GEOPHYSICAL INVESTIGATION REPORT

Concept Engineering Consultants

Clinton Commons Project
Clinton, New Jersey

December 23, 2022 (REV. 4)

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Appendices

1 Executive Summary

ANS Geo was retained by Concept Engineering Consultants to complete a broad-scale geophysical investigation to evaluate potential karst conditions at the proposed Clinton Commons project site located in the Town of Clinton, New Jersey. Our geophysical survey was completed as a supplemental investigation behind a previous investigation completed by Engineering and Land Planning Associates in June 2009 and April 2020, and ahead of an ANS Geo's 2022 Geotechnical investigation consisting of percussion probes and test borings. Through review of Engineering & Land Planning Associates 2020 "*Karstic Geology Investigation Report*", USGS NAPP color infra-red (CIR) imagery was evaluated and eight (8) possible karstic locations were delineated based off of that imagery.

Based on our review of available information, we identified the project site is mapped by the United States Geological Survey (USGS) as being underlain by the Allentown Formation and Lower Beekmantown Group consisting primarily of Dolomite with some Shale and Orthoquartzite bedding. Dolomite bedrock, while not typically as prone as Limestone, can be generally susceptible to karst. To better evaluate the presence or absence of karst anomalies at the project site, ANS Geo completed a geophysical investigation program consisting of Electrical Resistivity Imaging (ERI), to characterize the type, depth, and extent of karst features at representative locations across the site. The geophysical program was not an exhaustive evaluation of the entire site, but intended to gain a general understanding of the subsurface conditions and the impact of karst on the design, siting, and construction of the project.

ANS Geo completed the ERI geophysical survey at the project site on February 28 and March 1, 2022. In total, nine (9) ERI survey transects were completed at locations depicted as potential karst zones as well as along a northwest-southeast running fault line and within the projects planned SWM Recharge Basin.

The surveys conducted generally showed steep trends in depths between upper soil horizons, weathered bedrock, and competent bedrock. Survey interpretations identified interbedded upper clay and soil-like residuum and possible "epi-karst" consisting of a gravel-clay-sand mixture. These soil-like residuum zones were sporadic and were observed through analysis of ERI results, to different degrees, within all the profiles surveyed. Weathered top of bedrock was generally observed between ground surface and approximately 5 to 10 feet below grade. As expected, our surveys indicate that the quality of the bedrock generally improves with increased depth. Top of bedrock was moderately to highly pinnacled or abruptly changing in depth, with particular locations exhibiting possible deep soil or soil-residuum horizons, most likely caused by deep weathering of the bedrock over time and possible karst zones.

Based on our preliminary evaluation of the geophysics results, it appeared that karst may be of low-risk to design and construction within the broader project boundaries. Karst features, such as pinnacled top of bedrock, and areas of possible soil infilling were observed within the majority of the ERI profiles. Therefore, these existing conditions shall be considered for the proposed foundations of structures and design and location of proposed stormwater basin.

Apparent resistivity values above approximately 10,000 ohm-meters can generally be categorized as possible "air-filled" karst anomalies. These values can also be associated with "massive" bedrock, or extremely fractured bedrock. Zones depicting bedrock, then decreasing below resistivities of 100 ohm-meters may represent clay or soil-infilled anomalies.

To further investigate and confirm ERI survey results, ANS Geo completed a Geotechnical Investigation Program between May 2022 and September 2022 consisting of 12 test borings and ten percussion probes. The detailed summary of the findings is included in Section 3.2 and 3.3.

2 Introduction

ANS Geo was retained by Concept Engineering Consultants to assist with Phase II investigation program as requested by Engineer for Town of Clinton. The Town Engineer's request included the following:

- Borings shall include 10-foot rock cores as described in the Ordinance to properly assess the condition of the underlying site bedrock.
- All identified sinkhole locations shall be investigated, since all eight (8) of potential areas are either within the footprints of the proposed structures or within proximity of the proposed stormwater basin.
- The northeast corner of the proposed Food Market where two (2) USGS mapped fracture traces and a fault intersect will require further assessment.
- The plan proposes several deep cuts (18 ft. +/-) for sewer utility installation near the proposed northern site entrance. The soil and bedrock conditions along those alignments need to be investigated to assess the potential impact of the installation.
- A major area of concern is near the single SWM Recharge Basin that is proposed for this project. The Phase I study identified possible sinkholes on three (3) sides of the proposed stormwater basin and as such, the bedrock condition underlying the proposed stormwater basin requires a thorough investigation to assess any potential impacts. This area is of high concern given its proximity to residential structures and lack of any explorations into the bedrock. Consideration must be given to the fact that more than one SWM Basin may be required (ref: G-3) to meet the Highlands requirements.

To be cost efficient, ANS Geo proposed completing non-invasive geophysical investigation to evaluate karst conditions at the proposed Clinton Commons project site in the Town of Clinton, New Jersey prior to performing test borings and/or test pits at specific locations. As part of our initial review process prior to mobilizing on the project site, ANS Geo reviewed geotechnical reports from previous investigations on the project, which identified certain areas prone to the potential for karst features such as sinkholes and faults within the project boundary.

ANS Geo placed Electrical Resistivity Imaging (ERI) locations at localized locations within the project site to obtain a specified set of data which was used to characterize the type, depth, and extent of karst features at select representative locations across the site. It should be noted the purpose of the geophysical program was not intended to be an exhaustive evaluation of the entirety of the site, as that intent would require extensive and comprehensive canvassing and investigation across the entirety of the project site. However, the investigation was intended to gain a general understanding of the subsurface conditions near locations identified in previous investigations by others and requested by the Town Engineer to gauge the impact which karst geohazards may or may not contribute to the design, siting, and construction of the proposed project. **Figure 1** below depicts a project vicinity map.

Figure 1: Project Vicinity Map

(Source: Google Earth Imagery 2021)

3 Field Investigation

3.1 Electrical Resistivity Imaging (ERI)

ANS Geo completed ERI survey at the project site on February 28th and March 1st, 2022. A Geophysics Investigation Location Plan, which shows the location of all geophysical survey transects (lines) as they correspond to the proposed site development layout is provided as **Appendix A**. ERI survey methods used for this field investigation were a combination of Dipole-Dipole and Strong Gradient. The methods were completed using an array of electrodes positioned in a linear fashion along the proposed survey locations. In total, nine (9) ERI survey transects were completed within the project area. **Appendix B** includes **Figures 1** through **6**, which represent each of the nine surveyed locations with an associated profile. ANS Geo's ERI surveys were cross-referenced against previous test boring data completed by Engineering and Land Planning Associates. **Table 1** summarizes the geophysical survey method and ID number, reporting Figure number, distance, and orientation of each line, as well as their spacing distances used for ERI testing.

Table 1 – Geophysical Survey Parameters

Method-ID	Figure No.	Profile Orientation	Survey Distance (ft)	Electrode Configuration/Qty	Electrode Spacing (ft)
ERI-1	1	North to south	270	28	10
ERI-2	1	Northwest to southeast	270	28	10
ERI-3	2	Northwest to southeast	270	28	10
ERI-4	3	Northwest to southeast	270	28	10
ERI-5	4	Northwest to southeast	270	28	10
ERI-6	4	Southwest to northeast	275	56	5
ERI-7	5	Southwest to northeast	270	28	10
ERI-8	5	West to east	560	56	10
ERI-9	6	North to south	270	28	10

3.2 Percussion Probes

The percussion probes were completed by Hayduk Enterprises of Factoryville, Pennsylvania between May 4th, and May 10th, 2022. Percussion probes were advanced using ECM-590 Self-Contained Hydraulic Crawler Drill, which uses a drilling hammer with compressed air and a down-the-hole hammer with drilling bit that is advanced by this hammering and rotation action. All percussion probes were advanced a depth of 49 feet BGS and estimated top of rock is based on drilling timing is provided in **Table 2** below.

Table 2 – Percussion Probe

Percussion Probe ID	Estimated Top of Rock (feet)	Completed Depth (feet)
PP-01	7	49
PP-02	7	49
PP-03	7	49
PP-04	4	49
PP-05	24	49
PP-06	7	49
PP-07	12	49
PP-08	18	49
PP-09	6	49
PP-10	5	49

Sudden drops of drilling rod, which is a typical indication of karst features such as air-void or soil-filled void were not encountered in all completed percussions probes. The ERI survey results from ERI-5, ERI-6, ERI-8, and ERI-9 indicated overburden soil to be thicker than other ERI survey locations. This was confirmed by percussion probes PP-05, PP-07 and PP-08, where the overburden soil was encountered as deep as 24 feet BGS, 12 feet BGS, and 18 feet BGS, respectively. All percussion probes were backfilled as per NJDEP well abandonment requirements. Investigation Location Plan and percussion probe logs are provided in **Appendix C and Appendix D,** respectively.

3.3 Test Borings

ANS Geo retained Boring Brothers, Inc. of Egg Harbor, New Jersey to advance the test borings. The first mobilization of test borings was completed between May 11th and May 13th, 2022, and the second mobilization of test boring were completed between September 12th and September 20th, 2022 using a CME-55LC track-mounted drill rig with a 3-7/8-inch diameter tri-cone roller bit mud-rotary techniques to the proposed borehole termination depth or top of rock. Once estimated bedrock was encountered, minimum 10 feet of rock coring was performed in accordance with Town of Clinton's Chapter 88 Land Use Article VII Zoning Regulations 88-64.2 Carbonate Area District requirements. Soil samples were collected using the Standard Penetration Test (SPT) Method in accordance with American Society for Testing Materials (ASTM) Standard D1586 – Standard Test Method for SPT and Split-Barrel Sampling of soils. Rock coring was completed using ASTM D2113-08 – Standard Practice for Rock Core Drilling. All boreholes were backfilled as per NJDEP well abandonment requirements. It should be noted that NJDEP requested that test borings shall not be performed within 1,000 feet of existing bald eagle's nest once ANS Geo's test boring crew mobilized on site in May 2022. Therefore, only six test borings were completed in the previous report submitted by ANS Geo. As of this report, remaining six test Borings were completed in September 2022. This report comprises of all the Borings which is summarized in **Table 3** below.

Table 3 – Test Borings

Borehole ID	Approx. Existing Elevation (feet)	Approx. Proposed Elevation (feet)	Approx. Elevation Difference (feet)	Proposed Boring Depth (feet)	Encountered Top of Rock (feet)	Total Depth of Rock Coring (feet)	Borehole Termination Depth (feet)
B-01	235	241	-6	40	17	10	27
B-02	234	241	-7	40	Borehole Removed from Scope of Work		
B-03	253	256	-3	40	20	10	30
B-04	222	224	-2	40	23	10	33
B-05	246	246	0	40	4	10	14
B-06	269	264	5	40	10	30	40
B-07	245	244	1	40	5	10	15
B-08	264	263	1	40	10	10	20
B-09	249	242	7	40	3	10	13
B-10	258	256	2	40	10	10	20
B-11	222	224	-2	40	Borehole Removed from Scope of Work		
B-12	260	261	-1	40	10	10	20
B-13	235	225	10	40	10	10	20
B-14	245	251	6	40	Borehole Removed from Scope of Work		
B-15	253	252	1	40	4	10	14

3.3.1 Encountered Subsurface Conditions in Test Borings

Total 12 of 15 proposed test borings were completed in this report. Three borings were removed from our scope of work due to sufficient test borings and percussion probes. As completed boring locations are included in the Investigation Location Plan in **Appendix C**. The overburden material encountered consisted of sand and clay underlain by gravel stratum before encountering bedrock. Average N-values ranged from 6 to 15 blows per foot (bpf) within the sand and clay stratums, and greater than 50 bpf within the gravel stratum. Groundwater was not encountered within the overburden soil.

Top of bedrock within the completed twelve test borings ranged from 4 to 23 feet BGS. Recovered rock cores were classified as Limestone moderately weathered, weak to medium strong rock, and very close to close discontinuities spacing. Rock core recovery ranged from 13% to 100% and Rock Quality Designation (RQD) ranged from 0% to 97%. Fractured rock zones were generally encountered within the low RQD zones.

Based on ERI-4 survey results, potential karst anomaly may exist between 25 to 37 feet BGS on the southern end of the ERI survey. Therefore, test boring B-06 was advanced to minimum 40 feet BGS at the location to determine if karst features such as soil infilled or air-void will be encountered. In test boring B-06, top of bedrock was encountered at 10 feet BGS and 30 feet of bedrock was cored. Rock core recoveries ranged from 98% to 100% and RQDs ranged from 45% to 97%. Fractured rock was encountered between 31.3 to 34.4 feet BGS, but loss of drilling water, drill rod drops, or residual soil zones were not encountered within test boring B-06, which are typical indications of karst anomalies. In addition, ANS Geo attempted use a borehole camera to confirm any anomalies, but water in the open borehole prevented recording any clear images of cored borehole. For additional details, refer to **Appendix E** for test boring logs and rock core photos.

4 Geophysical Investigation Method

4.1 Electrical Resistivity Imaging (ERI)

ERI is a geophysical survey method that measures electrical resistivity in soil and rock based off the principles of Ohm's Law. Data obtained through an ERI investigation acquires a series of voltage and current measurements from surface electrode arrays. The electrode arrays consist of a series of dipoles that communicate with other dipoles. The arrays can be spaced close or very far apart depending on necessary survey resolution. Resistivity is dependent on the material property and geometry and thus is measured in Ohm-meters.

4.1.1 Theory

Electrical resistance is based upon Ohm's Law:

$$R = \frac{V}{I} \quad [ohms]$$

Where, resistance, **R**, is equal to the ratio of potential, **V** (volts) to current flow, **I** (amperes).

Resistivity is the measure of the resistance along a linear distance of a material with a known cross-sectional area. Consequently, resistivity is measured in Ohm-meters. This Report presents the geophysical results as geo-electrical profiles of modeled resistance plotted as two-dimensional profiles of distance and depth, in units of feet.

Electrical currents propagate as a function of three material properties: (1) ohmic conductivity, (2) electrolytic conductivity, and (3) dielectric conductivity. Ohmic conductivity is a property exhibited by metals. Electrolytic conductivity is a function of the concentration of total dissolved solids and chlorides in the groundwater that exists in the pore spaces of a material. Dielectric conductivity is a function of the permittivity of the matrix of the material. Therefore, the matrix of most soil and bedrock is highly resistive. Of these three properties, electrolytic conductivity is the dominant material characteristic that influences the apparent resistivity values collected by this method. In general, resistivity values decrease in water-bearing rocks and soil with increasing:

a. Fractional volume of the rock occupied by groundwater;
b. Total dissolved solid and chloride content of the groundwater;
c. Permeability of the pore spaces; and,
d. Temperature.

Materials with minimal primary pore space (i.e., limestone, dolomite) or those which lack groundwater in the pore spaces will exhibit high resistivity values (Mooney, 1980). Factors contributing to low resistivity:

- Degree of water bearing void space within soil and rock (only if water exists);
- Chloride content of water bearing within soil and rock pore space;
- Available pore space within material (i.e., low pore space will decrease resistivity);
- Temperature.

Highly porous, moist, or saturated soil will exhibit very low resistivity values. Additionally, high resistivity values will result from generally inverse conditions (i.e., highly-porous and dry conditions). This is, of course, a range, and most earthen materials falls within the range of low to medium resistivity depending on their properties. For these reasons, cavities, voids, highly fractured bedrock and groundwater can often have definable values observed through the methods of ERI.

In homogeneous ground, the apparent resistivity is the true ground resistivity; however, in heterogeneous ground, the apparent resistivity represents a weighted average of all formations through which the current passes.

4.1.2 Methods

Different acquisition algorithms can be implemented during an investigation. For this investigation, the Dipole-Dipole / Strong-Gradient array combination methods, which have proven to be an effective configuration for imaging voids in shallow bedrock settings, were implemented. The measurements were collected to create a two-dimensional image. The image is developed using an inversion algorithm. The inversion algorithm uses the collected apparent resistivity data to create a model space of resistivity values that would replicate the collected data.

While homogeneous ground conditions represent the true apparent ground resistivity, non-unique values represent a weighted average of the multiple formation variations (Reynolds, 1997). Apparent resistivity values are computed with a forward modelling subroutine, and a smoothness-constrained least-squares optimization routine, creating a pseudosection using finite-difference or finite-element approaches. The pseudosection model is compared to the actual measurements for consistency. A measure of the inversion progress and difference is given by the root-mean-squared error.

4.1.3 Data Collection and Data Processing

Six total ERI profiles were acquired using an AGI SuperSting R8 Resistivity meter. Seven (7) of the ERI surveys were completed with a 28-electrode setup at 10-feet spacings. One (1) ERI profile was acquired in conjunction with a 56-electrode setup at 5-foot spacings and another at 10-foot spacings. Measurements were obtained through a combined Dipole-Dipole and Strong Gradient paired array setup. Locational data were recorded using a Trimble Geo7X global positioning system. The approximate depth of penetration of the survey is contingent on a few factors, most of which relate to the overall survey line length. Each test reached an approximate penetration depth of 60 feet below existing grade. Two-dimensional profiles have been provided within **Appendix B**.

5 Background Geology

Prior to site mobilization, ANS Geo reviewed geologic mapping made publicly available by the United States Geologic Survey (USGS), which indicates the site is underlain by Allentown Dolomite and the Lower Beekmantown Group. These groups both generally consist of light gray to medium-gray dolomite with minor orthoquartzite and shale beds. These rock types are known for their susceptibility of karst formation which is addressed in Section 5.3.

5.1 Surficial Geology

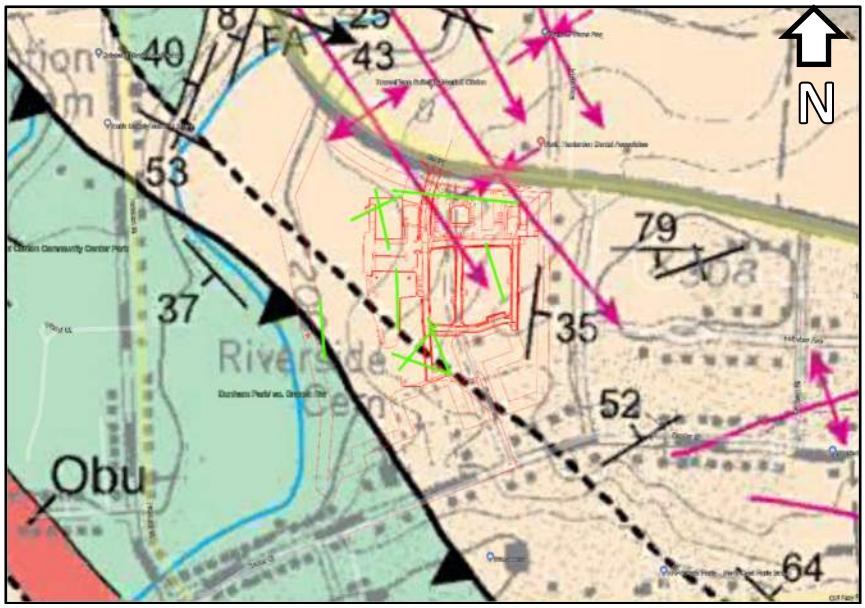
ANS Geo also conducted a desktop study of the surficial geology in the project area using the National Resource Conservation Service (NRCS) Web Soil Survey. The Web Soil Survey only evaluates the upper five feet of soils, as it is generally used for agricultural purposes. However, reviewing this information can indicate what soil properties can be expected on site. The NRCS mapping indicates that the project area consists primarily as material of the Duffield silt loam unit, which is comprised primarily of silts and clays and shallow unweathered bedrock.

5.2 Bedrock Geology

A desktop review of the local bedrock geology was conducted using publicly available mapping and literature published by the New Jersey Geological and Water Survey and the USGS. Based on this mapping, the predominant bedrock formation within the project boundary is the Allentown Formation consisting primarily of Dolomite. The Lower Beekmantown Group exists within the southwestern portion of

the site and also consists of Dolomite. Due to the degree of folding and fracturing of the bedrock, bedrock may generally present a high degree of dipping. Additionally, a thrust-fault was mapped within the northwest corner of the project site heading southeast. After reviewing the New Jersey Geological Society's latest (2015) *Bedrock Geologic Map of the High Bridge Quadrangle*, it appears that the previously mapped "Thrust Fault" as depicted within E&LP's Report has been updated and moved southwest of the project site. The updated mapping does place a thrust fault within the proposed developments. However, it now runs northwest to southeast along the southwest boundaries of the project site, as depicted within **Figure 2** below. In addition, Concealed Fault, Anticline, and Syncline are mapped within the project site.

Figure 2: Updated Geologic Map



Based on our knowledge and experience, concealed faults can be small and are difficult to identify compared to thrust faults. The "dipping" direction or dip angle is unknown compared to identified thrust faults unless bedrock is exposed above ground surface.

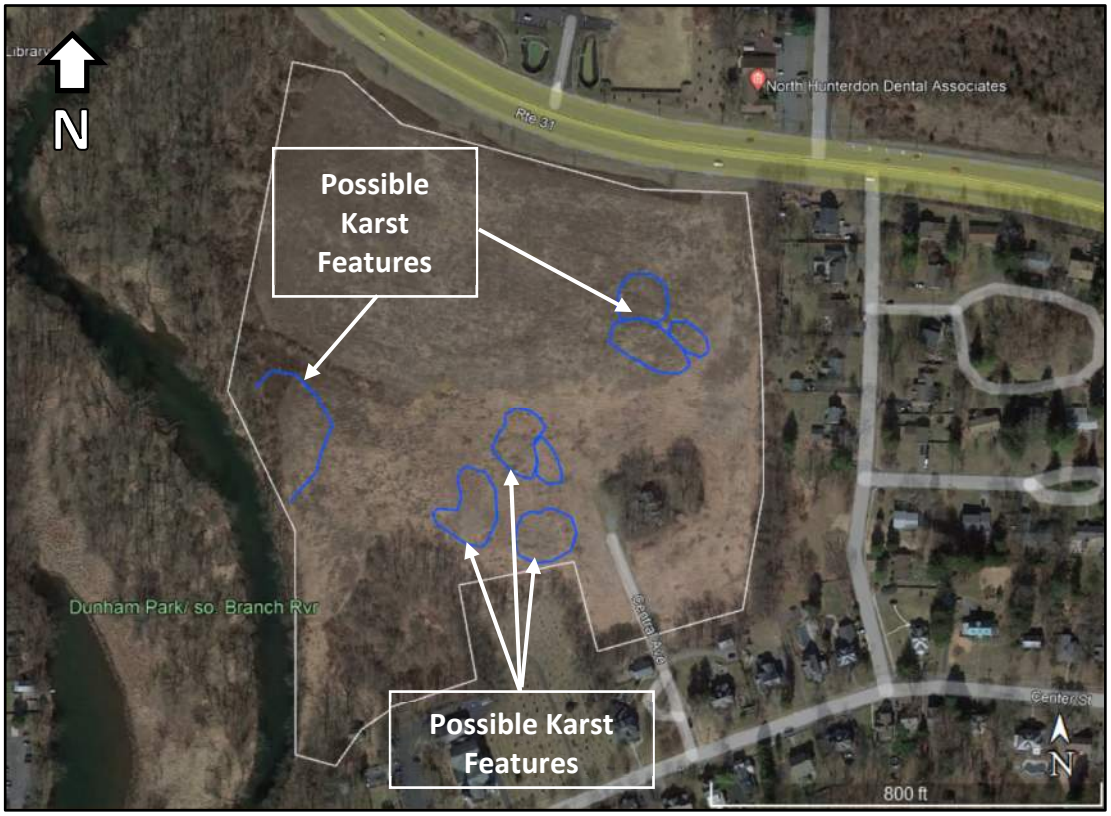
5.3 Karst Geology

Ground subsidence, commonly referred to as "sinkholes", is the local downward movement of surface material with little or no horizontal movement. Subsidence is a potential geologic hazard in areas where karst terrain occurs, or where underground mining has taken place. In karst terrain, limestone and dolomite bedrock (carbonate rock formations) are eroded by water and create karst features such as subsurface channels, caves, and sinkholes. Within the Allentown Formation, karst can be prevalent. Due to the project site having multiple mapped fracture sets, these are areas where a higher amount of dissolution may occur as they become preferential pathways for groundwater drainage.

5.4 Aerial Imagery Evaluation for Previous On-Site Subsidence Events

ANS Geo conducted a review of aerial images across the site to create a map of potential subsidence events that have occurred or are currently active within the project boundaries. Potential subsidence incidences can be identified by reviewing site topography, looking at shading on the ground surface of aerial images, surface water drainage pathways, and looking for pooling or standing water. No identifiable subsidence occurrence within the project boundaries could be confirmed visually via aerial imagery. Through review of Engineering & Land Planning Associates 2020 "*Karstic Geology Investigation Report*", USGS NAPP color infra-red (CIR) imagery was evaluated, and eight (8) possible karstic locations were delineated based off of that imagery. Those locations are depicted in **Figure 3**.

