97

Date: 9-27-23

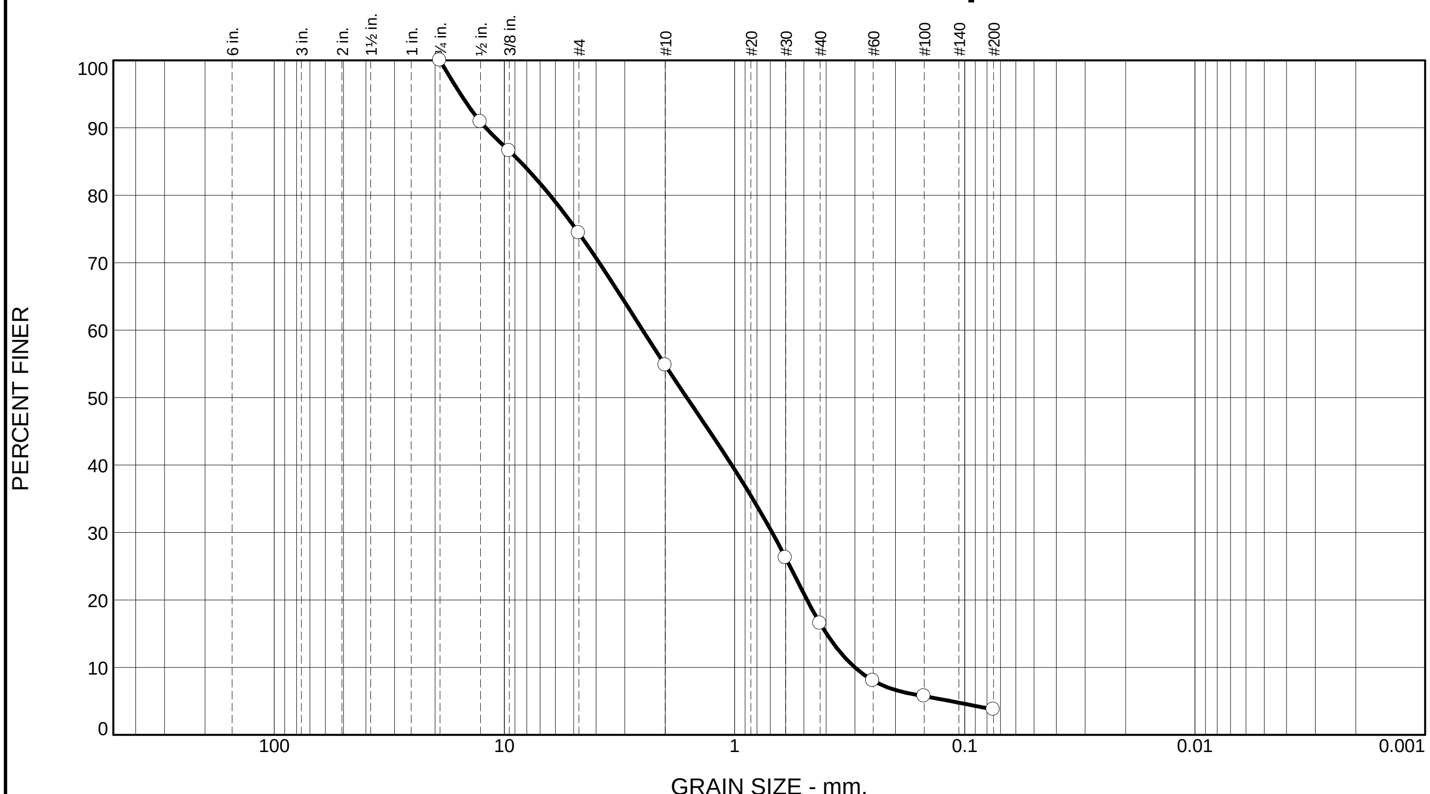
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	25.6	19.6	38.3	12.7	3.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	90.9		
.375	86.6		
#4	74.4		
#10	54.8		
#30	26.2		
#40	16.5		
#60	8.0		
#100	5.7		
#200	3.8		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 12.0682 D_{85}= 8.5493 D_{60}= 2.5088
D_{50}= 1.6125 D_{30}= 0.6869 D_{15}= 0.3988
D_{10}= 0.3003 C_u= 8.35 C_c= 0.63

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB2-05 S-1 5-7

Date: 9-27-23

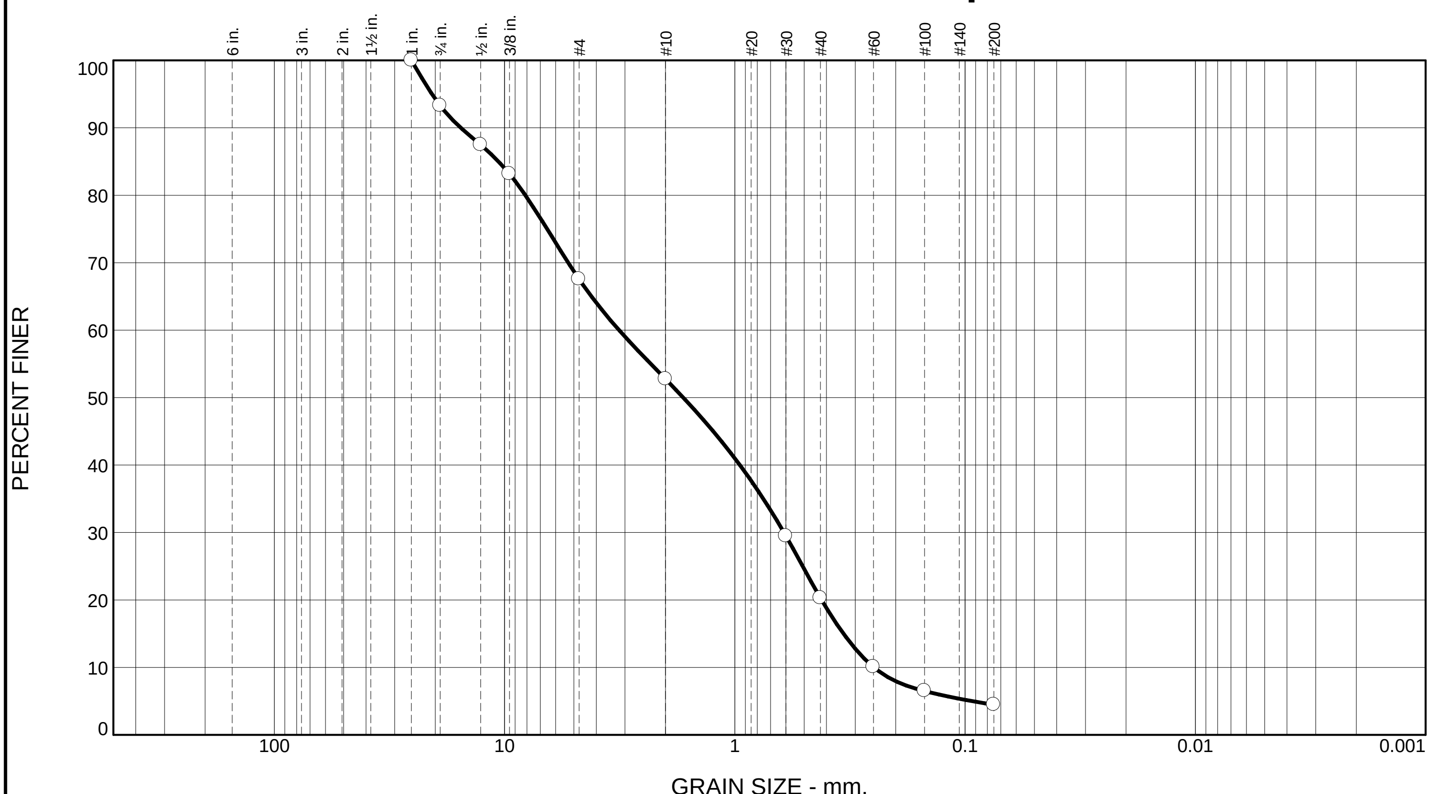
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.7	25.7	14.8	32.5	15.9	4.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	93.3		
.5	87.5		
.375	83.2		
#4	67.6		
#10	52.8		
#30	29.5		
#40	20.3		
#60	10.1		
#100	6.5		
#200	4.4		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 15.4907 D_{85}= 10.6314 D_{60}= 3.1817
D_{50}= 1.6758 D_{30}= 0.6119 D_{15}= 0.3375
D_{10}= 0.2488 C_u= 12.79 C_c= 0.47

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB2-05 S-5 15-17

Date: 9-27-23

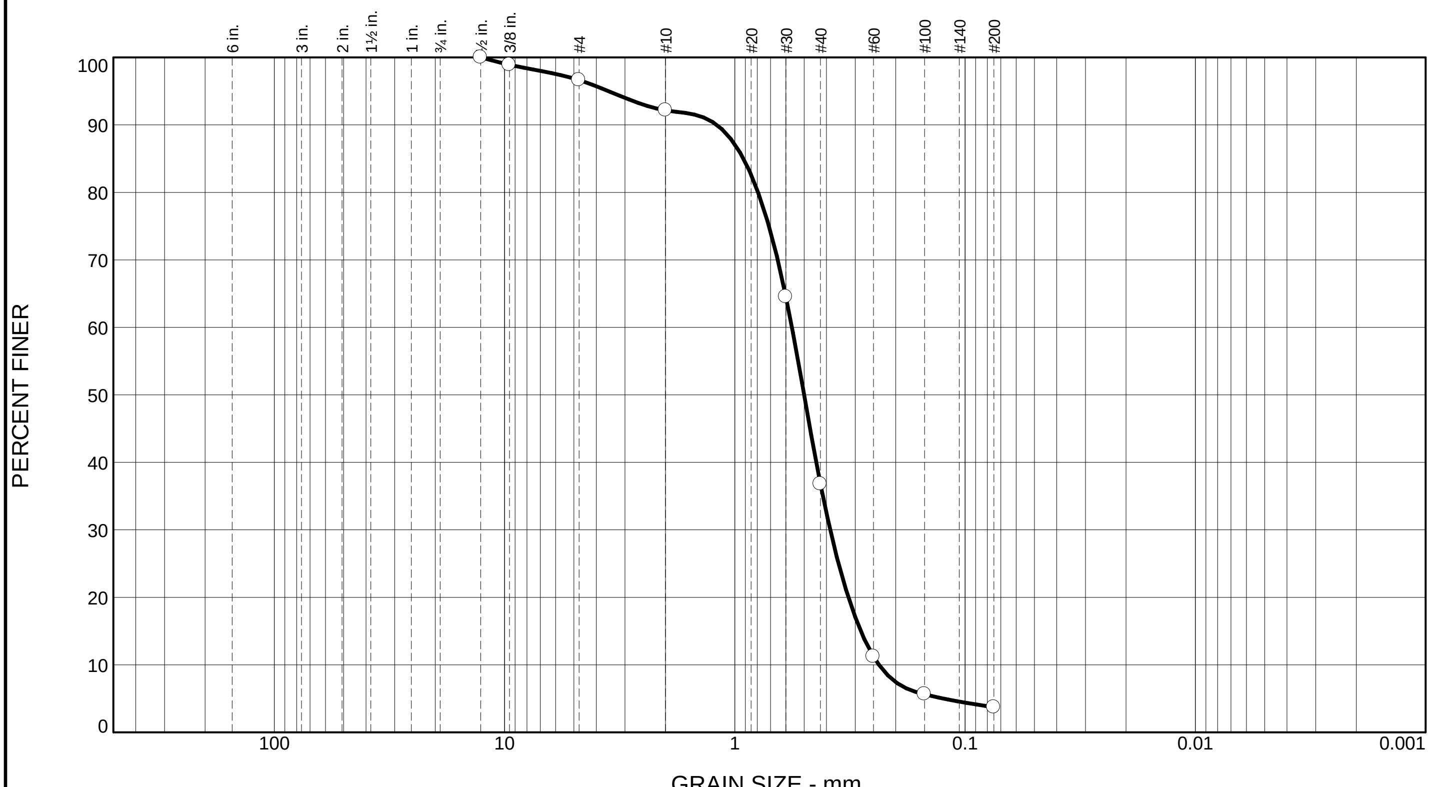
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.4	4.4	55.4	33.1	3.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	98.9		
#4	96.6		
#10	92.2		
#30	64.5		
#40	36.8		
#60	11.2		
#100	5.6		
#200	3.7		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.1971 D_{85}= 0.9177 D_{60}= 0.5651
D_{50}= 0.5003 D_{30}= 0.3854 D_{15}= 0.2839
D_{10}= 0.2367 C_u= 2.39 C_c= 1.11

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB2-05 S-11 45-47

Date: 9-27-23

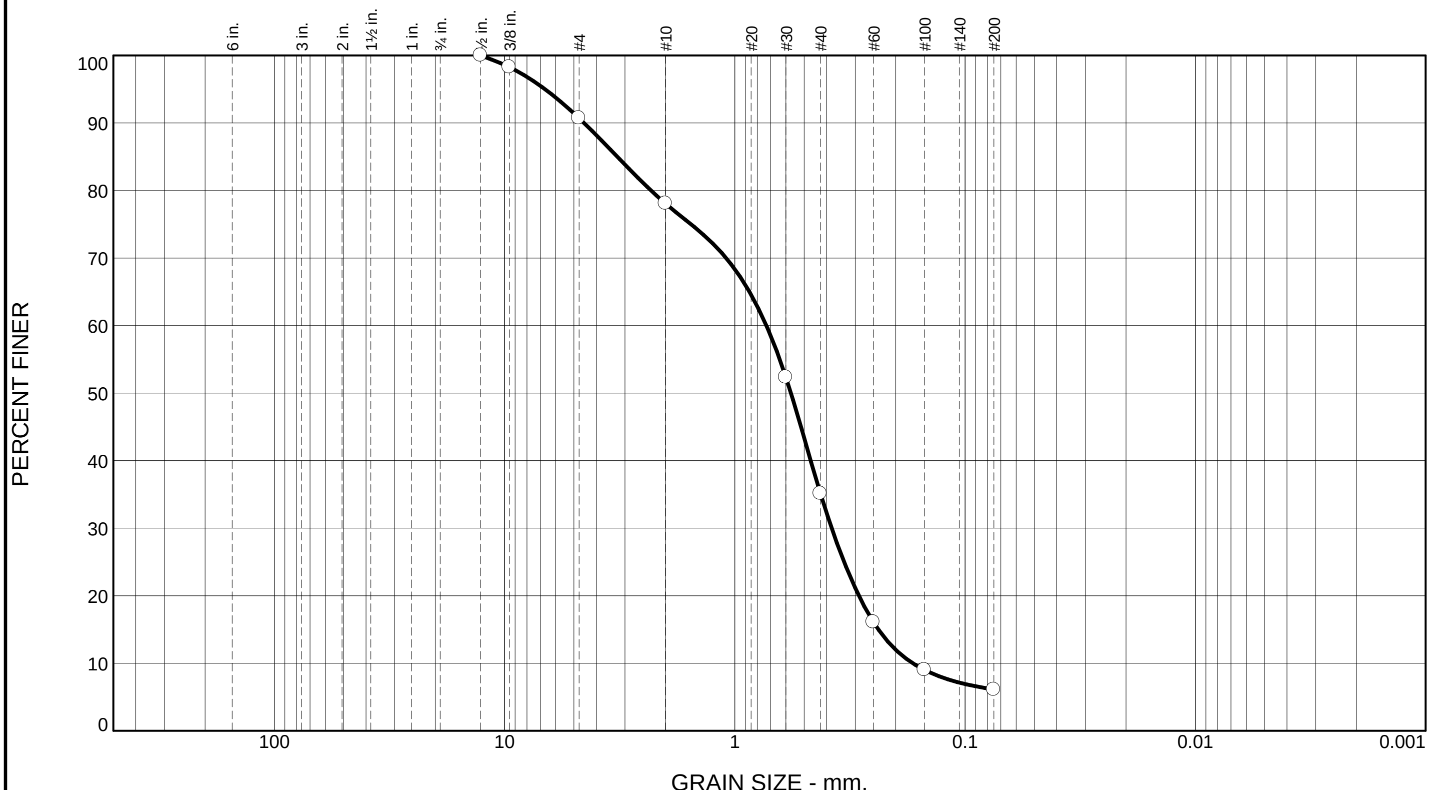
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	9.3	12.6	43.0	29.0	6.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	98.3		
#4	90.7		
#10	78.1		
#30	52.3		
#40	35.1		
#60	16.1		
#100	9.0		
#200	6.1		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 4.5172 D_{85}= 3.2379 D_{60}= 0.7297
D_{50}= 0.5707 D_{30}= 0.3798 D_{15}= 0.2380
D_{10}= 0.1688 C_u= 4.32 C_c= 1.17

Classification

USCS= AASHTO=

Remarks

Sample Number: LB2-06 S-4 11-13

Date: 9-27-23

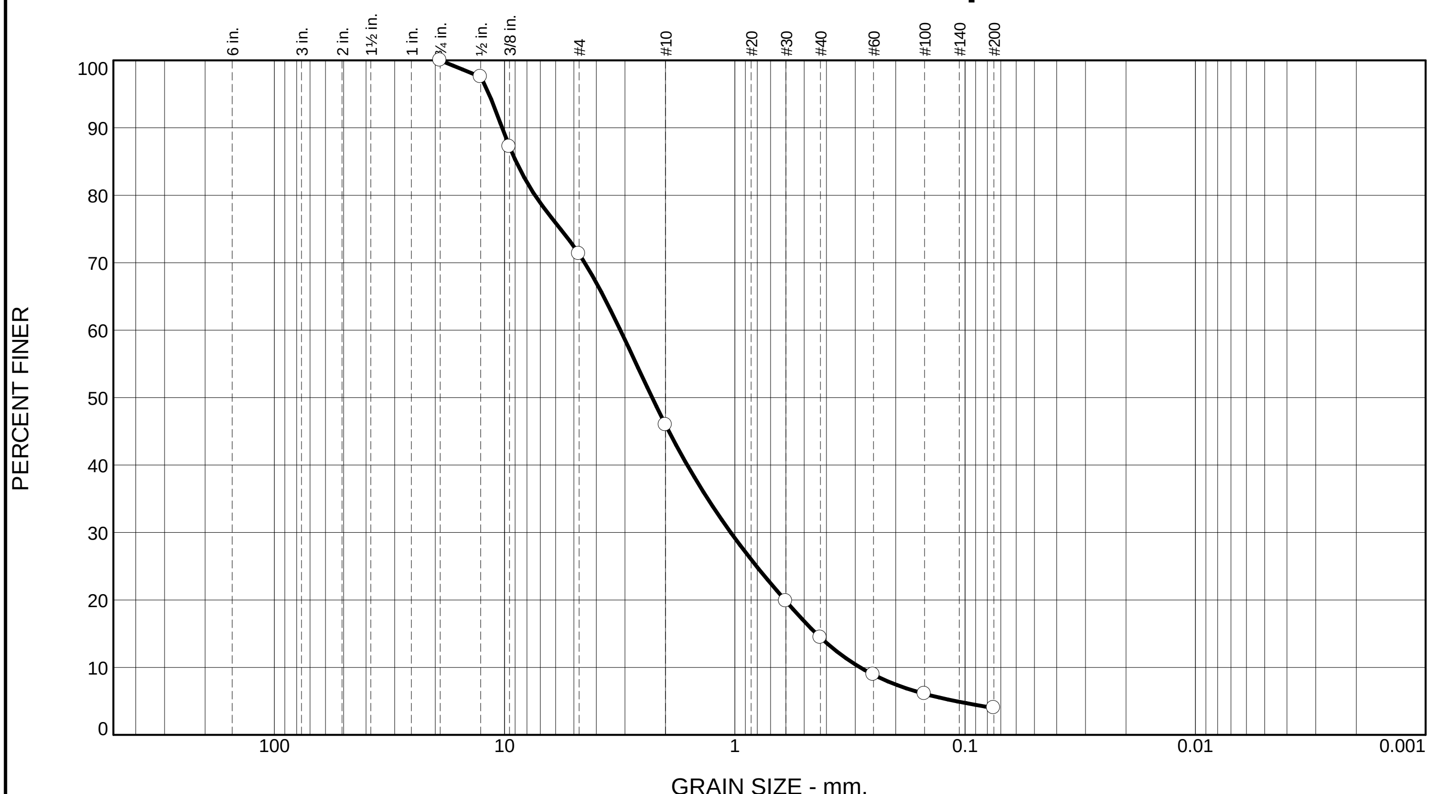
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	28.7	25.3	31.6	10.4	4.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	97.6		
.375	87.2		
#4	71.3		
#10	46.0		
#30	19.8		
#40	14.4		
#60	8.9		
#100	6.1		
#200	4.0		

