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GEOTECHNICAL EVALUATION
PROPOSED ATHLETIC FACILITY IMPROVEMENTS
NORTH ROCKLAND HIGH SCHOOL
106 HAMMOND ROAD
HAMLET OF THIELLS, TOWN OF HAVERSTRAW,
ROCKLAND COUNTY, NEW YORK

Submitted To:

North Rockland Central School District

106 Hammond Road
Thiells, New York 10984

October 20, 2022

W.O. 11584.01

Submitted By:

Tectonic Engineering Consultants, Geologists & Land Surveyors, D.P.C.

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North Rockland Central School District
106 Hammond Road
Thiells, New York 10984

Attention: C/O: Mr. Joe Kral Jr., Landscape Architect/Project Manager– The LA Group
Via email: (jkral@thelagroup.com)

October 20, 2022

RE: W.O. 11584.01
GEOTECHNICAL EVALUATION
NORTH ROCKLAND CENTRAL SCHOOL DISTRICT
NORTH ROCKLAND HIGH SCHOOL
PROPOSED ATHLETIC FACILITY IMPROVEMENTS
106 HAMMOND ROAD
HAMLET OF THIELLS, TOWN OF HAVERSTRAW, ROCKLAND COUNTY, NEW YORK

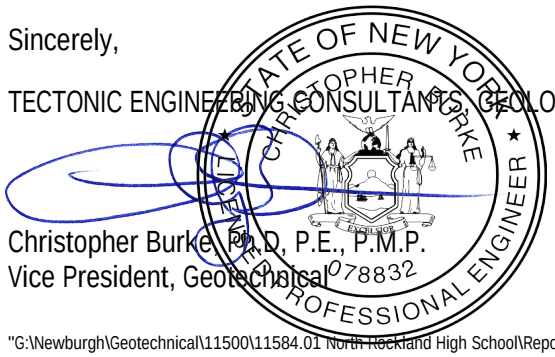
Dear Mr. Kral:

Tectonic Engineering Consultants, Geologists & Land Surveyors, D.P.C. is pleased to submit this subsurface investigation and geotechnical engineering evaluation for the proposed new building and site improvements to the athletic facility of the North Rockland High School campus, in the Hamlet of Thiells, New York. The purpose of the investigation was to evaluate the subsurface conditions within the areas of proposed site improvements, and to provide geotechnical recommendations for design and construction of the proposed new structures and improvements. This report presents detailed information about the investigations, our findings and recommendations.

We appreciate this opportunity to assist you with this project. If you have any questions, please do not hesitate to contact the undersigned.

Sincerely,

TECTONIC ENGINEERING CONSULTANTS, GEOLOGISTS & LAND SURVEYORS, D.P.C.



Christopher Burke, Ph.D, P.E., P.M.P.
Vice President, Geotechnical

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GEOTECHNICAL EVALUATION
PROPOSED ATHLETIC FACILITY IMPROVEMENTS
NORTH ROCKLAND HIGH SCHOOL
106 HAMMOND ROAD
HAMLET OF THIELLS, TOWN OF HAVERSTRAW, ROCKLAND COUNTY, NEW YORK

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1.0 INTRODUCTION

In accordance with your request and authorization, Tectonic Engineering Consultants, Geologists, and Land Surveyors D.P.C. (Tectonic) has completed a subsurface investigation and geotechnical engineering evaluation for the proposed structures and site improvements within the athletic facility at North Rockland High School. The purpose of the investigation was to evaluate the subsurface conditions within the areas of improvements, and to provide geotechnical recommendations for the design and construction of the proposed structures and site improvements. This report presents detailed information about the investigation, our findings, and recommendations.

2.0 SCOPE OF SERVICES

The geotechnical investigation was performed for North Rockland Central School District (hereafter referred to as the Client), and coordinated through The LA Group, herein referred to as Client Agent. The scope of the geotechnical investigation consisted of the following:

- Review of geological information publicly available through the United States Geological Survey (USGS) and the National Resources Conservation Service (NRCS).
- Drilling, sampling, and logging of test borings and infiltration tests within the areas of the proposed new structures and site improvements. These included:
    - Fifteen (15) structural borings, designated as borings SB-1 through SB-13, SB-7A, and SB-8A, for the proposed new concession building, new bleachers, new athletic field lighting, and new baseball and softball field dugouts.
    - Six (6) pavement borings, designated as borings PB-1 through PB-6, for proposed new asphalt-paved pedestrian walkways and an ADA parking lot.
    - Drilling and performance of twelve (12) infiltration tests, designated as INF-1 through INF-12, for the proposed improvements to the stormwater management of the existing fields.
- Field inspection by a Tectonic representative, working under the supervision of a New York State licensed Professional Engineer, to locate the borings and infiltration tests; and log and classify all soil samples.
- Laboratory testing of soil samples selected to verify the field classifications of the soils, and to evaluate the engineering characteristics of the soil.
- Geotechnical engineering analyses of the subsurface conditions as they relate to the design and construction of the proposed structures, pavement sections, and site improvements.
- Preparation of this report presenting the results of the subsurface investigation, engineering analyses, and our geotechnical recommendations for the design and construction for the geotechnical aspects of the proposed site improvements.

3.0 SITE AND PROJECT DESCRIPTIONS

The project site is located on the campus of North Rockland High School, located at 106 Hammond Road, in the Hamlet of Thiells, Town of Haverstraw, Rockland County, New York. The campus contains an existing three-story high school building within the southwestern portion of the campus, and existing athletic facilities within the northern and eastern portions of campus. There are existing asphalt-paved parking lots adjacent to the north, west, south, and southeast of the existing school building. The improvements are proposed to be constructed within the athletic facility to the east of the school building. The project site is bound by the school building to the west, wooded areas to the north and east, and a line of trees that separates the athletic field from residential structures to the south. As of the writing of this report, the eastern athletic facility contains existing baseball, softball, and soccer fields on the western half of the site, and a multipurpose turf field with a perimeter running track on the eastern half of the site.

Based on a review of a historical topographic survey provided by the USGS, entitled "Ramapo Quadrangle", dated 1891, a branch of Minisceongo Creek previously extended through the center of the high school campus in a north-south alignment. A review of topographic surveys provided by the USGS between 1910 and 1931 indicate that the creek was filled in, and the site was re-graded. Based on a topographic survey provided by the Client Agent, site grades within the existing baseball and softball fields generally slope downwards from east to west, with surface elevations between approximately +277 and +273 feet. Site grades within the existing multipurpose field slope gently from east to west, with surface elevations between +273 and +272 feet. Site grades within the proposed ADA parking lot to the southwest of the multipurpose field gently slope downwards from north to south, with surface elevations between approximately +278 and +276 feet. All elevations referenced herein are per the North American Vertical Datum of 1988 (NAVD88).

The proposed project will reportedly be completed in two phases; the first phase will include new stormwater management systems for the existing multipurpose field, a new concession building with a second-floor press box, new pedestrian walkways, and lighting structures to the west of the track, expanded bleachers to the east of the track, a perimeter pedestrian walkway adjacent to the track, and an ADA parking lot to the southwest of the multipurpose field. Based on architectural drawings provided by the Client Agent, the new concession building is not proposed to have a below-grade basement. The second phase will include improvements to the existing baseball and softball fields, which will include new synthetic turf fields, field lighting, dugouts, bullpens, bleachers, and pedestrian walkways to the west of the field.

Based on architectural plans provided by the Client Agent, the new concession building will reportedly be approximately 1,800 square feet (sf) in area and will be constructed adjacent to the existing bleachers to the west of the multipurpose field. Stairs to the press box will be constructed to the south of the concession building. Due to the preliminary nature of the project, structural loading values were not available, but it is anticipated that the building will be relatively lightly loaded. The proposed baseball and softball field dugouts are proposed to be constructed at existing grade. Based on conversations with the Client Agent, significant re-grading of the site to construct the proposed improvements is not expected; however, no finished floor elevations were provided for any of the proposed structures.

4.0 SUBSURFACE INVESTIGATION

The subsurface investigation consisted of the drilling, sampling, and logging of twenty-one (21) total borings within the eastern athletic facility, designated as borings SB-1 through SB-13, SB-7A, and SB-8A (structural borings), PB-1 through PB-6 (pavement borings); and the drilling and performance of twelve (12) infiltration tests, designated as INF-1 through INF-12. Borings SB-7A and SB-8A were offset from borings SB-7 and SB-8 respectively, due to relatively shallow obstructions encountered during sampling. The test locations were generally performed at the Client Agent requested locations. The boring and infiltration test locations are shown on the attached Boring and Infiltration Test Location Plan, Figure 1.

The borings were drilled by Core Down Drilling, LLC., between August 9 and September 15, 2022, using track-mounted CME 55LC and Geoprobe 7822DT drill rigs, equipped with automatic hammers. The borings were advanced using 3-¼-inch inside-diameter hollow-stem augers. Within the structural borings, Standard Penetration Testing (SPT) was conducted with a split-spoon sampler continuously to depths of up to 12 feet, and then 5-foot maximum intervals thereafter. Within the pavement borings, SPT sampling was performed continuously to a depth of 6 feet. SPT sampling was performed in general accordance with the requirements of ASTM Standard D1586 *Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils".* SPT N-values were recorded for each soil sample taken. Samples of the soil obtained during the investigation were retained in glass jars, and are currently stored at our material testing laboratory. The boreholes were backfilled with grout to match the existing conditions.

The infiltration tests were performed within 4-inch diameter holes drilled within the existing athletic fields. Infiltration tests INF-1 through INF-5 were advanced within the existing turf multipurpose field; INF-6 was advanced to the south of the multipurpose field; INF-7 and INF-8 were advanced within the existing softball field,

in the northwest corner of the athletic facility; INF-9 through INF-12 were advanced within the existing baseball field, in the southwest corner of the athletic facility. The locations of the infiltration tests are also shown on Figure 1. The infiltration test holes were drilled to depths of approximately 60 inches. Each infiltration test was performed in accordance with the requirements dictated by New York State, including a pre-soak and measurement over four (4) one-hour intervals. Upon completion, the infiltration test holes were backfilled with drill cuttings.

A geotechnical engineer observed the subsurface investigation and prepared logs of the subsurface conditions, under the purview of a Professional Engineer licensed in New York State. All materials encountered were classified in accordance with the Unified Soil Classification System (ASTM D2488), and the Modified Burmister Soil Classification System. Copies of the boring and infiltration test logs are included in Appendix I.

5.0 LABORATORY TESTING

Laboratory testing was performed on soil samples selected to assist in evaluating the engineering properties of the encountered soils and to help in field identifications of the soils. Testing included the performance of twelve (12) grain-size distribution tests, performed in general accordance with ASTM Standard D6913, and one (1) Atterberg limits determination, performed in general accordance with D4318. The results of the laboratory testing are included in Appendix II.

6.0 OVERALL SUBSURFACE CONDITIONS

A review of USGS and New York State geologic maps and surveys indicates that the site is generally underlain by fine sandy loam, and upper layers of fill in the western portion of the existing baseball field and has been previously re-graded. Based on the results of the subsurface investigation, the site is generally underlain by an upper layer of fill and native till soils. The fill soils are likely a mixture of re-worked native soils and imported fill to construct the athletic facility. The following sections provide generalized descriptions of the soils and groundwater conditions encountered in the borings. Detailed descriptions of the subsurface conditions are provided in the boring and infiltration test logs included in Appendix I.

As noted above, an automatic hammer was used in the SPT sampling of the borings. Given that an automatic hammer imparts more energy into the split spoon sampler than a safety hammer (N_{60}) – the standard hammer used for most geotechnical engineering calculations – an energy correction factor of 1.3 is applied to the field N-values to obtain the N_{60}-values.

6.1 Proposed Concession and Press Box Building

Borings SB-1 and SB-2 were advanced within the footprint of the concession and press box building, to the west of the multipurpose field and adjacent to the existing bleachers. Underlying a thin layer of gravel, a layer of fill soils was encountered to a depth of approximately 6 feet below existing ground (bgs). The fill soils generally consisted of brown-gray coarse-to-fine sand and gravel, with varying amounts of fines. Field SPT N-values within the fill ranged from 8 to 35 blows per foot (bpf). When corrected, SPT N_{60}-values ranged from approximately 10 to 46 bpf, corresponding to a medium dense to dense condition. Laboratory results of a soil sample tested indicates that the fill soils within the footprint of the concession and press box building are comprised of between approximately 20 and 46 percent coarse-to-fine gravel, 20 to 42 percent coarse-to-fine sand, and 11 to 20 percent passing the #200 sieve. The fill soils have USGS designations of SM, GW-GM, and GM.

Underlying the fill soils in both borings, native soils were encountered to the termination depths explored. The native soils generally consisted of variable-colored coarse-to-fine sand, with varying amounts of coarse-to-fine gravel and fines. Exceptions occurred in pockets where silt (boring SB-1 from approximately 35 to 42 feet bgs) and gravel (boring SB-2 from approximately 15 to 20 feet bgs) were encountered as the primary material component. Field SPT N-values within the native soils ranged from 1 to 35 bpf. When corrected, SPT N_{60}-values ranged from approximately 1 to 45 bpf, corresponding to a very loose to dense condition. Based on the SPT N_{60}-values, loose layers of native soils were encountered between 15 and 30 feet within boring SB-1, and between 15 and 20 feet within boring SB-2. The native soils within the footprint of the concession and press box building are comprised of between approximately 0 and 61 percent coarse-to-fine gravel, 20 to 45 percent coarse-to-fine sand, and 10 to 45 percent passing the #200 sieve. The native soils have USCS designations of SM, GM, and ML.

As indicated on the boring logs, saturated soil conditions were observed within the native soils in the footprint of the concession and press box building at a depth of approximately 15 feet in borings SB-1 and SB-2. It should also be noted that groundwater levels fluctuate seasonally and with changing weather conditions and may be encountered in a perched condition overlying the finer-grained soils.

6.2 Proposed Multipurpose Field Improvements

Borings SB-3 through SB-8, SB-7A and SB-8A were advanced in the vicinity of the existing multipurpose field for the proposed new field lighting structures, and new visitors bleacher stands to the east of the multipurpose field. Borings SB-3 and SB-4 were advanced to the west of the multipurpose field and borings SB-5 through SB-8, SB-7A and SB-8A were advanced to the east of the multipurpose field. Boring SB-7 was terminated at auger refusal at a depth of 4 feet bgs. Boring SB-7A was then offset approximately 3 feet north of boring SB-7. Boring SB-8 was terminated at auger refusal at a depth of 8 feet bgs. Boring SB-8A was then offset approximately 7 feet north of SB-8. Borings SB-7 and SB-8 were likely terminated on cobbles or boulders. Underlying a thin veneer of topsoil-like material, fill soils were encountered to approximate depths between 2 and 6 feet bgs. The fill soils generally consisted of variable-colored coarse-to-fine sand and gravel, with varying amounts of fines. Field SPT N-values within the fill soils ranged from 6 bpf to sampler refusal, which is defined as less than 6 inches of sampler penetration for 50 blows of the hammer. When corrected, SPT N_{60}-values ranged from approximately 8 bpf to sampler refusal, indicating a loose to very dense condition. The fill soils have USCS classifications of SM and GM.

Underlying the fill, native soils were encountered to the termination depths of the borings. It should be noted that borings SB-6, SB-7A, and SB-8A were terminated at auger refusal at depths between approximately 16 and 20.3 feet bgs. The native soils generally consisted of variable-colored coarse-to-fine sand and gravel, with varying amounts of fines. Layers of silt were encountered between 30 and 32 feet bgs within boring SB-3 and between 10 and 20 feet bgs within boring SB-6. Field SPT N-values within the native soils ranged from 3 bpf to sampler refusal. When corrected, SPT N_{60}-values ranged from approximately 4 bpf to sampler refusal, indicating a very loose to very dense condition. The native soils within the footprint of the proposed lighting structures were generally observed in a medium dense to dense condition; the only loose layers were observed between 30 and 32 feet bgs within boring SB-3, and between 0 and 2 feet bgs within boring SB-6. Laboratory results of soil samples tested indicate that the native soils within the footprints of the proposed lighting structures are comprised of approximately 15 to 55 percent coarse-to-fine gravel, 33 to 49 percent coarse-to-fine sand, and 5 to 36 percent passing the #200 sieve. The native soils have USCS designations of SM, GP-GM, GM, and ML.

