1. Provide a copy of the final geotechnical report.

Response: Please see attached Geotech, pile load test, and geophysics report, "S&ME Geotech, Pile Test, ERI Report – Russellville, KY Solar Facility" SITING BOARD_PH-RFI_1.

Witness: Stefan Eckmann

Report for Geotechnical Engineering Services
Russellville Solar Facility
Watermelon Road
Russellville, Kentucky 42276
S&ME Project No. 22800023

PREPARED FOR:

Silicon Ranch Corporation
150 Third Avenue South, Suite 2000
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PREPARED BY:

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May 18, 2022

May 18, 2022

Silicon Ranch Corporation
150 Third Avenue South, Suite 2000
Nashville, Tennessee 37201

Attention: Mr. Stefan Eckmann

Reference: **Report for Geotechnical Engineering Services**
Russellville Solar Facility
Watermelon Road, Russellville, Kentucky 42276
S&ME Project No. 22800023

Dear Mr. Eckmann:

S&ME, Inc. (S&ME) is pleased to submit our *Report of Geotechnical Engineering Services* for the referenced project. Our services were performed in general accordance with our Proposal No. 22800023, dated February 10, 2022. The proposal was issued for supplemental work to our original geotechnical report for this site performed in 2020. We appreciate being selected to participate in this phase of the project. Please contact us with any questions about this report or if we may be of further service.

Sincerely,

S&ME, Inc.

Eric Conway, E.I.T.
Associate Project Manager
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Report for Geotechnical Engineering Services
Russellville Solar Facility
Watermelon Road, Russellville, Kentucky 42276
S&ME Project No. 22800023

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Appendix

1.0 Purpose

The purpose of our geotechnical engineering services was to obtain subsurface data from widely spaced borings and pile tests to help identify potential geotechnical issues that might affect design and construction of the planned solar facility. This report provides the following:

- A summary of the project and provided information;
- A summary of current site conditions, topography, and area geology;
- A summary of the field exploration methods;
- A summary of the subsurface conditions encountered in the test borings;
- A summary of the laboratory test methods and results;
- Conclusions and Site Assessment;
- Recommendations for site preparation, excavation, structural fill placement, and groundwater control;
- Recommendations for foundation design and construction for the solar panels;
- Recommendations for design and construction of the concrete slab-on-grade;
- Recommendations for design and construction of utility vaults; and
- An Appendix with Site Location Plan, Test Location Plan, individual boring logs for each test location, laboratory test reports, and individual pile load test plots.

2.0 Project Information

Initial information was summarized in our December 4, 2020 *Report of Geotechnical Exploration*. Additional project information was provided through October 2021 and January 2022 e-mail conversations between Messrs. P.J. Saliterman and Stefan Eckmann of Silicon Ranch and Mr. Doubrava. Appended to the e-mails was a Google Earth (.kmz) file showing the array layout throughout the site and *Preliminary Site Layout* by HDR, dated November 24, 2021.

Based on the provided information, we understand that a new solar facility is being constructed on approximately 1,500 acres of land situated east of Watermelon Road on the southwest side of Russellville, Kentucky. Most of the tract is comprised of agricultural fields with pockets of densely vegetated areas and some small ponds. There are some paved and gravel roads throughout the site as well.

We anticipate the solar panels will be supported on driven W6x9 piles to depths of 7 to 8 feet below grade. Structural loading for the solar panel supports has not been provided. However, we estimate allowable axial (compression), axial (tension), and lateral loads of 4 kips, 4 kips, and 2.5 kips, respectively. No grading information was provided; however, we anticipate that minimal grading (maximum cuts and fills of 5 feet) will be required.

The project information and assumptions detailed above should be reviewed and confirmed by the appropriate team members. Modifications to our report may be required if the actual conditions vary from the project information and assumptions described herein.

3.0 Exploration and Testing Procedures

3.1 Field Exploration

3.1.1 Test Borings

Our 2020 exploration included 22 widely spaced borings. The locations of these borings are identified as B-01 through B-22. The locations of these borings were established in the field by Mr. Eric Conway of S&ME using a consumer grade, hand-held-global positioning system (GPS) unit with pre-loaded points established using Google Earth.

The locations of the supplemental test borings for our current exploration, identified as B-101 through B-117, were established by Mr. Conway with a (GPS) unit with pre-loaded points established using Google Earth. Because of the limited accuracy of the methods used, the boring locations shown on the Test Location Plans (Figure 2) in the Appendix should be considered approximate.

Ground surface elevations at each test location were estimated using data from the Google Earth topographic information and interpolating between contours on the topographic information provided by Silicon Ranch. Due to the limited detail of this information, the ground surface elevations at the boring locations have been approximated to the nearest foot and should be considered approximate.

We advanced the borings by mechanically twisting hollow stem augers into the soil in general accordance with ASTM D6151, the *Standard Practice for Using Hollow-Stem Augers for Geotechnical Exploration and Soil Sampling*. Soil samples were obtained at prescribed intervals in the upper 10-feet and at 5-foot intervals thereafter in general accordance with ASTM D1586, *Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of* until the termination depth was reached. During standard penetration testing, the sampler was first seated 6 inches and then driven an additional foot with blows of a 140-pound hammer falling 30-inches. The number of hammer blows required to drive the sampler the final foot was recorded and is designated the "standard penetration resistance (SPT)" or N-value with units of blows per foot (bpf). An automatic hammer was used during the standard penetration testing. Automatic hammers are typically more efficient than manual hammers and can thus yield lower standard penetration resistances. We have accounted for this improved efficiency in our analysis, but the consistency descriptions shown on the boring logs are based on the field resistance data.

3.1.2 Field Resistivity Testing

During our 2020 geotechnical exploration, members of our engineering staff performed field resistivity testing at 16 traverse locations, B-01, B-02, B-03, B-05, B-06, B-07, B-09, B-10, B-11, B-12, B-14, B-16, B-17, B-18, B-19, and B-20, using the Wenner four-pin method in general accordance with ASTM G57, the *Standard Test Method for Field Measurement of Soil Resistivity Using the Wenner-Four-Electrode Method*. In this method, four equally-spaced electrodes are inserted into the ground along a linear array. A current is applied across the two outermost electrodes and the voltage drop across the two innermost electrodes is measured. The voltage drop can be used to determine the apparent resistivity of the soil. Electrode spacings of 2, 5, 8, 12, 15, 25, 40, 60, and 75 feet were

used for each array in both the north-south and east-west directions. Approximate traverse locations are shown on the Test Location Plans in the Appendix. Field data sheets are included in the Appendix.

3.1.3 Geophysical Methodology, Field Services, and Data Processing

We completed an Electrical Resistivity Tomography (ERT) survey at the site in two separate phases. Phase I was completed between November 15, 2020 and November 21, 2020, and Phase II was completed between March 28, 2022 and May 13, 2022. The goal of the ERT surveys was to assist the geotechnical exploration program with identifying lateral changes in subsurface materials associated with depth to bedrock and possible karst features.

The ERT method introduces a known amount of direct current into the ground and measures the corresponding response to identify variations in subsurface electrical potentials. By introducing a known amount of current into the ground, the measured voltage potential at the surface is used to calculate the resistivity of subsurface material. In general, clayey, and moist soils result in lower resistivity (higher conductivity) readings, while dry sands, gravels, chert, and limestone/dolomite exhibit higher resistivity values. The resistivity of materials also partially depends on the substance filling its pore or void space. If a cavity or fracture is air-filled, a highly resistive anomaly within the limestone unit is expected. If it is water- or clay-filled, an anomaly more conductive than the surrounding limestone unit is expected. Natural variations in porosity and grain size distribution can also cause such anomalies.

An ERT survey typically uses a series of stainless-steel electrodes that are inserted into the ground along a linear array and attached to data cables, which are connected to a transmitter/recording instrument (resistivity meter). The resistivity meter generates an induced current at two of the electrodes (current electrodes) and then measurements are acquired from the voltage potential difference between two other electrodes (potential electrodes). Material included between the potential electrodes is essentially averaged so the depth and resolution of the measurements is dependent upon the distance between these electrodes. Therefore, limitations of this method exist depending on the necessary resolution of data acquisition versus the depth of a target/feature. It is important to also note that actual ground resistivity is not collected during a resistivity survey. The survey is used to collect the apparent resistivity of a volume of material. Actual resistivities are later determined through a data inversion process. In addition, ERT data is collected using various array configurations set up in the software (Dipole-Dipole, Wenner, etc.), which is stored in the resistivity meter for later processing and analysis. Array considerations are dependent on the objectives of the survey (e.g., soil and bedrock profiling, karst exploration, etc.).

We used Advanced Geosciences, Inc. (AGI) SuperSting™ R8/IP resistivity systems configured with up to 84 electrodes in general accordance with ASTM D6431 "*Using DC Resistivity for Subsurface Investigations*". A total of seven (7) ERT profiles were collected in 2020 (Lines 1 through 7; Figure 2) and a total of fourteen (14) were collected in 2022 (Lines 8 through 21; Figure 2). Due to surficial obstruction such as roads and fences, several of the proposed profiles were segmented and designated with an A, B, or C. Line lengths ranged between about 700 and 3,600 feet, and the "roll-along" method was also required for lines longer than 830 feet, which consists of the first string of electrodes being relocated to the end of the original line and data are reacquired. This process is repeated until the desired line length has been achieved. The Dipole-Dipole array configuration was used and electrodes were spaced at 10 feet. ERT data was processed using AGI's EarthImager 2D software and Golden Software's Surfer® was used to grid and plot the data. Elevations used for our models were derived from a CAD

file provided by the client and Kentucky Statewide (Kentucky Geography Network) Digital Elevation Models (DEM) derived from 1.0 meter point spacing LiDAR data for Line 8 rather than actual field survey measurements performed by S&ME, and as such, should be considered approximate.

3.2 Geophysical Results

The following summarizes the results of the geophysical survey performed at the site:

- The ERT results presented in Figures 6 through 24 indicate a varying resistivity contrast across the surveyed area that generally range from approximately 10 ohmmeters (ohm-m) to 5,000 ohm-m.
- Presented depths of the ERT profiles are a function of the inversion process and are generally about 100 to 120 feet below ground surface (bgs).
- Based on the geotechnical exploration borings, we identified two general layers: residual clayey soil overburden and the underlying bedrock. The soil overburden is characterized by resistivity values less than about 200 ohm-m with the relatively higher values (greater than about 100 Ohm-m) likely associated with increased rock fragment and/or sand content. The underlying resistive limestone is characterized by resistivity values generally greater than about 100 ohm-m.
- The interpreted top of rock is highlighted on the ERT profiles as a black dashed line and the approximate locations of the geotechnical borings adjacent to our profiles that were used to assist with our interpretations are also overlain on the ERT geophysical models for reference.
- Additionally, two types of anomalous features not associated with known metallic surficial sources of influence such as fences and piles were interpreted in the ERT data sets (Type I and Type II anomalies):
    - Type I anomalies are generally associated with topographic changes along the interpreted top of bedrock. The upper portion of the interpreted top of rock within these areas also appears to exhibit relatively low resistivity zones (less than about 100 ohm-m) that may be related to increased solutioning and/or clay-filled joints/fractures along the top of the bedrock surface
    - Type II anomalies are characterized by relatively deeper low resistivity zones within the interpreted bedrock. These features are most likely related to deeper solutioning/karst features, which could include clay-filled cavities.
    - Prominent interpreted Type I and Type II anomalies are highlighted on the ERT profiles.

3.3 Laboratory Testing Services

The split-spoon samples obtained during standard penetration testing and bulk samples collected near the resistivity locations were transported to our laboratory and visually classified by a member of our engineering staff in general accordance with ASTM D2488, the *Standard Practice for Description and Identification (Visual-Manual Procedure)*. The purpose of this review were to check the field descriptions, visually estimate the relative percentages of the soils' constituents (sand, clay, etc.), determine soil origin, identify pertinent structural features such as foliation planes and slickensides, and select samples for laboratory testing. The stratification lines shown on the appended test boring records represent the approximate boundaries between soil types, but the transitions may be more gradual than shown.

Bulk samples were collected near 10 of the original resistivity locations and were subjected to laboratory testing consisting of standard proctor test (ASTM D698), thermal resistivity test, Atterberg Limits test, moisture content,

and corrosion series tests (pH, sulfates, sulfides, chlorides, and resistivity). Additionally, the topsoil at each location was tested for organic content, particle size distribution, soil organic carbon and soluble salts, moisture/saturation percentages, Nitrogen-Phosphorus-Potassium (N-P-K) ratio, pH, soil salinity and secondary nutrient groups - calcium, magnesium, sodium, and Sodium Absorption Ratio (SAR) and micronutrients - zinc, manganese, iron, copper. A summary of the laboratory results is presented in the Appendix as well as full test reports.

Select samples from our supplemental exploration, were sent off for corrosion potential analysis.

4.0 Site, Geologic, and Subsurface Conditions

4.1 USDA Soil Survey Map

We reviewed available Soil Survey mapping from the United States Department of Agriculture (USDA) for the site. The USDA Soil Survey maps provide an inventory of the different kinds of near-surface soils in an area and identify the areas that those soils occupy. The mapped Soil Survey groups are shown in the Appendix. We have summarized the soil groups and some of their characteristics below.

Group Symbol	Name	Parent Material	Drainage Class	Depth to Seasonal High-Water Table (in)
BaD	Baxter Gravelly Silt Loam	Residuum	Well Drained	>80 inches
BbC3	Baxter Cherty Silty Clay Loam	Residuum	Well Drained	>80 inches
CrA	Crider Silt Loam	Loess and Residuum	Well Drained	>80 inches
CrB	Crider Silt Loam	Loess and Residuum	Well Drained	>80 inches
CrC	Crider Silt Loam	Loess and Residuum	Well Drained	>80 inches
FeC	Fredonia Rocky Silty Clay Loam	Residuum	Well Drained	>80 inches
La	Lawrence Silt Loam	Alluvium and Residuum	Poorly Drained	12 – 15 inches
Ld	Lindside Silt Loam	Alluvium	Moderately Well Drained	18 – 24 inches
Me	Melvin Silt Loam	Alluvium	Poorly Drained	0 – 12 inches

Group Symbol	Name	Parent Material	Drainage Class	Depth to Seasonal High-Water Table (in)
Ne	Newark Silt Loam	Alluvium	Somewhat Poorly Drained	12 – 18 inches
NhA	Nicholson Silt Loam	Loess and Residuum	Moderately Well Drained	20 - 25
NhB	Nicholson Silt Loam	Loess and Residuum	Moderately Well Drained	20 - 25
No	Nolin Silt Loam	Alluvium	Well Drained	36 – 72
PeA	Pembroke Silt Loam	Loess and Residuum	Well Drained	>80 inches
PeB	Pembroke Silt Loam	Loess and Residuum	Well Drained	>80 inches
PeC	Pembroke Silt Loam	Loess and Residuum	Well Drained	>80 inches
PfC3	Pembroke Silty Clay Loam	Loess and Residuum	Well Drained	>80 inches
PkB	Pickwick Silt Loam	Loess and Residuum	Well Drained	>80 inches
PkC	Pickwick Silt Loam	Loess and Residuum	Well Drained	>80 inches
PlC3	Pickwick Silty Clay Loam	Loess and Residuum	Well Drained	>80 inches
Rx	Rock Outcrop-Fredonia-Colbert Complex	Residuum	Well Drained	>80 inches
TcD	Talbott-Colbert Rocky Silt Loams	Residuum	Wells Drained	>80 inches
W	Water	N/A	N/A	N/A

4.2 Geologic Conditions

4.2.1 Site Conditions

The approximate 1,500-acre site is located south of US 79 and east State Route 1041 in Russellville, Kentucky. The site was covered in cultivated fields. There are areas of trees and ponds throughout the property, but most of the site was unwooded. A portion of the site is being used for cattle. There are several farm buildings throughout the property.

4.2.2 Cultivated Materials

Many areas of Kentucky have been and continue to be used for agriculture. Farming activities can disturb the upper soils and cause the finer soil particles in the disturbed layer to be leached down to the bottom of this layer. Some organics are commonly intermixed with the upper soils in the cultivation process. Other activities can also produce a surficial disturbed soil layer such as logging, minor grading, etc. These "cultivated" materials typically resemble the composition of the underlying residual materials, but often exist in a loose or soft condition. Cultivated materials can be highly susceptible to moisture content changes, becoming very wet during wet weather and extremely dry during summer months.

4.2.3 Fill Materials

Fill materials were encountered in boring B-106 during this exploration. Fill can be composed of different soil types from various sources and can also contain debris, organics, topsoil, and/or deleterious materials. The engineering properties of fill depend primarily on its composition, density, and moisture content. If observation and/or test reports are available to document the placement of the encountered fill materials, we request they be provided to us for review and incorporation into our analyses.

4.2.4 Residual Materials

The project site is located in Kentucky's Mississippian Plateaus and is generally comprised of the Ste. Genevieve Limestone Formation as noted in the geologic map of the Russellville quadrangle for Logan County, Kentucky by Robert C. Miller, 1968. The soil overburden of this area was formed by in-place weathering of the parent sedimentary rocks. Geologic mapping indicates the predominant rock types underlying this site is limestone with few beds of dolomitic limestone.

Separating the completely weathered soil overburden from the unaltered parent rock is a transition zone of very high consistency materials referred to as weathered rock. Weathered rock retains much of the appearance and fabric of the parent rock formations, and may consist of alternating layers of high consistency soil and rock. Weathered rock exhibits standard penetration resistances in excess of 100 blows per foot (bpf) (50/6", etc.).

The weathering processes that formed the overburden soils and partially weathered rock were extremely variable, depending on such factors as rock mineralogy, past groundwater conditions, and the tectonic history (joints, faults, igneous intrusions, etc.) of the specific area. Differential weathering of the rock mass has resulted in erratically varying subsurface conditions, evidenced by abrupt changes in soil type and consistency in relatively

short horizontal and vertical distances. Furthermore, depths to rock can be irregular and isolated boulders, discontinuous rock layers, or rock pinnacles can be present within the overburden and transition zones.

4.3 Subsurface Conditions

The following are generalized descriptions of the subsurface conditions as encountered in the 37 widely spaced soil test borings performed for this exploration. The Boring Logs are included in the Appendix and contain more detailed soil descriptions and test results at each boring location.

4.3.1 Cultivated Materials

With the exception of boring B-106, the borings initially penetrated 1 to 3 feet of cultivated materials visually classified as brown lean clay and silt with minor organic content apparent. N-values ranged from 2 to 12 bpf, indicating a soft to stiff consistency, but most of the values were 4 to 7 bpf, indicating a firm consistency.

4.3.2 Fill Materials

Boring B-106 initially penetrated 3 feet of fill materials primarily composed of lean clay. N values in the fill were 5 to 8 blows per foot, indicating a firm soil consistency.

4.3.3 Residual Materials

Beneath the cultivated and fill materials noted above, each boring encountered residual materials typically comprised of lean clay with varying amounts of silt and some trace sand which transitioned to more weathered rock content. N-values in the residuum ranged from 0 bpf to more than 100 bpf (weathered rock lenses), but typically from 9 to 20 bpf.