* (no specification provided)

Material Description

Pale Yellow

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 10.2512 D_{85}= 8.9172 D_{60}= 3.1423
D_{50}= 2.2861 D_{30}= 1.0418 D_{15}= 0.4425
D_{10}= 0.2855 C_u= 11.00 C_c= 1.21

Classification

USCS= SW AASHTO=

Remarks

Sample Number: LB2-06 S-8 30-32

Date: 9-27-23

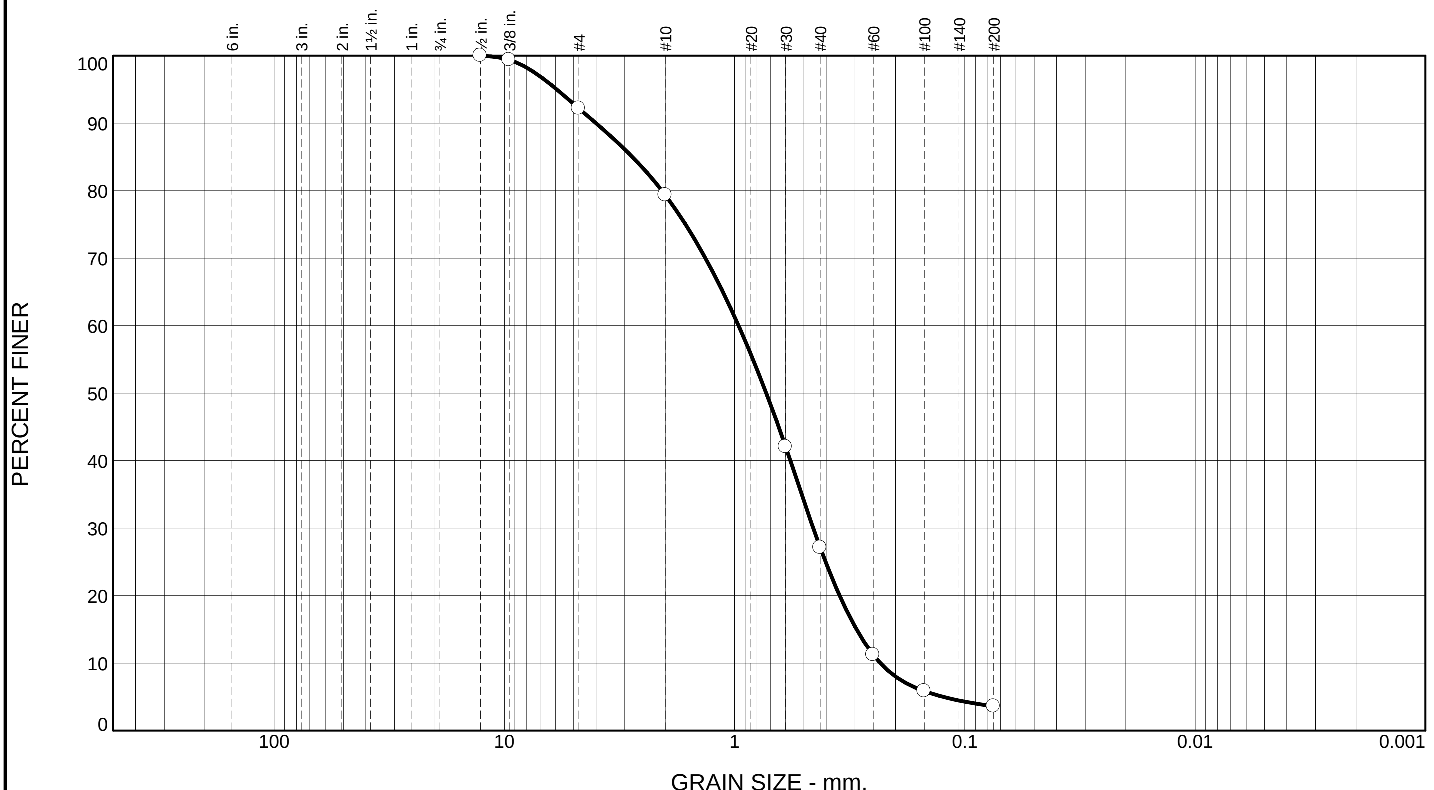
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.8	12.9	52.2	23.5	3.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	99.4		
#4	92.2		
#10	79.3		
#30	42.0		
#40	27.1		
#60	11.2		
#100	5.8		
#200	3.6		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 4.0027 D_{85}= 2.7800 D_{60}= 0.9612
D_{50}= 0.7288 D_{30}= 0.4556 D_{15}= 0.2956
D_{10}= 0.2329 C_u= 4.13 C_c= 0.93

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB2-07 S-3 9-11

Date: 9-27-23

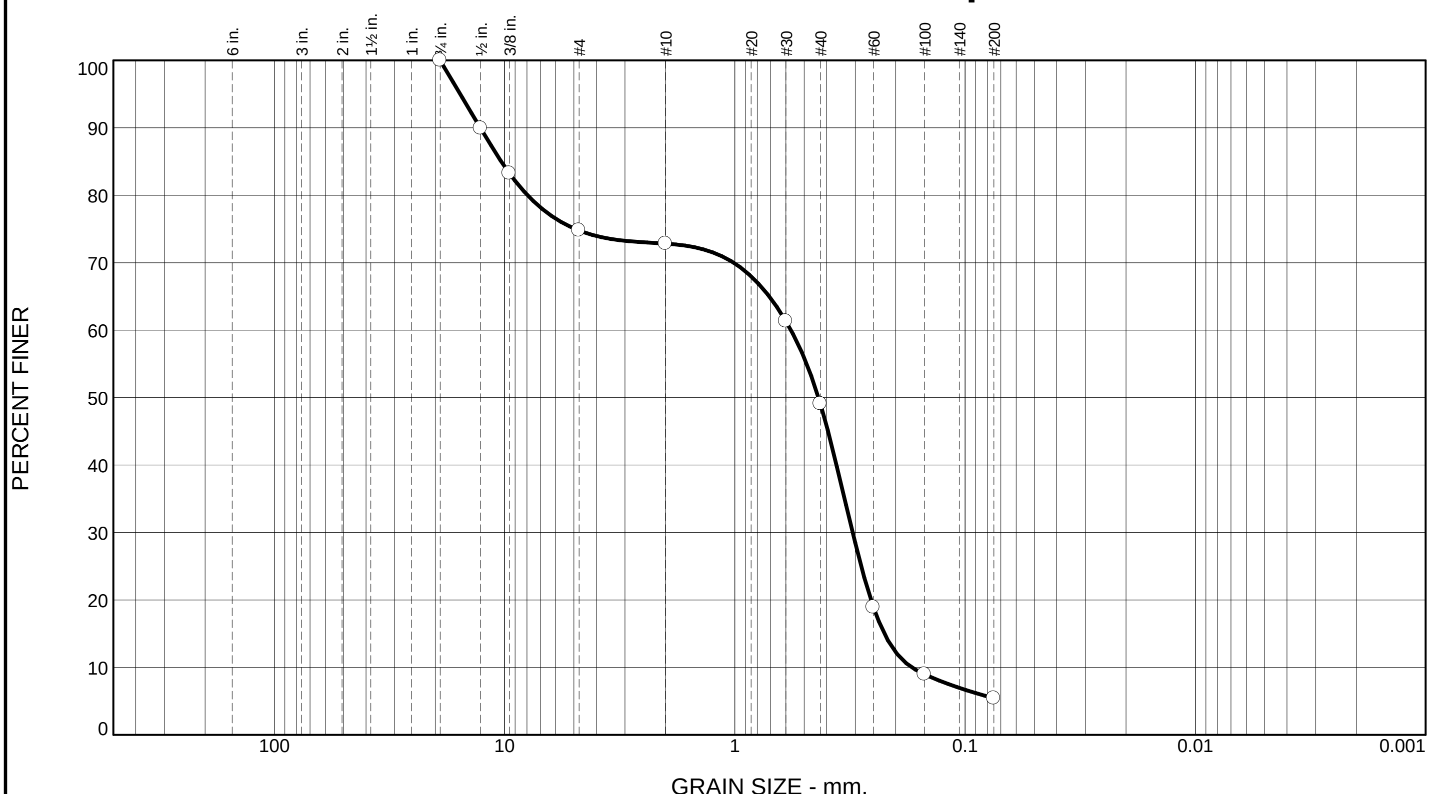
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	25.2	2.0	23.7	43.7	5.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	89.9		
.375	83.2		
#4	74.8		
#10	72.8		
#30	61.3		
#40	49.1		
#60	18.9		
#100	9.0		
#200	5.4		

* (no specification provided)

Material Description

Pale Yellow

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 12.7453 D_{85}= 10.3393 D_{60}= 0.5707

D_{50}= 0.4331 D_{30}= 0.3078 D_{15}= 0.2243

D_{10}= 0.1704 C_u= 3.35 C_c= 0.97

Classification

USCS= AASHTO=

Remarks

Sample Number: LB2-07 S-11 50-52

Date: 9-27-23

RSA Geolab

Union, New Jersey

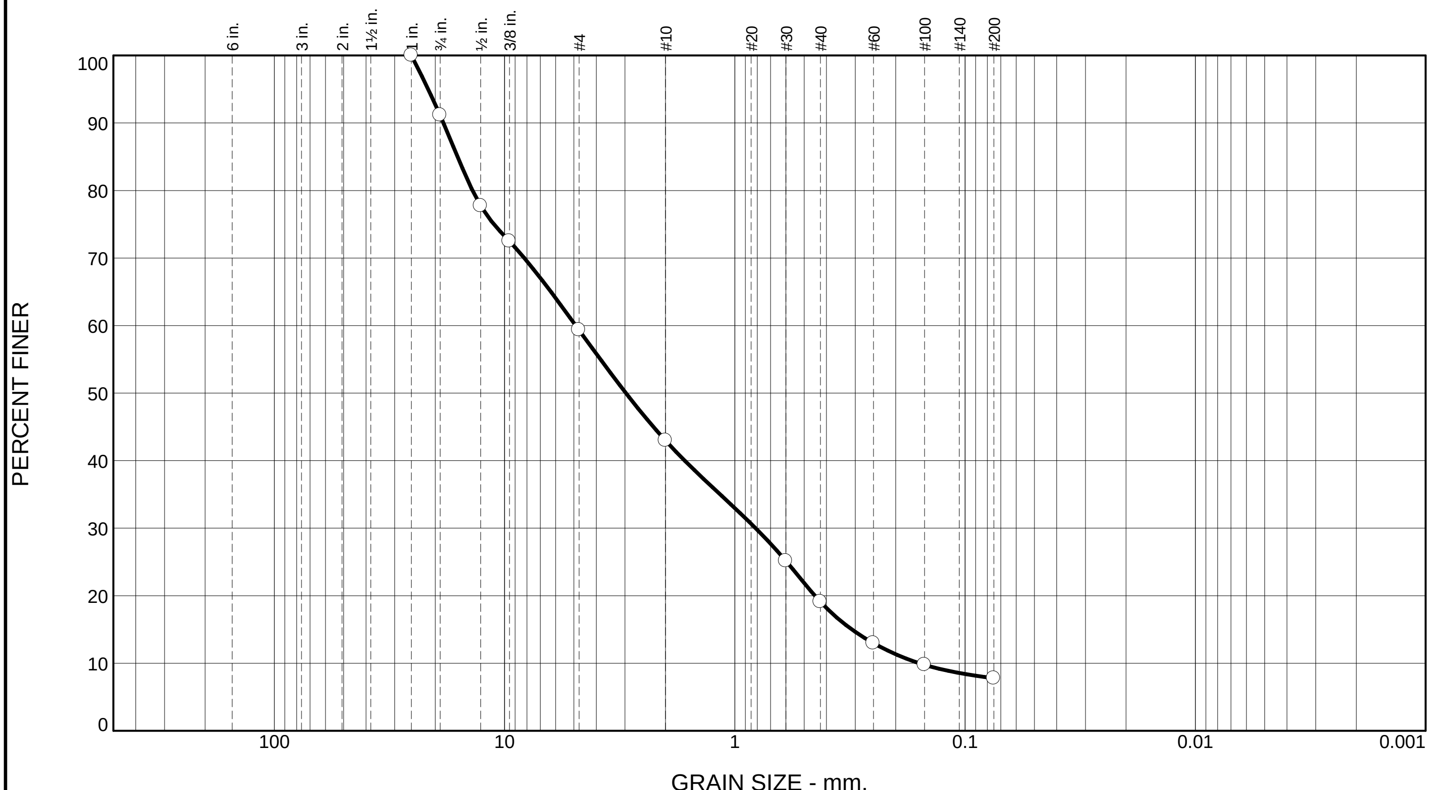
Client: Langan Engineering

Project: Sands New York , Hempstead, NY
Project# not provided

Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	8.9	31.8	16.3	23.9	11.3	7.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	91.1		
.5	77.7		
.375	72.5		
#4	59.3		
#10	43.0		
#30	25.1		
#40	19.1		
#60	13.0		
#100	9.8		
#200	7.8		

* (no specification provided)

Material Description

Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 18.4261 D_{85}= 16.0093 D_{60}= 4.9090
D_{50}= 2.9713 D_{30}= 0.8126 D_{15}= 0.3105
D_{10}= 0.1578 C_u= 31.11 C_c= 0.85

Classification

USCS= AASHTO=

Remarks

Sample Number: LB2-08 S-2 8-10

Date: 9-27-23

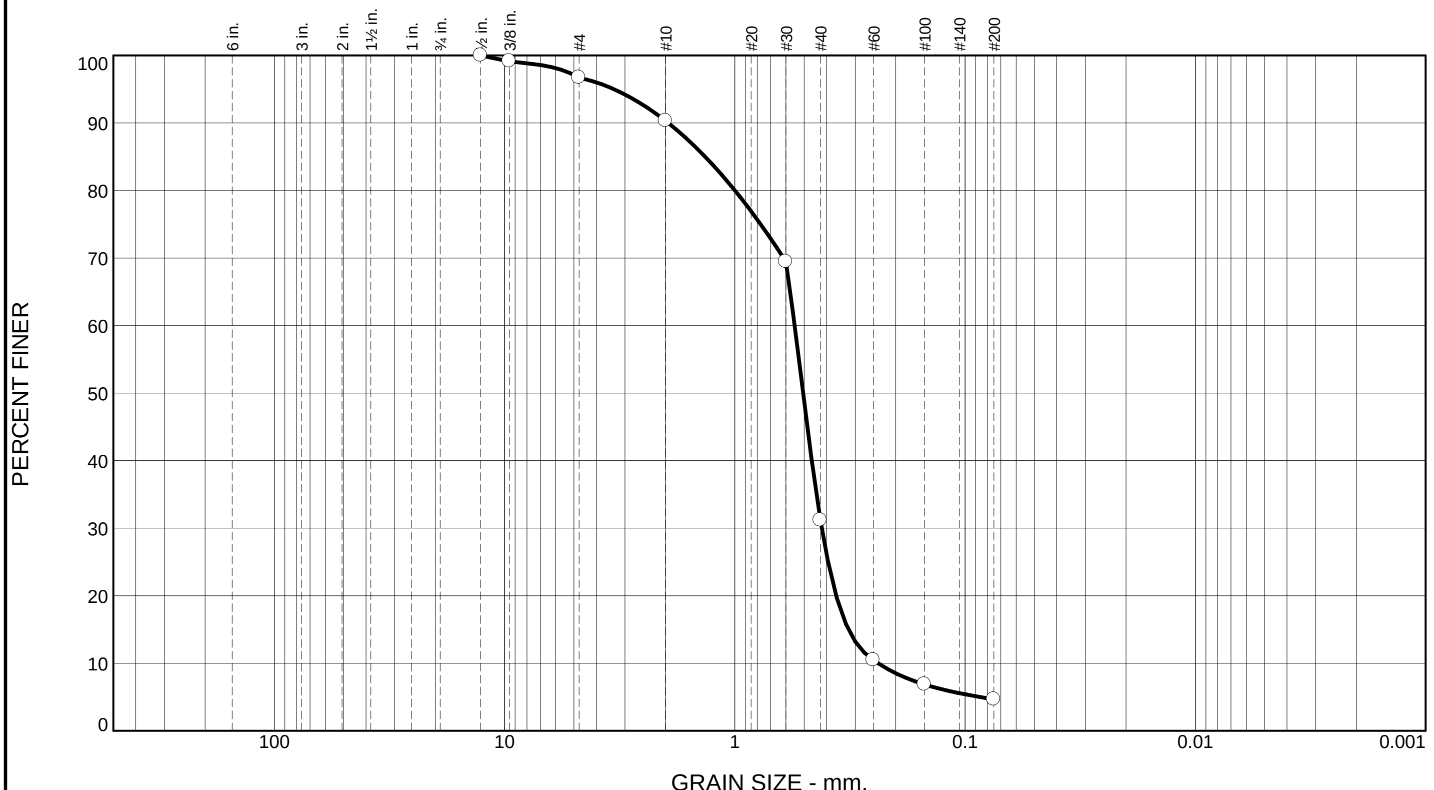
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.3	6.4	59.1	26.5	4.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	99.2		
#4	96.7		
#10	90.3		
#30	69.5		
#40	31.2		
#60	10.5		
#100	6.9		
#200	4.7		

* (no specification provided)

Material Description

Pale Yellow

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.9452 D_{85}= 1.3459 D_{60}= 0.5500
D_{50}= 0.5052 D_{30}= 0.4194 D_{15}= 0.3213
D_{10}= 0.2386 C_u= 2.31 C_c= 1.34