Infiltration tests INF-1 through INF-5 were advanced within the existing multipurpose turf field, and infiltration test INF-6 was advanced to the southeast of the multipurpose field for the proposed stormwater management system. SPT sampling was not performed within the infiltration test holes. The results of the infiltration tests are provided on the attached Infiltration Test logs, Appendix I.

As indicated on the boring logs, saturated soil conditions were observed within the native soils in the vicinity of the multipurpose field at a depth of approximately 15 feet within borings SB-3 and SB-4.

6.3 Proposed Baseball/Softball Field Improvements

Borings SB-9 through SB-13 were advanced within the existing baseball and softball fields on the western portion of the athletic facility for the proposed new field lighting, dugouts, and associated baseball field improvements. Underlying a thin veneer of topsoil-like material, the subsurface conditions generally consisted of fill soils, underlain by native sand, silt, and gravel soils.

Fill soils were encountered in all borings to approximate depths between 4 and 6 feet bgs. The fill soils generally consisted of brown coarse-to-fine sand and gravel, with varying amounts of fines. Field SPT N-values within the fill soils ranged from 12 to 58 bpf. When corrected, SPT N_{60}-values ranged from approximately 16 to 75 bpf, indicating a medium dense to very dense condition. The fill soils encountered within the existing baseball and softball fields are comprised of approximately 10 to 50 percent coarse-to-fine gravel, 20 to 50 percent coarse-to-fine sand, and 10 to 35 percent passing the #200 sieve. The fill soils have USCS classifications of SM and GM.

Underlying the fill soils, native soils were encountered to the termination depths of the borings. The native soils generally consisted of variable-colored coarse-to-fine sand and gravel, with varying amounts of fines. A layer of silt with approximately 40 percent fine sand and 14 percent coarse gravel was observed between approximately 4 and 6 feet within boring SB-10. Field SPT N-values within the native soils ranged from 2 bpf to sampler refusal. When corrected, SPT N_{60}-values ranged from approximately 3 bpf to sampler refusal, indicating a very loose to very dense condition. Loose layers of native soils were observed between 10 to 15 feet, and 20 to 32 feet bgs within boring SB-9, between 4 and 8 feet, and 15 to 20 feet bgs within boring SB-10, and between 6 and 32 feet bgs within boring SB-11. Laboratory results of soil samples tested indicate that the native soils are comprised of approximately

14 to 39 percent coarse-to-fine gravel, 39 to 51 percent coarse-to-fine sand, and 7 to 47 percent passing the #200 sieve. The native soils have USCS classifications of SW-SM, SM, ML, and GM.

Infiltration tests INF-7 through INF-12 were advanced within the existing baseball and softball fields, for the proposed future stormwater management system. SPT sampling was not performed within the infiltration test holes.

As indicated on the boring logs, saturated soil conditions were encountered within borings SB-9 through SB-13 at varying depths. Groundwater was observed at a depth of 8 feet bgs within borings SB-9 and SB-10, and between 10 and 15 feet bgs within borings SB-11 through SB-13.

6.4 Pavement Borings

Borings PB-1 through PB-6 were advanced around the perimeter of the existing baseball field for the proposed pedestrian asphalt paths, and the proposed ADA parking lot to be constructed to the southeast of the baseball field. In general, the subsurface conditions consisted of pockets of fill soils, and native soils to the termination depths of the borings of up to 6 feet bgs.

Underlying a thin veneer of topsoil-like material, gravel, or the running track surface and asphalt, fill soils were observed to depths up to 6 feet bgs within borings PB-1 through PB-5. The fill soils generally consisted of variable-colored coarse-to-fine gravel, with varying amounts of coarse-to-fine sand and fines. Field SPT N-values within the fill soils ranged from 13 to 56 bpf. When corrected, SPT N_{60}-values ranged from approximately 17 to 73 bpf, indicating a medium dense to very dense condition. Laboratory results of soil samples tested indicate that the fill soils are comprised of approximately 21 to 49 percent coarse-to-fine gravel, 37 to 65 percent coarse-to-fine sand, and 12 to 14 percent passing the #200 sieve. The native soils have USCS classifications of GM.

Native soils were encountered below the fill soils within borings PB-2, PB-4, and PB-5, and below a thin veneer of topsoil-like material within boring PB-6. The native soils generally consisted of variable-colored coarse-to-fine sand and gravel, with varying amounts of fines. SPT N-values within the native soils ranged from 20 to 28 bpf. When corrected, SPT N_{60}-values ranged from 26 to 36 bpf, indicating a medium dense to dense condition. The native soils have USCS classifications of SM and GM.

As indicated on the boring logs, saturated soil conditions were not encountered within any of the pavement borings. It should also be noted that groundwater levels fluctuate seasonally and with changing weather conditions.

7.0 INFILTRATION TESTS

Twelve (12) infiltration tests, designated as INF-1 through INF-12 were performed throughout the project site. In general, these tests found that the infiltration rates vary significantly throughout the site. The site soils within infiltration tests INF-1, INF-2, advanced within the northern portion of the multipurpose field, and INF-6, advanced within the landscape area to the southeast of the multipurpose field, had a relatively low infiltration rate, with measured rates between approximately 2 to 2.6 inches per hour (iph). The infiltration rates within the center and southern portion of the multipurpose field, and within the baseball and softball fields had relatively high infiltration rates, with measured rates ranging from approximately 13 to 24 iph. The stable infiltration rates are presented in the infiltration test logs, attached to Appendix I.

8.0 SEISMIC SITE COEFFICIENTS AND LIQUEFACTION POTENTIAL

Based on the results of the subsurface investigation and the criteria outlined in the current edition of the New York State Building Code (Code), the subsurface conditions underlying the site should be considered Class D, with maximum spectral response accelerations at short periods (S_{MS}) equal to 0.452g and at 1-second periods (S_{M1}) equal to 0.146g. Based on the procedures outlined in the Code, the corresponding five-percent damped design spectral response acceleration at short periods, S_{DS}, is equal to 0.301g, and at 1-second, S_{D1}, is equal to 0.098g. It should be noted that the values given above are the same, whether the structures to be built are essential or non-essential facilities.

Liquefaction of soils can be caused by strong vibratory motion due to earthquakes. Both research and historical data indicate that loose, granular soils saturated by a shallow groundwater table are most susceptible to liquefaction. Liquefaction occurs when an earthquake and associated ground shaking of sufficient duration results in the loss of grain-to-grain contact due to a rapid increase in pore-water pressure, causing the soil to behave as a fluid for short periods.

An analysis was performed to evaluate the liquefaction potential at the site, in accordance with the Code, using a procedure recommended by Youd et. al. (2001). This method estimates the stresses likely to be induced by an earthquake and the stresses likely to initiate liquefaction using the SPT N-values, the effective overburden pressure, and the peak horizontal ground acceleration caused by the design seismic event. The factors of safety against liquefaction were computed by the ratio of cyclic shear strength of the soil to the cyclic shear stress induced by the seismic event. Using a design earthquake magnitude of 5.47 and the peak horizontal ground acceleration of 0.176g, specified by the Code and reported by the USGS, the liquefaction analysis indicates that the subsurface soils have a factor of safety against liquefaction greater than the generally accepted minimum of 1.1. Subsequently, the soils underlying the site are unlikely to liquefy during the design earthquake.

9.0 DISCUSSION AND CONCLUSIONS

The proposed project consists of various site improvements throughout the athletic facility, including the installation of new stormwater management systems within the multipurpose, baseball, and softball fields, a new concession building with a second-floor press box, new bleachers, pedestrian walking paths, field lighting, and an ADA parking lot. Construction of the various site improvements are feasible from a geotechnical standpoint. The results of the subsurface investigation indicate that the site is generally underlain by fill soils, and native till, consisting of sand and gravel, with varying amounts of fines. The fill soils were generally observed in a medium dense to dense condition, and the native soils were generally in a medium dense condition, with isolated pockets of relatively deep loose native soils.

The proposed 1,800 sf concession building with a second-floor press box is proposed to be constructed to the west of the multipurpose field, adjacent to the existing bleachers. As of the writing of this report, structural loading values were not available, but based on the anticipated construction and use of the building, it is anticipated that the structure will impart relatively light loads. Borings SB-1 and SB-2 were advanced within the footprint of the proposed building. Within the borings, medium dense native soils were observed between 0 and 15 feet bgs. Loose native soils were observed between 15 and 30 feet bgs within boring SB-1, and between 15 and 20 feet bgs within boring SB-2. Due to the anticipated light loads of the building, our analysis indicates that the influence of the foundation loads will be minimal at the depth of the loose layers of soil. Therefore, the proposed building can be supported by traditional, shallow foundations. Significant re-grading in the footprint of the building is not anticipated; therefore, the proposed building is assumed to have an FFE of approximately +279 feet.

New field lighting structures are proposed to be constructed adjacent to the multipurpose, baseball, and softball fields. The subsurface conditions in the vicinity of the multipurpose field generally consists of medium dense to dense native sand and gravel soils. It should be noted that loose native soils were observed between 6 and 32 feet bgs within boring SB-11, advanced within the center of the softball field. Specifications regarding the field lighting structures were not available as of the writing of this report; however, based on our experience on similar projects, the preferred foundation for light poles are drilled shaft foundations, which can be designed to resist the large overturning moments typical of these structures.

New visitor bleachers are proposed to be constructed to the east of the multipurpose field. Borings SB-6, SB-7, and SB-7A were advanced within the vicinity of the proposed bleachers. The subsurface conditions generally consisted of loose to very dense native soils. A loose layer of native soil was observed between 0 and 2 feet bgs within boring SB-6. The bleachers are expected to be supported by shallow foundations, so it is anticipated that the loose upper layer will be excavated as part of the construction.

New dugouts are proposed to be constructed for the existing softball field, located in the northwest corner of the athletic facility. Based on the provided survey, there are existing dugouts for the baseball field, in the southwest corner of the facility that are constructed at grade. It is anticipated that the new dugouts will be constructed in the style of the baseball field dugouts. Based on documents provided by the Client Agent, the dugouts are proposed on slabs-on-grade. Based on the subsurface conditions observed, the dugout slabs can be supported either on the in-place fill soils, or on properly compacted structural fill. The footprints of the dugout slabs should be properly prepared and compacted per Section 11 prior to the placement of concrete to minimize potential settlement. Seasonal deformation of slabs bearing above the frost depth can be reduced by undercutting the frost susceptible soil subgrades and replacing them with gravel or other non-frost susceptible soils, as described in Section 11.

It is Tectonic's understanding that a new ADA parking lot will be constructed to the southwest of the multipurpose field, and pedestrian walkway will be constructed around the perimeter of the athletic facility. Based on documents provided by the Client Agent, the ADA parking lot is proposed to be constructed with flexible pavement for medium-duty traffic, for wheel loads up to 9,000 pounds. The pedestrian walkways are anticipated to be constructed for light-duty loading. The proposed new asphalt paving sections should be designed as discussed in Section 10.7. Due to the relatively high fines content of the native soils, frost heave susceptibility should be considered regarding longevity of the pavement.

Groundwater was observed at varying depths throughout the site. Within the footprint of the proposed concession building, groundwater was encountered at approximately 15 feet bgs; groundwater was observed between 8 and 10 feet bgs within the existing baseball and softball fields; groundwater was not encountered in the footprint of the proposed visitor bleachers, or within the footprints of the ADA parking lot and pedestrian walkways. It is not expected that groundwater will affect construction of the proposed concession building, bleachers, or dugouts, but perched groundwater will likely be encountered during construction throughout the sites. Depending on the final configuration of the proposed lighting structure foundations, groundwater may be encountered during construction of the drilled shaft foundations.

Due to relatively high fines content of the on-site soils, they should be considered to be sensitive to disturbance during excavation and/or compaction, when exposed to water. Therefore, it is critical that care be taken during construction of foundations and pavement subgrade preparation to prevent undue wetting of the soils. Due to the density and generally high fines content of the native till, it is expected to have relatively low permeability, and to be difficult to dewater. It should be noted that groundwater was observed throughout the site between 8 and 15 feet bgs, and may be encountered during the construction phase in a perched condition overlying the finer-grained soils. Grading of pavement subgrades to shed water and to prevent ponding will also be critical to prevent disturbance of the existing soils. Both of these conditions may require subgrade remediation during the construction of new structures and pavement sections, if adequate protection cannot be maintained. Subgrade disturbance can be minimized by using proper subgrade preparation techniques, as described in Section 11 of this report.

The following are other general conclusions that can be made regarding the proposed construction:

- Excavation should be feasible with conventional construction equipment; however, it should be noted that cobbles and boulders may be encountered during excavation.

- Due to their relatively high fines content, the soils found on-site are typically not suitable for use as structural fill. The existing fill and native soils should not be used as backfill behind foundation walls, because their high fines content will impede the proper drainage of the backfill. If used for general fill, these soils are moisture sensitive, and should be at or below optimum moisture content when placed and compacted, to achieve the specific degree of compaction and to provide a stable pavement subgrade. Construction delays should be expected, if the on-site soils are used.

- The results of our liquefaction analysis indicate that the soils underlying the site are unlikely to liquefy.

10.0 RECOMMENDATIONS

The following sections provide our geotechnical recommendations for design and construction of the proposed concession building, field lighting, bleachers, and asphalt paving. The recommendations are based on our understanding of the proposed construction, as described in Section 3, the results of our subsurface investigation and our experience in the general vicinity of the project site.

10.1 Concession and Press Box Building Foundations

The proposed concession and press box building can be supported on conventional shallow spread footings or continuous wall footings that bear on the medium dense to dense native soils. It should be noted that loose layers of native soil were observed between 15 and 32 feet within boring SB-1, and between 20 and 25 feet bgs within boring SB-2. If encountered during excavation, it is recommended that any soft and unsuitable soils encountered within the zone of influence of the building foundations are undercut, and replaced with properly compacted, structural fill.

Due to the dense nature of the soils at the anticipated bearing elevation, and the expected light loads for the building, our analysis indicates that the influence of the foundation loads will largely dissipate before reaching the depths of the loose layers. If any loose or unsuitable soils are encountered within the footprint of the concession building foundations, they should be removed from the zone of influence of the foundations, and replaced with compacted, structural fill. Spread and continuous wall footings for the new buildings and building additions bearing on medium dense native soils or compacted structural fill can be designed for a maximum net allowable soil bearing pressure of 2,000 pounds per square foot (psf). Section 11 of this report provides the subgrade preparation procedures necessary to achieve the recommended bearing capacity.

Using the above design criteria, total settlement of the proposed building is estimated to be up to 1 inch and differential settlements are estimated to be less than 0.5 inch. The differential settlement is estimated between columns and over a distance of about 30 feet along continuous footings. Continuous wall footings should have a minimum width of 2 feet and isolated spread footing should have a minimum width of 3.5 feet. All footings should bear at least 4 feet below the outside grade, for frost protection.

10.2 Concession and Press Box Slab-On-Grade Floors

Slab-on-grade floors should be supported on a minimum 6-inch-thick layer of free draining ½ to ¾ inch crushed stone placed over the existing in-place soils, or structural fill subgrades. If encountered, any loose fill that is encountered below the slab-on-grades should be removed and replaced with compacted structural fill prior to placement of crushed stone. All moisture-sensitive floor slabs should be constructed above a vapor barrier, consisting of a polyethylene membrane with a minimum thickness of twenty (20) mils. A coefficient of friction of 0.3 should be used between the slab and the vapor barrier. If concrete is cast directly against competent native soils, structural fill or existing fill, a coefficient of friction of 0.4 can be used.

A subgrade modulus of 150 pounds per cubic inch (pci) is recommended for design of slab-on-grade floors bearing on 6 inches of crushed stone base placed above the existing fill. The design should be in accordance with the latest edition of the American Concrete Institute (ACI 360). The subgrade modulus is suitable for estimating distributions of bearing pressure beneath the slab and for estimating bending moments and shears within the slab. It is not intended for calculating total or differential settlements.

10.3 Dugout Slabs

The dugout can be supported by a slab-on-grade assuming frost heave can be tolerated. Slabs for the proposed dugouts should be supported on a minimum 6-inch-thick layer of free draining ½ to ¾ inch crushed stone placed over the existing in-place soil, or structural fill subgrades. If encountered, any loose fill that is encountered below the slab-on-grades should be removed and replaced with compacted structural fill prior to placement of crushed stone. If concrete is cast directly against competent native soils, structural fill or existing fill, a coefficient of friction of 0.4 can be used. A subgrade modulus of 150 pounds per cubic inch (pci) is recommended for design of slab-on-grade floors bearing on 6 inches of crushed stone base placed above the existing fill. The design should be in accordance with the latest edition of the American Concrete Institute (ACI 360). The subgrade modulus is suitable for estimating distributions of bearing pressure beneath the slab and for estimating bending moments and shears within the slab. It is not intended for calculating total or differential settlements.