Figure 3 – Potential On-Site Subsidence Incidents



(Source: Google Earth 2021 Imagery)

6 Geophysical Analysis

Limestone and Dolomite that matures within karstic or dissolution prone conditions undergoes a variable maturation process. When younger, the features represent small caves, short caves, and uniform rockhead. As the karst matures, so does its complexity. Cover-subsidence and cover-collapse sinkholes, irregular or pinnacled rockhead, buried sinkholes, all become more prevalent. The surveys conducted showed variability in the presence, depth, and characteristics of karst features across the site; however, they were also consistent on multiple fronts.

6.1 Electrical Resistivity Imaging Analysis

The depth to interpreted bedrock ranged from approximately at existing grade to 10 feet below existing grade with the results of the ERI surveys and previous completed soil borings correlating well (showing similar depths). ANS Geo's planned geotechnical investigation will provide more data from test borings and/or test pits to correlate and confirm ERI results.

Top of bedrock was observed to generally fluctuate along the ERI profiles. This is indicative of "pinnacled" top of bedrock and usually occurs over extended dissolution and weathering of the bedrock surface. As expected, our surveys indicate that the quality of the bedrock generally gets better with increased depth. There were indications of past dissolution, collapse and soil-infilling within a six of the ERI surveys completed. As these zones are soil-infilled and have already disintegrated, it is in our opinion that they will not provide a large risk to the project's development.

ERI methods provide indications of overall stratigraphy type and change, possible anomalies such as voids or caverns, and water bearing zones. Apparent resistivity values obtained through the ERI surveys

portrayed variable subsurface conditions with apparent resistivities ranging from less than 1 ohm-meters to over 13,000 ohm-meters. The subsurface profiles generally exhibited a moist lower resistivity clay and silt layer within the upper approximately 5 to 10 feet below grade which then varied in material type between decomposed dolomite and zones of variable resistivities within the upper approximately 5 to 30 feet below grade. A zone of very high (>10,000 ohm-m) resistivity within the upper 12 to 327 feet below existing grade existed within ERI-4. Competent bedrock was generally observed with increasing depth.

6.2 Geology Analysis

A top layer of clay with frequent areas of gravel inclusion was generally observed within the five to 30 feet below existing grade. Where subsidence has occurred, these soils can be very loose, indicating raveling of soils (into previously-formed voids) with one moderate sized possible open void. Particular trends were observed within the ERI data showing that portions of profiles may have experienced some degree of "raveling". These zones will typically exhibit lower bearing strengths as the soils have experienced loosening due to possible subsidence in the past. This upper soil transitioned into a weathered dolomite that has predominantly weathered to clay, silt and gravel with sections of intact rock. This zone of weathered bedrock extended to variable depths and had transitions to pinnacled top of rock with abrupt change.

No indications of surface depressions were visible at the time of our ERI surveys.

7 Risk Evaluation and Conclusions

ANS Geo understands that the project site is intended to support commercial development, which will consist of residential buildings and commercial buildings such as retail stores, food market store, gas station and convenience store. In addition, new development supporting systems such as stormwater recharge basin, water lines, gas line, and stormwater and sewer lines are proposed to be constructed. To aid in site planning and development, it is important to identify the relative potential for risk across certain portions of the site to help minimize the potential for siting critical project components and structures (i.e. building foundations) within these areas with higher geologic risk of settlement and movement.

Through our investigation, it does not appear that significant representations of sinkholes or air-filled karst appear within the ERI survey data. However, karst features such as pinnacled top of bedrock, and areas of potential sinking and infilling were observed. Percussion probes and test borings were completed at select locations to confirm the presence or lack thereof karst features depicted within the geophysics results. The follow-up investigation consisting of percussion probes and test borings did not indicate that any of these features exist. Typically, if a feature exists, while drilling, drilling water loss or a sudden drop of drilling rods or soft zones would be encountered. Drilling water loss, rod drops, and soft zones were not encountered in the completed percussion probes and test borings. Additionally, the previously mapped fault locations, depicted within ERI-5 and ERI-6 were looked at closer during the geotechnical subsurface investigation consisting of a percussion probe along the two geophysical surveyed lines. The probe did not indicate any rod drops or clear indications of subsurface variation. Due to this location's proximity to a nearby bald eagle's nest and as per NJDEP's request, no test borings within confirmatory rock core were completed at time of this report.

Through our preliminary evaluation of geophysics survey results, it is in our opinion that there are karstic features onsite; however, they appear to be relic and soil-infilled features. These karstic conditions should be considered while designing foundations for the proposed developments and planning for the stormwater basin. **Table 4** provides a summary of the inferred depth to bedrock, as well as subsurface profile, evaluated as part of our geophysical investigation.

Table 4 – Geophysics Survey Notes

Geophysics ID	Topographic & Geologic Setting	Inferred Approximate Depth to Top of Bedrock [feet]	Notes
ERI-1	Mild sloping	~ 0' ~ 20'	Clay/Silt overburden layer with possible inclusions of gravel and sand generally 0 to 20 feet thick. Bedrock abruptly changes with depth "pinnacled". Bedrock quality is variable across the survey's length and depth.
ERI-2	Moderate sloping	~ 3' – 10'	Shallow bedrock that abruptly changes in depth.
ERI-3	Moderate sloping	~ 5' – 10'	Pinnacled top of bedrock. Generally shallow competent rock. A possible dissolution and weathered rock zone exists at approximately 190 to 270 feet horizontal distance along the ERI line.
ERI-4	Moderate sloping	~ 0' – 10'	Discontinuous overburden soils with shallow bedrock. The bedrock is highly pinnacled.
ERI-5	Mild sloping	~ 3' – 25'	Bedrock dips steeply from the northwest to southeast. Fine-grained material present as overburden soil. A possible discontinuous zone of gravel or floating bedrock exists between 3 to 25 feet. The bedrock appears to dip northwest to southeast at an approximate depth of 20 to 40 feet along the ERI line. No indications of a fault were represented within the data or follow-up percussion probe completed.
ERI-6	Mild sloping	~ 3' – 20'	Overburden soils appear to be "epi-karst" with remnants of fine-grained soils as well as granular soil and floating bedrock. Competent bedrock appears at an approximate depth of 20 to 30 feet below grade.
ERI-7	Moderate sloping	~ 0' – 10'	Bedrock quality fluctuates along the horizontal and vertical extents of the ERI survey. A highly weathered zone exists at an approximate horizontal distance of 110 to 190 feet.
ERI-8	Mild sloping	~ 0' – 30'	There may be a deep soil horizon up to 30 feet deep. The soils would most likely be a combination of fine-grained and coarse-grained material including bedrock remnants.
ERI-9	Steep sloping	~ 3' – 25'	Abruptly changing top of bedrock. Multiple dissolution and soil-infilled zones exist across the extents of the survey line.

8 Limitations

ANS Geo notes that the findings and recommendations presented with this Report are based on investigation program completed by ANS Geo between February and September 2022, and our engineering judgement. Geophysical investigations are a non-invasive method of interpreting physical properties of the shallow earth using electrical, electromagnetic, or mechanical energy. This document contains geophysical interpretations of responses to induced or real-world phenomena. As such, the measured phenomenon may be impacted by variables not readily identified in the field that can result in a false-positive and/or false negative interpretations. ANS Geo makes no representations or warranties as to the accuracy of the interpretations. The extent of reliability of the survey is based on the specific areas where surveys were conducted; areas outside surveyed alignments may have variations in the conditions noted. We also understand that the current investigation is considered preliminary, and that traditional geotechnical investigations including an appropriate number of borings, and associated laboratory testing of soil material have been or will be completed prior to detailed design and construction.

9 References

AGI. 2017 EarthImager Program. Advanced Geosciences Inc., Austin, Texas.

DeGroot-Hedlin, C. and Constable, S., 1990, Occam's inversion to generate smooth, two-dimensional models from magnetotelluric data. Geophysics, V. 55, 1613-1624.

Engineering & Land Planning Associates, 2020, Karstic Geology Investigation Report

Mavko, Gary. Conceptual Overview of Rock and Fluid Factors that Impact Seismic Velocity and Impedance. Standford Rock Physics Laboratory.

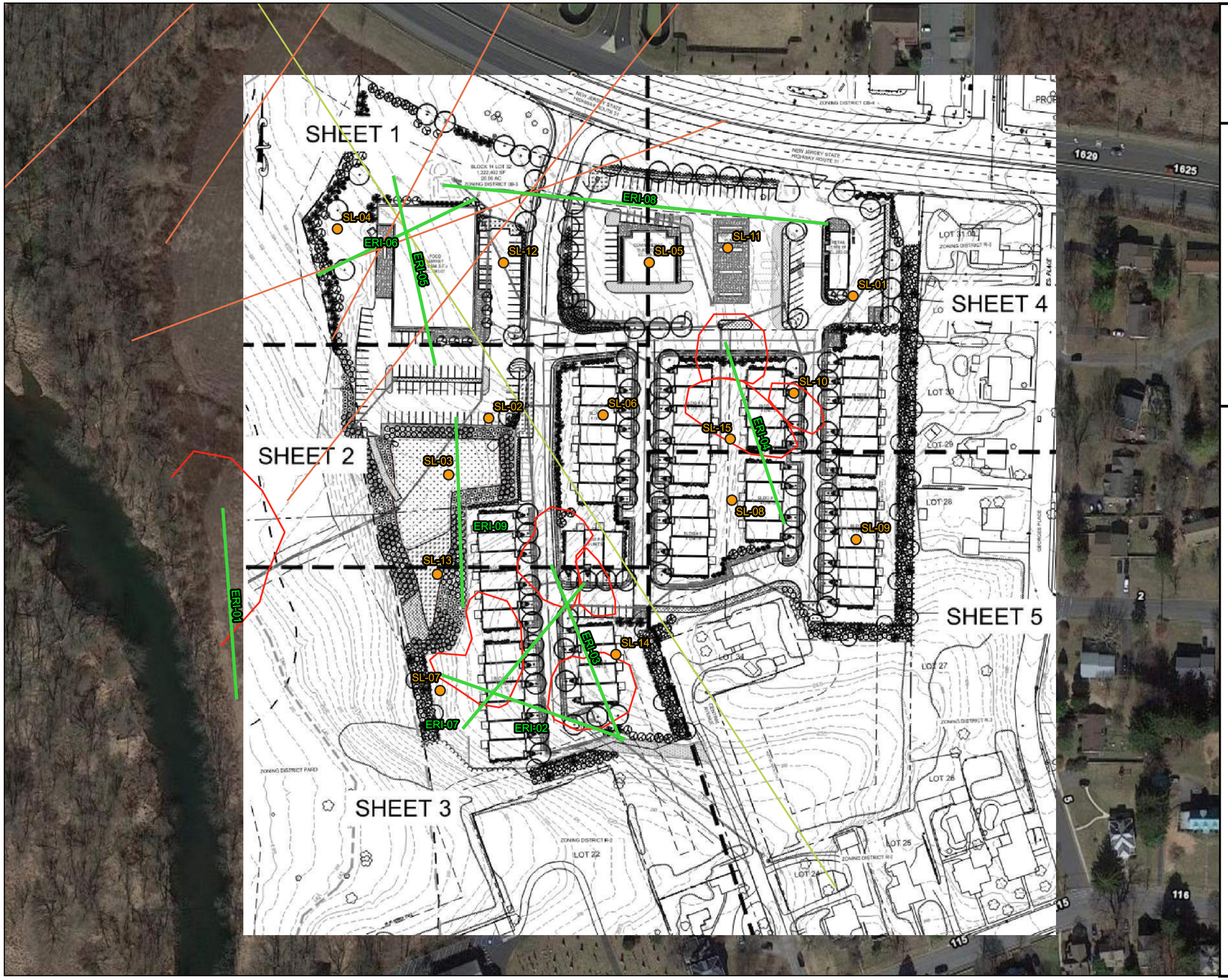
Mooney, H.M. (1980) Handbook of Engineering Geophysics: Volume 2: Electrical Resistivity, Bison Instruments, Inc.

Reynolds, J.M. (1997) An Introduction to Applied and Environmental Geophysics, John Wiley, Chichester, New York, 796 p.

Xia, J.; Miller, R. D.; Park, C. B.; Hunter J. A.; Harris, J. B.; and Ivanov, J., (2002), Comparing shearwave velocity profiles inverted from multi-channel surface wave with borehole measurements: *Soil Dynamics Earthquake Engineering*, Vol. 22, pp. 181-190.

APPENDIX A

Geophysical Investigation Survey Location Plans



ANS GEO

Client:

CONCEPT ENGINEERING CONSULTANTS, PA

GEOPHYSICS INVESTIGATION LOCATION PLAN CLINTON COMMONS DEVELOPMENT

TOWN OF CLINTON, NEW JERSEY

Legend

- As-Completed E&LP Soil Borings
- As-Completed Geophysics Locations
- Possible Karst Locations
- Fractures as per E&LP's Report
- Fault as per E&LP's Report
- Project Boundary

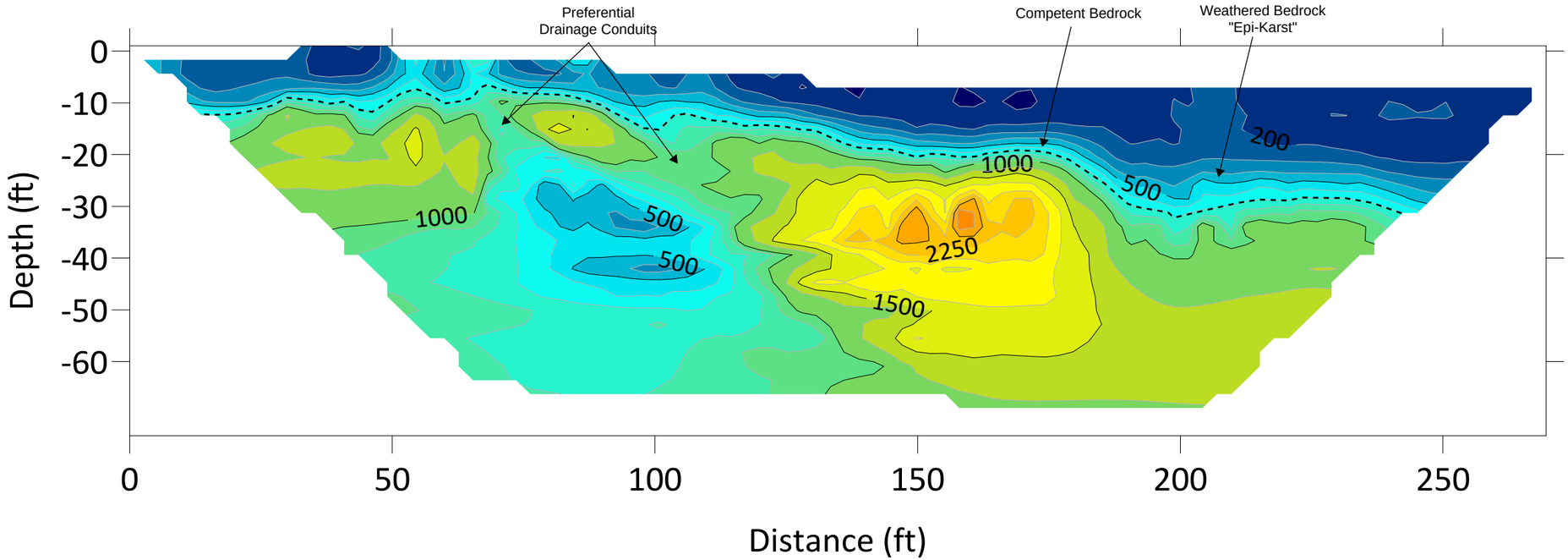
0 70 140 ft

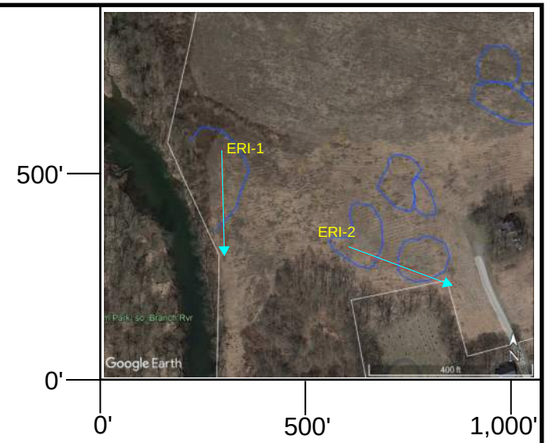
Absolute Scale: 1 inch = 150 feet
Scale at 11" x 17" AS SHOWN

Prepared by: Jonathan Nelson
Date: April 7, 2022
Drawing Number: PIP-1 Rev.1

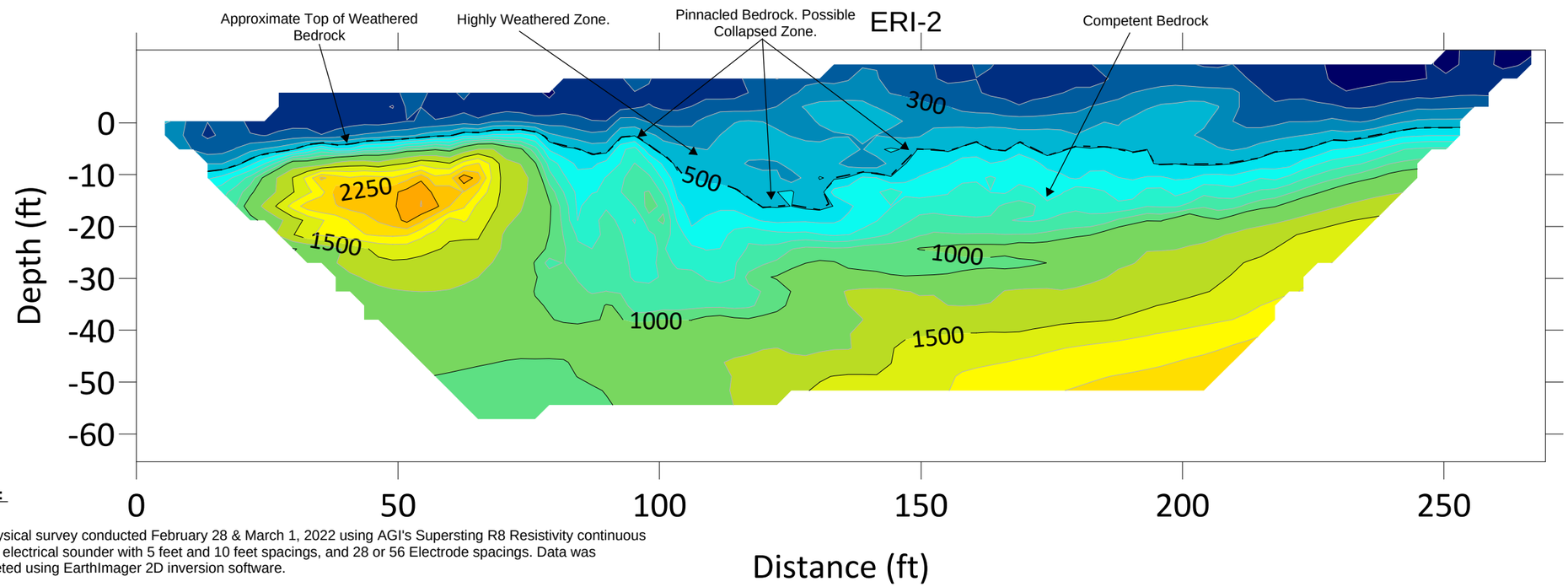
APPENDIX B
Electrical Resistivity Imaging Profiles

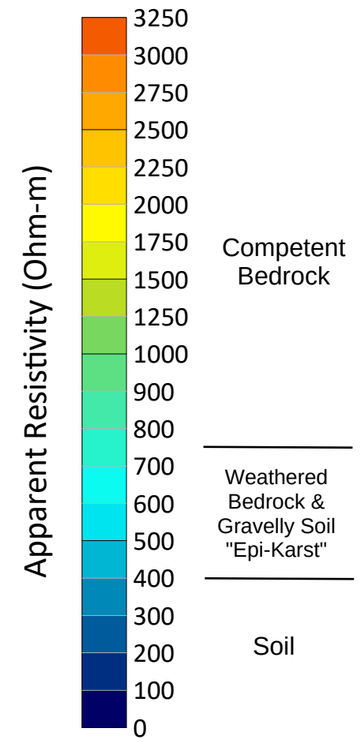
ERI-1





ERI-2





Notes:

Geophysical survey conducted February 28 & March 1, 2022 using AGI's Supersting R8 Resistivity continuous vertical electrical sounder with 5 feet and 10 feet spacings, and 28 or 56 Electrode spacings. Data was interpreted using EarthImager 2D inversion software.

No vertical exaggeration.

Real-time positioning of data using fully integrated Trimble Geo-7X global positioning system set to NAD 1983 New Jersey State coordinate system (US Survey feet).

Locations are approximate.

ANS GEO
4405 S Clinton Ave
South Plainfield, New Jersey 07080
(908) 754-8800
www.ansgeo.com

DRN	JWN	3/17/2022
DES	JWN	3/17/2022
CHK	TR	3/18/2022
REV		
PROJ. MGR.	TR	3/18/2022

SCALE:

SOURCE: AGI EarthImager 2D

PROJECT:
Geophysical Investigation
Clinton Commons Project
Town of Clinton, New Jersey

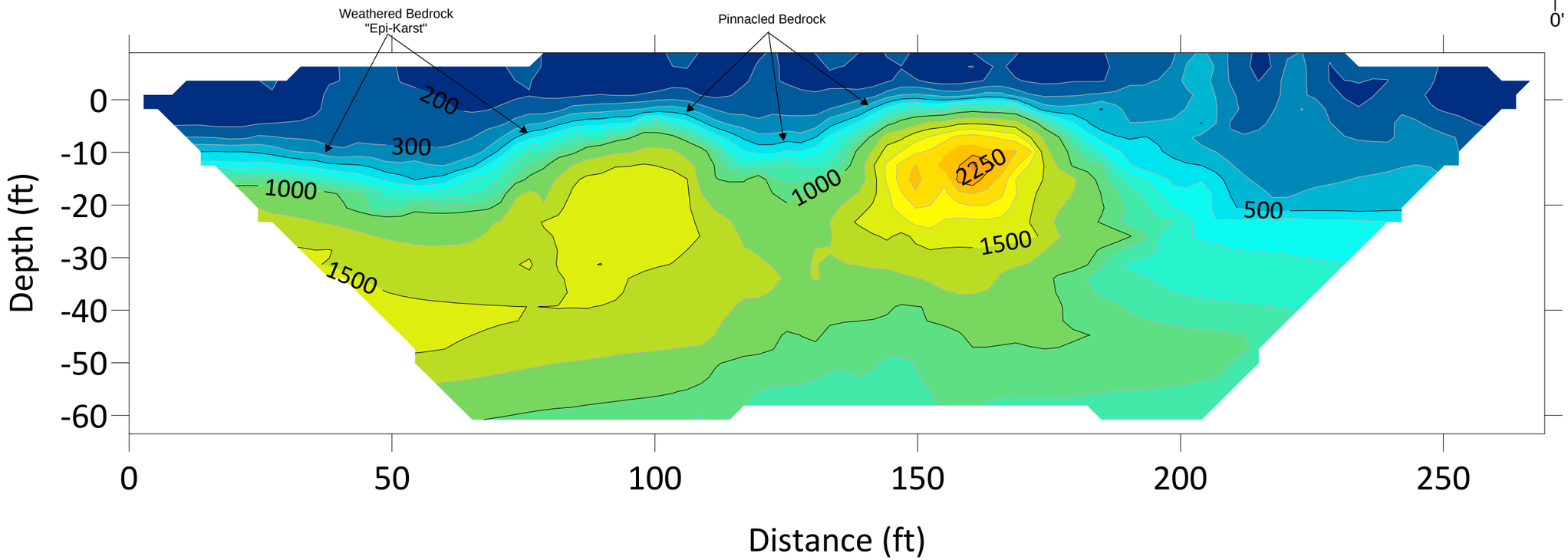
DRAWING NO.:
Figure 1
Electrical Resistivity Imaging Profile
Location 1 & 2 (ERI-1 & ERI-2)

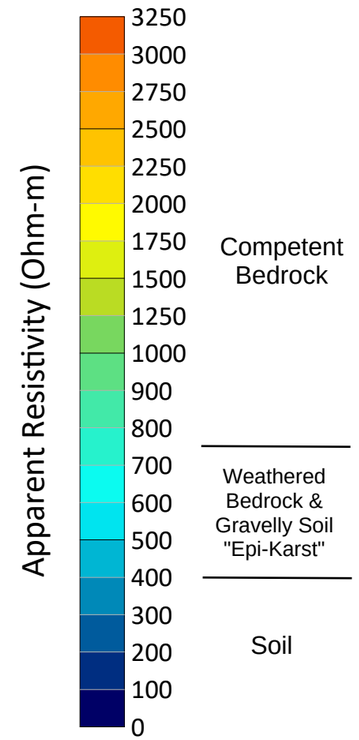
PREPARED FOR:
CONCEPT ENGINEERING CONSULTANTS, PA

PROJECT NO.:

SHEET TITLE:

ERI-3





Notes:

Geophysical survey conducted February 28 & March 1, 2022 using AGI's Supersting R8 Resistivity continuous vertical electrical sounder with 5 feet and 10 feet spacings, and 28 or 56 Electrode spacings. Data was interpreted using EarthImager 2D inversion software.

