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Flat Creek Substation Geotechnical Engineering Report

TRC Project No. 435979.0000

Date: June 26, 2024

Revised July 15, 2024

Prepared For:

SunEast Development LLC / Cordelio Services LLC

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Mr. Eric Trammel
Lead Project Manager, Pre-Construction
Cordelio Services LLC
55 Fifth Avenue, Suite 1805
New York, NY 10003
Submitted via e-mail:
etrammel@cordeliopower.com

Re: Supplemental Geotechnical Engineering Report
Proposed Flat Creek Solar Project - Collection Substation and POI Switchyard
Montgomery County, NY
TRC Project #: 435979.1GEO

Dear Mr. Trammel:

TRC Engineers, Inc. (TRC) is pleased to present Cordelio Servies LLC (Cordelio) our Geotechnical Engineering Report for the above referenced project. Our work was initiated in accordance with the signed Change Order #4 of Work Order #22 and completed in general accordance with the agreed scope of work presented in TRC's proposal, submitted April 12, 2024. A summary of our geotechnical exploration activities, including the laboratory test results, findings and recommendations related to the proposed Flat Creek Solar Project is summarized below.

1.0 INTRODUCTION

This report presents the results of our supplemental geotechnical exploration for the proposed photovoltaic (PV) collection substation and Point of Interconnection (POI) switchyard to be constructed at the Flat Creek Solar Project site located in Montgomery County, New York (Facility Site). TRC completed a subsurface exploration for the Facility in June of 2022 (report dated September 8, 2022) and a supplemental subsurface exploration in June of 2023 (report dated April 2, 2024). The proposed collection substation for the Facility has been relocated since our previous explorations and will be constructed adjacent to the existing New York Power Authority (NYPA) overhead transmission right-of-way (ROW) for the 345 kV Transmission Line #352.

The purpose of our exploration was to evaluate the geologic and subsurface conditions within the new collection substation and POI switchyard footprints to reduce uncertainty with respect to anticipated foundation and site construction, and to provide geotechnical recommendations for design of the proposed Facility by others.

1.1 Project Description

The collection substation and POI switchyard are located on the north side of the Facility Site and along the south side of the adjacent, existing NYPA overhead transmission ROW. Concept plans showing specific details of the substation development were provided to TRC by Reynolds Architecture Engineering (Drawing No. FLCK-760, issued for permit dated 3/7/2024) and included new transformers, switches, busses and dead-end structures, as well as ancillary equipment typical of such projects across an approximate 271 ft x 290 ft (78,590 square feet) fenced area for the collection substation and an approximate 323 ft x 482 ft (155,686 square feet) fenced area for the POI switchyard located immediately adjacent. No new retaining walls or stormwater management areas were identified to TRC at the time of this report.

The parcels evaluated as part of this investigation are primarily open agricultural land, which was generally clear of crops at the time of the field exploration along with scattered wooded areas and hedgerows to the north and west. No existing structures are currently located on or adjacent to the proposed facilities. The site is bounded by Rappa Road to the east, the NYPA overhead transmission ROW to the north and a combination of partially wooded areas and open agricultural fields to the south and west. The anticipated loading conditions have not been provided to TRC.

1.2 Scope of Services

Based on our geotechnical scope of services as presented in TRC's revised Proposal for Geotechnical Engineering Services dated June 7, 2023, the following services were completed:

- Exploration of subsurface conditions by drilling a total of eleven (11) borings on-site within the proposed collection substation, POI switchyard and point-of-interconnect areas as shown on Figure 1, *Approximate Test Boring Location Plan*.
- Evaluation of the physical and geotechnical engineering properties of the subsurface soils within the boring locations based on describing the soils by visual-manual examination by a member of our geotechnical staff.
- Engineering analysis for the proposed foundation systems for the support of the collection substation structures and associated development.
- Preparation of this report to summarize our findings, conclusions, and recommendations regarding the following:
    - Foundation support recommendations for the proposed collection substation components including assumed control building, cable trench, transformers, transmission dead end structures and supports.
    - Bearing capacity parameters for use in foundation design by others.
    - Anticipated excavation conditions and presence of potential rock or other refusal conditions, if applicable.
    - Suitability of on-site soils for reuse in back fills and requirements for imported fills.
    - Recommendations for placement, compaction and testing of fills, if applicable
    - Soil parameters (both above and below ground water table) for active, at rest and passive conditions and L-Pile soil parameters for use in foundation design by others.
    - Observed ground water conditions including perched conditions and general guidance related to the control of groundwater during construction, as applicable.
    - Frost penetration depth based on local/regional data.
    - Corrosivity potential on buried steel and concrete.
    - Preliminary Seismic Site Class parameters in accordance with ASCE 7-22
    - Other construction-related concerns, as applicable based on available site subsurface information and any available preliminary design information.

2.0 SITE CONDITIONS

2.1 Site Reconnaissance and Boring Stakeout

A limited site reconnaissance was conducted on May 13 and 14, 2024. At the time of the visit, the majority of the of the proposed development area (parcel) consisted of open fields with vegetation at the time of the site visit and several tree-lined areas. Several farmers trails were also observed throughout the Site. The southern parcel of land was planted with hay at the time of TRC's field exploration. During the field visit, TRC did not observe any structures, stockpiles or any other man-made obstructions that are likely to interfere with the proposed collection substation construction.

During the site visit, TRC also staked out the test boring locations in the field at the proposed locations. Test boring locations were determined in the field using Google Earth KMZ files and a cellphone-based GPS application at the approximate locations recommended by TRC and approved by the project team as shown on the attached Figure 1, *Approximate Test Boring Location Plan*. Prior to drilling, the U-Dig New York One-Call notification system was contacted to notify owners of public utilities in the area of the proposed testing borings for utility mark out and clearance of test boring activities.

Any observations, evaluations, and conclusions made from the site visit were disclosed by our visual observations, where applicable. Our site reconnaissance was limited to visual observations and surface features free of obstruction at the time of the field visit. TRC's observations and/or reporting do not account for other non-visible, hidden, subsurface or material condition analyses, and the professional services rendered are not guaranteed to be a representation by TRC of inaccessible and unobservable site conditions or actual conditions subsequent to the date of TRC's site visit.

2.2 Geotechnical Field Exploration

Geotechnical test borings, designated B-301 through B-311, were drilled at the approximate structure and/or equipment locations within the proposed collection substation, POI switchyard and POI footprints at the approximate locations shown on Figure 1. The test boring field exploration was performed during the period from May 14 to May 16, 2024 by TRC's in-house drilling division under the full-time supervision by a member of TRC's geotechnical engineering staff. Drilling and sampling were performed using a track-mounted drill rig. Split spoon soil sampling was performed continuously through the upper ten (10) ft bgs and at five (5)-ft intervals thereafter to the completion depths in each boring using the Standard Penetration Test (SPT) Method (American Society of Testing and Materials [ASTM] D1586). The samples were obtained by driving the split spoon sampler 24 inches into the soil with a 140-pound automatic hammer free-falling 30 inches. The number of blows required for each 6 inches of penetration was recorded separately. The SPT blow count ("N-value") of the soil was calculated as the number of blows required for the middle 12 inches (6 to 18-inch interval) of penetration or fraction thereof. The SPT N-value serves as an indicator of consistency for cohesive soils and relative density for granular soils. The borings were advanced to the target depths and terminated at depths ranging from 15 to 35.1 ft bgs. Boring depths varied based on the proposed structures and all borings were terminated at the planned depths, except where auger refusal was encountered. Upon completion, all test borings were backfilled to the approximate existing ground surface with the auger cuttings. Copies of the test boring logs are attached along with a copy of the approximate test boring location plan.

2.3 Regional Geology

According to available public geological data, the surficial geology at the construction area consists of residual soil deposits weathered in place from the underlying parent rock. Locally the Site is underlain predominantly by mudstone and shale of the Utica Shale Formation from the Middle Ordovician Age. The northeast corner of the site also lies within relatively close proximity to a geologic contact zone between the Utica Shale and carbonate limestone and dolostone of the Beekmantown Group from the Lower Ordovician Age.

2.4 Subsurface Conditions

This section presents the generalized subsurface conditions observed during the field exploration. During the field activities, observations were made of existing soil cover/topsoil thicknesses, groundwater conditions, surface features, and other site observations deemed important to the planned site development. Refer to the attached boring logs for more detailed descriptions of subsurface units, sample data, SPT results, groundwater conditions, and other pertinent information. Spatial transitions between soil units illustrated on the logs may not be well defined, or gradual and/or erratic; and represents a general interpolation of our inspector's observations obtained at the specific boring location at the time of drilling. See *Figure 1, Approximate Test Boring Locations* for a map that illustrates the approximate locations of the "as drilled" borings. It should be noted that environmental studies were not performed as part of this scope of work, and, as such, no recommendations relative to environmental compliance, including permitting, are included in the Report.

A topsoil layer, approximately 5 to 15 inches thick, was observed at the ground surface in all of the test borings.

Below the surficial cultivated topsoil, the test borings generally encountered soils that consist of predominantly of CLAY and SILTY CLAY with varying quantities of sand and gravel extending to depths ranging from approximately 13 to 23 ft bgs. SPT N-values indicate that the consistency of these soils ranges from "soft" to "medium stiff" in the upper 2 to 6 ft bgs; and becomes "stiff" to "hard" below these depths through the termination depth of each boring. Laboratory test results indicate that the materials tested are a combination of predominantly fine-grained, low plastic clay and silty clay with plastic limits ranging from 11% to 18%, liquid limits ranging from 17% to 29%, and plasticity indexes ranging from 5% to 18%. Natural moisture contents as received by the laboratory range from approximately 6% to 25%. Maximum laboratory compacted dry densities of a two representative bulk samples of the near surface (0 to 5 ft bgs) soils as determined by ASTM D 698 were approximately 112.4 pounds per cubic foot (pcf) at an optimum moisture content of 13.6% from within the Flat Creek collection substation area and approximately 107.4 pcf at an optimum moisture content of 13.6% from within the POI switchyard area with California Bearing Ratios (CBRs) of approximately 3% when compacted to approximately 95% of the maximum dry density for each sample. The unit weight of a representative samples was 130.3 pounds per cubic foot (pcf).

Below the surficial clayey soil stratum, at depths ranging from 13 to 23 feet bgs each test boring with the exception of B-301 and B-306 encountered a stratum consisting of silty clayey SAND and GRAVEL-SIZED ROCK FRAGMENTS with, generally extending to the completion depths. SPT N-values indicate the relative density of this stratum ranges from "medium dense" to "very dense". Laboratory test results indicate that the fine-grained (silt and clay) content of this layer ranges from approximately 38% to 47%. Laboratory test results on the fine-grained portions of this soil layer indicate that plastic limits ranging from 10% to 12%, liquid limits ranging from 15% to 18%, and plasticity indexes ranging from 4% to 7%. Natural moisture content as received by the laboratory ranged from approximately 9% to 10%. Unit weights of representative samples ranged from 130.1 pounds per cubic foot (pcf) to 132.3 pcf.

Auger refusal, which typically represents the apparent top of weathered rock, was encountered in test borings B-310 and B-311 at approximate depths 35.1 ft and 33.6 ft bgs, respectively. Difficult drilling conditions, which are typically indicative of hard or very dense soil conditions and/or the potential presence of oversized rock fragments, were also encountered at 8 of the 11 test boring locations. The depths and locations where difficult drilling and auger refusal were encountered are summarized in Table 1, below.

Table 1. Summary of Difficult Drilling and Auger Refusal Depths

Test Boring Location	**Boring Termination Depth, ft***	**Depth to Hard or Very Dense Soils (ft, bgs**)**	**Depth to Difficult Drilling (ft, bgs**)**
B-301	15	10	NE
B-302	25	9	14.3
B-303	30	13	13.9
B-304	25	18	18.1
B-305	25	NE	NE
B-306	15	NE	NE
B-307	35	NE	22
B-308	25	22	22
B-309	35	23	23.5
B-310	35.1***	8.5	8.5
B-311	33.6***	28	24.5

**All borings completed to planned depth, except where auger refusal is noted.*
***ft, bgs = feet below existing ground surface*
**** Indicated depth of auger refusal*
NE=Not encountered

2.5 Groundwater

Observations for groundwater were attempted during drilling and shortly after completion in each test boring. Free water was observed on the drilling rods or split-spoon sampler in test borings B-303, B-305, B-307, B-309 and B-310 during drilling at depths ranging from approximately 17.0 to 23.5 ft bgs. Groundwater was observed in these test borings at depths ranging from approximately 16.8 ft bgs to 28.0 ft bgs after completion of drilling at the time of the field exploration. The water readings recorded on the logs represent the conditions at the time the measurements were taken and do not reflect daily, seasonal, or long-term fluctuations in the groundwater level or development of perched water. Hydrostatic groundwater levels and upper (perched) saturation zones should be expected to fluctuate seasonally due to variations in rainfall, runoff, evapotranspiration, irrigation methods, and other factors. Consequently, the observed measured groundwater levels or absence thereof shown on the boring logs only represent conditions at the time the readings were collected and may thus be different at the time of construction. Furthermore, the actual groundwater levels, seepage, and localized saturated conditions may be observed at shallower depths during periods of heavy precipitation. Static daily and seasonal groundwater levels and upper (perched) saturation zones would need to be determined through the installation and monitoring of piezometers, especially in fine-grained soil stratums that are present at the Site. This was outside of TRC's scope of work. The boreholes were subsequently backfilled with soil cuttings following water level measurements upon completion of drilling activities.

3.0 CORROSION EVALUATION

To evaluate the corrosion potential of the near surface soils at the Site, we submitted two (2) representative bulk soil samples from depths of approximately 1 ft to 5 ft bgs, composited from test boring locations during our subsurface exploration to an analytical laboratory for pH, chloride, soluble sulfate, and sulfate content, resistivity and oxidation reduction testing. Bulk 1 was collected from the auger cuttings within the proposed Flat Creek collection substation area and Bulk 2 was collected from the proposed POI switchyard area. The results are summarized in Table 2, below.

Table 2. Results of Corrosivity Testing

Sample	Boring No.	pH in (H20)	pH in (CaCl2)	Chlorides (mg/kg)*	Sulfates (mg/kg)*	Sulfides (mg/kg)*	Oxidation Reduction (mV)	Resistivity (ohm-cm)**
Bulk 1	B-301 to B-304	6.72	5.89	40	63	Nil	+668	4,120
Bulk 2	B-305 to B-309	6.55	5.83	50	80	Nil	+687	2,740

** mg/kg = milligrams per kilogram*
*** ohm-cm = ohm-centimeter*

Many factors can affect the corrosion potential of soil including soil moisture content, resistivity, permeability, and pH, as well as chloride and sulfate concentration. In general, soil resistivity, which is a measure of how easily electrical current flows through soils, is the most influential factor. Based on classification developed by William J. Ellis (1978), the approximate relationship between soil corrosiveness was developed as shown in Table 3 below.

Table 3. Relationship Between Soil Resistivity and Soil Corrosivity

Soil Resistivity (ohm-cm)*	Classification of Soil Corrosiveness
0 to 900	Very Severely Corrosive
900 to 2,300	Severely Corrosive
2,300 to 5,000	Moderately Corrosive
5,000 to 10,000	Mildly Corrosive
10,000 to >100,000	Very Mildly Corrosive

** ohm-cm = ohm-centimeter*

Chloride and sulfate ion concentrations and pH appear to play secondary roles in affecting corrosion potential. High chloride levels tend to reduce soil resistivity and break down otherwise protective surface deposits, which can result in corrosion of buried metallic improvements or reinforced concrete structures. Sulfate ions in the soil can lower the soil resistivity and can be highly aggressive to Portland cement concrete (PCC) by combining chemically with certain constituents of the concrete, principally tricalcium aluminate. This reaction is accompanied by expansion and eventual disruption of the concrete matrix. Soils containing high sulfate content could also cause corrosion of the reinforcing steel in concrete. Table 4.2.1 of the American

Concrete Institute (ACI, 2008) provides requirements for concrete exposed to sulfate-containing solutions as summarized in Table 4 below.

Table 4. Relationship Between Sulfate Concentration and Sulfate Exposure (Table 4.2.1 of ACI)

Water-Soluble Sulfate (SO4) in soil (ppm)*	**Sulfate Exposure**
0 to 1,000	Negligible
1,000 to 2,000	Moderate
2,000 to 20,000	Severe
over 20,000	Very Severe

**ppm = parts per million*

Acidity is an important factor of soil corrosivity. The lower the pH (the more acidic the environment), the higher will the soil corrosivity be with respect to buried metallic structures. As soil pH increases above 7 (the neutral value), the soil is increasingly more alkaline and less corrosive to buried steel structures due to protective surface films which form on steel in high pH environments. A pH between 5 and 8.5 is generally considered relatively passive from a corrosion standpoint.
The laboratory electrical resistivity test completed on the samples of surficial soils indicates values ranging from 2,740 to 4,120 ohm-centimeters, which would be indicative of moderately corrosive potential to buried metallic improvements.

Based on our previous experience and Table 4.2.1 of the ACI, it is our opinion that sulfate exposure to PCC may be considered negligible for the native subsurface materials tested.

4.0 FOUNDATIONS AND EARTHWORK

4.1 Site Seismic Coefficients

According to the ASCE 7-22, the site class is within "Site Class D". Based on the soil profiles, the maximum considered earthquake ground motions in this area for 0.2 second and 1.0 second spectral responses are approximately 22% g and 5.3% g, respectively. For Site Class D, the corresponding 0.2 and 1.0 sec. design spectral response acceleration parameters S_{DS} and S_{D1} are 18% g and 7.4 % g, respectively.

4.2 Foundations

Based on the results of this investigation and our experience with similar structures, the subsurface conditions within the proposed collection substation and POI switchyard areas are suitable for support of the proposed equipment and structures. A combination of shallow foundations and mats could be utilized for support of all structures bearing on newly placed, compacted load bearing fill or the existing natural soils after proper subgrade preparation as described below. Drilled piers could also be utilized.

As noted in Table 1, eight (8) of the eleven (11) test borings encountered very dense soils and/or difficult augering at depths as shallow as 8.5 feet. Therefore, shallow refusal conditions or obstructions may be encountered within these areas and other portions of the proposed development area when attempting to excavate for foundations depending on final site grading and the required minimum foundation embedment depths.

Based on the SPT N-values, the existing residual soils underlying the cultivated layer are typically in a “very stiff” to “hard” state of consistency. Newly placed and well compacted fill would generally be expected to exhibit similar strength properties to those observed in the test borings completed for this project. Recommended parameters for use in design are summarized below, along with general observations and recommendations related to constructability.

4.2.1 Spread Footings

Shallow foundation systems such as spread footings or rigid mats bearing on newly placed and compacted load-bearing fill or densified existing soils with a minimum 8 inch undercut can be considered for support of electrical equipment and other lightly loaded ancillary structures. Mats supporting electrical equipment can be designed for an allowable bearing capacity of 2,000 psf when constructed in accordance with the general recommendations presented in the *Earthwork* section of this report. A vertical subgrade modulus of 100 pci may be used in foundation mat design. Shallow spread footing foundations bearing on densified natural soils can be designed using the allowable bearing capacities and other design parameters shown in Table 5. A typical allowable interface friction coefficient of 0.35 may be used for design of cast in place concrete foundations assuming that they are constructed on grade overlying the densified natural soils. These values can be increased by 1/3 for transient, short-term loading such as seismic and wind loads. Allowable bearing capacity assumes that final bearing elevation of all spread footings will be established a minimum 2 feet above highest anticipated groundwater levels, including possible flood stage conditions. New footing foundations and excavations adjacent to existing structures or utilities should be constructed outside a zone bounded by an imaginary 1H:1V (horizontal : vertical) plane projected upward from the base of the existing features to prevent undermining.

Table 5. Recommended Shallow Foundation Design Parameters

Soil Parameter	**Densified SILTY CLAY Soils***	**Compacted Structural Fill (USCS SW-GW / AASHTO #57)**
Total Unit Weight, γ (pcf)	120	130
ϕ	28°	34°
$\delta_{concrete}$	23°	29°
Cohesion, C’ (psf)	200	---
Undrained Cohesion, Cu (psf)- zero friction	2,500	---
Allowable Bearing Capacity (ksf)	2.5	4.0
Vertical Subgrade Modulus (pci)	100	300

* Foundations can be placed on densified existing clayey soils provided that the upper 8 inches of existing soil is over-excavated and replaced by structural fill

Transformers, dead-end structures and similar heavily loaded structure foundations or mats bearing on the densified existing natural soils or newly placed and compacted fill can

be designed for an allowable bearing capacity of 3,000 psf, after proper subgrade preparation as follows:

1. Over-excavate the natural soils for a minimum depth of 2.0 feet below bottom of the footing depth. Over-excavation shall extend beyond the perimeter of the foundation 1 foot horizontally for each foot of depth below existing grade.
2. The exposed subgrade shall be densified in the presence of a qualified geotechnical professional to confirm suitability of exposed grade and identify any soft, loose, unstable or unsuitable (biodegradable material or waste) materials that shall be removed.