10.4 Design for Lateral Loading of Walls

Any foundation walls and temporary shoring should be designed in accordance with the following criteria:

Table 10.4.1 – Lateral Load Parameters		
Soil Parameter	On-Site Soil	Structural Fill
Angle of Internal Friction	32°	34°
Active Earth Pressure Coefficient (K_a) [1]	0.31	0.28
Passive Earth Pressure Coefficient (K_p) [2]	3.25	3.54
At-Rest Earth Pressure Coefficient (K_o) [3]	0.47	0.44
Unit Weight of Soil (pounds per cubic foot)	115	125
Coefficient of Base Friction	0.4	0.4

1) Use for freestanding walls, such as retaining walls, where movement of up to 0.0015 X height of wall is both possible and tolerable. Otherwise, use at-rest coefficient.

2) Reduce passive pressure by half above a depth of 4 feet below exterior grade to account for disturbance caused by frost action.

3) Use for walls restrained against outward lateral movement, such as foundation walls.

Additional loading due to temporary and permanent surcharges should be added to the lateral loading exerted by the retained soil. Loads due to supported structures should be applied in appropriate combinations with the lateral loads. Walls should be backfilled in accordance with Section 11.3 of this report. Placement and compaction of backfill should be observed and tested by a geotechnical engineer to monitor that proper compaction is being achieved.

10.5 Athletic Field Lighting Foundations

The proposed athletic field lighting structures can be supported on drilled shafts. Design for axial compressive loading can incorporate both end bearing and side resistance, while design for uplift load should only incorporate the side resistance and the pile weight. Drilled shaft foundations should bear at a minimum depth of 8 feet below proposed grade, or 3 times the shaft diameter, whichever is greater. The diameter and embedment depth of the proposed shafts are not known to Tectonic as of the writing of this report. Design parameters for drilled shaft foundations to be constructed adjacent to the multipurpose field to resist axial loading are provided in Table 10.5.1. Design parameters for drilled shaft foundations constructed

adjacent to the baseball/softball fields to resist axial loading are provided in Table 10.5.2. A design groundwater depth of 12 feet bgs should be used for the lighting structures constructed adjacent to the multipurpose field, and a design groundwater depth of 8 feet bgs should be used for lighting structures constructed adjacent to the baseball and softball fields.

Table 10.5.1 – Drilled Pier Design Parameters for Axial Loading (Multipurpose Field Lighting)		
Depth Interval below Existing Grade (feet)	Drilled Pier Parameters	
	Allowable Skin Friction (psf)	Allowable End Bearing Pressure (ksf)
0 – 4	0 – 80	N/A
4 – 8	175 – 320	N/A
8 – 15	320 – 525	6
15 – 32	525 – 630	6

Table 10.5.2 – Drilled Pier Design Parameters for Axial Loading (Baseball/Softball Field Lighting)		
Depth Interval below Existing Grade (feet)	Drilled Pier Parameters	
	Allowable Skin Friction (psf)	Allowable End Bearing Pressure (ksf)
0 – 4	0 – 80	N/A
4 – 8	165 – 300	N/A
8 – 15	300 – 375	4
15 – 32	375 – 500	6

Notes:
1. Skin friction varies linearly with depth and can be interpolated for piles terminated within a given depth interval.
2. Allowable side resistance has been reduced by half in the upper 4 feet to account for frost.
3. Allowable resistance based on a factor of safety of 2.
4. The range given for allowable end bearing pressure corresponds to the top and bottom of the depth interval, and values for intermediate depths can be linearly interpolated.
5. The pile weight should be included in the uplift capacity.

It is anticipated that the primary lateral loading on the lighting structures will be from wind loads. The soil parameters presented in Table 10.5.3 below are provided for design to resist lateral movement and for analyzing lateral deflection and lateral stability of shafts constructed adjacent to the multipurpose field. The parameters presented in Table 10.5.4 are provided for design of shafts constructed adjacent

to the baseball and softball fields. Lateral deflection at the top of the shaft should be checked using a computer program such as LPILE.

Table 10.5.3 – Lateral Load Design Parameters (Multipurpose Field Lighting)								
Soil Type	Depth Below Proposed Ground (ft)		γ'	c	ϕ'	K static	K_p	e_{50}
	From	To	(pcf)	(psf)	(deg)	(pci)		(in/in)
Upper Medium Dense to Dense Soils	0	10	115	0	34	90	1.77/ 3.54(1)	NA
Medium Dense Native Sand Soils	10	32	115/47.6 (2)	0	32	90/60 (2)	3.54	NA

Table 10.5.4 – Lateral Load Design Parameters (Baseball/Softball Field Lighting)								
Soil Type	Depth Below Proposed Ground (ft)		γ'	c	ϕ'	K static	K_p	e_{50}
	From	To	(pcf)	(psf)	(deg)	(pci)		(in/in)
Upper Medium Dense to Dense Soils	0	8	115	0	34	90	1.77/ 3.54(1)	NA
Loose to Medium Dense Native Soils	8	25	42.6	0	30	20	3.00	NA
Medium Dense to Dense Native Soils	25	32	52.6	0	34	60	3.54	NA

Where

γ' = Effective unit weight
c = Cohesion
φ' = Effective friction angle
Kstatic = LPILE soil modulus parameter
K_p = Passive earth pressure coefficient
e_{50} = Strain at 50 percent
NA = Not Applicable

Note:

1. The static passive resistances (Kp) within the top 4 feet of the piles have been cut by half to accommodate weakening from frost action.
2. The upper value is for soils above the water table and the lower value is for soils below the water table, which is assumed to be at a depth of 15 feet in the area of the multipurpose fields.

10.6 Groundwater and Foundation Drainage

Based on the results of our subsurface investigation, it is not anticipated that groundwater will affect the construction of the foundations of the concession building foundations, pavement sections, and bleachers, but may for the lighting structures. In addition, perched groundwater may be encountered during the construction phase. Rainwater and surface water may become trapped in excavations. If necessary, dewatering can be performed with sump pumps and should be performed to allow work to be performed in the dry. Any dewatering should prevent loosening or migration of the subgrade soils. The dewatering system, if necessary, should be designed by a New York State licensed Professional Engineer.

Grading of the surface of the backfill and the surrounding topography and pavements should provide positive drainage away from the walls. Roof drains should be positively drained to areas away from the building.

10.7 Bleacher Foundations

Bleachers are proposed to be constructed to the east of the existing multipurpose field. The upper soils within the athletic field generally consist of medium dense to dense sand and gravel soils. If encountered, loose soils in the zone of influence of the bleacher foundations should be removed, and replaced with compacted, granular fill. The proposed bleachers may be supported on shallow foundations that bear on the existing in-place soils at a minimum depth of 4 feet for protection from frost. Bleacher foundations can be designed for a maximum net allowable soil bearing pressure of 2,000 psf. Total settlements of up to 1/2 inch and differential settlements of up to 1/4 inch can be expected. Section 11 of this report provides the subgrade preparation procedures necessary to achieve the recommended bearing capacity.

10.8 Pavements

It is our understanding that the proposed site improvements include the construction of new asphalt paving sections for the proposed ADA parking lot, and pedestrian walkways. It is our understanding that no significant re-grading of the site will be performed to construct the pavement sections. Subgrade preparation and proofrolling should be performed in accordance with the recommendations provided in Section 11 of this report. For this report, the pavement design parameters were estimated by Tectonic, for medium duty traffic. The standard duty section was based upon a daily traffic of 200 vehicles, with 25 percent heavy trucks. An assumed twenty (20) year design life was used for each pavement section.

Light duty pavement sections may be used for the pedestrian walking paths, where vehicle traffic is not anticipated.

A design California Bearing Ratio (CBR) value of 5 was selected for the design of the asphalt pavement section. This CBR was selected based on the soils encountered on the site, and the compacted native soils that will support the pavement.

Based on the generally high fines content of the subgrade soils, and the high susceptibility of these soils to frost heave, the subgrade should be undercut by 1 foot, and a separation fabric (Mirafi® 180N or similar) should be placed between the in-place soils and a 1-foot layer of non-expansive granular structural fill for frost heave protection. We recommend that the pavement section consist of the following:

Table 10.8.1 - Asphalt Pavements	
Pavement Section Type	Recommended Section
Light Duty	1.5 inches Top Course HMA (Items 402.095102 or 402.125102) 4 inches Type 2 Aggregate Subbase (Item 304.12) 12 inches Select Granular Fill (Item 203.07)
Medium Duty	2 inches Top Course HMA (Items 402.095102 or 402.125102) 3 inches Binder Course HMA (Item 402.195102 or 402.255902) 6 inches Type 2 Aggregate Subbase (Item 304.12) 12 inches Select Granular Fill (Item 203.07)

Note:

1) All Item Numbers are indicated in New York State Department of Transportation Standard Specifications.

11.0 EARTHWORK CONSTRUCTION CRITERIA

The following sections present our recommendations regarding earthwork and construction monitoring.

11.1 General Site Preparation

Initially, the site of the proposed building, bleachers, lighting structures, and pavement sections should be cleared and grubbed, then stripped of all existing fill, pavement, topsoil and debris. The clearing and grubbing should extend at least 5 feet beyond the planned structures to be constructed. Any existing asphalt pavement within the footprints of the ADA parking lot and pedestrian walkway should be stripped

and removed. Debris and vegetation from the clearing operations should be removed from the site and disposed of at a legal disposal facility. All soft or unsuitable materials and subsurface obstructions should be removed from the building footprint and the zone of influence of the slab-on-grade or foundation. The zone of influence is defined by 1:1 (horizontal to vertical) planes sloping downward and outward from the bottom edges of the slab or footing.

Any existing utilities within the project limits should be re-routed around the foundations or removed. The resulting excavations should be backfilled with structural fill in accordance with the procedures outlined below. Any trench excavations should be properly benched to allow for adequate compaction.

11.2 Subgrade Preparation

All building and bleacher foundation, slab-on-grade, and pavement subgrades should be inspected by the geotechnical engineer prior to the placement of structural fill, concrete, or pavement subbase material. It is our understanding that significant re-grading will not be performed for the construction of the proposed concession building, bleachers, dugouts, or asphalt paving sections. Any cut areas of the site should be lowered to the planned subgrade depth, and the exposed native soils should be proofrolled to observe for potentially yielding soils. In any proposed fill areas, the surface should be cleared and grubbed, and the resulting subgrade prior to fill placement should also be proofrolled. Areas to receive structural fill should also be proofrolled before placing any backfill materials.

The foundation and pavement subgrades, and any surfaces to receive structural fill or concrete should be proofrolled under the observation of the geotechnical engineer. Proofrolling should be accomplished by making a minimum of four (4) passes in perpendicular directions with a 10-ton roller in open areas, or a 1.5-ton trench roller, where access is confined. Proofrolling should not be performed on saturated soils or in areas having freestanding surface water, until they are dewatered and allowed to dry. Proofrolling soils that exceed the optimum moisture content may disturb the soils, resulting in more unfavorable conditions. Unsuitable materials or areas identified to be soft by the geotechnical engineer, based on visual inspection and observation of proofrolling operations should be removed and replaced with compacted structural fill. Any subgrade soils found to be soft and yielding during proofrolling, or otherwise deemed unsuitable by the geotechnical engineer, should be removed and replaced with properly compacted structural fill.

11.3 Fill and Backfill Materials

Imported structural fill should be well-graded granular soil that meets the general gradation requirements for New York State Department of Transportation (NYSDOT) Type 2 Aggregate Subbase (Item 304.12), and as follows:

Sieve Size	Percent Finer by Weight
2 Inch	100
¼ Inch	25 to 60
No. 40	5 to 40
No. 200	0 to 10

Based on the results of our subsurface investigation and laboratory testing the native soils are not suitable for use as structural fill, due to the high fines content (up to 47 percent). Any soils that are to be used as structural fill should be tested and approved by the geotechnical engineer prior to use.

Non-conforming native soils may be suitable for use as general fill in landscaped areas, provided they are free of trash, debris, roots, vegetation, or other deleterious materials. It should be noted that use of soils containing moderately high silt contents (such as those encountered at the site) will likely cause construction delays during the winter months, following periods of wet weather, or if the material is wet when excavated.

All general fill and structural fill should be compacted to at least 95 percent of the maximum dry density, at near optimum moisture contents, as determined by the modified Proctor test (ASTM D1557). The degree of compaction should be tested and documented by a geotechnical engineer for each lift of fill. The lift thickness for the structural fill soils will vary depending on the type of compaction equipment used. Structural fill should generally be placed in uniform horizontal lifts not exceeding 8 inches in loose thickness when using a 10-ton roller. In confined areas, the loose lift thickness should be 4 inches or less and each lift should be compacted with sufficient passes of hand operated vibratory or impact compaction equipment. A geotechnical engineer with appropriate field and laboratory support should inspect all subgrades, approve materials for use as fill, and test backfill materials for compliance with the recommended compaction.

Free draining crushed stone placed below floor slabs and as drainage materials behind foundation walls should be Underdrain Filter Type I materials (Item No. 733.2001) as specified in the NYSDOT Standard Specifications and as follows:

Sieve Size	Percent Finer by Weight
1 inch	100
1/2 inch	30 - 100
1/4 inch	0 - 30
No. 4	0 - 10
No. 8	0 – 5

Select granular fill to be placed below the subbase material for the asphalt paving sections should be a well-graded durable granular material that meets the gradation requirements for Select Granular Fill (Item 203.07).

11.4 Protection of Subgrades and Construction Dewatering

Approved soil subgrades should be protected from the effects of frost, construction traffic, perched groundwater, surface water and precipitation. The necessary protection should be provided as soon after approval by the geotechnical engineer as is practicable and should be maintained until coverage with compacted fill or gravel. It is recommended that temporary surface drainage measures be installed to divert runoff away from the proposed construction limits.

Based on the conditions observed during the subsurface investigation, perched groundwater may be encountered during the construction phase. If necessary, dewatering should be performed in a manner that will prevent loosening or migration of the subgrade soils and performed to maintain the water level at least 1 foot below the deepest excavation. Given the dense nature and high fines content of the on-site soils, it is anticipated that sump pits and pumps may be suitable for dewatering. Sump pits should be placed at least 1 foot outside of excavations for every foot below the subgrade elevation that they are excavated. The dewatering system should be designed by a New York State Licensed Professional Engineer, and it should be designed to ensure that dewatering does not result in any loss of soil.

As has been previously noted, the on-site soils contain a high percentage of fines and they will soften and experience a reduction in load-carrying capacity when exposed to moisture and disturbed. They may also become unworkable if allowed to get wet. These soils are also frost susceptible and could become disturbed if allowed to freeze during construction. Additional excavation and material removal may be required if subgrades are allowed to be exposed for long durations without fill or concrete placement. Additionally, construction traffic could also disturb the native soils.

If maintaining subgrade stabilization during periods of wet weather is a concern, crushed stone may be placed on footing and/or floor subgrades after excavation and proofrolling. The crushed stone should be clean ½ to ¾ inch gravel, stone, or recycled concrete, and should not exceed 6 inches in thickness.

11.5 Excavations and Shoring

Temporary excavation slopes should conform to the latest OSHA standards, including slopes permitted for specified heights and soil conditions encountered. The presence of perched water, or other deleterious materials could require flatter slopes or temporary excavation support (e.g., shoring and bracing). Excavation support may also be necessary in areas where sufficient distance to provide adequate benching of slopes is not available.

Excavations into the existing fill and native soil should be feasible using standard construction equipment (i.e. hydraulic excavator). Cobbles and boulders should be expected within both the existing fill and within the undisturbed glacial till. Design of dewatering and excavation support should conform to the latest OSHA and other applicable agency requirements. Design of all excavation slopes greater than a 4-foot depth and design of sheeting, shoring, and bracing should be performed by a New York State licensed Professional Engineer. Adequate dewatering or surface-water runoff control should be provided to avoid instability and caving of soils.