4.3.4 Auger Refusal / Boring Termination

Borings B-01, B-06, B-08, B-09, B-13, B-14, B-15, B-21, B-22, B-101, B-102, B-105, B-106, B-107, B-109, B-111, B-113, B-114, B-115, B-116, and B-117 encountered auger refusal materials at depths ranging from 8 to 21 feet. The remaining borings were terminated at their planned depths of 20 feet without encountering auger refusal materials.

4.3.5 Groundwater

Groundwater was encountered borings B-20, B-104, B-105, B-107, B-114, B-115, B-116, and B-117 at depths ranging from approximately 10 to 16½ feet below ground surface during our exploration. Groundwater was not encountered in the other borings at the time of our exploration. We note that groundwater levels will fluctuate with seasonal and yearly rainfall and temperature variations; therefore, future groundwater levels may be higher or lower than those measured during this exploration. Further, groundwater in this area can be transported at the soil/rock interface following periods of heavy precipitation.

4.4 Laboratory Test Results

The bulk samples collected near the resistivity locations were subjected to a suite of requested laboratory tests. The range of test values along with averages are listed below. Individual test results are included in the appendix.

- Standard proctor tests yielded maximum dry densities ranging from 101.4 pcf to 106 pcf (average of about 103.5 pcf) at optimum moisture contents ranging from 15.8 % to 20.3 % (average of about 18%).
- The thermal resistivity tests yielded results ranging from 91 ^{0}C cm W^{-1} to 781 ^{0}C cm W^{-1} (average of about 309 cm W^{-1}).
- The moisture content test yielded in-situ moisture contents ranging from 19.9 % to 26.8 % (average of 23%).
- pH values were 5.2 to 8.2 (average of about 6.7).
- Sulfate contents ranged from less than 10 parts per million (ppm) to 173 ppm.
- Sulfide contents ranged from 100 parts per billion (ppb) to 530 ppb.
- Chloride contents ranged from less than 10 ppm to 82 ppm.
- The laboratory minimum resistivities ranged from 871 Ω-cm to 16,080 Ω-cm (average of about 6,985 Ω-cm).
- Particle size distribution testing yielded % finer than a No. 200 (0.075 mm) sieve ranging from 87.6% to 98.3 %.
- Organic contents in the samples ranged from 3.3 % to 8.5 % (average of about 5.9%).
- The total soil organic carbon contents ranged from 38,700 ppm to 97,100 ppm (average of about 68,150 ppm).
- The total soluble salt contents ranged from 36 ppm to 86 ppm (average of 62 ppm).
- Nitrogen percentages ranged from 0.08 % to 0.17 % (average of about 0.11 %).
- Phosphorus contents ranged from 285 ppm to 408 ppm (average of about 344).
- Potassium contents ranged from 472 ppm to 1,291 ppm (average of about 873).
- Calcium contents ranged from 493 ppm to 1,774 ppm (average of about 1,271 ppm).
- Magnesium contents ranged from 583 ppm to 1,083 ppm (average of about 816 ppm).
- Sodium contents were less than 25 ppm for each tested sample.
- The sodium absorption ratio (SAR) values ranged from 0.04 to 0.07.
- Zinc contents ranged from 32 ppm to 45 ppm (average of about 38 ppm).
- Manganese contents ranged from 353 ppm to 1,773 ppm (average of about 1,109 ppm).
- Iron contents ranged from 8,964 ppm to 26,599 ppm (average of about 16,840 ppm).
- Copper contents ranged from 4.51 ppm to 8.76 ppm (average of about 7.11 ppm).

Laboratory testing summary sheets and individual test reports are included in the Appendix for reference.

4.5 Field Resistivity Testing

Field resistivity test results are summarized in the table below for reference. Individual field test data sheets are included in the Appendix. Minimum field resistivity ranged from 4,213 Ω-cm to 9,097 Ω-cm with an average of about 6,190 Ω-cm.

Summary of Field Resistivity Test Results

Location	Minimum Resistivity (Ω-cm)
B-01	5,745
B-02	4,596
B-03	4,309
B-05	4,290
B-06	6,894
B-07	5,362
B-09	7,277
B-10	7,900
B-11	6,128
B-12	4,443
B-14	5,209
B-16	4,213
B-17	8,139
B-18	7,277
B-19	7,277
B-20	7,660

5.0 Pile Installation Procedures

We retained a subcontractor to install the test piles at a total of 38 locations, identified as P-01 through P-38, across the site. The approximate pile test locations are shown on the Test Location Plan (Figure No. 25) in the Appendix. The pile installation procedure generally consisted of the following:

- The test piles consisted of uncoated ASTM A992 (Grade 50) W6x9 wide flange sections.
- 3 piles were installed at each of the test locations. Each of the test locations had a uniform target pile embedment of ranging in depth from 4 to 10 feet.
- The test piles were installed April 25 to 28, 2022. The piles for each test location were installed about 20 feet apart.
- The piles were installed with a Vermeer PD-10 track-mounted excavator equipped with a hydraulic hammer.
- Drive times were recorded by the subcontractor and provided to us. Driving times ranged from about 4 seconds to about 28 seconds per foot of pile penetration. Driving time generally increased with pile embedment depth. The pile driving time data (in seconds per foot of penetration) is presented in Figure No. 26 to 29 in the Appendix.
- At location P-20B, refusal was encountered by the driving equipment at a depth of 6½ feet.

6.0 Pile Load Testing Procedures

6.1 Axial Tension Load Tests

- Axial tension testing was performed on one pile at each test location. A total of 38 axial tension tests were performed.
- A telescopic lift was located over each test pile. The machine arm was adjusted to center the loading apparatus above the pile and provide a horizontal separation of at least 8-feet between the test pile location and the points where the tires contacted the ground.
- The test loads were applied using the excavator arm. Applied loads were measured using a calibrated Dillon model EDjr-5T load cell with a digital readout.
- Pile deflections at the approximate groundline were measured using two calibrated Mitutoyo Absolute Series 543 digital dial gauges. The dial gauges allowed for a maximum measurement of 2 inches. The dial gauges were set up on opposite sides of the piles and the average deflection was calculated. The measurements were taken relative to the middle of a steel reference beam that was supported on either end at a distance of about 4-feet away from the tested pile.
- The load tests were conducted in general accordance with the Quick Test Procedure (Procedure A) detailed in ASTM D3689 Section 8.1.2 with load schedule modifications due to the short duration of the design loads as shown below:

Table 6-1: Tension Test Load Schedule

Approximate Incremental Load (% of 4,000 lb. Allowable Load)	Hold time before measurement (min)
25%	30 seconds
50%	30 seconds
75%	30 seconds
100%	30 seconds
117%	30 seconds

Recorded loads are presented in the load test data sheets in the Appendix.

6.2 Axial Compression Load Tests

- A total of 38 axial compression tests were performed.
- A telescopic lift was located over each test pile. The machine arm was adjusted to center the loading apparatus above the pile and provide a horizontal separation of at least 8 feet between the test pile and the points where the tires contacted the ground.
- The test loads were applied using a calibrated hydraulic jack reacting against the machine boom. The pressure applied to the jack was measured and used to determine the load on the pile.

- Pile deflections at the approximate groundline were measured using two calibrated Mitutoyo Absolute Series 543 digital dial gauges. The dial gauges allowed for a maximum measurement of 2 inches. The dial gauges were set up on opposite sides of the pile and the average deflection was calculated. The measurements were taken relative to the middle of a steel reference beam that was supported on either end at a distance of 8 feet away from the pile.
- The load tests were conducted in general accordance with the Quick Test Procedure (Procedure A) detailed in ASTM D3689 Section 8.1.2 with load schedule modifications due to the short duration of the design loads as shown below:

Table 6-2: Compression Test Load Schedule

Approximate Incremental Load (% of 4,000 lb. Allowable Load)	Hold time before measurement (min)
25%	30 seconds
50%	30 seconds
75%	30 seconds
100%	30 seconds
125%	30 seconds
150%	30 seconds
175%	30 seconds
200%	120 seconds

Recorded loads are presented in the load test data sheets in the Appendix.

6.3 Lateral Load Tests

- A total of 38 lateral tests were completed.
- The test loads were applied along the strong axis of the piles using an telescopic lift at a height of about 55 inches above the ground surface. Applied loads were measured using the Dillon model EDjr-5T load cell with a digital readout.
- Pile deflections were measured at approximately six inches above the groundline using two Mitutoyo Absolute Series 543 digital dial gauges. The dial gauges allowed for a maximum measurement of 2 inches. The dial gauges were positioned on the “front” face of the pile (relative to loading) and the average deflection was calculated. The measurements were taken relative to the middle of a steel reference beam that was supported on either end at a distance of 8 feet away from the pile.
- The load tests were conducted in general accordance with the Quick Test Procedure (Procedure A) detailed in ASTM D3966 Section 8.1.2) with load schedule modifications in light of the short duration of the design loads as shown below:

Table 6-3: Lateral Test Load Schedule

Approximate Incremental Load (% of 2,500 lb. Allowable Load)	Hold time before measurement (min)
25%	30 seconds
50%	30 seconds
75%	30 seconds
100%	30 seconds
125%	30 seconds
150%	30 seconds
175%	30 seconds
200%	120 seconds

Recorded loads are presented in the load test data sheets in the Appendix.

7.0 Load Test Results

7.1 Axial Tension Tests

The results of the axial tension load tests are presented graphically in Figure No. 30 in the Appendix. To determine the "failure" load for each test, we applied a modified Davisson failure criterion which considers the elastic lengthening of the pile plus an offset of 0.15 inches. Because the elastic lengthening for the test loads is very small, the failure criterion was set as 0.15 inches of deflection. The axial tension load test results are summarized below:

- Axial tension load tests were performed on 6 piles with 6 feet or less of embedment. The test piles reached failure criterion of 0.15 inches of movement at loading ranging from 3,230 to 9,120.
- Axial tension load tests were performed on 30 piles with 7 feet of embedment. Six of the test piles did not exceed 0.15 inches of movement at the targeted load. The remaining 24 piles reached the failure criterion of 0.15 inches of movement at loadings ranging from 3,780 to 10,300 lbs.
- Axial tension load tests were performed on 2 piles with greater than 7 feet of embedment. The test piles did not reach the failure criterion of 0.15 inches of movement at their target loading of 8,000 lbs.

7.2 Axial Compression Tests

The results of the axial compression tests are presented graphically in Figure No. 31 in the Appendix. Axial compression tests were performed on 6 piles with less than 7 feet of embedment, 30 piles with 7 feet of embedment, and 2 piles with greater than 7 feet of embedment. Each of the piles were loaded to at least 8,000 pounds without exhibiting deflections consistent with plunging or failure.

7.3 Lateral Load Tests

The results of the lateral load tests are presented in Figure No. 32 in the Appendix. A "failure" criterion of 1.5 inches of pile deflection at approximately 6 inches above the groundline was assigned. The lateral load test results are summarized below:

- Lateral load tests were performed on 7 piles with less than 7 feet of embedment. One of the test piles did not exceed 1.5 inches of movement at the target loading of 5,000 lbs. The remaining piles reached the failure criterion of 1.5 inches of movement at loadings ranging from 3,610 to 4,650 lbs.
- Lateral load tests were performed on 26 piles with 7 feet of embedment. Seventeen of the test piles did not exceed 1.5 inches of movement at the target loading of 5,000 lbs. The remaining 9 piles reached the failure criterion of 1.5 inches of movement at loadings ranging from 3,820 to 4,910 lbs.
- Lateral load tests were performed on 5 piles with greater than 7 feet of embedment. Four of the test piles did not exceed 1.5 inches of movement at the target loading of 5,000 lbs. The remaining pile reached the failure criterion of 1.5 inches of movement at a loading of 4,790 lbs.

8.0 Conclusions and Recommendations

8.1 Site Assessment

The data obtained during this exploration and our experience with similar developments indicate that the site is adaptable for the planned development. We note the following items that may impact construction schedules and budgets:

- The desired W6x9 piles should generally be driven to a minimum depth of 6 feet below planned grades based on preliminary lateral analysis.

- Based on our field and laboratory testing, the site soils are generally mildly to moderately corrosive.

- The geophysical efforts show what appears to be typical weathering of the bedrock and soil filled features. Our evaluation on the widely spaced geophysical lines did not reveal caves or other air-filled voids that appear readily problematic. Construction in this area comes with the inherent risk of karst development and activity. Maintaining positive drainage to existing features and streams is a good mitigation tool. Further evaluation of the area could be beneficial, but there is no cost-effective way to "scan" the entire array field. And, even if no features were readily identified now, it is not a guarantee that nothing would occur in the future. Based on the findings from our field exploration, it is our professional opinion that the risk for immediate karst feature development (i.e. large scale drop-outs within the proposed array fields) is relatively low. Should areas of concern be present during construction, we should be notified in order to assist with remedial activities.

The preceding has been an overview of the primary geotechnical issues associated with the proposed development. Our recommendations regarding these issues, as well as other geotechnical aspects of the proposed construction are discussed in the report.

8.2 Earthwork

We anticipate that limited earthwork will be performed across much of the site but may be needed for access roads and equipment pad areas.

8.2.1 Site Preparation and Subgrade Evaluation

To prepare the site for construction, organics, debris, topsoil, and large root systems should be stripped from the site.

Cultivated soils were encountered in our borings. These soils were of low to moderate consistency and are particularly susceptible to changes in moisture content. Special care should be taken in evaluation of fill areas where cultivated soils will be left in place. If these materials are assessed to be soft or unstable, stabilization measures such as moisture conditioning with re-compaction or undercutting to firm soils may be required. Their stability will depend on rainfall quantities and seasonal conditions leading up to and during site grading.

The stability of the subgrade soils in the area of the equipment pads and access roads should be evaluated by an experienced geotechnical engineer or their representative. This should include observing proofrolling of the subgrade with a loaded tandem-axle dump truck. Proofrolling consists of applying repeated passes to the subgrade with this equipment. Materials judged to deflect excessively under the wheel loads and which cannot be densified by continued rolling should be undercut to stable soils before placing fill.

8.2.2 Earth Material Utilization and Fill Placement

After site preparation and subgrade evaluation are completed, areas to receive fill may be brought to design subgrade levels with structural fill. Structural fill is defined as inorganic natural soil with maximum particle sizes of about 6 inches and Plasticity Indexes (PI) of 30 or less. Maximum particle sizes for structural fill placed as backfill around utilities should be limited to about 3 inches to reduce the chance of damaging the conduits and to help facilitate adequate compaction using the smaller equipment usually necessary when backfilling utility trenches. Structural fill should be placed in relatively thin (4- to 8-inch) layers and compacted to at least 90 percent of the soil's maximum dry density as determined by the standard Proctor compaction test (ASTM D698).

Based on the materials encountered in our borings, we expect the on-site soils are generally satisfactory for re-use as structural fill. At times, moisture conditioning of excavated soil may be needed to achieve moisture contents compatible with achieving the appropriate degree of compaction.

In-place density testing must be performed as a check that the previously recommended compaction criteria have been achieved. We recommend density testing by a technician working under the direction of our project engineer.

8.3 Foundation Recommendations

8.3.1 Equipment Pad Shallow Foundations

The exploration findings indicate that the equipment pads can be supported by conventional spread footings bearing on residual soils or properly compacted structural fill as previously discussed. We recommend use of a maximum allowable net soil bearing pressure of 2,000 psf to size footings supported by these materials. We recommend the foundation excavations be evaluated by a member of our engineering staff.

Even though computed footing dimensions may be less, column footings should be at least 24 inches wide and strip footings should be at least 18 inches wide. These dimensions facilitate reinforcing steel placement and hand cleaning of footing subgrades disturbed by the excavation process. They also help reduce the potential for localized punching shear failure. All exterior footing bottoms should be at least 24 inches below the lowest adjacent exterior grade for protection against seasonal moisture changes and frost penetration.

Footing excavations should be evaluated by a representative of our firm to observe field conditions in light of our design recommendations. We can also provide geotechnical guidance to the owner's design team if any other unforeseen soil conditions are encountered during construction. Footing excavation often produces a thin veneer of disturbed soil at the footing subgrade. We recommend that this disturbed soil be hand cleaned prior to placing reinforcing steel. Furthermore, the footing excavation bottom should be free of all fall-in soil prior to placing concrete. The strength properties of soil exposed at the footing subgrade will change if exposed to wetting, drying, or freezing. Whenever possible, concrete should be placed during the day the excavation is completed. If subgrades will be left open for more than one day, they should be covered with polyethylene sheeting. Excavation of disturbed soil may be required if protective measures are not implemented.

8.3.2 Solar Array Field Piles

8.3.2.1 General

Based on the results of the axial tension and lateral load tests, we recommend that piles have a minimum embedment of 6 feet.

8.3.2.2 Axial-Tension Parameters

The ultimate skin friction capacities for the piles were based on the test results at P-37A, P-23B, P-12B, P-31B, and P-28B. These tests appeared to be a reasonable lower bound of the tests upon which to base the design values, as most of the test results were better. A factor of safety of 1.67 was applied to the ultimate skin friction values to determine an allowable skin friction parameter for each soil layer. We recommend use of the design allowable skin friction values as listed in Table 8-1 below. These skin friction values should be applied to the "boxed" perimeter of the pile. These skin friction values can also be used in axial compression resistance calculations.

8.3.2.3 Lateral Parameters

Lateral analyses were performed using the proprietary computer program LPile2018® to simulate observed pile load-deflection behavior. The program performs a soil-structure interaction analysis based on soil strength

parameters and several selectable p-y (load-deflection) curve models. The LPile soil properties were adjusted such that the predicted response generally fit to the results of the load tests.

Using the properties of an ASTM A992 W6x9 wide flange beam section, the load-deflection performance measured during pile load testing was modeled. Based on iterative variation of the soil strength parameters in the models, deflection curves were developed that approximate the reasonable lower bound of the measured load test behavior.

Based on our evaluation, we recommend the LPile model soil parameters in Table 8-1 for design/evaluation of production driven piles at the site:

Table 8-1: Recommended Soil Parameters

Depth (ft BGS)	Allowable End Bearing (psf)	Allowable Skin Friction (psf)	LPILE Soil Type	Effective Unit Weight (pcf)	Cohesion (psf)	Strain Factor, ε_{50}
0 to 1	0	0	Soft Clay	110	600	0.02
>1	4,000	225	Stiff CLAY (w/o water*)	115	2,000	0.008

"BGS" = Below Ground Surface
"Stiff Clay (w/o water)" is a LPILE soil type name and is not intended to imply the groundwater is not present below the tabled depth. Our Report of Geotechnical exploration for the project should be reviewed for groundwater data at individual exploration locations.

These values (except the allowable skin friction) are not recommended for use in any other geotechnical analysis or evaluation except lateral pile behavior analysis using the LPile program. These values are intended for driven steel piles and are not recommended for use with pre-drilled piles, helical piers, or other foundation systems. They also only apply to undisturbed existing site soils and not to piles supported in fill. Additional testing and analysis would be required to develop recommendations for piles supported in fill.