No vertical exaggeration.

Real-time positioning of data using fully integrated Trimble Geo-7X global positioning system set to NAD 1983 New Jersey State coordinate system (US Survey feet).

Locations are approximate.

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DRN	JWN	3/17/2022
DES	JWN	3/17/2022
CHK	TR	3/18/2022
REV		
PROJ. MGR.	TR	3/18/2022

SCALE:

SOURCE: AGI EarthImager 2D

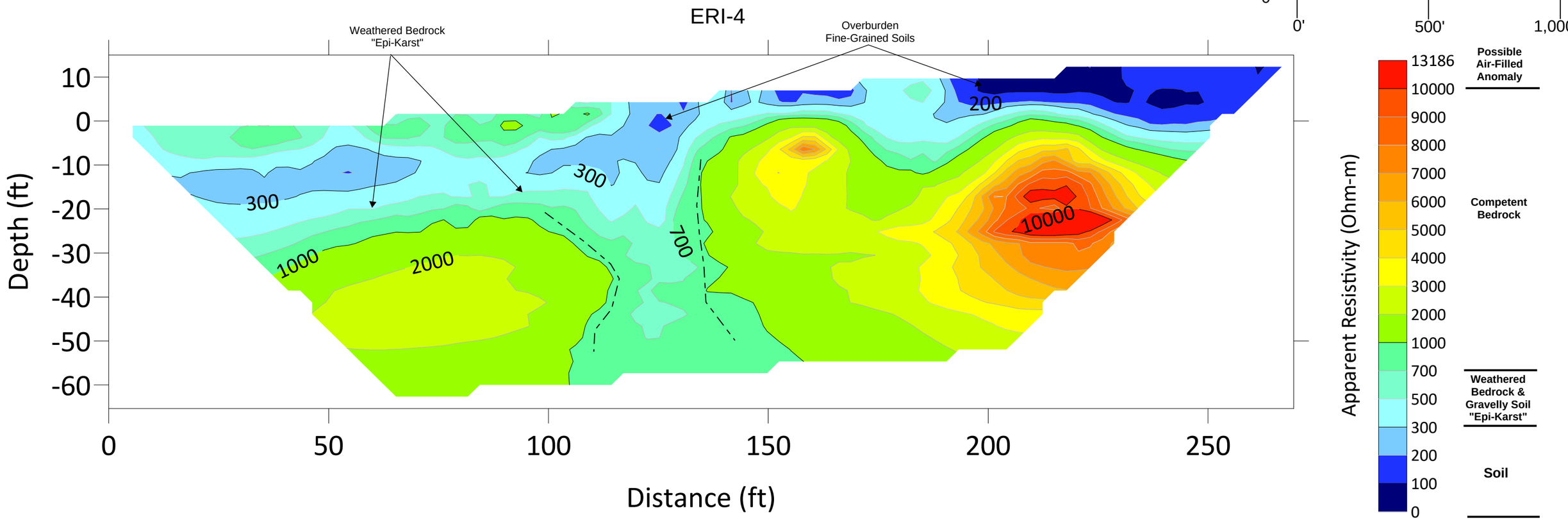
PROJECT:
Geophysical Investigation
Clinton Commons Project
Town of Clinton, New Jersey

DRAWING NO.:
Figure 2
Electrical Resistivity Imaging Profile
Location 3 (ERI-3)

PREPARED FOR:
CONCEPT ENGINEERING CONSULTANTS, PA

PROJECT NO.:

SHEET TITLE:



Notes:

Geophysical survey conducted February 28 & March 1, 2022 using AGI's Supersting R8 Resistivity continuous vertical electrical sounder with 5 feet and 10 feet spacings, and 28 or 56 Electrode spacings. Data was interpreted using EarthImager 2D inversion software.

No vertical exaggeration.

Real-time positioning of data using fully integrated Trimble Geo-7X global positioning system set to NAD 1983 New Jersey State coordinate system (US Survey feet).

Locations are approximate.

ANS GEO
4405 S Clinton Ave
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DRN	JWN	3/17/2022
DES	JWN	3/17/2022
CHK	TR	3/18/2022
REV		
PROJ. MGR.	TR	3/18/2022

SCALE:

SOURCE: AGI EarthImager 2D

PROJECT:
Geophysical Investigation
Clinton Commons Project
Town of Clinton, New Jersey

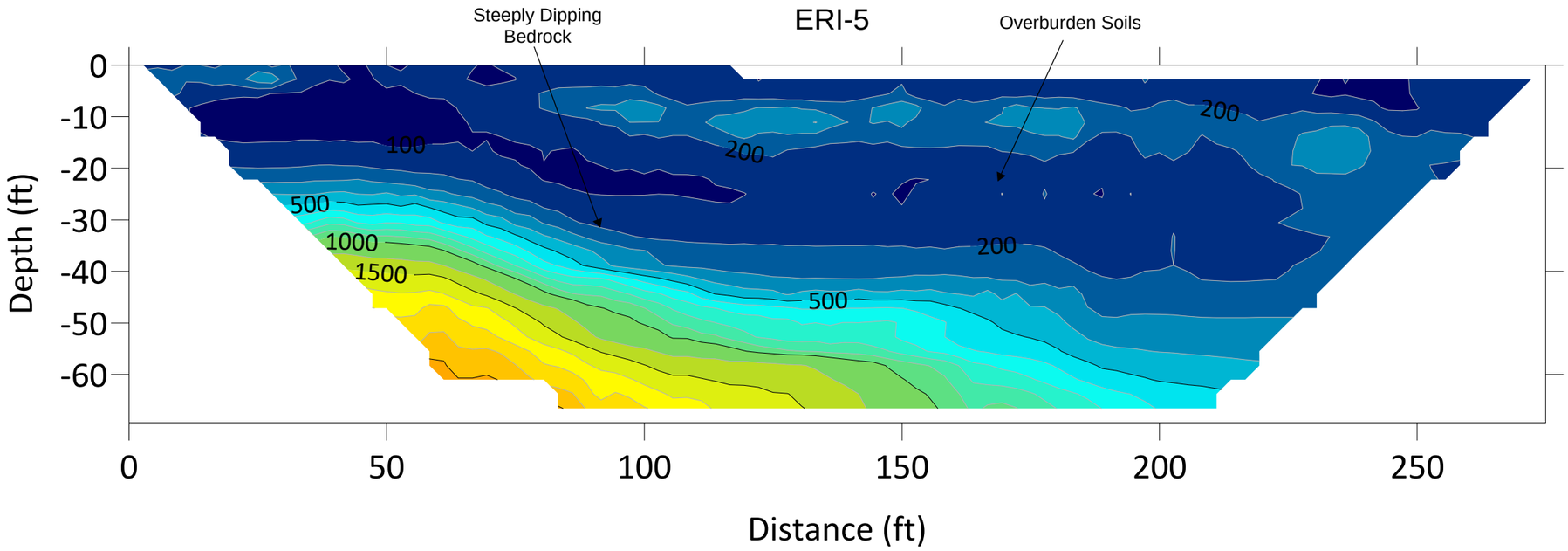
DRAWING NO.:
Figure 3
Electrical Resistivity Imaging Profile
Location 4 (ERI-4)

PREPARED FOR:
CONCEPT ENGINEERING CONSULTANTS, PA

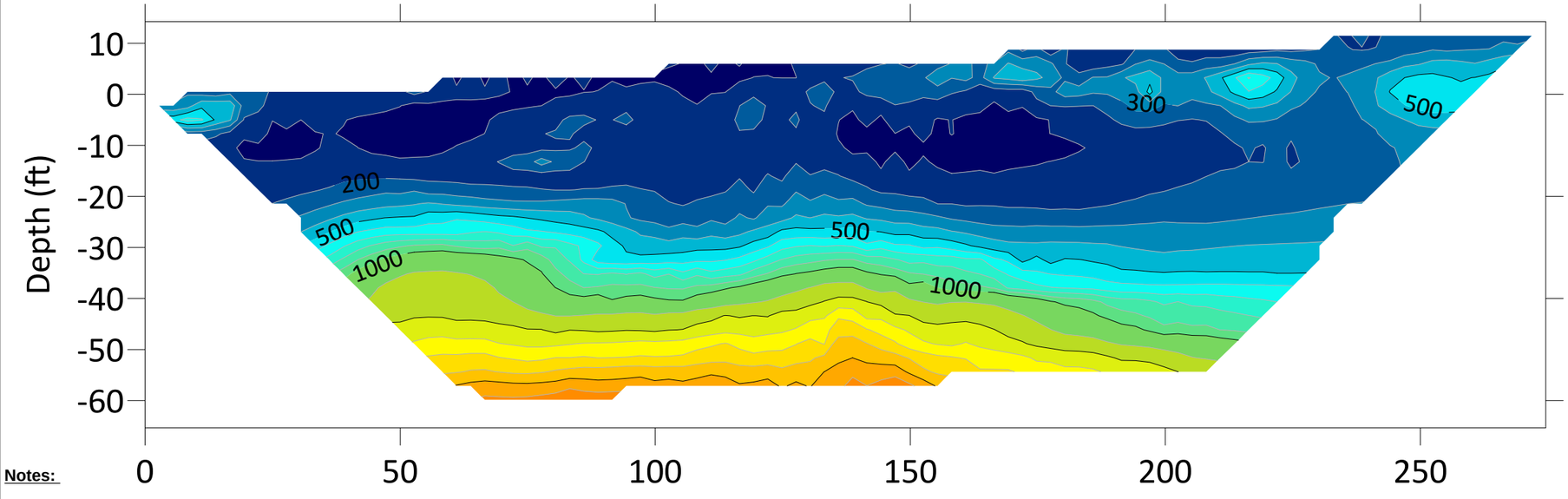
PROJECT NO.:

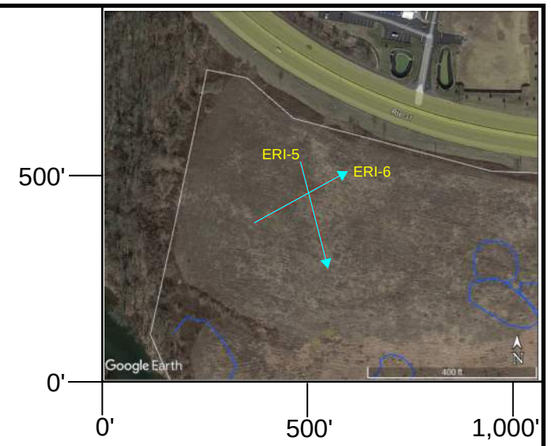
SHEET TITLE:

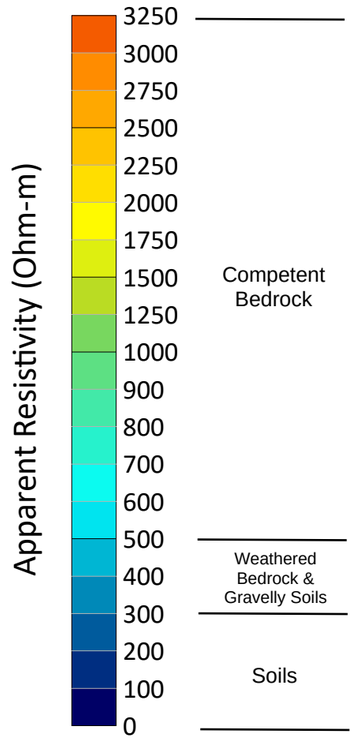
ERI-5



ERI-6







Notes:

Geophysical survey conducted February 28 & March 1, 2022 using AGI's Supersting R8 Resistivity continuous vertical electrical sounder with 5 feet and 10 feet spacings, and 28 or 56 Electrode spacings. Data was interpreted using EarthImager 2D inversion software.

No vertical exaggeration.

Real-time positioning of data using fully integrated Trimble Geo-7X global positioning system set to NAD 1983 New Jersey State coordinate system (US Survey feet).

Locations are approximate.

ANS GEO
4405 S Clinton Ave
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(908) 754-8800
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DRN	JWN	3/17/2022
DES	JWN	3/17/2022
CHK	TR	3/18/2022
REV		
PROJ. MGR.	TR	3/18/2022

SCALE:

SOURCE: AGI EarthImager 2D

PROJECT:

Geophysical Investigation
Clinton Commons Project
Town of Clinton, New Jersey

DRAWING NO.:

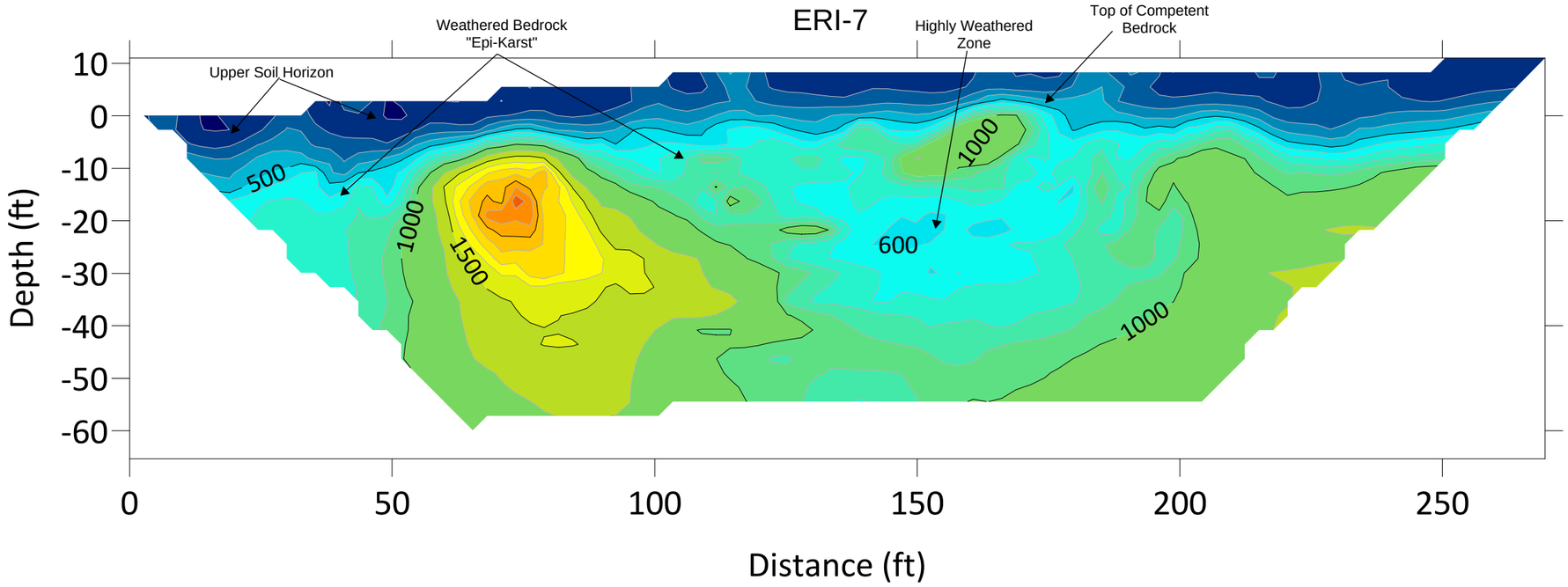
Figure 4
Electrical Resistivity Imaging Profile
Location 5 & 6 (ERI-5 & ERI-6)

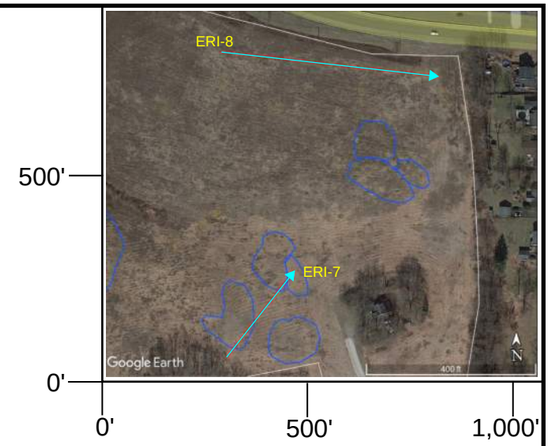
PREPARED FOR:

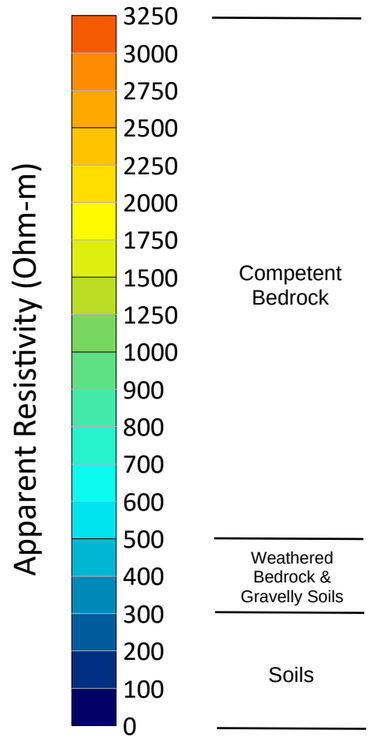
CONCEPT ENGINEERING CONSULTANTS, PA

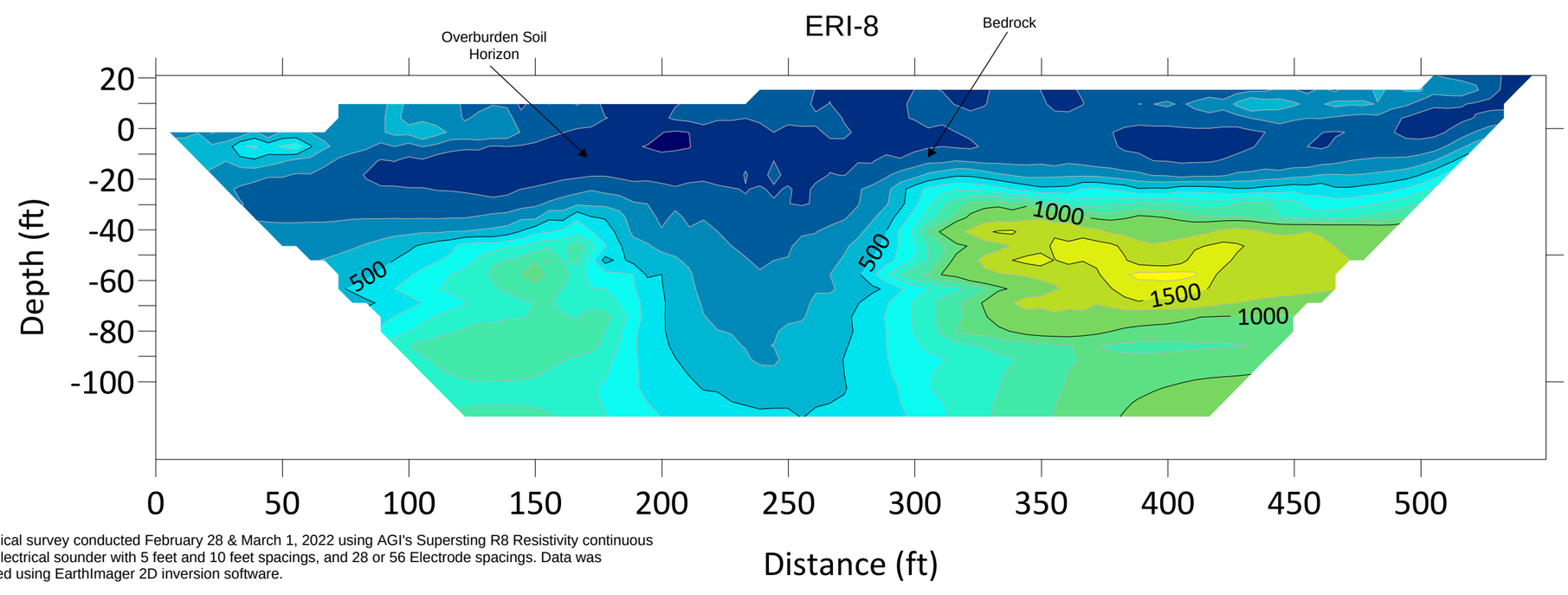
PROJECT NO.:

SHEET TITLE:









Soils

Notes:

Geophysical survey conducted February 28 & March 1, 2022 using AGI's Supersting R8 Resistivity continuous vertical electrical sounder with 5 feet and 10 feet spacings, and 28 or 56 Electrode spacings. Data was interpreted using EarthImager 2D inversion software.

No vertical exaggeration.

Real-time positioning of data using fully integrated Trimble Geo-7X global positioning system set to NAD 1983 New Jersey State coordinate system (US Survey feet).

Locations are approximate.

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DRN	JWN	3/17/2022
DES	JWN	3/17/2022
CHK	TR	3/18/2022
REV		
PROJ. MGR.	TR	3/18/2022

SCALE:

SOURCE: AGI EarthImager 2D

PROJECT:

Geophysical Investigation
Clinton Commons Project
Town of Clinton, New Jersey

DRAWING NO.:

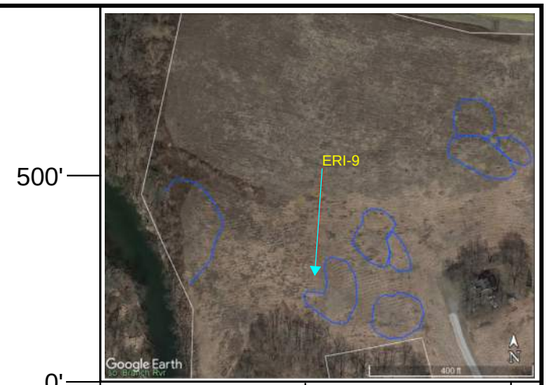
Figure 5
Electrical Resistivity Imaging Profile
Location 7 & 8 (ERI-7 & ERI-8)

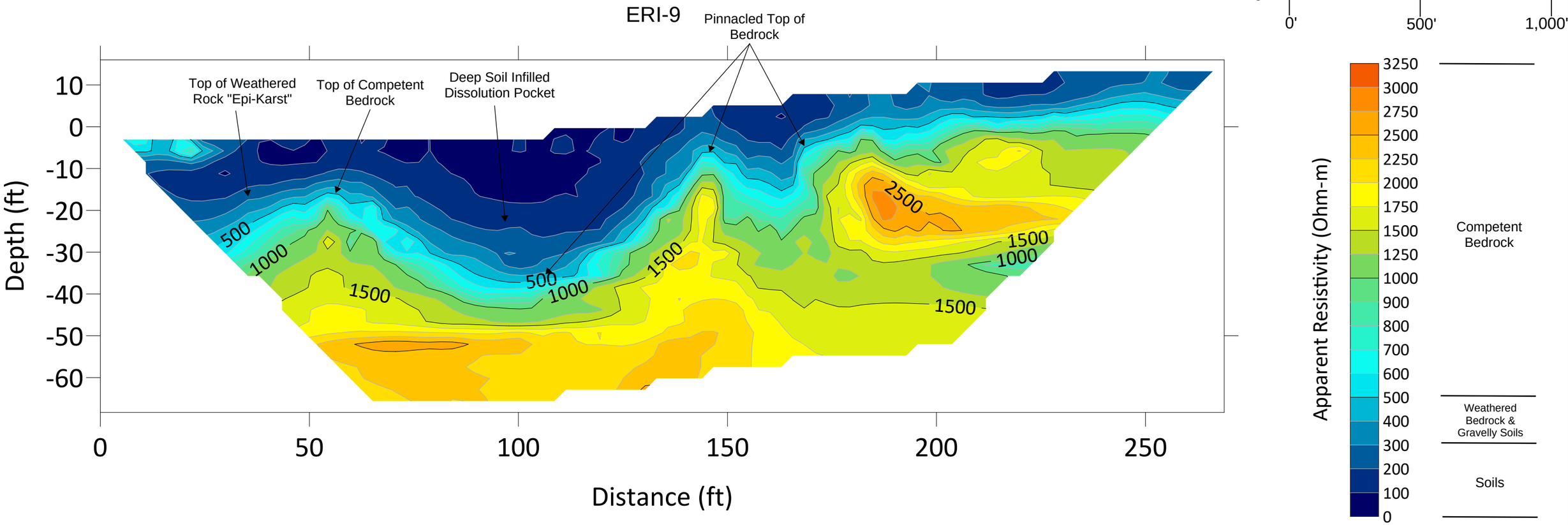
PREPARED FOR:

CONCEPT ENGINEERING CONSULTANTS, PA

PROJECT NO.:

SHEET TITLE:





Notes:

Geophysical survey conducted February 28 & March 1, 2022 using AGI's Supersting R8 Resistivity continuous vertical electrical sounder with 5 feet and 10 feet spacings, and 28 or 56 Electrode spacings. Data was interpreted using EarthImager 2D inversion software.