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB2-08 S-5 20-22

Date: 9-27-23

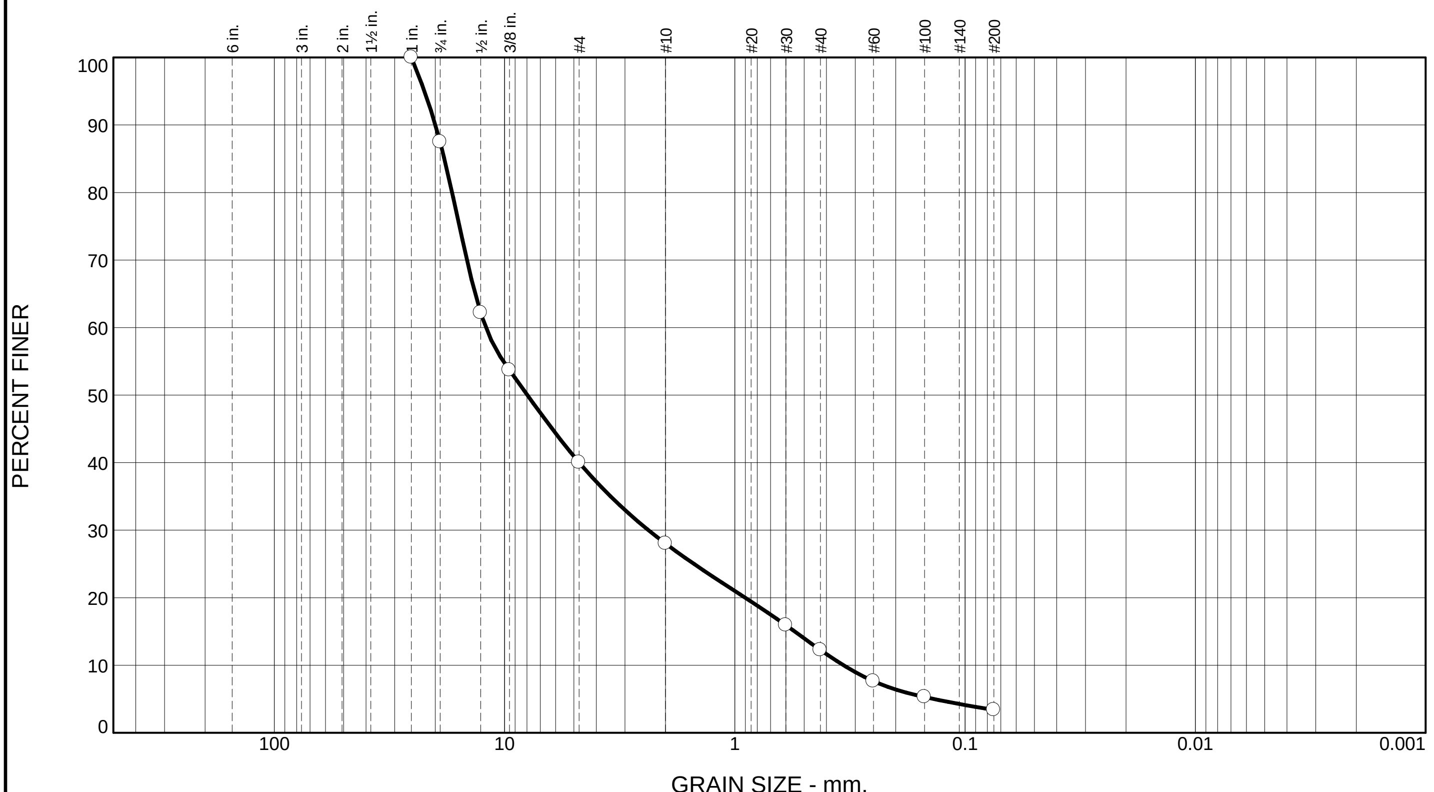
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	12.5	47.5	12.0	15.7	8.9	3.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	87.5		
.5	62.2		
.375	53.7		
#4	40.0		
#10	28.0		
#30	15.9		
#40	12.3		
#60	7.6		
#100	5.3		
#200	3.4		

* (no specification provided)

Material Description

Pale Yellow

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 19.9659 D_{85}= 18.2640 D_{60}= 12.0661
D_{50}= 7.9597 D_{30}= 2.3724 D_{15}= 0.5497
D_{10}= 0.3373 C_u= 35.77 C_c= 1.38

Classification

USCS= GW AASHTO=

Remarks

Sample Number: LB2-09 S-5 15-17

Date: 9-27-23

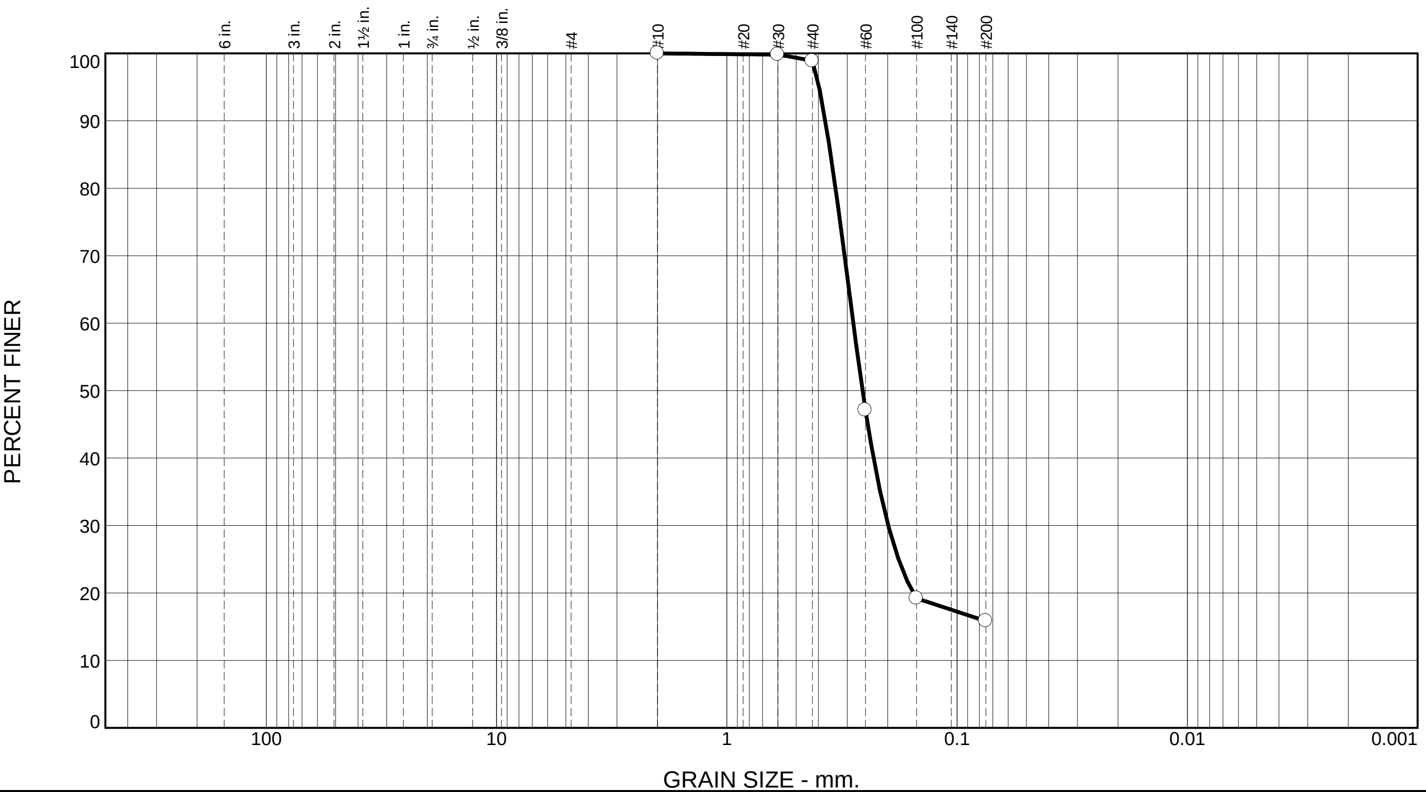
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.1	83.1	15.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#30	99.8		
#40	98.9		
#60	47.1		
#100	19.2		
#200	15.8		

* (no specification provided)

Material Description

Light Gray

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3733 D_{85}= 0.3539 D_{60}= 0.2824
D_{50}= 0.2574 D_{30}= 0.1991 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB2-09 S-16 70-72

Date: 9-27-23

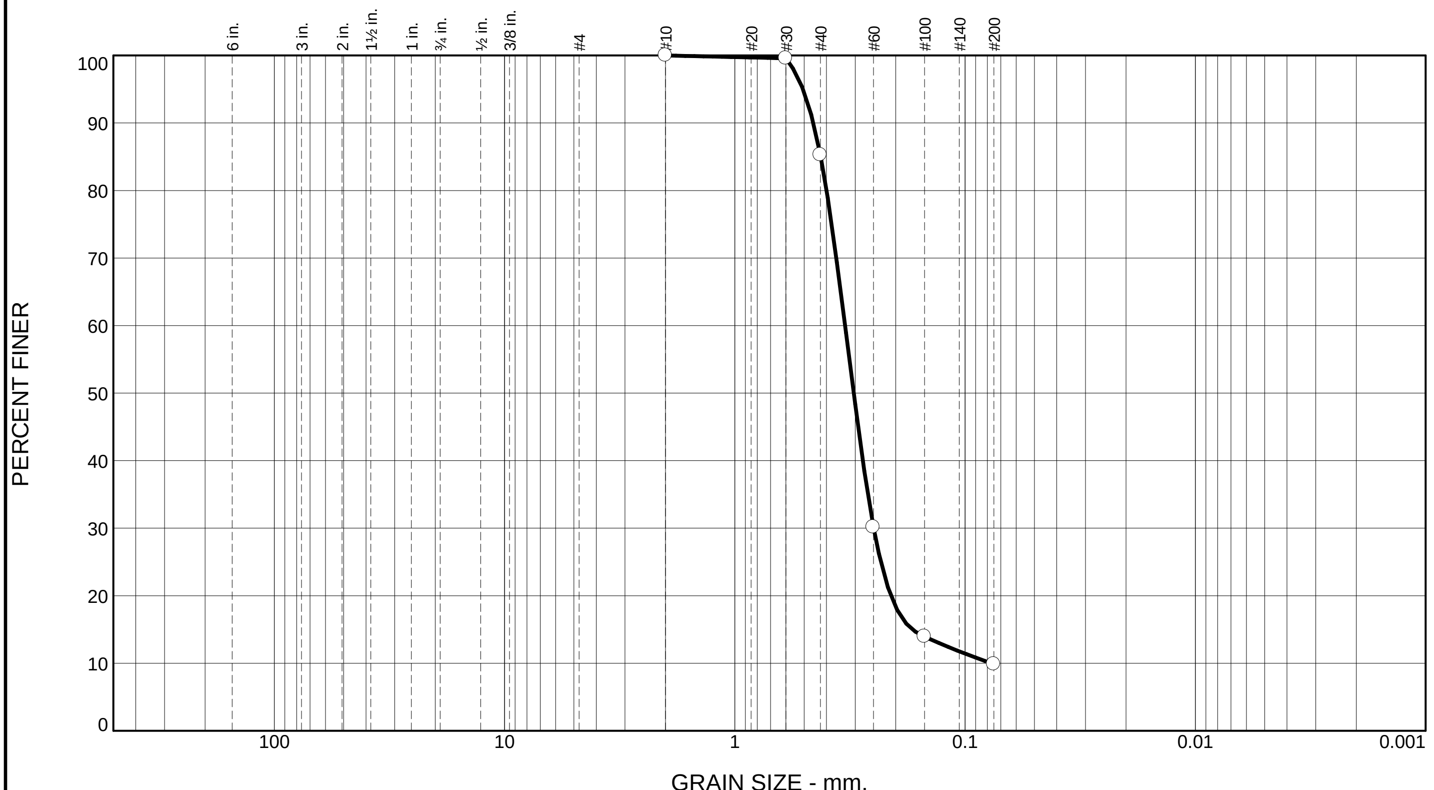
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	14.7	75.4	9.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#30	99.6		
#40	85.3		
#60	30.1		
#100	13.9		
#200	9.9		

* (no specification provided)

Material Description

Pale Yellow

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.4557 D_{85}= 0.4236 D_{60}= 0.3320
D_{50}= 0.3046 D_{30}= 0.2496 D_{15}= 0.1694
D_{10}= 0.0770 C_u= 4.31 C_c= 2.43

Classification

USCS= AASHTO=

Remarks

Sample Number: LB2-09 S-20 90-92

Date: 9-27-23

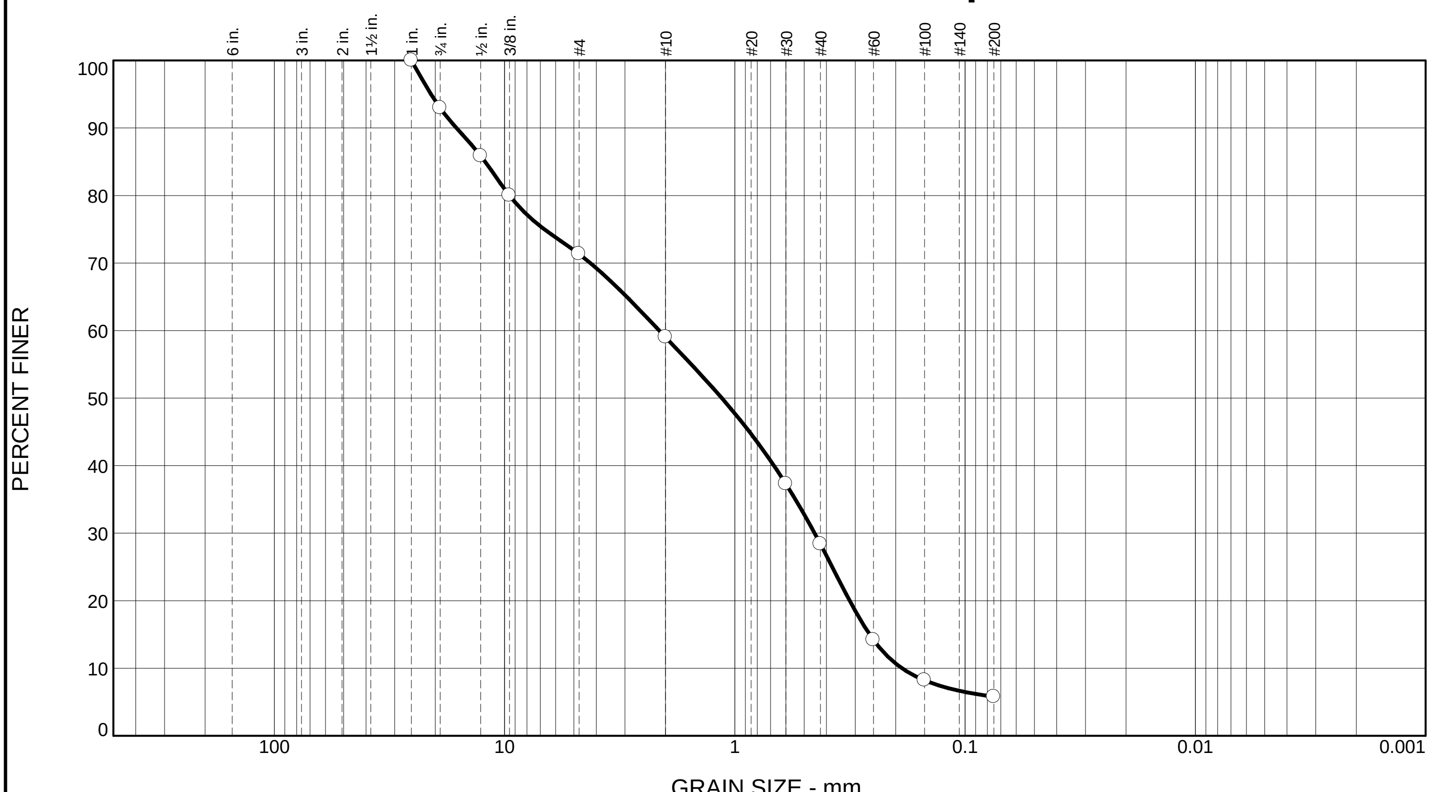
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.0	21.7	12.3	30.6	22.6	5.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	93.0		
.5	85.9		
.375	80.0		
#4	71.3		
#10	59.0		
#30	37.3		
#40	28.4		
#60	14.2		
#100	8.2		
#200	5.8		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 16.1923 D_{85}= 12.1472 D_{60}= 2.1301
D_{50}= 1.1393 D_{30}= 0.4504 D_{15}= 0.2598
D_{10}= 0.1882 C_u= 11.32 C_c= 0.51

Classification

USCS= AASHTO=

Remarks

Sample Number: LB2-10 S-2 8-10

Date: 9-27-23

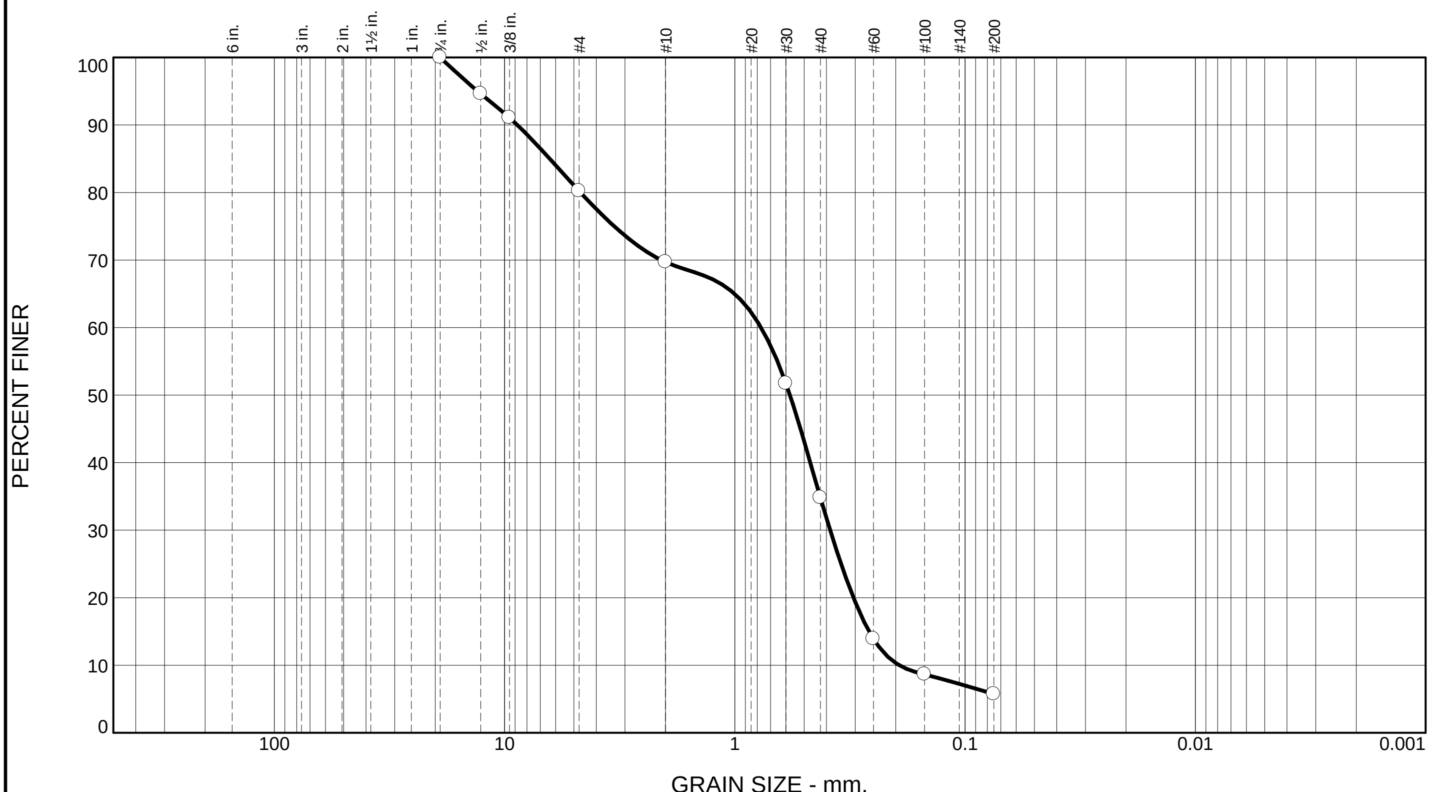
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	19.8	10.5	34.9	29.1	5.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	94.6		
.375	91.1		
#4	80.2		
#10	69.7		
#30	51.7		
#40	34.8		
#60	13.9		
#100	8.6		
#200	5.7		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 8.8077 D_{85}= 6.3668 D_{60}= 0.7694
D_{50}= 0.5764 D_{30}= 0.3856 D_{15}= 0.2613
D_{10}= 0.1932 C_u= 3.98 C_c= 1.00