8.4 Corrosion Potential

The laboratory test results performed on the 10 bulk samples of near surface (0 – 2 feet) were summarized above and individual test reports are included in the Appendix for reference. The laboratory resistivity test results were between 871 and 16,080 Ω-cm (average of about 6,985 Ω-cm). The measured pH levels were between 5.2 and 8.2 (average of about 6.7). The sulfate content test results indicate sulfate contents ranging from less than 10 parts per million (ppm) to 173 ppm parts per million (PPM) and the chloride contents were less than 10 to 82 ppm. The Federal Highway Administration's (FHWA) *Corrosion/Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Soil Slopes* (Publication No. FHWA-NHI-09-087, dated November 2009) provides the following table on the effect of resistivity on corrosion:

Aggressiveness Potential	Resistivity (Ω-cm)
Very Corrosive	<700
Corrosive	700 – 2,000
Moderately Corrosive	2,000 – 5,000
Mildly Corrosive	5,000 – 10,000
Non-corrosive	>10,000

Additionally, the FHWA publication recommends an allowable pH range of about 5 to 10 and maximum allowable sulfate and chloride contents of 200 ppm and 100 ppm, respectively. Based on these references relative to our laboratory and field testing, the site soils are considered moderately to mildly corrosive. Additional site specific corrosion discussion is contained in the report by Project X in the Appendix. We subcontracted them to perform laboratory tests on split spoon samples from 1 and 4-foot depths in order to provide their professional opinion on corrosion concerns and considerations for the site.

8.5 Seismic Site Classification

We calculated the Seismic Site Class using the 2018 International Building Code (IBC 2018). Based on the soil boring data and our experience in the area, we recommend that Seismic Site Class of C be used in design.

Seismic Site Class	S_S	S_1	F_a	F_v	S_{MS}	S_{M1}	S_{DS}	S_{D1}
C	0.316	0.151	1.548	2.297	0.488	0.348	0.326	0.232

8.6 Access Road

We anticipate the access roads will consist of compacted soil, soil cement, and/or gravel. Once construction of the facility is complete, we expect only occasional service truck traffic. While a compacted soil road may suffice for the limited service truck traffic expected, a soil cemented road would help limit down time for site access following inclement weather along with longevity of the road. A graveled road may help limit surface run-off. If gravel is selected, we recommend using a No. 34 or No. 2 sized stone with a minimum thickness of 6 inches with an optional single layer of non-woven geotextile fabric for support during construction and facility operation. The gravel should be compacted until no further movement is observed beneath the compaction equipment. We note that construction traffic could damage the gravel pavement in some areas, and repairs of these areas should be expected.

We offer the following recommendations regarding the use of soil cement at this site. Typically, soil cement is accomplished by incorporating about 5 to 8 percent cement, by volume or weight, into the upper 12 to 16 inches of the soil subgrade utilizing a mechanized rotary tiller. Typically, the cement hydrates within about 12 to 24 hours creating a stable working platform and helping limit degradation of the surface during construction. Sometimes, higher plasticity or very wet materials may require additional cement. We recommend that soil cement mix designs be performed to aid in determining the appropriate mixture to support the access roads. Due to the size of the site, several different soil types will be found across the site which may perform differently when mixed with

cement due to variation in fines content and plasticity. We recommend that the Contractor consider these different soil types when determining the appropriate soil cement mix design(s).

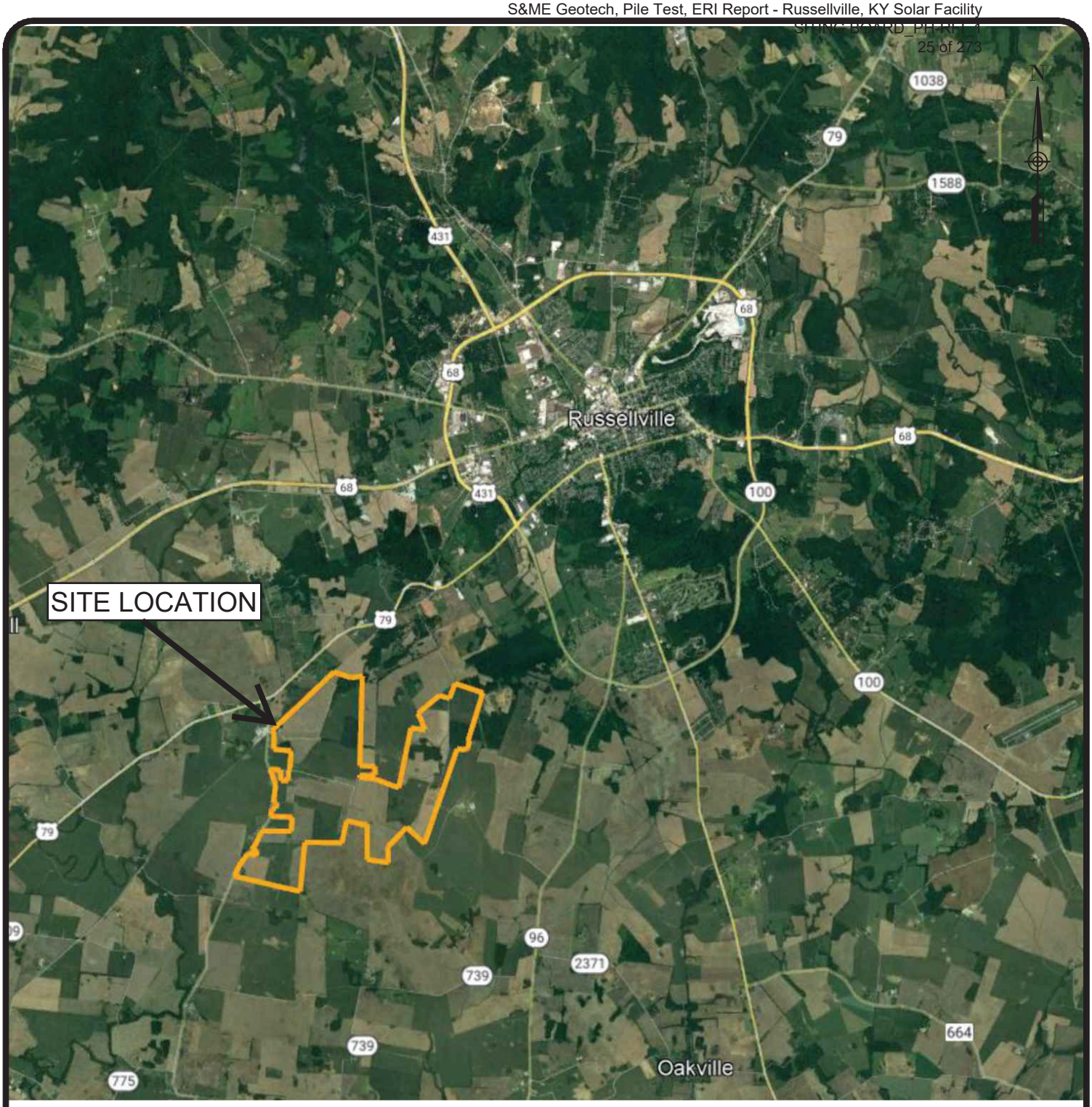
9.0 Limitations of Conclusions and Recommendations

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The conclusions and recommendations contained in this report are based upon applicable standards of our practice in this geographic area at the time this report was prepared. No other representation or warranty either express or implied, is made. We relied on project information given to us to develop our conclusions and recommendations. If project information described in this report is not accurate, or if it changes during project development, we should be notified of the changes so that we can modify our recommendations based on this additional information if necessary. Our conclusions and recommendations are based on limited data from a field exploration program. Subsurface conditions can vary widely between explored areas. Some variations may not become evident until construction. If conditions are encountered which appear different than those described in our report, we should be notified. This report should not be construed to represent subsurface conditions for the entire site.

We should be retained to review the final plans and specifications to confirm that earthwork, foundation, and other recommendations are properly interpreted and implemented. The recommendations in this report are contingent on our review of final plans and specifications followed by our observation and monitoring of earthwork and foundation construction activities.

For additional information regarding the use and limitations of this report, please read the *Important Information about your Geotechnical Engineering Report* document located at the end of this report.

Appendix



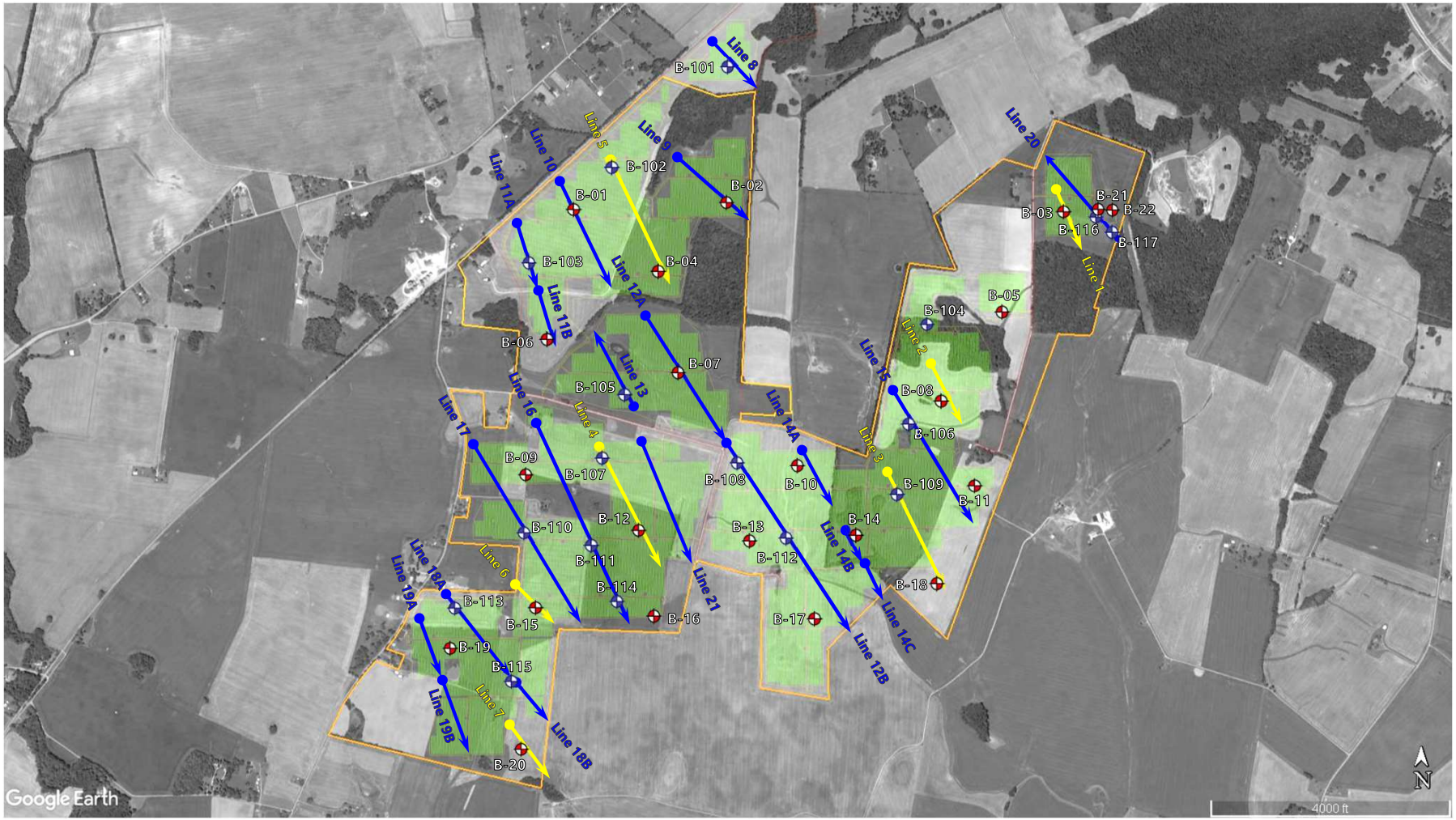
Notes:

1) Base map from Google Earth Pro accessed on May 2, 2022.

	Site Location Plan	SCALE: Not to Scale	FIGURE NO.
	Russellville Solar Facility Watermelon Road Russellville, Kentucky	DATE: 5/3/2022 PROJECT NUMBER 22800023	1

Drawing Path: T:\GEO\Projects\2022\22800023_Silicon Ranch_Russellville KY Solar Facility_Russellville, KY\4 GEO\110 Geotech\CAD\Figure 1_SVM.dwg

REFERENCE:
GOOGLE EARTH PRO AERIAL PHOTOGRAPH
(DATED MAY 19, 2019)



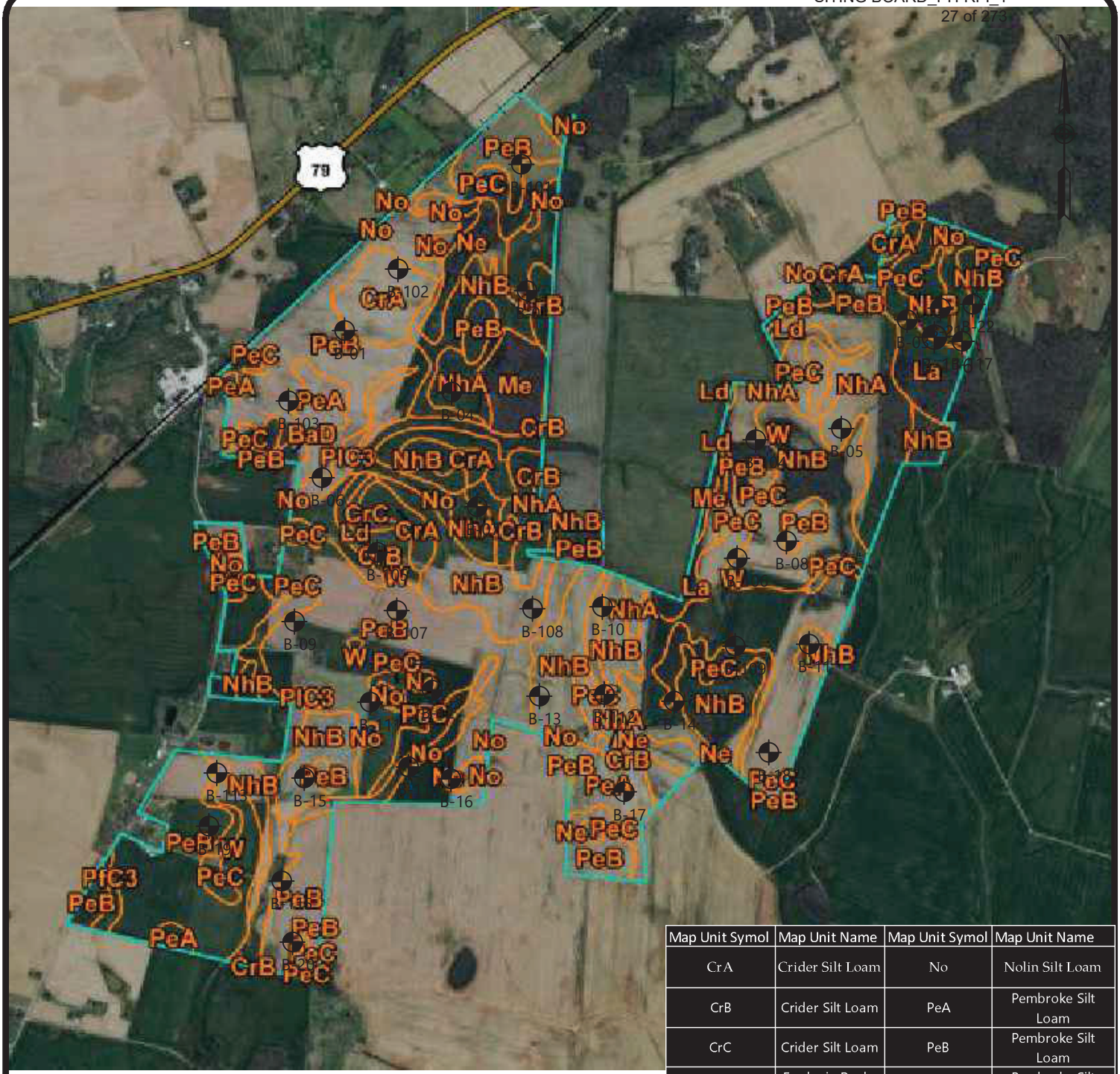
LEGEND

- Approximate Location of ERT Profile (S&ME; 2020)
- Approximate Location of ERT Profile (S&ME; 2022)
- Approximate Boring Location (S&ME; 2020)
- Approximate Boring Location (S&ME; 2022)
- Approximate Site Location
- Approximate Solar Array Location

GEOPHYSICAL SURVEY LOCATION PLAN

RUSSELLVILLE KY SOLAR FACILITY
RUSSELLVILLE, KENTUCKY

SCALE: AS SHOWN
DATE: 5/18/2022
PROJECT NUMBER: 22800023
FIGURE NO. 2



Map Unit Symol	Map Unit Name	Map Unit Symol	Map Unit Name
CrA	Crider Silt Loam	No	Nolin Silt Loam
CrB	Crider Silt Loam	PeA	Pembroke Silt Loam
CrC	Crider Silt Loam	PeB	Pembroke Silt Loam
FeC	Fredonia Rocky Silty Clay Loam	PeC	Pembroke Silt Loam
La	Lawrence Silt Loam	PfC3	Pembroke Silty Clay Loam
Ld	Lindside Silt Loam	PkB	Pickwick Silt Loam
Me	Melvin Silt Loam	PkC	Pickwick Silt Loam
Ne	Newark Silt Loam	PlC3	Pickwick Silty Clay Loam
NhA	Nicholson Silt Loam	Rx	Rock Outcrop-Fredonia-Colbert Complex
NhB	Nicholson Silt Loam	TcD	Talbott-Colbert Rocky Silt Loams

Legend:

Approximate Location of Soil Test Borings

Notes:

1) Base map from Google Earth Pro accessed on May 3, 2022.
2) Soil Survey overlay from USDA Web Soil Survey

Drawing Path: T:\GEO\Projects\2022\22800023_Silicon Ranch_Russellville KY Solar Facility_Russellville, KY\4 GEO\110 Geotech\CAD\Figure 3 Soil Site Map.dwg

Site Soil Survey Unit Plan	SCALE:	FIGURE NO.
	Not to Scale	3
Russellville Solar Facility Watermelon Road Russellville, Kentucky	DATE: 5/2/2022	
	PROJECT NUMBER 22800023	