11.6 Deep Foundation Construction Considerations

Drilled shaft foundations should be constructed in accordance with the most recent standards of the International Association of Foundation Drilling (ADSC), the Code, and ACI 336. Plans and specifications should clearly indicate that variable soil conditions are present, and obstructions, likely in the form of cobbles and boulders, are present in the native soils. This will allow the contractor to employ the appropriate equipment and construction methodologies. The foundations should also be constructed under the full-time observation of the geotechnical engineer.

Due to the granular nature of the subsurface soils, a temporary steel casing may be needed to prevent collapse of the soils into the excavations, and drilling slurry may be required to maintain the sidewall stability below the groundwater level. At the time of the subsurface investigation, groundwater was observed at approximately 15 feet bgs adjacent to the multipurpose field, and between 8 and 10 feet bgs adjacent to the baseball fields. The embedment depth of the shafts is not known as of the writing

of this report, so groundwater may potentially be encountered when installing the shafts. The temporary casing could be extended to the full depth of the pile in lieu of the drilling slurry, provided that the casing is removed while concrete is placed. Removal of the casing should be performed so that the level of the concrete within the casing is always at least 1-foot above the bottom of the casing.

Concrete placement associated with the drilled piles should be performed utilizing a concrete pump and using tremie methods to prevent segregation of the concrete. If casing is used, concrete placement should be done in a manner to prevent "necking" of the drilled pile.

12.0 CONSTRUCTION MONITORING

A geotechnical engineer familiar with the existing subsurface conditions and having the appropriate laboratory and field-testing support should be engaged by the Client to observe that all earthwork is performed in accordance with the specifications, the Code, and the criteria provided in this report. As a minimum, the following work should be performed under the observation of the geotechnical engineer:

- Subgrade preparation
- Proofrolling
- Remedial removals of unsuitable soils
- Placement and compaction of fill and backfill materials
- Construction of drilled shafts for lighting structures
- Dewatering, if necessary

All materials proposed for use as soil fill should be tested and approved prior to delivery to the site. Additionally, all fill materials should be tested as they are being placed to verify that the required compaction is achieved. We further recommend that Tectonic be retained to review the project plans and specifications prior to completion of the bid documents.

13.0 LIMITATIONS

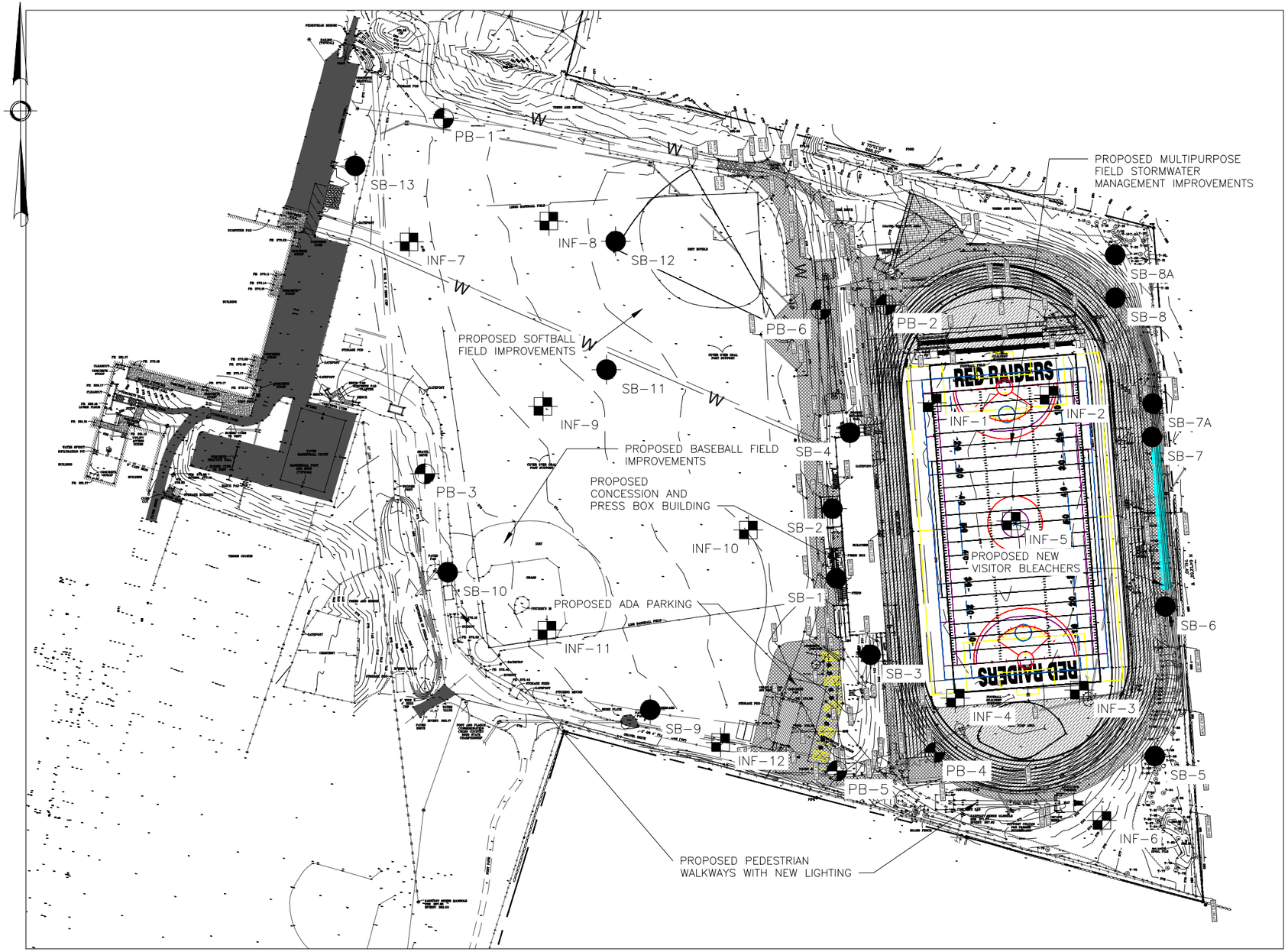
Our professional services have been performed using that degree of care and skill ordinarily exercised under similar circumstances by reputable geotechnical engineers and geologists practicing in this or similar situations. The interpretation of the field data is based on good judgment and experience. However, no matter how qualified the geotechnical engineer or detailed the investigation, subsurface conditions cannot always be predicted beyond the points of actual sampling and testing. No other warranty, expressed or implied, is made as to the professional advice included in this report. The recommendations contained in this report are intended for design purposes

only. Contractors and others involved in the construction of this project are advised to make an independent assessment of the soil and groundwater conditions for the purpose of establishing quantities, schedules and construction techniques.

This report has been prepared for the exclusive use of The LA Group, for the specific application to the proposed construction detailed in this report. We recommend that prior to construction; Tectonic Engineering Consultants, Geologists, and Land Surveyors D.P.C. reviews the project plans and specifications. It should be noted that upon review of those documents, some recommendations presented herein might be revised or modified. In the event that any changes in the design or location of the proposed structures are planned, Tectonic shall not consider the conclusions and recommendations contained in this report valid unless reviewed and verified in writing. It is further recommended that Tectonic be retained to provide construction monitoring and inspection services to ensure proper implementation of the recommendations contained herein, which would otherwise limit our professional liability.

SC/CBB: G:\Newburgh\Geotechnical\11500\11584.01 North Rockland High School\Report\11584.01 North Rockland High School improvements geoinv.docx

FIGURE I



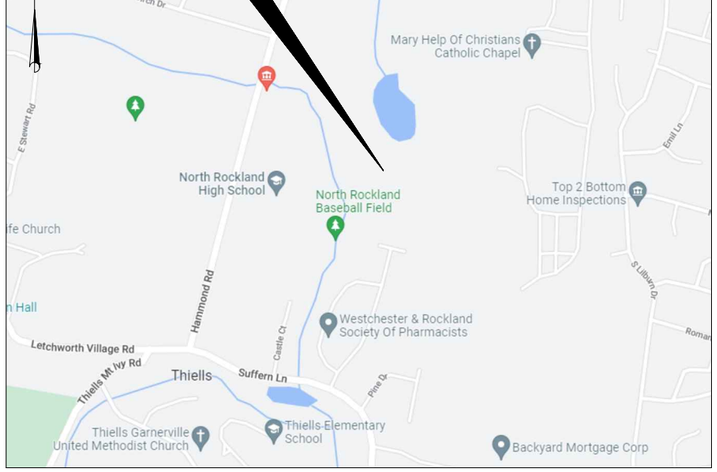
LEGEND

- PB-6 — APPROXIMATE PAVEMENT BORING LOCATION
- SB-13 — APPROXIMATE STRUCTURAL BORING LOCATION
- INF-12 — APPROXIMATE INFILTRATION TEST LOCATION

NOTES

1. PLAN BASED ON A SITE SURVEY PROVIDED BY THE LA GROUP DATED 05/2022.
2. BORINGS AND INFILTRATION TEST LOCATIONS WERE FIELD LOCATED BY TECTONIC AND SHOULD BE CONSIDERED APPROXIMATE.

SITE



0 1 2 3

ORIGINAL SIZE IN INCHES

Tectonic
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BORING AND INFILTRATION TEST LOCATION PLAN

PROPOSED ATHLETIC FACILITY IMPROVEMENTS
NORTH ROCKLAND HIGH SCHOOL
106 HAMMOND ROAD
HAMLET OF THIELLS, TOWN OF HAVERSTRAW, ROCKLAND COUNTY, NY

Date	Work Order	Drawing No.	Rev
10/13/2022	11584.01	FIGURE I	0
Scale 1" = 125'			

APPENDIX I

Tectonic

BORING No. PB-1

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**
SHEET No. 1 of 1

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**
METHOD OF ADVANCING BORING | DIA. | DEPTH
POWER AUGER: | | TO
ROT. DRILL: | | TO
CASING: | | TO
DIAMOND CORE: | | TO
Geoprobe 7822DT track-mounted drill rig with automatic hammer

GROUND WATER | DATE | TIME | DEPTH
| | | |

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **85° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **William Guerrieri**
DRILLER: **Billy Johnson**
SURFACE ELEVATION: **274.5**
DATUM: **See Remarks**
DATE START: **8/9/22**
DATE FINISH: **8/9/22**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT %
10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	24	4 9 15 13	S-1	16		M	SW-SM	1" Topsoil-like material Bwn c-f SAND, and f Gravel, little Silt (FILL)		
3	43	21 21 22 22	S-2	11		M	SM	Bwn-gy c-f SAND, some c-f Gravel, little Silt (FILL)		
5	24	12 14 10 16	S-3	22		M	SM	Same (FILL)		269.5
6								End of Boring at 6'		
10										264.5
15										259.5
20										254.5
25										249.5

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**

BORING No. PB-2

SHEET No. 1 of 1

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**
METHOD OF ADVANCING BORING | DIA. | DEPTH
POWER AUGER: | | TO
ROT. DRILL: | | TO
CASING: | | TO
DIAMOND CORE: | | TO
Geoprobe 7822DT track-mounted drill rig with automatic hammer

GROUND WATER | DATE | TIME | DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **85° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **William Guerrieri**
DRILLER: **Billy Johnson**
SURFACE ELEVATION: **272.0**
DATUM: **See Remarks**
DATE START: **8/9/22**
DATE FINISH: **8/9/22**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) ◓ — 1 2 3 4 5
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % — 10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.) ● — 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RECOV.: RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1–2	14	15, 6, 8, 17	S-1	15		M	GM	Red track surface, 2" asphalt, 3" subbase gravel Bwn c-f GRAVEL, and c-f Sand, little Silt (FILL)		
3–4	56	21, 31, 25, 21	S-2	19		M	GM	Bwn-gy c-f GRAVEL, some c-f Sand, little Silt (FILL)		
5–6	28	16, 14, 14, 11	S-3	10		M	SM	Bwn-gy c-f SAND, and c-f Gravel, little Silt		267.0
								End of Boring at 6'		
10										262.0
15										257.0
20										252.0
25										247.0

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**

BORING No. PB-3

SHEET No. 1 of 1

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**
METHOD OF ADVANCING BORING | DIA. | DEPTH
POWER AUGER: | | TO
ROT. DRILL: | | TO
CASING: | | TO
DIAMOND CORE: | | TO
Geoprobe 7822DT track-mounted drill rig with automatic hammer

GROUND WATER | DATE | TIME | DEPTH
| | | |

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **85° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **William Guerrieri**
DRILLER: **Billy Johnson**
SURFACE ELEVATION: **271.0**
DATUM: **See Remarks**
DATE START: **8/9/22**
DATE FINISH: **8/9/22**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) ◓
1 2 3 4 5
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT %
10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.) ●
10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	50	13, 17, 33, 36	S-1	16		M	GM	4" gravel surface Bwn c-f GRAVEL, and m-f Sand, little Silt (FILL)		
3	55	21, 30, 25, 26	S-2	17		M	GM	Gy-bwn c-f GRAVEL, some c-f Sand, little Silt (FILL)		
5	30	14, 16, 14, 11	S-3	9		M	GM	Same (FILL)		266.0
6								End of Boring at 6'		
10										261.0
15										256.0
20										251.0
25										246.0

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**

BORING No. PB-4

SHEET No. 1 of 1

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**
METHOD OF ADVANCING BORING | DIA. | DEPTH
POWER AUGER: | | TO
ROT. DRILL: | | TO
CASING: | | TO
DIAMOND CORE: | | TO
Geoprobe 7822DT track-mounted drill rig with automatic hammer

GROUND WATER | DATE | TIME | DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **85° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **William Guerrieri**
DRILLER: **Billy Johnson**
SURFACE ELEVATION: **272.0**
DATUM: **See Remarks**
DATE START: **8/9/22**
DATE FINISH: **8/9/22**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT % 10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	13	10 5 8 9	S-1	13		M	SM	Red track surface, 1" asphalt, 3" subbase gravel Bwn c-f SAND, some f Gravel, little Silt (FILL)		
3	18	12 7 11 15	S-2	18		M	SM	Bwn c-f SAND, some c-f Gravel, little Silt		
5	21	19 13 8 6	S-3	19		M	SM	Bwn c-f SAND, some Silt, some c-f Gravel		267.0
6								End of Boring at 6'		
10										262.0
15										257.0
20										252.0
25										247.0

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**

BORING No. PB-5

SHEET No. 1 of 1

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**
METHOD OF ADVANCING BORING | DIA. | DEPTH
POWER AUGER: | | TO
ROT. DRILL: | | TO
CASING: | | TO
DIAMOND CORE: | | TO
Geoprobe 7822DT track-mounted drill rig with automatic hammer

GROUND WATER | DATE | TIME | DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **85° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **William Guerrieri**
DRILLER: **Billy Johnson**
SURFACE ELEVATION: **276.0**
DATUM: **See Remarks**
DATE START: **8/9/22**
DATE FINISH: **8/9/22**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT % 10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	40	14 19 21 12	S-1	12		M	GM	3" gravel surface Bwn-gy c-f GRAVEL, some c-f Sand, little Silt (FILL)		
3	21	8 13 8 6	S-2	10		M	SM	Bwn-tn c-f SAND, little f Gravel, little Silt		
5	20	10 10 10 12	S-3	19		M	GM	Bwn c-f GRAVEL, some c-f Sand, little Silt		271.0
6								End of Boring at 6'		
10										266.0
15										261.0
20										256.0
25										251.0

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**

BORING No. PB-6

SHEET No. 1 of 1

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**
METHOD OF ADVANCING BORING | DIA. | DEPTH
POWER AUGER: | | TO
ROT. DRILL: | | TO
CASING: | | TO
DIAMOND CORE: | | TO
Geoprobe 7822DT track-mounted drill rig with automatic hammer

GROUND WATER | DATE | TIME | DEPTH
| | | |
| | | |

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **85° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **William Guerrieri**
DRILLER: **Billy Johnson**
SURFACE ELEVATION: **278.0**
DATUM: **See Remarks**
DATE START: **8/9/22**
DATE FINISH: **8/9/22**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT % 10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	27	11 16 11 15	S-1	16		M	SM	3" topsoil-like material Bwn c-f SAND, and c-f Gravel, little Silt (FILL)		
3	38	15 21 17 15	S-2	11		M	SM	Same (FILL)		
5	28	14 14 14 12	S-3	16		M	GM	Bwn-gy c-f GRAVEL, some c-f Sand, little Silt		273.0
6								End of Boring at 6'		
10										268.0
15										263.0
20										258.0
25										253.0