Classification

USCS= AASHTO=

Remarks

Sample Number: LB2-10 S-5 20-22

Date: 9-27-23

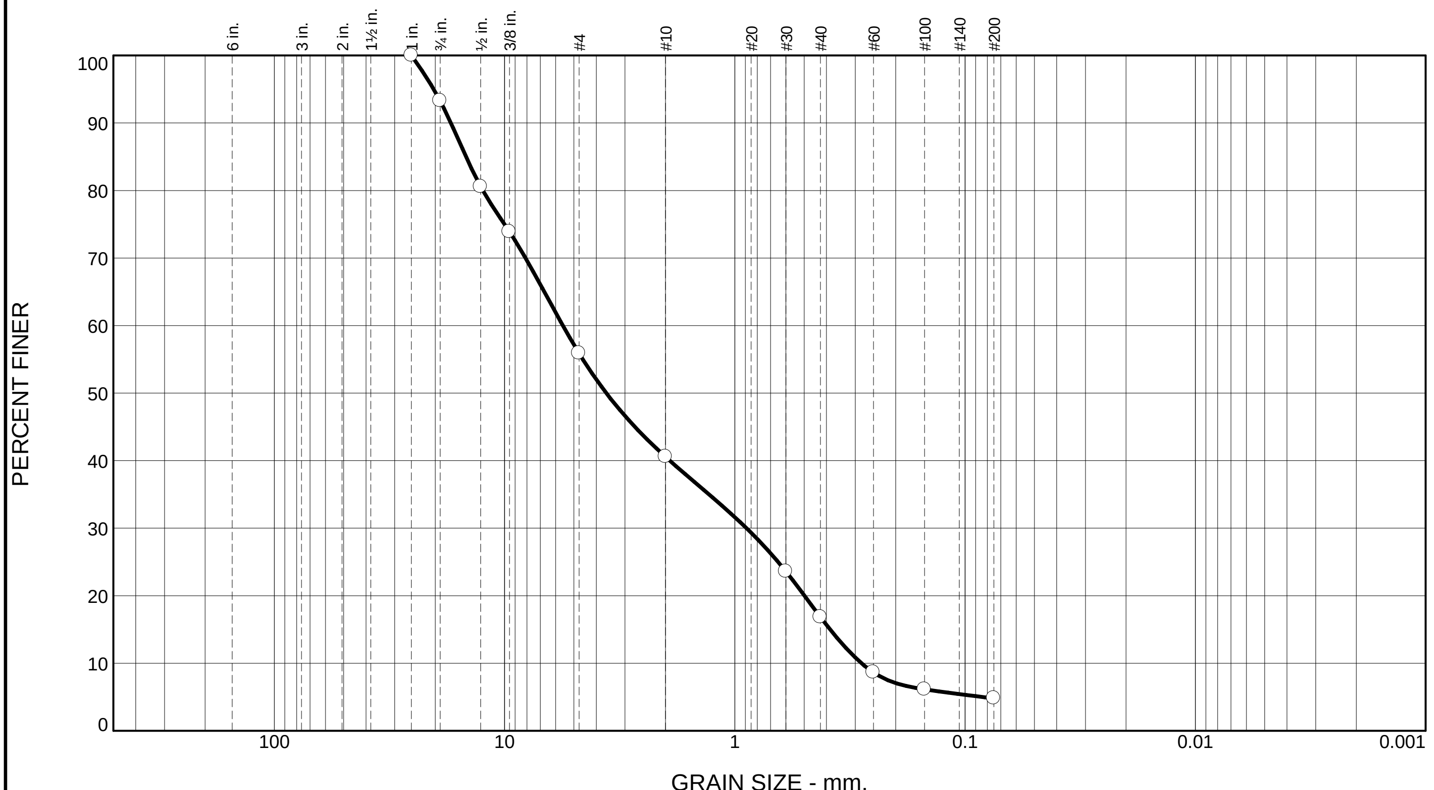
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.7	37.4	15.3	23.8	12.0	4.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	93.3		
.5	80.6		
.375	73.9		
#4	55.9		
#10	40.6		
#30	23.6		
#40	16.8		
#60	8.6		
#100	6.1		
#200	4.8		

* (no specification provided)

Material Description

Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 17.1072 D_{85}= 14.6965 D_{60}= 5.5832
D_{50}= 3.6160 D_{30}= 0.8901 D_{15}= 0.3857
D_{10}= 0.2818 C_u= 19.81 C_c= 0.50

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB2-11 S-1 5-7

Date: 9-27-23

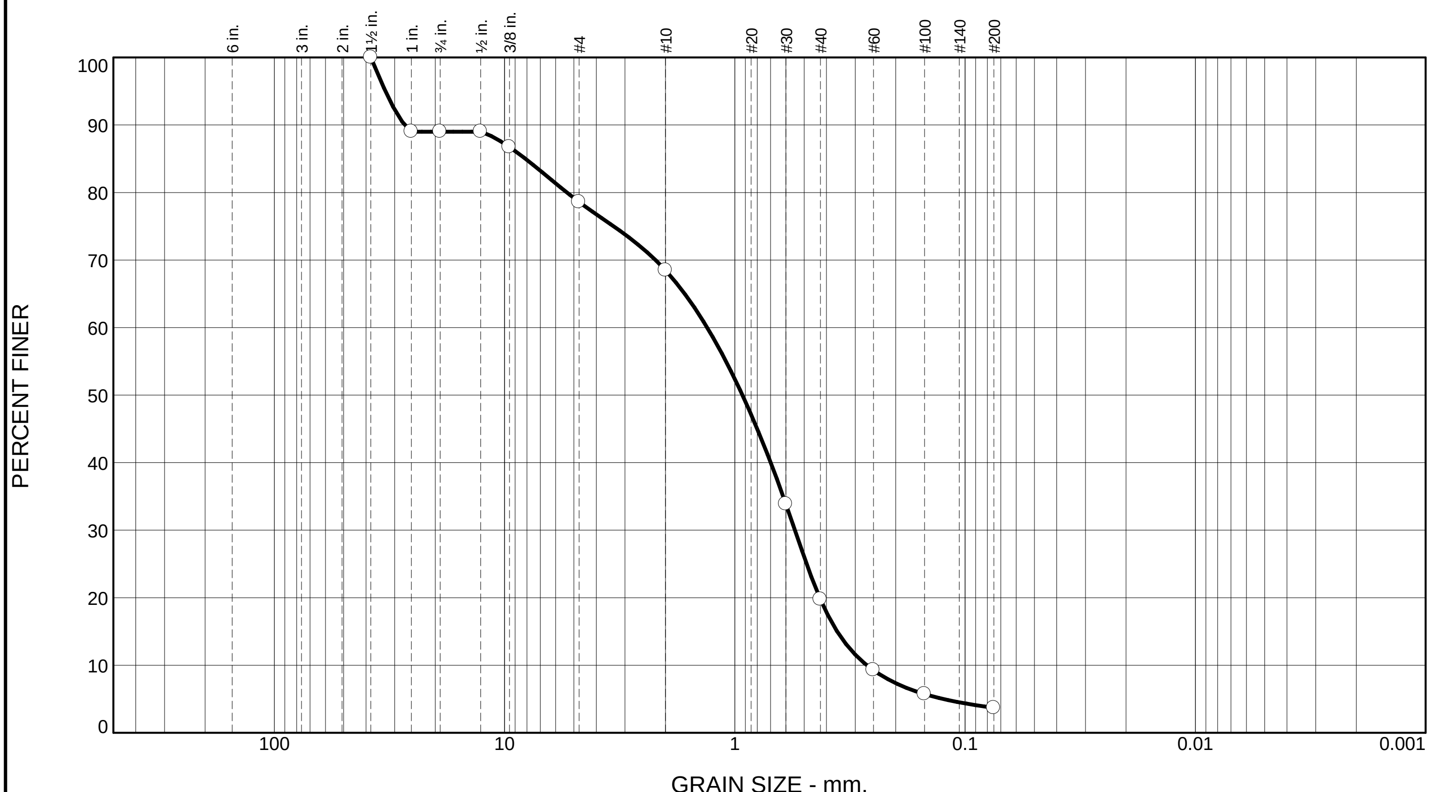
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	11.0	10.4	10.1	48.7	16.1	3.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	89.0		
.75	89.0		
.5	89.0		
.375	86.7		
#4	78.6		
#10	68.5		
#30	33.8		
#40	19.8		
#60	9.3		
#100	5.7		
#200	3.7		

* (no specification provided)

Material Description

Pale Yellow

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 27.1851 D_{85}= 8.1237 D_{60}= 1.3188
D_{50}= 0.9268 D_{30}= 0.5485 D_{15}= 0.3595
D_{10}= 0.2671 C_u= 4.94 C_c= 0.85

Classification

USCS= SP AASHTO=

Remarks

Sample Number: LB2-11 S-5 15-17

Date: 9-27-23

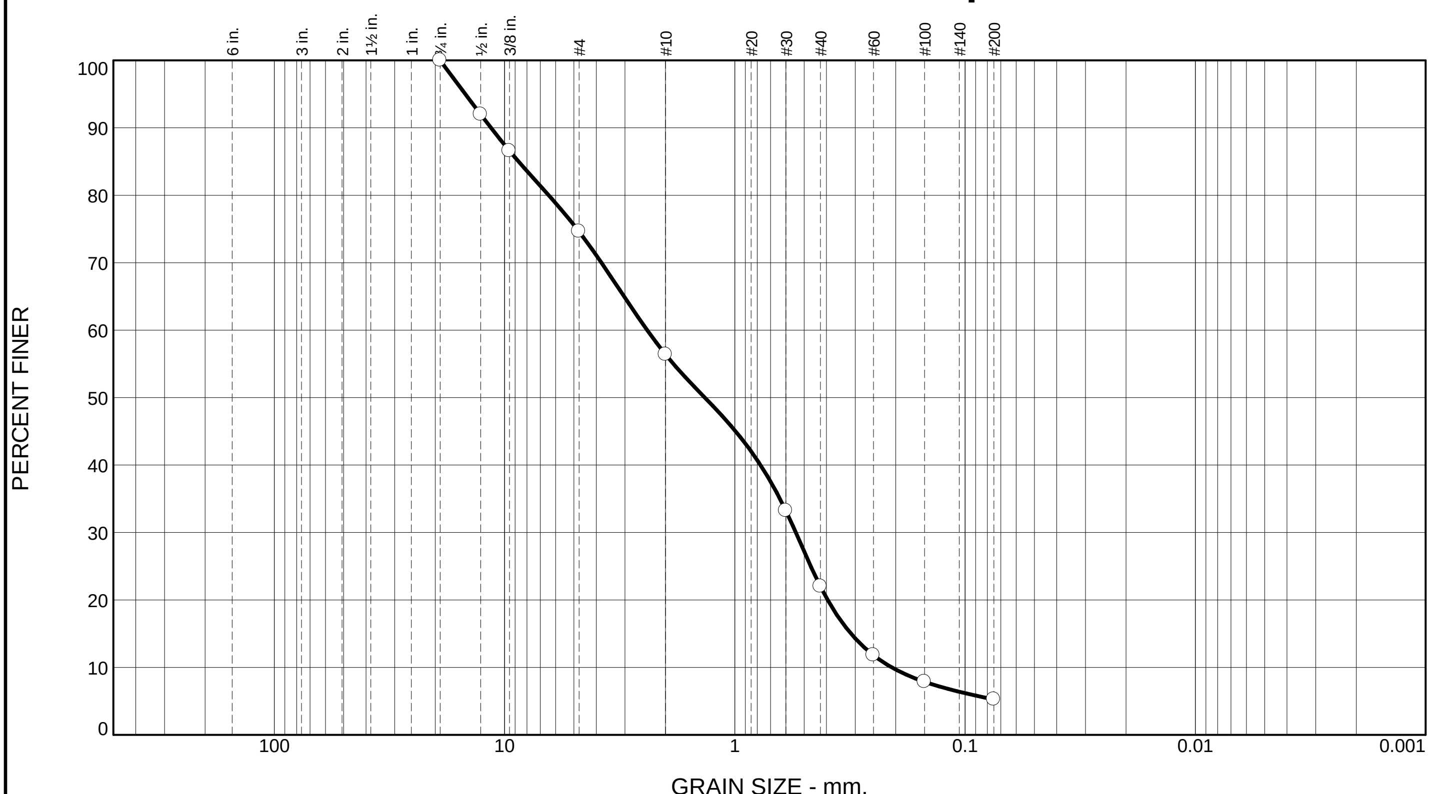
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	25.4	18.2	34.4	16.7	5.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	92.0		
.375	86.6		
#4	74.6		
#10	56.4		
#30	33.2		
#40	22.0		
#60	11.8		
#100	7.9		
#200	5.3		

* (no specification provided)

Material Description

Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 11.4578 D_{85}= 8.6951 D_{60}= 2.4021
D_{50}= 1.3501 D_{30}= 0.5433 D_{15}= 0.3130
D_{10}= 0.2082 C_u= 11.54 C_c= 0.59

Classification

USCS= AASHTO=

Remarks

Sample Number: LB2-12 S-4 15-17

Date: 9-27-23

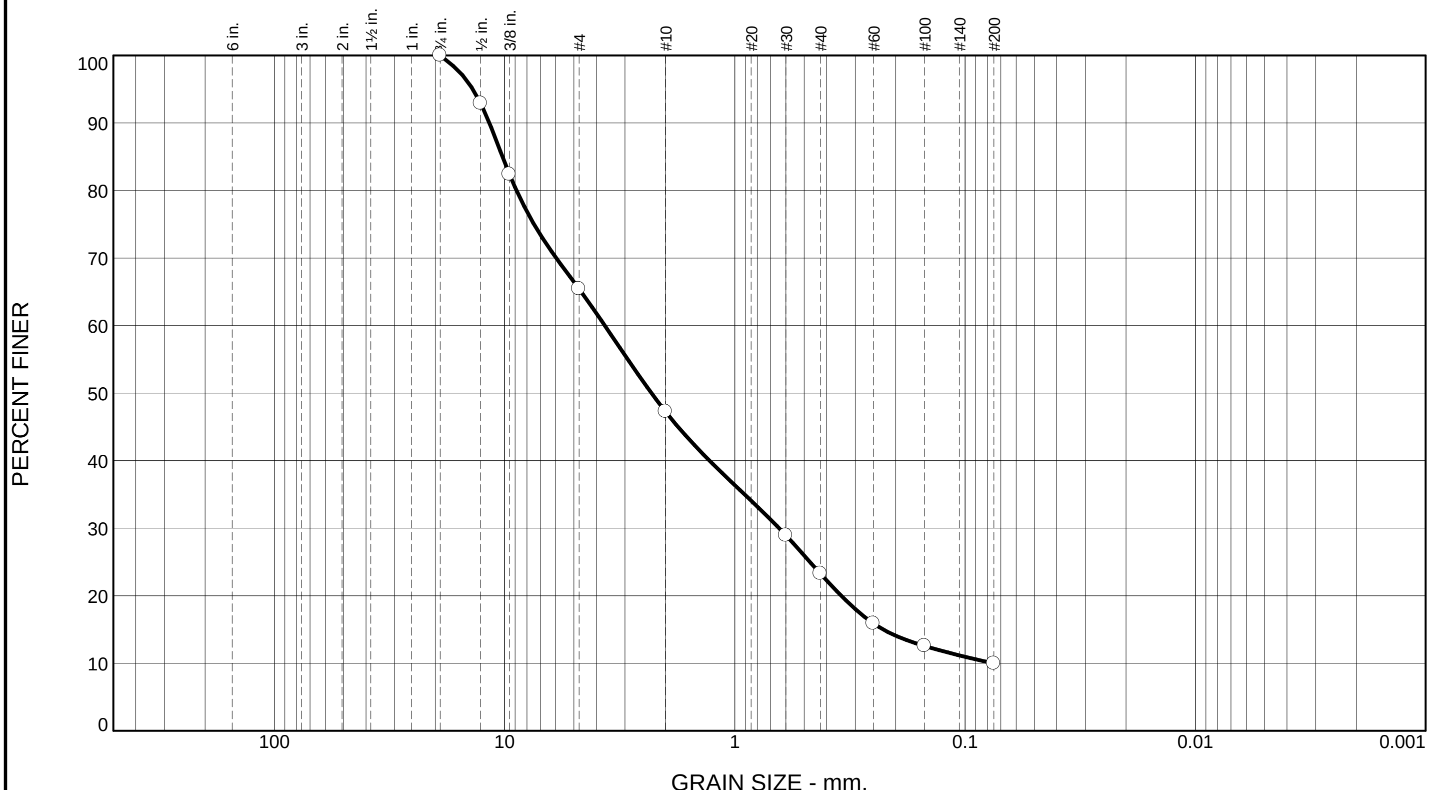
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	34.6	18.1	24.0	13.3	10.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	92.9		
.375	82.4		
#4	65.4		
#10	47.3		
#30	28.9		
#40	23.3		
#60	15.9		
#100	12.6		
#200	10.0		

* (no specification provided)

Material Description

Pale Yellow

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 11.6472 D_{85}= 10.2139 D_{60}= 3.6712
D_{50}= 2.3023 D_{30}= 0.6427 D_{15}= 0.2267
D_{10}= 0.0758 C_u= 48.41 C_c= 1.48