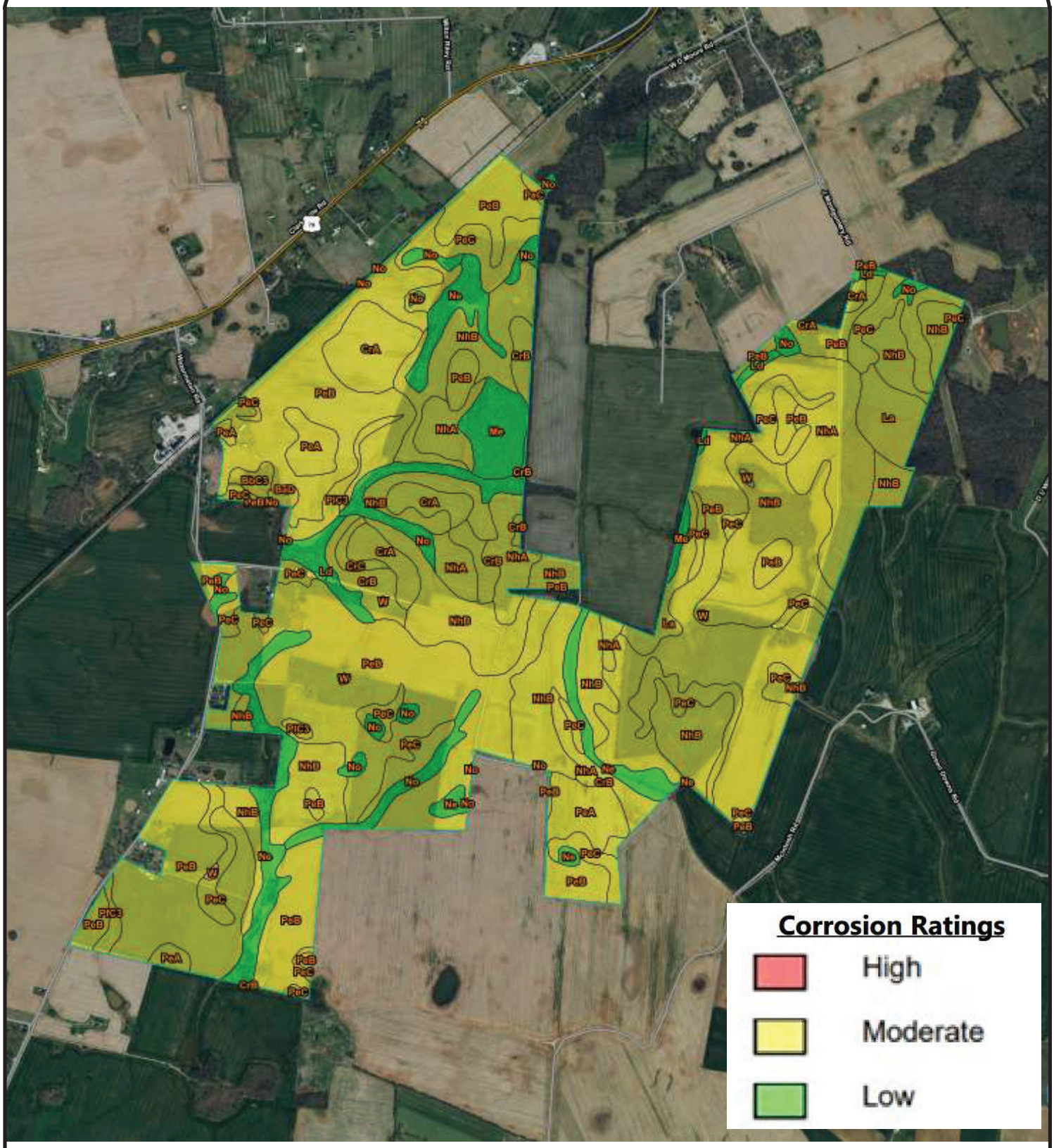


Photo Location:
USDA Web Soil Survey

	SOIL TO CONCRETE CORROSION PLAN	SCALE: NTS	FIGURE NO.
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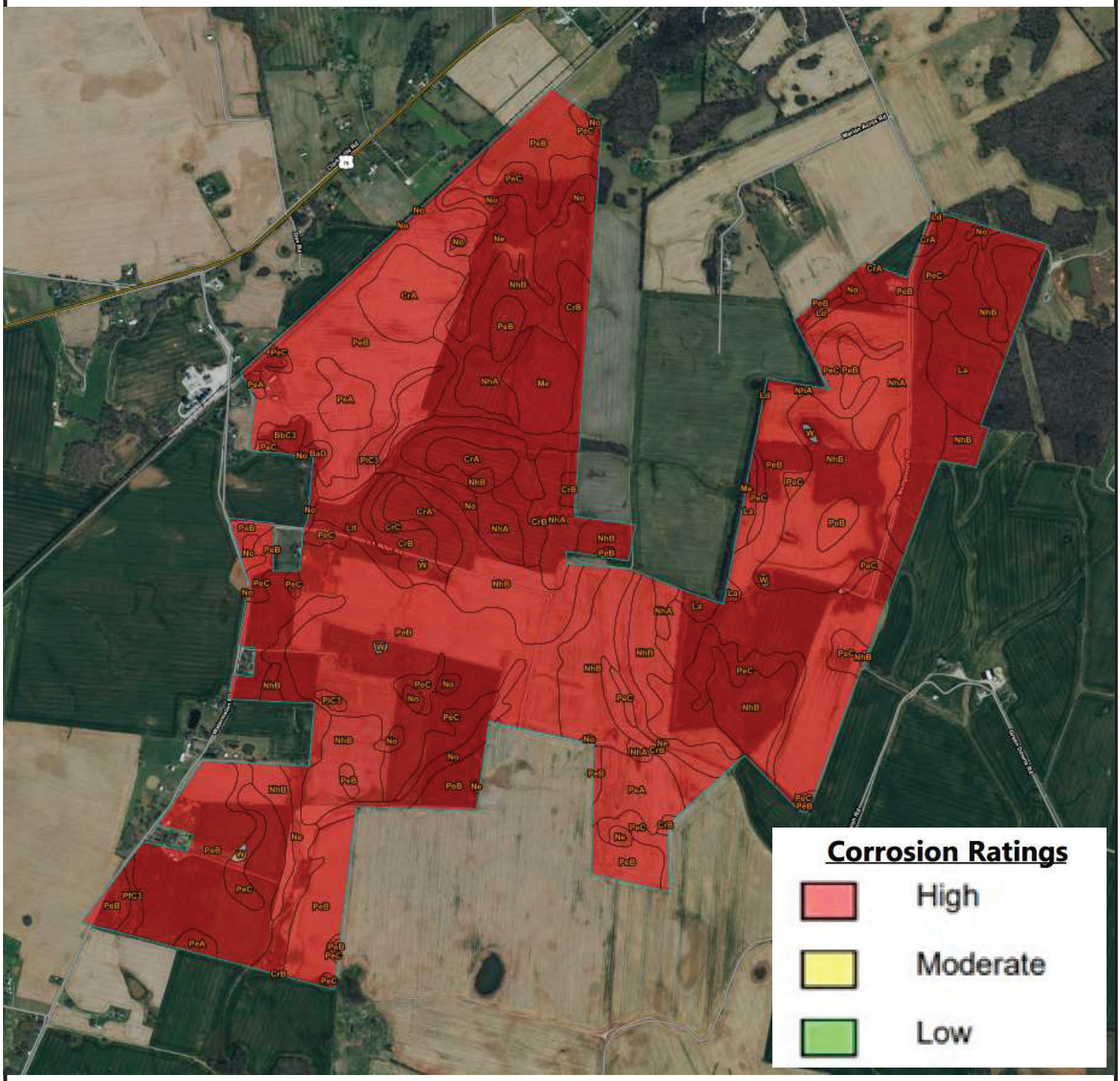
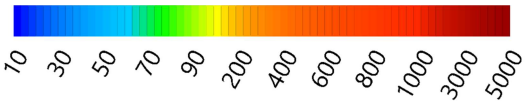


Photo Location:
USDA Web Soil Survey

	SOIL TO STEEL CORROSION PLAN	SCALE: NTS	FIGURE NO.
	RUSSELLVILLE SOLAR FACILITY WATERMELON ROAD RUSSELLVILLE, KENTUCKY	DATE: 5/3/2022 PROJECT NUMBER 22800023	5

Resistivity
(Ohm-m)

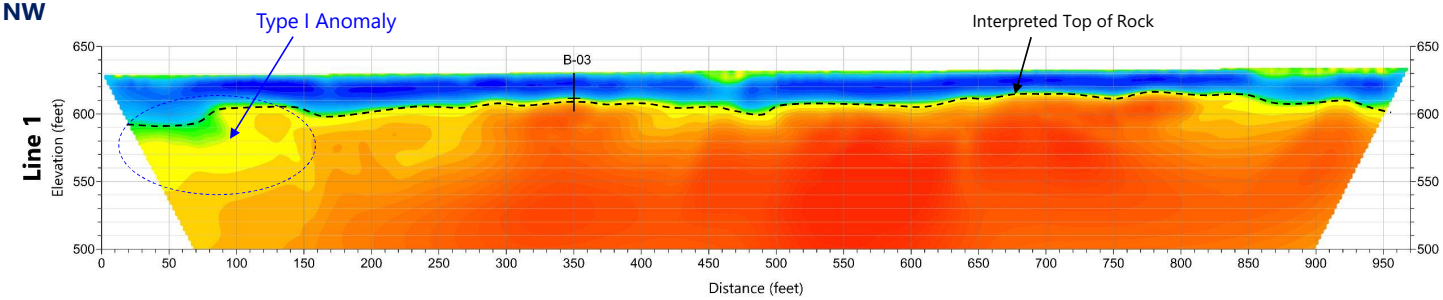


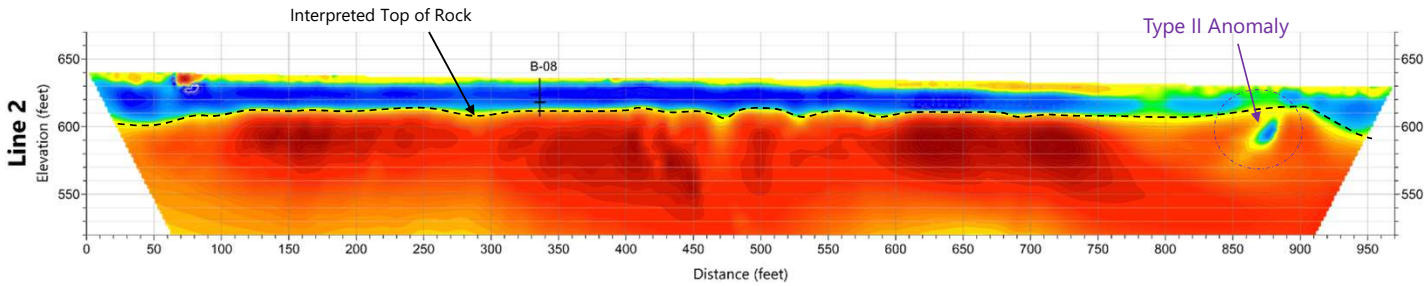
Approximate Boring Location
(hash mark indicates Auger Refusal)

LEGEND

- Approximate Location of ERT Profile (S&ME; 2020)
- Approximate Location of ERT Profile (S&ME; 2022)
- Approximate Boring Location (S&ME; 2020)
- Approximate Boring Location (S&ME; 2022)
- Approximate Site Location
- Approximate Solar Array Location

NW **SE**



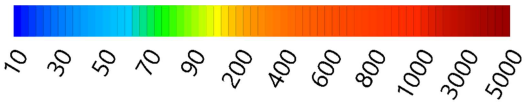


GEOPHYSICAL DATA PROFILES – LINES 1 AND 2

RUSSELLVILLE KY SOLAR FACILITY
RUSSELLVILLE, KENTUCKY

SCALE:	AS SHOWN
DATE:	5/18/2022
PROJECT NUMBER	22800023
FIGURE NO.	6

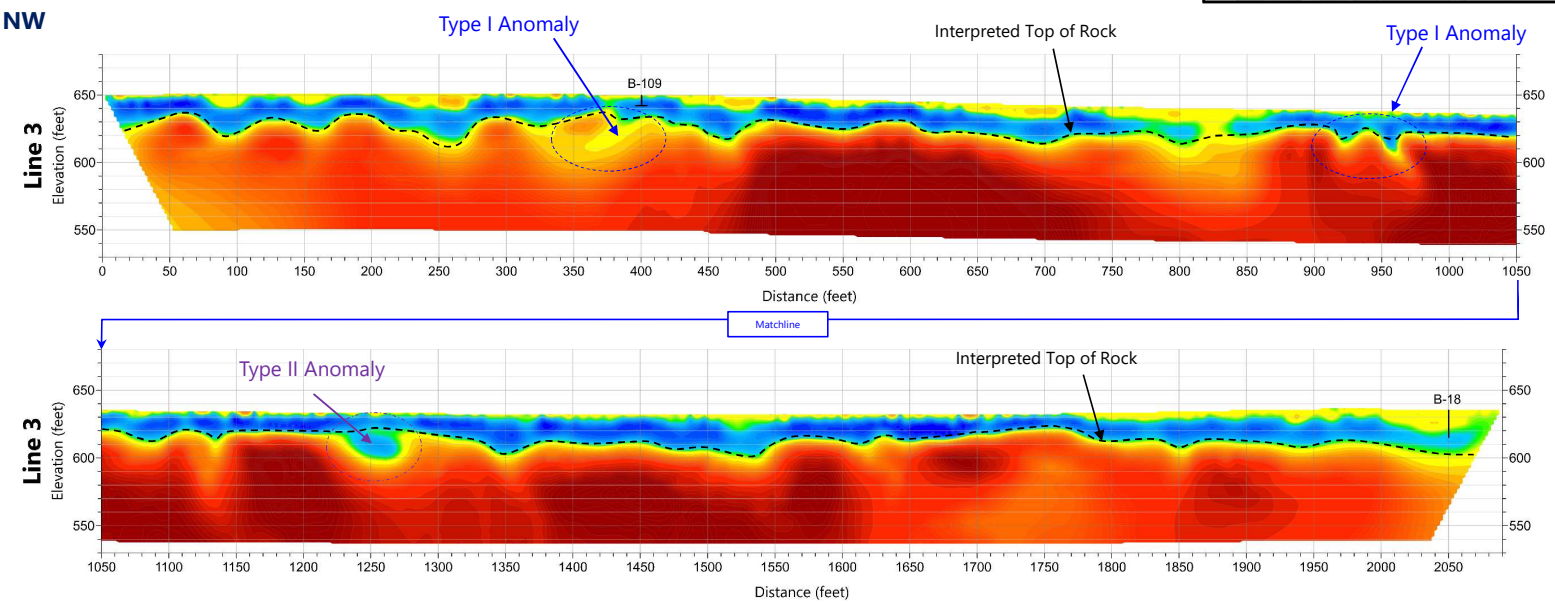
Resistivity
(Ohm-m)



Approximate Boring Location
(hash mark indicates Auger Refusal)

LEGEND

- Approximate Location of ERT Profile (S&ME; 2020)
- Approximate Location of ERT Profile (S&ME; 2022)
- Approximate Boring Location (S&ME; 2020)
- Approximate Boring Location (S&ME; 2022)
- Approximate Site Location
- Approximate Solar Array Location

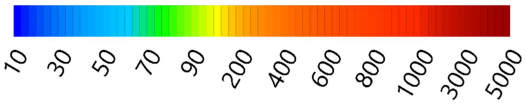


GEOPHYSICAL DATA PROFILE – LINE 3

RUSSELLVILLE KY SOLAR FACILITY
RUSSELLVILLE, KENTUCKY

SCALE:	AS SHOWN
DATE:	5/18/2022
PROJECT NUMBER	22800023
FIGURE NO.	7

Resistivity
(Ohm-m)



Approximate Boring Location
(hash mark indicates Auger Refusal)

LEGEND

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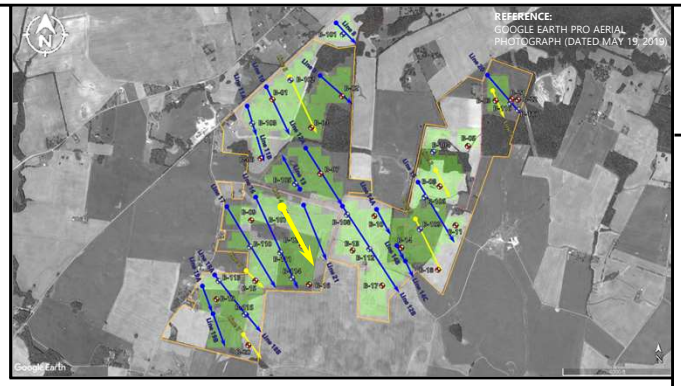
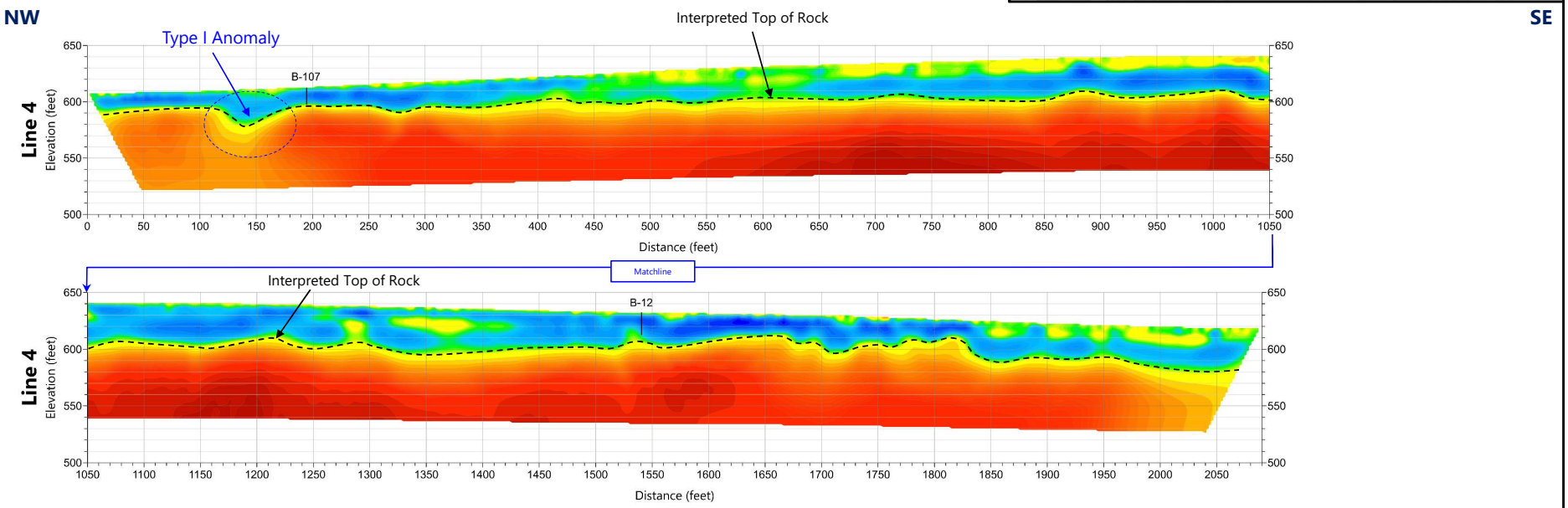
- Approximate Location of ERT Profile (S&ME; 2022)
- Approximate Boring Location (S&ME; 2020)
- Approximate Boring Location (S&ME; 2022)
- Approximate Site Location
- Approximate Solar Array Location