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**

BORING No. SB-1

SHEET No. 1 of 2

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**
METHOD OF ADVANCING BORING | DIA. | DEPTH
POWER AUGER: | **3 1/4"** | **0** TO **40'**
ROT. DRILL: | | TO
CASING: | | TO
DIAMOND CORE: | | TO
CME 55LC track-mounted drill rig with automatic hammer

GROUND WATER | DATE | TIME | DEPTH
| | | |
| | | |

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **75° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Daniela Parrino**
DRILLER: **Andrew Bellucci**
SURFACE ELEVATION: **279.0**
DATUM: **See Remarks**
DATE START: **9/14/22**
DATE FINISH: **9/14/22**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT % ✕ ⊗ △ 10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	18	5 7 11 15	S-1	20		M	SM	3" gravel surface Bwn-gy c-f SAND, some c-f Gravel, little Silt (FILL)		
3	35	20 18 17 11	S-2	20		M	GW-GM	Bwn c-f GRAVEL, and c-f Sand, little Silt (FILL)		
5	16	11 10 6 9	S-3	10		M	GW-GM	Same (FILL)		274.0
7	23	10 12 11 9	S-4	9		M	SM	Bwn-gy c-f SAND, some c-f Gravel, little Silt		
9	14	8 8 6 6	S-5	19		M	SM	Bwn c-f SAND, some c-f Gravel, little Silt		269.0
11	10	5 6 4 5	S-6	18		M	SM	Bwn c-f SAND, little Silt, trace c-f Gravel		
13										
15										264.0
16	6	3 3 3 3	S-7	18		W	SM	Bwn c-f SAND, little Silt, trace c-f Gravel		
18										
20										259.0
21	8	WOR 4 4 4	S-8	21		W	SM	Same		
23										
25										254.0

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**

BORING No. SB-1

SHEET No. 2 of 2

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RECOV.: RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
26	1	WOH 0 1 1	S-9	10		W	SM	Bwn-gy c-f SAND, and Silt		
27										
28										
29										
30										249.0
31	8	2 4 4 3	S-10	18		W	SM	Gy m-f SAND, and Silt		
32										
33										
34										
35										244.0
36	9	1 3 6 9	S-11	16		W	ML	Gy-rd SILT, some m-f Sand, some c-f Gravel		
37										
38										
39										
40										239.0
41	33	8 15 18 16	S-12	16		W	ML	Rd-gy SILT, some c-f Gravel, some c-f Sand		
42										
43								End of Boring at 42'		
44										
45										234.0
46										
47										
48										
49										
50										229.0
51										
52										
53										
54										
55										224.0

UNCONFINED COMPRESS. STRENGTH (TONS/FT)
1 2 3 4 5
PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.)
10 20 30 40 50

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**

BORING No. SB-2

SHEET No. 1 of 2

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**
METHOD OF ADVANCING BORING | DIA. | DEPTH
POWER AUGER: | **3 1/4"** | **0** TO **25'**
ROT. DRILL: | | TO
CASING: | | TO
DIAMOND CORE: | | TO
CME 55LC track-mounted drill rig with automatic hammer

GROUND WATER | DATE | TIME | DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **75° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Daniela Parrino**
DRILLER: **Andrew Bellucci**
SURFACE ELEVATION: **279.0**
DATUM: **See Remarks**
DATE START: **9/14/22**
DATE FINISH: **9/14/22**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5
PLASTIC LIMIT % × | WATER CONTENT % ⊗ | LIQUID LIMIT % △ 10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	8	8 4 4 5	S-1	14		M	SM	3" gravel surface Bwn-gy c-f SAND, some c-f Gravel, little Silt (FILL)		
3	15	4 6 9 10	S-2	9		M	GM	Bwn-gy c-f GRAVEL, some c-f Sand, little Silt (FILL)		
5	33	15 15 18 11	S-3	18		M	GM	Bwn-gy c-f GRAVEL, some c-f Sand, some Silt (FILL)		274.0
7	12	8 7 5 10	S-4	16		M	SM	Bwn-gy c-f SAND, some c-f Gravel, some Silt		
9	22	12 12 10 7	S-5	14		M	SM	Same		
10										269.0
11	15	8 8 7 7	S-6	14		M	SM	Same		
15										264.0
16	10	4 5 5 5	S-7	8		W	GM	Bwn c-f GRAVEL, some c-f Sand, little Silt		
20										259.0
21	5	3 3 2 2	S-8	22		W	SM	Bwn-gy m-f SAND, some Silt, trace c-f Gravel		
25										254.0

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**

PROJECT: **North Rockland High School**

LOCATION: **Thiells, NY**

BORING No. SB-2

SHEET No. 2 of 2

CLIENT: **North Rockland Central School District**

CONTRACTOR: **Core Down Drilling LLC**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	SAMPLES: RECOV. LENGTH (IN.)	SAMPLES: RECOV. RQD (%)	SAMPLES: MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
26	20	12 10 10 9	S-9	24		W	SM	Bwn c-f SAND, and c-f Gravel, little Silt		
27										
28								End of Boring at 27'		
30										249.0
35										244.0
40										239.0
45										234.0
50										229.0
55										224.0

UNCONFINED COMPRESS. STRENGTH (TONS/FT)
1 2 3 4 5

PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
10 20 30 40 50

STANDARD PENETRATION (BLOWS/FT.)
10 20 30 40 50

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**

BORING No. SB-3

SHEET No. 1 of 2

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**
METHOD OF ADVANCING BORING | DIA. | DEPTH
POWER AUGER: | **3 1/4"** | **0** TO **30'**
ROT. DRILL: | | TO
CASING: | | TO
DIAMOND CORE: | | TO
CME 55LC track-mounted drill rig with automatic hammer

GROUND WATER | DATE | TIME | DEPTH
| | | |

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Overcast** TEMP: **65° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Daniela Parrino**
DRILLER: **Andrew Bellucci**
SURFACE ELEVATION: **278.0**
DATUM: **See Remarks**
DATE START: **9/15/22**
DATE FINISH: **9/15/22**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT % ✕ ⊗ △ 10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	11	4 6 5 5	S-1	10		M	GM	3" topsoil-like material Bwn-gy c-f GRAVEL, some c-f Sand, little Silt (FILL)		
3	28	6 11 17 16	S-2	16		M	GM	Same (FILL)		
5	14	13 8 6 4	S-3A S-3B	18		M	SM ML	8" Bwn c-f SAND, some c-f Gravel, little Silt (FILL) 10" Or-bwn SILT, some m-f Sand, trace c-f Gravel		273.0
7	34	11 14 20 18	S-4	20		M	GM	Bwn-gy c-f GRAVEL, some c-f Sand, little Silt		
9	72	17 24 48 37	S-5	18		M	GM	Bwn-gy c-f GRAVEL, some m-f Sand, little Silt		
10	50+	50/3	S-6	3		M	SM	Gy-wht c-f SAND, little c-f Gravel, little Silt		268.0
15										263.0
16	14	8 8 6 3	S-7	16		W	SM	Bwn c-f SAND, little Silt, trace c-f Gravel		
20										258.0
21	15	4 7 8 6	S-8	18		W	SM	Bwn-or c-f SAND, some Silt, trace c-f Gravel		
25										253.0

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

Tectonic

PROJECT No. **11584.01**

PROJECT: **North Rockland High School**

LOCATION: **Thiells, NY**

BORING No. SB-3

SHEET No. 2 of 2

CLIENT: **North Rockland Central School District**

CONTRACTOR: **Core Down Drilling LLC**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	SAMPLES: RECOV. LENGTH (IN.)	SAMPLES: RECOV. RQD (%)	SAMPLES: MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
26	4	2 2 2 2	S-9	14		W	SM	Tn-or c-f SAND, and Silt		
27										
28										
29										
30										248.0
31	3	2 0 3 2	S-10	20		W	ML	Gy-or SILT, and m-f Sand		
32										
33								End of Boring at 32'		
34										
35										243.0
36										
37										
38										
39										
40										238.0
41										
42										
43										
44										
45										233.0
46										
47										
48										
49										
50										228.0
51										
52										
53										
54										
55										223.0

UNCONFINED COMPRESS. STRENGTH (TONS/FT)
1 2 3 4 5

PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
10 20 30 40 50

STANDARD PENETRATION (BLOWS/FT.)
10 20 30 40 50

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**

BORING No. SB-4

SHEET No. 1 of 2

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**
METHOD OF ADVANCING BORING | DIA. | DEPTH
POWER AUGER: | **3 1/4"** | **0** TO **30'**
ROT. DRILL: | | TO
CASING: | | TO
DIAMOND CORE: | | TO
CME 55LC track-mounted drill rig with automatic hammer

GROUND WATER | DATE | TIME | DEPTH
| | | |
| | | |

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **75° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Daniela Parrino**
DRILLER: **Andrew Bellucci**
SURFACE ELEVATION: **276.0**
DATUM: **See Remarks**
DATE START: **9/14/22**
DATE FINISH: **9/14/22**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT % 10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	23	4 10 13 16	S-1	8		M	GM	4" topsoil-like material Bwn-gy c-f GRAVEL, some c-f Sand, little Silt (FILL)		
3	32	22 22 10 12	S-2	8		M	SM	Bwn c-f SAND, some Silt, little c-f Gravel		
5	24	6 11 13 10	S-3	18		M	GM	Bwn-gy c-f GRAVEL, and c-f Sand, little Silt		271.0
7	24	11 10 14 11	S-4	17		M	SM	Bwn-gy c-f SAND, some c-f Gravel, little Silt		
9	28	11 12 16 12	S-5	17		M	SM	Same		
10										266.0
11	13	8 8 5 7	S-6	20		M	SM	Tn m-f SAND, some Silt		
15										261.0
16	9	4 4 5 22	S-7	18		W	SM	Bwn c-f SAND, little Silt, trace f Gravel		
20										256.0
21	10	2 5 5 5	S-8	24		W	SM	Gy m-f SAND, little Silt		
25										251.0

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**

PROJECT: **North Rockland High School**

LOCATION: **Thiells, NY**

BORING No. SB-4

SHEET No. 2 of 2

CLIENT: **North Rockland Central School District**

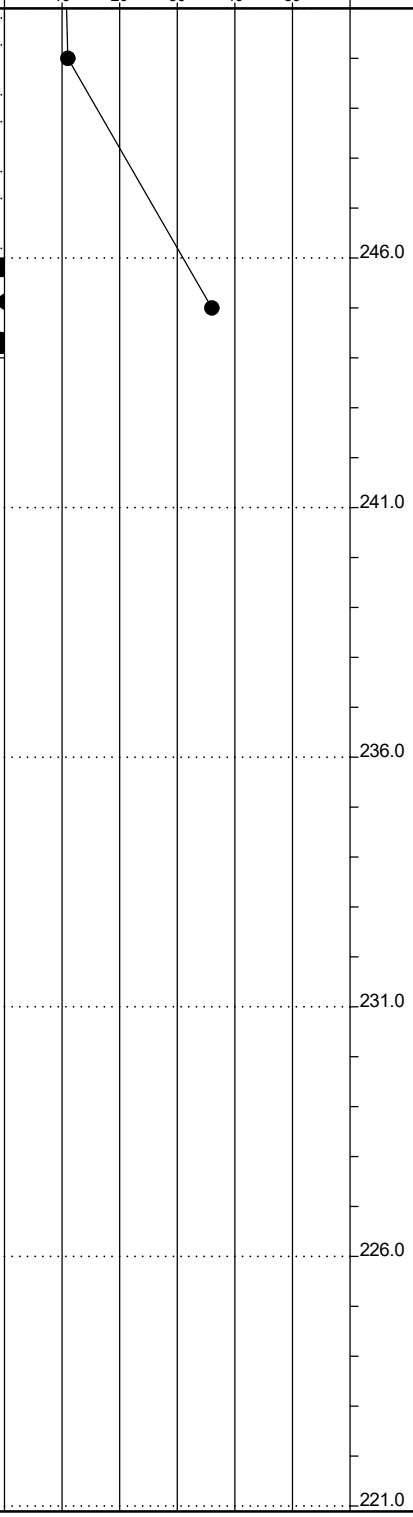
CONTRACTOR: **Core Down Drilling LLC**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	SAMPLES: RECOV. LENGTH (IN.)	SAMPLES: RECOV. RQD (%)	SAMPLES: MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
26	11	3 5 6 7	S-9	14		W	SM	Bwn m-f SAND, and Silt		
27										
28										
29										
30										246.0
31	36	24 13 23 14	S-10	12		W	GM	Bwn-gy c-f GRAVEL, some c-f Sand, little Silt		
32										
33								End of Boring at 32'		
34										
35										241.0
36										
37										
38										
39										
40										236.0
41										
42										
43										
44										
45										231.0
46										
47										
48										
49										
50										226.0
51										
52										
53										
54										
55										221.0

UNCONFINED COMPRESS. STRENGTH (TONS/FT)
1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %
10 20 30 40 50

STANDARD PENETRATION (BLOWS/FT.)
10 20 30 40 50



REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

BORING No. SB-5

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**
SHEET No. 1 of 1

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**
METHOD OF ADVANCING BORING | DIA. | DEPTH
POWER AUGER: | **3 1/4"** | **0** TO **15'**
ROT. DRILL: | | TO
CASING: | | TO
DIAMOND CORE: | | TO
CME 55LC track-mounted drill rig with automatic hammer

GROUND WATER | DATE | TIME | DEPTH
| | | |
| | | |

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Overcast** TEMP: **75° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Daniela Parrino**
DRILLER: **Andrew Bellucci**
SURFACE ELEVATION: **278.0**
DATUM: **See Remarks**
DATE START: **9/12/22**
DATE FINISH: **9/12/22**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT % 10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	11	1 3 8 10	S-1	16		M	SM	6" topsoil-like material Bwn c-f SAND, some Silt, little c-f Gravel (FILL)		
3	29	8 15 14 9	S-2	17		M	SM	Bwn c-f SAND, some Silt, some c-f Gravel		
5	28	6 18 10 7	S-3	14		M	GM	Bwn c-f GRAVEL, some c-f Sand, some Silt		273.0
7	14	8 8 6 6	S-4	20		M	SM	Bwn m-f SAND, and Silt, little f Gravel		
9	14	8 8 6 9	S-5	12		M	GM	Bwn c-f GRAVEL, some c-f Sand, little Silt		268.0
11	39	22 16 23 28	S-6	24		M	GM	Bwn c-f GRAVEL, some c-f Sand, some Silt		
15	50+	63 50/2	S-7	8		M	GM	Bwn c-f GRAVEL, little c-f Sand, little Silt Auger refusal at 16 feet bgs		263.0
								End of Boring at 16'		
20										258.0
25										253.0

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

BORING No. SB-6

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**
SHEET No. 1 of 1

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**
METHOD OF ADVANCING BORING | DIA. | DEPTH
POWER AUGER: | **3 1/4"** | **0** TO **20'**
ROT. DRILL: | | TO
CASING: | | TO
DIAMOND CORE: | | TO
CME 55LC track-mounted drill rig with automatic hammer

GROUND WATER | DATE | TIME | DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Overcast** TEMP: **75° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Daniela Parrino**
DRILLER: **Andrew Bellucci**
SURFACE ELEVATION: **279.0**
DATUM: **See Remarks**
DATE START: **9/12/22**
DATE FINISH: **9/12/22**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT % ⊗ 10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	6	1 3 3 4	S-1	15		M	SM	3" topsoil-like material Bwn c-f SAND, some c-f Gravel, little Silt (FILL)		
3	14	6 6 8 7	S-2	6		M	GM	Bwn-gy c-f GRAVEL, little c-f Sand, little Silt (FILL)		
5	13	12 8 5 5	S-3	16		M	SM	Bwn-gy c-f SAND, and c-f Gravel, some Silt		274.0
7	21	21 17 4 3	S-4	18		M	SM	Bwn c-f SAND, some Silt, some c-f Gravel		
9	27	8 12 15 8	S-5	10		M	GM	Bwn-gy c-f GRAVEL, some Silt, some c-f Sand		269.0
11	27	3 11 16 16	S-6	10		M	ML	Bwn SILT, some c-f Sand, little c-f Gravel		
13										
15										264.0
16	40	7 19 21 33	S-7	20		M	ML	Bwn-gy SILT, some c-f Gravel, little c-f Sand		
18										
20	50+	50/0	S-8					No recovery in spoon Auger refusal at 20 feet bgs		259.0
21								End of Boring at 20'		
23										
25										254.0