Classification

USCS= AASHTO=

Remarks

Sample Number: LB2-13 S-4 15-17

Date: 9-27-23

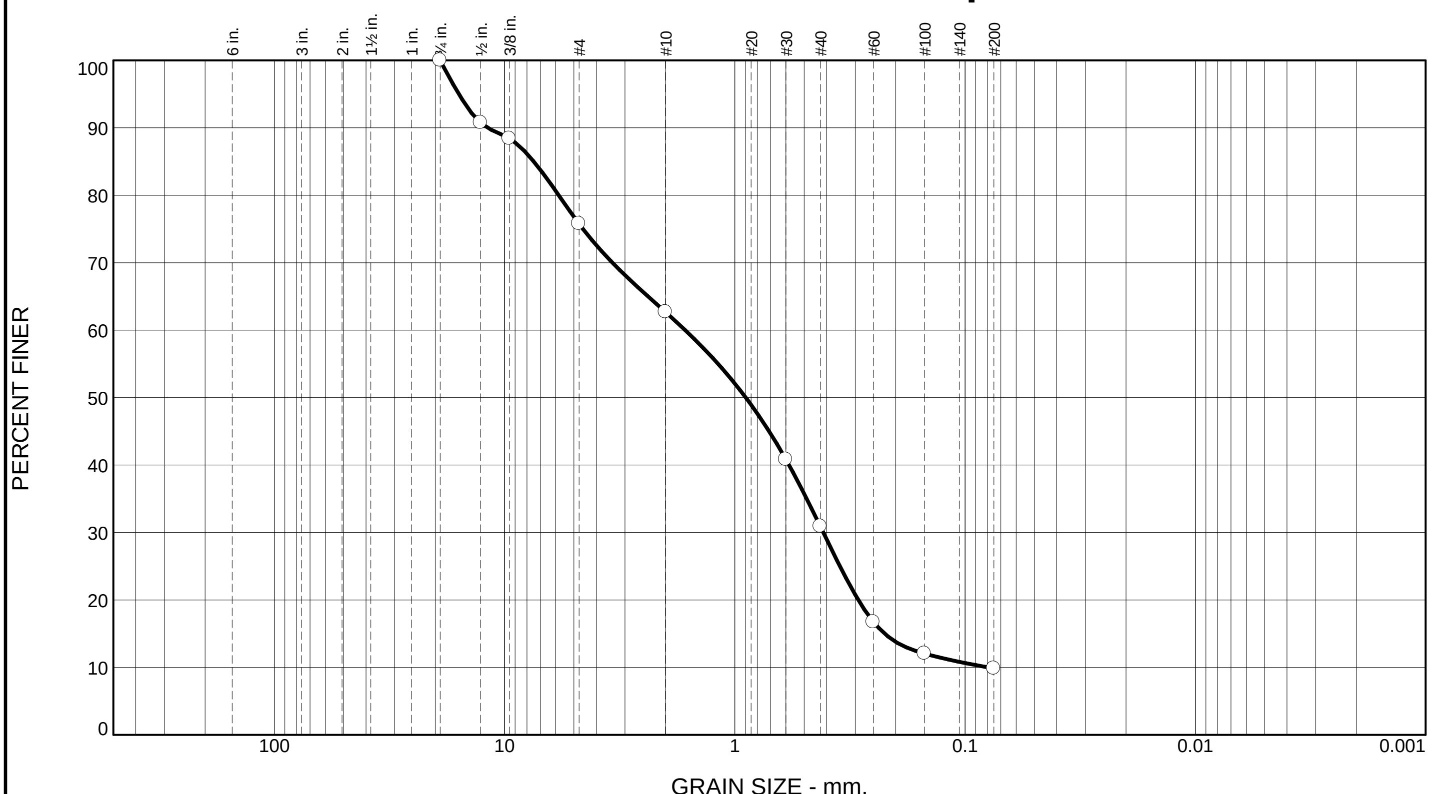
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	24.2	13.1	31.8	21.1	9.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	90.7		
.375	88.4		
#4	75.8		
#10	62.7		
#30	40.8		
#40	30.9		
#60	16.7		
#100	12.0		
#200	9.8		

* (no specification provided)

Material Description

Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 11.8460 D_{85}= 7.4679 D_{60}= 1.6436
D_{50}= 0.8961 D_{30}= 0.4128 D_{15}= 0.2236
D_{10}= 0.0795 C_u= 20.66 C_c= 1.30

Classification

USCS= AASHTO=

Remarks

Sample Number: LB2-14 S-2 8-10

Date: 9-27-23

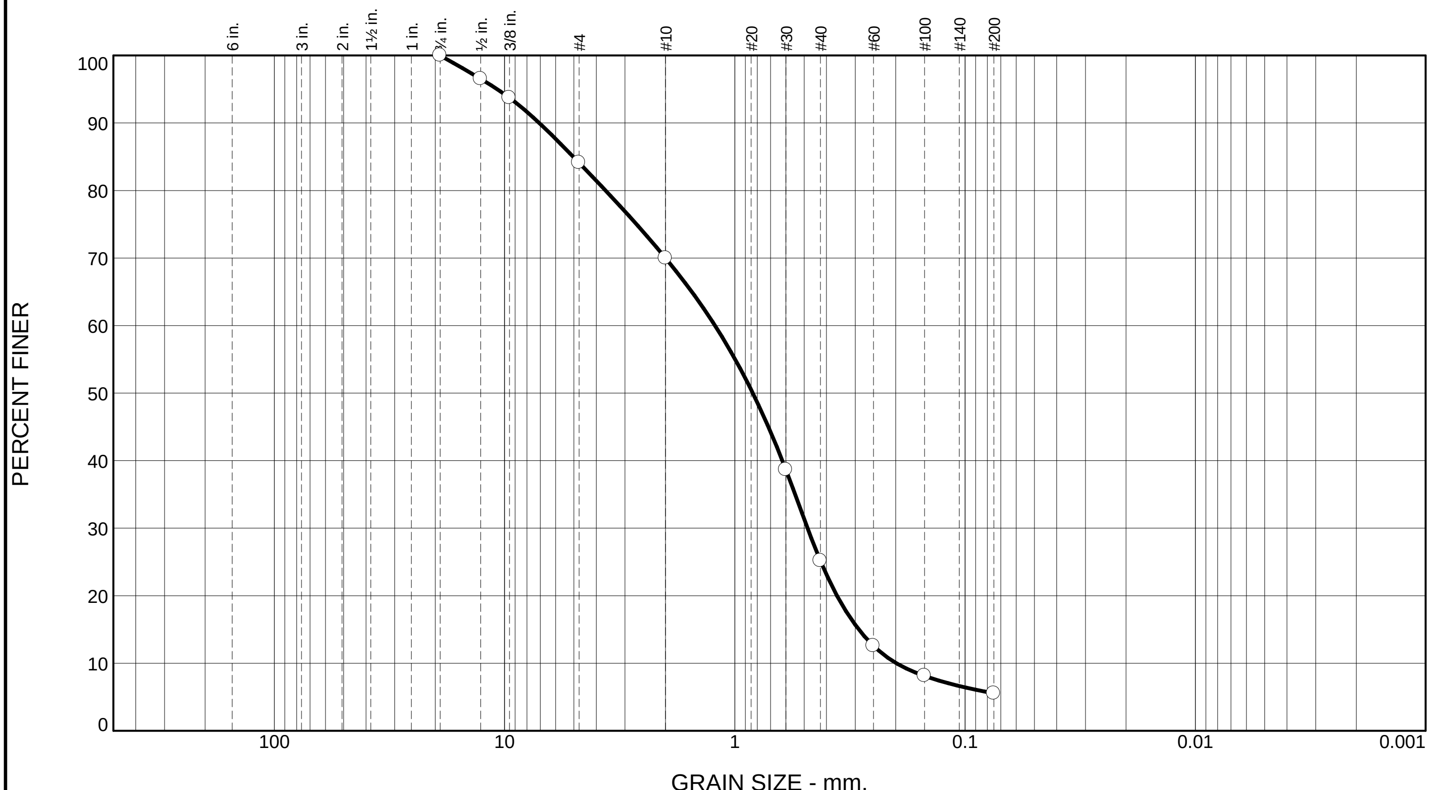
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	15.9	14.1	44.8	19.7	5.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	96.5		
.375	93.7		
#4	84.1		
#10	70.0		
#30	38.6		
#40	25.2		
#60	12.6		
#100	8.1		
#200	5.5		

* (no specification provided)

Material Description

Yellow

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 7.0727 D_{85}= 5.0346 D_{60}= 1.2196
D_{50}= 0.8357 D_{30}= 0.4834 D_{15}= 0.2896
D_{10}= 0.1988 C_u= 6.13 C_c= 0.96

Classification

USCS= AASHTO=

Remarks

Sample Number: LB2-14 S-6 25-27

Date: 9-27-23

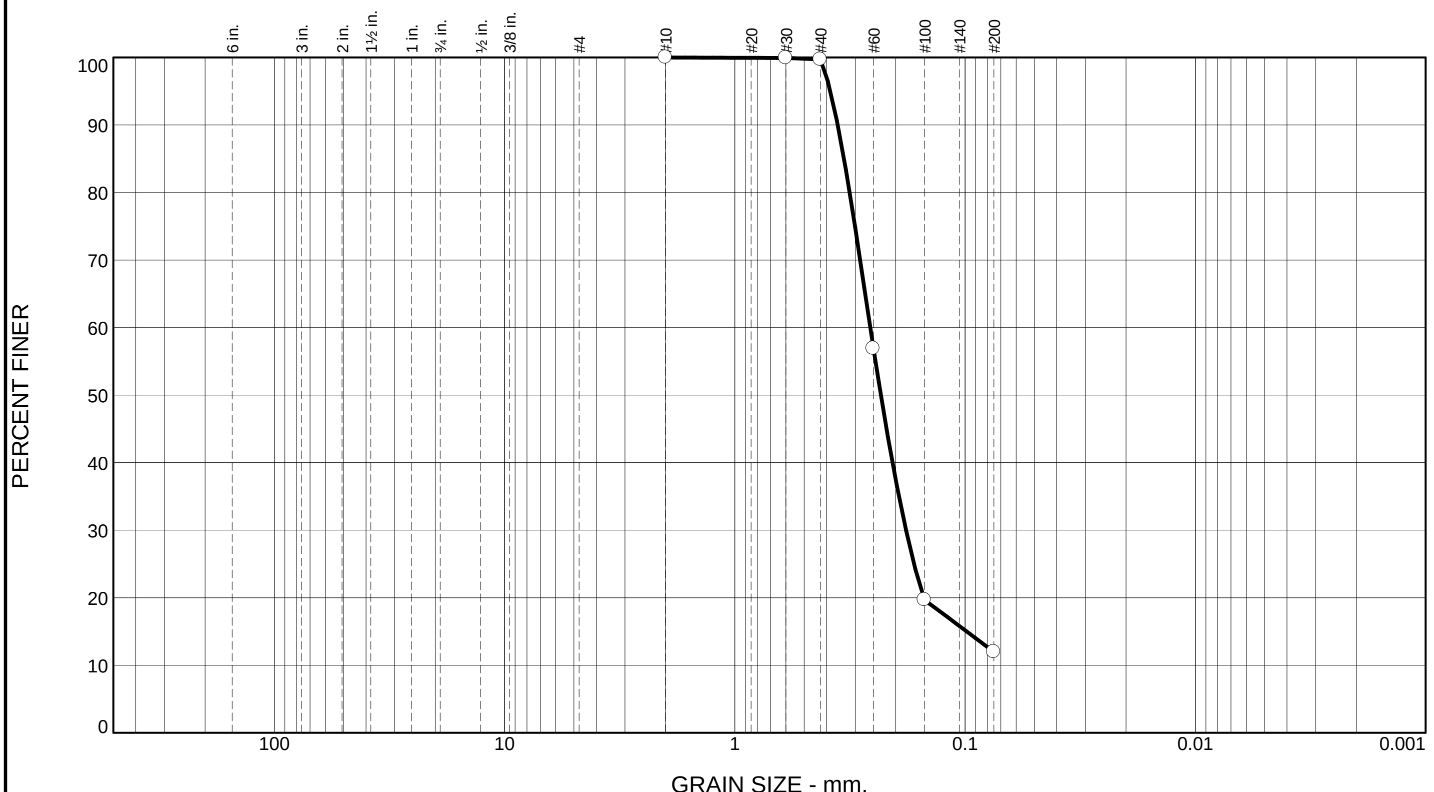
RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.3	87.7	12.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#30	99.9		
#40	99.7		
#60	56.9		
#100	19.7		
#200	12.0		

* (no specification provided)

Material Description

Pale Yellow

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3573 D_{85}= 0.3357 D_{60}= 0.2581
D_{50}= 0.2322 D_{30}= 0.1806 D_{15}= 0.0984
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: LB2-14 S-16 75-77

Date: 9-27-23

RSA Geolab

Union, New Jersey

Client: Langan Engineering
Project: Sands New York , Hempstead, NY
Project# not provided
Project No: 869 **Figure**

Tested By: ER/JK **Checked By:** KP

RSA GEOLAB

1017 Greeley Ave N
Union, NJ 07083
908-964-0786
www.RSAGeolab.com

Letter of Transmittal

Date: 9-28-23 Job No.: 869 Lab Log: 23-2957

Attention: Julia Langewis
Langan Engineering & Environmental Services
360 West 31st Street, 8th Floor
New York, New York 10001

CC:

Re: Sands New York, Hempstead, NY
Langan# not provided

Sample(s) ID: **LB2-01 S-20, LB2-04 S-14, LB2-09 S-18A**

Dear Julia,

Please find attached results for the samples referenced above. The following lab testing was performed:

- ASTM D4318 Atterberg Limits

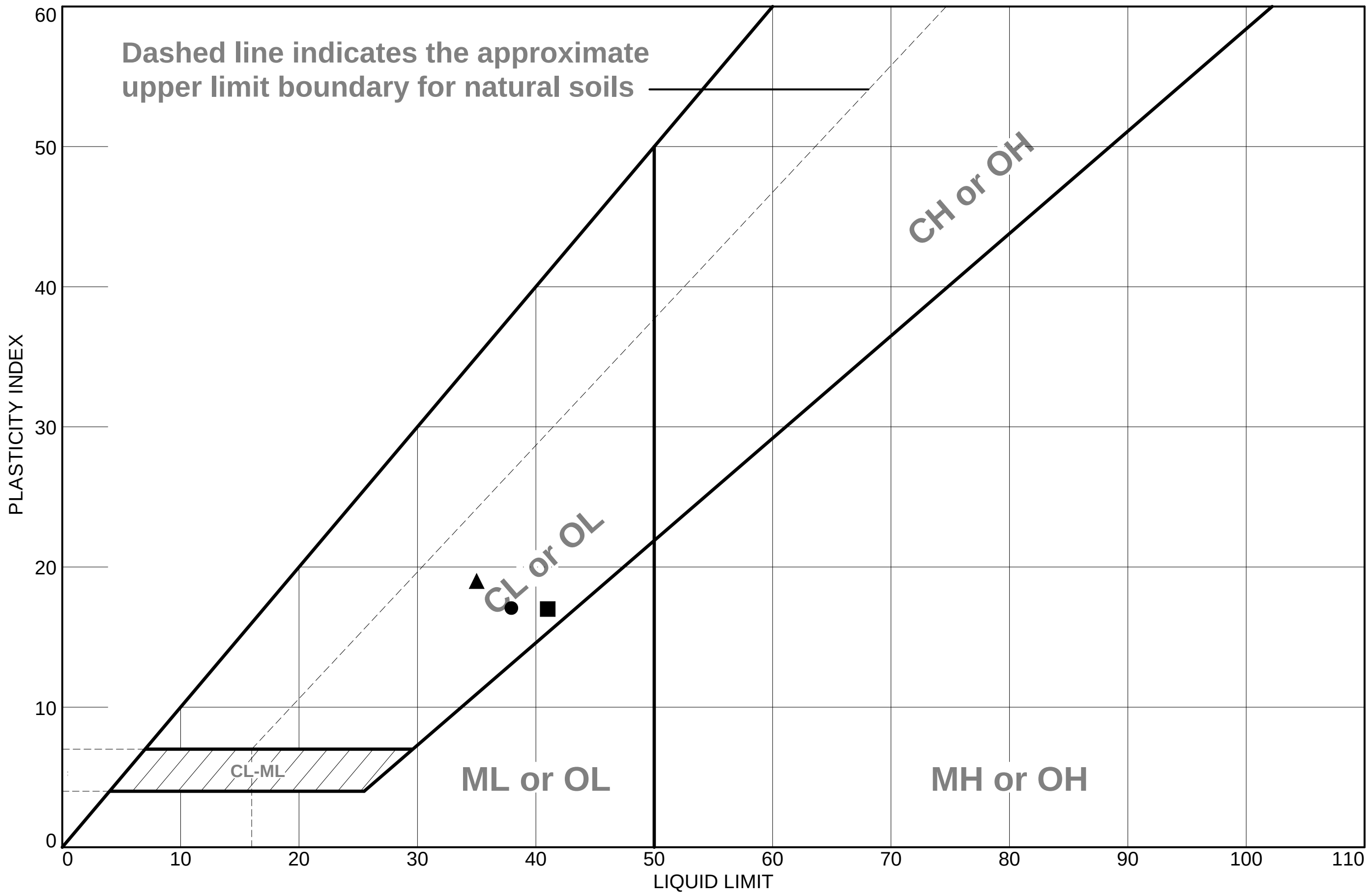
Regards,
RSA Geolab, LLC

Remarks: If you have any questions, please call 908-964-0786.

Signed: ______________

Dr. Raza S. Ahmed
President RSA Geolab, LLC

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Gray Clay & Silt, little cmf Sand (visual)	38	21	17			
■	Brownish Yellow Clay & Silt, trace cmf Sand (visual)	41	24	17			
▲	Light Gray Clay & Silt, some cmf Sand (visual)	35	16	19			

Project No. 869 **Client:** Langan Engineering

Project: Sands New York , Hempstead, NY

Project# not provided

●**Sample Number:** LB2-01 S-20 90-92

■**Sample Number:** LB2-04 S-14 60-62

▲**Sample Number:** LB2-09 S-18A 80-81.5

Remarks:

●9-28-23

RSA Geolab

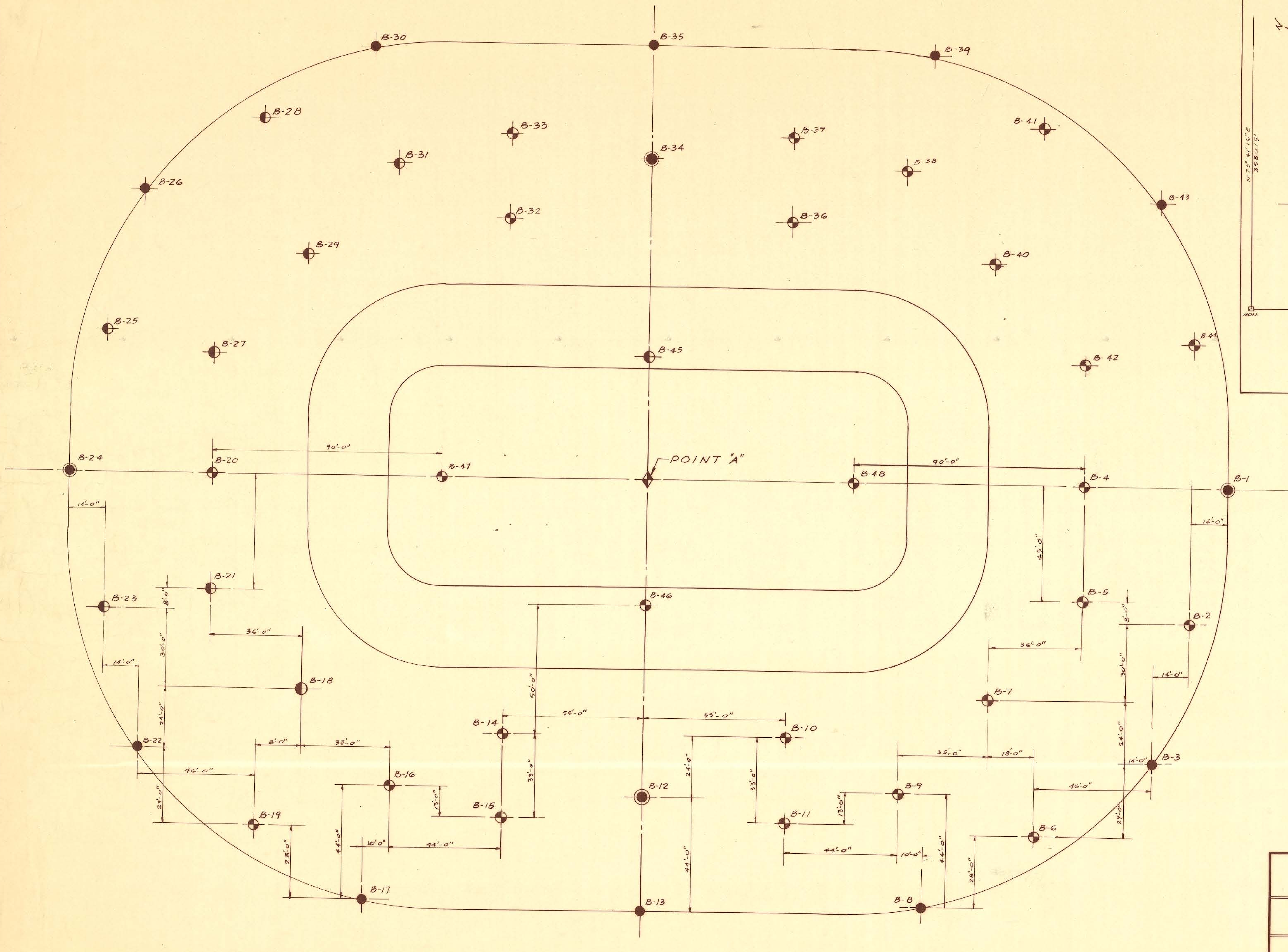
Union, New Jersey

Figure

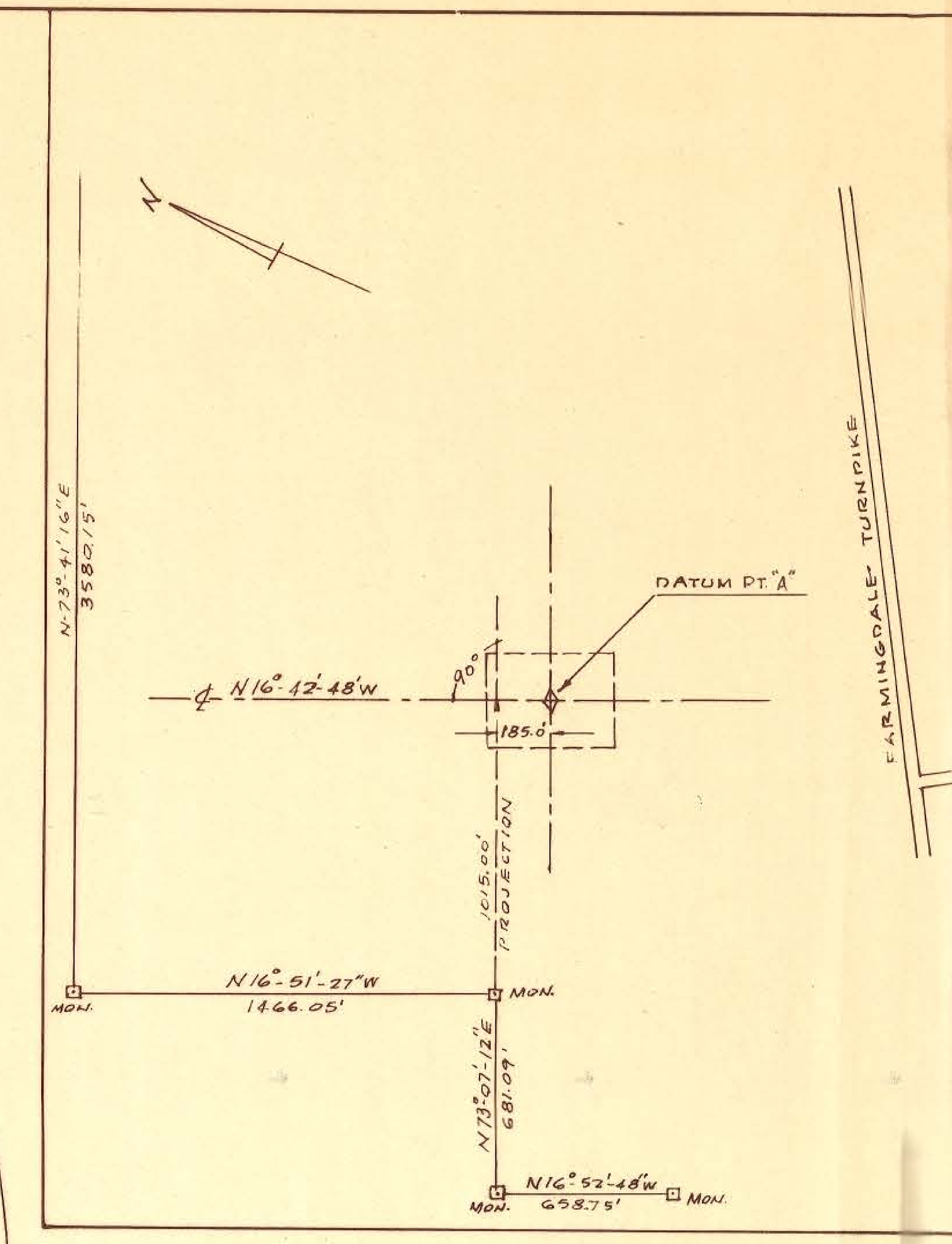
Tested By: OH **Checked By:** KP

APPENDIX C

(1966 HISTORICAL BORING LOGS BY OTHERS)



SCALE: 1/16 = 1'-0"



SITE PLAN

SCALE: 1" = 400'

SEE MITCHEL FIELD SURVEY DATED 1963

LEGEND

- 50.0' Below Datum.
- 76.5' Below Datum.
- 101.5' Below Datum
- Water Hole 101.5' Below Datum.

Boring samples delivered to Nassau County Museum in Seaford Sept. 30, 1966.

See water readings sheet 7 of 7.

J.F.K. CULTURAL CENTER
COLISEUM
MITCHEL FIELD, L.I.

WELTON BECKET F.A.I.A.
ARCHITECT
300 PARK AVENUE NEW YORK, N.Y.

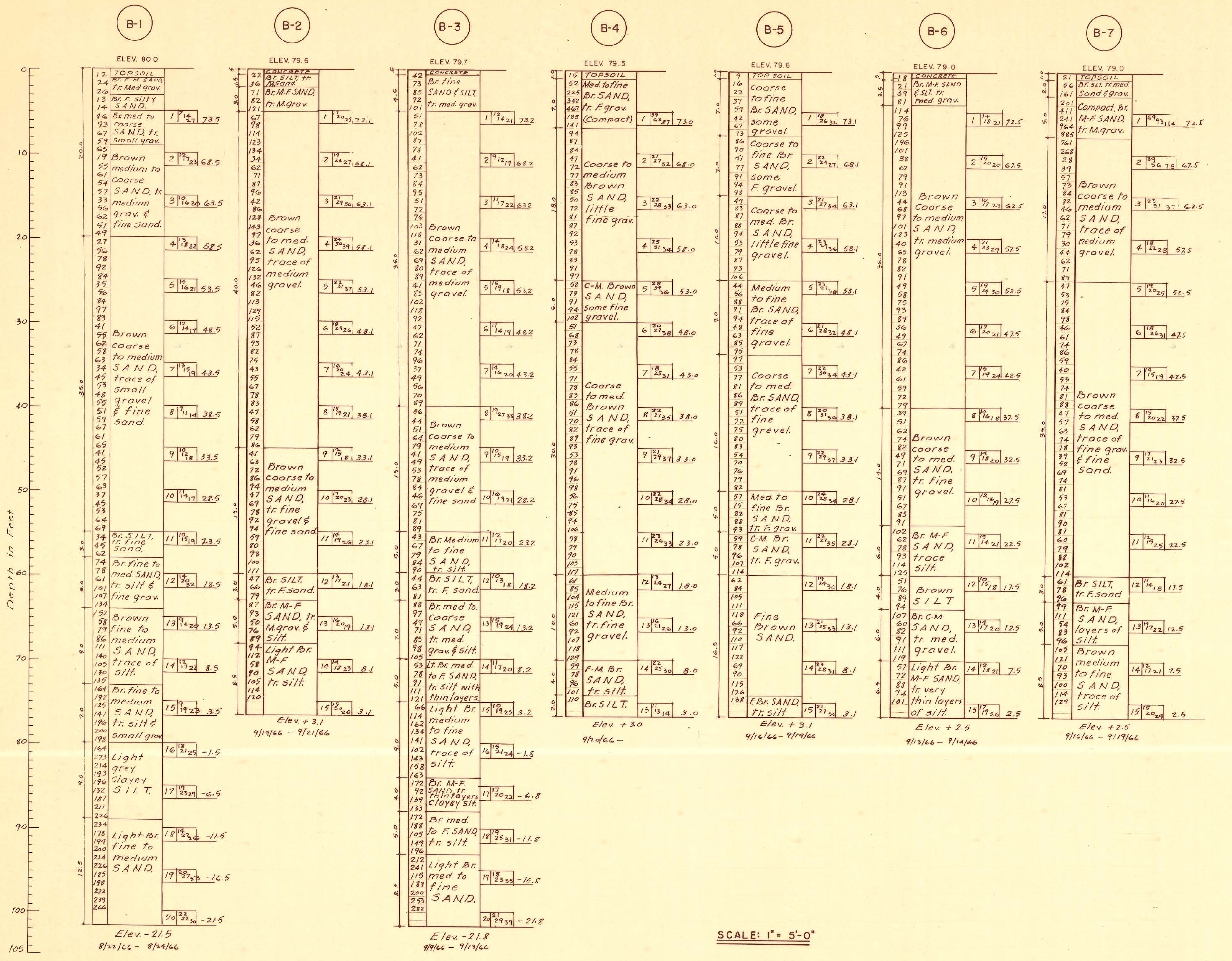
FARKAS & BARRON
CONSULTING ENGINEERS
301 WEST 23rd. STREET NEW YORK, N.Y.

BORING PLAN

BORINGS BY RELIABLE DRILLING CORP.
34-16 61st. STREET WOODSIDE 77, N.Y.

Julius Kashnar, P.E.

SCALE: AS SHOWN	BY: J.K./J.C.	JOB No. 65-5	DWG. No. 1 OF 7 DWGS.	DATE: 9/66



GENERAL NOTES

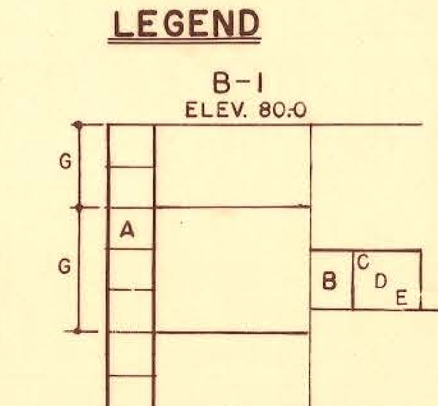
1. ELEVATIONS ARE BASED ON MITCHEL FIELD DATUM, BENCH MARK F.M. 16, ELEVATION 86.529 WHICH IS A SQUARE CUT ON CONCRETE APRON 3FT. SOUTH OF NORTH EDGE OF APRON AND WHICH LIES APPROXIMATELY MIDWAY BETWEEN HANGARS NO. 3 & 4 & APPROX. 500' THEREFROM.

2. BORING LOCATIONS ARE ALL TAKEN FROM ESTABLISHED POINT "A" FROM PROPERTY MAP AT MITCHEL FIELD, DATED 10/63 AND SHOWN IN PART ON SHEET NO. 1. POINT "A IS LATITUDE 40°-43'-30" N AND LONGITUDE 73°-36'-00" W.

3. DRILLING FOREMAN ____________ ____________

SOILS ENGINEER ____________

LEGEND



ELEV. +2.5
9/16/66 - 9/19/6 — ELEV. BOTTOM OF HOLE & DATE STARTED & FINISHED.

A — NUMBER OF BLOWS OF 300 lb HAMMER REQUIRED TO DRIVE A 3 IN. CASING ONE FOOT WHEN FALLING 18"

B — SAMPLE NUMBER

C, D, E — NUMBER OF BLOWS OF A 140 POUND HAMMER REQUIRED TO DRIVE A 2" SPLIT SAMPLER 6" WHEN FALLING 30 INCHES.

F — ELEVATION OF BOTTOM OF SAMPLER AT FINISH OF DRIVING.

G — THICKNESS OF STRATUM IN FEET.

CASING O.D. = 3" I.D. = 2½"

SAMPLER O.D. = 2" I.D. = 1⅜"

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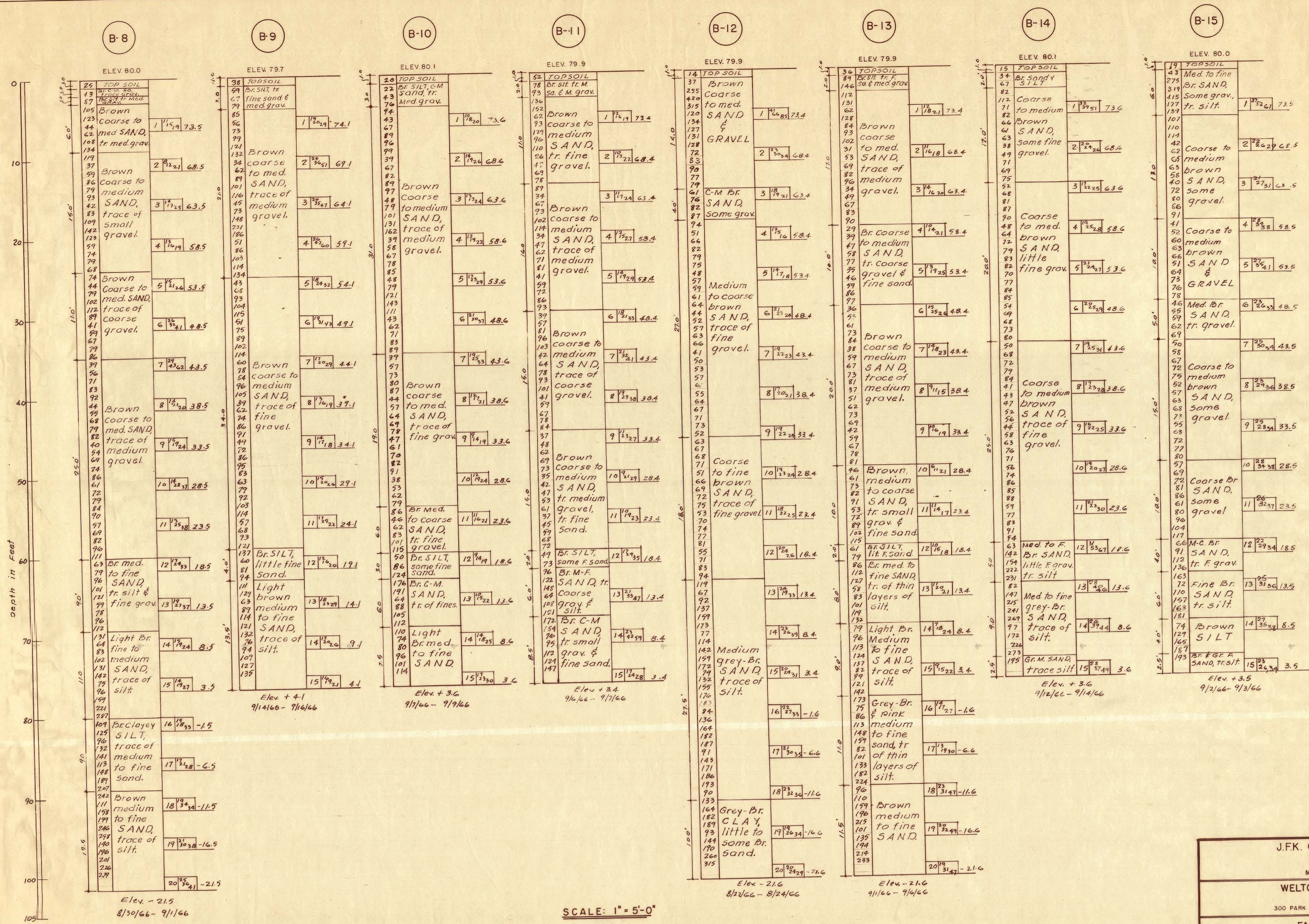
BORING SECTIONS

BORINGS BY RELIABLE DRILLING CORP.
34-16 61st. STREET WOODSIDE 77, N.Y.

Julius Eastman, P.E.

SCALE: AS SHOWN	BY: J.R.C.	JOB No. 66-17	DWG. No. 2 OF 7 DWGS.	DATE 9/66

2



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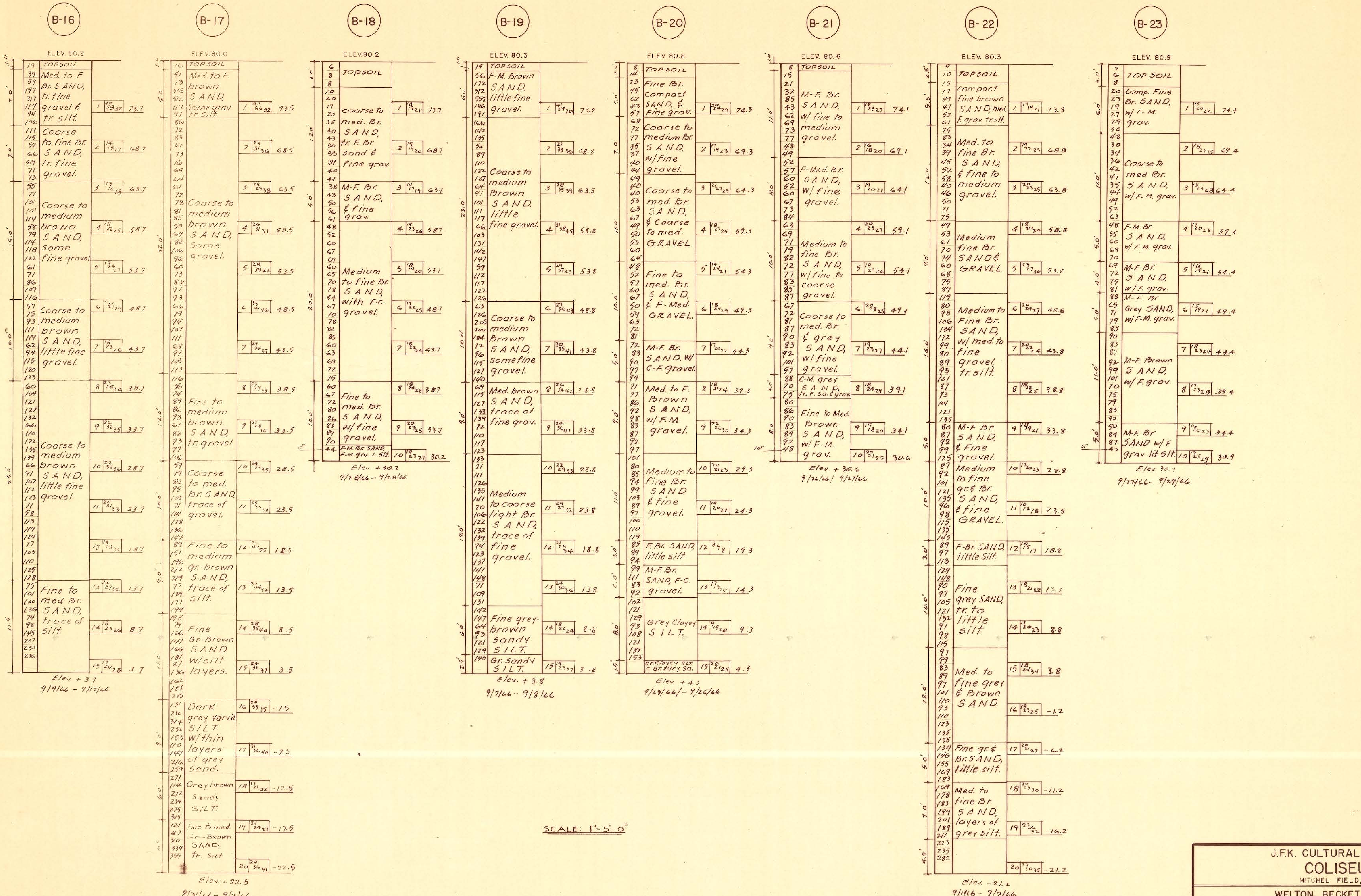
BORING SECTIONS

BORINGS BY RELIABLE DRILLING CORP.
34-16 61st. STREET WOODSIDE 77, N.Y.