GEOPHYSICAL DATA PROFILE – LINE 4

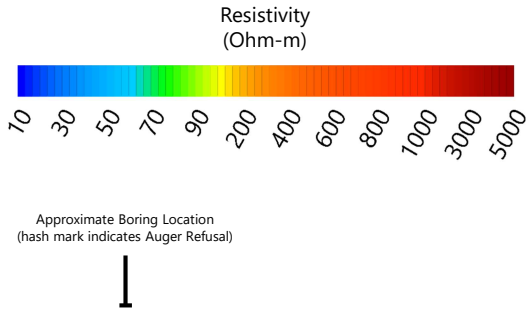
RUSSELLVILLE KY SOLAR FACILITY
RUSSELLVILLE, KENTUCKY

SCALE:
AS SHOWN

DATE:
5/18/2022

PROJECT NUMBER
22800023

FIGURE NO.
8



LEGEND

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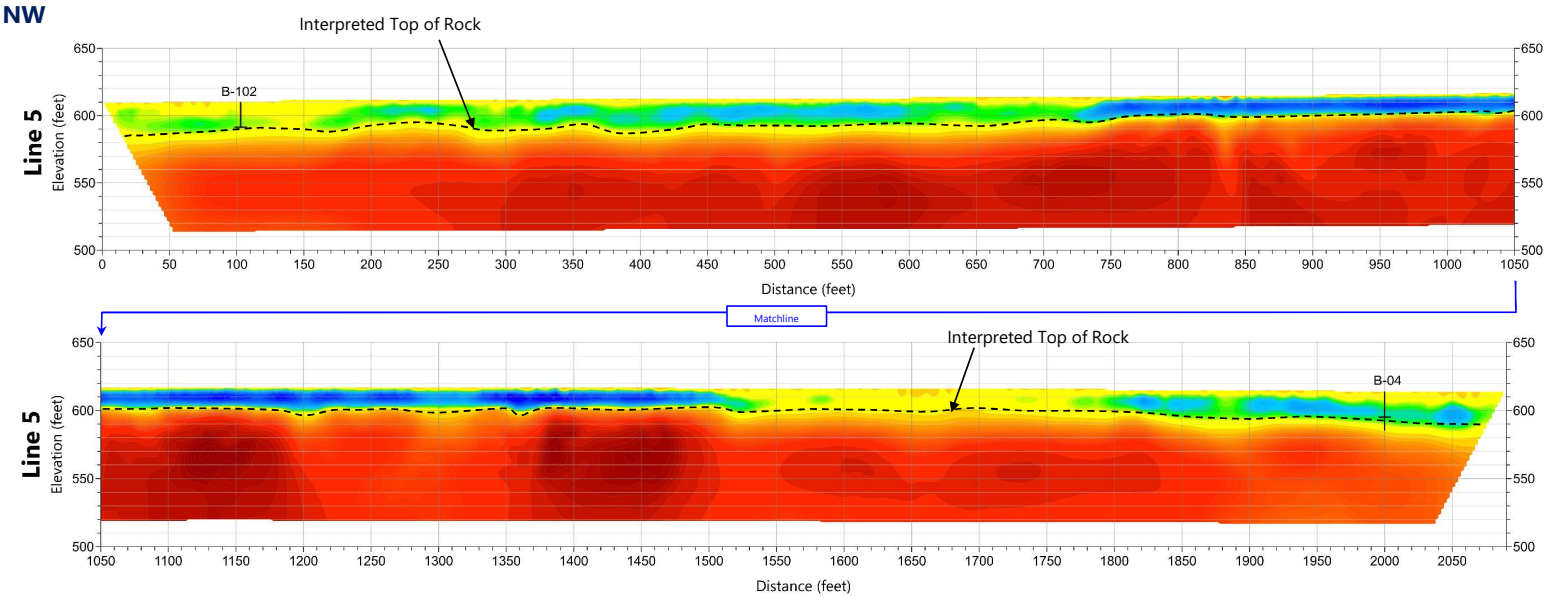
- Approximate Location of ERT Profile (S&ME; 2022)
- Approximate Boring Location (S&ME; 2020)
- Approximate Boring Location (S&ME; 2022)
- Approximate Site Location
- Approximate Solar Array Location



GEOPHYSICAL DATA PROFILE – LINE 5

RUSSELLVILLE KY SOLAR FACILITY
RUSSELLVILLE, KENTUCKY

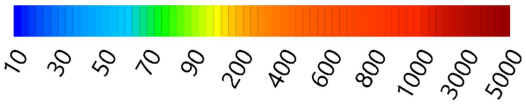
SCALE:
AS SHOWN

DATE:
5/18/2022

PROJECT NUMBER
22800023

FIGURE NO.
9

Resistivity
(Ohm-m)



Approximate Boring Location
(hash mark indicates Auger Refusal)

LEGEND

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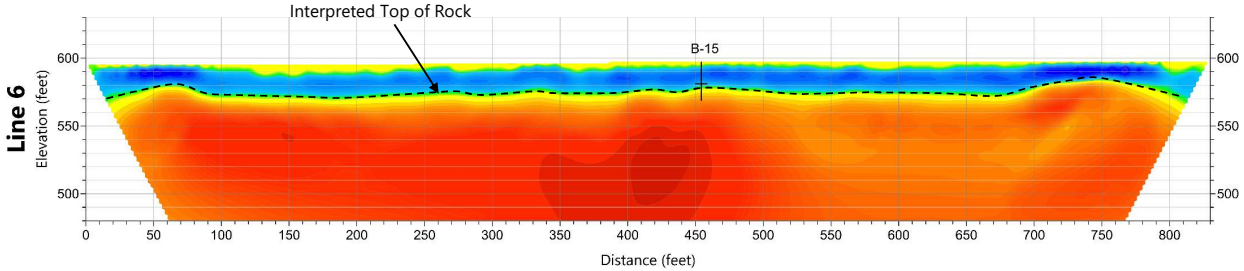
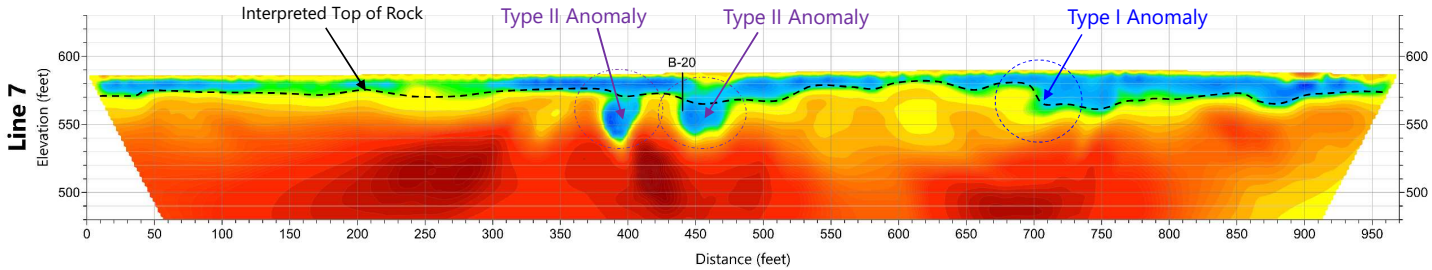
- Approximate Location of ERT Profile (S&ME; 2022)
- Approximate Boring Location (S&ME; 2020)
- Approximate Boring Location (S&ME; 2022)
- Approximate Site Location
- Approximate Solar Array Location

NW **SE**





GEOPHYSICAL DATA PROFILES – LINES 6 AND 7

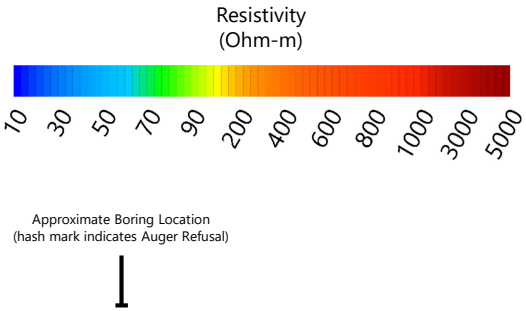
RUSSELLVILLE KY SOLAR FACILITY
RUSSELLVILLE, KENTUCKY

SCALE:
AS SHOWN

DATE:
5/18/2022

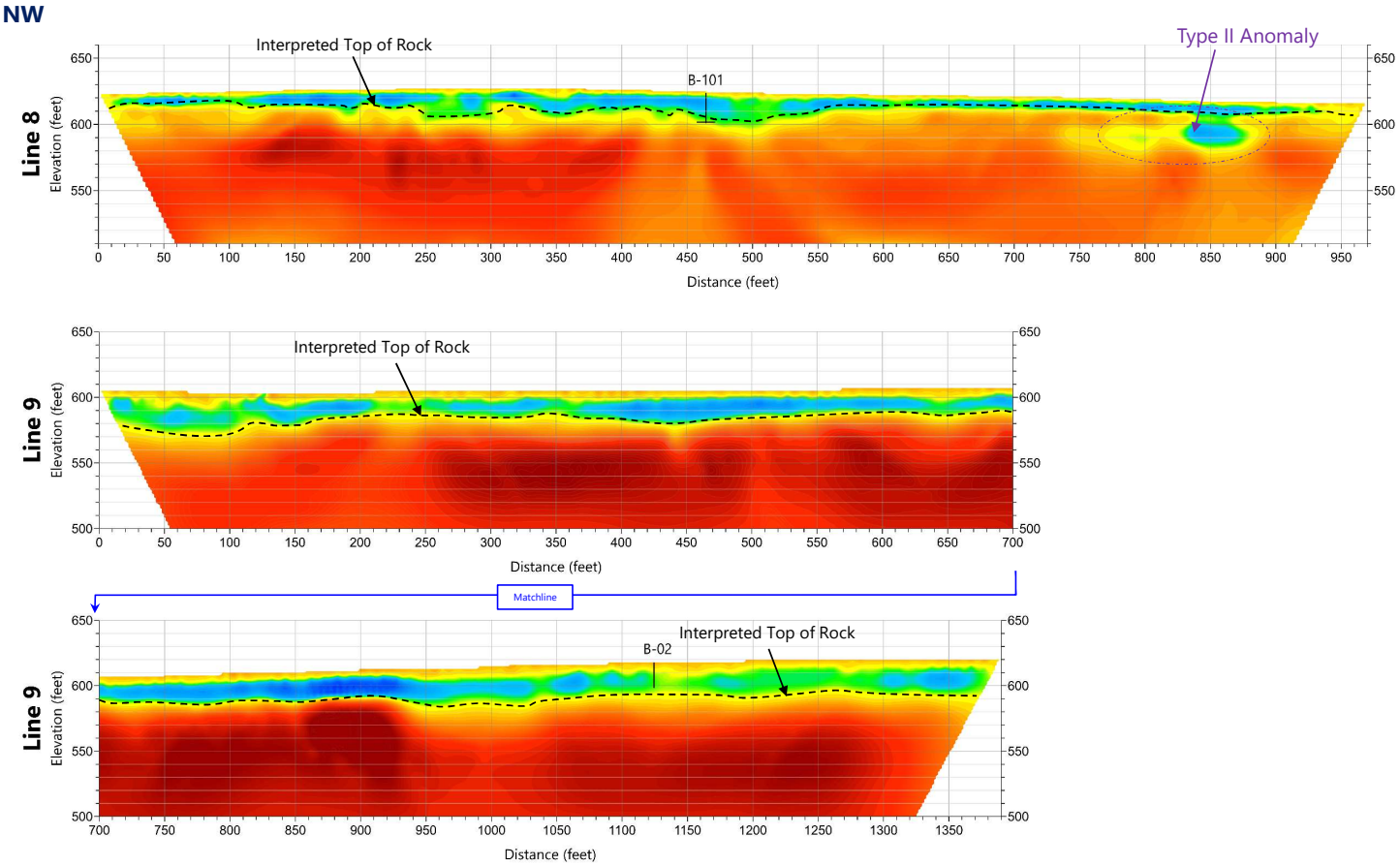
PROJECT NUMBER
22800023

FIGURE NO.
10



LEGEND

- Approximate Location of ERT Profile (S&ME; 2020)
- Approximate Location of ERT Profile (S&ME; 2022)
- Approximate Boring Location (S&ME; 2020)
- Approximate Boring Location (S&ME; 2022)
- Approximate Site Location
- Approximate Solar Array Location



GEOPHYSICAL DATA PROFILES – LINES 8 AND 9

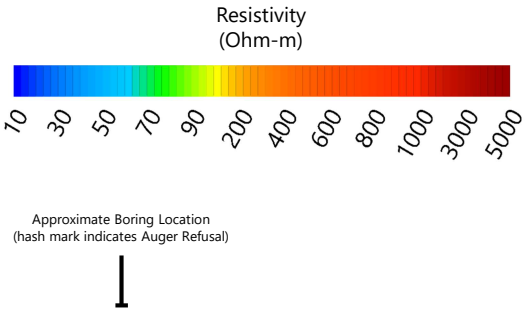
RUSSELLVILLE KY SOLAR FACILITY
RUSSELLVILLE, KENTUCKY

SCALE:
AS SHOWN

DATE:
5/18/2022

PROJECT NUMBER
22800023

FIGURE NO.
11



LEGEND

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- Approximate Boring Location (S&ME; 2022)
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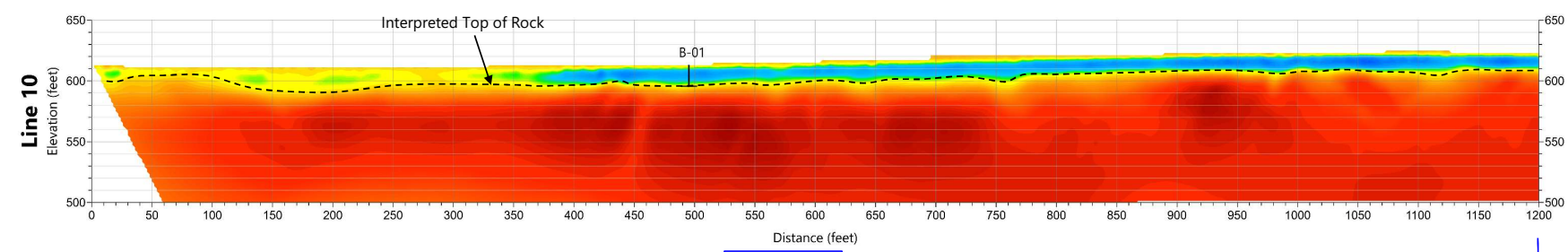
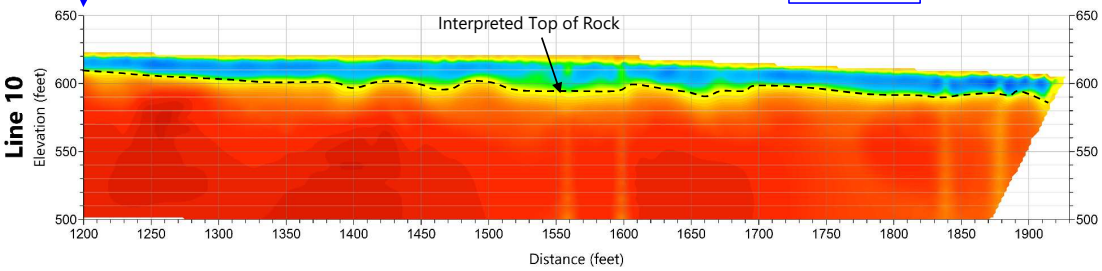
- Approximate Solar Array Location





GEOPHYSICAL DATA PROFILES – LINE 10

RUSSELLVILLE KY SOLAR FACILITY
RUSSELLVILLE, KENTUCKY

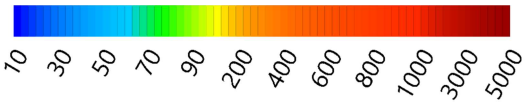
SCALE:
AS SHOWN

DATE:
5/18/2022

PROJECT NUMBER
22800023

FIGURE NO.
12

Resistivity
(Ohm-m)



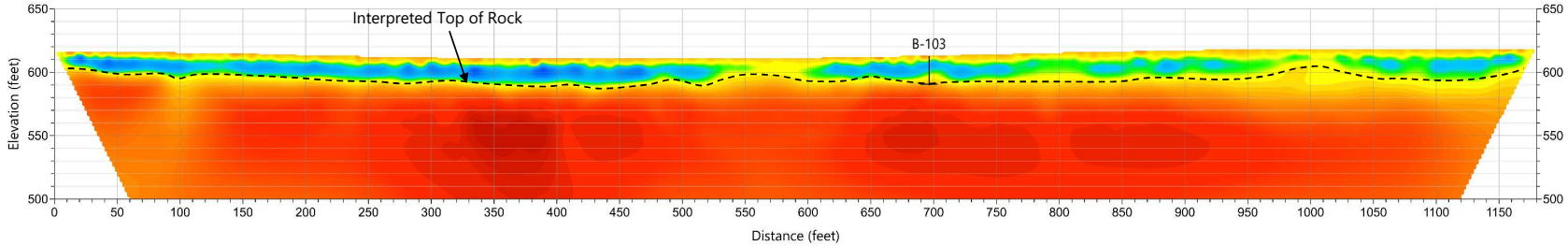
Approximate Boring Location
(hash mark indicates Auger Refusal)

LEGEND

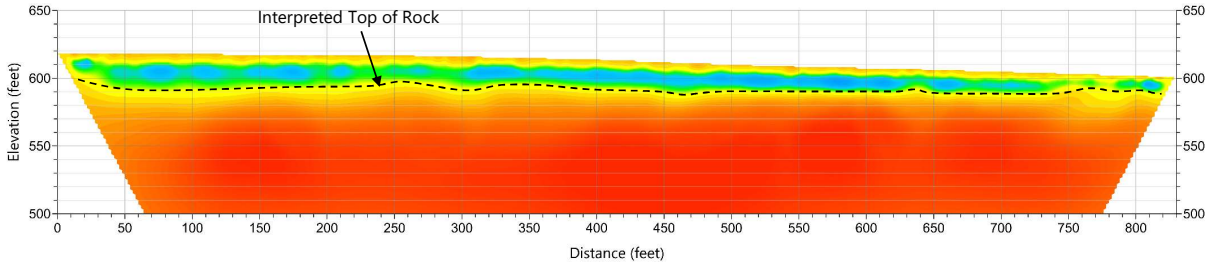
- Approximate Location of ERT Profile (S&ME; 2020)
- Approximate Location of ERT Profile (S&ME; 2022)
- Approximate Boring Location (S&ME; 2020)
- Approximate Boring Location (S&ME; 2022)
- Approximate Site Location
- Approximate Solar Array Location