Foundation subgrades for supporting structures subjected to freezing temperatures during construction and/or the life of the structures should be established at least 4.1 ft below adjacent grades or otherwise protected against frost action. Alternatively, to resist frost heave impacts, mat slabs constructed at grade should be provided a coarse aggregate similar to AASHTO #57 aggregate layer extending to the frost depth (49 inches) below the mat foundations for movement sensitive equipment or minimum 24 inches thick below lightly loaded electrical equipment designed to tolerate the movement associated with potential frost heave. To guard against a punching type shear failure, minimum widths of continuous footings should be 24 inches. Shallow foundation systems should be sized not only with consideration for allowable bearing pressure, but also to resist the anticipated lateral loading and overturning moments of the proposed structures and equipment. Shallow foundations, including reinforced mat foundations may be keyed or embedded into the harder/denser soils below the required bearing elevations where additional lateral stability or sliding resistance is required.

All slabs and foundations should be over-excavated to a minimum depth of 1 foot below the proposed bearing elevation. The undercuts should extend 1 foot laterally beyond the outside edge of the foundation. The exposed subgrade should be proof-rolled in-place and the undercut area backfilled with compacted, free draining load-bearing structural fill in accordance with the recommendations provided in the Earthwork section. This procedure is intended to create uniform and stable bearing conditions.

Shallow excavations for foundation slabs and construction of utilities may encounter perched groundwater in low lying areas or during wet periods. If perched groundwater or surface runoff are encountered, sumps and pumps will be sufficient to control groundwater and provide stable working conditions.

4.2.2 Drilled Shafts

Axial Capacity

Alternately, based on the subsurface conditions encountered and on our experience with similar construction, drilled shafts may be considered, particularly for support structures with high lateral loads and the heavier equipment such as transformers and dead-end structures. The bottom of drilled shafts are anticipated to bear within the very stiff to hard clay or medium dense granular soils. The foundation designer should verify that the overall shaft diameter and length are sufficient to provide the vertical and necessary lateral support based on recommendations presented herein. It is our experience that the required length and diameter of drilled shafts, if used to support structures subjected to high lateral loads (such as the proposed dead-end structures) will be controlled by anticipated lateral loading conditions.

Drilled shafts can be designed to derive their load-carrying capacities from shaft sidewall resistance (i.e., “skin friction”), end-bearing, or a combination of the two. The following are noted with respect to axial capacity of drilled shafts:

- Where the shaft length is entirely in soil and the length of the shaft is at least twice the shaft diameter, the embedment length can be checked for adequate axial compression capacity based on the sum of the allowable load in end bearing and side friction.
- Where the shaft length is less than twice the shaft diameter, or where methods of construction preclude consideration for shaft resistance (i.e., permanent casing installed in an oversized hole) the drilled shaft should be sized based on end bearing alone.
- Shaft resistance should not be included in soil within the upper 4 ft from the ground surface to account for disturbance during construction as well as negative impacts from frost action.
- For large diameter shafts, the weight of concrete (including consideration for the effects of buoyancy) might be adequate to resist anticipated uplift (or tension) loads, where applicable. If shaft resistance must be considered in addition to the weight of the shaft, a factor of safety of 3 is recommended for use in estimating allowable uplift capacity.
- Allowable design unit resistances against axial loads are provided in Table 6 below.

Table 6. Recommended Allowable Drilled Shaft Soil Bearing Capacities

Soil Description	**Relative Density/ Consistency**	**Allowable Shaft Resistance (ksf)***		**Allowable End Resistance (ksf)*****
		Compression**	**Uplift****	
Newly Placed Structural FILL	“Dense”	0.60	0.40	
CLAY	“Soft” to “Medium Stiff”	0.30	0.20	---****
CLAY/ SILTY CLAY	“Stiff” to “Hard”	0.45	0.30	6.0
Silty Clayey SAND & GRAVEL	“Medium Dense” to “Dense”	0.60	0.40	5.0

* Upper 4.0 feet of shaft length shall be ignored.
** Includes factors of safety of 2.5 compression and 3.0 uplift loads
*** Includes a Factor of Safety of 3.0.
****End bearing resistance shall not be considered at these shallow depths.

The piers should have a minimum diameter of at least 18 inches and extend at least 10 feet below the exterior ground surface. Piers should have a minimum center-to-center spacing of at least three pier diameters. Axial capacity in the frost zone should be ignored.

Temporary casing may be required during shaft construction to maintain sidewall stability through the natural soils. The difficult augering conditions observed in the test borings indicates the possible presence of cobbles, boulders, or large obstructions within the subsurface profile which may be encountered during drilled pier installation.

If the shaft is cased so that the excavation remains stable and free of water infiltration, freefall placement of concrete could be considered, provided the contractor can direct concrete discharge through the center of the shaft and avoid contact with the reinforcement cage during freefall, which could result in unacceptable aggregate separation. In the event of water infiltration into the shaft, the reinforcement cage should be installed followed by installation of a tremie tube to the bottom of the shaft so that the shaft can be concreted using bottom-up tremie techniques. Care will need to be taken to ensure that the tremie remains inserted at the bottom of the shaft during concrete placement.

Final length and diameter of the drilled shafts will be a function of the vertical loads as well as the lateral load and deflection requirements, where applicable.

Lateral Capacity

Recommended geotechnical parameters for use in LPILE analysis are included in Table 6 for soil conditions encountered in the test borings. If drilled shafts are to be constructed within a distance of 3B to 5B, where B is the shaft diameter, reduction factors should be applied as appropriate to account for group effects. We recommend that lateral resistance of soils within 4 ft of the ground surface be neglected to account for disturbance resulting from both drilled shaft construction and the negative impacts due to frost action.

Table 7. Summary of Unfactored Soil Parameters for Lateral Design
(neglect for upper 4 ft)

Soil Description	LPILE Soil Type	Consistency/ Relative Density	Total (Submerged) Unit Weight (pcf*)	Friction Angle (degrees)	E_{50}	Cohesion (psf**)	Soil Modulus Above/Below Water Table, k (pci***)
Newly Placed Structural FILL	Sand	"Dense"	125 (NA)	34	-	-	225
CLAY	Clay	"Soft" to "Stiff"	120 (NA)	-	0.007	1,000	- / -
CLAY/ SILTY CLAY	Clay	"Stiff" to "Hard"	125 (62.6)	-	0.005	2,500	- / -
Silty Clayey SAND & GRAVEL	Sand	"Medium Dense" to "Dense"	130 (67.6)	34	-	-	225 / 125

* *pcf – pounds per cubic foot*
** *psf – pounds per square foot*
*** *pci – pounds per cubic inch*

Construction Related Concerns

Temporary casing may be required during shaft construction to maintain sidewall stability through the soft natural soils, where cobble inclusions are present, or in excavations where groundwater and/or perched water zones are encountered.

Intimate contact between the drilled shaft and surrounding soil will be critical to achieve the lateral load resistance predicted by the LPILE models. As such, use of permanent casing in the design and installation of drilled shafts should be avoided. If use of permanent casing is required, the permanent casing should be in intimate contact with the surrounding soil. Permanent casing should not be placed in an oversized hole unless grouting of the exterior annular space is performed to create intimate contact between the casing and soil. If intimate contact is not maintained, lateral deflections will significantly exceed those estimated in the LPILE evaluations. These deflections will be very highly variable and difficult to predict as they will be dependent on the method of construction and the amount of sidewall relaxation and annular space resulting from the construction process.

If the shaft is cased so that the excavation remains stable and free of water infiltration, freefall placement of concrete could be considered, provided the contractor can direct concrete discharge through the center of the shaft and avoid contact with the reinforcement cage during freefall, which could result in unacceptable aggregate separation. In the event of water infiltration into the shaft, the reinforcement cage should be installed followed by installation of a tremie tube to the bottom of the shaft so that the shaft can be concreted using bottom-up tremie techniques. Care will need to be taken to ensure that the tremie remains inserted at the bottom of the shaft during concrete placement.

Final length and diameter of the drilled shafts will be a function of the vertical loads as well as the lateral load and deflection requirements, where applicable. Preferably, shafts should extend into the natural alluvial soils to limit settlements and maximize end bearing capacity.

4.2.3 Lateral Earth Pressures

No retaining walls are currently proposed as part of the current site development. Any retaining walls proposed at a later time should be designed to resist lateral earth pressures from adjoining natural materials, backfill, and surcharge loads. Provided that adequate drainage is established as recommended below, soil parameters indicated in Table 7 below may be used to estimate lateral earth pressures on any below grade foundations, walls or other structures, as well as for temporary excavation support. The following soil parameters may be used to estimate the lateral earth pressures on any below-grade features:

Table 8. Lateral Earth Pressure Parameters

Parameter	Soft to Stiff Clay*	Very Stiff to Hard Clay*	Newly Placed Structural Fill	Silty Clayey SAND & GRAVEL	Imported Aggregate (AASHTO #57)
γ_t (pcf)	120	125	125	135	130
ϕ(deg)	26	28	32	34	34
c (psf)	100	200	0	0	0
c_a (psf)	70	140	0	0	0
δ (concrete)	17	17	20	27	27
K_p	2.56	2.77	3.25	3.54	3.54
K_o	0.56	0.53	0.47	0.44	0.44
K_a	0.38	0.36	0.31	0.28	0.28

* For the clayey soils, if the use of ϕ and c values resulted in negative lateral pressures, negative lateral pressures should be ignored and the lateral earth pressures should be evaluated based on a minimum equivalent fluid unit weight of γ K = 30 pcf (i.e., min. $K_a = 0.25$).

Imported fill soils similar to USCS SW-GW or AASHTO No. 57 aggregate should be used as backfill for below grade walls. Alternately, a prefabricated drain board with high in-plane transmissivity, such as Miradrain, Geotech Drainage Panels, Enkadrain drainage matting, or similar equivalents, may be used for wall drainage as an alternative to the Aggregate Material or drain rock backfill. The drainage panels should be connected to the perforated pipe at the base of the wall, or to some other closed or through-wall system. At-rest earth pressures (Ko) and the active earth pressure (Ka) should be used in the design of non-yielding and yielding structures, respectively. Backfill behind foundations and other structures should be placed with light equipment and the soils should not be over-compacted. Heavy compaction equipment and compaction effort may lead to overstress of the structures.

4.3 Earthwork

4.3.1 Subgrade Preparation and Compaction

Based on our understanding of the proposed construction and the existing site grades we anticipate that re-grading and site leveling may be needed. Proposed site grading is not currently known but cuts and fills of several feet are assumed. The following recommendations are provided based on the site soils encountered.

Any existing subsurface utilities, including drain tiles, if present, which conflict with the proposed. structure footprints or running beneath the proposed access road should be removed or relocated, and the excavation replaced with the re-compacted natural soils or imported granular soils. In areas of fill placement for the new substation pad and/or construction of shallow foundations, all debris, topsoil and organic or otherwise deleterious material, including the existing cultivated topsoil layer, should be removed before foundation construction or new fill placement. Any obstructions that would interfere with new foundation construction must be removed in their entirety from a foundation location. The stripped materials should be removed from the site or may be stockpiled for use in landscaped areas, if desired.

After stripping residual topsoil and removal of vegetation, unsuitable fills, etc. the exposed subgrade areas should be vigorously densified with a minimum 25-ton roller, or as large a compactor as is practical to improve overall performance and reduce impacts of settlements within the soft soil stratum. The residual clay soils shall be compacted by use of sheepsfoot or tamping type roller. The predominantly granular sand or gravel soils, if encountered during excavation and grading operations, may be compacted by vibratory compaction equipment. The exposed subgrades should then be thoroughly proof rolled in the presence of a qualified geotechnical inspector to check for any soft, loose, or unstable areas. Proof-rolling should be performed using a minimum 10-ton roller in static mode or a fully loaded triaxle truck and be deemed firm and non-yielding under the weight, as determined by the qualified inspector. Any soft, loose, or otherwise unstable areas detected during proof-rolling should be over-excavated to more competent material and replaced with a compacted fill. No new fills should he placed on frozen subgrades.

For new fill on sloping ground surfaces that are steeper than one vertical to four horizontal, existing ground should be benched for bonding and proper compaction of the new fill. Immediately prior to placement of the first lift on embankment fill the exposed subgrade surface should be scarified to a depth on the order of 4 to 6 inches and re-compacted after placement of the initial lift of fill material.

The existing surficial soils contain predominant fine-grained (clay / silty clay) content and will be sensitive to moisture and disturbance. Therefore, they may lose strength when wet or disturbed by construction equipment and could be difficult to work with during cold or wet weather. The presence of low-lying areas will also be highly sensitive to disturbance when wet. These soils are suitable for re-use as general fill for site grading and backfill. Some moisture conditioning (wetting or drying) of the onsite soils should be anticipated before reuse in compacted backfills, particularly during wet seasons. Existing surficial soils with organic inclusions should be excluded from reuse as load-bearing fill. Once a subgrade has been prepared, construction traffic should be controlled in such a fashion as to minimize subgrade disturbance.

Imported load-bearing fill, if required, should consist of well-graded granular material similar to SP, SM, SW, GP, GM or GW as identified by the Unified Soil Classification System (USCS) which is not excessively moist and is free from ice and snow, roots, surface coatings, sod, loam, clay, rubbish, other deleterious or organic matter, and any particles larger than four (4) inches in diameter. Imported fill for use as load-bearing fill should have less than 65% by weight passing the No. 200 sieve, liquid limits less than 50, & Plasticity Index less than 35. Alternatively, an AASHTO No. 57 or NYSDOT Type 2 coarse aggregate layer (minimum 24 inches thick) could be considered below mat foundations supporting electrical equipment to reduce frost impacts. Imported fills for general site grading may consist of materials similar in gradation to GW, GP, GC, GM, SW, SP, SC, SM, CL, ML, CH, & MH as identified by the USCS with no index property limitations. However, imported fill materials with greater than 25% by weight passing the No. 200 sieve should be considered high frost susceptibility. Any load-bearing, structural fill placement for support of buildings, structures or equipment should extend at least 5 ft beyond the edge of all foundations and structure footprints. Exterior slopes in fill areas around structures or equipment should be constructed at a slope of 2H:1V or flatter.

All backfills fills should be placed in relatively horizontal layers not exceeding 8 inches loose thickness. This criterion may be modified in the field with approval of the geotechnical engineer depending on the conditions present at the time of construction and on the compaction equipment used. Load-bearing fills for the support of foundations should be compacted to not less than 98% of maximum dry density as determined by ASTM D 698 (or approximately 95% as determined by ASTM D 1557). Fills in paved areas, if planned, or areas supporting access roads should be compacted to not less than 95% of maximum dry density by ASTM D 698 (minimum 92% as determined by ASTM D 1557). Fills in landscaped areas should be compacted to at least 90% of maximum dry density (ASTM D 698).

4.3.2 Temporary Slopes and Excavations

The sidewalls of any confined excavations deeper than 4 ft must be sloped, benched or adequately shored per OSHA 29 CFR 1926 regulations. The onsite near surface soils are classified as Type B soils according to OSHA 29 CFR 1926. Short-term open excavations in the existing Type B clayey soils that are greater than 4 feet in depth shall have a maximum allowable slope of 1H:1V (45°) if dry and 1.5H:1V (34°) if submerged or where wet conditions are observed, such as perched water or significant surface runoff. The deeper onsite granular soils (sandy and/or gravelly soils) are classified as Type C soils according to OSHA 29 CFR 1926. Open excavations in the granular soils, if encountered, should not be steeper than 1.5H:1V if dry and 2H:1V if submerged or where considerable wetness if observed. Alternately, trench boxes and/or sheeting could be used in conjunction with open cut slopes when performed in accordance with OSHA 29 CFR 1926.652(b). Sloping or benching for excavations greater than 20 feet deep, if required, shall be designed by a registered professional engineer.

The contractor is solely responsible for designing, constructing, and maintaining stable, temporary excavations and should shore, slope, or bench the sides of any confined excavations deeper than 4 ft as required to maintain stability of both the excavation sides and bottom. All excavations for the project should comply with applicable local, state, and federal safety regulations including the current United States Department of Labor, Occupational Safety and Health Administration (OSHA) guidelines for Excavation and Trench Safety Standards (29 CFR Part 1926, Part P, Excavations) or other applicable jurisdictional codes for permissible temporary side-slope ratios and or shoring requirements. The contractor should avoid stockpiling excavated materials or placing construction equipment immediately adjacent to the excavation unless the excavation sidewalls are braced to withstand the anticipated surcharge load.

Daily inspections of open excavations, adjacent areas and protective systems by a “competent person” should be performed for evidence of situations that could result in cave-ins, indications of failure of a protective system, or other hazardous conditions, as applicable. The information in this report is being provided solely as a service to our client. Under no circumstance should the information provided be interpreted to mean TRC is assuming responsibility for construction Site safety.

4.4 Trench Backfill

Bedding and pipe embedment materials to be used around underground utility or electrical conduit pipes should be well graded sand or gravel conforming to the pipe manufacturer’s recommendations and should be placed and compacted in accordance with project specifications, local requirements, or governing jurisdiction. General fill to be used above pipe embedment materials should be placed and compacted in accordance with the recommendations contained in this section.

Depended on site grading and depth of trenches, it is noted that very dense soils or obstructions, such as possible oversized gravel and/or cobbles may be encountered during excavation of trenches. Shallow obstructions if encountered during utility excavation, must be removed entirely from within the bedding zone of all trenches prior to utility construction. Excavation of cobbles (or boulders, if present) may require the use of larger equipment, including, but not limited to large heavy-duty excavators and hydraulic rams. Trench excavations should be over-excavated to provide at least 3 to 4 inches of bedding material to provide a uniform support and eliminate hard points for utilities and electrical conduits. Where direct bury of utilities will occur, a layer of clean sand, or similar material free of rock fragments should be placed immediately over the cables to prevent damage during compaction of backfill. General fill should be placed in lifts not exceeding 8 inches in uncompacted thickness and should be compacted to at least 90% maximum dry density by mechanical means only. The upper 12 inches of general fill in areas subject to wheel loads should be compacted not less than 95% maximum dry density (ASTM D 698).

Utility trenches located adjacent to footings or foundations should not extend below an imaginary 1H:1V (horizontal:vertical) plane projected downward from the foundation bearing surface to the bottom edge of the trench. Where utility trenches will cross beneath footing bearing planes, the footing concrete should be deepened to encase the pipe, or the utility trench should be backfilled with sand/cement slurry or lean concrete within the foundation-bearing plane.

4.5 Gravel Access Roadways

It is assumed that the Site will be accessed using unpaved gravel roads by heavy construction equipment temporarily during site construction periods estimated at less than six (6) months, followed by periodic light truck traffic during the remaining service life of the project.

After stripping of the existing topsoil proposed access roads should be proof-rolled with a heavily loaded pneumatic-tired vehicle such as a loaded water truck or tri-axle dump truck. Soft, loose or unstable areas, identified by significant pumping, rutting or similar deformation under wheel loads must be removed and replaced with compacted fill or aggregate material to achieve a stable subgrade prior to placing common fill for site grading, if required, or fill aggregate surfacing. A layer of a geogrid should be installed directly over the subgrade with adjacent rolls lapped in accordance with manufacturer's recommendations in general accordance with NYSDEC standard for limited Use Pervious Haul Roads. A layer of aggregate similar in gradation to NYSDOT Item 703-02, Size Designation 3-5 of Table 703-4 material should be placed directly over the geogrid in a single 12-inch thick layer and spread with tracked equipment in accordance with NYSDEC standards. During construction, the access road may need to be occasionally re-graded and re-densified. Any electric cables crossing below the roadway should be installed in heavy duty rigid steel conduits or installed a minimum 3 ft below finished grade to prevent damage to the cables.

Access road design criteria, such as traffic loads and volumes were not known at the time of this report. The project civil or geotechnical engineer should be contacted for final design once criteria are known. Final aggregate road design can be performed using an estimate CBR value of 3 for compacted onsite soils. Increased CBR values may apply for subgrades improved by the placement of geogrid reinforcement.

4.6 Surface Drainage

Positive surface water drainage gradients at least 2 percent should be provided to direct surface water away from foundations and mat slabs towards suitable stormwater discharge facilities. Ponding of surface water should not be allowed on or adjacent to structures, slabs-on-grade, or pavements. Any rain runoff should be directed away from foundation and slabs-on-grade such as equipment pads, as applicable.

In addition, a sufficiently thick velocity dissipater, such as layer of coarse drainage aggregate of adequate size based on anticipated flow velocity, should be placed along water flow paths to dissipate concentrated flow of runoff water in order to minimize surface erosion.

4.7 Plans, Specifications, and Construction Review

We recommend that TRC perform a plan review of the geotechnical aspects of the project design for general conformance with the recommendations presented in this report. In addition, subsurface materials encountered in the relatively small diameter, widely spaced borings may vary significantly from other subsurface materials on the site. Therefore, we also recommend that a representative of our firm observe and confirm the geotechnical specifications of the project construction. This will allow us to form an opinion about the general conformance of the project plans and construction with our recommendations. In addition, our observations during construction will enable us to note subsurface conditions that may vary from the conditions encountered during our investigation and, if needed, provide supplemental recommendations. For the above reasons, the recommendations provided in this report are based on the assumption that TRC will be retained to provide observation and testing services during construction to confirm that conditions are similar to that assumed for design and to form an opinion as to whether the work has been performed in general accordance with the project plans and specifications. If we are not retained for these services, TRC cannot assume any responsibility for any potential claims that may arise during or after construction as a result of misuse or misinterpretation of TRC's report by others. These services are not included as part of TRC's current scope of work.