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**

BORING No. SB-7

SHEET No. 1 of 1

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**
METHOD OF ADVANCING BORING | DIA. | DEPTH
POWER AUGER: | **3 1/4"** | **0** TO **4'**
ROT. DRILL: | | TO
CASING: | | TO
DIAMOND CORE: | | TO
CME 55LC track-mounted drill rig with automatic hammer

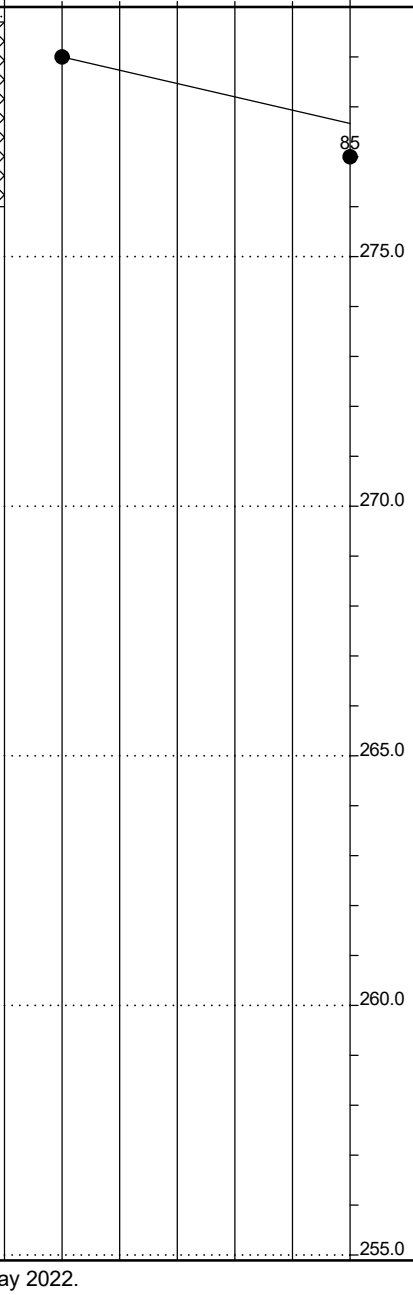
GROUND WATER | DATE | TIME | DEPTH
| | | |
| | | |

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Overcast** TEMP: **75° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Daniela Parrino**
DRILLER: **Andrew Bellucci**
SURFACE ELEVATION: **280.0**
DATUM: **See Remarks**
DATE START: **9/12/22**
DATE FINISH: **9/12/22**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT % 10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RECOV.: RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	10	3 5 5 5	S-1	8		M	GM	3" topsoil-like material Bwn-gy c-f GRAVEL, some c-f Sand, little Silt (FILL)		
2										
3	85+	29 35 50/2	S-2	9		M	GM	Same (FILL) Auger refusal at 4 feet bgs See Boring SB-7A		
4										
5								End of Boring at 4'		275.0
6										
7										
8										
9										
10										270.0
11										
12										
13										
14										
15										265.0
16										
17										
18										
19										
20										260.0
21										
22										
23										
24										
25										255.0



REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**

BORING No. SB-7A

SHEET No. 1 of 1

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**
METHOD OF ADVANCING BORING | DIA. | DEPTH
POWER AUGER: | **3 1/4"** | **0** TO **20'**
ROT. DRILL: | | TO
CASING: | | TO
DIAMOND CORE: | | TO
CME 55LC track-mounted drill rig with automatic hammer

GROUND WATER | DATE | TIME | DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Overcast** TEMP: **80° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Daniela Parrino**
DRILLER: **Andrew Bellucci**
SURFACE ELEVATION: **280.0**
DATUM: **See Remarks**
DATE START: **9/12/22**
DATE FINISH: **9/12/22**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT % ✕ ⊗ △ 10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1–4								Boring SB-7A offset 3 feet north of boring B-7. No SPT sampling performed to 4 feet bgs		
5–6	47	24 26 21 17	S-1	24		M	SM	Bwn m-f SAND, some Silt, some c-f Gravel		275.0
7–8	24	12 12 12 10	S-2	18		M	SM	Same		
9–10	27	15 16 11 10	S-3	14		M	GM	Bwn-gy c-f GRAVEL, some c-f Sand, little Silt		270.0
11–12	28	28 16 12 12	S-4	9		M	GM	Bwn-blk-gy c-f GRAVEL, and Silt, little c-f Sand		
13–15										265.0
16	50+	50 50/2	S-5	4		M	GM	Gy-bwn c-f GRAVEL, little Silt, trace c-f Sand		
17–20										260.0
20	50+	50/0	S-6	0				No recovery in spoon Auger refusal at 20 feet bgs		
21–25								End of Boring at 20'		255.0

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**

BORING No. SB-8

SHEET No. 1 of 1

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**
METHOD OF ADVANCING BORING | DIA. | DEPTH
POWER AUGER: | **3 1/4"** | **0** TO **8'**
ROT. DRILL: | | TO
CASING: | | TO
DIAMOND CORE: | | TO
CME 55LC track-mounted drill rig with automatic hammer

GROUND WATER | DATE | TIME | DEPTH
| | | |
| | | |

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Rain** TEMP: **72° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Daniela Parrino**
DRILLER: **Andrew Bellucci**
SURFACE ELEVATION: **281.0**
DATUM: **See Remarks**
DATE START: **9/13/22**
DATE FINISH: **9/13/22**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT % 10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	9	3 4 5 9	S-1	19		M	SM	3" topsoil-like material Bwn c-f SAND, some Silt, trace c-f Gravel (FILL)		
3	45	15 20 25 23	S-2	23		M	SM	Bwn-tn c-f SAND, some Silt, little c-f Gravel		
5	51	20 27 24 27	S-3	24		M	GM	Bwn-gy c-f GRAVEL, and c-f Sand, some Silt		276.0
7	50+	50/4	S-4	4		M	SM	Bwn c-f SAND, some c-f Gravel, some Silt Drilled to 8 feet bgs, auger refusal at 8 feet See Boring SB-8A		
								End of Boring at 8'		271.0
										266.0
										261.0
										256.0

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**

BORING No. SB-8A

SHEET No. 1 of 1

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**
METHOD OF ADVANCING BORING | DIA. | DEPTH
POWER AUGER: | **3 1/4"** | **0** TO **20'**
ROT. DRILL: | | TO
CASING: | | TO
DIAMOND CORE: | | TO
CME 55LC track-mounted drill rig with automatic hammer

GROUND WATER | DATE | TIME | DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **75° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Daniela Parrino**
DRILLER: **Andrew Bellucci**
SURFACE ELEVATION: **281.0**
DATUM: **See Remarks**
DATE START: **9/14/22**
DATE FINISH: **9/14/22**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT % ⊗ 10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1–8								Boring B-8A offset 7 feet north of boring B-8. No SPT sampling performed to 8 feet		276.0
9–10	13	11 7 6 5	S-1	14		M	GP-GM	Bwn c-f GRAVEL, and m-f Sand, trace Silt		271.0
11–12	18	6 6 12 13	S-2	12		M	SM	Bwn c-f SAND, some Silt, little c-f Gravel		
13–15										266.0
16	115+	23 65 50/3	S-3	10		M	SM	Bwn-gy c-f SAND, some c-f Gravel, some Silt		
17–19										
20	50+	50/4	S-4	4		M	GM	Gy-bwn c-f GRAVEL, some c-f Sand, little Silt		261.0
21–25								End of Boring at 20.3'		256.0

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REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**

BORING No. SB-9

SHEET No. 1 of 2

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**
METHOD OF ADVANCING BORING | DIA. | DEPTH
POWER AUGER: | **3 1/4"** | **0** TO **30'**
ROT. DRILL: | | TO
CASING: | | TO
DIAMOND CORE: | | TO
CME 55LC track-mounted drill rig with automatic hammer

GROUND WATER | DATE | TIME | DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **75° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Daniela Parrino**
DRILLER: **Andrew Bellucci**
SURFACE ELEVATION: **272.0**
DATUM: **See Remarks**
DATE START: **9/15/22**
DATE FINISH: **9/15/22**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT % ✕ ⊗ △ 10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RECOV.: RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	40	2 10 30 13	S-1	15		M	GM	4" topsoil-like material Bwn-gy c-f GRAVEL, some c-f Sand, little Silt (FILL)		
3	30	9 9 21 29		18		M	GM	Bwn-gy c-f GRAVEL, and c-f Sand, some Silt (FILL)		
5	58	20 32 26 23	S-3	14		M	GM	Gy-wht-bwn c-f GRAVEL, some c-f Sand, little Silt (FILL)		267.0
7	35	19 17 18 15	S-4	16		M	SW-SM	Bwn c-f SAND, and f Gravel, little Silt		
9	12	7 7 5 4	S-5	12		W	GM	Bwn-gy c-f GRAVEL, and c-f Sand, little Silt		
11	6	3 3 3 WOH	S-6	6		W	GM	Same		262.0
13										
15										257.0
16	22	10 13 9 6	S-7	6		W	GM	Bwn c-f GRAVEL, some c-f Sand, little Silt		
18										
20										252.0
21	5	2 3 2 4	S-8	18		W	SM	Bwn c-f SAND, some Silt, trace m-f Gravel		
23										
25										247.0

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**

PROJECT: **North Rockland High School**

LOCATION: **Thiells, NY**

BORING No. SB-9

SHEET No. 2 of 2

CLIENT: **North Rockland Central School District**

CONTRACTOR: **Core Down Drilling LLC**

UNCONFINED COMPRESS. STRENGTH (TONS/FT)

1 2 3 4 5

PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT %

10 20 30 40 50

STANDARD PENETRATION (BLOWS/FT.)

10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	SAMPLES: RECOV. LENGTH (IN.)	SAMPLES: RECOV. RQD (%)	SAMPLES: MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
26	7	5 3 4 6	S-9	24		W	SM	Bwn c-f SAND, and Silt, little c-f Gravel		
27										
28										
29										
30										242.0
31	4	WOH 2 2 4	S-10	12		W	SM	Bwn c-f SAND, and Silt, trace c-f Gravel		
32										
33								End of Boring at 32'		
34										
35										237.0
36										
37										
38										
39										
40										232.0
41										
42										
43										
44										
45										227.0
46										
47										
48										
49										
50										222.0
51										
52										
53										
54										
55										217.0

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**

BORING No. SB-10

SHEET No. 1 of 2

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**
METHOD OF ADVANCING BORING | DIA. | DEPTH
POWER AUGER: | **3 1/4"** | **0** TO **25'**
ROT. DRILL: | | TO
CASING: | | TO
DIAMOND CORE: | | TO
CME 55LC track-mounted drill rig with automatic hammer

GROUND WATER | DATE | TIME | DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **80° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Daniela Parrino**
DRILLER: **Andrew Bellucci**
SURFACE ELEVATION: **272.0**
DATUM: **See Remarks**
DATE START: **9/15/22**
DATE FINISH: **9/15/22**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT % 10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	34	6 6 28 16	S-1	10		M	GM	3" topsoil-like material Bwn-gy c-f GRAVEL, and c-f Sand, little Silt (FILL)		
3	33	12 16 17 12	S-2	14		M	GM	Same (FILL)		
5	7	9 5 2 2	S-3	13		M	ML	Bwn SILT, and f Sand, little c Gravel		267.0
7	5	2 2 3 2	S-4	18		M	SM	Gy c-f SAND, and Silt		
9	12	3 5 7 6	S-5	18		W	SM	Bwn-or c-f SAND, some Silt, little c-f Gravel		
11	15	6 7 8 8	S-6	24		W	SM	Bwn c-f SAND, some Silt, little c-f Gravel		262.0
13										
15										257.0
16	7	2 4 3 3	S-7	20		W	SM	Bwn c-f SAND, some m-f Gravel, little Silt		
17										
19										
20										252.0
21	28	4 10 18 15	S-8 S-8A	18		W	SM GM	Top 9" Bwn-gy c-f SAND, some Silt, trace m-f Gravel Bottom 9" Gy-rd c-f GRAVEL, some c-f Sand, some Silt		
23										
25										247.0

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**

PROJECT: **North Rockland High School**

LOCATION: **Thiells, NY**

BORING No. SB-10

SHEET No. 2 of 2

CLIENT: **North Rockland Central School District**

CONTRACTOR: **Core Down Drilling LLC**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	SAMPLES: RECOV. LENGTH (IN.)	SAMPLES: RECOV. RQD (%)	SAMPLES: MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
26	33	31 23 10 9	S-9	18		W	GM	Same		
27								End of Boring at 27'		
30										242.0
35										237.0
40										232.0
45										227.0
50										222.0
55										217.0

UNCONFINED COMPRESS. STRENGTH (TONS/FT)
1 2 3 4 5

PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
10 20 30 40 50

STANDARD PENETRATION (BLOWS/FT.)
10 20 30 40 50

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**

BORING No. SB-11

SHEET No. 1 of 2

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**
METHOD OF ADVANCING BORING | DIA. | DEPTH
POWER AUGER: | **3 1/4"** | **0** TO **30'**
ROT. DRILL: | | TO
CASING: | | TO
DIAMOND CORE: | | TO
CME 55LC track-mounted drill rig with automatic hammer

GROUND WATER | DATE | TIME | DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Overcast** TEMP: **75° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **William Guerrieri**
DRILLER: **Andrew Bellucci**
SURFACE ELEVATION: **275.5**
DATUM: **See Remarks**
DATE START: **8/26/22**
DATE FINISH: **8/26/22**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT % ✕ 10 20 30 40 50 △
STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	20	2, 11, 9, 12	S-1	14		M	SM	4" topsoil-like material Bwn c-f SAND, some Silt, little c-f Gravel (FILL)		
3	23	14, 10, 13, 14	S-2	16		M	GM	Bwn-wht c-f GRAVEL, and Silt, some c-f Sand (FILL)		
5	11	9, 6, 5, 3	S-3	7		M	SW-SM	Bwn c-f SAND, and f Gravel, trace Silt		270.5
7	3	2, 1, 2, 1	S-4	3		M	SW-SM	Bwn c-f SAND, and f Gravel, trace Silt		
9	6	2, 2, 4, 2	S-5	0				No Recovery		
11	6	3, 3, 3, 7	S-6	3		W	SM	Bwn c-f SAND, little f Gravel, little Silt		265.5
13										
15										260.5
16	4	2, 2, 2, 2	S-7	22		W	SM	Bwn m-f SAND, little Silt, trace f Gravel		
18										
20	2	WOH, 1, 1, WOH	S-8	24		W	SM	Same		255.5
22										
24										
25										250.5

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**

PROJECT: **North Rockland High School**

LOCATION: **Thiells, NY**

BORING No. SB-11

SHEET No. 2 of 2

CLIENT: **North Rockland Central School District**

CONTRACTOR: **Core Down Drilling LLC**

UNCONFINED COMPRESS. STRENGTH (TONS/FT)
1 2 3 4 5
PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.)
10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	SAMPLES: RECOV. LENGTH (IN.)	SAMPLES: RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
26	8	4 4 4 4	S-9	12		W	SM	Same		
27										
28										
29										
30										245.5
31	9	3 4 5 9	S-10	15		W	SM	Bwn m-f SAND, little Silt, trace f Gravel		
32										
33								End of Boring at 32'		
34										
35										240.5
36										
37										
38										
39										
40										235.5
41										
42										
43										
44										
45										230.5
46										
47										
48										
49										
50										225.5
51										
52										
53										
54										
55										220.5

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

BORING No. SB-12

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**
SHEET No. 1 of 2

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**
METHOD OF ADVANCING BORING | DIA. | DEPTH
POWER AUGER: | **3 1/4"** | **0** TO **26.5'**
ROT. DRILL: | | TO
CASING: | | TO
DIAMOND CORE: | | TO
CME 55LC track-mounted drill rig with automatic hammer

GROUND WATER | DATE | TIME | DEPTH
| | | |
| | | |

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Overcast** TEMP: **75° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **William Guerrieri**
DRILLER: **Andrew Bellucci**
SURFACE ELEVATION: **276.5**
DATUM: **See Remarks**
DATE START: **8/26/22**
DATE FINISH: **8/26/22**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT % 10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	29	11, 14, 15, 16	S-1	9		M	SM	3" topsoil-like material Bwn m-f SAND, some Silt, trace c-f Gravel (FILL)		
3	12	11, 7, 5, 5	S-2	10		M	SM	Bwn c-f SAND, and f Gravel, little Silt (FILL)		
5	27	7, 12, 15, 9	S-3	12		M	GM	Bwn-wht c-f GRAVEL, some c-f Sand, some Silt (FILL)		271.5
7	14	6, 7, 7, 10	S-4	15		M	SM	Bwn c-f SAND, little f Gravel, little Silt		
16	11	8, 5, 6, 3	S-5	3		W	SM	Bwn c-f SAND, and f Gravel, little Silt		261.5
21	16	6, 7, 9, 9	S-6	10		W	SM	Bwn-gy c-f SAND, little f Gravel, little Silt		256.5
										251.5