NW **SE**

Line 11A



Line 11B



GEOPHYSICAL DATA PROFILES – LINES 11A AND 11B

RUSSELLVILLE KY SOLAR FACILITY
RUSSELLVILLE, KENTUCKY

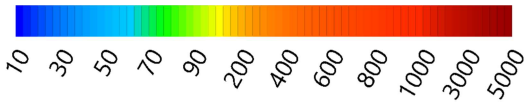
SCALE:
AS SHOWN

DATE:
5/18/2022

PROJECT NUMBER
22800023

FIGURE NO.
13

Resistivity
(Ohm-m)



Approximate Boring Location
(hash mark indicates Auger Refusal)

LEGEND

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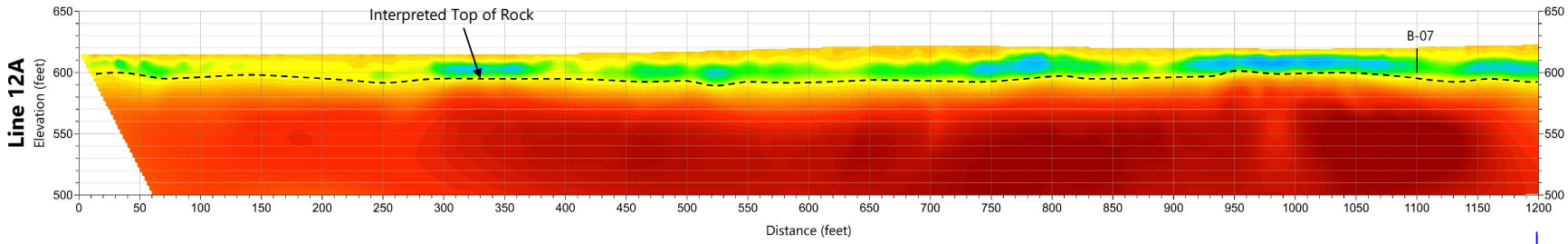
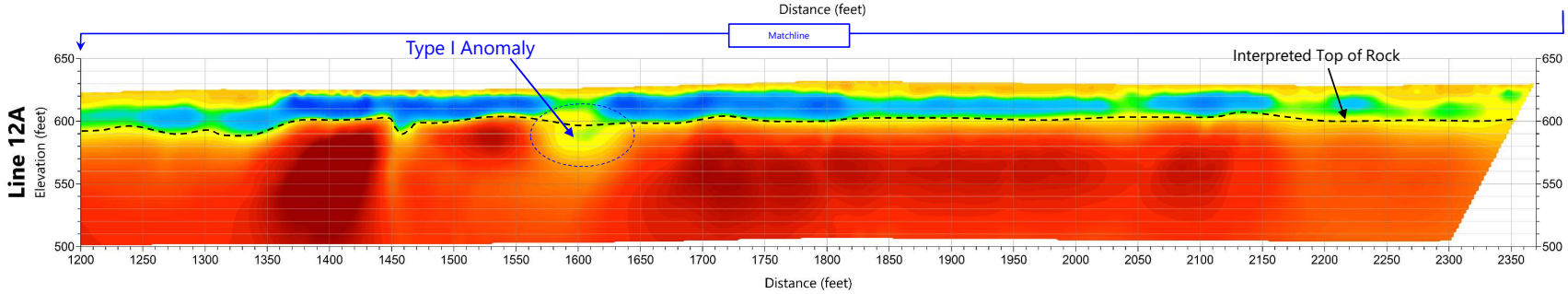
- Approximate Boring Location (S&ME; 2020)
- Approximate Boring Location (S&ME; 2022)
- Approximate Site Location
- Approximate Solar Array Location

NW **SE**





GEOPHYSICAL DATA PROFILES – LINE 12A

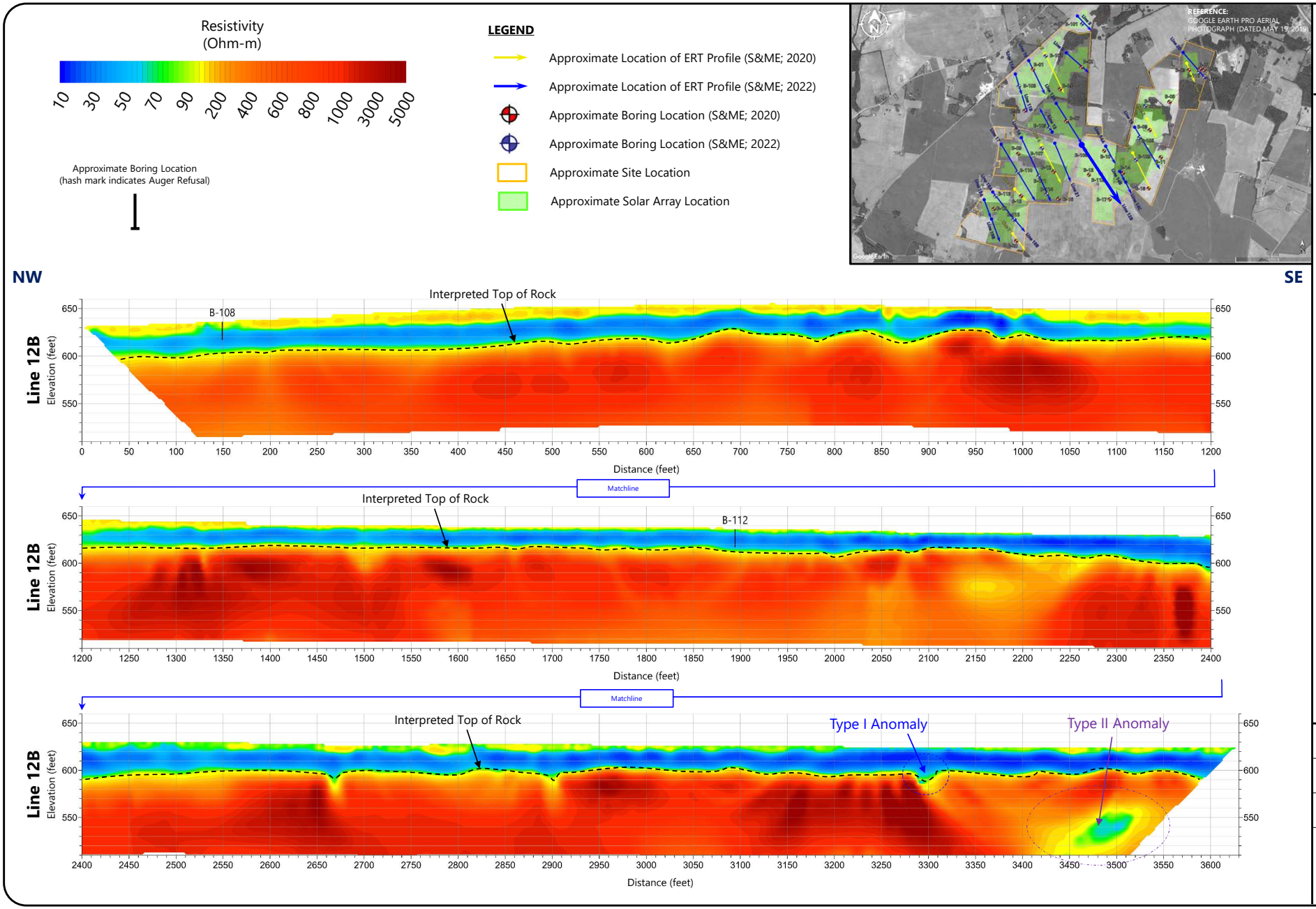
RUSSELLVILLE KY SOLAR FACILITY
RUSSELLVILLE, KENTUCKY

SCALE:
AS SHOWN

DATE:
5/18/2022

PROJECT NUMBER
22800023

FIGURE NO.
14



GEOPHYSICAL DATA PROFILES – LINE 12B

RUSSELLVILLE KY SOLAR FACILITY
RUSSELLVILLE, KENTUCKY

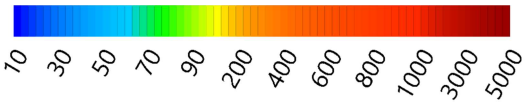
SCALE:
AS SHOWN

DATE:
5/18/2022

PROJECT NUMBER
22800023

FIGURE NO.
15

Resistivity
(Ohm-m)



Approximate Boring Location
(hash mark indicates Auger Refusal)

LEGEND

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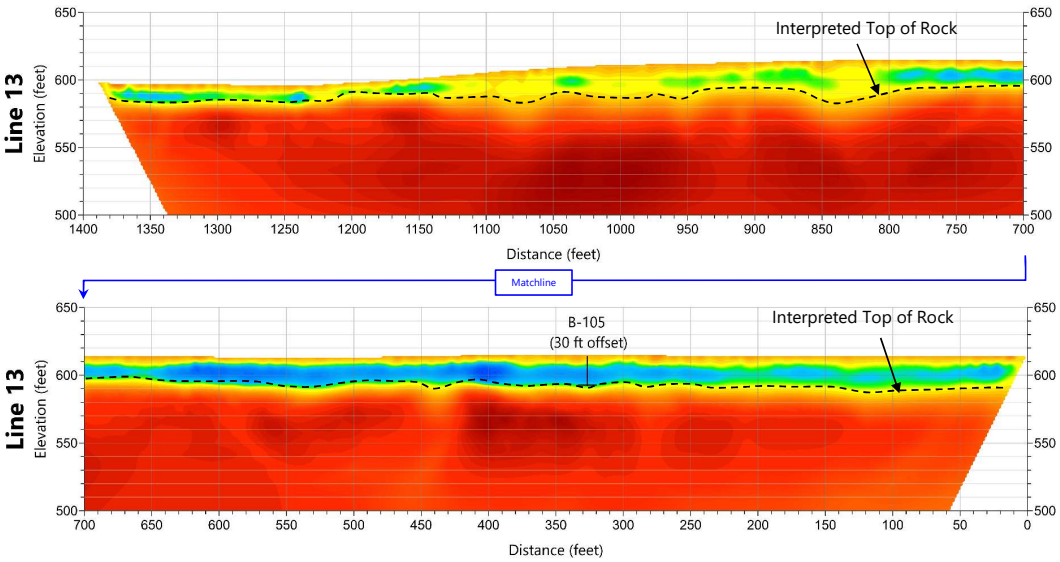
- Approximate Location of ERT Profile (S&ME; 2022)
- Approximate Boring Location (S&ME; 2020)
- Approximate Boring Location (S&ME; 2022)
- Approximate Site Location
- Approximate Solar Array Location

SE **NW**



GEOPHYSICAL DATA PROFILES – LINE 13

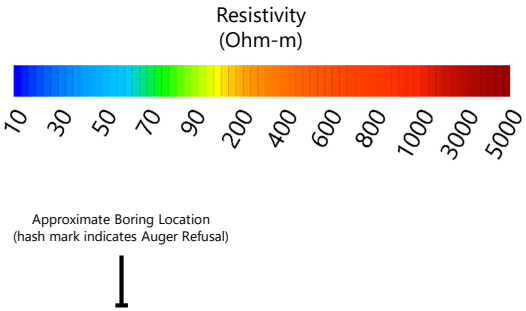
RUSSELLVILLE KY SOLAR FACILITY
RUSSELLVILLE, KENTUCKY

SCALE:
AS SHOWN

DATE:
5/18/2022

PROJECT NUMBER
22800023

FIGURE NO.
16



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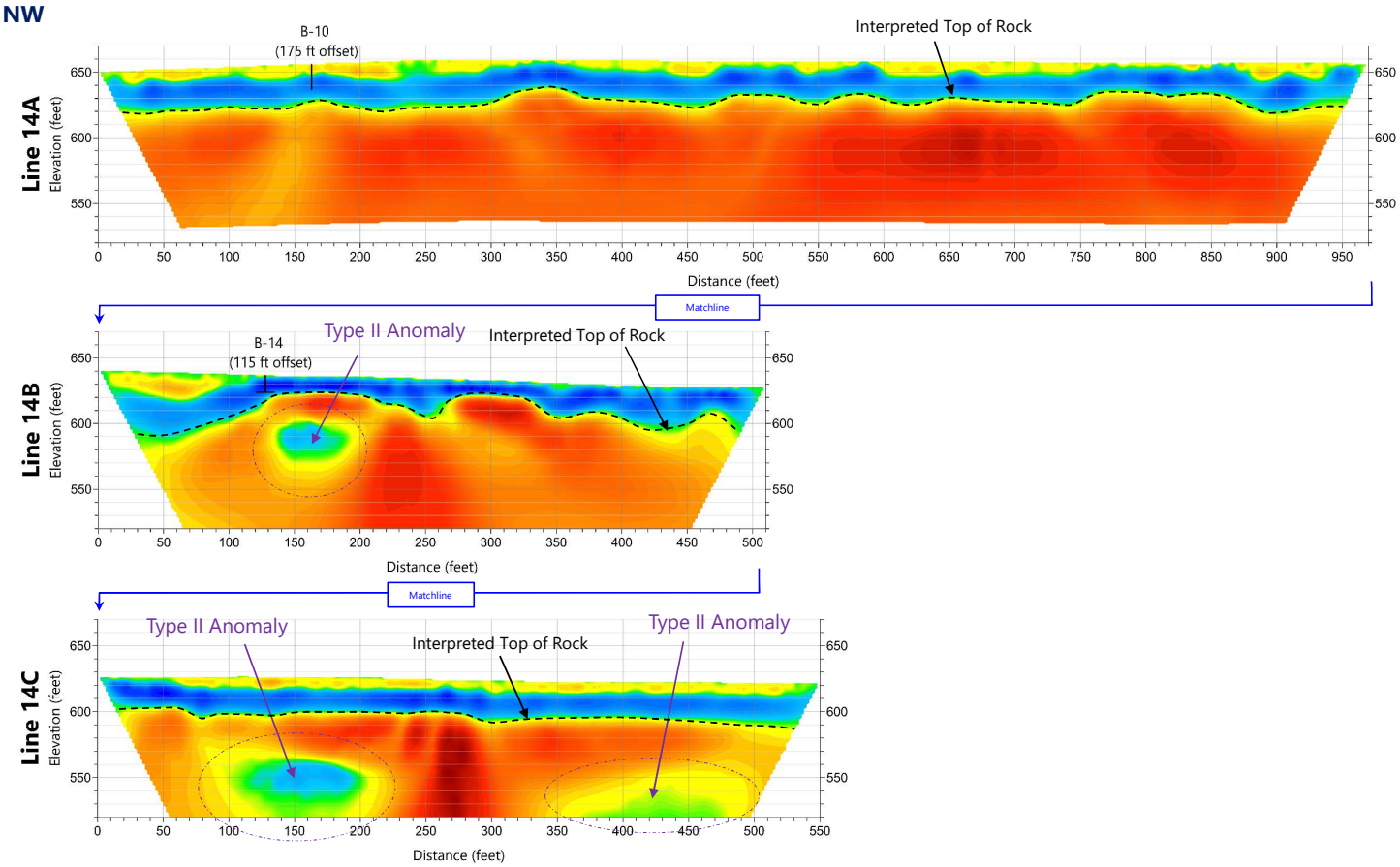


GEOPHYSICAL DATA PROFILES – LINES 14A, 14B AND 14C

RUSSELLVILLE KY SOLAR FACILITY
RUSSELLVILLE, KENTUCKY

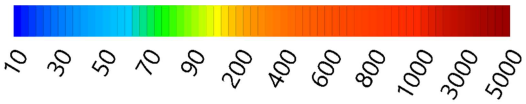
SCALE:
AS SHOWN

DATE:
5/18/2022

PROJECT NUMBER
22800023

FIGURE NO.
17

Resistivity
(Ohm-m)



Approximate Boring Location
(hash mark indicates Auger Refusal)

LEGEND

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- Approximate Boring Location (S&ME; 2020)
- Approximate Boring Location (S&ME; 2022)
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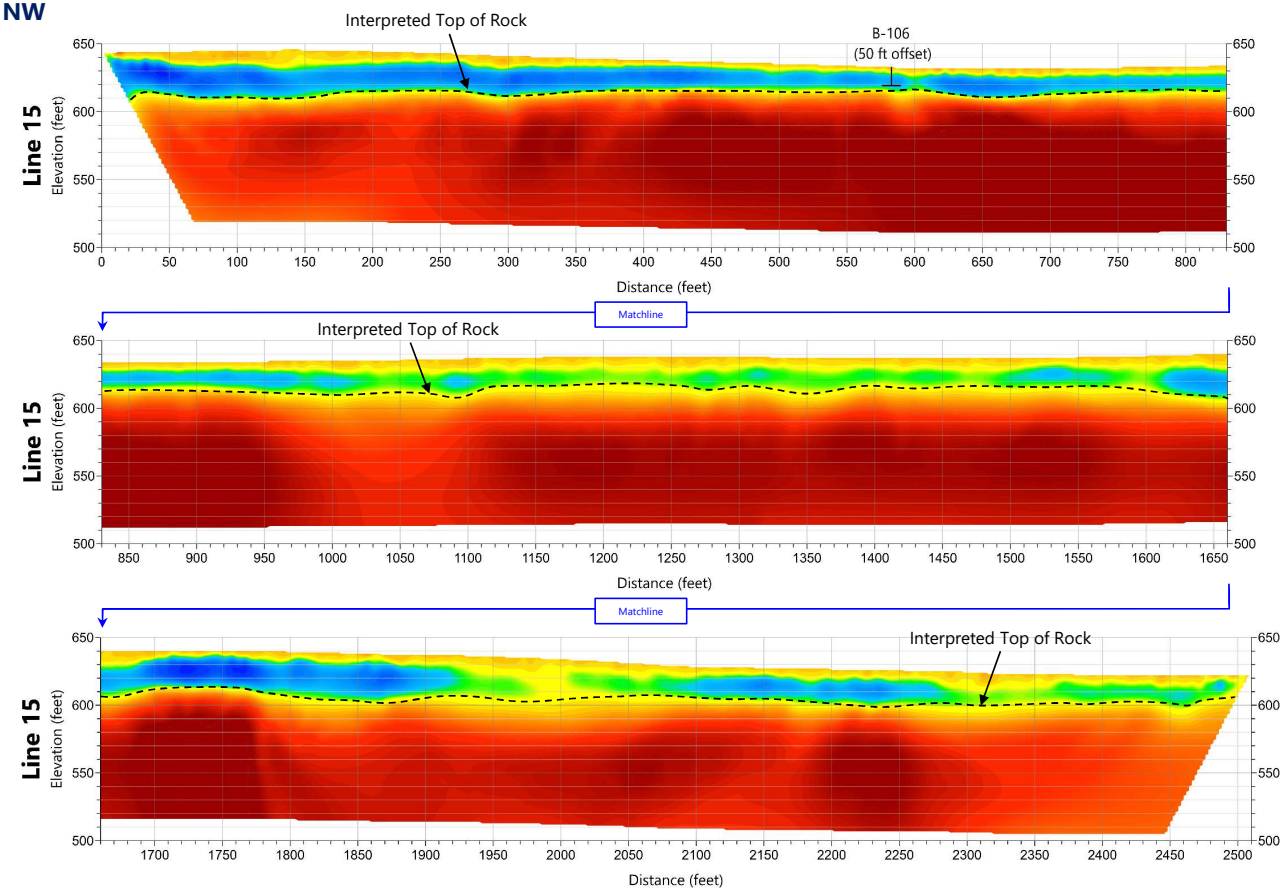
- Approximate Solar Array Location