4.8 Construction Observation

TRC recommends that a qualified geotechnical professional should observe the geotechnical aspects of the earthwork for general conformance with our recommendations including site preparation, selection of fill materials, pile installation, and the placement and compaction of fill.

To facilitate your construction schedule and if you wish TRC to perform these services, we request sufficient notification (72 hours in advance) for site visits. The project plans and specifications should incorporate all recommendations contained in the text of this report. These services are not included as part of TRC's current scope of work.

5.0 LIMITATIONS

This report has been prepared for Cordelio Services LLC, specifically for design of the proposed collection substation and POI switchyard development to be constructed at the Flat Creek Solar Facility Site located in Montgomery County, NY as identified herein. Transfer of this report or included information is at the sole discretion of Cordelio Services LLC. TRC's contractual relationship remains with Cordelio Services LLC and limitations stated herein remain applicable regardless of end user. The opinions, conclusions, and recommendations presented in this report have been formulated in accordance with accepted geotechnical engineering practices that exist in the area at the time this report was written. No other warranty, expressed or implied, is made or should be inferred.

The opinions, conclusions and recommendations contained in this report are based upon the information obtained from our investigation, which includes data from a limited number of widely separated discrete locations, visual observations from our site reconnaissance, and review of other geotechnical data provided to us, along with local experience and engineering judgment. An attempt has been made to provide for normal contingencies; however, the possibility remains that differing or unexpected conditions may be encountered during construction. If this should occur, or if additional or contradictory data are revealed in the future, TRC should be notified so that modifications to this report can be made, if necessary. TRC is not responsible for any conclusions or opinions drawn from the data included herein, other than those specifically stated, nor are the recommendations presented in this report intended for direct use as construction specifications.

TRC should be retained to review the geotechnical aspects of the final plans and specifications for conformance with our recommendations. The recommendations provided in this report are based on the assumption that TRC will be retained to provide observation and testing services during construction to confirm that conditions are similar to that assumed for design and to form an opinion as to whether the work has been performed in accordance with the project plans and specifications. If we are not retained for these services, TRC cannot assume any responsibility for any potential claims that may arise during or after construction as a result of misuse or misinterpretation of TRC's report by others. Furthermore, TRC will cease to be the Geotechnical Engineer-of-Record at the time another consultant is retained for follow up service to this report, if applicable.

The opinions presented in this report are valid as of the present date for the property evaluated. Changes in the condition of the property will likely occur with the passage of time due to natural processes and/or the works of man. In addition, changes in applicable standards of practice can occur as a result of legislation and/or the broadening of knowledge. Furthermore, geotechnical issues may arise that were not apparent at the time of our investigation. Accordingly, the opinions presented in this report may be invalidated, wholly or partially, by changes outside of our control. Therefore, this report is subject to review and should not be relied upon after a period of three years. Similarly, this report should not be used, nor are its recommendation applicable, for any other properties or alternate developments.

We trust this report contains the information you require and thank you for the opportunity to work on this project. Please consider our firm for future geotechnical services as needed.

Sincerely,

TRC Engineers, Inc.

James P. Benjamin

James P. Benjamin, PE*
Geotechnical Project Manager
*NJ, PA

Izzaldin Al Mohd, PhD, PE
Chief Geotechnical Engineer
NY License No.: 105780

cc: Samantha Kranes, TRC
Misty Darby, TRC

FIGURES

Project No.	435979.1GEO
Date:	June 14,2024
For:	SunEast Development LLC

TRC
16000 Commerce Parkway, Mt. Laurel, New Jersey 08054
PH. (856) 273-1224 FAX. (856) 273-9244

APPROXIMATE TEST BORING LOCATIONS
Flat Creek Solar Substation
Montgomery County, New York

FIGURE
1

FIELD DATA

TEST BORING LOGS

TEST BORING LOG

PROJECT: FLAT CREEK SUBSTATION
LOCATION: MONTGOMERY COUNTY, NY

BORING **B-301**
G.S. ELEV.
FILE 435979.1GEO
SHEET 1 OF 1

GROUNDWATER DATA				
FIRST ENCOUNTERED NE				▽
DEPTH	HOUR	DATE	ELAPSED TIME	
				▼

METHOD OF ADVANCING BOREHOLE				
a	FROM	0.0 '	TO	10.0 '
d	FROM	10.0 '	TO	15.0 '

DRILLER R. CRUM
HELPER D. CRUM
INSPECTOR W. MCCART
DATE STARTED 05/14/2024
DATE COMPLETED 05/14/2024

DEPTH		A	B	C	DESCRIPTION	REC	REMARKS
				▨	0.8 ***TOPSOIL***	70	
		S-1	1 1 3 3	▨	2.0 ***BROWN CLAY, TR TO SM F/M SAND (MOIST)***		
		S-2	3 6 10 10	▨	***BROWN CLAY, TR TO SM F/M/C SAND, TR F/ GRAVEL (MOIST)***	85	
5		S-3	13 17 17 18	▨	6.0	100	
		S-4	35 19 18 23	▨		100	
10		S-5	32 27 29 28	▨		100	
				▨	***DARK BROWN SILTY CLAY, SM F/M/C SAND, SM F/C GRAVEL (MOIST TO DAMP)***		
15		S-6	15 13 18 21	▨	15.0	100	
					END OF BORING AT 15'		
20							
25							
30							
35							

NE=NOT ENCOUNTERED

DRN. WHM
CKD. JPB

TEST BORING LOG

PROJECT: FLAT CREEK SUBSTATION
LOCATION: MONTGOMERY COUNTY, NY

BORING **B-302**
G.S. ELEV.
FILE 435979.1GEO
SHEET 1 OF 1

GROUNDWATER DATA			
FIRST ENCOUNTERED NE			
DEPTH	HOUR	DATE	ELAPSED TIME

▽
▼

METHOD OF ADVANCING BOREHOLE				
a	FROM	0.0 '	TO	10.0 '
d	FROM	10.0 '	TO	25.0 '

DRILLER R. CRUM
HELPER D. CRUM
INSPECTOR W. MCCART
DATE STARTED 05/14/2024
DATE COMPLETED 05/14/2024

DEPTH	A	B	C	DESCRIPTION	REC	REMARKS
				0.7 ***TOPSOIL***		
	S-1	WH 1 3 4		***BROWN CLAY, TR F/M SAND (MOIST)*** 2.0	60	
	S-2	5 6 6 8			75	
5	S-3	12 11 13 16		***BROWN CLAY, SM F/M/C SAND, TR TO SM GRAVEL (MOIST)***	85	
	S-4	9 12 22 23		8.0	100	
10	S-5	28 23 34 31		***DARK BROWN SILTY CLAY, SM F/M/C SAND, SM F/C GRAVEL, SM CLAY (DAMP)***	100	
				13.0		
15	S-6	22 23 50/0.3'		***DARK BROWN F/C GRAVELLY F/M/C SAND, TR CLAY (DAMP)***	65	DIFFUCLT AUGERING AT 14.3 FT; POSSIBLE COBBLE
				18.0		
20	S-7	21 14 33 13		***DARK GRAY BROWN SILTY CLAYEY F/M/C SAND AND F/C GRAVEL (DAMP)***	75	DIFFUCLT AUGERING AT 19 FT; POSSIBLE COBBLE
				23.0		
25	S-8	10 14 9 12		***DARK GRAY F/M/C SAND, SM F/C GRAVEL, SM CLAY*** 25.0	15	
				END OF BORING AT 25'		
30						
35						

NE=NOT ENCOUNTERED

DRN. WHM
CKD. JPB

TEST BORING LOG

PROJECT: FLAT CREEK SUBSTATION
LOCATION: MONTGOMERY COUNTY, NY

BORING B-303
G.S. ELEV.
FILE 435979.1GEO
SHEET 1 OF 1

GROUNDWATER DATA				
FIRST ENCOUNTERED 18.0 '				▽
DEPTH	HOUR	DATE	ELAPSED TIME	
16.8'		5/14	0 HOURS	▼
				▽

METHOD OF ADVANCING BOREHOLE				
a	FROM	0.0 '	TO	10.0 '
d	FROM	10.0 '	TO	30.0 '

DRILLER R. CRUM
HELPER D. CRUM
INSPECTOR W. MCCART
DATE STARTED 05/14/2024
DATE COMPLETED 05/14/2024

DEPTH	A	B	C	DESCRIPTION	REC	REMARKS
				0.9 ***TOPSOIL***	50	
	S-1	WH 1 3 2		2.0 ***BROWN CLAY, TR F/M SAND (MOIST)***		
	S-2	4 4 6 7			80	
5				***BROWN CLAY, SM F/M/C SAND, TR TO SM GRAVEL (MOIST)***	85	
	S-3	9 7 8 13			85	
	S-4	1 1 4 5		8.0		
10	S-5	9 12 15 25			100	
				BROWN SILTY CLAY, SM F/M/C SAND, SM F/C GRAVEL, SM CLAY (DAMP)		
				13.0	100	
	S-6	6 50/0.4'				DIFFUCLT AUGERING AT 13.9 FT
15						
▼						
▽					39	DIFFUCLT AUGERING AT 18.5 FT
20	S-7	7 26 11 50/0.3'				
				DARK GRAY BROWN SILTY CLAYEY F/M/C SAND AND F/C GRAVEL (DAMP)	35	
25	S-8	7 9 9 8				
					25	
30	S-9	11 19 13 37		30.0		
				END OF BORING AT 30'		
35						

DRN. WHM
CKD. JPB

TEST BORING LOG

PROJECT: FLAT CREEK SUBSTATION
LOCATION: MONTGOMERY COUNTY, NY

BORING B-304
G.S. ELEV.
FILE 435979.1GEO
SHEET 1 OF 1

GROUNDWATER DATA				
FIRST ENCOUNTERED NE				▽
DEPTH	HOUR	DATE	ELAPSED TIME	
				▼

METHOD OF ADVANCING BOREHOLE				
a	FROM	0.0 '	TO	10.0 '
d	FROM	10.0 '	TO	25.0 '

DRILLER R. CRUM
HELPER D. CRUM
INSPECTOR W. MCCART
DATE STARTED 05/14/2024
DATE COMPLETED 05/14/2024

DEPTH	A	B	C	DESCRIPTION	REC	REMARKS
				0.6 ***TOPSOIL***	70	
	S-1	WH 3 3 4		***BROWN CLAY, TR F/M SAND (MOIST)*** 2.0		
	S-2	3 5 7 9			85	
5	S-3	9 15 13 13		***BROWN CLAY, SM F/M/C SAND, TR TO SM GRAVEL (MOIST)***	35	
	S-4	9 12 16 18		8.0	60	
10	S-5	24 26 30 22			65	
				BROWN SILTY CLAY, SM F/M/C SAND, SM F/C GRAVEL, SM CLAY (DAMP) 13.0		
15	S-6	7 10 9 12			100	
	S-7	50/0.1'		***DARK GRAY BROWN SILTY CLAYEY F/M/C SAND AND F/C GRAVEL (DAMP)***	100	DIFFUCLT AUGERING AT 18.1 FT; POSSIBLE COBBLE
20				23.0		
25	S-8	10 7 8 12		***DARK GRAY SILTY CLAY, SM F/M/C SAND, SM F/C GRAVEL (DAMP)*** 25.0	100	
				END OF BORING AT 25'		
30						
35						

DRN. WHM
CKD. JPB

TEST BORING LOG

PROJECT: FLAT CREEK SUBSTATION

LOCATION: MONTGOMERY COUNTY, NY

BORING **B-305**
G.S. ELEV.
FILE 435979.1GEO
SHEET 1 OF 1

GROUNDWATER DATA			
FIRST ENCOUNTERED 23.0 ' ▽			
DEPTH	HOUR	DATE	ELAPSED TIME
▼			

METHOD OF ADVANCING BOREHOLE				
a	FROM	0.0 '	TO	10.0 '
d	FROM	10.0 '	TO	25.0 '

DRILLER R. CRUM
HELPER D. CRUM
INSPECTOR W. MCCART
DATE STARTED 05/14/2024
DATE COMPLETED 05/14/2024

DEPTH	A	B	C	DESCRIPTION	REC	REMARKS
				0.4 ***TOPSOIL***		
	S-1	1 1 2 3		***BROWN CLAY, TR F/M SAND (MOIST)*** 2.0	35	
	S-2	2 3 4 3		***NO RECOVERY*** 4.0	0	
5	S-3	8 13 18 13		***BROWN SILTY CLAY, SM F/M/C SAND, SM F/C GRAVEL (MOIST)***	30	
	S-4	12 8 15 18		8.0	75	
10	S-5	21 19 28 26			65	
15	S-6	10 10 9 11		***BROWN F/M/C SANDY SILTY CLAY, SM F/C GRAVEL (DAMP)*** 18.0	55	
20	S-7	19 20 17 11		***DARK GRAY BROWN SILTY CLAYEY F/C GRAVEL AND F/M/C SAND (DAMP)*** 23.0	45	
▽ 25	S-8	7 10 10 13		***DARK GRAY CLAY, SM F/C GRAVEL, SM F/M/C SAND (WET)*** 25.0	35	
				END OF BORING AT 25'		
30						
35						

DRN. WHM
CKD. JPB

NEW PROJECTS TEST BORING LOG 435979.0GEO FLAT CREEK SUBSTATION.GPJ SITE BLAUVELT.GDT 6/17/24

TEST BORING LOG

PROJECT: FLAT CREEK SUBSTATION
LOCATION: MONTGOMERY COUNTY, NY

BORING	**B-306**
G.S. ELEV.	
FILE	435979.1GEO
SHEET	1 OF 1

GROUNDWATER DATA			
FIRST ENCOUNTERED NE			
DEPTH	HOUR	DATE	ELAPSED TIME

METHOD OF ADVANCING BOREHOLE				
a	FROM	0.0 '	TO	10.0 '
d	FROM	10.0 '	TO	15.0 '

DRILLER R. CRUM
HELPER D. CRUM
INSPECTOR W. MCCART
DATE STARTED 05/16/2024
DATE COMPLETED 05/16/2024

DEPTH	A	B	C	DESCRIPTION	REC	REMARKS
				0.7 ***TOPSOIL***	65	
	S-1	WH 3 5 4	▨	***BROWN F/M/ SAND AND CLAY (MOIST)*** 2.0		
	S-2	4 7 8 9	▨	***BROWN SILTY CLAY, SM F/M SAND (MOIST)*** 4.0	55	
5	S-3	8 9 7 13	▨	***BROWN F/M/C SANDY CLAY, SM F/C GRAVEL (MOIST)*** 6.0	100	
	S-4	9 10 14 17	▨	***BROWN CLAY, SM F/M/C SAND, TR F/ GRAVEL (MOIST)*** 8.0	25	
10	S-5	19 19 21 22	▨		80	
			▨	***DARK GRAY BROWN TO DARK GRAY SILTY CLAY, SMF/MC SAND, SM F/C GRAVEL (MOIST)***		
15	S-6	9 8 9 10	▨	15.0	85	
				END OF BORING AT 15'		
20						
25						
30						
35						

NE=NOT ENCOUNTERED

DRN. WHM
CKD. JPB

TEST BORING LOG

PROJECT: FLAT CREEK SUBSTATION
LOCATION: MONTGOMERY COUNTY, NY

BORING **B-307**
G.S. ELEV.
FILE 435979.1GEO
SHEET 1 OF 1

GROUNDWATER DATA				
FIRST ENCOUNTERED 23.0 '				▽
DEPTH	HOUR	DATE	ELAPSED TIME	
25.2'		5/16	0 HOURS	▼
				▽

METHOD OF ADVANCING BOREHOLE					
a	FROM	0.0 '	TO	10.0 '	
d	FROM	10.0 '	TO	35.0 '	

DRILLER R. CRUM
HELPER D. CRUM
INSPECTOR W. MCCART
DATE STARTED 05/16/2024
DATE COMPLETED 05/16/2024

DEPTH	A	B				C	DESCRIPTION	REC	REMARKS
						1.3	***TOPSOIL***		
	S-1	WH/1'		2	3	2.0	***BROWN CLAY, TR F/M SAND (WET)***	25	
	S-2	WH/1'		3	1			25	
5	S-3	WH/1'		3	3			35	
	S-4	7	7	4	7	8.0	***BROWN CLAY, SM F/M/C SAND, TR F/ GRAVEL (WET)***	100	
10	S-5	11	15	15	8			100	
						13.0	***BROWN F/M/C SANDY SILTY CLAY, SM F/C GRAVEL (MOIST TO WET)***		
15	S-6	8	7	8	10			100	
20	S-7	13	7	5	11			85	
▽									DIFFUCLT AUGERING AT 22 FT
▼ 25	S-8	7	5	5	9			55	DIFFUCLT AUGERING AT 26 FT
						28.0	***DARK GRAY SILTY CLAYEY F/M/C SAND AND F/C GRAVEL (MOIST TO WET)***		
30	S-9	8	12	10	33			60	DIFFUCLT AUGERING FROM 30 TO 33 FT
35	S-10	11	10	8	20	35.0	***DARK GRAY SILTY CLAYEY F/C GRAVELLY F/M/C, TR TO SM F/M/C SAND (WET)***	45	

END OF BORING AT 35'

DRN. WHM
CKD. JPB

TEST BORING LOG

PROJECT: FLAT CREEK SUBSTATION

LOCATION: MONTGOMERY COUNTY, NY

BORING **B-308**

G.S. ELEV.

FILE 435979.1GEO

SHEET 1 OF 1

GROUNDWATER DATA			
FIRST ENCOUNTERED NE			
DEPTH	HOUR	DATE	ELAPSED TIME

METHOD OF ADVANCING BOREHOLE				
a	FROM	0.0 '	TO	10.0 '
d	FROM	10.0 '	TO	25.0 '

DRILLER R. CRUM
HELPER D. CRUM
INSPECTOR W. MCCART
DATE STARTED 05/15/2024
DATE COMPLETED 05/15/2024

DEPTH	A	B	C	DESCRIPTION	REC	REMARKS
	S-1	WH 1 3 4	1.1	***TOPSOIL***	40	
			2.0	***BROWN CLAY, TR F/M SAND (MOIST)***		
	S-2	3 5 5 5			70	
5	S-3	5 7 9 15		***BROWN CLAY AND F/M SAND, TR F/C GRAVEL (MOIST)***	80	
	S-4	10 11 20 20	8.0		100	
10	S-5	33 29 24 25			90	
15	S-6	8 9 11 10		***BROWN F/M/C SANDY SILTY CLAY, SM F/C GRAVEL (DAMP)***	100	
20	S-7	6 8 9 9			70	
	S-8	50/0.1'	22.0		0	AUGER REFUSAL AT 22.0 FT; BROING OFFSET 30 FT SE AND CONTINUED
			23.0	***DARK GRAY F/M/C SAND AND CLAY, SM F/C GRAVEL (DAMP)***		
25	S-9	19 15 18 17	25.0	***DARK GRAY SILTY CLAYEY F/C GRAVELLY F/M/C, TR TO SM F/M/C SAND (DAMP)***	15	
				END OF BORING AT 25'		
30						
35						

NE=NOT ENCOUNTERED

DRN. WHM
CKD. JPB

NEW PROJECTS TEST BORING LOG 435979.0GEO FLAT CREEK SUBSTATION.GPJ SITE BLAUVELT.GDT 6/17/24

TEST BORING LOG

BORING	**B-309**
G.S. ELEV.	
FILE	435979.1GEO
SHEET	1 OF 1

PROJECT: FLAT CREEK SUBSTATION
LOCATION: MONTGOMERY COUNTY, NY

GROUNDWATER DATA

FIRST ENCOUNTERED 27.5 ' ▽

DEPTH	HOUR	DATE	ELAPSED TIME	
28.0'		5/15	0 HOURS	▼
				▽

METHOD OF ADVANCING BOREHOLE

a	FROM	0.0 '	TO	10.0 '
d	FROM	10.0 '	TO	35.0 '

DRILLER R. CRUM
HELPER D. CRUM
INSPECTOR W. MCCART
DATE STARTED 05/15/2024
DATE COMPLETED 05/15/2024

DEPTH	A	B				C	DESCRIPTION	REC	REMARKS
	S-1	WH	1	4	4		0.6 ***TOPSOIL*** ***BROWN CLAY, TR F/M SAND (WET)*** 2.0	35	
	S-2	4	6	7	7		***BROWN SILTY CLAY, SM F/M/C SAND (MOIST)***	70	
5	S-3	8	8	10	11		6.0	55	
	S-4	27	11	10	14		***BROWN F/C GRAVELLY CLAY, SM F/M/C SAND (MOIST)*** 8.0	100	
10	S-5	17	24	35	33			100	
15	S-6	9	15	13	8		***BROWN TO DARK GRAYF/M/C SANDY SILTY CLAY, SM F/C GRAVEL (DAMP TO MOIST)*** 18.0	60	
20	S-7	5	4	6	5		***DARK GRAY CLAY, SM F/M/C SAND, TR F/ GRAVEL (MOIST)*** 23.0	90	
25	S-8	7	47	20	10		***DARK GRAY SILTY CLAYEY F/C GRAVEL, AND F/M/C SAND (MOIST)***	60	DIFFUCLT AUGERING AT 23.5 FT; POSSIBLE COBBLE
30	S-9	22	17	10	7		33.0	45	
35	S-10	7	8	6	50		***DARK GRAY F/M/C SANDY CLAY, SM F/C GRAVEL (WET)*** 35.0	45	DIFFUCLT AUGERING AT 34.5 FT; POSSIBLE COBBLE