SCALE: AS SHOWN | BY: | JOB No. 6457 | DWG No. 3 OF 7 DWGS. | DATE: 9/66

3



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BORING SECTIONS

BORINGS BY RELIABLE DRILLING CORP.
34-16 61st. STREET WOODSIDE 77, N.Y.

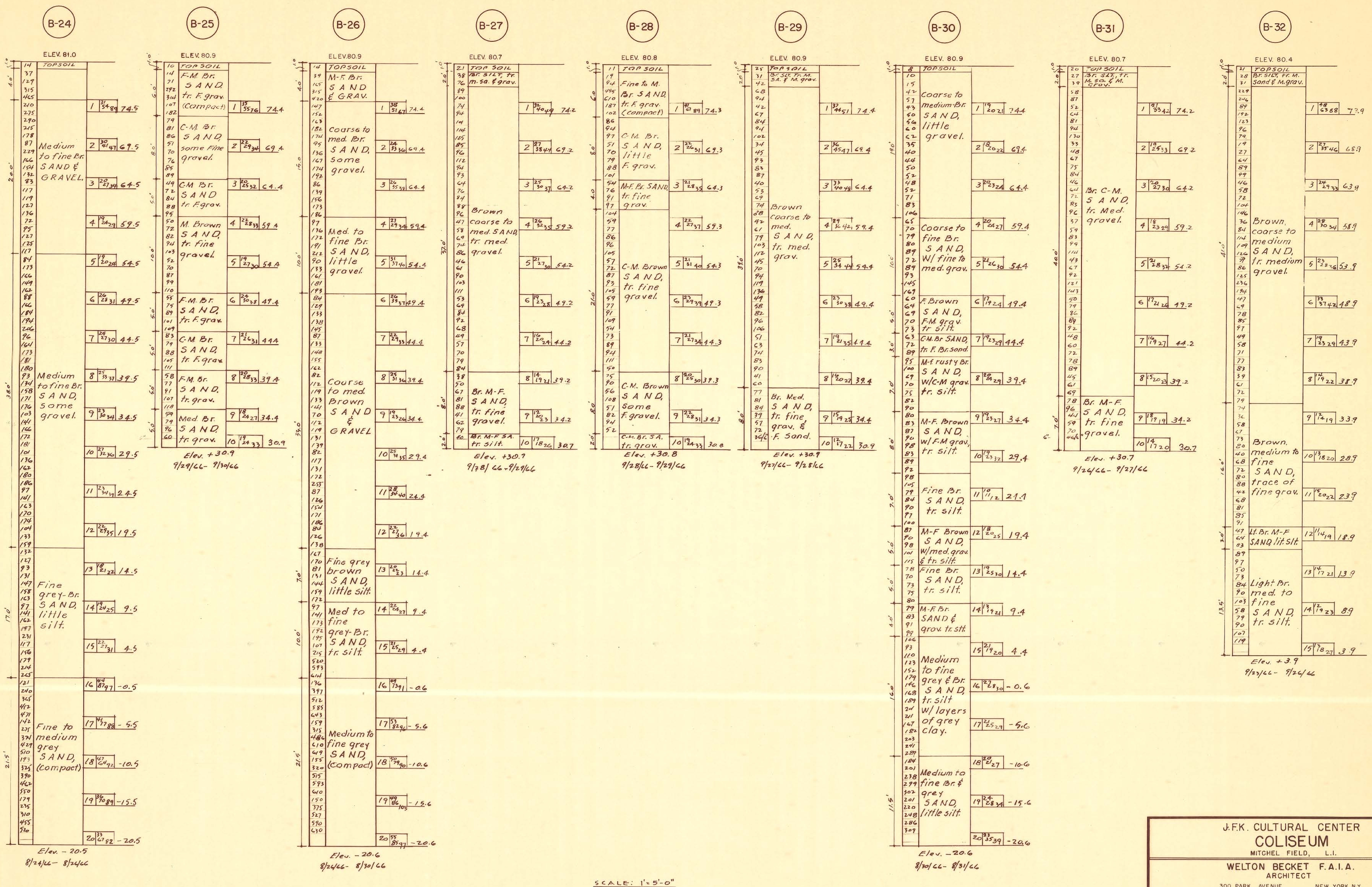
LICENSED PROFESSIONAL ENGINEER · STATE OF NEW YORK · 38358

[signature], P.E.

SCALE: AS SHOWN	BY:	JOB No. 66-17	DWG. No. 4 OF 7 DWGS.	DATE: 9/66

4

1529-5



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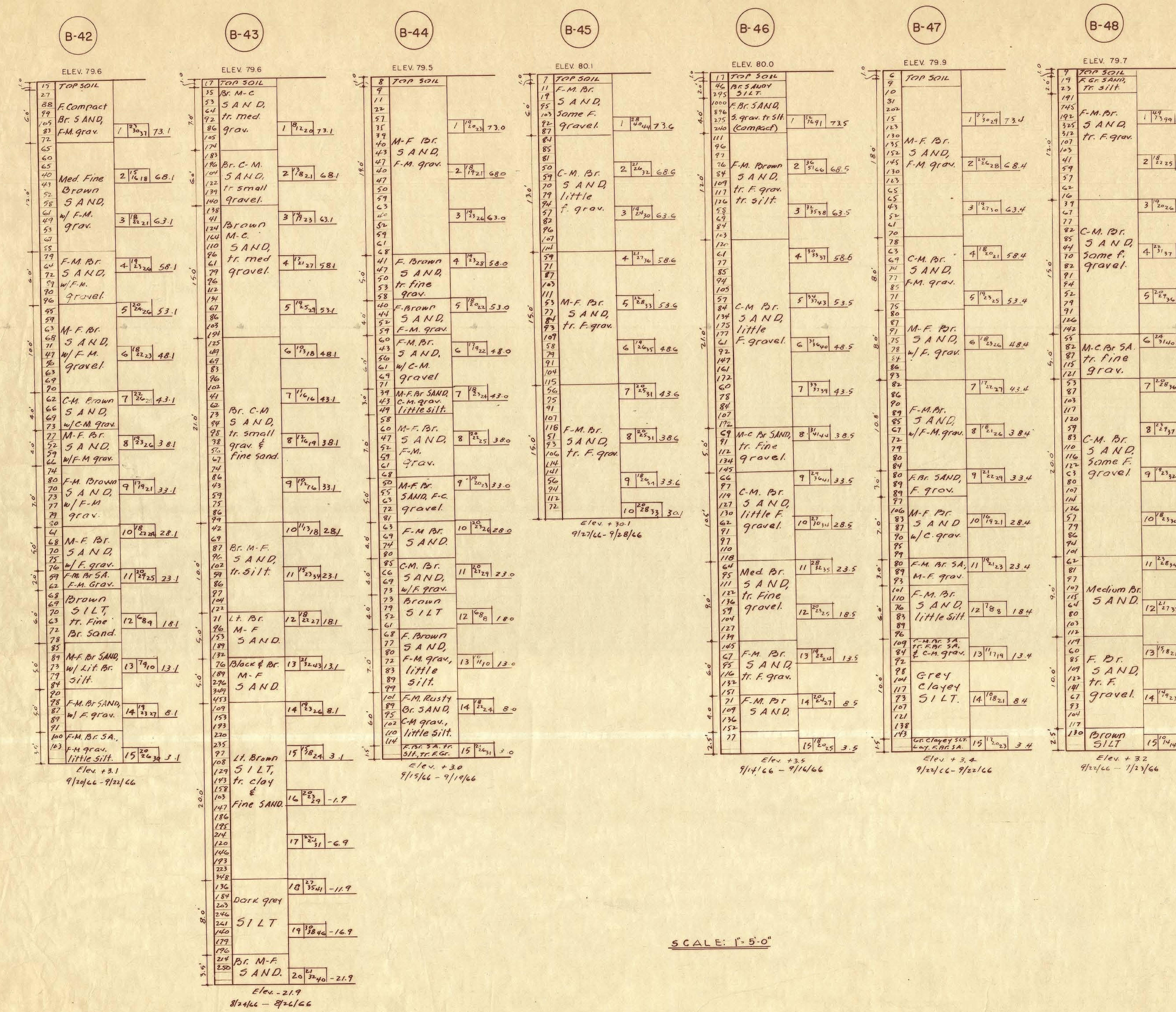
BORING SECTIONS

BORINGS BY RELIABLE DRILLING CORP.
34-16 61st. STREET WOODSIDE 77, N.Y.

SCALE: AS SHOWN | BY: J.D.E. R.G. | JOB No. 4447 | DWG. No. 5 OF 7 DWGS. | DATE: 9/66

5

1529-5



SCALE: 1" = 5'-0"

DAILY WATER READINGS

DATE	B-1 A.M.	B-1 P.M.
8/25/66	50.7	50.7
26/66	50.9	51.0
29/66	50.8	50.9
30/66	50.9	50.7
31/66	50.7	50.7
9/1/66	50.6	50.5
9/2/66	50.3	50.3
9/6/66	50.7	50.6
9/7/66	50.6	50.5
9/8/66	50.4	50.4
9/9/66	50.2	50.2
9/12/66	50.2	50.2
9/13/66	50.3	50.3
9/14/66	50.2	50.2
9/15/66	50.2	50.2
9/16/66	50.2	50.2
9/19/66	50.4	50.3
9/20/66	50.2	50.2
9/21/66	50.2	50.2
9/22/66	50.1	50.1
9/23/66	50.0	50.0
9/26/66	50.7	50.7
9/27/66	50.6	50.5
9/28/66	50.4	50.5
9/29/66	50.3	50.2
9/30/66	50.2	50.2

DATE	B-12 A.M.	B-12 P.M.
8/25/66	50.9	50.9
26	50.7	50.9
29	50.9	50.8
30	50.8	50.6
31	50.6	50.7
9/1/66	50.6	50.6
2	50.8	50.5
6	50.4	50.3
7	49.9	49.9
8	49.8	49.7
9	49.7	49.8
12	49.9	49.9
13	50.1	49.9
14	50.8	49.8
15	49.9	49.9
16	50.0	49.8
19	49.9	49.8
20	49.7	49.7
21	49.9	49.7
22	49.6	49.8
23	49.7	49.7
26	49.9	49.7
27	49.7	49.7
28		49.7
29	49.6	
30	49.6	

DATE	B-24 A.M.	B-24 P.M.
8/29/66	51.6	51.7
30	51.7	51.5
31	50.9	50.7
9/1/66	50.7	50.6
2	50.6	50.4
6	50.3	50.3
7	50.3	50.2
8	50.2	50.3
9	50.3	50.2
12	50.3	50.3
13	50.2	50.3
14	50.2	50.3
15	50.3	50.3
16	50.4	50.3
19	50.3	50.2
20	50.2	50.4
21	50.3	50.4
22	50.5	50.5
23	50.4	50.4
26	50.3	50.4
27	50.5	50.4
28	50.4	50.3
29	50.3	50.3
30	50.2	

DATE	B-34 A.M.	B-34 P.M.
8/26/66	51.3	51.3
29	50.6	50.6
30	50.6	50.6
31	50.6	50.6
9/1/66	50.6	50.6
2	50.6	50.6
3		
4		
5		
6	50.5	50.5
7	50.5	50.5
8	50.5	50.6
12	50.6	50.6
13	50.6	50.6
14	50.6	50.6
15	50.5	50.5
16	50.5	50.5
19	50.6	50.5
20	50.5	50.5
21	50.5	50.5
22	50.5	50.5
23	50.5	50.5
26	50.5	50.5
27	50.5	50.5
28	50.5	50.5
29	50.5	50.5
30	50.5	50.5

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CONSULTING ENGINEERS
301 WEST 23rd. STREET NEW YORK

LICENSED PROFESSIONAL ENGINEER JULIUS D. EASTMAN 38358 STATE OF NEW YORK

Julius D. Eastman, P.E.

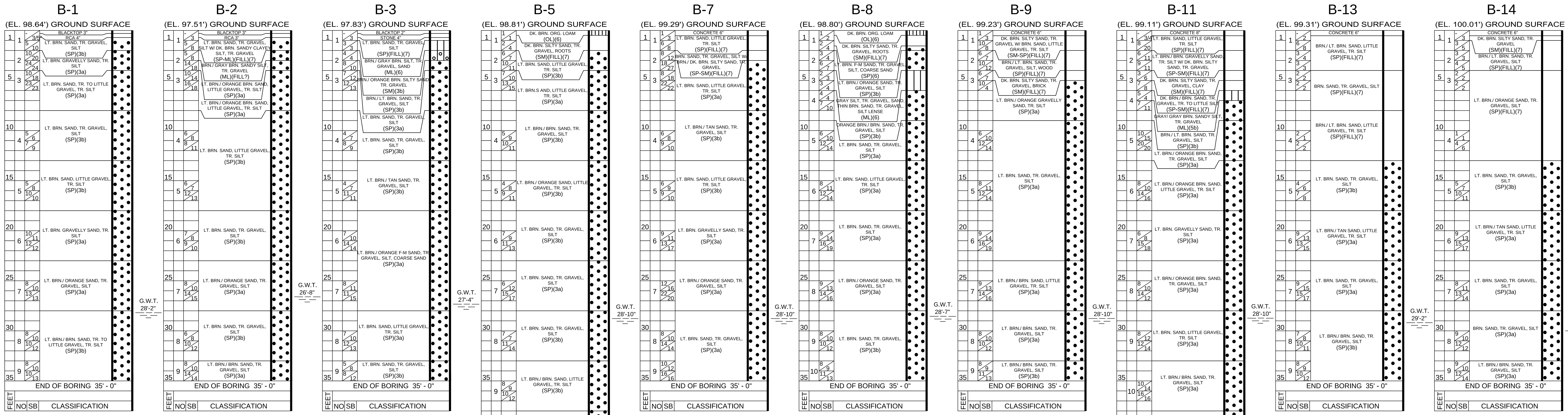
BORING SECTIONS

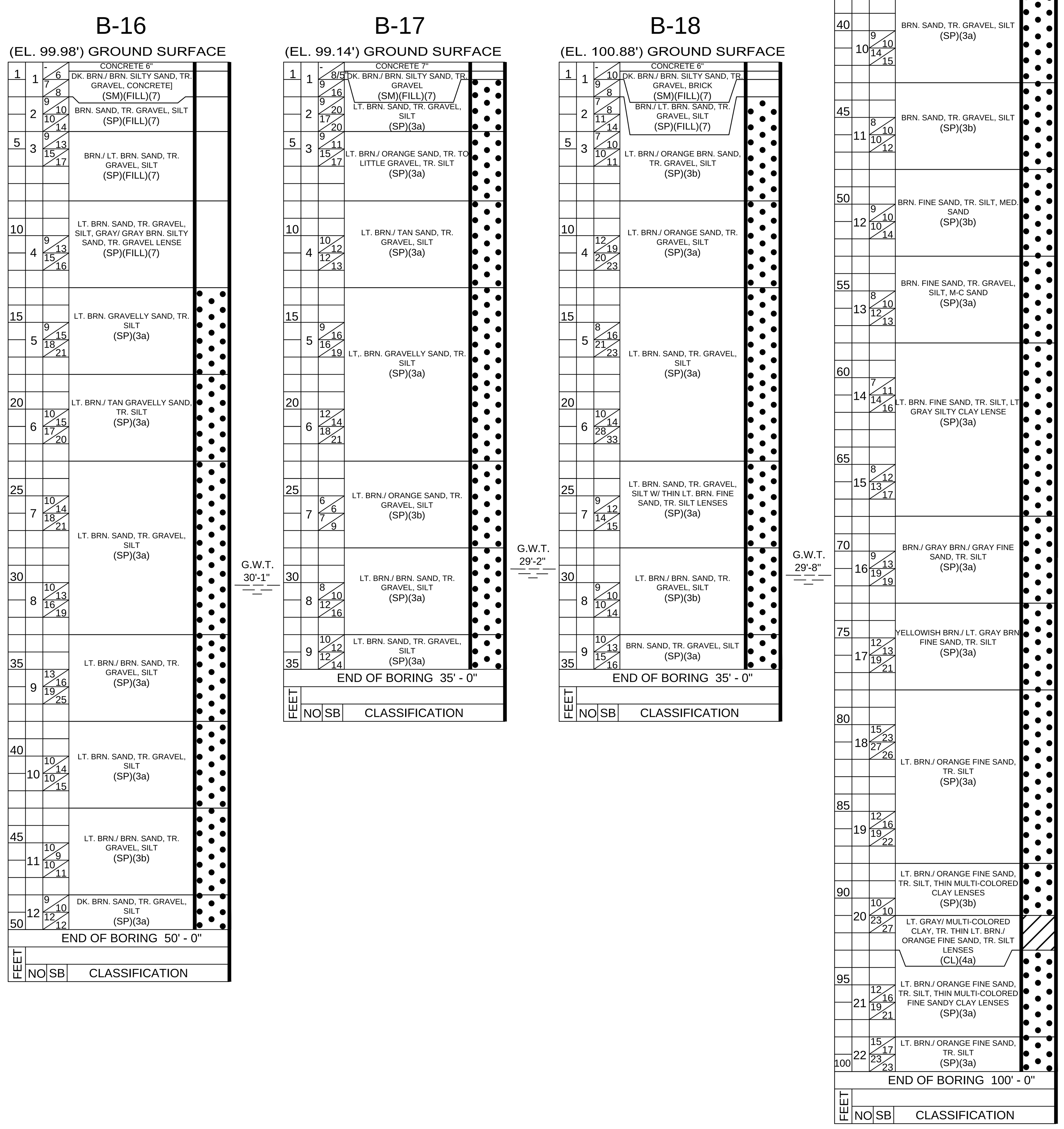
BORINGS BY RELIABLE DRILLING COR
34-16 61st. STREET WOODSIDE 7

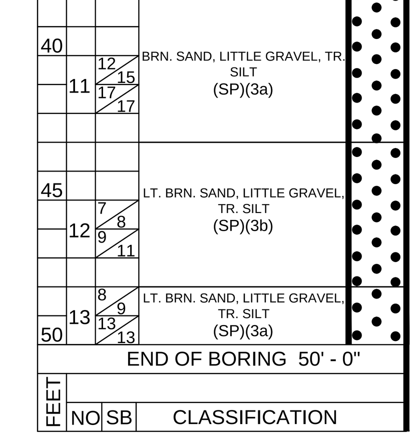
SCALE: AS SHOWN | BY: JDE/JRC | JOB No. 6647 | DWG. No. 7 OF 7 DWG

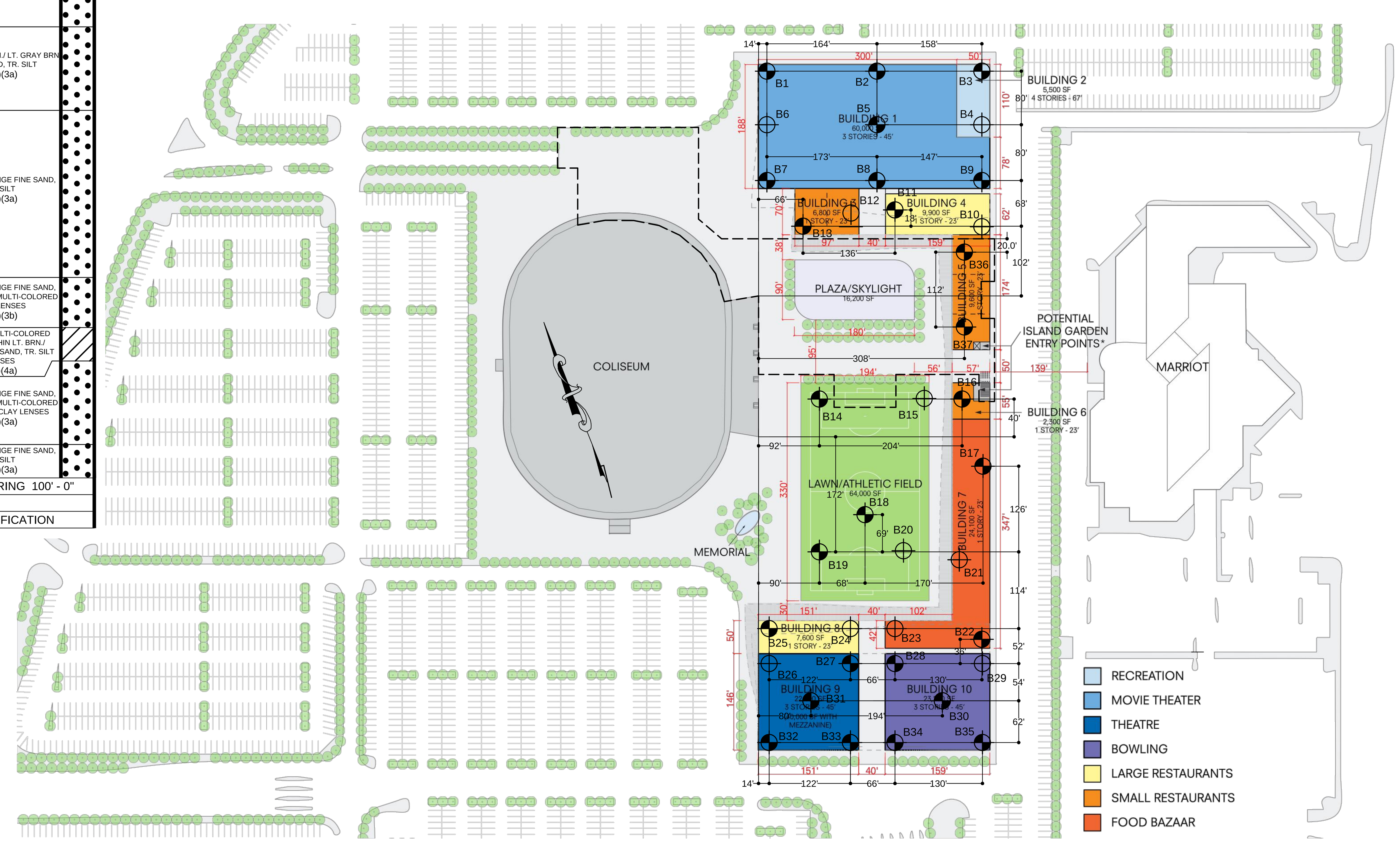
APPENDIX D

(2014 HISTORICAL BORING LOGS BY OTHERS)









BORING LOCATION PLAN
SCALE : N.T.S.