NW **SE**

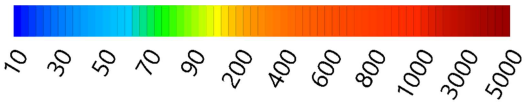


GEOPHYSICAL DATA PROFILES – LINE 17

RUSSELLVILLE KY SOLAR FACILITY
RUSSELLVILLE, KENTUCKY

SCALE:	AS SHOWN
DATE:	5/18/2022
PROJECT NUMBER	22800023
FIGURE NO.	18

Resistivity
(Ohm-m)



Approximate Boring Location
(hash mark indicates Auger Refusal)

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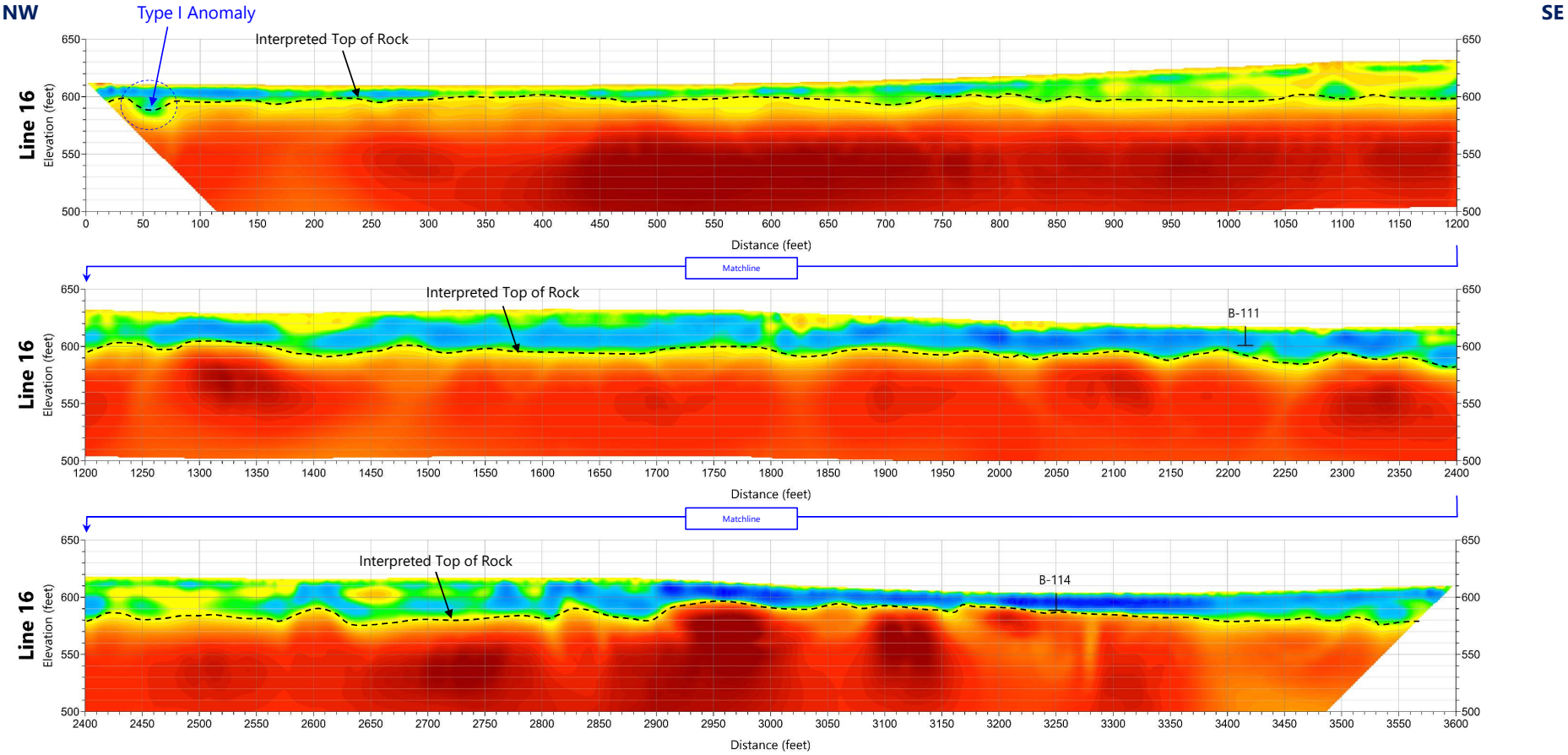


GEOPHYSICAL DATA PROFILES – LINE 16

RUSSELLVILLE KY SOLAR FACILITY
RUSSELLVILLE, KENTUCKY

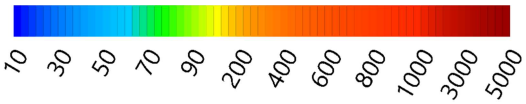
SCALE:
AS SHOWN

DATE:
5/18/2022

PROJECT NUMBER
22800023

FIGURE NO.
19

Resistivity
(Ohm-m)



Approximate Boring Location
(hash mark indicates Auger Refusal)

LEGEND

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- Approximate Boring Location (S&ME; 2022)
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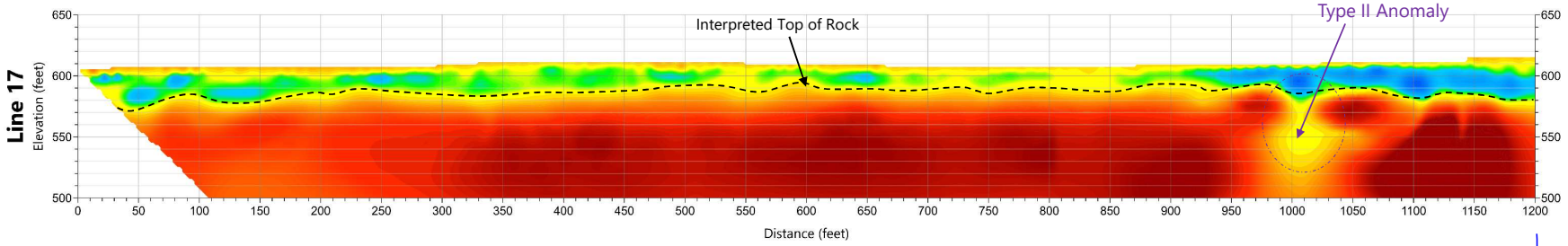
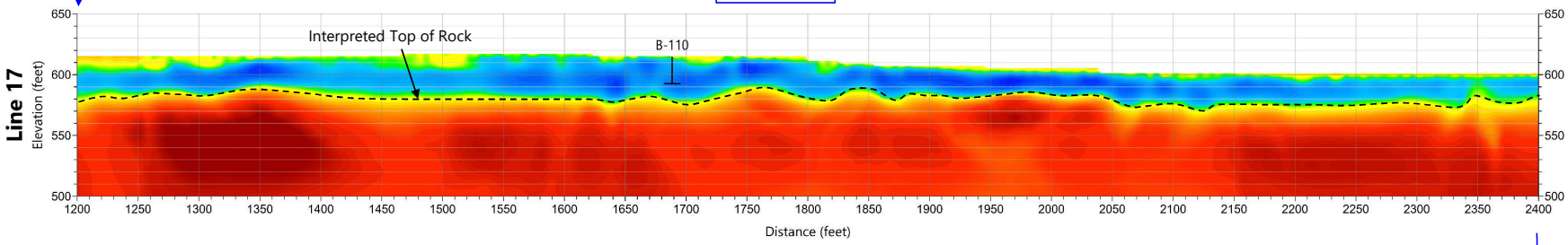
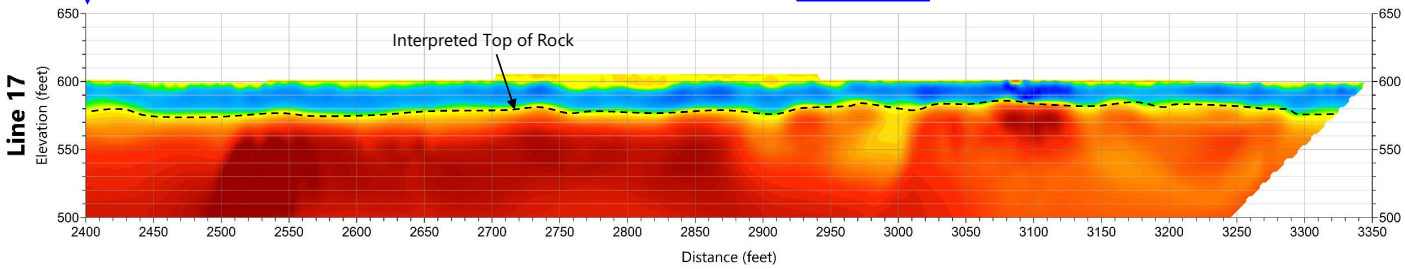
- Approximate Solar Array Location

NW **SE**







GEOPHYSICAL DATA PROFILES – LINE 17

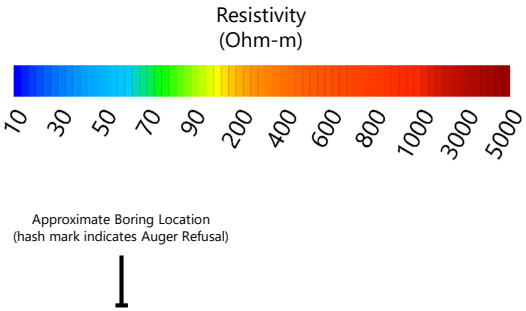
RUSSELLVILLE KY SOLAR FACILITY
RUSSELLVILLE, KENTUCKY

SCALE:
AS SHOWN

DATE:
5/18/2022

PROJECT NUMBER
22800023

FIGURE NO.
20



LEGEND

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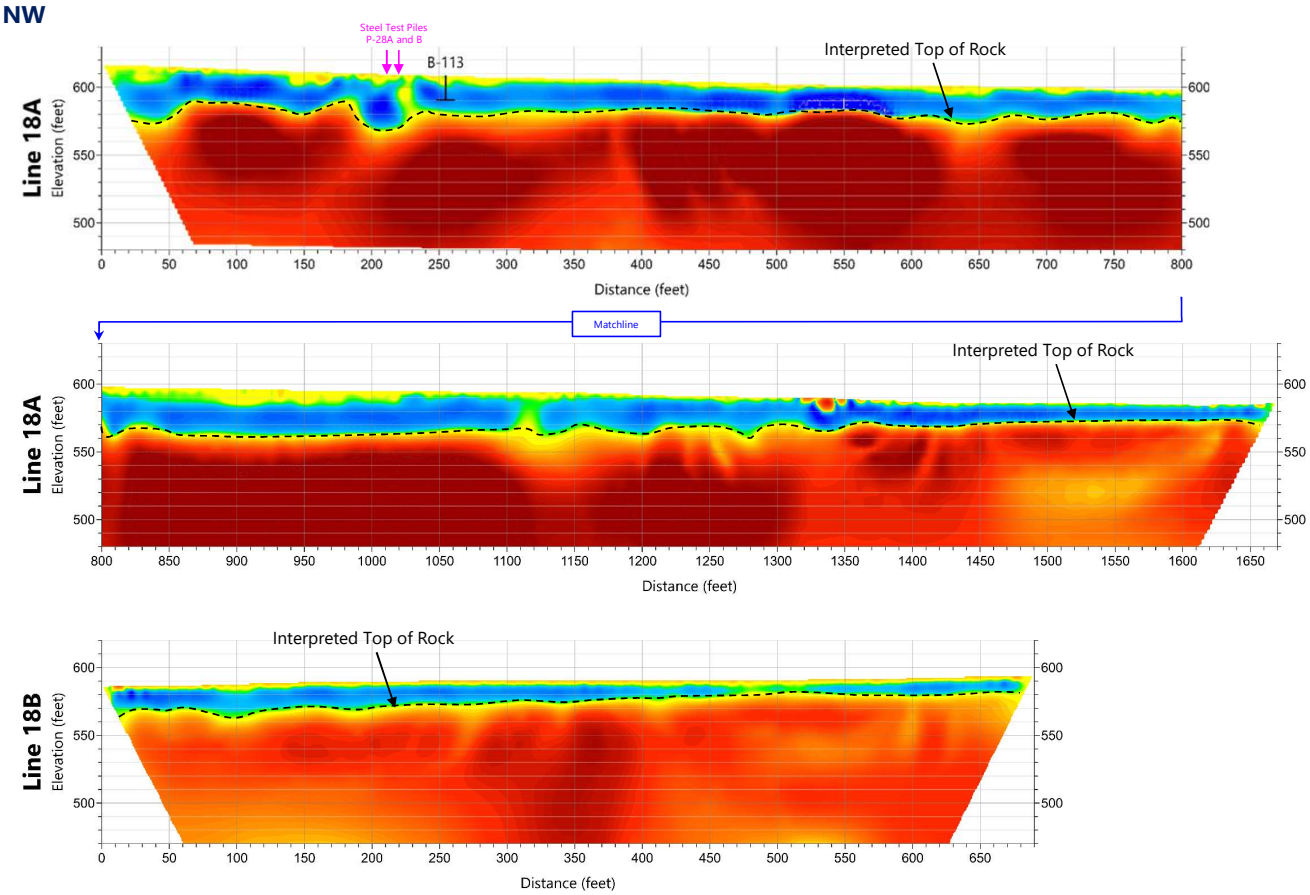


GEOPHYSICAL DATA PROFILES – LINES 18A AND 18B

RUSSELLVILLE KY SOLAR FACILITY
RUSSELLVILLE, KENTUCKY

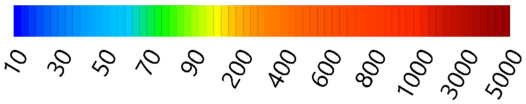
SCALE:
AS SHOWN

DATE:
5/18/2022

PROJECT NUMBER
22800023

FIGURE NO.
21

Resistivity
(Ohm-m)



Approximate Boring Location
(hash mark indicates Auger Refusal)

LEGEND

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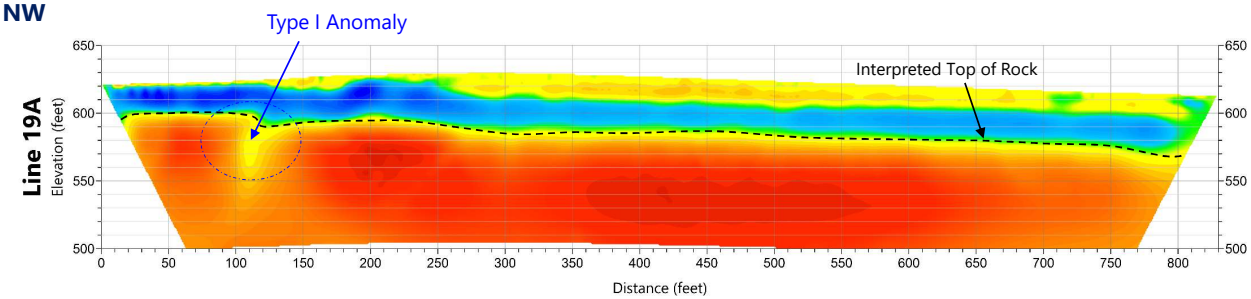
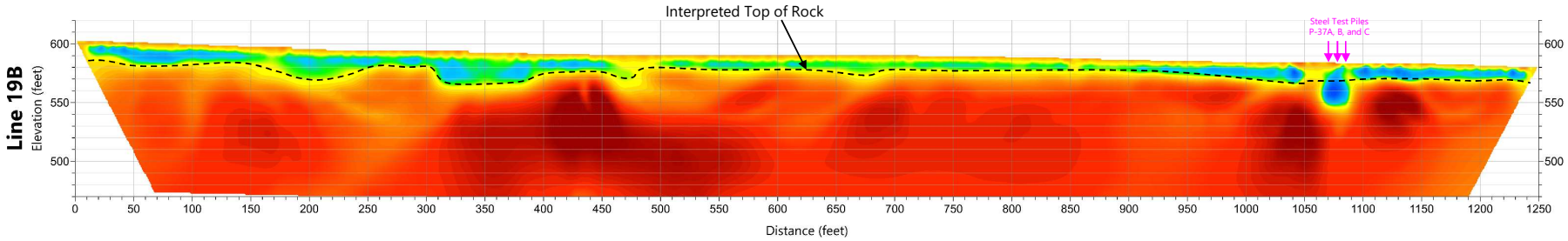
- Approximate Boring Location (S&ME; 2020)
- Approximate Boring Location (S&ME; 2022)
- Approximate Site Location
- Approximate Solar Array Location

NW **SE**





GEOPHYSICAL DATA PROFILES – LINES 19A AND 19B

RUSSELLVILLE KY SOLAR FACILITY
RUSSELLVILLE, KENTUCKY

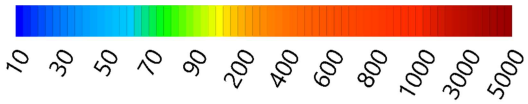
SCALE:
AS SHOWN

DATE:
5/18/2022

PROJECT NUMBER
22800023

FIGURE NO.
22

Resistivity
(Ohm-m)



Approximate Boring Location
(hash mark indicates Auger Refusal)

LEGEND

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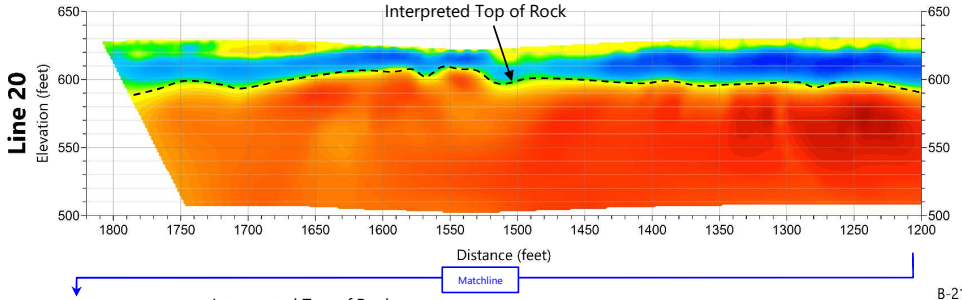
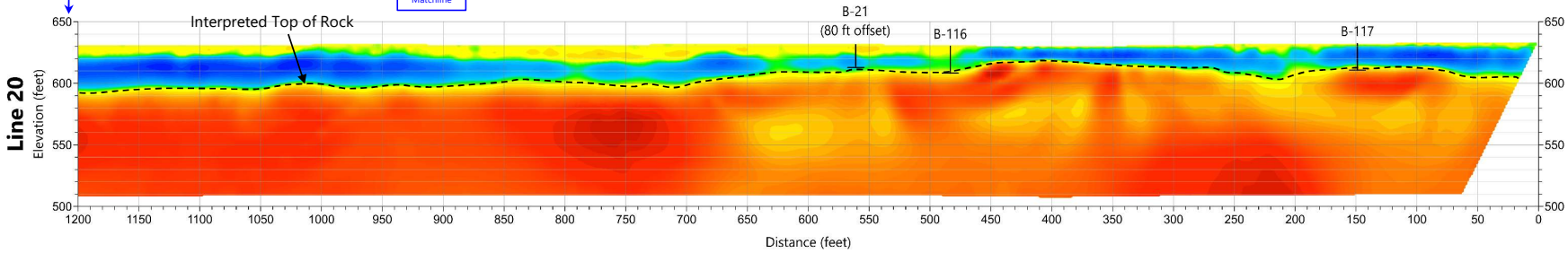
- Approximate Location of ERT Profile (S&ME; 2022)
- Approximate Boring Location (S&ME; 2020)
- Approximate Boring Location (S&ME; 2022)
- Approximate Site Location
- Approximate Solar Array Location