END OF BORING AT 35'

DRN. WHM
CKD. JPB

NEW PROJECTS TEST BORING LOG 435979.0GEO FLAT CREEK SUBSTATION.GPJ SITE BLAUVELT.GDT 6/17/24

TEST BORING LOG

PROJECT: FLAT CREEK SUBSTATION
LOCATION: MONTGOMERY COUNTY, NY

BORING **B-310**
G.S. ELEV.
FILE 435979.1GEO
SHEET 1 OF 2

GROUNDWATER DATA			
FIRST ENCOUNTERED 17.0 ' ▽			
DEPTH	HOUR	DATE	ELAPSED TIME

METHOD OF ADVANCING BOREHOLE				
a	FROM	0.0 '	TO	10.0 '
d	FROM	10.0 '	TO	35.1 '

DRILLER R. CRUM
HELPER D. CRUM
INSPECTOR W. MCCART
DATE STARTED 05/16/2024
DATE COMPLETED 05/16/2024

DEPTH	A	B	C	DESCRIPTION	REC	REMARKS
	S-1	WH 3 3 2		0.6 ***TOPSOIL*** ***BROWN CLAY, TR TO SM F/M/C SAND (MOIST)*** 2.0	40	
	S-2	4 4 3 2			15	
5	S-3	5 7 10 12		***BROWN F/M/C SANDY SILTY CLAY, TR TO SM F/C GRAVEL (MOIST)***	25	
	S-4	13 11 13 22		8.0	100	
	S-5	30 50/0.3'			50	DIFFUCLT AUGERING AT 8.5 FT
10				***DARK GRAY SILTY CLAYEY F/M/C SAND AND F/C GRAVEL (MOIST)***		
15	S-6	10 5 8 9			100	DIFFUCLT AUGERING AT 16 FT
▽				18.0		
20	S-7	6 5 5 11			15	DIFFUCLT AUGERING FROM 21 TO 23 FT; POSSIBLE COBBLES
	S-8	50/0.2'			0	AUGER REFUSAL AT 23.0 FT; BORING OFFSET 15 FT SOUTH AND CONTINUED
25				***DARK GRAY SILTY CLAYEY F/C GRAVEL AND F/M/C SAND (WET)***		
30	S-9	16 15 24 31			60	
35	S-10	46 34 37 50/0.3'			94	AUGER REFUSAL AT 35.1 FT

DRN. WHM
CKD. JPB

TEST BORING LOG

PROJECT: FLAT CREEK SUBSTATION
LOCATION: MONTGOMERY COUNTY, NY

BORING **B-310**
G.S. ELEV.
FILE 435979.1GEO
SHEET 2 OF 2

DEPTH		A	B	C	DESCRIPTION	REC	REMARKS
					35.1 ***END OF BORING AT 35.1'***		
40							
45							
50							
55							
60							
65							
70							
75							

TEST BORING LOG

PROJECT: FLAT CREEK SUBSTATION

LOCATION: MONTGOMERY COUNTY, NY

BORING	**B-311**
G.S. ELEV.	
FILE	435979.1GEO
SHEET	1 OF 1

GROUNDWATER DATA			
FIRST ENCOUNTERED NE			
DEPTH	HOUR	DATE	ELAPSED TIME

METHOD OF ADVANCING BOREHOLE				
a	FROM	0.0 '	TO	10.0 '
d	FROM	10.0 '	TO	34.2 '

DRILLER	R. CRUM
HELPER	D. CRUM
INSPECTOR	W. MCCART
DATE STARTED	05/16/2024
DATE COMPLETED	05/16/2024

DEPTH	A	B	C	DESCRIPTION	REC	REMARKS
	S-1	WH 2 4 3		0.6 ***TOPSOIL*** ***BROWN F/M SAND, SM CLAY (MOIST)*** 2.0	45	
	S-2	4 3 5 4		***BROWN CLAY, TR TO SM F/M/C SAND, TR F/ GRAVEL (MOIST)*** 4.0	65	
5	S-3	5 6 7 10			100	
	S-4	10 10 12 15		***BROWN F/M/C SANDY SILTY CLAY, TR TO SM F/C GRAVEL (MOIST)***	100	
10	S-5	17 19 20 32		13.0	100	
15	S-6	4 19 17 12			80	
20	S-7	6 4 6 6		***DARK GRAY F/M/C SANDY CLAY, SM F/C GRAVEL (WET)***	100	
25	S-8	9 15 13 49		28.0	45	DIFFUCLT AUGERING AT 24.5 FT
30	S-9	21 20 29 30		***DARK GRAY SILTY CLAYEY F/C GRAVEL, SM F/M/C SAND (MOIST)*** 33.0	25	
	S-10	70 58 50/0.2'		***DARK GRAY F/C GRAVEL-SIZED ROCK FRAGMENTS, SM F/M/C SAND, SM SILT (DRY)*** 34.2	100	AUGER REFUSAL AT 33.6 FT
35						

END OF BORING AT 34.2'

NE=NOT ENCOUNTERED

DRN.	WHM
CKD.	JPB

KEY TO SYMBOLS

Strata symbols

Symbol	Description
□	Blank Graphic
▨	Clay with Low Plasticity
▨	Silty Clay
▨	USCS Low Plasticity Sandy Clay
⁘	Silty, Clayey Gravel
⁘	Poorly-graded Sandy Gravel
▨	Clayey Sand
▨	Silty, Clayey Sand
⁘	USCS Poorly-graded Gravelly Sand
⁙	Topsoil

Misc. Symbols

Symbol	Description
▽	Water table first encountered
▼	Water table first reading after drilling
▼	Water table second reading after drilling
▼	Water table third reading after drilling
NR	Not Recorded
MH	Moh's Hardness

Sample Type

Symbol	Description
▯	Split Barrel

Lab Symbols

FINES = Fines %

LL = Liquid Limit %

PI = Plasticity Index %

U_c = Unconfined Compressive Strength

W/V = Unit Weight

Notes:

COLUMN A) Soil sample number.

COLUMN B) FOR SOIL SAMPLE (ASTM D 1586): indicates number of blows obtained for each 6 ins. penetration of the standard split-barrel sampler. FOR ROCK CORING (ASTM D2113): indicates percent recovery (REC) per run and rock quality designation (RQD). RQD is the % of rock pieces that are 4 ins. or greater in length in a core run.

COLUMN C) Strata symbol as assigned by the geotechnical engineer.

DESCRIPTION) Description including color, texture and classification of subsurface material as applicable (see Descriptive Terms). Estimated depths to bottom of strata as interpolated from the borings are also shown.

DESCRIPTIVE TERMS: F = fine M = medium C = coarse

RELATIVE PROPORTIONS:

-Descriptive Term-	-Symbol-	-Est. Percentages-
Trace	TR	1-10
Trace to Some	TR to SM	10-15
Some	SM	15-30
Silty, Sandy, Clayey, Gravelly	-	30-40
And	and	40-50

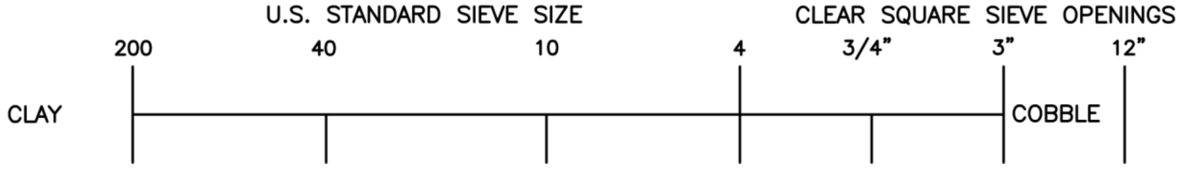
REMARKS) Special conditions or test data as noted during investigation. Note that W.O.P. indicates water observation pipes.

* Free water level as noted may not be indicative of daily, seasonal, tidal, flood, and/or long term fluctuations.

SILTS AND CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

PRIMARY DIVISIONS			SOIL TYPE		SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS (Less than 5% Fines)	GW	●	Well graded gravels, gravel–sand mixtures, little or no fines
			GP	○	Poorly graded gravels or gravel–sand mixtures, little or no fines
		GRAVEL WITH FINES	GM	○	Silty gravels, gravel–sand–silt mixtures, plastic fines
			GC	▨	Clayey gravels, gravel–sand–clay mixtures, plastic fines
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS (Less than 5% Fines)	SW	⁘	Well graded sands, gravelly sands, little or no fines
			SP	⁘	Poorly graded sands or gravelly sands, little or no fines
		SANDS WITH FINES	SM	▥	Silty sands, sand–silt–mixtures, non–plastic fines
			SC	▨	Clayey sands, sand–clay mixtures, plastic fines
FINE GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 50 %		ML	▥	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
			CL	▨	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	☰	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50 %		MH	▥	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	▨	Inorganic clays of high plasticity, fat clays
			OH	≋	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			PT	⁘	Peat and other highly organic soils

DEFINITION OF TERMS



METHODS AND TOOLS FOR **ADVANCING BOREHOLES**

a - Continuous Sampling

b - Finger type rotary cutter head 6 in. diameter (open hole)

d - Drilled in casing 3 3/8 in. ID; 8 in. OD (hollow-stem auger)

e - Drilled in casing 2 1/2 in. ID; 6 1/4 in. OD (hollow-stem auger)

f - Driven flush joint casing (BW) - 2 3/8 in. ID; 2 7/8 in. OD (300 lb. hammer, 18 in. drop)

g - Driven flush joint casing (NW) - 3 in. ID; 3 1/2 in. OD (300 lb. hammer, 18 in. drop)

h - Tricone Roller Bit - 2 3/8 in. or 2 7/8 in.

i - Drilling Mud (Slurry Method)

c_1 - Double tube diamond core barrel (BX) : core size: 1.6 in.
hole size: 2.36 in.

c_2 - Double tube diamond core barrel (NX) : core size: 2.0 in.
hole size: 2.98 in.

c_3 - 4 in. thin walled diamond bit

c_4 - 6 in. thin walled diamond bit

METHODS AND TOOLS FOR **TESTING AND SAMPLING SOILS AND/OR ROCKS**

Penetration test and split-barrel sampling of soils, ASTM D1586

140 lb. hammer, 30 in. drop. recording number of blows obtained for each 6 in. penetration usually for a total of 18 in. penetration of the standard 2 in. O.D. and 1 3/8 in. I.D. split-barrel sampler. Penetration resistance (N) is the total number of blows required for the second and third 6 in. penetration.

Thin walled tube sampling, ASTM D1587

Samples are obtained by pressing thin-walled steel, brass or aluminum tubes into soil. Standard thin-walled steel tubes:

O.D. in.	2	3
I.D. in.	1.94	2.87

Diamond core drilling, ASTM D2113

Diamond core drilling is used to recover intact samples of rock and some hard soils generally with the use of a:

BWM double tube core barrel
NWM double tube core barrel

LABORATORY DATA

SUMMARY OF LABORATORY TEST DATA

Project Name: SunEast Flat Creek Solar 94C
Root, NY
Client Name: SunEast Development, LLC
TRC Project #: 435979.1GEO

SAMPLE IDENTIFICATION			Soil Group (USCS System)	GRAIN SIZE DISTRIBUTION USCS GRADATION				Moisture Content (%)	PLASTICITY				Dry Density (pcf)
Source #	Sample #	Depth (ft)		Gravel (%)	Sand (%)	Silt (%)	Clay (%)		Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Liquidity Index (%)	
B-301	S-2 & S-3	2.0-6.0	CL[1]	-	-	-		13.4	23	15	8	-0.2	-
B-302, 303, & 304	S-2	2.0-4.0	CL[1]	-	-	-		16.3	25	15	10	0.1	-
B-302, 303, & 304	S-3	4.0-6.0	CL[2]	19.5	20.9	59.6		12.6	-	-	-	-	-
B-302, 303, & 304	S-5	8.0-10.0	CL-ML	20.8	22.7	56.5		10.7	20	13	7	-0.3	-
B-304	S-6	13.0-15.0	SC-SM	25.5	30.3	44.2		10.0	18	12	6	-0.3	132.3
B-304	S-8	18.0-25.0	CL-ML[1]	-	-	-		9.9	17	12	5	-0.4	130.3
B-305	S-3 & S-4	4.0-8.0	CL-ML[1]	-	-	-		12.4	19	14	5	-0.3	-
B-306	S-5 & S-6	8.0-15.0	CL-ML[2]	21.9	20.7	57.4		9.2	-	-	-	-	-
B-307 & B-309	S-3	4.0-6.0	CL-ML[1]	-	-	-		18.3	23	16	7	0.3	-
B-307	S-6	13.0-15.0	SC-SM	21.8	33.1	45.1		9.3	15	11	4	-0.4	131.8

DRAWN BY: TBT 06/10/24

CHECKED BY: JPB 06/10/24

TRC

SUMMARY OF LABORATORY TEST DATA

Project Name: SunEast Flat Creek Solar 94C
Root, NY
Client Name: SunEast Development, LLC
TRC Project #: 435979.1GEO

SAMPLE IDENTIFICATION			Soil Group (USCS System)	GRAIN SIZE DISTRIBUTION USCS GRADATION				Moisture Content (%)	PLASTICITY				Dry Density (pcf)
Source #	Sample #	Depth (ft)		Gravel (%)	Sand (%)	Silt (%)	Clay (%)		Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Liquidity Index (%)	
B-307	S-9 & S-10	28.0-35.0	GC-GM^2	42.1	19.8	38.1		9.4	-	-	-	-	-
B-308	S-5	8.0-10.0	CL-ML	13.9	30.3	55.8		9.9	18	11	7	-0.2	-
B-310 & B-311	S-3 & S-4	4.0-8.0	CL-ML	14.4	33.4	52.2		14.7	20	14	6	0.1	-
B-310	S-6	13.0-15.0	SC-SM	20.1	33.9	46.0		10.4	16	12	4	-0.4	130.1
B-310	S-9	28.0-30.0	CL-ML^2	30.9	22.0	47.1		6.3	-	-	-	-	-
B-311	S-7	18.0-20.0	SC-SM	16.8	35.8	47.4		9.9	17	10	7	0.0	-
BULK 1	-	0.0-5.0	CL	3.4	13.1	83.5		24.5	25	16	9	0.9	-
BULK 2	-	0.0-5.0	CL	3.2	15.1	81.7		24.8	29	18	11	0.6	-

Notes:

1. USCS based on fines only. A gradation was not requested.
2. USCS based on grain-size distribution and visual classification. Atterberg limits testing was not requested.

DRAWN BY: TBT 06/10/24

CHECKED BY: JPB 06/10/24

SUMMARY OF LABORATORY TEST DATA

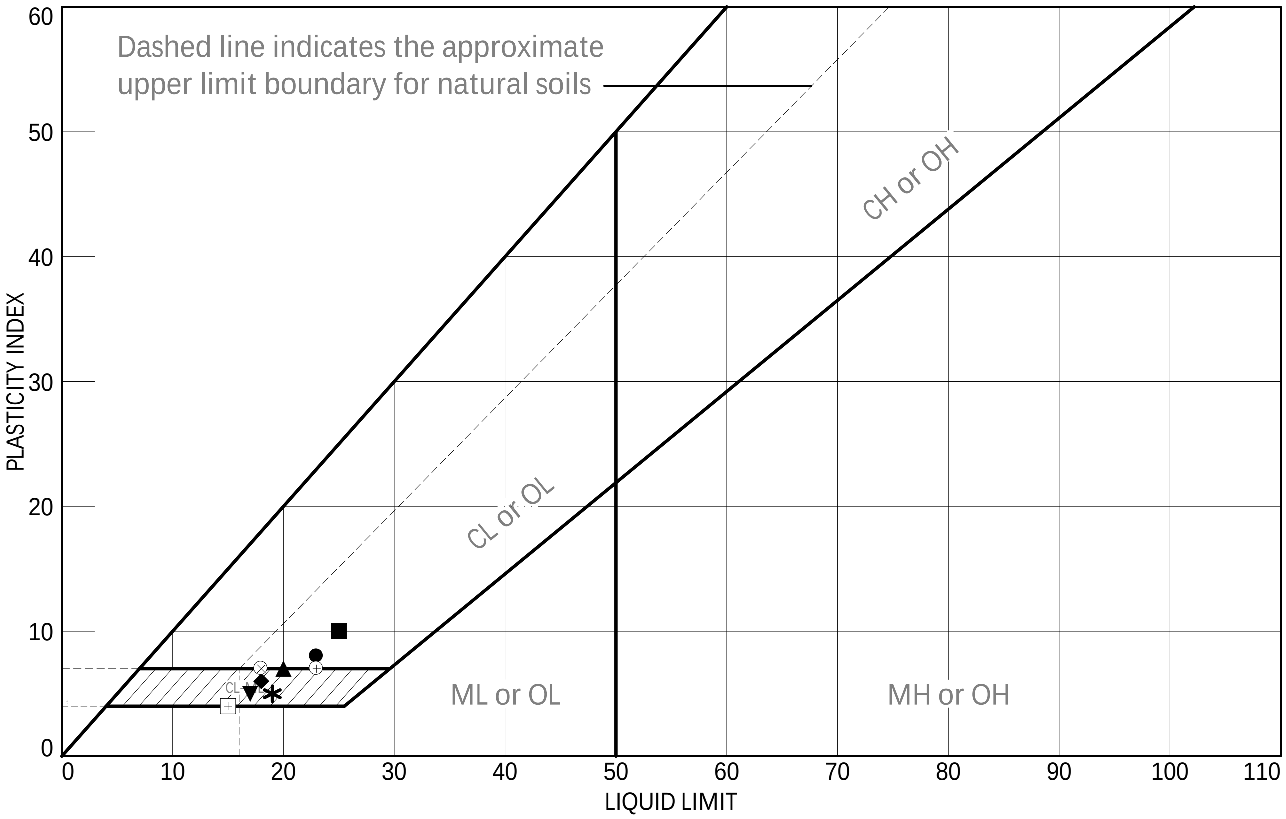
Project Name:	SunEast Flat Creek Solar 94C Root, NY
Client Name:	SunEast Development, LLC
TRC Project #:	435979.1GEO

SAMPLE IDENTIFICATION			COMPACTION CHARACTERISTICS			CALIFORNIA BEARING RATIO	
Source #	Sample #	Depth (ft)	Type of Test	Maximum Density (PCF)	Optimum Moisture Content (%)	% Compaction	0.10 in.
BULK 1	-	0.0-5.0	ASTM D698	112.4	13.6	94.9	3.0
BULK 2	-	0.0-5.0	ASTM D698	107.4	12.6	95.2	2.8

DRAWN BY: TBT 06/10/24

CHECKED BY: JPB 06/10/24

Atterberg Limits and Moisture Content Report



SOIL DATA									
	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	B-301	S-2 & S-3	2.0-6.0 FT	13.4	15	23	8	-0.2	CL*
■	B-302, 303, & 304	S-2	2.0-4.0 FT	16.3	15	25	10	0.1	CL*
▲	B-302, 303, & 304	S-5	8.0-10.0 FT	10.7	13	20	7	-0.3	CL-ML
◆	B-304	S-6	13.0-15.0 FT	10.0	12	18	6	-0.3	SC-SM
▼	B-304	S-8	18.0-25.0 FT	9.9	12	17	5	-0.4	CL-ML*
✱	B-305	S-3 & S-4	4.0-8.0 FT	12.4	14	19	5	-0.3	CL-ML*
⊕	B-307 & B-309	S-3	4.0-6.0 FT	18.3	16	23	7	0.3	CL-ML*
⊞	B-307	S-6	13.0-15.0 FT	9.3	11	15	4	-0.4	SC-SM
⊗	B-308	S-5	8.0-10.0 FT	9.9	11	18	7	-0.2	CL-ML