No vertical exaggeration.

Real-time positioning of data using fully integrated Trimble Geo-7X global positioning system set to NAD 1983 New Jersey State coordinate system (US Survey feet).

Locations are approximate.

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South Plainfield, New Jersey 07080
(908) 754-8800
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DRN	JWN	3/17/2022
DES	JWN	3/17/2022
CHK	TR	3/18/2022
REV		
PROJ. MGR.	TR	3/18/2022

PROJECT:
Geophysical Investigation
Clinton Commons Project
Town of Clinton, New Jersey

SCALE:

SOURCE:
AGI EarthImager 2D

DRAWING NO.:
Figure 6
Electrical Resistivity Imaging Profile
Location 9 (ERI-9)

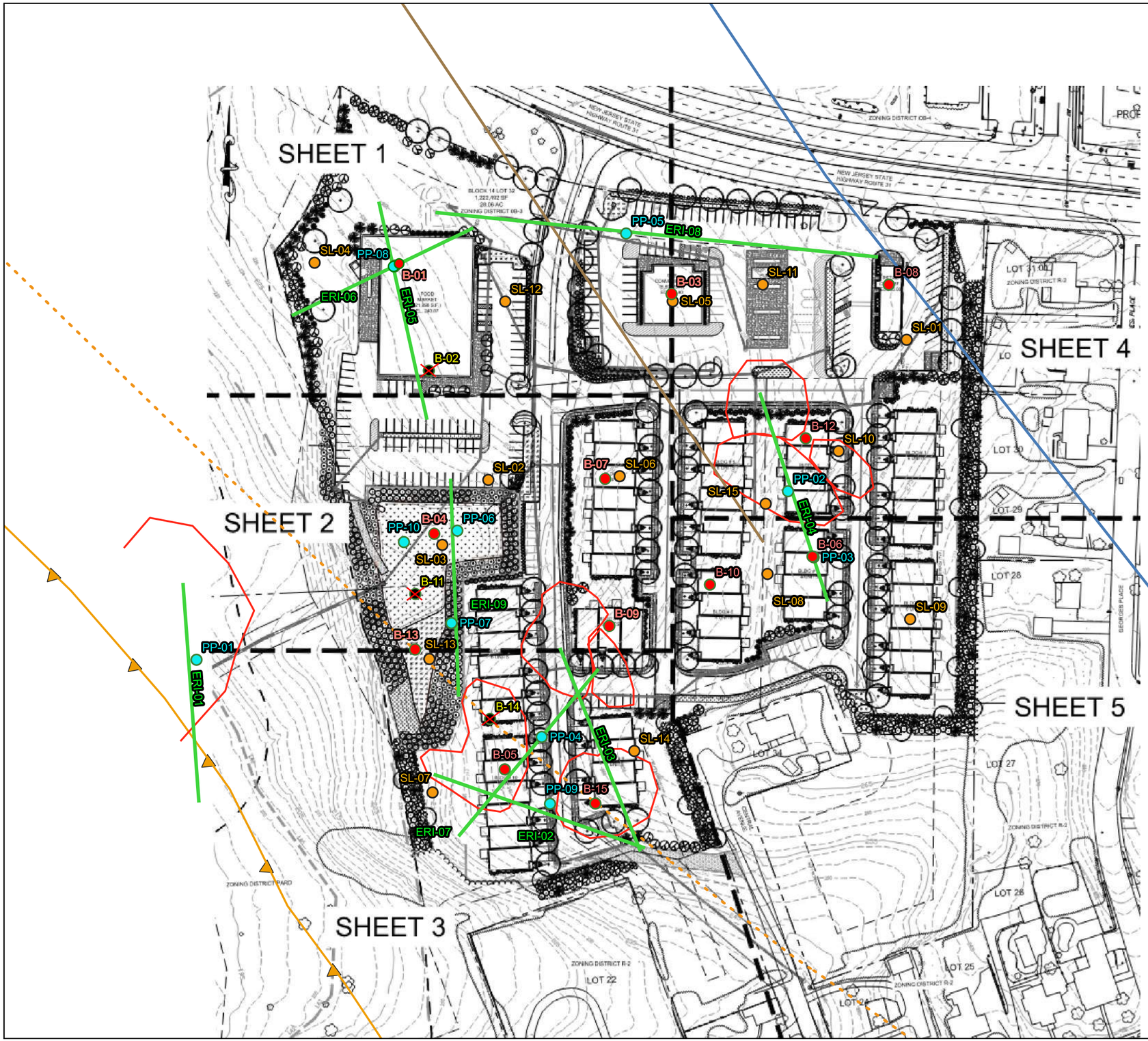
PREPARED FOR:
CONCEPT ENGINEERING CONSULTANTS, PA

PROJECT NO.:

SHEET TITLE:

APPENDIX C

Investigation Location Plan



ANS GEO

Client:

CONCEPT ENGINEERING CONSULTANTS, PA

INVESTIGATION LOCATION PLAN

CLINTON COMMONS DEVELOPMENT

TOWN OF CLINTON, NEW JERSEY

Legend

- As-Completed ANS Geo Soil Boring Location
- Cancelled Soil Boring Location
- As-Completed Percussion Probe Location
- As Completed E&LP Soil Borings
- As-Completed Geophysics Locations
- Syncline
- Anticline
- Possible Karst Locations
- Concealed Fault
- Thrust Fault

0 130 260 ft

Absolute Scale: 1 inch = 130 feet
Scale at 11" x 17" AS SHOWN

Prepared by: Michael Lionikis
Date: Oct. 07, 2022
Drawing Number: PIP-1 Rev. 4

APPENDIX D

As-Completed Percussion Probe Logs

Percussion Drilling Log

PP - 01

Client:	Concept Engineering Consultants	**Drilling Firm:**	Hayduk Enterprises	**Coordinates:**	40.641144, -74.90875
Project:	Clinton Commons	**Drill Crew:**	Garth Devlia	**Horiz. Datum:**	WGS 84
Location:	Clinton , NJ	**Boring Start:**	12:45 am 5/09/2022	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	2:00 pm 5/09/2022	**Vert. Datum:**	N/A
Rig Model:	Ingersoll-Rand ECM-590	**Drill Bit Type:**	Percussion Drill Bit	**Drill Rod Type:**	N/A
Rig Type:	Hydraulic Rock Drill	**Drill Bit Length:**	6 inches	**Drill Rod Length:**	12 feet
Drill Method:	Top Hammer	**Drill Bit I.D.:**	3 inches	**Drill Rod I.D.:**	N/A

Depth (ft)	Average Drilling Rate (sec/ft)	Drilling & Observation Notes	Additional Notes
1	6	Light brown coarse to fine SAND, trace Silt	- 0 to 7 feet BGS Drill Time : 0.75 minutes
2	6		
3	6		
4	6		
5	6		
6	6		
7	9		
8	20	Top of bedrock ~ 7 Ft. BGS.	- 7 to 10 feet BGS Drill Time : 1 minute
9	20		
10	20		
11	20		- 10 to 15 feet BGS Drill Time : 1.52 minutes
12	20		
13	17		
14	17		
15	17		
16	17		- 15 to 20 feet BGS Drill Time : 1.91 minutes
17	17		
18	17		
19	32		
20	32		
21	36		- 20 to 25 feet BGS Drill Time : 3.03 minutes
22	38		
23	38		
24	38		
	32		

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

BGS = Below Grade Surface
No groundwater observed.

Percussion Drilling Log

PP - 01
(continued)

Client:	Concept Engineering Consultants	**Drilling Firm:**	Hayduk Enterprises	**Coordinates:**	40.641144, -74.90875
Project:	Clinton Commons	**Drill Crew:**	Garth Devlia	**Horiz. Datum:**	WGS 84
Location:	Clinton , NJ	**Boring Start:**	12:45 am 5/09/2022	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	2:00 pm 5/09/2022	**Vert. Datum:**	N/A

Depth (ft)	Average Drilling Rate (sec/ft)	Drilling & Observation Notes	Additional Notes
26	32		- 25 to 30 feet BGS Drill Time : 2.67 minutes
27	32		
28	32		
29	32		
30	32		
31	30		- 30 to 35 feet BGS Drill Time : 2.92 minutes
32	30		
33	35		
34	40		
35	40		
36	40		- 35 to 40 feet BGS Drill Time : 3.67 minutes
37	45		
38	45		
39	45		
40	45		
41	42		- 40 to 45 feet BGS Drill Time : 3 minutes
42	42		
43	36		
44	30		
45	30		
46	30		- 45 to 49 feet BGS Drill Time : 2 minutes
47	30		
48	30		
49	30		Total Drill Time in Rocks : 21.72 minutes
50		End of Percussion Drilling at 49 feet BGS. Backfilled with cuttings and bentonite holeplug	

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

BGS = Below Grade Surface
No groundwater observed.

Percussion Drilling Log

PP - 02

Client:	Concept Engineering Consultants	**Drilling Firm:**	Hayduk Enterprises	**Coordinates:**	40.641723, -74.906078
Project:	Clinton Commons	**Drill Crew:**	Garth Devlia	**Horiz. Datum:**	WGS 84
Location:	Clinton , NJ	**Boring Start:**	2:45 pm 5/10/2022	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	3:20 pm 5/10/2022	**Vert. Datum:**	N/A
Rig Model:	Ingersoll-Rand ECM-590	**Drill Bit Type:**	Percussion Drill Bit	**Drill Rod Type:**	N/A
Rig Type:	Hydraulic Rock Drill	**Drill Bit Length:**	6 inches	**Drill Rod Length:**	12 feet
Drill Method:	Top Hammer	**Drill Bit I.D.:**	3 inches	**Drill Rod I.D.:**	N/A

Depth (ft)	Average Drilling Rate (sec/ft)	Drilling & Observation Notes	Additional Notes
1	8	Light brown coarse to fine SAND, trace Silt	- 0 to 7 feet BGS Drill Time : 1.03 minutes
	8		
2	8		
3	8		
4	10		
5	10		
6	10		
7	30	Top of bedrock ~ 7 Ft. BGS.	- 7 to 10 feet BGS Drill Time : 1.5 minutes
8	30		
9	30		
10	30		- 10 to 15 feet BGS Drill Time : 2 minutes
11	30		
12	20		
13	20		
14	20		
15	20		- 15 to 20 feet BGS Drill Time : 1.73 minutes
16	20		
17	20		
18	22		
19	22		
20	28		- 20 to 25 feet BGS Drill Time : 2.23 minutes
21	28		
22	28		
23	28		
24	22		

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

BGS = Below Grade Surface
No groundwater observed.

Percussion Drilling Log

PP - 02
(continued)

Client:	Concept Engineering Consultants	**Drilling Firm:**	Hayduk Enterprises	**Coordinates:**	40.641723, -74.906078
Project:	Clinton Commons	**Drill Crew:**	Garth Devlia	**Horiz. Datum:**	WGS 84
Location:	Clinton , NJ	**Boring Start:**	2:45 pm 5/10/2022	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	3:20 pm 5/10/2022	**Vert. Datum:**	N/A

Depth (ft)	Average Drilling Rate (sec/ft)	Drilling & Observation Notes	Additional Notes
26	22		- 25 to 30 feet BGS Drill Time : 1.83 minutes
27	22		
28	22		
29	22		
30	22		
31	20		- 30 to 35 feet BGS Drill Time : 1.83 minutes
32	20		
33	20		
34	25		
35	25		
36	25		- 35 to 40 feet BGS Drill Time : 2.42 minutes
37	30		
38	30		
39	30		
40	30		
41	25		- 40 to 45 feet BGS Drill Time : 1.97 minutes
42	25		
43	20		
44	24		
45	24		
46	24		- 45 to 49 feet BGS Drill Time : 1.6 minutes
47	24		
48	24		
49	24		Total Drill Time in Rocks : 18.14 minutes
50		End of Percussion Drilling at 49 feet BGS. Backfilled with cuttings and bentonite holeplug	

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

BGS = Below Grade Surface
No groundwater observed.

Percussion Drilling Log

PP - 03

Client:	Concept Engineering Consultants	**Drilling Firm:**	Hayduk Enterprises	**Coordinates:**	40.641496, -74.905962
Project:	Clinton Commons	**Drill Crew:**	Garth Devlia	**Horiz. Datum:**	WGS 84
Location:	Clinton , NJ	**Boring Start:**	1:30 pm 5/10/2022	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	2:40 pm 5/10/2022	**Vert. Datum:**	N/A
Rig Model:	Ingersoll-Rand ECM-590	**Drill Bit Type:**	Percussion Drill Bit	**Drill Rod Type:**	N/A
Rig Type:	Hydraulic Rock Drill	**Drill Bit Length:**	6 inches	**Drill Rod Length:**	12 feet
Drill Method:	Top Hammer	**Drill Bit I.D.:**	3 inches	**Drill Rod I.D.:**	N/A

Depth (ft)	Average Drilling Rate (sec/ft)	Drilling & Observation Notes	Additional Notes
1	8	Light brown coarse to fine SAND, trace Silt	- 0 to 7 feet BGS Drill Time : 0.83 minutes
2	8		
3	8		
4	8		
5	7		
6	7		
7	7		
8	25	Top of bedrock ~ 7 Ft. BGS.	- 7 to 10 feet BGS Drill Time : 1.25 minutes
9	25		
10	25		
11	25		- 10 to 15 feet BGS Drill Time : 1.83 minutes
12	25		
13	20		
14	20		
15	20		
16	20		- 15 to 20 feet BGS Drill Time : 1.83 minutes
17	20		
18	20		
19	25		
20	25		
21	26		- 20 to 25 feet BGS Drill Time : 2.35 minutes
22	30		
23	30		
24	30		
	25		

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

BGS = Below Grade Surface
No groundwater observed.

Percussion Drilling Log

PP - 03
(continued)

Client:	Concept Engineering Consultants	**Drilling Firm:**	Hayduk Enterprises	**Coordinates:**	40.641496, -74.905962
Project:	Clinton Commons	**Drill Crew:**	Garth Devlia	**Horiz. Datum:**	WGS 84
Location:	Clinton , NJ	**Boring Start:**	1:30 pm 5/10/2022	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	2:40 pm 5/10/2022	**Vert. Datum:**	N/A

Depth (ft)	Average Drilling Rate (sec/ft)	Drilling & Observation Notes	Additional Notes
	25		- 25 to 30 feet BGS
26			Drill Time : 2.08 minutes
	25		
27			
	25		
28			
	25		
29			
	25		
30			
	28		- 30 to 35 feet BGS
31			Drill Time : 2.68 minutes
	28		
32			
	35		
33			
	35		
34			
	35		
35			
	35		- 35 to 40 feet BGS
36			Drill Time : 2.85 minutes
	34		
37			
	34		
38			
	34		
39			
	34		
40			
	40		- 40 to 45 feet BGS
41			Drill Time : 3.17 minutes
	40		
42			
	40		
43			
	35		
44			
	35		
45			
	35		- 45 to 49 feet BGS
46			Drill Time : 2.33 minutes
	35		
47			
	35		
48			
	35		Total Drill Time in Rocks : 21.20 minutes
49		End of Percussion Drilling at 49 feet BGS.	
50		Backfilled with cuttings and bentonite holeplug	

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

BGS = Below Grade Surface
No groundwater observed.

Percussion Drilling Log

PP - 04

Client:	Concept Engineering Consultants	**Drilling Firm:**	Hayduk Enterprises	**Coordinates:**	40.640880, -74.907191
Project:	Clinton Commons	**Drill Crew:**	Garth Devlia	**Horiz. Datum:**	WGS 84
Location:	Clinton , NJ	**Boring Start:**	12:45 pm 5/09/2022	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	2:00 pm 5/09/2022	**Vert. Datum:**	N/A
Rig Model:	Ingersoll-Rand ECM-590	**Drill Bit Type:**	Percussion Drill Bit	**Drill Rod Type:**	N/A
Rig Type:	Hydraulic Rock Drill	**Drill Bit Length:**	6 inches	**Drill Rod Length:**	12 feet
Drill Method:	Top Hammer	**Drill Bit I.D.:**	3 inches	**Drill Rod I.D.:**	N/A

Depth (ft)	Average Drilling Rate (sec/ft)	Drilling & Observation Notes	Additional Notes
1	4	Light brown coarse to fine SAND, trace fine Gravel, trace Silt	- 0 to 4 feet BGS Drill Time : 0.27 minutes
	4		
2	4		
3	4		
4	34	Top of bedrock ~ 4 Ft. BGS.	- 4 to 10 feet BGS Drill Time : 2.88 minutes
5	34		
6	30		
7	25		
8	25		
9	25		
10	25		- 10 to 15 feet BGS Drill Time : 1.83 minutes
11	25		
12	20		
13	20		
14	20		
15	20		- 15 to 20 feet BGS Drill Time : 1.83 minutes
16	20		
17	20		
18	25		
19	25		
20	30		- 20 to 25 feet BGS Drill Time : 2.28 minutes
21	30		
22	30		
23	30		
24	17	Possible Groundwater ~ 24 Ft. BGS.	

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

BGS = Below Grade Surface
No groundwater observed.

Percussion Drilling Log

PP - 04
(continued)

Client:	Concept Engineering Consultants	**Drilling Firm:**	Hayduk Enterprises	**Coordinates:**	40.640880, -74.907191
Project:	Clinton Commons	**Drill Crew:**	Garth Devlia	**Horiz. Datum:**	WGS 84
Location:	Clinton , NJ	**Boring Start:**	12:45 pm 5/09/2022	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	2:00 pm 5/09/2022	**Vert. Datum:**	N/A

Depth (ft)	Average Drilling Rate (sec/ft)	Drilling & Observation Notes	Additional Notes
26	17		- 25 to 30 feet BGS Drill Time : 1.42 minutes
27	17		
28	17		
29	17		
30	17		
31	22		- 30 to 35 feet BGS Drill Time : 1.98 minutes
32	22		
33	15		
34	30		
35	30		
36	30		- 35 to 40 feet BGS Drill Time : 2.17 minutes
37	25		
38	25		
39	25		
40	25		
41	22		- 40 to 45 feet BGS Drill Time : 1.67 minutes
42	22		
43	22		
44	17		
45	17		
46	17		- 45 to 49 feet BGS Drill Time : 1.13 minutes
47	17		
48	17		
49	17		Total Drill Time in Rocks : 17.46 minutes
50		End of Percussion Drilling at 49 feet BGS. Backfilled with cuttings and bentonite holeplug	

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

BGS = Below Grade Surface
No groundwater observed.

Percussion Drilling Log

PP - 05

Client:	Concept Engineering Consultants	**Drilling Firm:**	Hayduk Enterprises	**Coordinates:**	40.642606, -74.906809
Project:	Clinton Commons	**Drill Crew:**	Garth Devlia	**Horiz. Datum:**	WGS 84
Location:	Clinton , NJ	**Boring Start:**	09:00 am 5/04/2022	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	11:00 am 5/04/2022	**Vert. Datum:**	N/A
Rig Model:	Ingersoll-Rand ECM-590	**Drill Bit Type:**	Percussion Drill Bit	**Drill Rod Type:**	N/A
Rig Type:	Hydraulic Rock Drill	**Drill Bit Length:**	6 inches	**Drill Rod Length:**	12 feet
Drill Method:	Top Hammer	**Drill Bit I.D.:**	3 inches	**Drill Rod I.D.:**	N/A

Depth (ft)	Average Drilling Rate (sec/ft)	Drilling & Observation Notes	Additional Notes
1	2	Light brown coarse to fine SAND, trace Silt	- 0 to 10 feet BGS Drill Time : 0.42 minutes
	2		
2	2		
3	2		
4	3		
5	3		
6	2		
7	3		
8	3		
9	3		
10	3		- 10 to 24 feet BGS Drill Time : 0.9 minutes
11	3		
12	2		
13	2		
14	2		
15	2		
16	4		
17	4		
18	2		
19	6		
20	6		
21	6		
22	6		
23	6		
24	20	Top of bedrock ~ 24 Ft.	

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

BGS = Below Grade Surface
No groundwater observed.

Percussion Drilling Log

PP - 05
(continued)

Client:	Concept Engineering Consultants	**Drilling Firm:**	Hayduk Enterprises	**Coordinates:**	40.642606, -74.906809
Project:	Clinton Commons	**Drill Crew:**	Garth Devlia	**Horiz. Datum:**	WGS 84
Location:	Clinton , NJ	**Boring Start:**	09:00 am 5/04/2022	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	11:00 am 5/04/2022	**Vert. Datum:**	N/A

Depth (ft)	Average Drilling Rate (sec/ft)	Drilling & Observation Notes	Additional Notes
	20		- 24 to 30 feet BGS
26			Drill Time : 2.0 minutes
	20		
27			
	20		
28			
	20		
29			
	20		
30			
	15		- 30 to 35 feet BGS
31			Drill Time : 1.18 minutes
	14		
32			
	14		
33			
	14		
34			
	14		
35			
	14		- 35 to 40 feet BGS
36			Drill Time : 1.63 minutes
	21		
37			
	21		
38			
	21		
39			
	21		
40			
	26		- 40 to 45 feet BGS
41			Drill Time : 2.17 minutes
	26		
42			
	30		
43			
	24		
44			
	24		
45			
	24		- 45 to 49 feet BGS
46			Drill Time : 1.6 minutes
	24		
47			
	24		
48			
	24		Total Drill Time in Rocks : 9.9 minutes
49		End of Percussion Drilling at 49 feet BGS.	
50		Backfilled with cuttings and bentonite holeplug	

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

BGS = Below Grade Surface
No groundwater observed.

Percussion Drilling Log

PP - 06

Client:	Concept Engineering Consultants	**Drilling Firm:**	Hayduk Enterprises	**Coordinates:**	40.641588, -74.907572
Project:	Clinton Commons	**Drill Crew:**	Garth Devlia	**Horiz. Datum:**	WGS 84
Location:	Clinton , NJ	**Boring Start:**	12:00 pm 5/04/2022	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	1:00 pm 5/04/2022	**Vert. Datum:**	N/A
Rig Model:	Ingersoll-Rand ECM-590	**Drill Bit Type:**	Percussion Drill Bit	**Drill Rod Type:**	N/A
Rig Type:	Hydraulic Rock Drill	**Drill Bit Length:**	6 inches	**Drill Rod Length:**	12 feet
Drill Method:	Top Hammer	**Drill Bit I.D.:**	3 inches	**Drill Rod I.D.:**	N/A

Depth (ft)	Average Drilling Rate (sec/ft)	Drilling & Observation Notes	Additional Notes
1	4	Light brown coarse to fine SAND, trace Silt	- 0 to 7 feet BGS Drill Time : 0.7 minutes
	4		
2	4		
3	4		
4	4		
5	10		
6	12		
7	15	Top of bedrock ~ 7 Ft. BGS.	- 7 to 10 feet BGS Drill Time : 0.75 minutes
8	15		
9	15		
10	15		- 10 to 15 feet BGS Drill Time : 0.85 minutes
11	15		
12	18		
13	18		
14	18		
15	18		- 15 to 20 feet BGS Drill Time : 1.43 minutes
16	15		
17	15		
18	20		
19	18		
20	18		- 20 to 25 feet BGS Drill Time : 1.57 minutes
21	18		
22	18		
23	18		
24	22		

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

BGS = Below Grade Surface
No groundwater observed.

Percussion Drilling Log

PP - 06
(continued)

Client:	Concept Engineering Consultants	**Drilling Firm:**	Hayduk Enterprises	**Coordinates:**	40.641588, -74.907572
Project:	Clinton Commons	**Drill Crew:**	Garth Devlia	**Horiz. Datum:**	WGS 84
Location:	Clinton , NJ	**Boring Start:**	12:00 pm 5/04/2022	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	1:00 pm 5/04/2022	**Vert. Datum:**	N/A

Depth (ft)	Average Drilling Rate (sec/ft)	Drilling & Observation Notes	Additional Notes
26	22		- 25 to 30 feet BGS Drill Time : 1.83 minutes
27	22		
28	22		
29	22		
30	22		
31	22		- 30 to 35 feet BGS Drill Time : 1.77 minutes
32	21		
33	21		
34	21		
35	21		
36	21		- 35 to 40 feet BGS Drill Time : 2.08 minutes
37	26		
38	26		
39	26		
40	26		
41	23		- 40 to 45 feet BGS Drill Time : 1.78 minutes
42	23		
43	18		
44	18		
45	25		
46	25		- 45 to 49 feet BGS Drill Time : 1.67 minutes
47	25		
48	25		
49	25		Total Drill Time in Rocks : 14.43 minutes
50		End of Percussion Drilling at 49 feet BGS. Backfilled with cuttings and bentonite holeplug	

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

BGS = Below Grade Surface
No groundwater observed.