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**

PROJECT: **North Rockland High School**

LOCATION: **Thiells, NY**

BORING No. SB-12

SHEET No. 2 of 2

CLIENT: **North Rockland Central School District**

CONTRACTOR: **Core Down Drilling LLC**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	SAMPLES: RECOV. LENGTH (IN.)	SAMPLES: RECOV. RQD (%)	SAMPLES: MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
26	81+	4 31 50/2	S-7	18		W	GM	Gy-rd c-f GRAVEL, some c-f Sand, little Silt Auger refusal at 26.5 feet bgs		81
27								End of Boring at 26.5'		
30										246.5
35										241.5
40										236.5
45										231.5
50										226.5
55										221.5

UNCONFINED COMPRESS. STRENGTH (TONS/FT)
1 2 3 4 5

PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
10 20 30 40 50

STANDARD PENETRATION (BLOWS/FT.)
10 20 30 40 50

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**
PROJECT: **North Rockland High School**
LOCATION: **Thiells, NY**

BORING No. SB-13

SHEET No. 1 of 2

CLIENT: **North Rockland Central School District**
CONTRACTOR: **Core Down Drilling LLC**
METHOD OF ADVANCING BORING | DIA. | DEPTH
POWER AUGER: | **3 1/4"** | **0** TO **30'**
ROT. DRILL: | | TO
CASING: | | TO
DIAMOND CORE: | | TO
CME 55LC track-mounted drill rig with automatic hammer

GROUND WATER | DATE | TIME | DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Overcast** TEMP: **75° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **William Guerrieri**
DRILLER: **Andrew Bellucci**
SURFACE ELEVATION: **273.0**
DATUM: **See Remarks**
DATE START: **8/26/22**
DATE FINISH: **8/26/22**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT % 10 20 30 40 50
STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1–2	29	3, 13, 16, 20	S-1	16		M	SM	2" topsoil-like material Bwn c-f SAND, some f Gravel, little Silt (FILL)		
3–4			S-2	0				Drilled through obstruction between 2 and 4 feet bgs, no sample obtained		
5–6	16	7, 8, 8, 9	S-3	8		M	SM	Bwn m-f SAND, some Silt, little f Gravel		268.0
7–8	18	5, 6, 12, 13	S-4	18		M	GM	Bwn-blk-wht c-f GRAVEL, some c-f Sand, little Silt		
9–10	21	10, 9, 12, 9	S-5	16		M	SM	Bwn c-f SAND, little f Gravel, little Silt		263.0
11–12	18	7, 8, 10, 4	S-6	24		W	SM	Bwn c-f SAND, and c-f Gravel, little Silt		
13–14										
15–16	25	10, 14, 11, 6	S-7	14		W	SM	Bwn c-f SAND, little f Gravel, little Silt		258.0
17–18										
19–20										253.0
21–22	28	14, 14, 14, 10	S-8	9		W	GM	Bwn-gy c-f GRAVEL, and c-f Sand, little Silt		
23–24										
25										248.0

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic

PROJECT No. **11584.01**

PROJECT: **North Rockland High School**

LOCATION: **Thiells, NY**

BORING No. SB-13

SHEET No. 2 of 2

CLIENT: **North Rockland Central School District**

CONTRACTOR: **Core Down Drilling LLC**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	SAMPLES: RECOV. LENGTH (IN.)	SAMPLES: RECOV. RQD (%)	SAMPLES: MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
26	56	20 27 29 40	S-9	7		W	SM	Gy-bwn c-f SAND, little f Gravel, little Silt		
27										
28										
29										
30	50+	50/0	S-10	0				No recovery in spoon Auger refusal at 30 feet bgs		243.0
31								End of Boring at 30'		
32										
33										
34										
35										238.0
36										
37										
38										
39										
40										233.0
41										
42										
43										
44										
45										228.0
46										
47										
48										
49										
50										223.0
51										
52										
53										
54										
55										218.0

UNCONFINED COMPRESS. STRENGTH (TONS/FT)
1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %
10 20 30 40 50

STANDARD PENETRATION (BLOWS/FT.)
10 20 30 40 50

REMARKS: Surface elevations estimated based on a topographic survey provided by The LA Group, dated May 2022.

BORING LOG 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

LEGEND FOR SOIL DESCRIPTION

COARSE GRAINED SOIL (Coarser then No. 200 Sieve)

DESCRIPTIVE TERM & GRAIN SIZE

TERM	SAND					GRAVEL
coarse - c	No.	4	Sieve to No.	10	Sieve	3" to 3/4"
medium - m	No.	10	Sieve to No.	40	Sieve	3/4" to 3/16"
fine - f	No,	40	Sieve to No.	200	Sieve	

COBBLES 3" to 10"

BOULDERS 10" +

GRADATION DESIGNATIONS	PROPORTIONS OF COMPONENT
fine, f	Less than 10% coarse to medium
medium to fine, m-f	Less than 10% coarse
medium, m	Less than 10% coarse and fine
coarse to medium, c-m	Less than 10% fine
coarse, c	Less than 10% medium and fine
coarse to fine, c-f	All greater than 10%

FINE GRAINED SOIL (Finer than No. 200 Sieve)

DESCRIPTION	PLASTICITY INDEX	PLASTICITY
Silt	0 - 1	none
Clayey Silt	2 - 5	slight
Silt & Clay	6 - 10	low
Clay & Silt	11 - 20	medium
Silty Clay	21 - 40	high
Clay	greater than 40	very high

PROPORTION

DESCRIPTIVE TERM	PERCENT OF SAMPLE WEIGHT
trace	1 - 10
little	10 - 20
some	20 - 35
and	35 - 50

The primary component is fully capitalized

COLOR

Blue - blue	Gy - gray	Wh - white
Blk - black	Or - orange	Yl - yellow
Bwn - brown	Rd - red	Lgt - light
Gn - green	Tn - tan	Dk - dark

SAMPLE NOTATION

S - Split Spoon Soil Sample
U - Undisturbed Tube Sample
C - Core Sample
B - Bulk Soil Sample
NR - No Recovery of Sample

WOC - Weight of Casing
WOR - Weight of Rods
WOH - Weight of Hammer
PPR - Compressive Strength based on Pocket Penetrometer
TV - Shear Strength (tsf) based on Torvane

ADDITIONAL CLASSIFICATIONS

New York City Building Code soil classifications are given in parentheses at the end of each description of material, if applicable. See sections 1804.2 of the 2008 Building Code for further details.

1279 Route 300
Newburgh, NY 12550
(845) 567-6656

INFILTRATION TEST DATA

W.O. No.: 11584.01 Lot No.: Date: 8/9/2022

Client: North Rockland Central School District

Project: North Rockland High School

Project Engineer: Scott Cohen, P.E.

Inspector: Jessica Ouderkirk

Infiltration Test Location: (see reverse) See Boring and Infiltration Test Location Plan, Figure I

Weather Conditions: Sunny Temperature: 97 F

TEST HOLE No.	TEST HOLE DEPTH	TEST HOLE DIA.		INFILTRATION TEST RUNS Drop in water levels (inches) at 1 hour intervals						STABLE RATE (in/hr)
INF-1	5'	4"	7:30AM		1.0	1.0	2.0	2.0		2.0
			TIME		1 hour	2 hours	3 hours	4 hours		
COMMENTS: INF-1 performed in northwest corner of existing turf field adjacent to running track.										
INF-2	5'	4"	7:40AM		3.0	0.0	4.0	1.0		2.0
			TIME		1 hour	2 hours	3 hours	4 hours		
COMMENTS: INF-2 performed in northeast corner of existing turf field adjacent to running track.										

Sketch Requirements

(To Be Completed On Back of Sheet)

Indicate North

Indicate Nearest Roadway

Indicate Property Lines

Indicate Off-Sets from 2 Adjacent Property Lines

Tectonic

1279 Route 300
Newburgh, NY 12550
(845) 567-6656

INFILTRATION TEST DATA

W.O. No.: 11584.01 Lot No.: Date: 8/9/2022

Client: North Rockland Central School District

Project: North Rockland High School

Project Engineer: Scott Cohen, P.E.

Inspector: Jessica Ouderkirk

Infiltration Test Location: (see reverse) See Boring and Infiltration Test Location Plan, Figure I

Weather Conditions: Sunny Temperature: 97 F

TEST HOLE No.	TEST HOLE DEPTH	TEST HOLE DIA.		INFILTRATION TEST RUNS Drop in water levels (inches) at 1 hour intervals					STABLE RATE (in/hr)
INF-3	5'	4"	7:50AM		19.0	20.0	19.0	19.0	19.0
			TIME		1 hour	2 hours	3 hours	4 hours	
COMMENTS: INF-3 performed in southeast corner of existing turf field adjacent to running track.									
INF-4	5'	4"	8:00AM		24.0	24.0	24.0	24.0	24.0
			TIME		1 hour	2 hours	3 hours	4 hours	
COMMENTS: INF-4 performed in southwest corner of existing turf field adjacent to running track.									

Sketch Requirements

(To Be Completed On Back of Sheet)

Indicate North

Indicate Nearest Roadway

Indicate Property Lines

Indicate Off-Sets from 2 Adjacent Property Lines

Tectonic

1279 Route 300
Newburgh, NY 12550
(845) 567-6656

INFILTRATION TEST DATA

W.O. No.: 11584.01 Lot No.: Date: 8/9/2022

Client: North Rockland Central School District

Project: North Rockland High School

Project Engineer: Scott Cohen, P.E.

Inspector: Jessica Ouderkirk

Infiltration Test Location: (see reverse) See Boring and Infiltration Test Location Plan, Figure I

Weather Conditions: Sunny Temperature: 97 F

TEST HOLE No.	TEST HOLE DEPTH	TEST HOLE DIA.		INFILTRATION TEST RUNS Drop in water levels (inches) at 1 hour intervals					STABLE RATE (in/hr)
INF-5	5'	4"	8:10AM		20.0	18.0	19.0	18.0	18.8
			TIME		1 hour	2 hours	3 hours	4 hours	
COMMENTS: INF-5 performed in the center of existing turf field adjacent to running track.									
INF-6	5'	4"	8:20AM		8.0	2.0	0.5	0.0	2.6
			TIME		1 hour	2 hours	3 hours	4 hours	
COMMENTS: INF-6 advanced within landscape area to the south of the existing running track.									

Sketch Requirements

(To Be Completed On Back of Sheet)

Indicate North

Indicate Nearest Roadway

Indicate Property Lines

Indicate Off-Sets from 2 Adjacent Property Lines

1279 Route 300
Newburgh, NY 12550
(845) 567-6656

INFILTRATION TEST DATA

W.O. No.: 11584.01 Lot No.: Date: 8/10/2022

Client: North Rockland Central School District

Project: North Rockland High School

Project Engineer: Scott Cohen, P.E.

Inspector: Jessica Ouderkirk

Infiltration Test Location: (see reverse) See Boring and Infiltration Test Location Plan, Figure I

Weather Conditions: Partly Cloudy Temperature: 85 F

TEST HOLE No.	TEST HOLE DEPTH	TEST HOLE DIA.		INFILTRATION TEST RUNS Drop in water levels (inches) at 1 hour intervals						STABLE RATE (in/hr)
INF-7	5'	4"	7:30AM		23.0	14.0	12.0	12.0		15.3
			TIME		1 hour	2 hours	3 hours	4 hours		
COMMENTS: INF-7 advanced in the northwest corner of the existing soccer field for proposed softball field.										
INF-8	5'	4"	7:40AM		5.0	7.0	24.0	24.0		15.0
			TIME		1 hour	2 hours	3 hours	4 hours		
COMMENTS: INF-8 advanced in the northeast corner of the existing soccer field for proposed softball field.										

Sketch Requirements

(To Be Completed On Back of Sheet)

Indicate North

Indicate Nearest Roadway

Indicate Property Lines

Indicate Off-Sets from 2 Adjacent Property Lines

Tectonic

1279 Route 300
Newburgh, NY 12550
(845) 567-6656

INFILTRATION TEST DATA

W.O. No.: 11584.01 Lot No.: Date: 8/10/2022

Client: North Rockland Central School District

Project: North Rockland High School

Project Engineer: Scott Cohen, P.E.

Inspector: Jessica Ouderkirk

Infiltration Test Location: (see reverse) See Boring and Infiltration Test Location Plan, Figure I

Weather Conditions: Partly Cloudy Temperature: 85 F

TEST HOLE No.	TEST HOLE DEPTH	TEST HOLE DIA.		INFILTRATION TEST RUNS Drop in water levels (inches) at 1 hour intervals					STABLE RATE (in/hr)
INF-9	5'	4"	7:50AM		24.0	24.0	24.0	21.0	23.3
			TIME		1 hour	2 hours	3 hours	4 hours	
COMMENTS: INF-9 advanced in the southern end of the existing soccer field for proposed baseball field.									
INF-10	5'	4"	8:00AM		24.0	24.0	16.0	13.0	19.3
			TIME		1 hour	2 hours	3 hours	4 hours	
COMMENTS: INF-10 advanced in the southeast corner of the existing athletic field for proposed baseball field.									

Sketch Requirements

(To Be Completed On Back of Sheet)

Indicate North

Indicate Nearest Roadway

Indicate Property Lines

Indicate Off-Sets from 2 Adjacent Property Lines

Tectonic

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Newburgh, NY 12550
(845) 567-6656

INFILTRATION TEST DATA

W.O. No.: 11584.01 Lot No.: Date: 8/10/2022

Client: North Rockland Central School District

Project: North Rockland High School

Project Engineer: Scott Cohen, P.E.

Inspector: Jessica Ouderkirk

Infiltration Test Location: (see reverse) See Boring and Infiltration Test Location Plan, Figure I

Weather Conditions: Partly Cloudy Temperature: 85 F

TEST HOLE No.	TEST HOLE DEPTH	TEST HOLE DIA.		INFILTRATION TEST RUNS Drop in water levels (inches) at 1 hour intervals					STABLE RATE (in/hr)
INF-11	5'	4"	8:10AM		13.0	16.0	12.0	12.0	13.3
			TIME		1 hour	2 hours	3 hours	4 hours	
COMMENTS: INF-11 advanced in the existing baseball field for the proposed baseball field improvements (near first base).									
INF-12	5'	4"	8:20AM		24.0	24.0	24.0	24.0	24.0
			TIME		1 hour	2 hours	3 hours	4 hours	
COMMENTS: INF-12 advanced in the existing baseball field for the proposed baseball field improvements (near right field).									