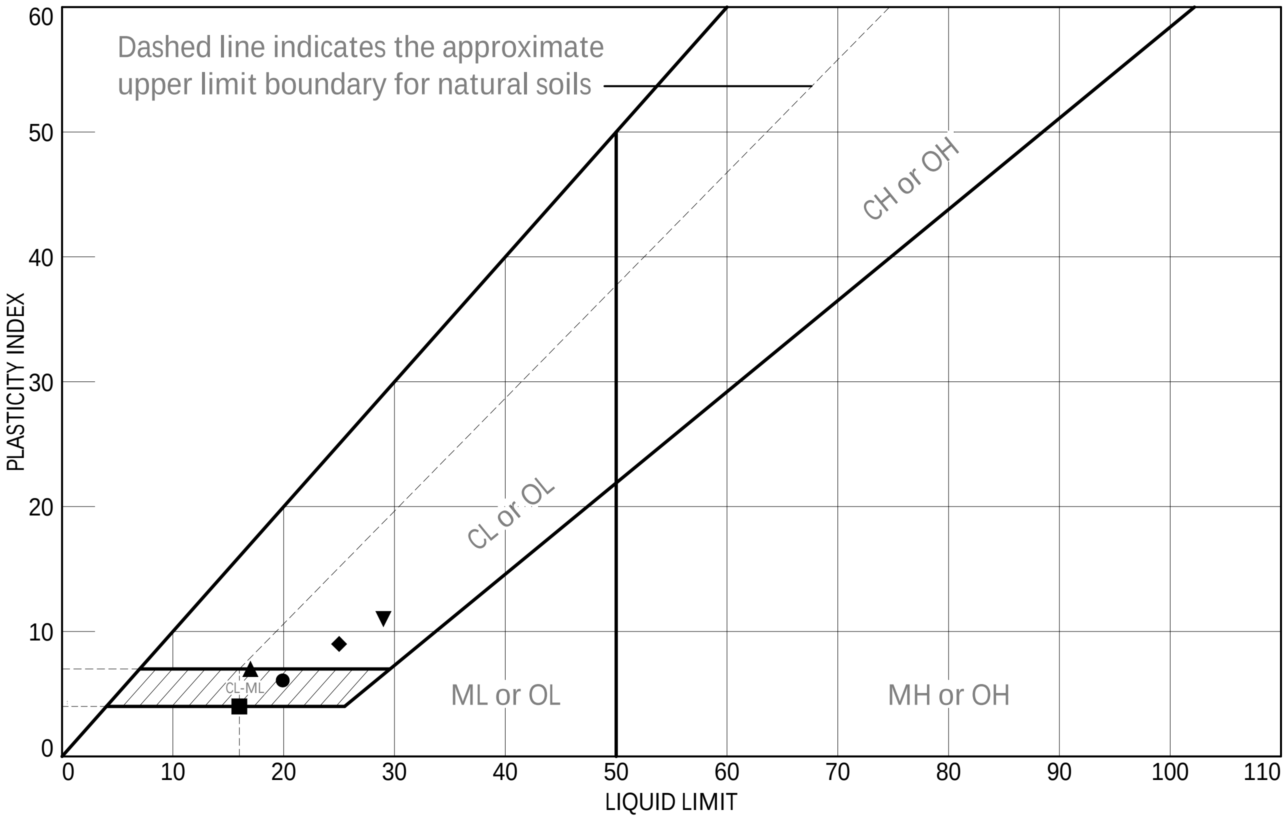
TRC
Engineers, Inc.
Mt. Laurel, NJ

Client: SUNEAST DEVELOPMENT, LLC
Project: SUNEAST FLAT CREEK SOLAR 94C

Project No.: 435979.1GEO

Figure 1

Atterberg Limits and Moisture Content Report



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	B-310 & B-311	S-3 & S-4	4.0-8.0 FT	14.7	14	20	6	0.1	CL-ML
■	B-310	S-6	13.0-15.0 FT	10.4	12	16	4	-0.4	SC-SM
▲	B-311	S-7	18.0-20.0 FT	9.9	10	17	7	0.0	SC-SM
◆	BULK 1		0.0-5.0 FT	24.5	16	25	9	0.9	CL
▼	BULK 2		0.0-5.0 FT	24.8	18	29	11	0.6	CL

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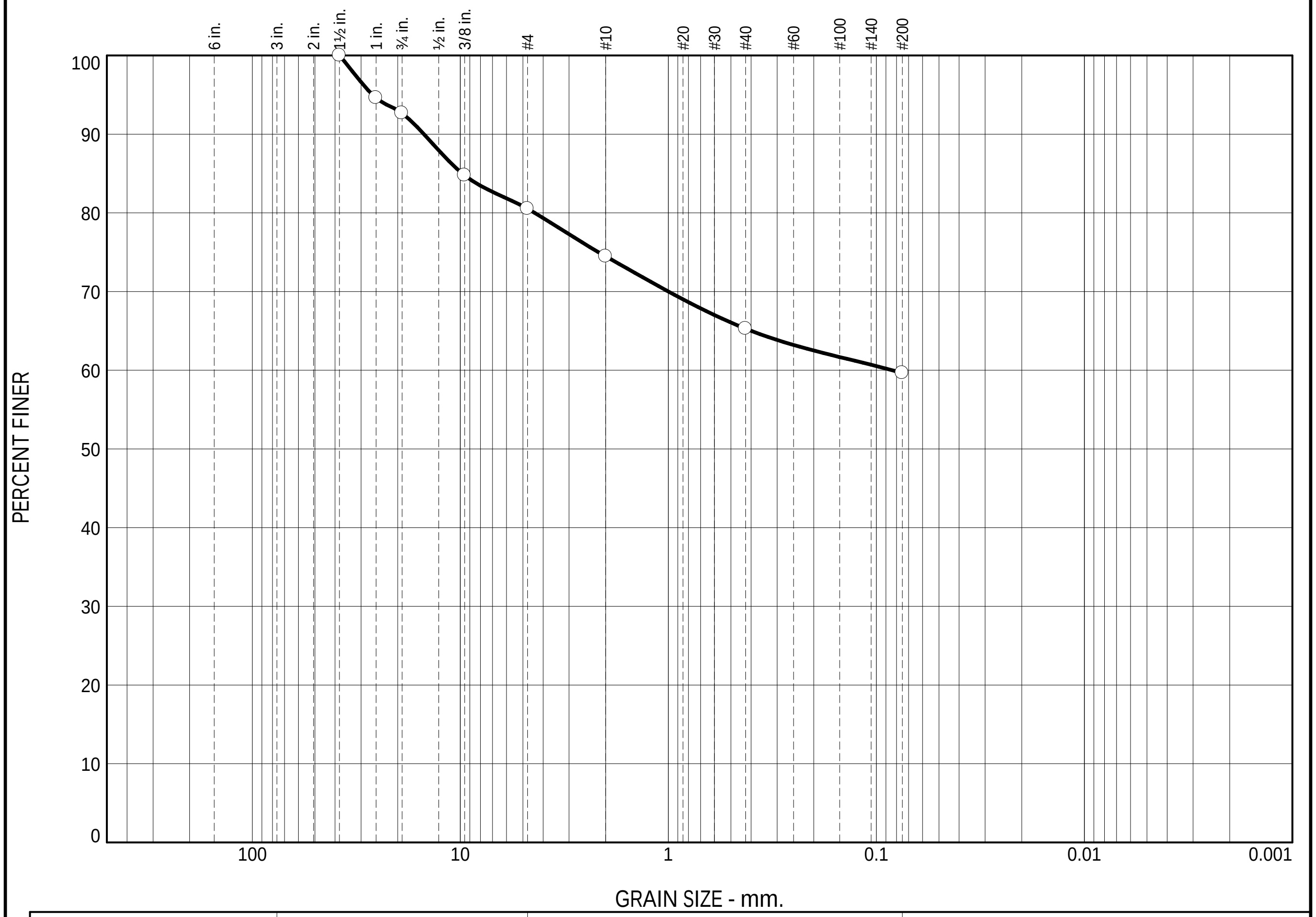
Mt. Laurel, NJ

Client: SUNEAST DEVELOPMENT, LLC
Project: SUNEAST FLAT CREEK SOLAR 94C

Project No.: 435979.1GEO

Figure 2

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	7.3	12.2	6.0	9.2	5.7	59.6	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			9.7704	0.0838						

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ BROWN SANDY CLAY WITH GRAVEL	06/03/24	CL	12.6

Project No. 435979.1GEO Client: SUNEAST DEVELOPMENT, LLC

Project: SUNEAST FLAT CREEK SOLAR 94C

○ Source of Sample: B-302, 303, & 304 Depth: 4.0-6.0 FT Sample Number: S-3

Remarks:

○SAMPLE DESCRIPTION BASED ON GRAIN-SIZE DISTRIBUTION AND VISUAL CLASSIFICATION

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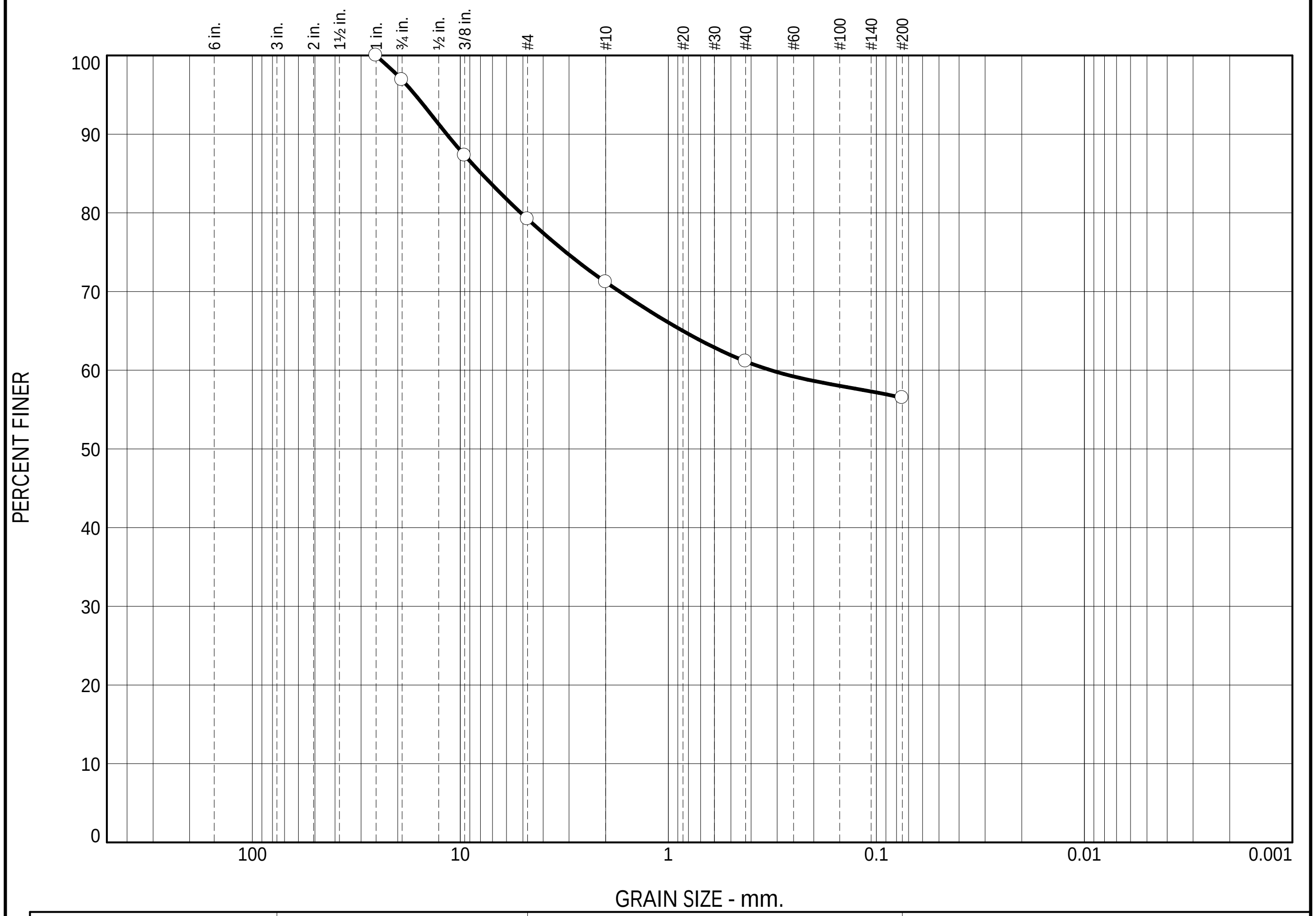
Figure 3

Tested By: JC 06/03/24 Checked By: JPB 06/05/24

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	3.1	17.7	8.0	10.1	4.6	56.5	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	20	13	7.9150	0.3214						

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ BROWN SANDY SILTY CLAY WITH GRAVEL	06/03/24	CL-ML	10.7

Project No. 435979.1GEO Client: SUNEAST DEVELOPMENT, LLC
Project: SUNEAST FLAT CREEK SOLAR 94C

○ Source: B-302, 303, & 304 Depth: 8.0-10.0 FT Sample No.: S-5

Remarks:
○SAMPLE DESCRIPTION
BASED ON USCS

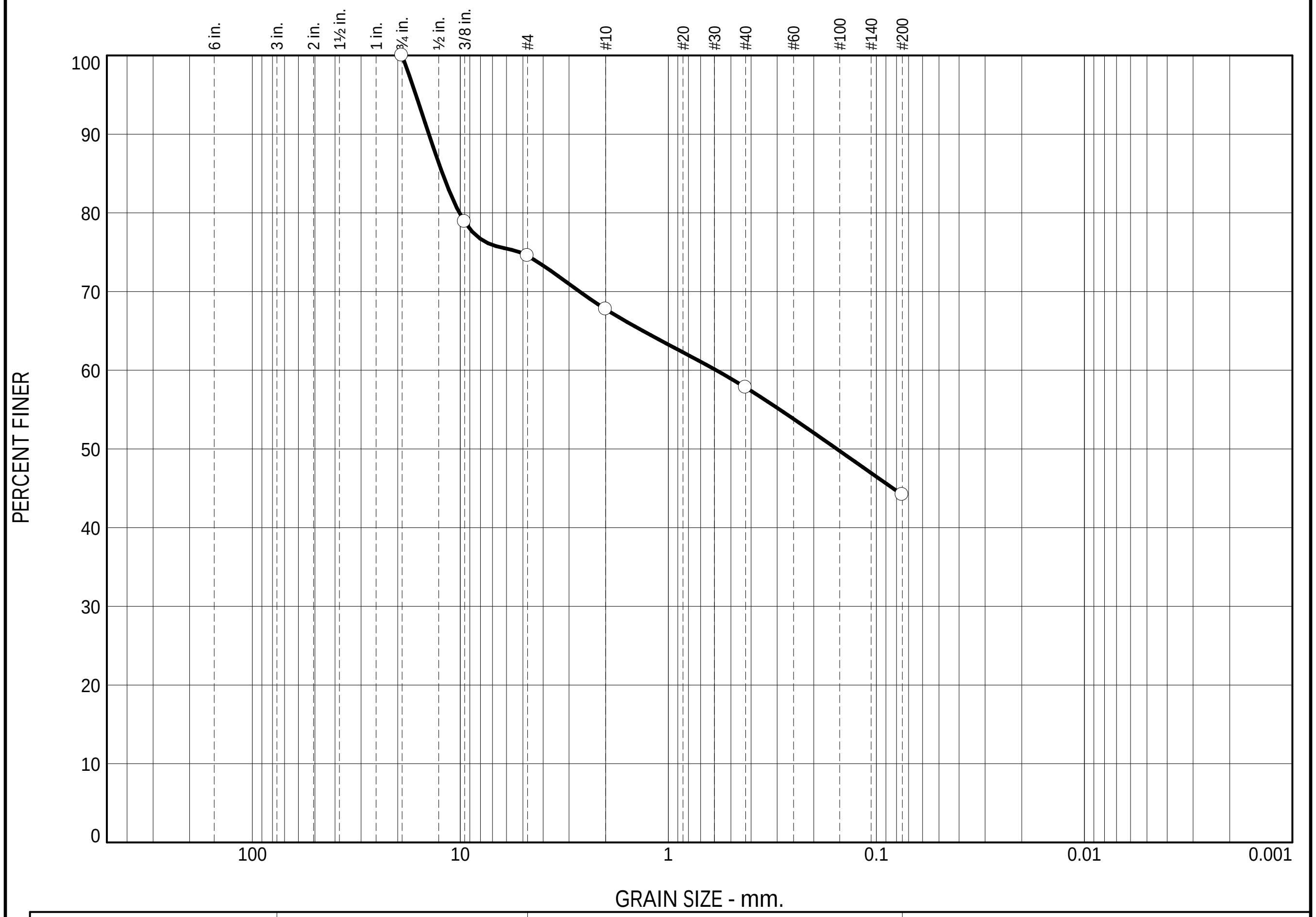
TRC Engineers, Inc.

Mt. Laurel, NJ

Figure 4

Tested By: JC 06/04/24 Checked By: JPB 06/05/24

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	25.5	6.8	9.9	13.6	44.2	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	18	12	12.1742	0.5886	0.1549					

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ GRAY SILTY, CLAYEY SAND WITH GRAVEL	06/04/24	SC-SM	10.0

Project No. 435979.1GEO Client: SUNEAST DEVELOPMENT, LLC

Project: SUNEAST FLAT CREEK SOLAR 94C

○ Source of Sample: B-304 Depth: 13.0-15.0 FT Sample Number: S-6

Remarks:

○SAMPLE DESCRIPTION BASED ON USCS

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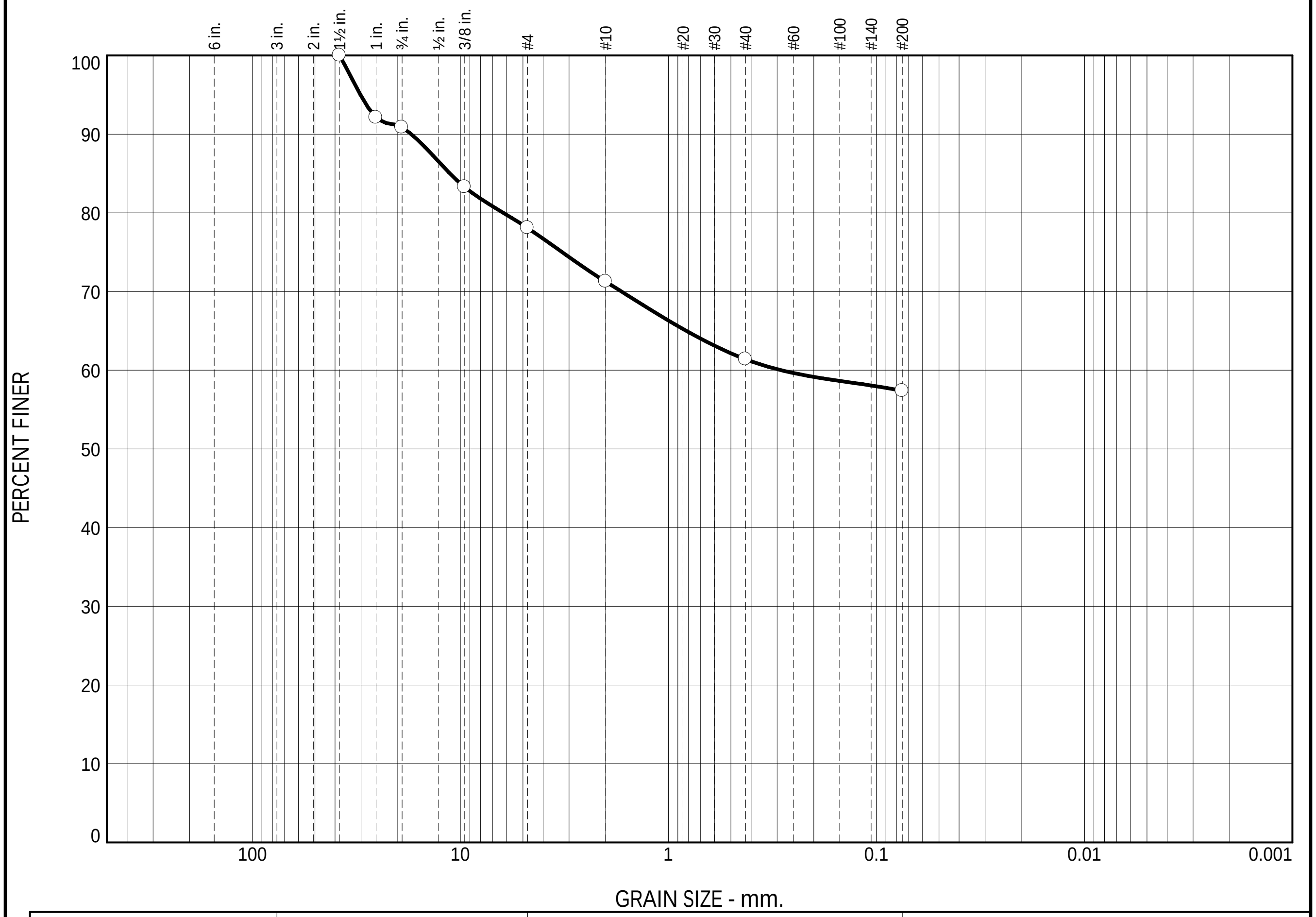
Figure 5

Tested By: JC 06/04/24 Checked By: JPB 06/06/24

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	9.2	12.7	6.8	9.9	4.0	57.4	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			11.2079	0.2858						