Percussion Drilling Log

PP - 07

Client:	Concept Engineering Consultants	**Drilling Firm:**	Hayduk Enterprises	**Coordinates:**	40.641271, -74.907599
Project:	Clinton Commons	**Drill Crew:**	Garth Devlia	**Horiz. Datum:**	WGS 84
Location:	Clinton , NJ	**Boring Start:**	09:00 am 5/09/2022	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	11:30 am 5/09/2022	**Vert. Datum:**	N/A
Rig Model:	Ingersoll-Rand ECM-590	**Drill Bit Type:**	Percussion Drill Bit	**Drill Rod Type:**	N/A
Rig Type:	Hydraulic Rock Drill	**Drill Bit Length:**	6 inches	**Drill Rod Length:**	12 feet
Drill Method:	Top Hammer	**Drill Bit I.D.:**	3 inches	**Drill Rod I.D.:**	N/A

Depth (ft)	Average Drilling Rate (sec/ft)	Drilling & Observation Notes	Additional Notes
1	3	Light brown coarse to fine SAND, trace fine Gravel, trace Silt	- 0 to 12 feet BGS Drill Time : 1.13 minutes
	3		
2	3		
3	3		
4	2		
5	2		
6	7		
7	9		
8	9		
9	9		
10	9		
11	9		
12	27	Top of bedrock ~ 12 Ft. BGS.	- 12 to 20 feet BGS Drill Time : 3.33 minute
13	27		
14	27		
15	27		
16	23		
17	23		
18	23		
19	23		
20	30		- 20 to 25 feet BGS Drill Time : 2.5 minutes
21	30		
22	30		
23	30		
24	30		

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

BGS = Below Grade Surface
No groundwater observed.

Percussion Drilling Log

PP - 07
(continued)

Client:	Concept Engineering Consultants	**Drilling Firm:**	Hayduk Enterprises	**Coordinates:**	40.641271, -74.907599
Project:	Clinton Commons	**Drill Crew:**	Garth Devlia	**Horiz. Datum:**	WGS 84
Location:	Clinton , NJ	**Boring Start:**	09:00 am 5/09/2022	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	11:30 am 5/09/2022	**Vert. Datum:**	N/A

Depth (ft)	Average Drilling Rate (sec/ft)	Drilling & Observation Notes	Additional Notes
26	30		- 25 to 30 feet BGS Drill Time : 2.5 minutes
27	30		
28	30		
29	30		
30	30		
31	33		- 30 to 35 feet BGS Drill Time : 2.75 minutes
32	33		
33	33		
34	33		
35	33		
36	33		- 35 to 40 feet BGS Drill Time : 3.08 minutes
37	38		
38	38		
39	38		
40	38		
41	30		- 40 to 45 feet BGS Drill Time : 2.87 minutes
42	30		
43	36		
44	38		
45	38		
46	38		- 45 to 49 feet BGS Drill Time : 2.53 minutes
47	38		
48	38		
49	38		Total Drill Time in Rocks : 20.69 minutes
50		End of Percussion Drilling at 49 feet BGS. Backfilled with cuttings and bentonite holeplug	

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

BGS = Below Grade Surface
No groundwater observed.

Percussion Drilling Log

PP - 08

Client:	Concept Engineering Consultants	**Drilling Firm:**	Hayduk Enterprises	**Coordinates:**	40.642493, -74.907857
Project:	Clinton Commons	**Drill Crew:**	Garth Devlia	**Horiz. Datum:**	WGS 84
Location:	Clinton , NJ	**Boring Start:**	11:00 am 5/04/2022	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	12:00 am 5/04/2022	**Vert. Datum:**	N/A
Rig Model:	Ingersoll-Rand ECM-590	**Drill Bit Type:**	Percussion Drill Bit	**Drill Rod Type:**	N/A
Rig Type:	Hydraulic Rock Drill	**Drill Bit Length:**	6 inches	**Drill Rod Length:**	12 feet
Drill Method:	Top Hammer	**Drill Bit I.D.:**	3 inches	**Drill Rod I.D.:**	N/A

Depth (ft)	Average Drilling Rate (sec/ft)	Drilling & Observation Notes	Additional Notes
1	3	Light brown coarse to fine SAND, trace fine Gravel, trace Silt	- 0 to 10 feet BGS Drill Time : 0.67 minutes
	3		
2	3		
3	3		
4	7		
5	7		
6	2		
7	4		
8	4		
9	4		
10	4		- 10 to 18 feet BGS Drill Time : 1.13 minute
11	4		
12	10		
13	10		
14	10		
15	10		
16	10		
17	10		
18	20	Top of bedrock ~ 18Ft. BGS	- 18 to 25 feet BGS Drill Time : 1.83 minutes
19	14		
20	14		
21	14		
22	14		
23	14		
24	20		

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

BGS = Below Grade Surface
No groundwater observed.

Percussion Drilling Log

PP - 08
(continued)

Client:	Concept Engineering Consultants	**Drilling Firm:**	Hayduk Enterprises	**Coordinates:**	40.642493, -74.907857
Project:	Clinton Commons	**Drill Crew:**	Garth Devlia	**Horiz. Datum:**	WGS 84
Location:	Clinton , NJ	**Boring Start:**	11:00 am 5/04/2022	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	12:00 am 5/04/2022	**Vert. Datum:**	N/A

Depth (ft)	Average Drilling Rate (sec/ft)	Drilling & Observation Notes	Additional Notes
26	20		- 25 to 30 feet BGS Drill Time : 1.7 minutes
27	20		
28	20		
29	21		
30	21		
31	24		- 30 to 35 feet BGS Drill Time : 2.27 minutes
32	28		
33	28		
34	28		
35	28		
36	28		- 35 to 40 feet BGS Drill Time : 2.73 minutes
37	34		
38	34		
39	34		
40	34		
41	35		- 40 to 45 feet BGS Drill Time : 2.77 minutes
42	35		
43	36		
44	30		
45	30		
46	30		- 45 to 49 feet BGS Drill Time : 2.0 minutes
47	30		
48	30		
49	30		Total Drill Time in Rocks : 15.1 minutes
50		End of Percussion Drilling at 49 feet BGS. Backfilled with cuttings and bentonite holeplug	

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

BGS = Below Grade Surface
No groundwater observed.

Percussion Drilling Log

PP - 09

Client:	Concept Engineering Consultants	**Drilling Firm:**	Hayduk Enterprises	**Coordinates:**	40.640651, -74.907153
Project:	Clinton Commons	**Drill Crew:**	Garth Devlia	**Horiz. Datum:**	WGS 84
Location:	Clinton , NJ	**Boring Start:**	11:45 am 5/10/2022	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	1:13 pm 5/10/2022	**Vert. Datum:**	N/A
Rig Model:	Ingersoll-Rand ECM-590	**Drill Bit Type:**	Percussion Drill Bit	**Drill Rod Type:**	N/A
Rig Type:	Hydraulic Rock Drill	**Drill Bit Length:**	6 inches	**Drill Rod Length:**	12 feet
Drill Method:	Top Hammer	**Drill Bit I.D.:**	3 inches	**Drill Rod I.D.:**	N/A

Depth (ft)	Average Drilling Rate (sec/ft)	Drilling & Observation Notes	Additional Notes
1	5	Light brown coarse to fine SAND, trace fine Gravel, trace Silt	- 0 to 6 feet BGS Drill Time : 0.67 minutes
	5		
2	5		
3	5		
4	10		
5	10		
6	34	Top of bedrock ~ 6 Ft. BGS.	- 6 to 10 feet BGS Drill Time : 2.06 minute
7	30		
8	30		
9	30		
10	30		- 10 to 15 feet BGS Drill Time : 2.25 minutes
11	30		
12	25		
13	25		
14	25		
15	25		- 12 to 20 feet BGS Drill Time : 2.08 minutes
16	25		
17	25		
18	25		
19	25		
20	27		- 20 to 25 feet BGS Drill Time : 2.37 minutes
21	30		
22	30		
23	30		
24	25		

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

BGS = Below Grade Surface
No groundwater observed.

Percussion Drilling Log

PP - 09
(continued)

Client:	Concept Engineering Consultants	**Drilling Firm:**	Hayduk Enterprises	**Coordinates:**	40.640651, -74.907153
Project:	Clinton Commons	**Drill Crew:**	Garth Devlia	**Horiz. Datum:**	WGS 84
Location:	Clinton , NJ	**Boring Start:**	11:45 am 5/10/2022	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	1:13 pm 5/10/2022	**Vert. Datum:**	N/A

Depth (ft)	Average Drilling Rate (sec/ft)	Drilling & Observation Notes	Additional Notes
	25		- 25 to 30 feet BGS
26			Drill Time : 2.08 minutes
	25		
27			
	25		
28			
	25		
29			
	25		
30			
	30		- 30 to 35 feet BGS
31			Drill Time : 2.5 minutes
	30		
32			
	25		
33			
	30		
34			
	30		
35			
	30		- 35 to 40 feet BGS
36			Drill Time : 2.17 minutes
	25		
37			
	25		
38			
	25		
39			
	25		
40			
	30		- 40 to 45 feet BGS
41			Drill Time : 2.08 minutes
	30		
42			
	25		
43			
	20		
44			
	20		
45			
	20		- 45 to 49 feet BGS
46			Drill Time : 1.33 minutes
	20		
47			
	20		
48			
	20		Total Drill Time in Rocks : 19.59 minutes
49		End of Percussion Drilling at 49 feet BGS.	
50		Backfilled with cuttings and bentonite holeplug	

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

BGS = Below Grade Surface
No groundwater observed.

Percussion Drilling Log

PP - 10

Client:	Concept Engineering Consultants	**Drilling Firm:**	Hayduk Enterprises	**Coordinates:**	40.641548, -74.907813
Project:	Clinton Commons	**Drill Crew:**	Garth Devlia	**Horiz. Datum:**	WGS 84
Location:	Clinton , NJ	**Boring Start:**	08:00 am 5/09/2022	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	09:00 am 5/09/2022	**Vert. Datum:**	N/A
Rig Model:	Ingersoll-Rand ECM-590	**Drill Bit Type:**	Percussion Drill Bit	**Drill Rod Type:**	N/A
Rig Type:	Hydraulic Rock Drill	**Drill Bit Length:**	6 inches	**Drill Rod Length:**	12 feet
Drill Method:	Top Hammer	**Drill Bit I.D.:**	3 inches	**Drill Rod I.D.:**	N/A

Depth (ft)	Average Drilling Rate (sec/ft)	Drilling & Observation Notes	Additional Notes
1	5	Light brown coarse to fine SAND, trace fine Gravel, trace Silt	- 0 to 5 feet BGS Drill Time : 0.42 minutes
	5		
2	5		
3	5		
4	5		
5	20	Top of bedrock ~ 5 Ft. BGS.	- 5 to 10 feet BGS Drill Time : 1.67 minutes
6	20		
7	20		
8	20		
9	20		
10	20		- 10 to 15 feet BGS Drill Time : 1.42 minutes
11	20		
12	15		
13	15		
14	15		
15	15		- 15 to 20 feet BGS Drill Time : 1.48 minutes
16	18		
17	18		
18	20		
19	18		
20	18		- 20 to 25 feet BGS Drill Time : 1.53 minutes
21	18		
22	18		
23	18		
24	20		

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

BGS = Below Grade Surface
No groundwater observed.

Percussion Drilling Log

PP - 10
(continued)

Client:	Concept Engineering Consultants	**Drilling Firm:**	Hayduk Enterprises	**Coordinates:**	40.641548, -74.907813
Project:	Clinton Commons	**Drill Crew:**	Garth Devlia	**Horiz. Datum:**	WGS 84
Location:	Clinton , NJ	**Boring Start:**	08:00 am 5/09/2022	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	09:00 am 5/09/2022	**Vert. Datum:**	N/A

Depth (ft)	Average Drilling Rate (sec/ft)	Drilling & Observation Notes	Additional Notes
26	20		- 25 to 30 feet BGS Drill Time : 1.8 minutes
27	20		
28	20		
29	24		
30	24		
31	22		- 30 to 35 feet BGS Drill Time : 1.7 minutes
32	20		
33	20		
34	20		
35	20		
36	20		- 35 to 40 feet BGS Drill Time : 2.0 minutes
37	25		
38	25		
39	25		
40	25		
41	20		- 40 to 45 feet BGS Drill Time : 1.5 minutes
42	20		
43	15		
44	15		
45	20		
46	20		- 45 to 49 feet BGS Drill Time : 1.33 minutes
47	20		
48	20		
49	20		Total Drill Time in Rocks : 14.85 minutes
50		End of Percussion Drilling at 49 feet BGS. Backfilled with cuttings and bentonite holeplug	

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

BGS = Below Grade Surface
No groundwater observed.

APPENDIX E

As-Completed Test Boring Logs

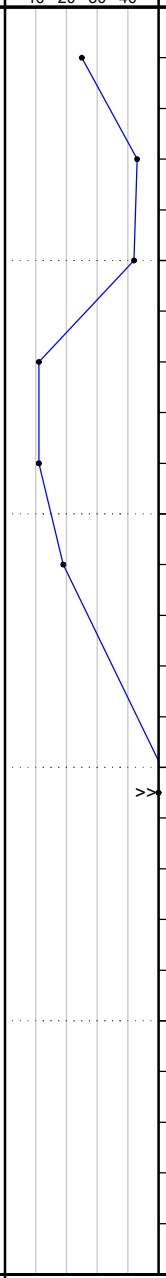
Soil Boring Log

B-01

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.6424972 N,-74.907852 E
Project:	Clinton Commons	**Drill Crew:**	M. Daniel / D. Osuch	**Horiz. Datum:**	WGS 84
Location:	Clinton, NJ	**Boring Start:**	9/12/2022 1:30:00 PM	**Elevation:**	Grade
Inspector:	Sidharth Nambiar	**Boring End:**	9/14/2022 9:30:00 AM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Sampler Type:**	Split Spoon	**Casing Type:**	Steel Casing
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	5 feet
Drill Method:	Mud Rotary	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	4 inches
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	140 pounds
Drilling Fluid:	Water	**Hammer Fall:**	30 inches	**Hammer Fall:**	30 inches

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)
	S-1	18	3 5 20 44	25	ML	Dark brown Clayey SILT, some coarse to fine Sand, dry (ML)	L	L	0.5	1.5
					GP	Brown to dark gray Sandy coarse to fine GRAVEL, some Silt, dry (GP)				
	S-2	10	17 19 24 49	43	ML	Hard, dark brown SILT, some Clay, trace coarse to fine Gravel, dry (ML)	M	M	3.75	4.0
5	S-3	11	12 17 25 22	42	GM	Dense, dark brown to dark gray Silty coarse to fine GRAVEL, little coarse to fine Sand, moist (GM)				
	S-4	11	8 5 6 7	11		Medium dense, dark brown Silty coarse to fine GRAVEL, some coarse to fine Sand, moist (GM)				
	S-5	4	13 5 6 12	11		Medium dense, dark brown Silty coarse to fine GRAVEL, trace fine Sand, moist (GM)				
10	S-6	5	8 13 6 4	19	ML	Very stiff, dark brown Clayey SILT, trace coarse to fine Sand, moist (ML)	M	M		
15	S-7	6	2 50/0"	> 50	GM	Very dense, dark brown Silty coarse to fine GRAVEL, some Clay, moist (GM)				
						Coring Rock at 17 feet BGS. See Rock Coring Log.				
20										



Drilling & Strata Notes

- Casing Installed at 4 feet BGS.
- Casing Installed at 8 feet BGS.
- Not enough sample for P.P/T.V tests.
- Rock fragments at spoon tip.
- Roller bit refusal at 17 feet BGS.

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed)
BGS = Below Ground Surface
Groundwater was not encountered within this borehole.

Toughness: Low (L), Medium (M), High (H)
Plasticity: Non-Plastic (NP), Low (L), Medium (M), High (H)
PP = Pocket Penetrometer, measured in tons per square ft.
TV = Torvane (Shear Vane), measured in tons per square ft.

Rock Coring Log

B-01

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.6424972 N,-74.907852 E
Project:	Clinton Commons	**Drill Crew:**	M. Daniel / D. Osuch	**Horiz. Datum:**	WGS 84
Location:	Clinton, NJ	**Boring Start:**	9/12/2022 1:30:00 PM	**Elevation:**	Grade
Inspector:	Sidharth Nambiar	**Boring End:**	9/14/2022 9:30:00 AM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Casing Type:**	Steel Casing	**Core Barrel Type:**	NQ	**Core Bit Type:**	NQ - 01
Rig Type:	Track	**Casing Length:**	5 feet	**Core Barrel Length:**	5 feet	**Core Bit Length:**	3 inches
Drill Method:	Mud Rotary	**Casing I.D.:**	4 inches	**Core Barrel I.D.:**	3 inches	**Core Bit I.D.:**	1.875 inches

Depth (ft)	Avg Core Rate (min/ft)	Run No.	Recovery (in. / %)	RQD (in. / %)	Hardness	Weathering	Graphic Log	Visual Classification	Depth (ft.)	Discontinuities: Type	Dip Angle	Roughness	Weathering	Aperture	Infilling	Drilling & Strata Notes
	4.97							LIMESTONE, light gray fine grained, slightly weathered, very close to close discontinuity spacing.								Casing Installed at 17 feet BGS.
	5.08								18.2	J	50	P,R	FR	VT	N	Water loss at 18 feet BGS.
								18.6' to 18.9' Highly Fractured Zone.								Calcite veins throughout the cores. Light gray return. Vertical fracture at 6.1 feet BGS.
	5.17	R-1	58 97%	25 42%	R4	SL			19.8	J	20	P,Sm	DS	VT	N	
20	4.83								20.9	J	20	P,Sm	FR	O	N	
	4.92							20.9' to 21.8' Fractured Zone.								
	5.22							LIMESTONE, light gray fine grained, slightly weathered, close discontinuity spacing.	22.7	J	25	P,R	DS	VT	N	
	5.13															Water loss at 23 feet BGS.
	3.72	R-2	60 100%	48 80%				24.2 to 24.6 Fractured Zone.	24.2	J	10	P,R	FR	VT	N	
25									24.7	J	20	P,R	DS	VT	N	
	10.7								26	J	20	P,R	FR	VT	N	
	9.97							End of Boring at 27 feet BGS. Backfilled with soil and bentonite holeplug.								
30																
35																

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed) **BGS =** Below Ground Surface

Groundwater was not encountered within this borehole.

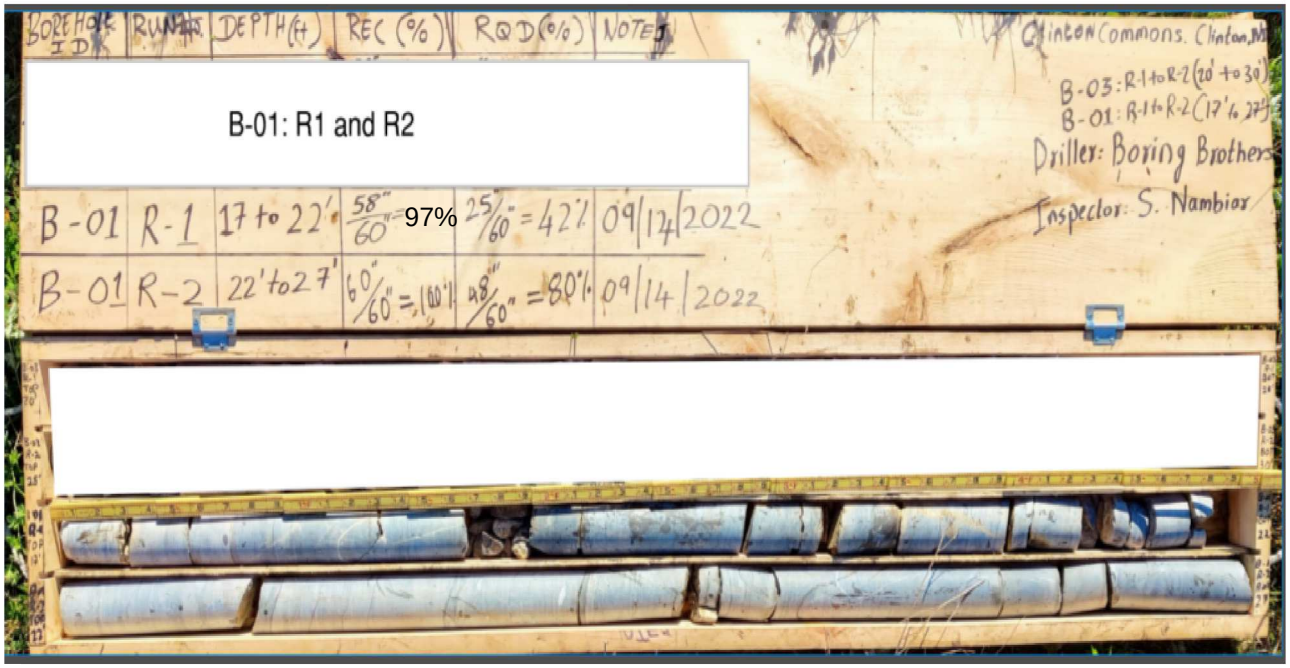


Figure B-01.1
B-01; R-1 and R-2 (dry)

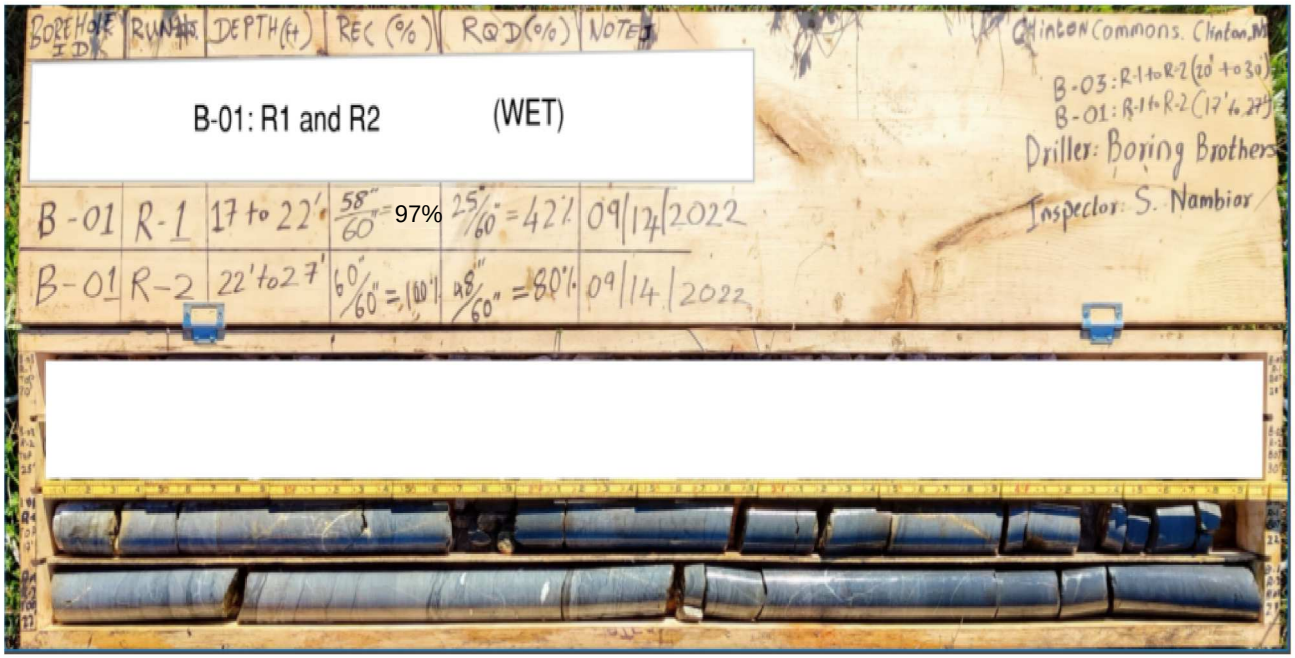


Figure B-01.2
B-01; R-1 and R-2 (wet)

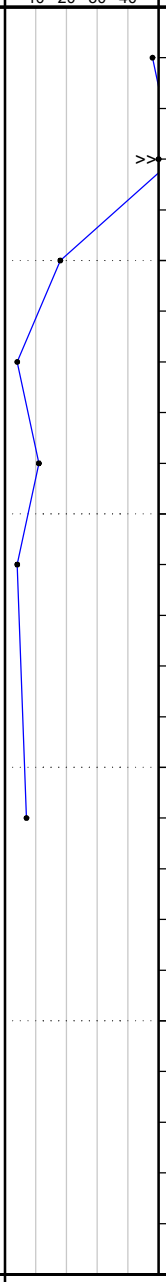
Soil Boring Log

B-03

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.6424 N,-74.9066 E
Project:	Clinton Commons	**Drill Crew:**	M. Daniel / D. Osuch	**Horiz. Datum:**	WGS 84
Location:	Clinton, NJ	**Boring Start:**	9/12/2022 8:30:00 AM	**Elevation:**	Grade
Inspector:	Sidharth Nambiar	**Boring End:**	9/12/2022 12:30:00 PM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Sampler Type:**	Split Spoon	**Casing Type:**	Steel Casing
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	5 feet
Drill Method:	Mud Rotary	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	4 inches
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	140 pounds
Drilling Fluid:	Water	**Hammer Fall:**	30 inches	**Hammer Fall:**	30 inches

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)	Drilling & Strata Notes
	S-1	17	5 24 24 22	48	ML	Brown Clayey SILT, trace fine Sand, moist (ML)					Not enough sample for P.P/T.V tests
					GP	Gray Sandy coarse to fine GRAVEL, trace Silt, dry (GP)	L	L			
	S-2	13	27 28 45 26	> 50		Very dense, light brown to dark gray Sandy coarse to fine GRAVEL, trace Silt, dry (GP)					
5	S-3	8	9 10 8 8	18	SP	Medium dense, light brown to dark gray coarse to fine SAND, some coarse to fine Gravel, trace Silt, dry (SP)					
	S-4	1	1 2 2 3	4	GM	Very loose, light brown coarse to fine GRAVEL, some Silt, trace coarse to fine Sand, moist (GM)					Casing installed at 6 feet BGS.
	S-5	8	4 5 6 5	11		Medium dense, brown to dark brown coarse to fine GRAVEL, some coarse to fine Sand, some Silt, moist (GM)					
10	S-6	4	3 2 2 3	4		Very loose, dark brown Silty coarse to fine GRAVEL, some coarse to fine Sand, moist (GM)					Casing installed at 10 feet BGS.
15	S-7	7	5 2 5 6	7		Loose, light brown Silty coarse to fine GRAVEL, some Clay, trace coarse to fine Sand, moist (GM)					Casing installed at 15 feet BGS. Water loss encountered at 15 feet BGS.
20						Coring Rock at 20 feet BGS. See Rock Coring Log.					