BORINGS DRILLED
BORINGS OMITTED BY CLIENT

NOTES:

1. - SOIL DESCRIPTIONS ARE BY VISUAL EXAMINATION OF SOIL SAMPLES RECOVERED DURING DRILLING OPERATIONS.
2. - SOIL DESCRIPTIONS ARE IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.
3. - GROUND WATER WAS MEASURED INSIDE THE DRILL CASING AT THE COMPLETION OF EACH BOREHOLE.
4. - SOIL STRATIFICATIONS ARE ACCURATE TO WITHIN TWO FEET VERTICALLY.
5. - ELEVATIONS WERE REFERENCED TO B.M. - AT FINISHED FLOOR OF EXISTING COLISEUM STRUCTURE, AS SHOWN. ASSUMED ELEVATION AT 100.0' .
6. - SOIL SAMPLES WERE OBTAINED USING A CENTRAL MINE EQUIPMENT (CME) AUTOMATIC TRIP HAMMER.

UNIFIED SOIL CLASSIFICATION

SOIL GROUPS	TYPICAL NAMES AND SOIL SYMBOLS
GW	WELL GRADED GRAVELS, GRAVEL SAND MIXTURES, LITTLE OR NO FINES
GP	POORLY GRADED GRAVELS OR GRAVEL SAND MIXTURES, LITTLE OR NO FINES
GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURE
GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURE
SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
SP	POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
SM	SILTY SANDS, SAND - SILT MIXTURES
SC	CLAYEY SANDS, SAND - CLAY MIXTURES
ML	INORGANIC SILTS, VERY FINE SANDS, CLAYEY SILTS, SLIGHT PLASTICITY
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS SANDY CLAYS, SILTY CLAYS
OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

ALLOWABLE SOIL BEARING PRESSURES, N.Y.C. BLDG. CODE TABLE 1804.1

CLASS OF MATERIALS (Notes 1 & 3) *	MAXIMUM ALLOWABLE FOUNDATION PRESSURE (TSF)	MAXIMUM ALLOWABLE FOUNDATION PRESSURE (kPa)
1. BEDROCK (NOTES 2 & 7) *		
1a HARD SOUND ROCK - GNEISS, DIABASE, SCHIST	60	5,746
1b MEDIUM HARD ROCK - MARBLE, SERPENTINE	40	3,830
1c INTERMEDIATE ROCK - SHALE, SANDSTONE	20	1,915
1d SOFT ROCK - WEATHERED ROCK	8	766
2. SANDY GRAVEL & GRAVEL (GW, GP) (NOTES 3, 4, 8, & 9) *		
2a DENSE	10	958
2b MEDIUM	6	575
3. GRANULAR SOILS (GC, GM, SW, SP, SM, & SC)(NOTES 4, 5, 8, & 9) *		
3a DENSE	6	575
3b MEDIUM	3	287
4. CLAYS (SC, CL, & CH)(NOTES 4, 6, 8, & 9) *		
4a HARD	5	479
4b STIFF	3	287
4c MEDIUM	2	192
5. SILTS & SILTY SOILS (ML & MH)(NOTES 4, 8, & 9) *		
5a DENSE	3	287
5b MEDIUM	1.5	144
6. ORGANIC SILTS, ORGANIC CLAYS, PEATS, SOFT CLAYS, LOOSE GRANULAR SOILS, & VARVED SILTS	SEE 1804.2.1 *	SEE 1804.2.1 *
7. CONTROLLED & UNCONTROLLED FILLS	SEE 1804.2.2 OR 1804.2.3 *	SEE 1804.2.2 OR 1804.2.3 *

* REFER TO SECTION 18-4.2 OR NOTES FOLLOWING TABLE 1804.1 IN THE N.Y.C. BUILDING CODE FOR ADDITIONAL INFORMATION.

COMPACTION RELATED TO SPOON BLOWS PER FOOT

SAND		SILT & CLAY	
LOOSE	LESS THAN 10	SOFT	10 OR LESS
MEDIUM	10 TO 30	MEDIUM	11 TO 29
DENSE	GREATER THAN 30	HARD	30 OR MORE

" N " STANDARD PENETRATION TEST (2" SPOON, 140lb HAMMER, 30" FALL)

N=17 BLOWS PER FOOT — SPOON BLOW COUNT IS GENERALLY SHOWN IN 6" INCREMENTS FOR 2' DRIVE TO OBTAIN BLOWS PER FOOT (N) USE THE 2ND & 3RD 6" INCREMENT

	ROTARY CASING	EXTRA HEAVY CASING	SAMPLE SPOON
SIZES, INCHES	2.5		2.0
HAMMER WEIGHT, POUNDS	______		140
HAMMER FALL, INCHES	______		30

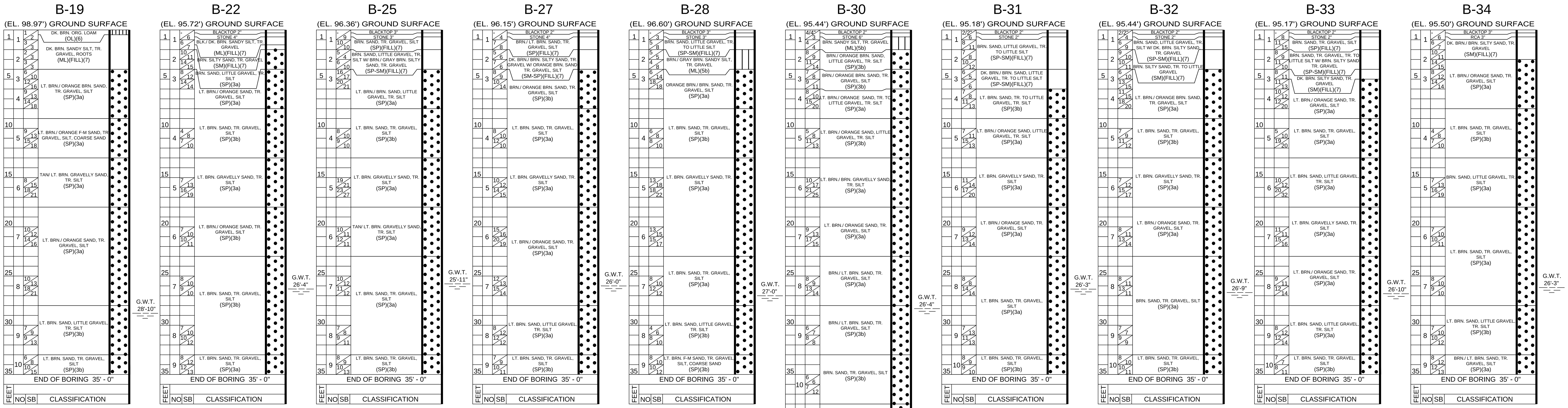
CB - CASING BLOWSPER 1 FOOT DRIVE
SB - SPOON BLOWS PER 6 INCH DRIVE
P - PUSHED BY WEIGHT OF HAMMER
WOR - WEIGHT OF ROD
UD - UNDISTURBED SOIL SAMPLE
NO - SAMPLE NUMBER
FEET - DEPTH FROM GND. SUR. NOTED AT EACH 5'
WOH - WEIGHT OF HAMMER (INCLUDES ROD)

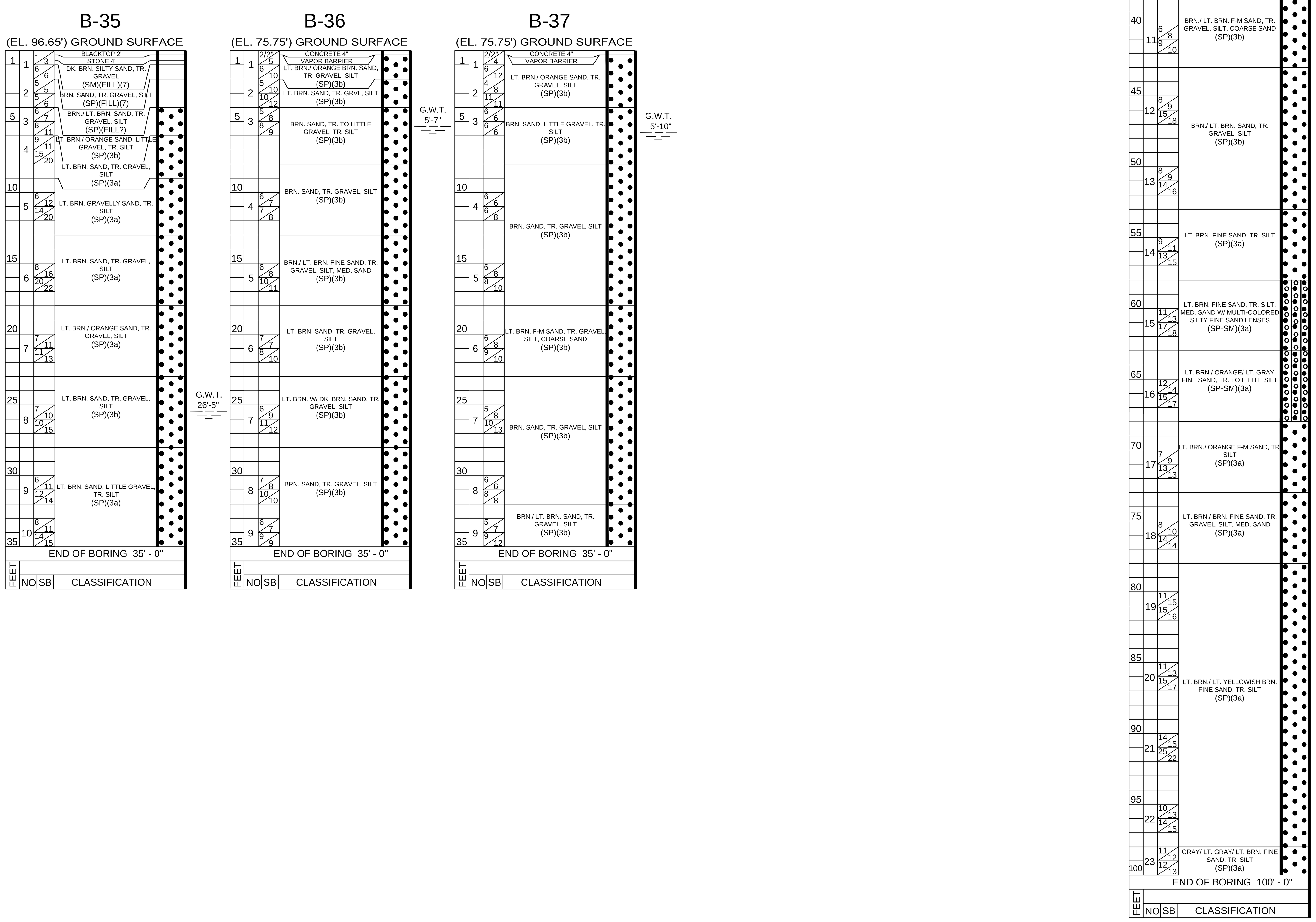
FOREST CITY RATNER COMPANIES
#1 METROTECH CENTER, BROOKLYN, NEW YORK 11201

SOIL MECHANICS DRILLING CORP.
subsoil investigations
3770 MERRICK ROAD * SEAFORD, NEW YORK 11783 * 516 - 221-2333

NASSAU COLISEUM - HEMPSTEAD TURNPIKE
-SUBSURFACE INVESTIGATION-
UNIONDALE, NEW YORK

VERTICAL BORING SCALE: 1/4"=1'-0"	DRAWING DATE JUNE 26, 2014	DRAWING NUMBER 14L145-37
DATES OF BORING JUNE 16-23, 2014	DWN. BY: JMR / CKD. BY: CV	SHEET 1 OF 2.





NOTES:

1. - SOIL DESCRIPTIONS ARE BY VISUAL EXAMINATION OF SOIL SAMPLES RECOVERED DURING DRILLING OPERATIONS.
2. - SOIL DESCRIPTIONS ARE IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.
3. - GROUND WATER WAS MEASURED INSIDE THE DRILL CASING AT THE COMPLETION OF EACH BOREHOLE.
4. - SOIL STRATIFICATIONS ARE ACCURATE TO WITHIN TWO FEET VERTICALLY.
5. - ELEVATIONS WERE REFERENCED TO B.M. - AT FINISHED FLOOR OF EXISTING COLISEUM STRUCTURE, AS SHOWN. ASSUMED ELEVATION AT 100.0'.
6. - SOIL SAMPLES WERE OBTAINED USING A CENTRAL MINE EQUIPMENT (CME) AUTOMATIC TRIP HAMMER.

UNIFIED SOIL CLASSIFICATION

SOIL GROUPS	TYPICAL NAMES AND SOIL SYMBOLS
GW	WELL GRADED GRAVELS, GRAVEL SAND MIXTURES, LITTLE OR NO FINES
GP	POORLY GRADED GRAVELS OR GRAVEL SAND MIXTURES. LITTLE OR NO FINES
GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURE
GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURE
SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
SP	POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
SM	SILTY SANDS, SAND - SILT MIXTURES
SC	CLAYEY SANDS, SAND - CLAY MIXTURES
ML	INORGANIC SILTS, VERY FINE SANDS, CLAYEY SILTS, SLIGHT PLASTICITY
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS SANDY CLAYS, SILTY CLAYS
OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

ALLOWABLE SOIL BEARING PRESSURES, N.Y.C. BLDG. CODE TABLE 1804.1

CLASS OF MATERIALS (Notes 1 & 3) *	MAXIMUM ALLOWABLE FOUNDATION PRESSURE (TSF)	MAXIMUM ALLOWABLE FOUNDATION PRESSURE (kPa)
1. BEDROCK (NOTES 2 & 7) *		
1a HARD SOUND ROCK - GNEISS, DIABASE, SCHIST	60	5,746
1b MEDIUM HARD ROCK - MARBLE, SERPENTINE	40	3,830
1c INTERMEDIATE ROCK - SHALE, SANDSTONE	20	1,915
1d SOFT ROCK - WEATHERED ROCK	8	766
2. SANDY GRAVEL & GRAVEL (GW, GP) (NOTES 3, 4, 8, & 9) *		
2a DENSE	10	958
2b MEDIUM	6	575
3. GRANULAR SOILS (GC, GM, SW, SP, SM, & SC)(NOTES 4, 5, 8, & 9) *		
3a DENSE	6	575
3b MEDIUM	3	287
4. CLAYS (SC, CL, & CH)(NOTES 4, 6, 8, & 9) *		
4a HARD	5	479
4b STIFF	3	287
4c MEDIUM	2	192
5. SILTS & SILTY SOILS (ML & MH)(NOTES 4, 8, & 9) *		
5a DENSE	3	287
5b MEDIUM	1.5	144
6. ORGANIC SILTS, ORGANIC CLAYS, PEATS, SOFT CLAYS, LOOSE GRANULAR SOILS, & VARVED SILTS	SEE 1804.2.1 *	SEE 1804.2.1 *
7. CONTROLLED & UNCONTROLLED FILLS	SEE 1804.2.2 OR 1804.2.3 *	SEE 1804.2.2 OR 1804.2.3 *

* REFER TO SECTION 18-4.2 OR NOTES FOLLOWING TABLE 1804.1 IN THE N.Y.C. BUILDING CODE FOR ADDITIONAL INFORMATION.

COMPACTION RELATED TO SPOON BLOWS PER FOOT

SAND		SILT & CLAY	
LOOSE	LESS THAN 10	SOFT	10 OR LESS
MEDIUM	10 TO 30	MEDIUM	11 TO 29
DENSE	GREATER THAN 30	HARD	30 OR MORE

" N " STANDARD PENETRATION TEST (2" SPOON, 140lb HAMMER, 30" FALL)

6 8 / 9 12 N=17 BLOWS PER FOOT — SPOON BLOW COUNT IS GENERALLY SHOWN IN 6" INCREMENTS FOR 2' DRIVE TO OBTAIN BLOWS PER FOOT (N) USE THE 2ND & 3RD 6" INCREMENT

	ROTARY CASING	EXTRA HEAVY CASING	SAMPLE SPOON
SIZES, INCHES	2.5		2.0
HAMMER WEIGHT, POUNDS	________		140
HAMMER FALL, INCHES	________		30

CB - CASING BLOWSPER 1 FOOT DRIVE
SB - SPOON BLOWS PER 6 INCH DRIVE
P - PUSHED BY WEIGHT OF HAMMER
WOR - WEIGHT OF ROD
UD - UNDISTURBED SOIL SAMPLE
NO - SAMPLE NUMBER
FEET - DEPTH FROM GND. SUR. NOTED AT EACH 5'
WOH - WEIGHT OF HAMMER (INCLUDES ROD)

FOREST CITY RATNER COMPANIES
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SOIL MECHANICS DRILLING CORP.
subsoil investigations
3770 MERRICK ROAD * SEAFORD, NEW YORK 11783 * 516 - 221-2333

NASSAU COLISEUM - HEMPSTEAD TURNPIKE

-SUBSURFACE INVESTIGATION-

UNIONDALE, NEW YORK

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