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ DARK BROWN/BROWN GRAVELLY SILTY CLAY WITH SAND	06/04/24	CL-ML	9.2

Project No. 435979.1GEO Client: SUNEAST DEVELOPMENT, LLC

Project: SUNEAST FLAT CREEK SOLAR 94C

○ Source of Sample: B-306 Depth: 8.0-15.0 FT Sample Number: S-5 & S-6

Remarks:

○SAMPLE DESCRIPTION BASED ON GRAIN-SIZE DISTRIBUTION AND VISUAL CLASSIFICATION

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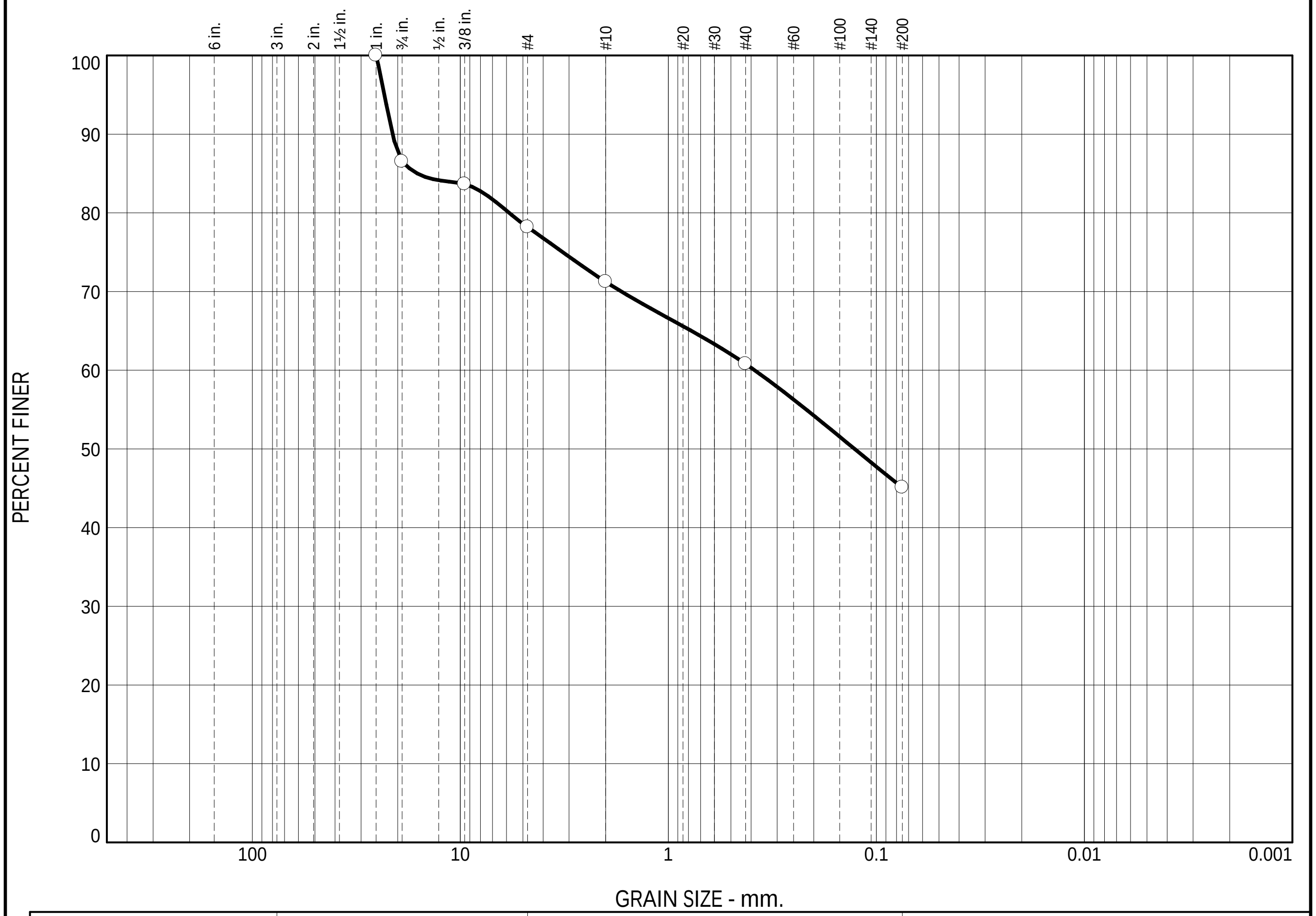
Figure 6

Tested By: JC 06/04/24 Checked By: JPB 06/06/24

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	13.5	8.3	7.0	10.4	15.7	45.1	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	15	11	16.0717	0.3851	0.1272					

	MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○	BROWN/GRAY SILTY, CLAYEY SAND WITH GRAVEL	06/05/24	SC-SM	9.3

Project No. 435979.1GEO Client: SUNEAST DEVELOPMENT, LLC
Project: SUNEAST FLAT CREEK SOLAR 94C

○ Source of Sample: B-307 Depth: 13.0-15.0 FT Sample Number: S-6

Remarks:
○SAMPLE DESCRIPTION BASED ON USCS

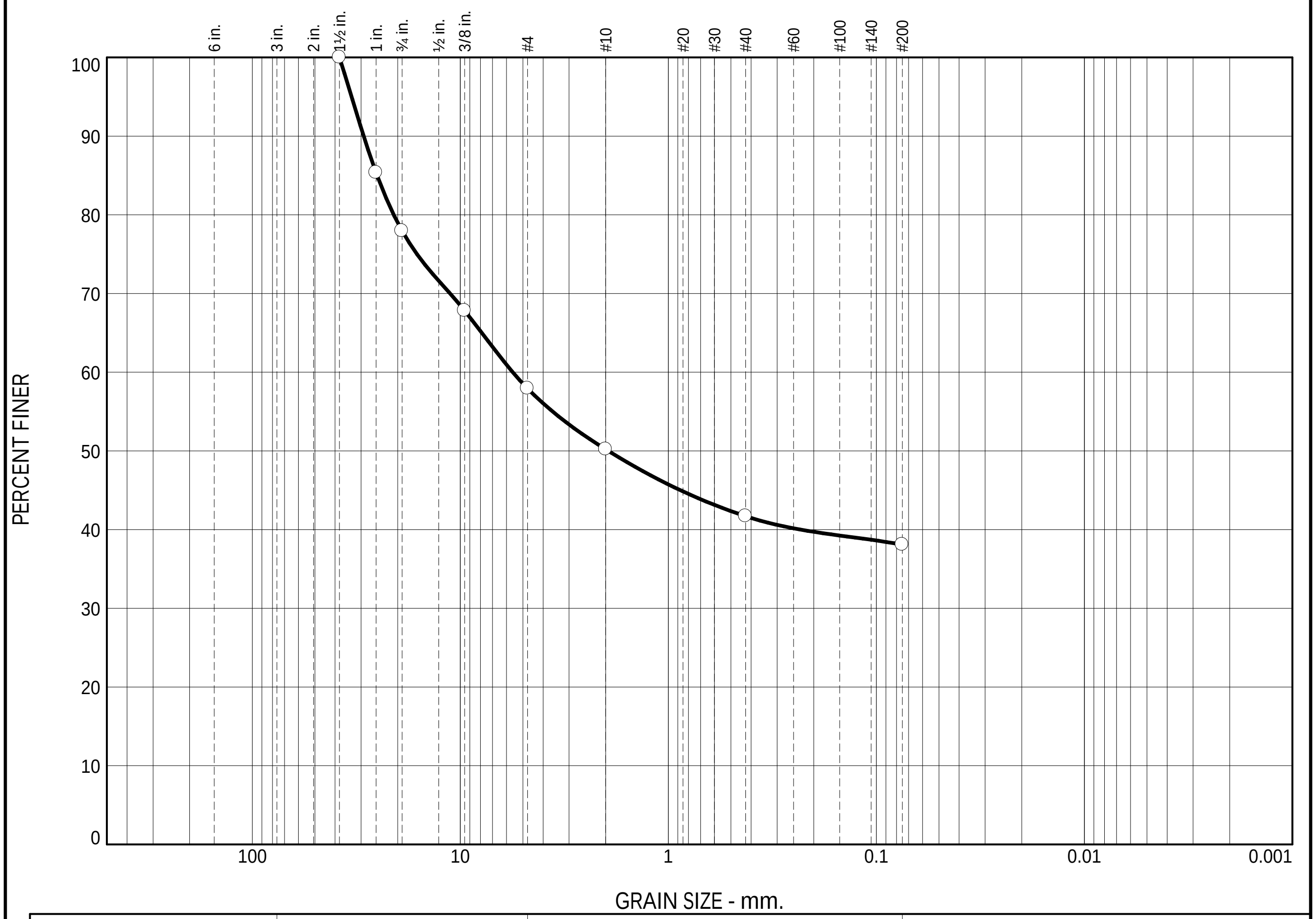
TRC Engineers, Inc.

Mt. Laurel, NJ

Figure 7

Tested By: JC 06/05/24 Checked By: JPB 06/06/24

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	22.0	20.1	7.7	8.5	3.6	38.1	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			25.1156	5.5994	1.9445					

	MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○	GRAY AND BROWN SILTY CLAYEY GRAVEL WITH SAND	06/05/24	GC-GM	9.4

Project No. 435979.1GEO Client: SUNEAST DEVELOPMENT, LLC

Project: SUNEAST FLAT CREEK SOLAR 94C

○ Source of Sample: B-307 Depth: 28.0-30.0 FT Sample Number: S-9 & S-10

Remarks:

○SAMPLE DESCRIPTION BASED ON GRAIN-SIZE DISTRIBUTION AND VISUAL CLASSIFICATION

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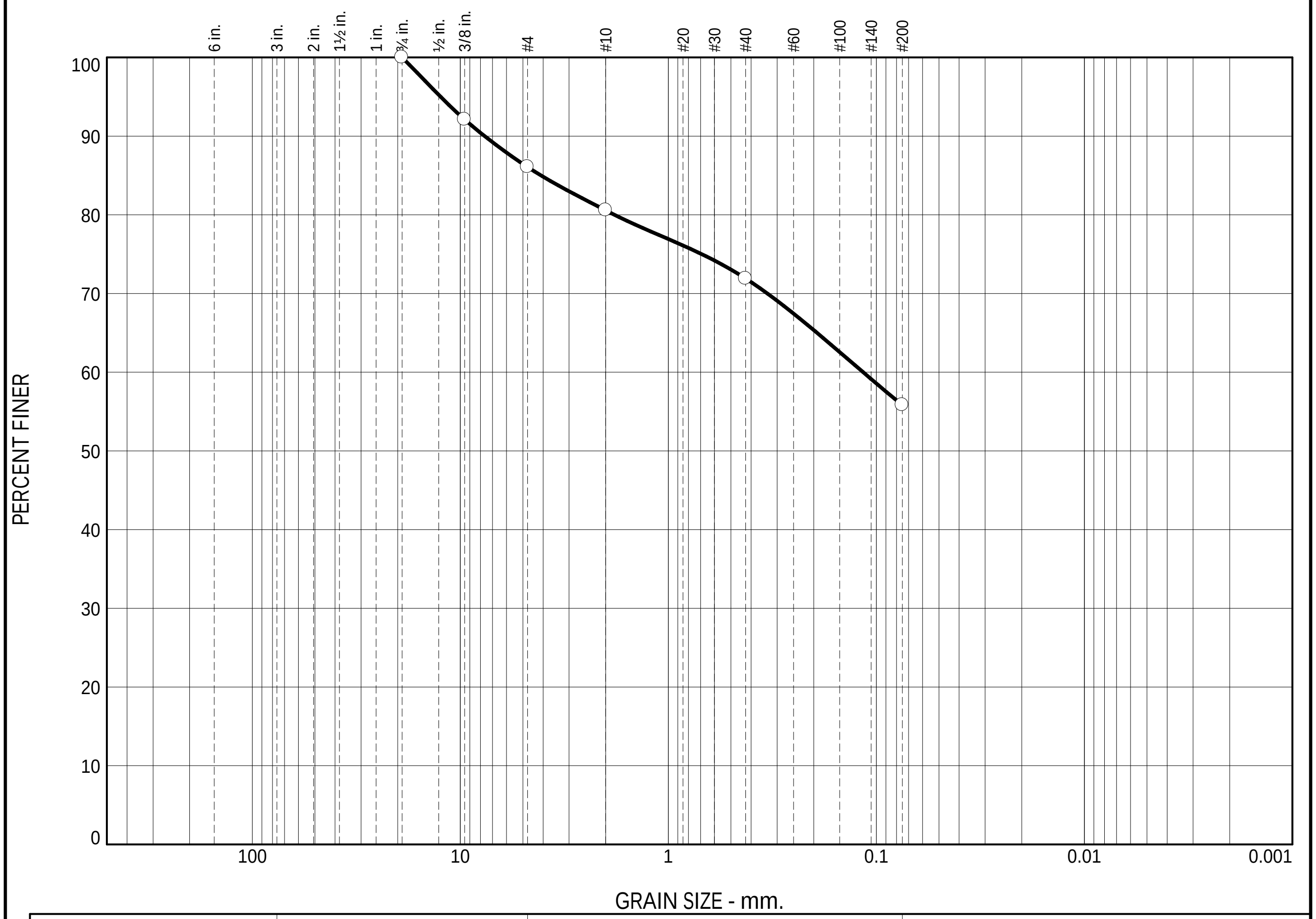
Figure 8

Tested By: JC 06/05/24 Checked By: JPB 06/06/24

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	13.9	5.5	8.7	16.1	55.8	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	18	11	4.0916	0.1158						

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ BROWN/DARK GRAY SANDY SILTY CLAY	06/05/24	CL-ML	9.9

Project No. 435979.1GEO Client: SUNEAST DEVELOPMENT, LLC
Project: SUNEAST FLAT CREEK SOLAR 94C

○ Source of Sample: B-308 Depth: 8.0-10.0 FT Sample Number: S-5

Remarks:
○SAMPLE DESCRIPTION BASED ON USCS

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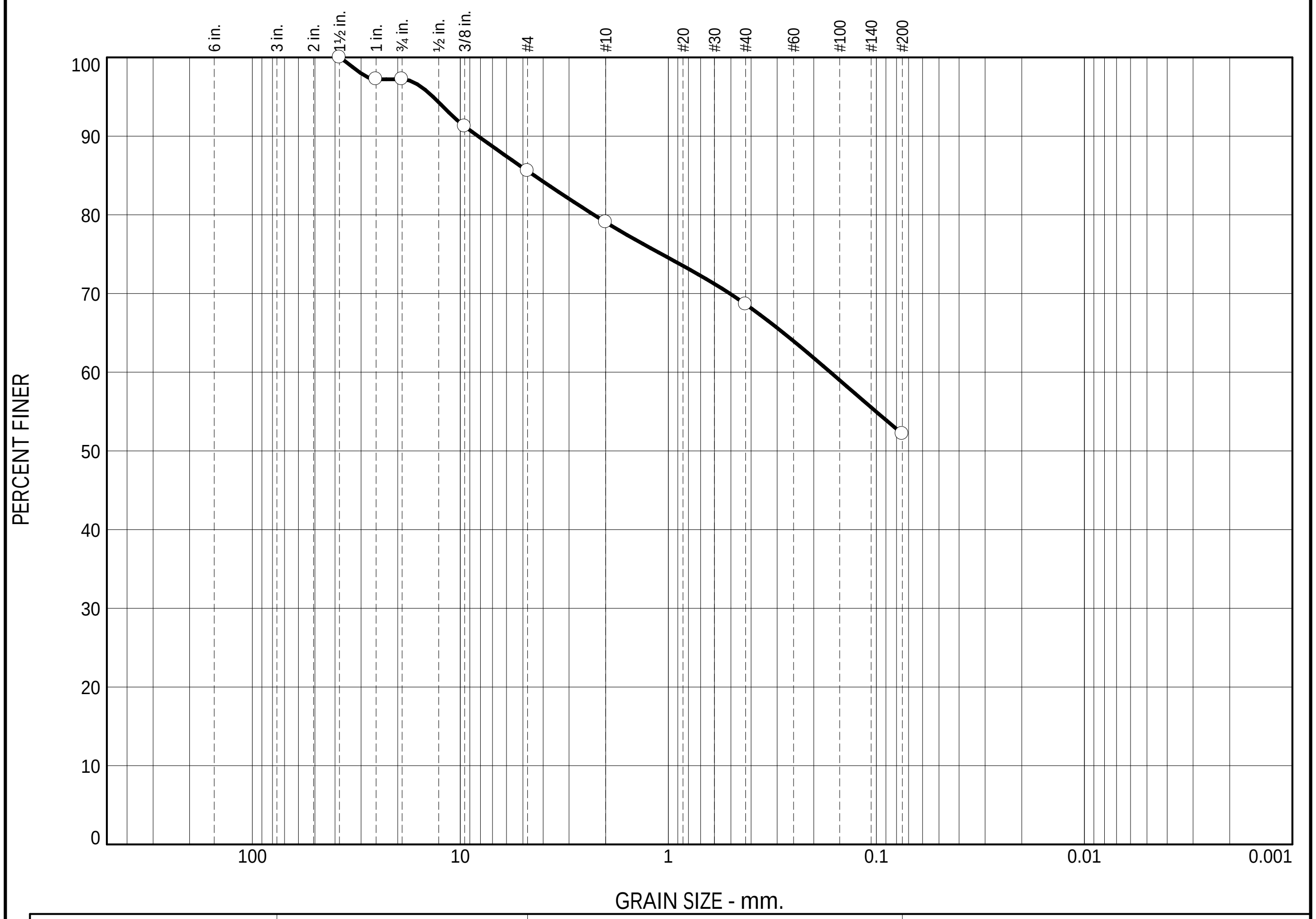
Mt. Laurel, NJ

Figure 9

Tested By: OA 06/05/24 Checked By: JPB 06/06/24

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	2.8	11.6	6.5	10.5	16.4	52.2	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	20	14	4.4140	0.1662						

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ BROWN SANDY SILTY CLAY	06/05/24	CL-ML	14.7

Project No. 435979.1GEO Client: SUNEAST DEVELOPMENT, LLC
Project: SUNEAST FLAT CREEK SOLAR 94C

○ Source: B-310 & B-311 Depth: 4.0-8.0 FT Sample No.: S-3 & S-4

Remarks:
○SAMPLE DESCRIPTION
BASED ON USCS

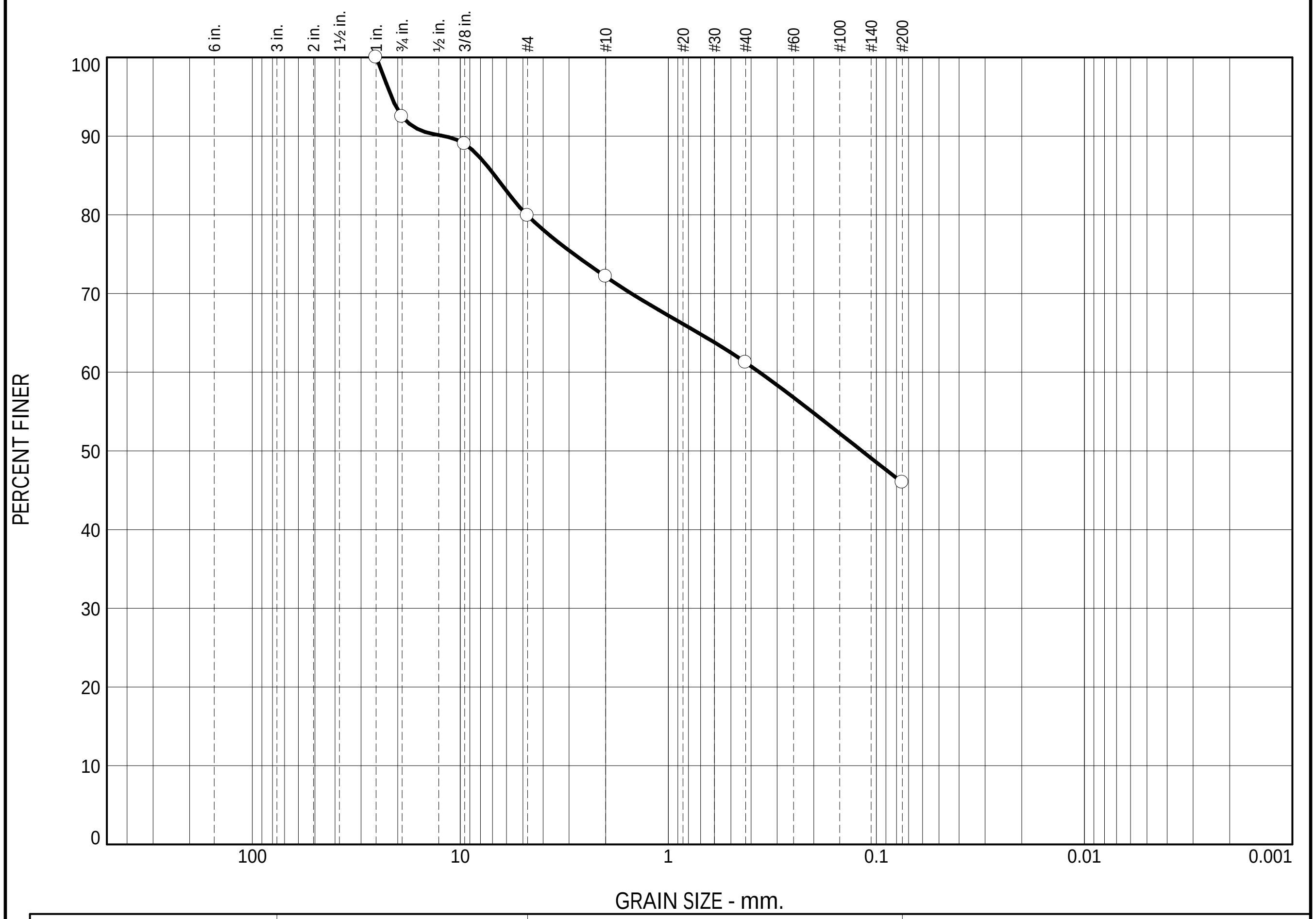
TRC Engineers, Inc.