In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed)
BGS = Below Ground Surface
Groundwater was not encountered within this borehole.

Toughness: Low (L), Medium (M), High (H)
Plasticity: Non-Plastic (NP), Low (L), Medium (M), High (H)
PP = Pocket Penetrometer, measured in tons per square ft.
TV = Torvane (Shear Vane), measured in tons per square ft.

Rock Coring Log

B-03

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.6424 N,-74.9066 E
Project:	Clinton Commons	**Drill Crew:**	M. Daniel / D. Osuch	**Horiz. Datum:**	WGS 84
Location:	Clinton, NJ	**Boring Start:**	9/12/2022 8:30:00 AM	**Elevation:**	Grade
Inspector:	Sidharth Nambiar	**Boring End:**	9/12/2022 12:30:00 PM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Casing Type:**	Steel Casing	**Core Barrel Type:**	NQ	**Core Bit Type:**	NQ - 01
Rig Type:	Track	**Casing Length:**	5 feet	**Core Barrel Length:**	5 feet	**Core Bit Length:**	3 inches
Drill Method:	Mud Rotary	**Casing I.D.:**	4 inches	**Core Barrel I.D.:**	3 inches	**Core Bit I.D.:**	1.875 inches

Depth (ft)	Avg Core Rate (min/ft)	Run No.	Recovery (in. / %)	RQD (in. / %)	Hardness	Weathering	Graphic Log	Visual Classification	Depth (ft.)	Discontinuities: Type	Dip Angle	Roughness	Weathering	Aperture	Infilling	Drilling & Strata Notes
	3.25							LIMESTONE, light gray very fine grained, slightly weathered, very close to close discontinuity spacing.								
	3.22															
	3.25	R-1	52 87%	0 0%	R3	SL		20' to 25' Highly Fractured Zone.								Water loss encountered at 22 feet BGS.
	3.28															
	3.37															
25	4.75							LIMESTONE, dark gray very fine grained, slightly weathered, very close to close discontinuity spacing.								
	5.88															
	5.77	R-2	29 48%	0 0%	R3	SL		25' to 30' Highly Fractured Zone.								
	2.383															
	7.15															
30								End of Boring at 30 feet BGS. Backfilled with soil and bentonite holeplug.								
35																

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed) **BGS =** Below Ground Surface

Groundwater was not encountered within this borehole.

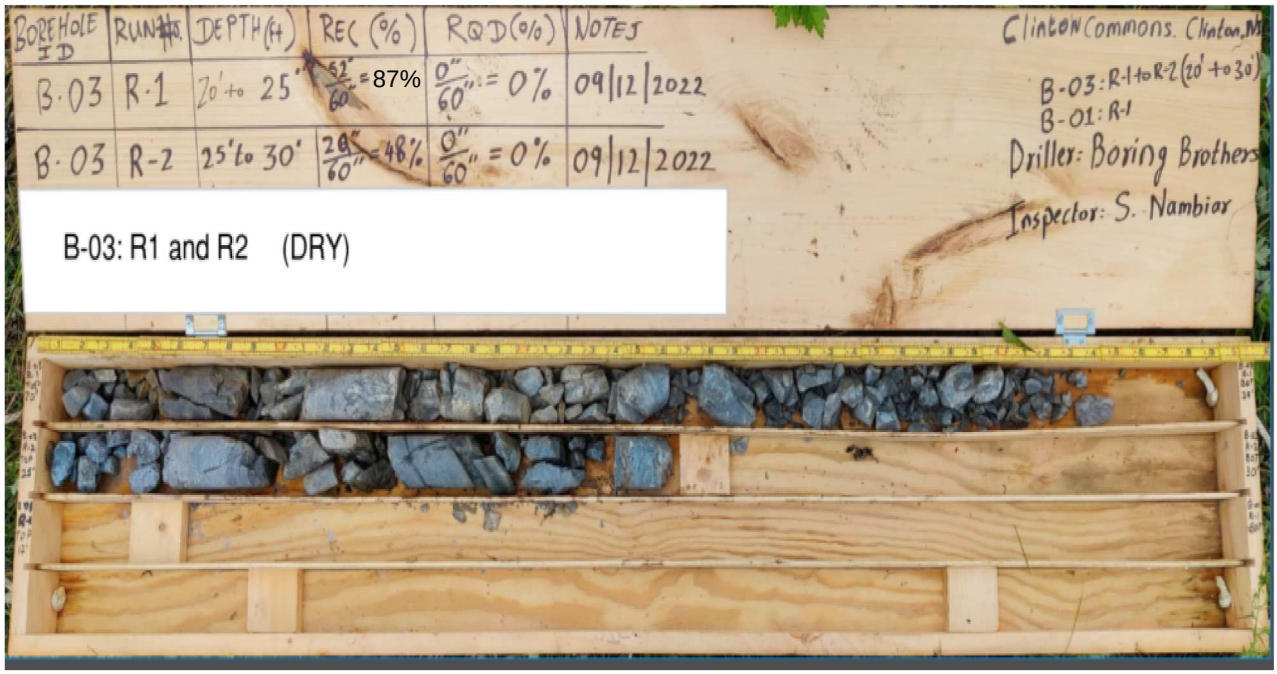


Figure B-03.1
B-03; R-1 and R-2 (dry)

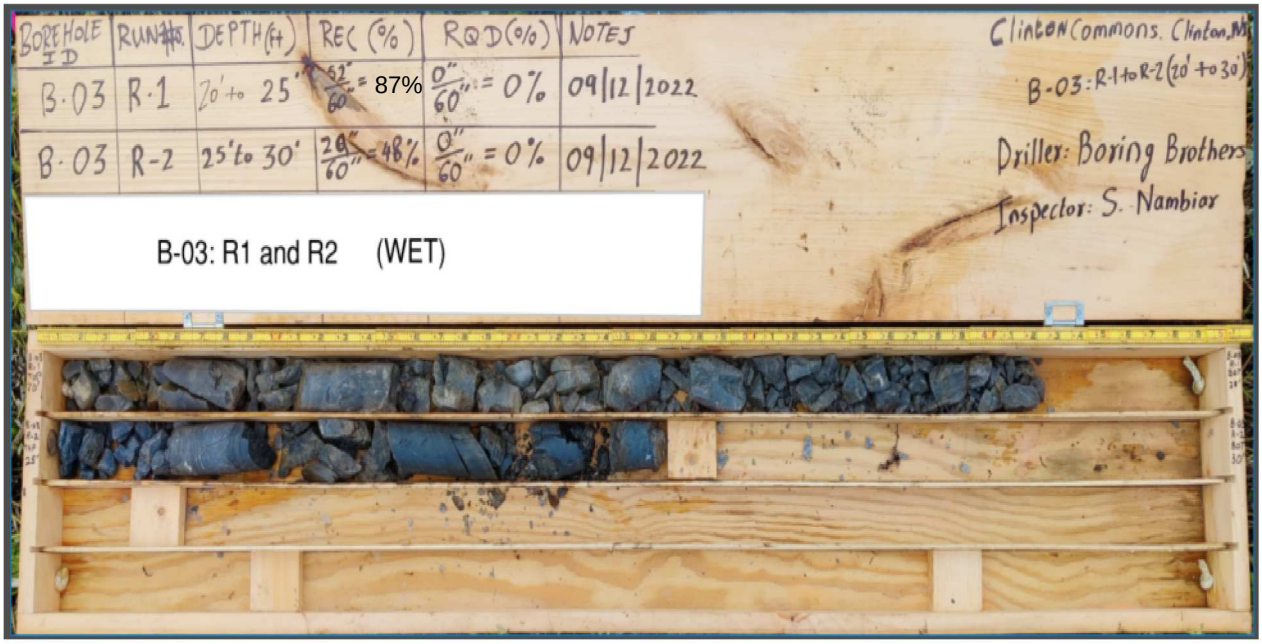


Figure B-03.2
B-03; R-1 and R-2 (wet)

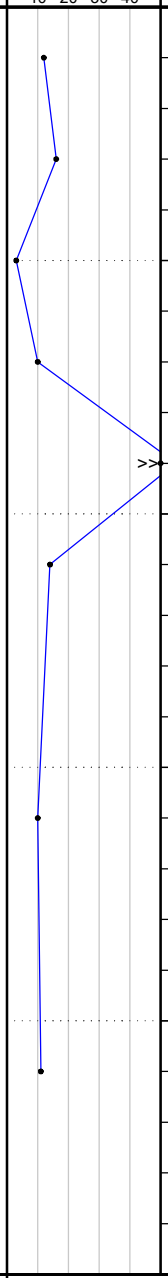
Soil Boring Log

B-04

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.64157 N,-74.907675 E
Project:	Clinton Commons	**Drill Crew:**	M. Daniel / D. Osuch	**Horiz. Datum:**	WGS 84
Location:	Clinton, NJ	**Boring Start:**	9/14/2022 9:45:00 AM	**Elevation:**	Grade
Inspector:	Sidharth Nambiar	**Boring End:**	9/14/2022 12:15:00 PM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Sampler Type:**	Split Spoon	**Casing Type:**	Steel Casing
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	5 feet
Drill Method:	Mud Rotary	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	4 inches
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	140 pounds
Drilling Fluid:	Water	**Hammer Fall:**	30 inches	**Hammer Fall:**	30 inches

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)	Drilling & Strata Notes
	S-1	10	9 3 9 10	12	ML	Dark brown SILT, some Clay, trace coarse to fine Sand, dry (ML)	L	L	0.75	1.0	
					GP	Brown to dark gray coarse to fine GRAVEL, some coarse to fine Sand, trace Silt, dry (GP)					
	S-2	10	6 10 6 3	16	ML	Very stiff, gray to brown SILT, some coarse to fine Gravel, trace Clay, dry (ML)	L	M			Not enough sample for P.P/T.V tests
5	S-3	2	2 2 1 2	3	GM	Very loose, brown to gray coarse to fine GRAVEL, some Silt, trace Clay, moist (GM)					Casing installed at 4 feet BGS.
	S-4	9	1 4 6 5	10		Loose, brown to dark brown Silty coarse to fine GRAVEL, trace coarse to fine Sand, moist (GM)					
	S-5	9	9 34 50/5"	> 50		Very dense, gray to brown coarse to fine GRAVEL, some coarse to fine Sand, some Silt, moist (GM)					Casing installed at 8 feet BGS. Weathered Rock.
10	S-6	6	10 7 7 3	14		Medium dense, gray to dark brown Silty coarse to fine GRAVEL, some coarse to fine Sand, moist (GM)					Weathered Rock.
											Roller bit drilled down to 15 feet BGS.
15	S-7	12	3 5 5 6	10	ML	Stiff, dark brown SILT, some coarse to fine Sand, trace Clay, moist (ML)	L	L	2.25	0.5	
20	S-8	18	2 4 7 13	11		Stiff, brown to dark gray Sandy coarse to fine SILT, little coarse to fine Gravel, trace Clay, moist (ML)					
						Coring Rock at 23 feet BGS. See Rock Coring Log.					



In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed)

BGS = Below Ground Surface

Groundwater was not encountered within this borehole.

Toughness: Low (L), Medium (M), High (H)
Plasticity: Non-Plastic (NP), Low (L), Medium (M), High (H)
PP = Pocket Penetrometer, measured in tons per square ft.
TV = Torvane (Shear Vane), measured in tons per square ft.

Rock Coring Log

B-04

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.64157 N,-74.907675 E
Project:	Clinton Commons	**Drill Crew:**	M. Daniel / D. Osuch	**Horiz. Datum:**	WGS 84
Location:	Clinton, NJ	**Boring Start:**	9/14/2022 9:45:00 AM	**Elevation:**	Grade
Inspector:	Sidharth Nambiar	**Boring End:**	9/14/2022 12:15:00 PM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Casing Type:**	Steel Casing	**Core Barrel Type:**	NQ	**Core Bit Type:**	NQ - 01
Rig Type:	Track	**Casing Length:**	5 feet	**Core Barrel Length:**	5 feet	**Core Bit Length:**	3 inches
Drill Method:	Mud Rotary	**Casing I.D.:**	4 inches	**Core Barrel I.D.:**	3 inches	**Core Bit I.D.:**	1.875 inches

Depth (ft)	Avg Core Rate (min/ft)	Run No.	Recovery (in. / %)	RQD (in. / %)	Hardness	Weathering	Graphic Log	Visual Classification	Depth (ft.)	Discontinuities: Type	Dip Angle	Roughness	Weathering	Aperture	Infilling	Drilling & Strata Notes
25	6.83	R-1	46 77%	17 28%	R3	SL		LIMESTONE, light gray fine grained, slightly weathered, very close to close discontinuity spacing.								Casing installed at 23 feet BGS.
	5.95								24.9	J	40	P,R	FR	VT	N	
	4.37							23' to 24.6' Fractured Zone.	25.3	J	45	P,R	FR	VT	N	
	5.85							26.1' to 26.8' Fractured Zone.	25.8	J	30	P,R	FR	T	N	
	8.52															
30	4.92	R-2	54 90%	33 55%	R4			LIMESTONE, light gray fine grained, slightly weathered, very close to close discontnuity spacing.								Casing installed at 28 feet BGS.
	2.53								28.8	J	30	P,R	FR	T	N	
	3.5								29.3	J	40	P,R	DS	T	N	
	3.37								29.9	J	20	P,R	FR	VT	N	
	3.87								30.3	J	10	P,R	FR	VT	N	
35									30.8	J	20	P,R	DS	VT	N	
									32	J	50	P,R	DS	VT	N	
40								End of Boring at 33 feet BGS. Backfilled with soil and bentonite holeplug.								

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed) **BGS =** Below Ground Surface

Groundwater was not encountered within this borehole.

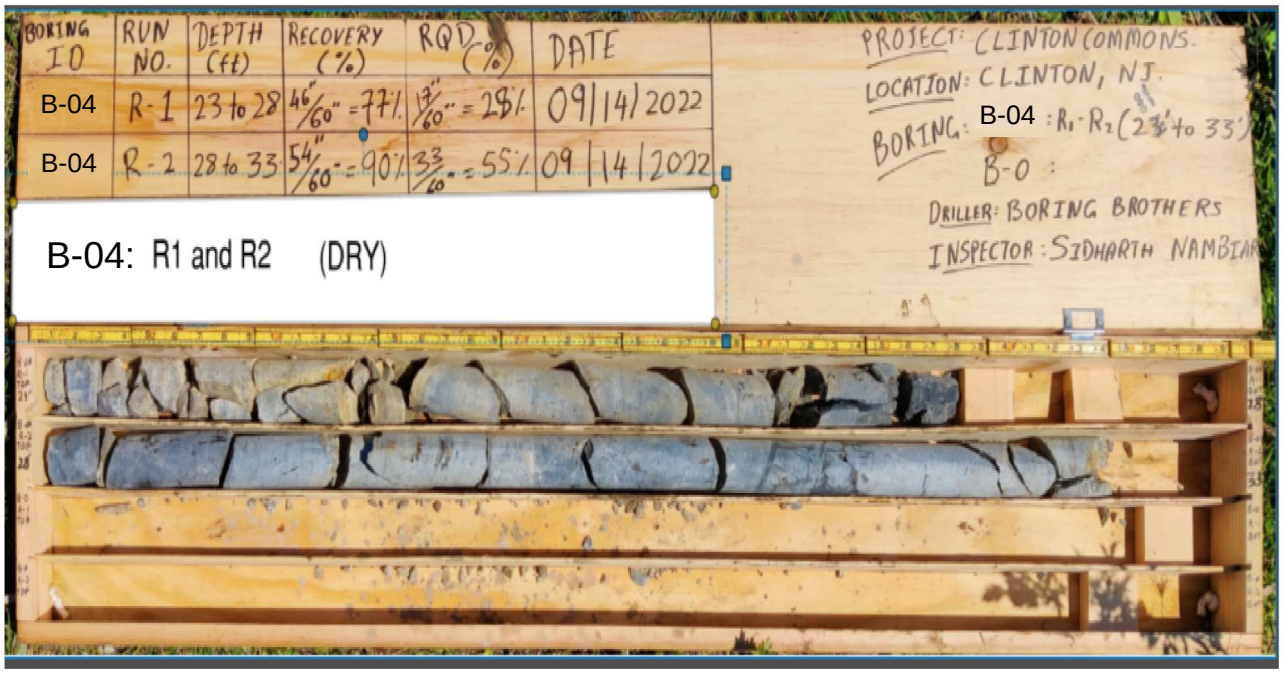


Figure B-04.1
B-04; R-1 and R-2 (dry)

Figure B-04.2
B-04; R-1 and R-2 (wet)

Soil Boring Log

B-05

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.640769 N, -74.907358 E
Project:	Clinton Commons	**Drill Crew:**	Rob Dollar / Lyle Delmeir	**Horiz. Datum:**	NAD83
Location:	Clinton, NJ	**Boring Start:**	5/13/2022 12:00:00 PM	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	5/13/2022 1:45:00 PM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Sampler Type:**	Split Spoon	**Casing Type:**	Steel Casing
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	5 feet
Drill Method:	Mud Rotary	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	4 inches
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	140 pounds
Drilling Fluid:	Water	**Hammer Fall:**	30 inches	**Hammer Fall:**	30 inches

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Graphic Log	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)	N-Value (10 20 30 40)	Drilling & Strata Notes
	S-1	19	4 5 10 12	15	SP		Medium dense, light gray to brown medium to fine SAND, some coarse to fine Gravel, trace Silt, moist (SP)						
	S-2	20	22 30 50/4"	> 50			Medium dense, light gray medium to fine SAND, some coarse to fine Gravel, trace Silt, dry (SP)					>>	Split spoon refusal at 3.3 feet BGS. Roller bit down to 4 feet BGS. Water return was light gray. Roller bit refusal at 4 feet BGS.
							Coring Rock at 4 feet BGS See Rock Coring Log						
5													5
10													10
15													15
20													20

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed)
BGS = Below Ground Surface
Groundwater was not encountered within this borehole.

Toughness: Low (L), Medium (M), High (H)
Plasticity: Non-Plastic (NP), Low (L), Medium (M), High (H)
PP = Pocket Penetrometer, measured in tons per square ft.
TV = Torvane (Shear Vane), measured in tons per square ft.

Rock Coring Log

B-05

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.640769 N, -74.907358 E
Project:	Clinton Commons	**Drill Crew:**	Rob Dollar / Lyle Delmeir	**Horiz. Datum:**	NAD83
Location:	Clinton, NJ	**Boring Start:**	5/13/2022 12:00:00 PM	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	5/13/2022 1:45:00 PM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Casing Type:**	Steel Casing	**Core Barrel Type:**	NQ	**Core Bit Type:**	NQ - 01
Rig Type:	Track	**Casing Length:**	5 feet	**Core Barrel Length:**	5 feet	**Core Bit Length:**	3 inches
Drill Method:	Mud Rotary	**Casing I.D.:**	4 inches	**Core Barrel I.D.:**	3 inches	**Core Bit I.D.:**	1.875 inches

Depth (ft)	Avg Core Rate (min/ft)	Run No.	Recovery (in. / %)	RQD (in. / %)	Hardness	Weathering	Graphic Log	Visual Classification	Depth (ft.)	Discontinuities: Type	Dip Angle	Roughness	Weathering	Aperture	Infilling	Drilling & Strata Notes
5	5.78							LIMESTONE, light gray coarse to fine grained, moderately weathered, medium strong, very close to close discontinuity spacing.								Calcite veins throughout the cores. Light gray return.
	3.75															Vertical fracture at 5.2 feet BGS.
	3.83	R-1	55 92%	24 40%	R3	M			6.35	J	44	S,R	DS	T	N	
									6.85	S	35	S,R	DS	T	N	
	3.90								7.33	J	80	S,R	DS	T	N	Vertical fracture at 7.21 feet BGS.
	5.92								8.12	J	43	S,R	DS	T	N	
10	4.72							LIMESTONE, light gray coarse to fine grained, moderately weathered, medium strong, very close to close discontinuity spacing.								Calcite veins throughout the cores. Light gray return. Vertical fracture at 9.29 feet BGS.
	4.37															
	4.43	R-2	43 72%	10 17%	R3	M			11	J	43	S,R	DS	T	N	
									11.4	J	32	S,R	DS	T	N	
	4.08															
	4.23															
15								End of Boring at 14 feet BGS. Backfilled with soil and bentonite holeplug.								
20																

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed) **BGS =** Below Ground Surface

Groundwater was not encountered within this borehole.