Sketch Requirements

(To Be Completed On Back of Sheet)

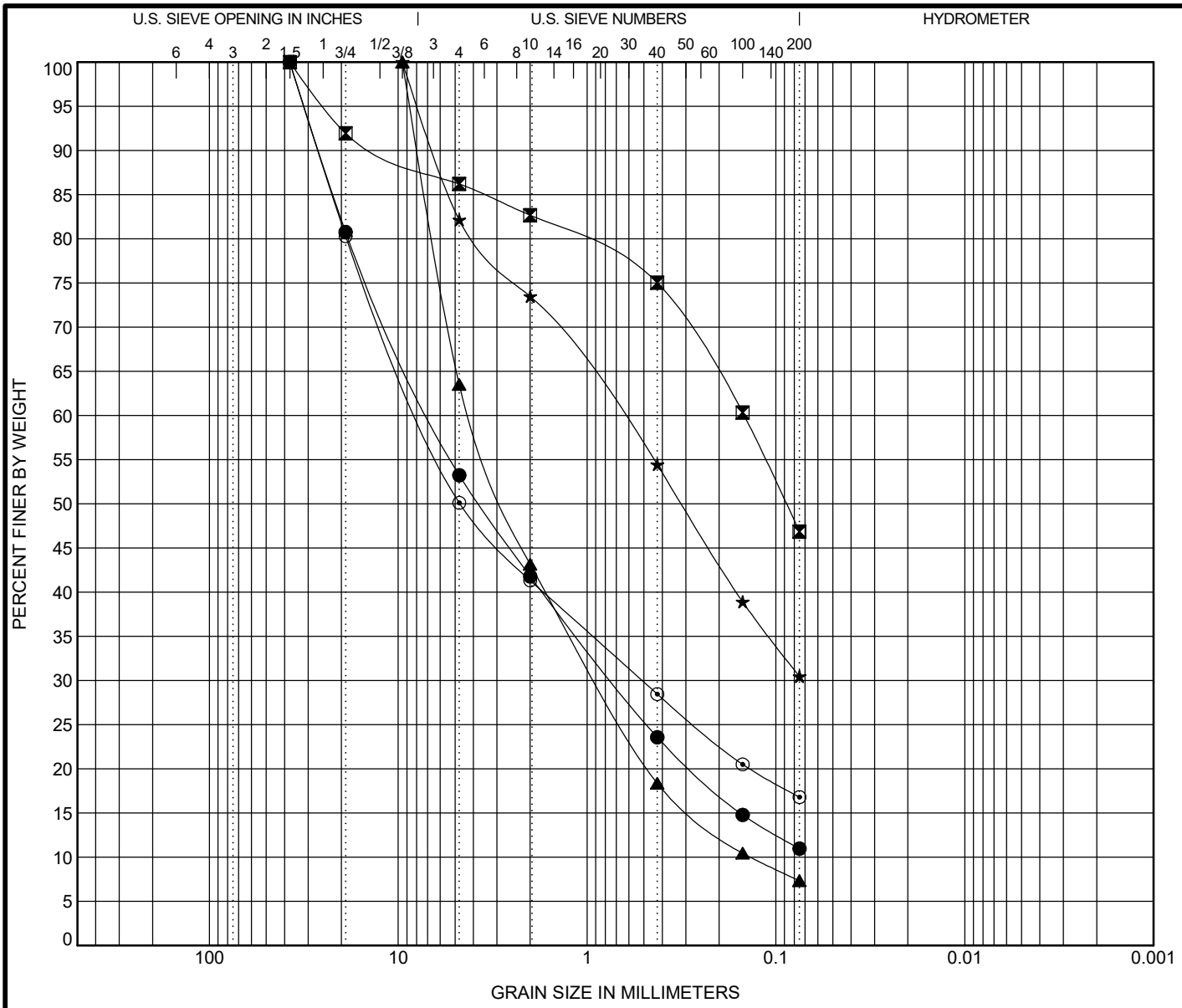
Indicate North

Indicate Nearest Roadway

Indicate Property Lines

Indicate Off-Sets from 2 Adjacent Property Lines

APPENDIX II



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample Identification			Classification	WC%	LL	PL	PI	Cc	Cu
●	B-1	2.0	S-2	Bwn c-f GRAVEL, and c-f Sand, little Silt	4.3				1.28	106.13
⊠	B-10	4.0	S-3	Bwn SILT, and f Sand, little c Gravel	22.5					
▲	B-11	6.0	S-4	Bwn c-f SAND, and f Gravel, trace Silt	3.3				1.39	30.14
★	B-13	4.0	S-3	Bwn m-f SAND, some Silt, little f Gravel	3.6					
⊙	B-3	8.0	S-5	Bwn-gy c-f GRAVEL, some m-f Sand, little Silt	4.7					

	Sample Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material
●	B-1	2.0	S-2	37.5	6.679	0.734		46.8	42.3	11.0		Boring
⊠	B-10	4.0	S-3	37.5	0.147			13.8	39.4	46.8		Boring
▲	B-11	6.0	S-4	9.5	4.091	0.88	0.136	36.5	56.2	7.3		Boring
★	B-13	4.0	S-3	9.5	0.668			17.9	51.7	30.5		Boring
⊙	B-3	8.0	S-5	37.5	7.482	0.512		49.9	33.3	16.8		Boring

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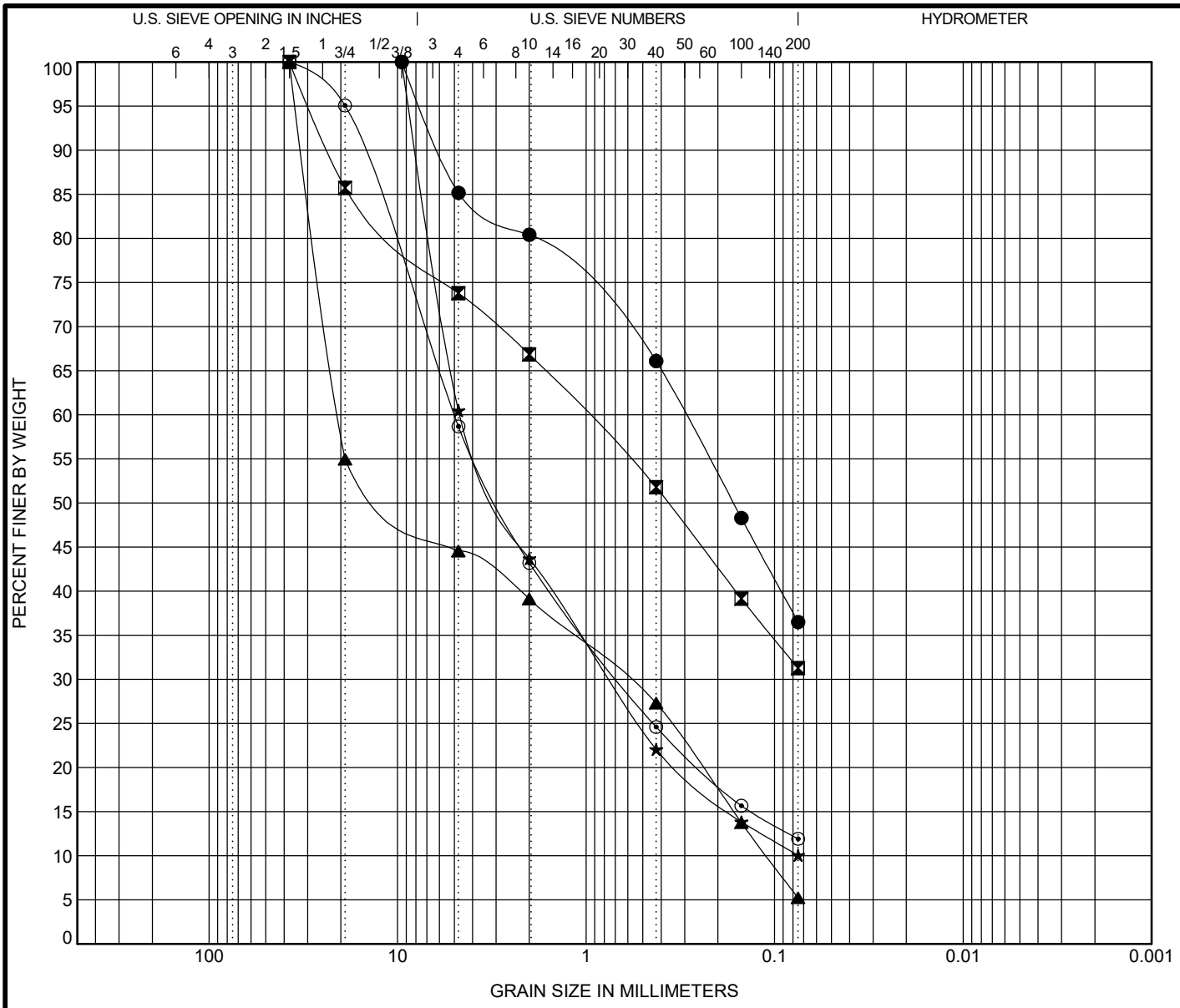
GRAIN SIZE DISTRIBUTION

Project No: **11584.01** Date: **10/18/22**

Project: **North Rockland High School**

Location: **Thiells, NY**



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample Identification			Classification	WC%	LL	PL	PI	Cc	Cu
●	B-5	6.0	S-4	Bwn m-f SAND, and Silt, little f Gravel	11.9					
⊠	B-7A	4.0	S-1	Bwn m-f SAND, some Silt, some c-f Gravel	6.7					
▲	B-8A	8.0	S-1	Bwn c-f GRAVEL, and m-f Sand, trace Silt	8.6				0.16	185.38
★	B-9	6.0	S-4	Bwn c-f SAND, and f Gravel, little Silt	3.7				1.63	62.36
⊙	PB-1	0.0	S-1	Bwn c-f SAND, and f Gravel, little Silt	2.5				1.69	94.84

	Sample Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material
●	B-5	6.0	S-4	9.5	0.298			14.8	48.7	36.5		Boring
⊠	B-7A	4.0	S-1	37.5	0.989			26.2	42.5	31.3		Boring
▲	B-8A	8.0	S-1	37.5	20.504	0.606	0.111	55.5	39.3	5.2		Boring
★	B-9	6.0	S-4	9.5	4.634	0.75		39.5	50.4	10.1		Boring
⊙	PB-1	0.0	S-1	37.5	4.996	0.666		41.3	46.8	11.9		Boring

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GRAIN SIZE DISTRIBUTION

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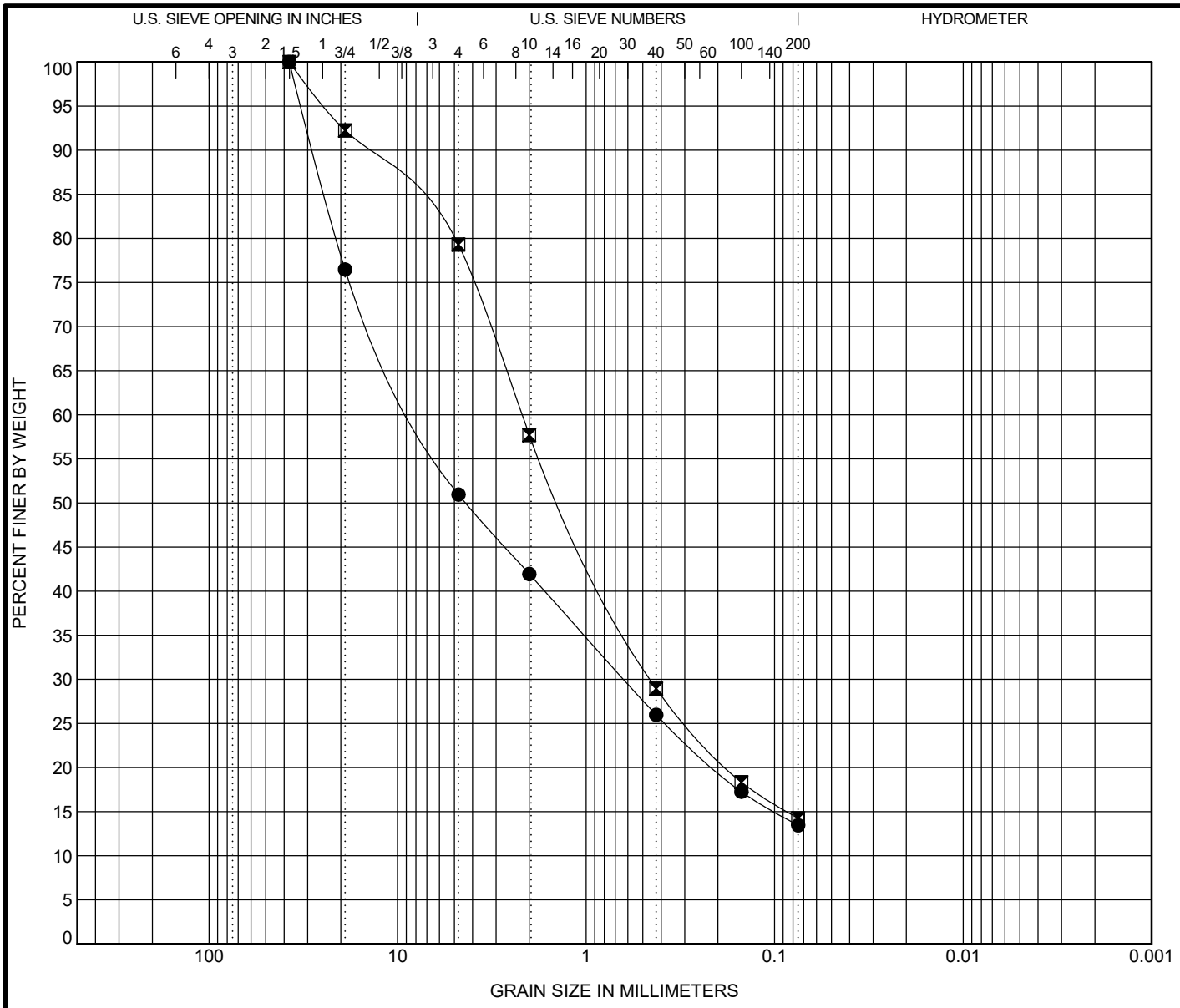
Project: **North Rockland High School**

Location: **Thiells, NY**



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample Identification			Classification	WC%	LL	PL	PI	Cc	Cu
●	PB-3	0.0	S-1	Bwn c-f GRAVEL, and m-f Sand, little Silt	2.9					
⊠	PB-4	0.0	S-1	Bwn c-f SAND, some f Gravel, little Silt	3.3					

	Sample Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material
●	PB-3	0.0	S-1	37.5	7.763	0.628		49.0	37.5	13.4		Boring
⊠	PB-4	0.0	S-1	37.5	2.194	0.45		20.7	65.1	14.2		Boring

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GRAIN SIZE DISTRIBUTION

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Project: **North Rockland High School**

Location: **Thiells, NY**

GRAIN SIZE DISTRIBUTION 11584.01.GPJ TECTONIC ENG.GDT 10/18/22

Boring #	Depth (Ft.)	Sample #	Specimen Description % Gravel : % Sand : % Fines	USCS	Water Content	Liquid Limit	Plastic Limit	Plasticity Index	Penetro-meter (tsf)	Torvane (tsf)	Dry Density (pcf)	Organic Content (%)	pH
B-1	2.0	S-2	Bwn c-f GRAVEL, and c-f Sand, little Silt 46.8 : 42.3 : 11.0		4								
B-10	4.0	S-3	Bwn SILT, and f Sand, little c Gravel 13.8 : 39.4 : 46.8		23								
B-11	6.0	S-4	Bwn c-f SAND, and f Gravel, trace Silt 36.5 : 56.2 : 7.3		3								
B-13	4.0	S-3	Bwn m-f SAND, some Silt, little f Gravel 17.9 : 51.7 : 30.5		4								
B-3	8.0	S-5	Bwn-gy c-f GRAVEL, some m-f Sand, little Silt 49.9 : 33.3 : 16.8		5								
B-5	6.0	S-4	Bwn m-f SAND, and Silt, little f Gravel 14.8 : 48.7 : 36.5		12								
B-6	10.0	S-6	Bwn SILT, some c-f Sand, little c-f Gravel **NON-PLASTIC: WILL NOT ROLL TO 1/8"**		13								
B-7A	4.0	S-1	Bwn m-f SAND, some Silt, some c-f Gravel 26.2 : 42.5 : 31.3		7								
B-8A	8.0	S-1	Bwn c-f GRAVEL, and m-f Sand, trace Silt 55.5 : 39.3 : 5.2		9								
B-9	6.0	S-4	Bwn c-f SAND, and f Gravel, little Silt 39.5 : 50.4 : 10.1		4								
PB-1	0.0	S-1	Bwn c-f SAND, and f Gravel, little Silt 41.3 : 46.8 : 11.9		2								
PB-3	0.0	S-1	Bwn c-f GRAVEL, and m-f Sand, little Silt 49.0 : 37.5 : 13.4		3								
PB-4	0.0	S-1	Bwn c-f SAND, some f Gravel, little Silt 20.7 : 65.1 : 14.2		3								

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Summary of Laboratory Results

Project No: **11584.01** Date: **10/18/22**

Project: **North Rockland High School**

Location: **Thiells, NY**

Our Story

For the past 30 years, Tectonic has delivered quality professional services in a timely and cost effective manner by pooling its talented staff into project teams that think, act, and perform as one integral unit. By carefully listening and collaborating with its clients, the firm is able to identify the key issues and assure stakeholder objectives are met in the final deliverables. Through innovating and adopting technological advances, the firm is able to generate unique solutions to improve our nation's deteriorating infrastructure and build safe sustainable communities.

As the world evolves, and its challenges grow more complex, Tectonic continues to innovate and provide the practical solutions and exceptional customer service its clients have trusted since its founding.

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