Mt. Laurel, NJ

Figure 10

Tested By: JC 06/05/24 Checked By: JPB 06/06/24

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	7.5	12.6	7.7	11.0	15.2	46.0	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	16	12	6.8314	0.3648	0.1174					

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ DARK GRAY SILTY, CLAYEY SAND WITH GRAVEL	06/05/24	SC-SM	10.4

Project No. 435979.1GEO Client: SUNEAST DEVELOPMENT, LLC
Project: SUNEAST FLAT CREEK SOLAR 94C

○ Source of Sample: B-310 Depth: 13.0-15.0 FT Sample Number: S-6

Remarks:
○SAMPLE DESCRIPTION BASED ON USCS

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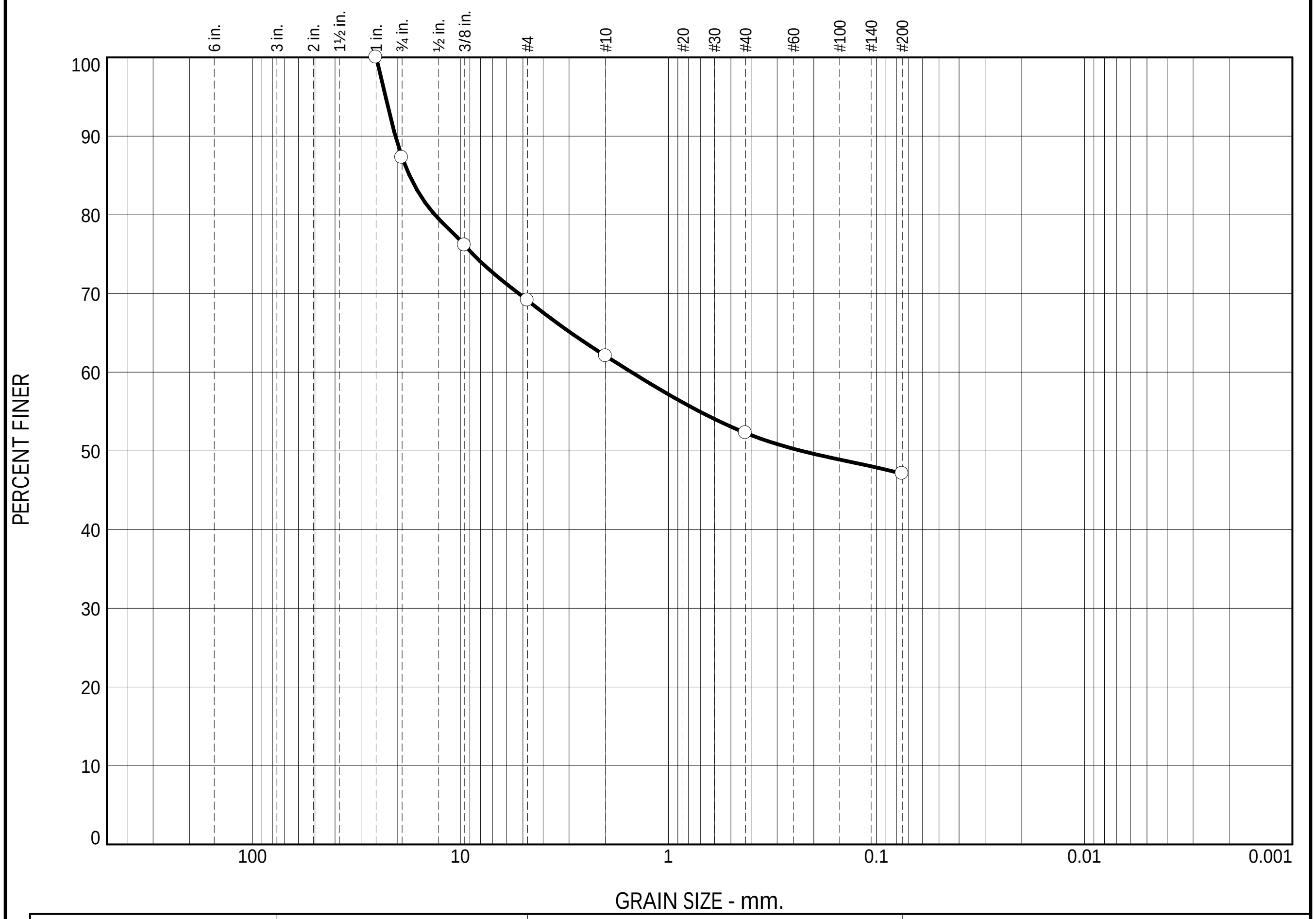
Figure 11

Tested By: OA 06/05/24 Checked By: JPB 06/06/24

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	12.7	18.2	7.0	9.8	5.2	47.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			17.5289	1.5013	0.2283					

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ BROWN/DARK BROWN GRAVELLY SILTY CLAY WITH SAND	06/04/24	CL-ML	6.3

Project No. 435979.1GEO Client: SUNEAST DEVELOPMENT, LLC
Project: SUNEAST FLAT CREEK SOLAR 94C

○ Source of Sample: B-310 Depth: 28.0-30.0 FT Sample Number: S-9

Remarks:
○SAMPLE DESCRIPTION BASED ON GRAIN-SIZE DISTRIBUTION AND VISUAL CLASSIFICATION

TRC Engineers, Inc.

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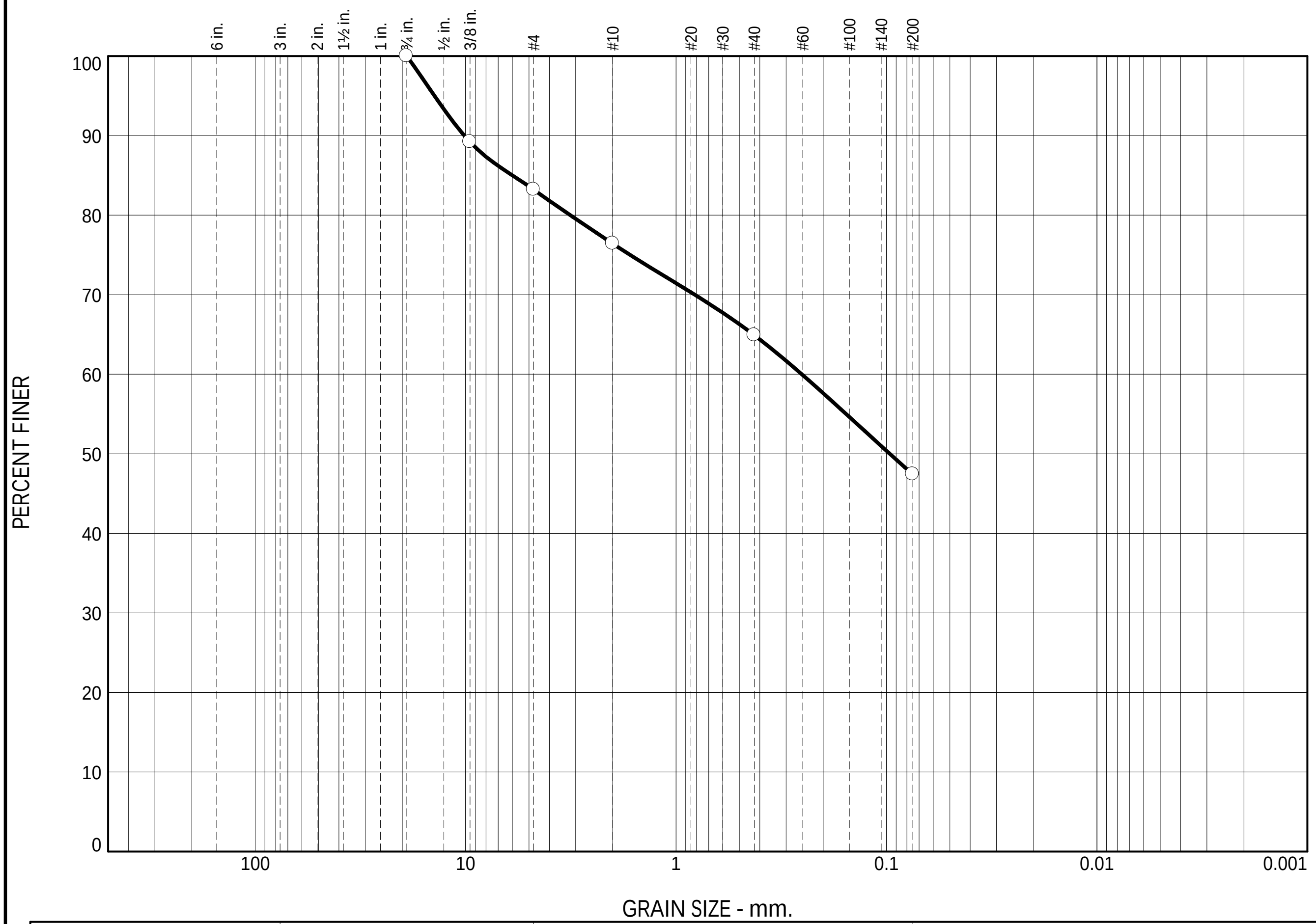
Figure 12

Tested By: JC 06/04/24 Checked By: JPB 06/06/24

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	16.8	6.8	11.5	17.5	47.4	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	17	10	5.9967	0.2526	0.0965					

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ GRAY SILTY, CLAYEY SAND WITH GRAVEL	06/03/24	SC-SM	9.9

Project No. 435979.1GEO Client: SUNEAST DEVELOPMENT, LLC
Project: SUNEAST FLAT CREEK SOLAR 94C

○ Source of Sample: B-311 Depth: 18.0-20.0 FT Sample Number: S-7

Remarks:
○SAMPLE DESCRIPTION BASED ON USCS

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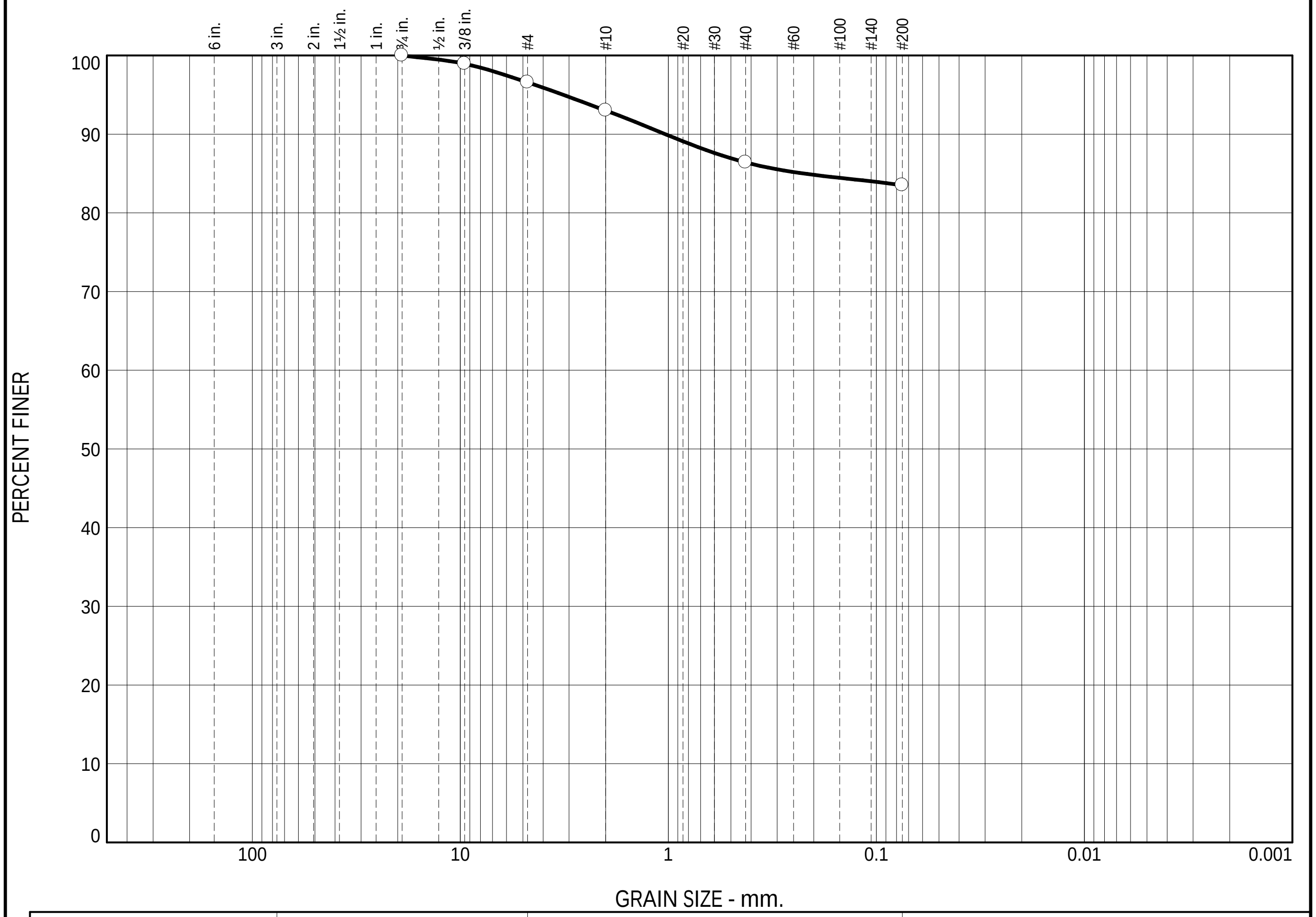
Figure 13

Tested By: OA 06/03/24 Checked By: JPB 06/06/24

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	3.4	3.6	6.6	2.9	83.5	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	25	16	0.2231							

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ BROWN LEAN CLAY WITH SAND	05/28/24	CL	24.5

Project No. 435979.1GEO Client: SUNEAST DEVELOPMENT, LLC
Project: SUNEAST FLAT CREEK SOLAR 94C

○ Source of Sample: BULK 1 Depth: 0.0-5.0 FT

Remarks:
○SAMPLE DESCRIPTION BASED ON USCS

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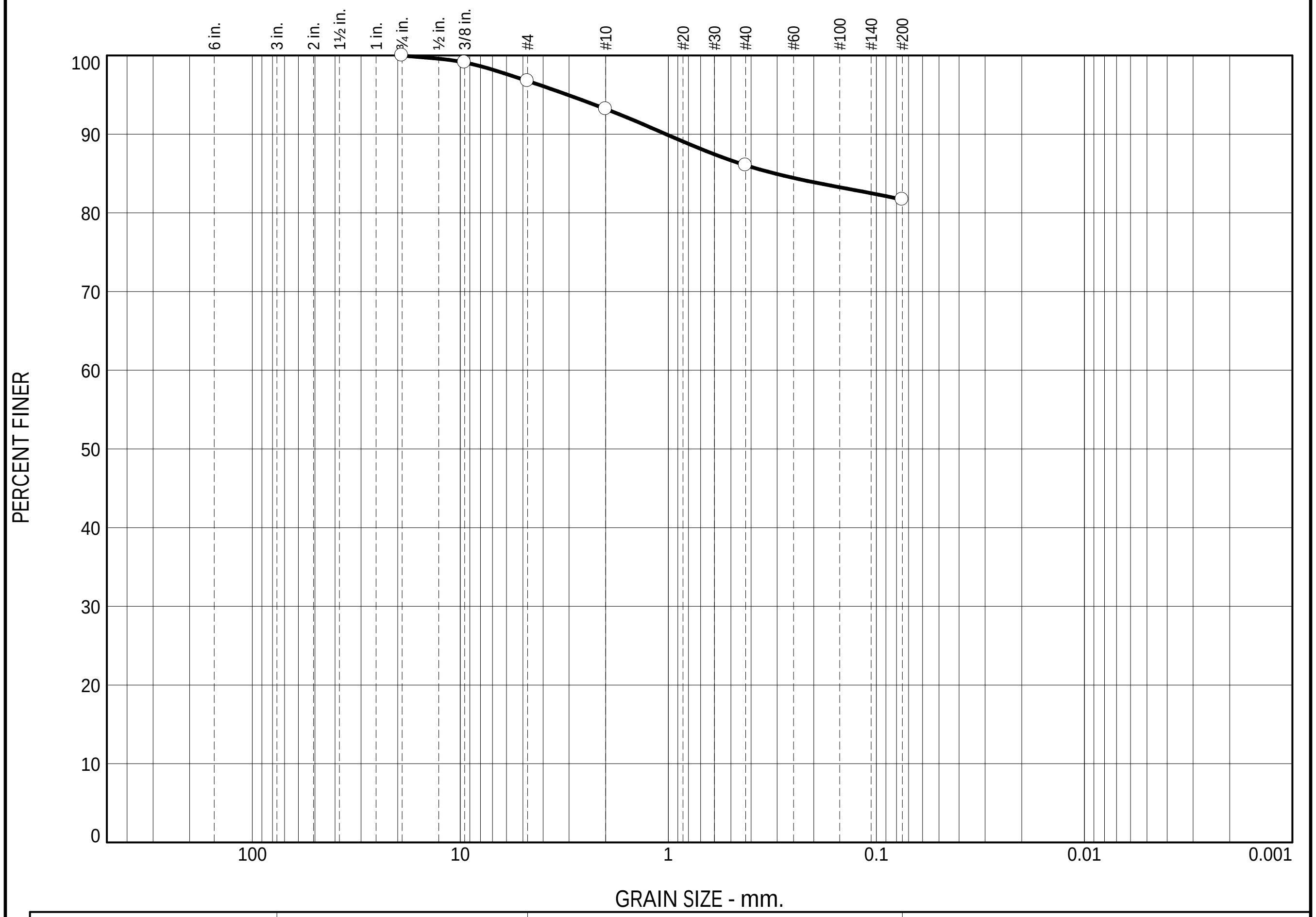
Mt. Laurel, NJ

Figure 14

Tested By: JC 05/28/24 Checked By: JPB 05/31/24

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	3.2	3.6	7.2	4.3	81.7	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	29	18	0.3065							

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ BROWN LEAN CLAY WITH SAND	06/03/24	CL	24.8

Project No. 435979.1GEO Client: SUNEAST DEVELOPMENT, LLC
Project: SUNEAST FLAT CREEK SOLAR 94C

○ Source of Sample: BULK 2 Depth: 0.0-5.0 FT

Remarks:
○SAMPLE DESCRIPTION
BASED ON USCS

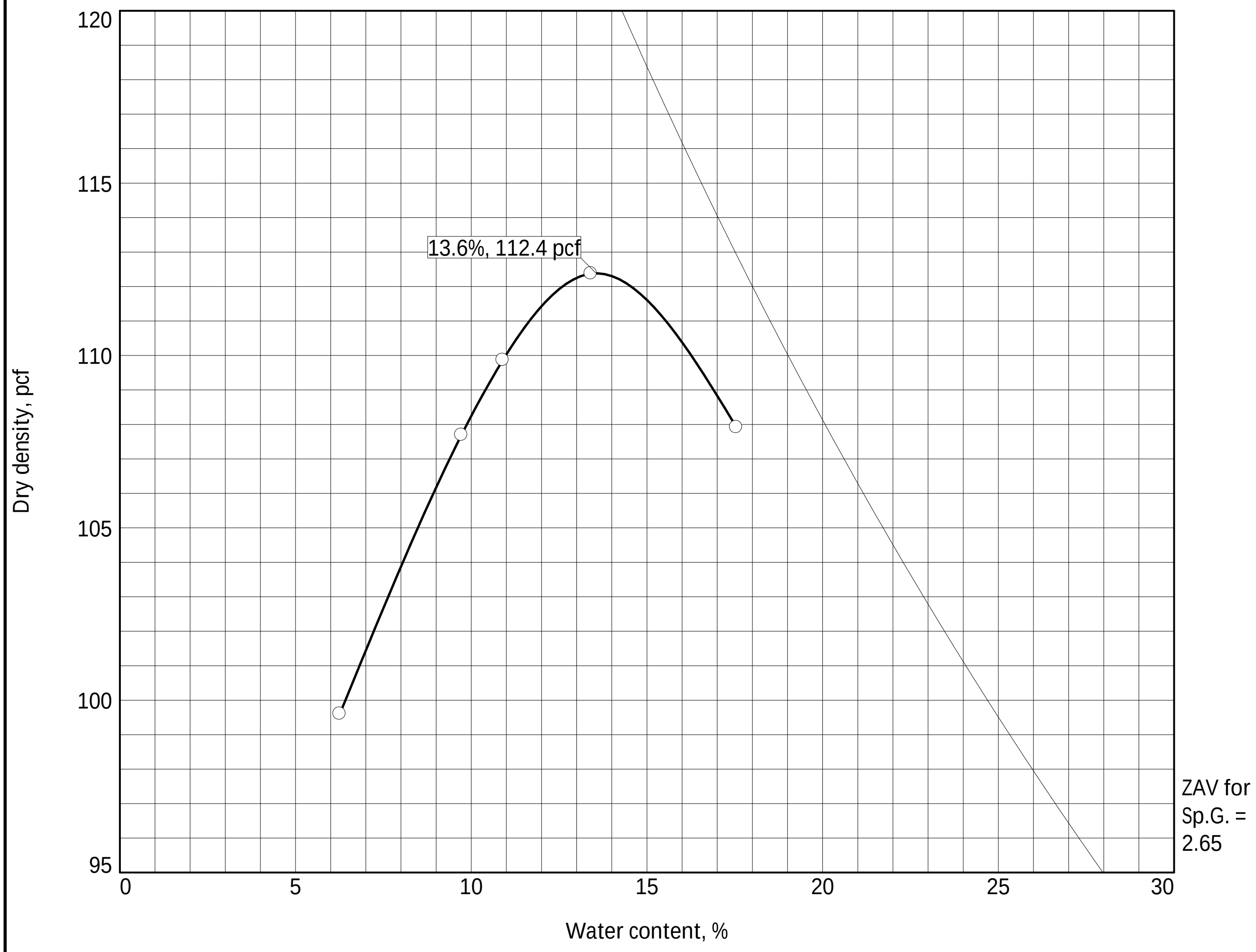
TRC Engineers, Inc.