Figure B-05.1

B-05; R-1 and R-2 (dry)

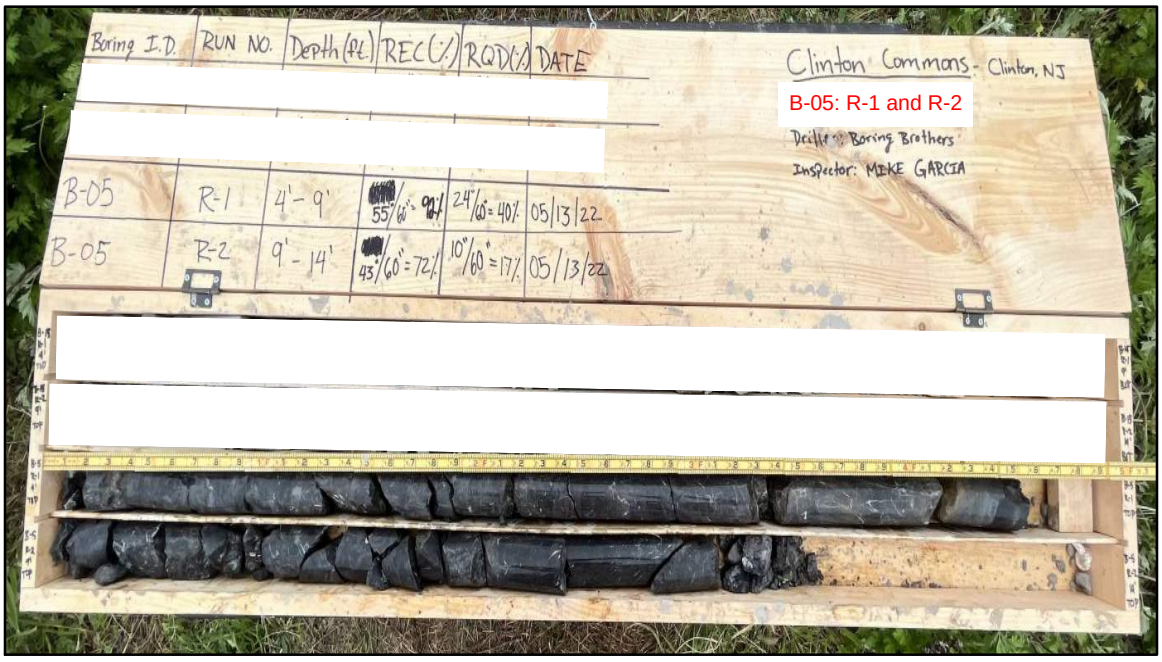


Figure B-05.2

B-05; R-1 and R-2 (wet)

Soil Boring Log

B-06

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.6415 N, -74.905967 E
Project:	Clinton Commons	**Drill Crew:**	Rob Dollar / Lyle Delmeir	**Horiz. Datum:**	NAD83
Location:	Clinton, NJ	**Boring Start:**	5/12/2022 8:30:00 AM	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	5/12/2022 11:05:00 AM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Sampler Type:**	Split Spoon	**Casing Type:**	Steel Casing
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	5 feet
Drill Method:	Mud Rotary	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	4 inches
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	140 pounds
Drilling Fluid:	Water	**Hammer Fall:**	30 inches	**Hammer Fall:**	30 inches

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Graphic Log	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)	N-Value (10 20 30 40)	Drilling & Strata Notes
	S-1	12	2 4 2 2	6	SP		Loose, dark brown medium to fine SAND, trace Silt, dry (SP)						
	S-2	15	2 3 3 4	6	CL		Medium stiff light brown CLAY, some fine Sand, some Silt, dry (CL)						
5	S-3	13	4 4 3 3	7			Medium stiff light brown CLAY, some fine Sand, some Silt, dry (CL)						
	S-4	12	4 6 50/5"	> 50			Stiff light brown CLAY, some Silt, trace fine Sand, moist (CL)					>>	Casing installed to 7 feet BGS.
	S-5	3	50/3"	> 50	GP		Very dense light to dark gray coarse GRAVEL, moist (GP)					>>	Split spoon refusal at 8.25 feet BGS.
10							Coring Rock at 10 feet BGS See Rock Coring Log						Roller bit down to 10 feet BGS. Water return was light gray. Roller bit refusal at 10 feet BGS.
15													
20													

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed)
BGS = Below Ground Surface
Groundwater was not encountered within this borehole.

Toughness: Low (L), Medium (M), High (H)
Plasticity: Non-Plastic (NP), Low (L), Medium (M), High (H)
PP = Pocket Penetrometer, measured in tons per square ft.
TV = Torvane (Shear Vane), measured in tons per square ft.

Rock Coring Log

B-06

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.6415 N, -74.905967 E
Project:	Clinton Commons	**Drill Crew:**	Rob Dollar / Lyle Delmeir	**Horiz. Datum:**	NAD83
Location:	Clinton, NJ	**Boring Start:**	5/12/2022 8:30:00 AM	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	5/12/2022 11:05:00 AM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Casing Type:**	Steel Casing	**Core Barrel Type:**	NQ	**Core Bit Type:**	NQ - 01
Rig Type:	Track	**Casing Length:**	5 feet	**Core Barrel Length:**	5 feet	**Core Bit Length:**	3 inches
Drill Method:	Mud Rotary	**Casing I.D.:**	4 inches	**Core Barrel I.D.:**	3 inches	**Core Bit I.D.:**	1.875 inches

Depth (ft)	Avg Core Rate (min/ft)	Run No.	Recovery (in. / %)	RQD (in. / %)	Hardness	Weathering	Graphic Log	Visual Classification
	3.10							LIMESTONE, light to dark gray, coarse to fine grained, moderately weathered, weak, very close discontinuity spacing.
	3.23							
	4.00	R-1	60 100%	27 45%	R3	M		
	3.73							
	3.92							
15								
	3.00							LIMESTONE, light gray, coarse to medium grained, moderately weathered, medium strong, very close discontinuity spacing.
	3.25							
	2.80	R-2	60 100%	58 97%	R3	M		
	3.67							
	5.92							
20								
	2.88							LIMESTONE, light gray, coarse to medium grained, moderately weathered, medium strong, very close discontinuity spacing.
	4.08							
	5.25	R-3	60 100%	52 87%	R3	M		
	5							
	5.93							
25								
	3.77							LIMESTONE, light gray, coarse to medium grained, moderately weathered, medium strong, very close discontinuity spacing.
	3.67							
	5.87	R-4	60 100%	56 93%	R3	M		
	6.72							
	7							

Depth (ft.)	Discontinuities: Type	Dip Angle	Roughness	Weathering	Aperture	Infilling	Drilling & Strata Notes
							Calcite veins throughout the cores. Light gray return.
							Vertical fracture at 10.7 feet BGS.
11.75	J	68	S,R	DS	T	N	
12	J	64	S,R	DS	T	N	
12.8	S	78	S,R	DS	T	N	
13.4	S	55	S,R	DS	T	N	
14.3	J	60	S,R	DS	T	N	Vertical fracture at 14.25 feet BGS.
15	J	55	S,R	DS	T	N	
							Calcite veins throughout the cores. Light gray return.
15.81	S	71	S,R	DS	T	N	
17.08	J	40	S,R	DS	T	N	Vertical fracture at 17.05 feet BGS.
17.75	J	44	S,R	DS	T	N	
18.25	J	58	S,R	DS	T	N	
18.65	J	60	S,R	DS	T	N	
							Iron stains throughout the cores. Calcite veins throughout the cores. Light gray return.
20.8	S	40	S,R	DS	T	N	Vertical fracture at 20.08 feet BGS.
21.19	J	65	S,R	DS	T	N	
22.65	J	40	S,R	DS	T	N	
23.3	J	45	S,R	DS	T	N	
24.01	J	35	S,R	DS	T	N	Vertical fracture at 24.1 feet BGS.
25	J	33	S,R	DS	T	N	
							Calcite veins throughout the cores. Light gray return.
26.01	J	52	S,R	DS	T	N	
26.22	J	61	S,R	DS	T	N	
28.2	J	33	S,R	DS	T	N	

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed) **BGS =** Below Ground Surface

Groundwater was not encountered within this borehole.

Borehole camera was attempted, but unable to see due to color of water in the borehole.

Rock Coring Log

B-06
(Continued)

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.6415 N, -74.905967 E
Project:	Clinton Commons	**Drill Crew:**	Rob Dollar / Lyle Delmeir	**Horiz. Datum:**	NAD83
Location:	Clinton, NJ	**Boring Start:**	5/12/2022 8:30:00 AM	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	5/12/2022 11:05:00 AM	**Vert. Datum:**	N/A

Depth (ft)	Avg Core Rate (min/ft)	Run No.	Recovery (in. / %)	RQD (in. / %)	Hardness	Weathering	Graphic Log	Visual Classification	Depth (ft.)	Discontinuities: Type	Dip Angle	Roughness	Weathering	Aperture	Infilling	Drilling & Strata Notes
	3.27							LIMESTONE, light gray, coarse to medium grained, moderately weathered, medium strong, very close discontinuity spacing.	30	J	60	P,R	DS	VT	N	Calcite veins throughout the cores. Light gray return.
									30.5	J	40	P,R	DS	VT	N	
	3.42															
	3.52	R-5	60 100%	34 57%	R3	M										
	3.32							31.3' to 34.4' Fractured Rock.								
									33.75	J	60	S,R	DS	T	N	
									34.1	J	50	S,R	DS	T	N	
	3.5								34.45	J	30	S,R	DS	T	N	
35									35	J	40	S,R	DS	T	N	
	3.15							LIMESTONE, light gray, coarse to medium grained, moderately weathered, medium strong, very close discontinuity spacing.	35.5	S	50	S,R	DS	T	N	Calcite veins throughout the cores. Light gray return.
	2.63															
	3.50	R-6	59 98%	49 82%	R3	M			37.75	J	50	S,R	DS	T	N	
	4.17								38.4	J	30	S,R	DS	T	N	
	4.07															
40								End of Boring at 40 feet BGS. Backfilled with soil and bentonite holeplug.								
45																
50																

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed) **BGS =** Below Ground Surface

Groundwater was not encountered within this borehole.

Figure B-06.1
B-06; R-1, R-2, R-3 and R-4 (dry)

Figure B-06.2
B-06; R-1, R-2, R-3 and R-4 (wet)

Figure B-06.3
B-06; R-5 and R-6 (dry)

Figure B-06.4
B-06; R-5 and R-6 (wet)

Soil Boring Log

B-07

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.64176389 N,-74.9069028 E
Project:	Clinton Commons	**Drill Crew:**	M. Daniel / D. Osuch	**Horiz. Datum:**	WGS 84
Location:	Clinton, NJ	**Boring Start:**	9/14/2022 1:00:00 PM	**Elevation:**	Grade
Inspector:	Sidharth Nambiar	**Boring End:**	9/14/2022 3:30:00 PM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Sampler Type:**	Split Spoon	**Casing Type:**	Steel Casing
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	5 feet
Drill Method:	Mud Rotary	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	4 inches
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	140 pounds
Drilling Fluid:	Water	**Hammer Fall:**	30 inches	**Hammer Fall:**	30 inches

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Graphic Log	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)	N-Value (10 20 30 40)	Drilling & Strata Notes
					ML		Brown SILT, trace coarse to fine Sand, dry (ML)						6" Topsoil.
	S-1	10	4 24 38 40	> 50	SP		Gray Gravelly coarse to fine SAND, some Silt, dry (SP)					>>	
	S-2	10	23 16 22 50/5"	> 50			Very dense, gray coarse to fine SAND, some coarse to fine Gravel, some Silt, dry (SP)					>>	
	S-3	0	50/2"	> 50			No recovery.					>>	Casing installed at 4 feet BGS.
5							Coring Rock at 5 feet BGS. See Rock Coring Log.						
10													
15													
20													

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed)
BGS = Below Ground Surface
Groundwater was not encountered within this borehole.

Toughness: Low (L), Medium (M), High (H)
Plasticity: Non-Plastic (NP), Low (L), Medium (M), High (H)
PP = Pocket Penetrometer, measured in tons per square ft.
TV = Torvane (Shear Vane), measured in tons per square ft.

Rock Coring Log

B-07

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.64176389 N,-74.9069028 E
Project:	Clinton Commons	**Drill Crew:**	M. Daniel / D. Osuch	**Horiz. Datum:**	WGS 84
Location:	Clinton, NJ	**Boring Start:**	9/14/2022 1:00:00 PM	**Elevation:**	Grade
Inspector:	Sidharth Nambiar	**Boring End:**	9/14/2022 3:30:00 PM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Casing Type:**	Steel Casing	**Core Barrel Type:**	NQ	**Core Bit Type:**	NQ - 01
Rig Type:	Track	**Casing Length:**	5 feet	**Core Barrel Length:**	5 feet	**Core Bit Length:**	3 inches
Drill Method:	Mud Rotary	**Casing I.D.:**	4 inches	**Core Barrel I.D.:**	3 inches	**Core Bit I.D.:**	1.875 inches

Depth (ft)	Avg Core Rate (min/ft)	Run No.	Recovery (in. / %)	RQD (in. / %)	Hardness	Weathering	Graphic Log	Visual Classification	Depth (ft.)	Discontinuities: Type	Dip Angle	Roughness	Weathering	Aperture	Infilling	Drilling & Strata Notes
	2.48							LIMESTONE, light gray fine grained, slightly weathered, very close to close discontinuity spacing.								Casing installed at 5 feet BGS.
	2.63															
	4.2	R-1	24 40%	0 0%	R3	SL										
	4.13							5' to 10' Fractured Zone.								
	4.97															
10	3.93							LIMESTONE, light gray fine grained, slightly weathered, very close to close discontinuity spacing.								
	5.18															
	6.87	R-2	8 13%	0 0%				10' to 15' Fractured Zone.								
	5.7															
	6.03															
15								End of Boring at 15 feet BGS. Backfilled with soil and bentonite holeplug.								
20																

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed) **BGS =** Below Ground Surface

Groundwater was not encountered within this borehole.

Figure B-07.1
B-07; R-1 and R-2 (dry)

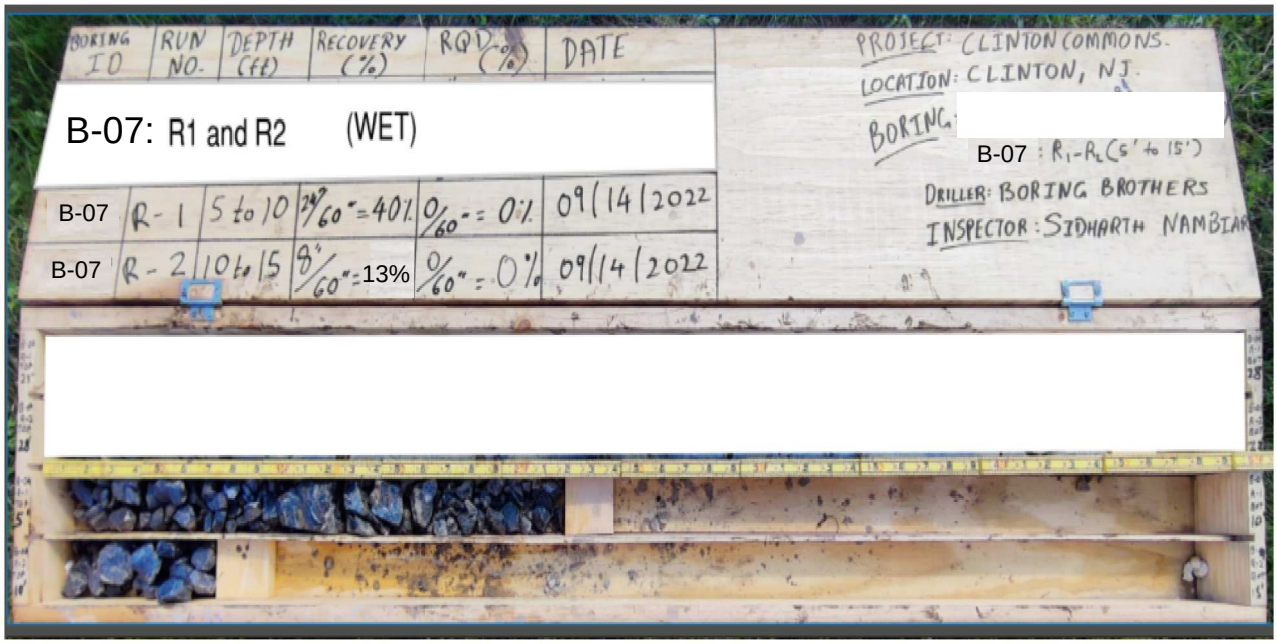


Figure B-07.2
B-07; R-1 and R-2 (wet)

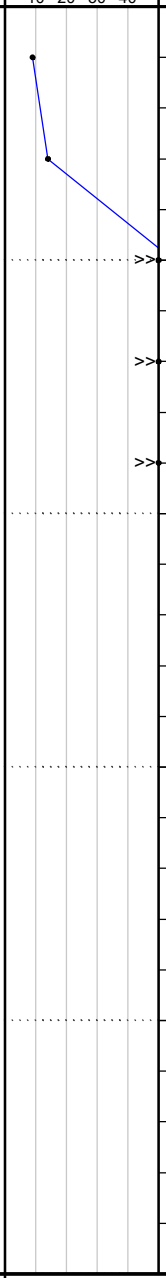
Soil Boring Log

B-08

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.642431 N, -74.905622 E
Project:	Clinton Commons	**Drill Crew:**	Rob Dollar / Lyle Delmeir	**Horiz. Datum:**	NAD83
Location:	Clinton, NJ	**Boring Start:**	5/11/2022 8:30:00 AM	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	5/11/2022 11:00:00 AM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Sampler Type:**	Split Spoon	**Casing Type:**	Steel Casing
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	5 feet
Drill Method:	Mud Rotary	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	4 inches
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	140 pounds
Drilling Fluid:	Water	**Hammer Fall:**	30 inches	**Hammer Fall:**	30 inches

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Graphic Log	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)
	S-1	16	4 4 5 2	9	SP		Loose, light to darkish brown coarse to medium SAND, trace Silt, dry (SP)				
	S-2	18	5 6 8 5	14			Medium dense, light brown coarse to medium SAND, trace Silt, dry (SP)				
5	S-3	16	10 15 52 38	> 50	GP		Very dense, light gray coarse to fine GRAVEL, some medium to fine Sand, trace Silt, dry (GP)				
	S-4	15	20 31 54 58	> 50			Very dense, light gray coarse to fine GRAVEL, some medium to fine Sand, trace Silt, dry (GP)				
	S-5	2.5	50/5"	> 50			Very dense, light gray coarse to fine GRAVEL, some medium to fine Sand, trace Silt, wet (GP)				
10							Coring Rock at 10 feet BGS See Rock Coring Log				
15											
20											



Drilling & Strata Notes

Casing installed to 7 feet BGS.

Split spoon refusal at 8 feet BGS. Gravel at the tip of the split-spoon

Roller bit refusal at 10 feet BGS.

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed)
BGS = Below Ground Surface
Groundwater was not encountered within this borehole.

Toughness: Low (L), Medium (M), High (H)
Plasticity: Non-Plastic (NP), Low (L), Medium (M), High (H)
PP = Pocket Penetrometer, measured in tons per square ft.
TV = Torvane (Shear Vane), measured in tons per square ft.

Rock Coring Log

B-08

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.642431 N, -74.905622 E
Project:	Clinton Commons	**Drill Crew:**	Rob Dollar / Lyle Delmeir	**Horiz. Datum:**	NAD83
Location:	Clinton, NJ	**Boring Start:**	5/11/2022 8:30:00 AM	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	5/11/2022 11:00:00 AM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Casing Type:**	Steel Casing	**Core Barrel Type:**	NQ	**Core Bit Type:**	NQ - 01
Rig Type:	Track	**Casing Length:**	5 feet	**Core Barrel Length:**	5 feet	**Core Bit Length:**	3 inches
Drill Method:	Mud Rotary	**Casing I.D.:**	4 inches	**Core Barrel I.D.:**	3 inches	**Core Bit I.D.:**	1.875 inches

Depth (ft)	Avg Core Rate (min/ft)	Run No.	Recovery (in. / %)	RQD (in. / %)	Hardness	Weathering	Graphic Log	Visual Classification	Depth (ft.)	Discontinuities: Type	Dip Angle	Roughness	Weathering	Aperture	Infilling	Drilling & Strata Notes
	1.5							LIMESTONE, light to dark gray medium to fine grained, moderately weathered, medium strong, very close to close discontinuity spacing.								Calcite veins throughout the cores. Water at 10 feet BGS and returned back at 18 feet BGS. Light gray return.
	2.63															
	3.67	R-1	60 100%	4.5 7.5%	R3	M										
	3.72							10' to 14.3' Fractured Rock.								
	11.5								14.17	J	20	S,R	DS	T	N	
15																
	1.42							LIMESTONE, light to dark gray medium to fine grained, moderately weathered, medium strong, very close to close discontinuity spacing.	15.65	J	10	P,R	DS	T	N	Calcite veins throughout the cores. Gray water return.
	3.45								16.25	J	25	S,R	DS	T	N	
	3.03	R-2	58 97%	21 35%	R3	M			17.35	J	44	S,R	DS	T	N	
	3.58							18' to 20' Fractured Rock.								
	7.58															
20								End of Boring at 20 feet BGS. Backfilled with soil and bentonite holeplug.								
25																

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed) **BGS =** Below Ground Surface

Groundwater was not encountered within this borehole.

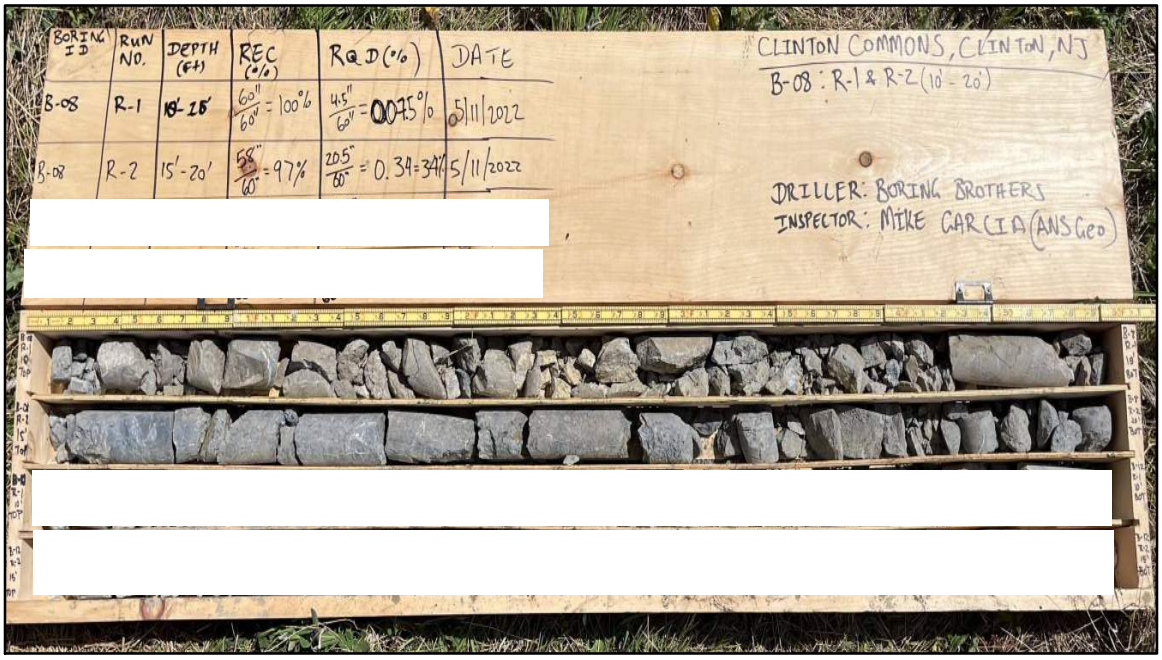


Figure B-08.1
B-08; R-1 and R-2 (dry)

Figure B-08.2
B-08; R-1 and R-2 (wet)

Soil Boring Log

B-09

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.641261 N,-74.9068861 E
Project:	Clinton Commons	**Drill Crew:**	R. Dollar / L. Delmeir	**Horiz. Datum:**	WGS 84
Location:	Clinton, NJ	**Boring Start:**	9/20/2022 12:45:00 PM	**Elevation:**	Grade
Inspector:	Sidharth Nambiar	**Boring End:**	9/20/2022 2:10:00 PM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Sampler Type:**	Split Spoon	**Casing Type:**	Steel Casing
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	5 feet
Drill Method:	Mud Rotary	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	4 inches
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	140 pounds
Drilling Fluid:	Water	**Hammer Fall:**	30 inches	**Hammer Fall:**	30 inches

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Graphic Log	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)	N-Value (10 20 30 40)	Drilling & Strata Notes
	S-1		7 35 45 50/3"	> 50	SM		Very dense, light brown to brown coarse to fine SAND, some Silt, little coarse to fine Gravel, dry, (SM)					>>	
	S-2		50/0"	> 50			No recovery.					>>	Casing installed at 2 feet BGS.
							Coring Rock at 3 feet BGS. See Rock Coring Log.						
5												5	
10												10	
15												15	
20												20	

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed)
BGS = Below Ground Surface
Groundwater was not encountered within this borehole.

Toughness: Low (L), Medium (M), High (H)
Plasticity: Non-Plastic (NP), Low (L), Medium (M), High (H)
PP = Pocket Penetrometer, measured in tons per square ft.
TV = Torvane (Shear Vane), measured in tons per square ft.

Rock Coring Log

B-09

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.641261 N,-74.9068861 E
Project:	Clinton Commons	**Drill Crew:**	R. Dollar / L. Delmeir	**Horiz. Datum:**	WGS 84
Location:	Clinton, NJ	**Boring Start:**	9/20/2022 12:45:00 PM	**Elevation:**	Grade
Inspector:	Sidharth Nambiar	**Boring End:**	9/20/2022 2:10:00 PM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Casing Type:**	Steel Casing	**Core Barrel Type:**	NQ	**Core Bit Type:**	NQ - 01
Rig Type:	Track	**Casing Length:**	5 feet	**Core Barrel Length:**	5 feet	**Core Bit Length:**	3 inches
Drill Method:	Mud Rotary	**Casing I.D.:**	4 inches	**Core Barrel I.D.:**	3 inches	**Core Bit I.D.:**	1.875 inches

Depth (ft)	Avg Core Rate (min/ft)	Run No.	Recovery (in. / %)	RQD (in. / %)	Hardness	Weathering	Graphic Log	Visual Classification	Depth (ft.)	Discontinuities: Type	Dip Angle	Roughness	Weathering	Aperture	Infilling	Drilling & Strata Notes
5	3.1	R-1	35 58%	12 20%	R3	SL		LIMESTONE, light gray fine grained, slightly weathered, very close discontinuity spacing.	3.7	J	40	P,R	FR	VT	N	
	1.68								4.5	J	55	P,R	FR	VT	N	
	1.383															
	2.25							5.1' to 5.9' Fractured Zone.								
	4.97															
10	5.07	R-2	48 80%	6 10%	R3	SL		LIMESTONE, light gray fine grained, slightly weathered, very close to close discontinuity spacing.	8.6	J	30	P,R	DS	VT	N	
	2.17															
	3.07							8.6' to 13' Fractured Zone.								
	3.75															
	4.35															
15								End of Boring at 13 feet BGS. Backfilled with soil and bentonite holeplug.								
20																

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed) **BGS =** Below Ground Surface

Groundwater was not encountered within this borehole.

Figure B-09.1
B-09; R-1 and R-2 (dry)

Figure B-09.2
B-09; R-1 and R-2 (wet)

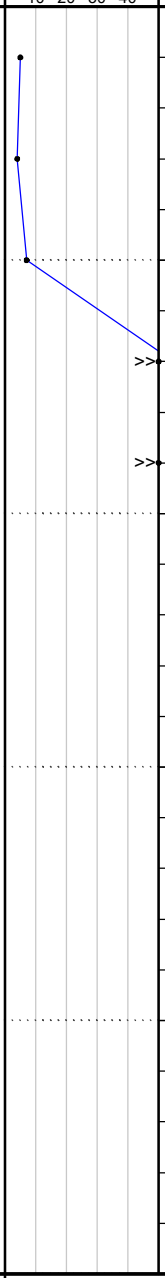
Soil Boring Log

B-10

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.641403 N, -74.906431 E
Project:	Clinton Commons	**Drill Crew:**	Rob Dollar / Lyle Delmeir	**Horiz. Datum:**	NAD83
Location:	Clinton, NJ	**Boring Start:**	5/11/2022 1:00:00 PM	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	5/11/2022 2:30:00 PM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Sampler Type:**	Split Spoon	**Casing Type:**	Steel Casing
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	5 feet
Drill Method:	Mud Rotary	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	4 inches
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	140 pounds
Drilling Fluid:	Water	**Hammer Fall:**	30 inches	**Hammer Fall:**	30 inches

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)	Drilling & Strata Notes
	S-1	19	2 4 1 2	5	SC	Loose, light brown SAND, some Clay, trace Silt, moist (SC)					
	S-2	16	2 1 3 2	4	CL	Soft, light brown CLAY, some medium to fine Sand, trace Silt, moist (CL)					
5	S-3	10	4 4 3 1	7	SP	Loose, light gray to brown, [grain size] SAND, some [grain size] Gravel, trace Clay, trace Silt, moist (SP)					
	S-4	5	50/4"	> 50	GP	Very dense light gray coarse to fine GRAVEL, trace medium to fine Sand, trace Silt, trace Clay, moist (GP)					Casing installed to 7 feet BGS.
	S-5	3	50/1"	> 50	GP	Very dense light gray coarse to fine GRAVEL, trace Silt, wet (GP)					Roller bit down to 8 feet BGS. Rig chatter from 8 to 9 feet BGS.
10						Coring Rock at 10 feet BGS See Rock Coring Log					Roller bit down to 10 feet BGS. Split spoon refusal at 10 feet BGS. Light gray water return. Roller bit refusal at 10 feet BGS.
15											
20											



In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed)
BGS = Below Ground Surface
Groundwater was not encountered within this borehole.

Toughness: Low (L), Medium (M), High (H)
Plasticity: Non-Plastic (NP), Low (L), Medium (M), High (H)
PP = Pocket Penetrometer, measured in tons per square ft.
TV = Torvane (Shear Vane), measured in tons per square ft.

Rock Coring Log

B-10

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.641403 N, -74.906431 E
Project:	Clinton Commons	**Drill Crew:**	Rob Dollar / Lyle Delmeir	**Horiz. Datum:**	NAD83
Location:	Clinton, NJ	**Boring Start:**	5/11/2022 1:00:00 PM	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	5/11/2022 2:30:00 PM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Casing Type:**	Steel Casing	**Core Barrel Type:**	NQ	**Core Bit Type:**	NQ - 01
Rig Type:	Track	**Casing Length:**	5 feet	**Core Barrel Length:**	5 feet	**Core Bit Length:**	3 inches
Drill Method:	Mud Rotary	**Casing I.D.:**	4 inches	**Core Barrel I.D.:**	3 inches	**Core Bit I.D.:**	1.875 inches

Depth (ft)	Avg Core Rate (min/ft)	Run No.	Recovery (in. / %)	RQD (in. / %)	Hardness	Weathering	Graphic Log	Visual Classification	Depth (ft.)	Discontinuities: Type	Dip Angle	Roughness	Weathering	Aperture	Infilling	Drilling & Strata Notes
	3.07							LIMESTONE, light gray, coarse to fine grained, moderately weathered, medium strong, very close to close discontinuity spacing.	10.55	S	47	S,R	DS	T	N	Calcite veins throughout the cores. Return was light gray.
	3.50								11.1	S	40	S,R	DS	T	N	
	3.77	R-1	42 70%	16 27%	R3	M		11.8' Fractured Rock.								
	4.85															
	5.17															
15									15	S	35	S,R	DS	T	N	
	3.40							LIMESTONE, light gray, coarse to fine grained, moderately weathered, medium strong, very close to close discontinuity spacing.								Calcite veins throughout the cores. Return was light gray.
	3.48								16.5	J	40	S,R	DS	T	N	
	3.58	R-2	58 97%	42 70%	R3	M			17.5	S	74	S,R	DS	T	N	Vertical fracture at 17.1 feet BGS.
	5.36								18.25	S	34	S,R	DS	T	N	
	5.73															
20								End of Boring at 20 feet BGS. Backfilled with soil and bentonite holeplug.								
25																

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed) **BGS =** Below Ground Surface

Groundwater was not encountered within this borehole.

Figure B-10.1

B-10; R-1 and R-2 (dry)

Figure B-10.2

B-10; R-1 and R-2 (wet)

Soil Boring Log

B-12

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.641903 N, -74.905997 E
Project:	Clinton Commons	**Drill Crew:**	Rob Dollar / Lyle Delmeir	**Horiz. Datum:**	NAD83
Location:	Clinton, NJ	**Boring Start:**	5/12/2022 11:15:00 AM	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	5/12/2022 2:30:00 PM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Sampler Type:**	Split Spoon	**Casing Type:**	Steel Casing
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	5 feet
Drill Method:	Mud Rotary	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	4 inches
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	140 pounds
Drilling Fluid:	Water	**Hammer Fall:**	30 inches	**Hammer Fall:**	30 inches

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Graphic Log	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)	Drilling & Strata Notes
	S-1	16	8 9 7 10	16			Medium dense, light gray to brown coarse to fine GRAVEL, some fine Sand, trace Silt, dry (GP)					
	S-2	19	11 10 12 18	22			Medium dense, light gray to brown coarse to fine GRAVEL, some fine Sand, trace Silt, dry (GP)					
5	S-3	20	11 14 21 34	35	GP		Dense, light gray to brown coarse to fine GRAVEL, some fine Sand, trace Silt, dry (GP)					
	S-4	11	50/5"	> 50			Very dense, light gray coarse to fine GRAVEL, some fine Sand, trace Silt, dry (GP)					Casing installed to 7 feet BGS.
	S-5	0	50/0"	> 50			Split Spoon refusal at 8 feet BGS.					SPT refusal at 8 feet BGS. Light gray water return.
10							Coring Rock at 10 feet BGS See Rock Coring Log					Roller bit refusal at 10 feet BGS.
15												
20												

N-Value: 10 20 30 40

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed)
BGS = Below Ground Surface
Groundwater was not encountered within this borehole.

Toughness: Low (L), Medium (M), High (H)
Plasticity: Non-Plastic (NP), Low (L), Medium (M), High (H)
PP = Pocket Penetrometer, measured in tons per square ft.
TV = Torvane (Shear Vane), measured in tons per square ft.

Rock Coring Log

B-12

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.641903 N, -74.905997 E
Project:	Clinton Commons	**Drill Crew:**	Rob Dollar / Lyle Delmeir	**Horiz. Datum:**	NAD83
Location:	Clinton, NJ	**Boring Start:**	5/12/2022 11:15:00 AM	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	5/12/2022 2:30:00 PM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Casing Type:**	Steel Casing	**Core Barrel Type:**	NQ	**Core Bit Type:**	NQ - 01
Rig Type:	Track	**Casing Length:**	5 feet	**Core Barrel Length:**	5 feet	**Core Bit Length:**	3 inches
Drill Method:	Mud Rotary	**Casing I.D.:**	4 inches	**Core Barrel I.D.:**	3 inches	**Core Bit I.D.:**	1.875 inches

Depth (ft)	Avg Core Rate (min/ft)	Run No.	Recovery (in. / %)	RQD (in. / %)	Hardness	Weathering	Graphic Log	Visual Classification	Depth (ft.)	Discontinuities: Type	Dip Angle	Roughness	Weathering	Aperture	Infilling	Drilling & Strata Notes
	6.17							LIMESTONE, light gray, coarse to fine grained, moderately weathered, medium strong, very close to close discontinuity spacing.	10.8	J	41	S,R	DS	T	N	
	10.50															Calcite veins throughout the cores. Vertical fracture at 11.5 feet BGS. Light gray return.
	5.83	R-1	43 72%	17 28%	R3	M			12.2	J	35	S,R	DS	T	N	
	9.50							10' to 12.3' Fractured Rock.	13	J	44	S,R	DS	T	N	
	9.00															
15	5.43							LIMESTONE, light gray, coarse to fine grained, moderately weathered, medium strong, very close to close discontinuity spacing.								Calcite veins throughout the cores. Light gray return.
	11.15															
	6.28	R-2	40 67%	5 8%	R3	M		Fractured Rock.	17.7	J	10	S,R	DS	T	N	
	7.77															
	6.33															
20								End of Boring at 20 feet BGS. Backfilled with soil and bentonite holeplug.								
25																

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed) **BGS =** Below Ground Surface

Groundwater was not encountered within this borehole.

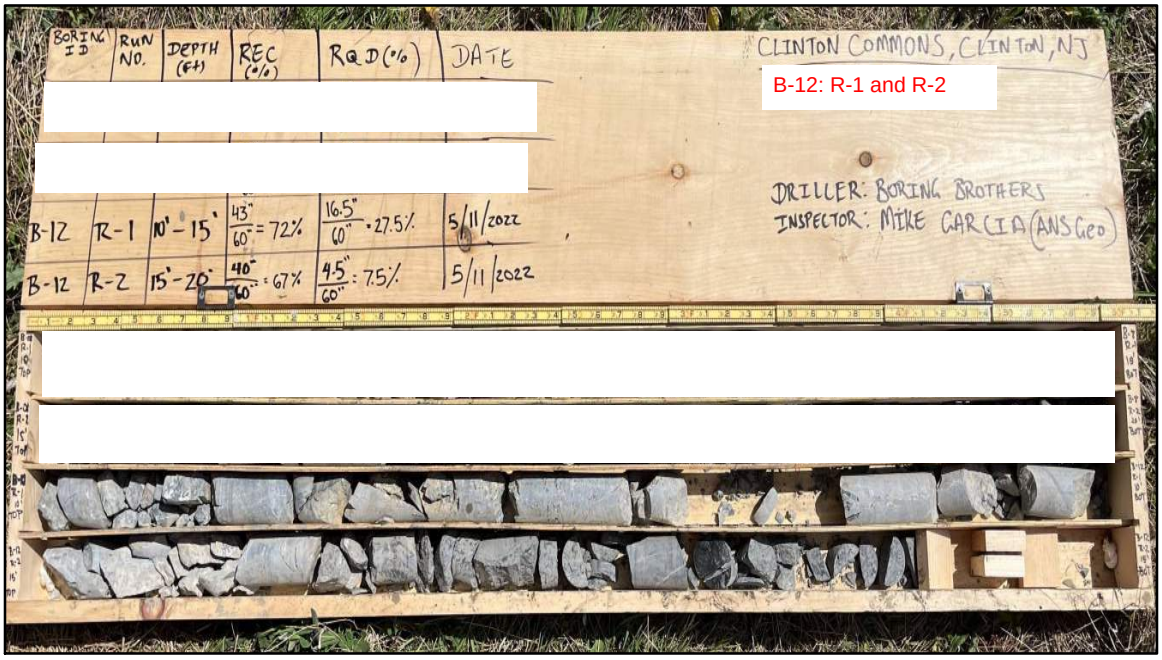


Figure B-12.1

B-12; R-1 and R-2 (dry)

Figure B-12.2

B-12; R-1 and R-2 (wet)

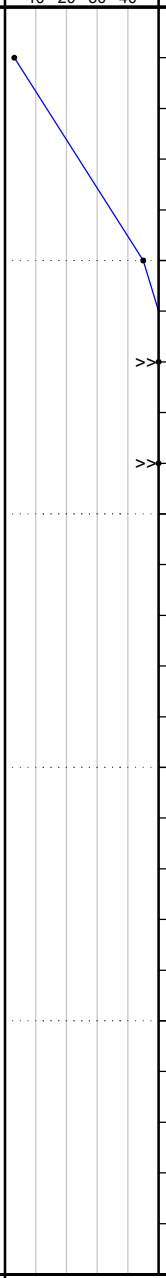
Soil Boring Log

B-13

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.64118056 N,-74.9077639 E
Project:	Clinton Commons	**Drill Crew:**	R. Dollar / L. Delmeir	**Horiz. Datum:**	WGS 84
Location:	Clinton, NJ	**Boring Start:**	9/20/2022 9:00:00 AM	**Elevation:**	Grade
Inspector:	Sidharth Nambiar	**Boring End:**	9/20/2022 12:30:00 PM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Sampler Type:**	Split Spoon	**Casing Type:**	Steel Casing
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	5 feet
Drill Method:	Mud Rotary	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	4 inches
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	140 pounds
Drilling Fluid:	Water	**Hammer Fall:**	30 inches	**Hammer Fall:**	30 inches

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)	Drilling & Strata Notes
	S-1	10	2 2 1 1	3	ML	Soft, dark brown to light gray SILT, little coarse to fine Sand, little Clay, trace coarse to fine Gravel, dry (ML)	L	L	1.5	1.0	
	S-2	12	0 0 1 11			Very soft, dark brown SILT, some coarse to fine Sand, little Clay, trace coarse to fine Gravel, dry (ML)	L	M	1.5	1.5	Weight of hammer penetrated first 12 inches. Very soft Soil.
5	S-3	9	42 25 20 8	45	GM	Dense, light gray to dark brown Silty coarse to fine GRAVEL, some coarse to fine Sand, dry (GM)					
	S-4	12	14 46 50 50/3"	> 50	GP	Very dense, light gray Sandy coarse to fine GRAVEL, little Silt, dry (GP)					Drilled down to 8 feet BGS.
	S-5	0	50/0"	> 50		No recovery.					Casing installed at 8 feet BGS. Water loss encountered at 8 feet BGS.
10						Coring Rock at 10 feet BGS. See Rock Coring Log.					
15											
20											



In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed)
BGS = Below Ground Surface
Groundwater was not encountered within this borehole.

Toughness: Low (L), Medium (M), High (H)
Plasticity: Non-Plastic (NP), Low (L), Medium (M), High (H)
PP = Pocket Penetrometer, measured in tons per square ft.
TV = Torvane (Shear Vane), measured in tons per square ft.

Rock Coring Log

B-13

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.64118056 N,-74.9077639 E
Project:	Clinton Commons	**Drill Crew:**	R. Dollar / L. Delmeir	**Horiz. Datum:**	WGS 84
Location:	Clinton, NJ	**Boring Start:**	9/20/2022 9:00:00 AM	**Elevation:**	Grade
Inspector:	Sidharth Nambiar	**Boring End:**	9/20/2022 12:30:00 PM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Casing Type:**	Steel Casing	**Core Barrel Type:**	NQ	**Core Bit Type:**	NQ - 01
Rig Type:	Track	**Casing Length:**	5 feet	**Core Barrel Length:**	5 feet	**Core Bit Length:**	3 inches
Drill Method:	Mud Rotary	**Casing I.D.:**	4 inches	**Core Barrel I.D.:**	3 inches	**Core Bit I.D.:**	1.875 inches

Depth (ft)	Avg Core Rate (min/ft)	Run No.	Recovery (in. / %)	RQD (in. / %)	Hardness	Weathering	Graphic Log	Visual Classification
	1.93							LIMESTONE, light gray fine grained, slightly weathered, very close discontinuity spacing.
	1.6							
	4.95	R-1	28 47%	5 8%	R4	SL		
	7.12							10' to 15' Fractured Zone.
	2.37							
15	2.07							LIMESTONE, light gray fine grained, moderately weathered, very close discontinuity spacing.
	2.23							
	1.95	R-2	57 95%	43 72%		M		
	1.87							
	1.38							
20								End of Boring at 20 feet BGS. Backfilled with soil and bentonite holeplug.
25								

Depth (ft.)	Discontinuities: Type	Dip Angle	Roughness	Weathering	Aperture	Infilling	Drilling & Strata Notes
10.8	J	50	P,R	FR	VT	N	Water loss encountered.
16.2	J	30	P,R	FR	VT	N	
17.6	J	40	P,R	DS	VT	N	
19	J	30	P,R	DS	T	N	
19.8	J	30	P,R	DS	T	N	

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed) **BGS =** Below Ground Surface

Groundwater was not encountered within this borehole.

Figure B-13.1
B-13; R-1 and R-2 (dry)

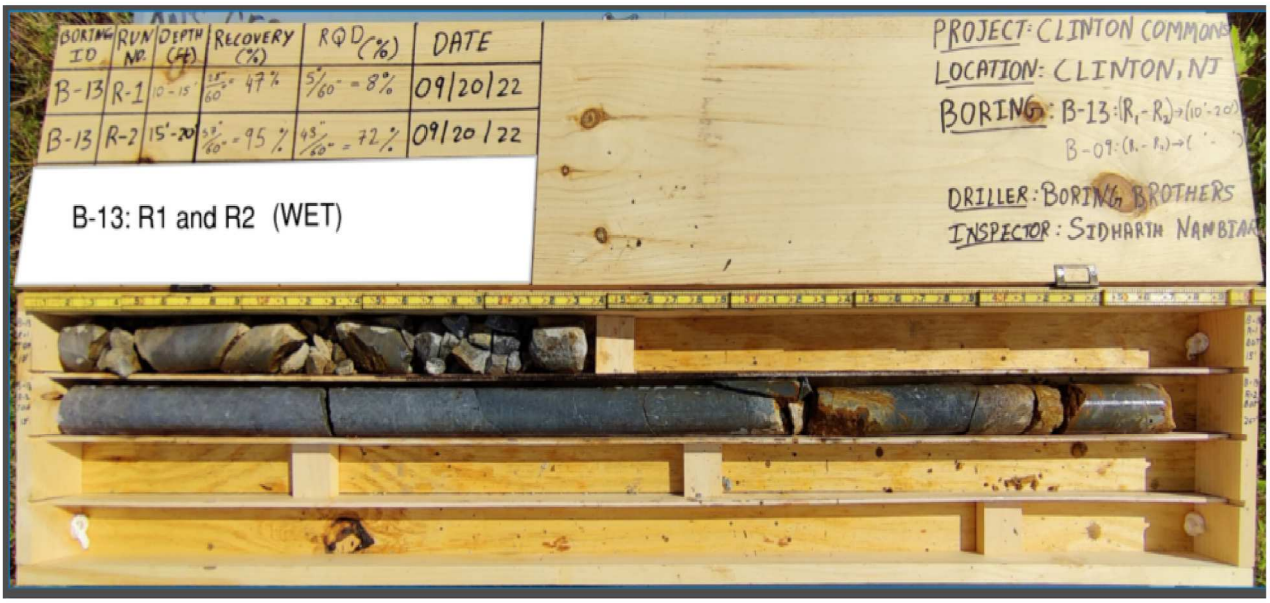


Figure B-13.2
B-13; R-1 and R-2 (wet)

Soil Boring Log

B-15

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.640653 N, -74.906947 E
Project:	Clinton Commons	**Drill Crew:**	Rob Dollar / Lyle Delmeir	**Horiz. Datum:**	NAD83
Location:	Clinton, NJ	**Boring Start:**	5/13/2022 8:15:00 AM	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	5/13/2022 11:45:00 AM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Sampler Type:**	Split Spoon	**Casing Type:**	Steel Casing
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	5 feet
Drill Method:	Mud Rotary	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	4 inches
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	140 pounds
Drilling Fluid:	Water	**Hammer Fall:**	30 inches	**Hammer Fall:**	30 inches

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Graphic Log	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)	N-Value (10 20 30 40)	Drilling & Strata Notes
	S-1	16	6 7 8 4	15	SP		Medium dense, light brown coarse to fine SAND, some coarse to fine Gravel, trace Silt, dry (SP)						
	S-2	15	11 20 50/3"	> 50			Dense, light gray to brown medium to fine SAND, some coarse to fine Gravel, trace Silt, dry (SP)					>>	Split spoon refusal at 3.25 feet BGS. Light gray water return. Roller bit refusal at 4 feet BGS.
							Coring Rock at 4 feet BGS See Rock Coring Log						
5												5	
10												10	
15												15	
20												20	

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed)
BGS = Below Ground Surface
Groundwater was not encountered within this borehole.

Toughness: Low (L), Medium (M), High (H)
Plasticity: Non-Plastic (NP), Low (L), Medium (M), High (H)
PP = Pocket Penetrometer, measured in tons per square ft.
TV = Torvane (Shear Vane), measured in tons per square ft.

Rock Coring Log

B-15

Client:	Concept Engineering Consultants, PA	**Drilling Firm:**	Boring Brothers, Inc	**Coordinates:**	40.640653 N, -74.906947 E
Project:	Clinton Commons	**Drill Crew:**	Rob Dollar / Lyle Delmeir	**Horiz. Datum:**	NAD83
Location:	Clinton, NJ	**Boring Start:**	5/13/2022 8:15:00 AM	**Elevation:**	Grade
Inspector:	Michael Garcia	**Boring End:**	5/13/2022 11:45:00 AM	**Vert. Datum:**	N/A

Rig Model:	CME-55LC	**Casing Type:**	Steel Casing	**Core Barrel Type:**	NQ	**Core Bit Type:**	NQ - 01
Rig Type:	Track	**Casing Length:**	5 feet	**Core Barrel Length:**	5 feet	**Core Bit Length:**	3 inches
Drill Method:	Mud Rotary	**Casing I.D.:**	4 inches	**Core Barrel I.D.:**	3 inches	**Core Bit I.D.:**	1.875 inches

Depth (ft)	Avg Core Rate (min/ft)	Run No.	Recovery (in. / %)	RQD (in. / %)	Hardness	Weathering	Graphic Log	Visual Classification	Depth (ft.)	Discontinuities: Type	Dip Angle	Roughness	Weathering	Aperture	Infilling	Drilling & Strata Notes
5	5.25							LIMESTONE, light gray coarse to fine grained, moderately weathered, medium strong, very close discontinuity spacing.	4.51	J	85	S,R	DS	T	N	
	4.08								5.7	J	30	S,R	DS	T	N	
	5.33	R-1	43 72%	19 32%	R3	M			6.1	J	60	S,R	DS	T	N	Calcite veins throughout the cores. Light gray return. Vertical fracture at 6.1 feet BGS.
	5.25															
	4.90															
10	4.72							LIMESTONE, light gray coarse to fine grained, moderately weathered, medium strong, very close discontinuity spacing.								
	5.03								10.25	J	64	P,R	DS	T	N	
	4.85	R-2	44 73%	5 8%	R3	M		9' to 11.4' Fractured Rock.								Calcite veins throughout the cores. Light gray return. Vertical fracture at 11.7 feet BGS.
	5.70															
	5.52															
15								End of Boring at 14 feet BGS. Backfilled with soil and bentonite holeplug.								
20																

In-Borehole Water Levels

Date / Time	Casing Tip (ft)	Bot. of Hole (ft)	Water Lvl (ft)

General Notes

▼ = Water Level (if observed) **BGS =** Below Ground Surface

Groundwater was not encountered within this borehole.

Figure B-15.1
B-15; R-1 and R-2 (dry)

Figure B-15.2
B-15; R-1 and R-2 (wet)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