Mt. Laurel, NJ

Figure 15

Tested By: JC 06/03/24 Checked By: JPB 06/11/24

COMPACTION TEST REPORT



Test specification: ASTM D 698-12 Method C Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
0.0-5.0 FT	CL	A-4(5)	24.5		25	9	0.0	83.5

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 112.4 pcf Optimum moisture = 13.6 %	BROWN LEAN CLAY WITH SAND

Project No. 435979.1GEO Client: SUNEAST DEVELOPMENT, LLC

Project: SUNEAST FLAT CREEK SOLAR 94C

Date:

○ Source of Sample: BULK 1

Remarks:

SAMPLE DESCRIPTION BASED ON USCS

TRC Engineers, Inc.

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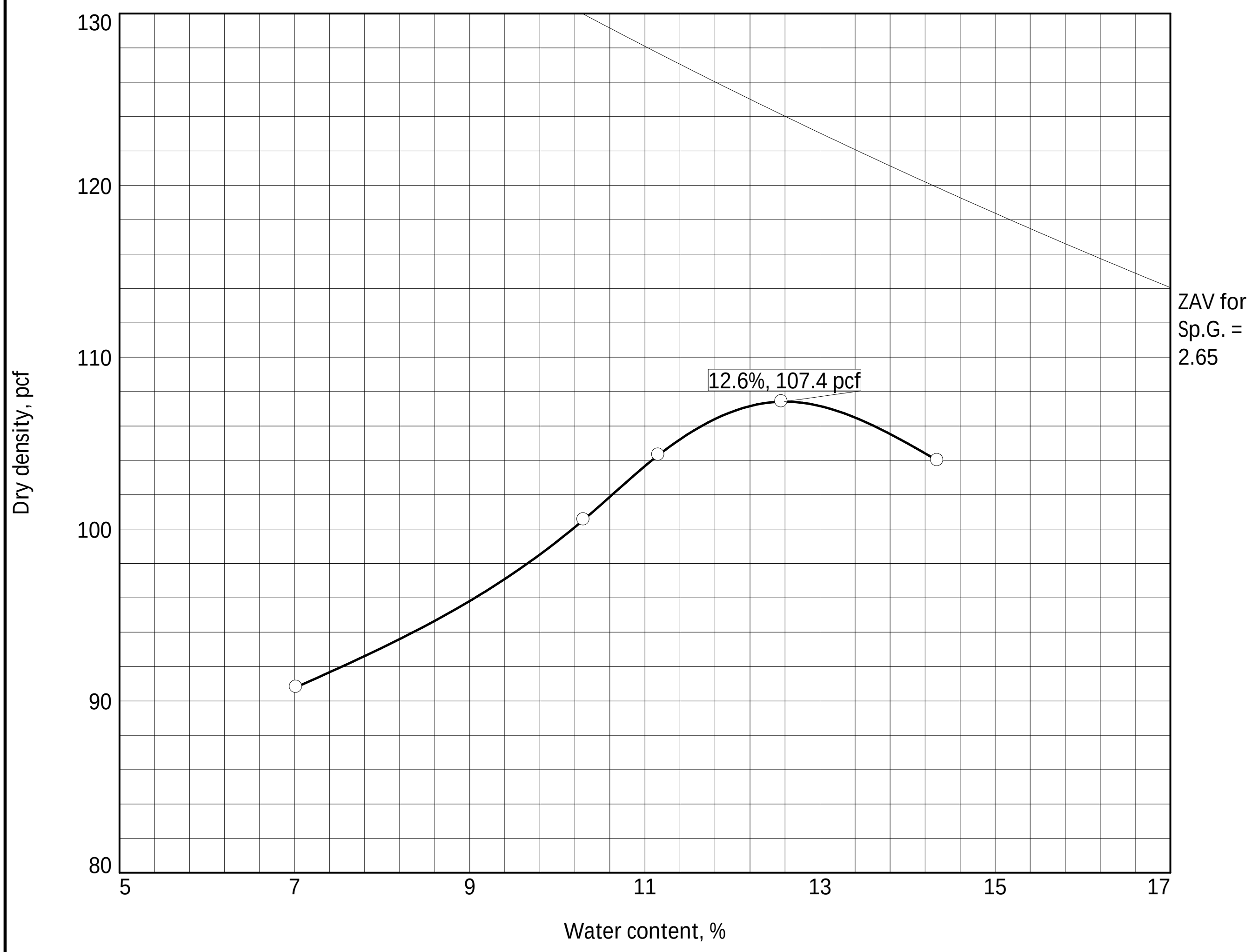
Figure 16

Tested By: RJM 05/30/24 Checked By: JPB 05/31/24

COMPACTION TEST REPORT



Test specification: ASTM D 698-12 Method C Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
0.0-5.0 FT	CL	A-6(7)	24.8		29	11	0.0	81.7

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 107.4 pcf Optimum moisture = 12.6 %	BROWN LEAN CLAY WITH SAND

Project No. 435979.1GEO Client: SUNEAST DEVELOPMENT, LLC
Project: SUNEAST FLAT CREEK SOLAR 94C
Date:
○ Source of Sample: BULK 2

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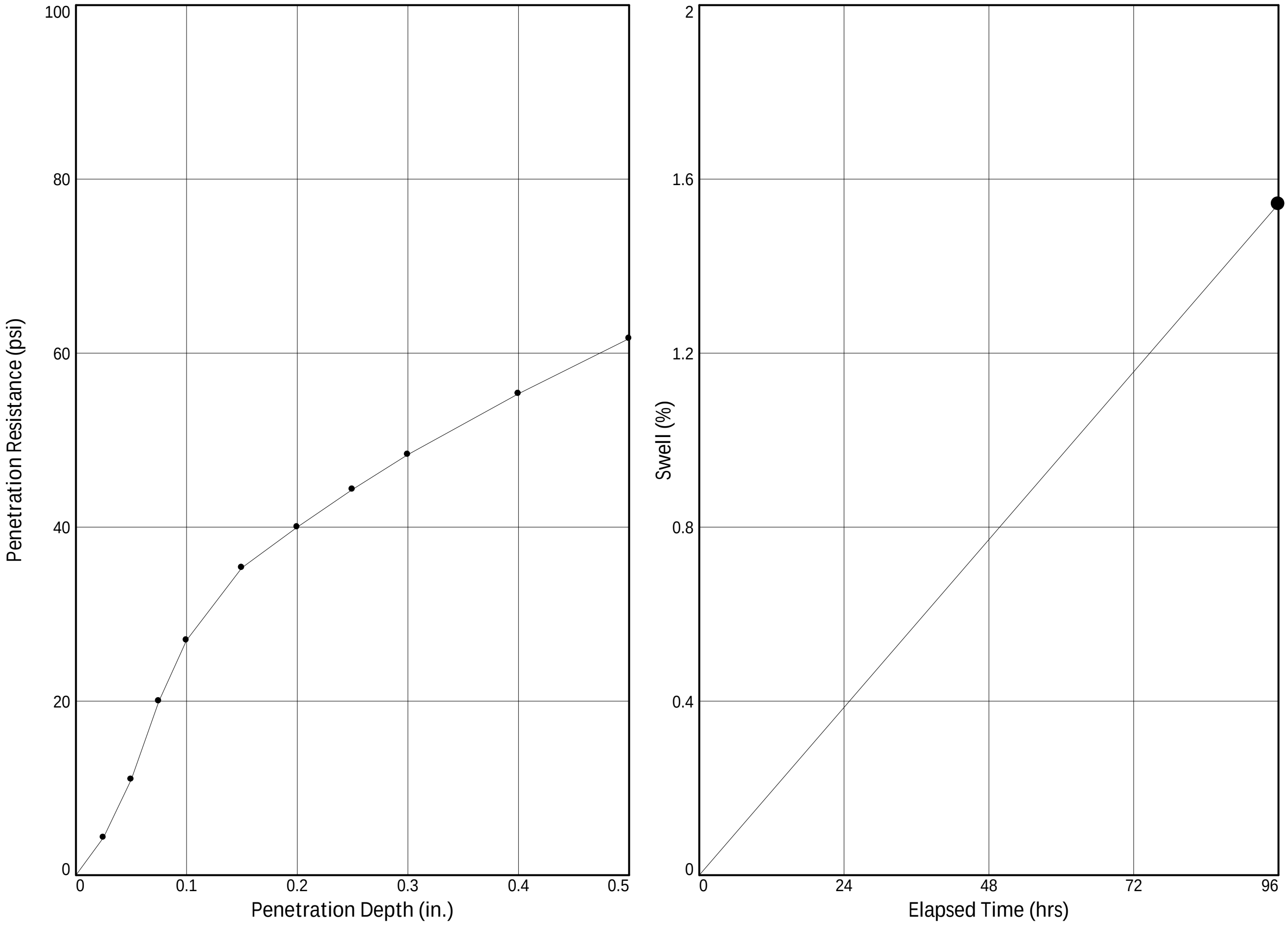
Remarks:
SAMPLE DESCRIPTION BASED ON USCS

Figure 17

Tested By: RJM 05/30/24 Checked By: JPB 05/31/24

BEARING RATIO TEST REPORT
ASTM D1883-21



	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ●	106.7	94.9	13.6	105.1	93.5	21.3	3.0	2.8	0.018	10	1.5
2 ▲											
3 ■											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
BROWN LEAN CLAY WITH SAND	CL	112.4	13.6	25	9

Project No: 435979.1GEO

Project: SUNEAST FLAT CREEK SOLAR 94C

Source of Sample: BULK 1 Depth: 0.0-5.0 FT

Date:

Test Description:

SAMPLE DESCRIPTION
BASED ON USCS

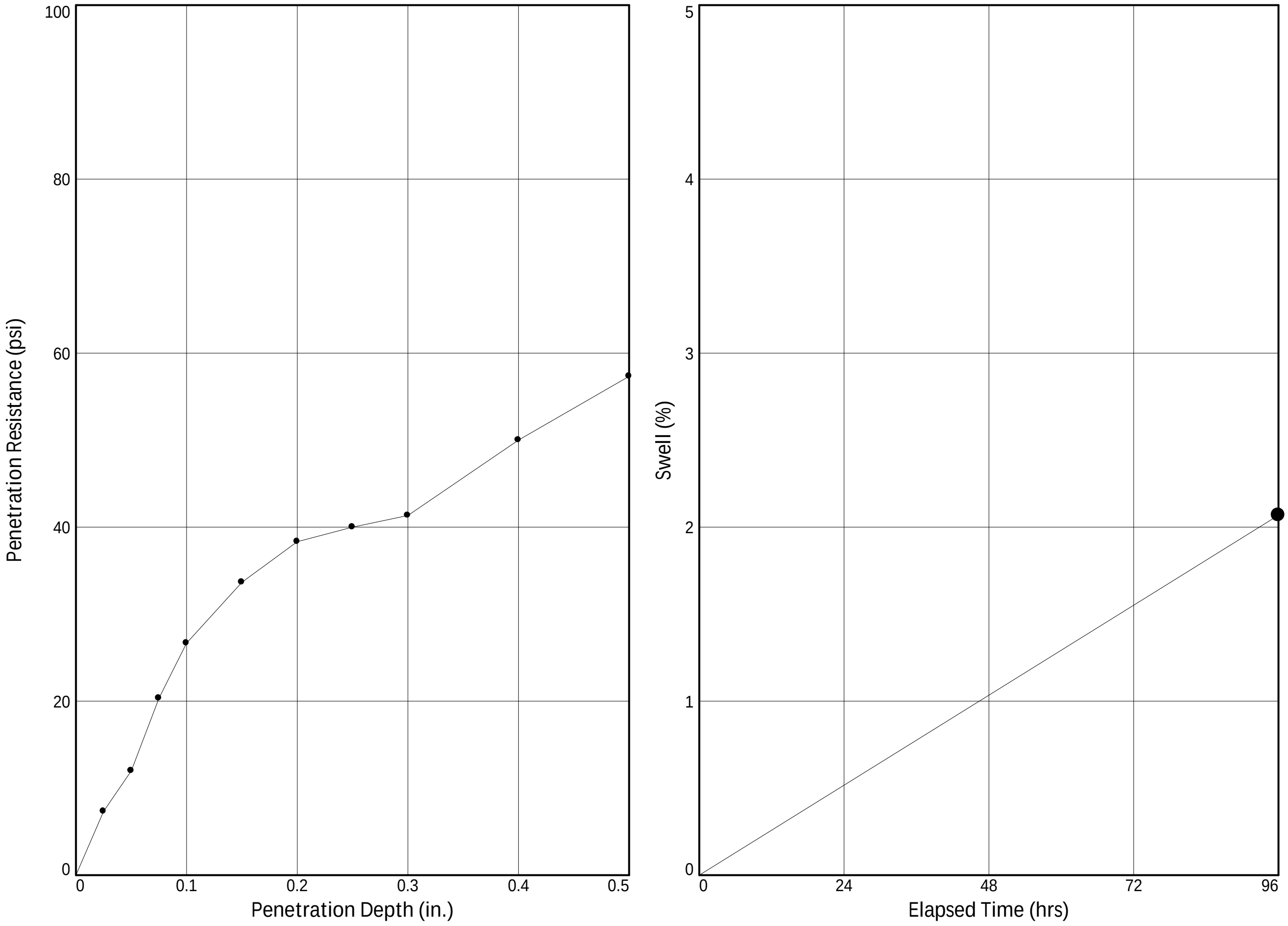
BEARING RATIO TEST REPORT

TRC Engineers, Inc.

Figure 18

Tested By: JC 06/10/24 Checked By: JPB 06/10/24

BEARING RATIO TEST REPORT
ASTM D1883-21



	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ●	102.2	95.2	12.6	100.1	93.2	26.1	2.8	2.6	0.013	10	2.1
2 ▲											
3 ■											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
BROWN LEAN CLAY WITH SAND	CL	107.4	12.6	29	11

Project No: 435979.1GEO

Project: SUNEAST FLAT CREEK SOLAR 94C

Source of Sample: BULK 2 Depth: 0.0-5.0 FT

Date:

Test Description:

SAMPLE DESCRIPTION
BASED ON USCS

BEARING RATIO TEST REPORT

TRC Engineers, Inc.

Figure 19

Tested By: JC 06/10/24 Checked By: JPB 06/10/24

TRC ENGINEERS, INC.
UNIT WEIGHT

Job # **435979.1GEO**

Source No. **B-304**

Sample No. **S-6**

Depth (FT): **13.0-15.0**

Job Name: **Suneast Flat Creek Solar 94C**

Client Name: **Suneast Development, LLC**

Height 2.26

Diameter 1.49

	g
Moist Sample Weight + Tare (g)	277.88
Dry Sample Weight + Tare (g)	264.23
Tare weight (g)	127.43

	g	lbs
Moist Sample Weight - Tare	150.45	0.331388
Dry Sample Weight - Tare	136.8	0.301322
Weight of Water	13.65	-
Moisture %	10.0	-
Moisture Content	0.100	-

Sample Total Area 1.74 in2

Total Volume (cu in) 3.94

Total Volume (cu ft) 0.0022775

Dry Unit Weight (pcf) **132.3**

Wet Unit Weight (pcf) **145.5**

TRC ENGINEERS, INC.
UNIT WEIGHT

Job # **435979.1GEO**

Job Name: **Suneast Flat Creek Solar 94C**

Source No. **B-304**

Sample No. **S-8**

Client Name: **Suneast Development, LLC**

Depth (FT): **18.0-25.0**

Height 1.58

Diameter 1.48

	g
Moist Sample Weight + Tare (g)	235.78
Dry Sample Weight + Tare (g)	226.63
Tare weight (g)	134.32

	g	lbs
Moist Sample Weight - Tare	101.46	0.223480
Dry Sample Weight - Tare	92.31	0.203326
Weight of Water	9.15	-
Moisture %	9.9	-
Moisture Content	0.099	-

Sample Total Area 1.71 in2

Total Volume (cu in) 2.70

Total Volume (cu ft) 0.0015602

Dry Unit Weight (pcf) **130.3**

Wet Unit Weight (pcf) **143.2**

TRC ENGINEERS, INC.
UNIT WEIGHT

Job # **435979.1GEO**

Job Name: **Suneast Flat Creek Solar 94C**

Source No. **B-307**

Sample No. **S-6**

Client Name: **Suneast Development, LLC**

Depth (FT): **13.0-15.0**

Height 0.97

Diameter 1.45

	g
Moist Sample Weight + Tare (g)	193.96
Dry Sample Weight + Tare (g)	188.82
Tare weight (g)	133.50

	g	lbs
Moist Sample Weight - Tare	60.46	0.133172
Dry Sample Weight - Tare	55.32	0.121850
Weight of Water	5.14	-
Moisture %	9.3	-
Moisture Content	0.093	-

Sample Total Area 1.65 in2

Total Volume (cu in) 1.60

Total Volume (cu ft) 0.0009248

Dry Unit Weight (pcf) **131.8**

Wet Unit Weight (pcf) **144.0**

TRC ENGINEERS, INC.
UNIT WEIGHT

Job # **435979.1GEO**

Source No. **B-310**

Sample No. **S-6**

Depth (FT): **13.0-15.0**

Job Name: **Suneast Flat Creek Solar 94C**

Client Name: **Suneast Development, LLC**

Height 2.46

Diameter 1.55

	g
Moist Sample Weight + Tare (g)	309.54
Dry Sample Weight + Tare (g)	293.17
Tare weight (g)	135.24

	g	lbs
Moist Sample Weight - Tare	174.30	0.383921
Dry Sample Weight - Tare	157.93	0.347863
Weight of Water	16.37	-
Moisture %	10.4	-
Moisture Content	0.104	-

Sample Total Area 1.88 in2

Total Volume (cu in) 4.62

Total Volume (cu ft) 0.0026736

Dry Unit Weight (pcf) **130.1**

Wet Unit Weight (pcf) **143.6**

KE CORROSION

3028 ALDON AVE. LAS VEGAS, NV 89121

702-340-1186 KDE@KECORROSION.COM

CLIENT
TRC Solutions, Inc.
16000 Commerce Parkway, Suite B
Mount Laurel, NJ 08054

PROJECT NO: 435979.1GEO 200Lab

PROJECT
Flat Creek Substation

DATE: May 28, 2024

LAB ID: 24-0068

Sample By: Client

Analyzed By: Kurt D. Ergun

RESULTS FOR CORROSIVITY ANALYSIS OF SOILS

Sample Number:		
Sample Location:	Bulk 1	Bulk 2
Sample Depth:	0.0-5.0	0.0-5.0
Laboratory Testing Methods		
pH Analysis, ASTM D4972(in H_2O)	6.72	6.55
PH Analysis, ASTM D4972(in $CaCl_2$)	5.89	5.83
Water Soluble Sulfates, ASTM D516 (mg/kg)	63	80
Clorides, ASTM D512 (mg/kg)	40	50
Sulfides, AWWA 4500-S (mg/kg)	Nil	Nil
Oxidation-Reduction, ASTM D1498 (mV)	+668	+687
Resistivity, ASTM G187 (ohm-cm)	4120	2740

Nil = <1.0 mg/kg

Kurt D. Ergun

Kurt D. Ergun
Chemist

Note: The tests were performed in accordance with applicable ASTM, AASHTO, or AWWA methods. Test results submitted are only applicable to samples tested at referenced locations and are not indicative of the results of similar materials.