NW **SE**





GEOPHYSICAL DATA PROFILES – LINE 20

RUSSELLVILLE KY SOLAR FACILITY
RUSSELLVILLE, KENTUCKY

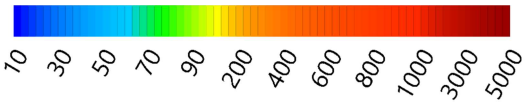
SCALE:
AS SHOWN

DATE:
5/18/2022

PROJECT NUMBER
22800023

FIGURE NO.
23

Resistivity
(Ohm-m)



Approximate Boring Location
(hash mark indicates Auger Refusal)

LEGEND

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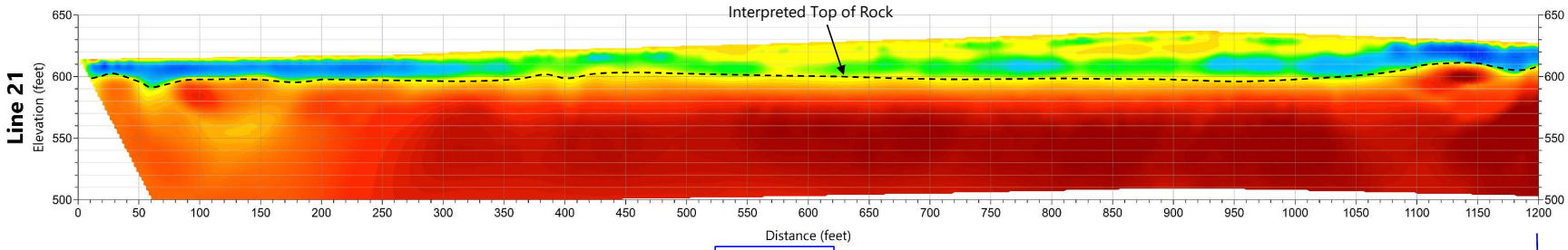
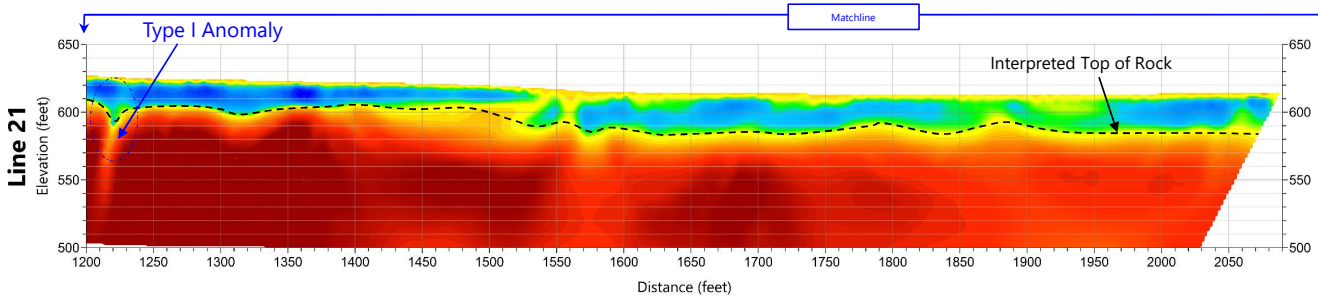
- Approximate Solar Array Location

NW **SE**





GEOPHYSICAL DATA PROFILES – LINE 21

RUSSELLVILLE KY SOLAR FACILITY
RUSSELLVILLE, KENTUCKY

SCALE:
AS SHOWN

DATE:
5/18/2022

PROJECT NUMBER
22800023

FIGURE NO.
24

TEST BORING LOG LEGEND

FINE AND COARSE GRAINED SOIL INFORMATION

COARSE GRAINED SOILS (SANDS AND GRAVELS)

N	Relative Density
0-4	Very Loose
5-10	Loose
11-30	Medium Dense
31-50	Dense
Over 50	Very Dense

FINE GRAINED SOILS (CLAYS AND SILTS)

N	Consistency
0-2	Very Soft
3-4	Soft
5-8	Firm
9-15	Stiff
16-30	Very Stiff
Over 30	Hard

PARTICLE SIZE

Boulders	Greater than 300 mm (12")
Cobbles	75 mm—300 mm (3-12")
Gravel	4.75 mm—75 mm (3/16-3")
Coarse Sand	2 mm—4.74 mm
Medium Sand	.425 mm—2 mm
Fine Sand	0.075 mm—0.425 mm
Silts and Clays	Less than 0.075 mm

The STANDARD PENETRATION TEST as defined by ASTM D 1586 is a method to obtain a disturbed soil sample for examination and testing and to obtain relative density and consistency information. A standard 1.4-inch I.D. / 2.0-inch O.D. split barrel sampler is driven three 6-inch increments with a 140 lb. hammer falling 30 inches. The hammer can either be of a trip, free-fall design, or actuated by a rope and cathead. The blow counts required to drive the sampler the final two 6-inch increments are added together and designated the N-value defined in the above tables.

ROCK PROPERTIES

RQD

Percent RQD	Quality
0-25	Very Poor
25-50	Poor
50-75	Fair
75-90	Good
90-100	Excellent

ROCK HARDNESS

Very Hard	Rock can be broken by heavy hammer blows.
Hard	Rock cannot be broken by thumb pressure, but can be broken by moderate hammer blows.
Moderately Hard	Small pieces can be broken off along sharp edges by considerable thumb pressure; can be broken with light hammer blows.
Soft	Rock is coherent but breaks very easily with thumb pressure at sharp edges and crumbles with firm hand pressure.
Very Soft	Rock disintegrates or easily compresses when touched; can be hard to very hard soil.

KEY

Undisturbed Sample

Standard Penetration Test Sample

Rock Core Sample

Core Diameter (I.D.)	Inches
BQ	1-7/16
NQ	1-7/8
HQ	2-1/2

$$\text{RQD} = \frac{\text{Sum of 4" and Longer Rock Pieces Recovered}}{\text{Length of Core Run}} \times 100$$

(Rock Quality Designation)

$$\text{REC} = \frac{\text{Length of Rock Core Recovered}}{\text{Length of Core Run}} \times 100$$

(Recovery)

SOIL PROPERTY SYMBOLS

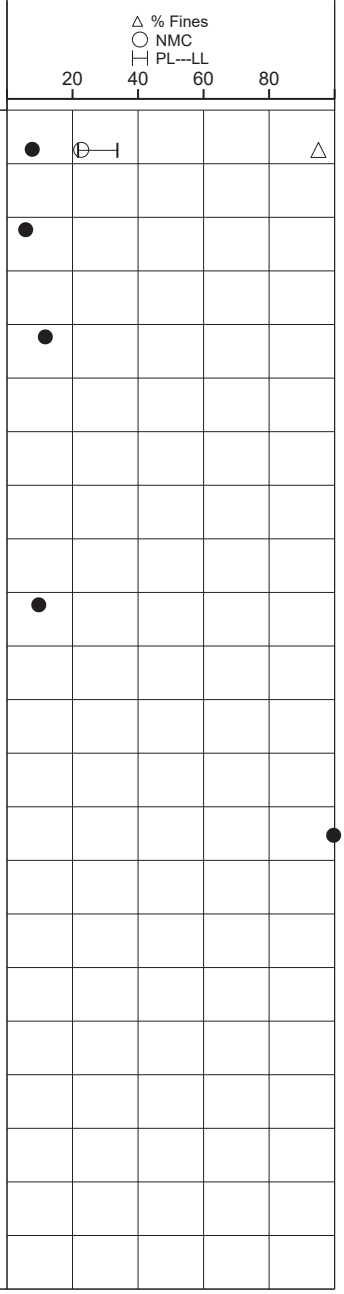
N	Standard Penetration, BPF
NMC	Natural Moisture Content, %
LL	Liquid Limit, %
PL	Plastic Limit, %
PI	Plasticity Index, %
PPV	Pocket Penetrometer Value, TSF
Qu	Unconfined Compressive Strength, TSF
Ɣd	Dry Unit Weight, PCF
F	Fines Content

PROJECT:	Russellville Solar Facility Russellville, Kentucky S&ME Project No. 1280-20-070	BORING LOG: B-01 *Sheet 1 of 1*

DATE DRILLED: 11/17/2020	**ELEVATION:** 615 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 18.6 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" SSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3453958.1 **EASTING:** 4570993.3
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), with silt, and roots, firm, brown, slightly moist to moist, Cultivated zone	3-3-5 N = 8 PPV= 1.8	615
				SS-2		2-2-4 N = 6 PPV= 0.8	
3.0		Residuum		SS-3	LEAN CLAY WITH SAND (CL), some rock fragments, stiff, brown and tan, Residuum	5-6-6 N = 12 PPV= 3.2	
5							610
7.0					FAT CLAY (CH), stiff, brown, moist, Residuum		
				SS-4		3-4-6 N = 10 PPV= 2.5	
10							605
11.5	Ground up fragments from the auger to about 19 feet	Rock			Limestone, gray		
				SS-5		50/1" N = 50/1"	
15							600
18.6	Auger refusal at 18.6 feet				Borehole terminated at 18.6 feet		
20							595

STANDARD PENETRATION TEST DATA



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/17/2020		not encountered
END OF DRILLING	▼	11/17/2020		dry
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Russellville Solar Facility Russellville, Kentucky S&ME Project No. 1280-20-070	BORING LOG: B-02 *Sheet 1 of 1*

DATE DRILLED: 11/17/2020	**ELEVATION:** 615 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 20.0 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" SSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3454012.8 **EASTING:** 4573553.9
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20, 40, 60, 80)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), with silt, and roots, firm to stiff, gray brown, slightly moist, Cultivated zone	1-2-3 N = 5 PPV= 2.0		615
				SS-2		3-4-6 N = 10 PPV= 1.2		
3.0		Residuum		SS-3	LEAN CLAY WITH SAND (CL), some silt, with rock fragments, very stiff, yellow brown with gray, slightly moist, Residuum	6-9-10 N = 19 PPV= 3.8		
5								610
				SS-4		7-14-16 N = 30 PPV= 4.5		
10								605
12.0					SANDY FAT CLAY (CH), very stiff, red brown, moist, Residuum			
				SS-5		4-6-10 N = 16 PPV= 2.0		
15								600
16.0					FAT CLAY (CH), soft, brown, wet, Residuum			
				SS-		1-1-2 N = 3 PPV= 0.2		
20								595
20.0					Borehole terminated at 20.0 feet			

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/17/2020		not encountered
END OF DRILLING	▼	11/17/2020		
AFTER DRILLING	▼			
AFTER DRILLING	▼			

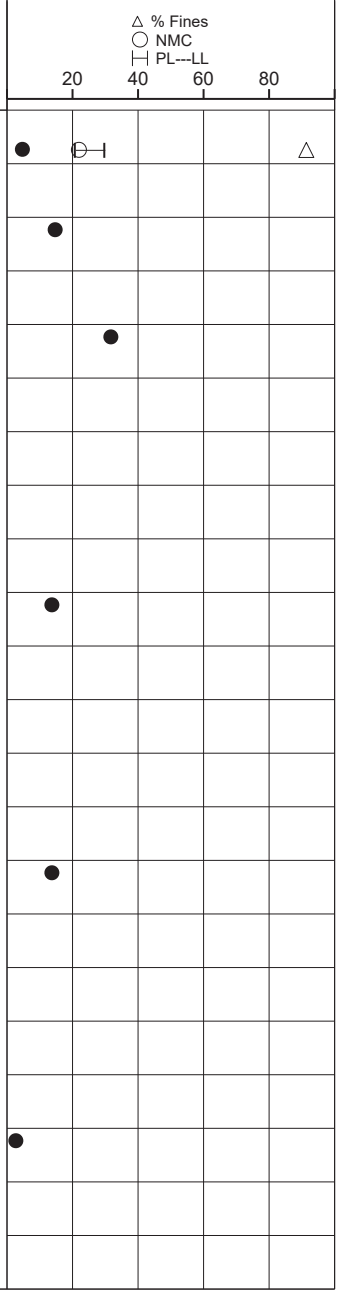
GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Russellville Solar Facility Russellville, Kentucky S&ME Project No. 1280-20-070	BORING LOG: B-03 *Sheet 1 of 1*

DATE DRILLED: 11/20/2020	**ELEVATION:** 631 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 20.0 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3453793.2 **EASTING:** 4579151.0
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), firm, dark brown, moist, Cultivated Zone	1-2-3 N = 5	631
1.0		Residuum		SS-2	LEAN CLAY (CL), some silt, stiff to very stiff, brown, moist, Residuum	4-6-9 N = 15	
				SS-3		12-16-16 N = 32	
5							626
				SS-4		4-6-8 N = 14	
10							621
				SS-5		4-6-8 N = 14	
15							616
18.0				SS-6	LEAN CLAY (CL), soft, brown, very moist, Residuum	1-2-1 N = 3	
20							611
20.0					Borehole terminated at 20.0 feet		

STANDARD PENETRATION TEST DATA



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/20/2020		not encountered
END OF DRILLING	▼	11/20/2020		dry
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
Russellville, Kentucky
S&ME Project No. 1280-20-070

BORING LOG: B-04
Sheet 1 of 1

DATE DRILLED: 11/17/2020	**ELEVATION:** 614 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 17.2 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" SSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3452887.8 **EASTING:** 4572394.0
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20, 40, 60, 80)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), with silt, firm, brown, very moist, Cultivated zone	1-3-3 N = 6 PPV= 1.5		614
1.5		Residuum		SS-2	LEAN CLAY WITH SAND (CL), few rock fragments, stiff to very stiff, yellow brown with gray, slightly moist to moist, Residuum	3-5-8 N = 13 PPV= 3.5		
				SS-3		9-10-13 N = 23 PPV= 2.5		
5								609
				SS-4		6-8-10 N = 18 PPV= 2.5		
10								604
				SS-5		6-6-7 N = 13		
15								599
17.2	Auger refusal at 17.2 feet				Borehole terminated at 17.2 feet			
20								594

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/17/2020		not encountered
END OF DRILLING	▼	11/17/2020		dry
AFTER DRILLING	▼			
AFTER DRILLING	▼			

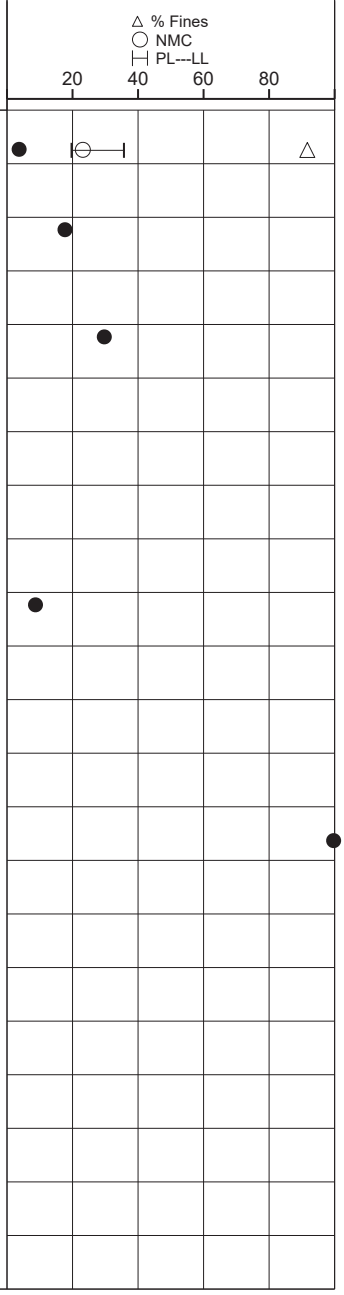
GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Russellville Solar Facility Russellville, Kentucky S&ME Project No. 1280-20-070	BORING LOG: B-05 *Sheet 1 of 1*

DATE DRILLED: 11/20/2020	**ELEVATION:** 633 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 14.2 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3452151.6 **EASTING:** 4578138.5
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), some silt, soft, tan with gray, wet, Cultivated Zone	1-1-3 N = 4 PPV= 1.0	633
1.5		Residuum		SS-2	LEAN CLAY (CL), trace sand, very stiff to stiff, tan and gray, moist, Residuum	5-8-10 N = 18 PPV= 3.5	
				SS-3		12-15-15 N = 30 PPV= 3.2	
5							628
				SS-4		4-4-5 N = 9 PPV= 2.0	
10							623
				SS-5		50/4" N = 50/4" PPV= 1.5	
14.2	Auger refusal at 14.2 feet				Borehole terminated at 14.2 feet		
15							618
20							613

STANDARD PENETRATION TEST DATA



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/20/2020		not encountered
END OF DRILLING	▼	11/20/2020		dry
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Russellville Solar Facility Russellville, Kentucky S&ME Project No. 1280-20-070	BORING LOG: B-06 *Sheet 1 of 1*

DATE DRILLED: 11/17/2020	**ELEVATION:** 600 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 18.6 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" SSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3451674.7 **EASTING:** 4570554.6
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20, 40, 60, 80)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), with silt, some roots, firm, brown, moist, Cultivated zone	1-2-3 N = 5 PPV= 0.8		600
1.5		Residuum		SS-2	LEAN CLAY (CL), trace sand, firm to stiff, red brown, moist, Residuum	2-3-5 N = 8 PPV= 1.2		
				SS-3		4-5-5 N = 10 PPV= 1.5		
5								595
				SS-4		4-5-7 N = 12 PPV= 3.5		
10								590
13.0				SS-5	FAT CLAY (CH), with sand, yellow brown, very moist, Residuum	N = 0 PPV= 3.5		
15								585
16.5	Ground up fragments from the auger	Rock			Limestone, gray			
18.6	Auger refusal at 18.6 feet				Borehole terminated at 18.6 feet			
20								580

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/17/2020		not encountered
END OF DRILLING	▼	11/17/2020		dry
AFTER DRILLING	▼			
AFTER DRILLING	▼			

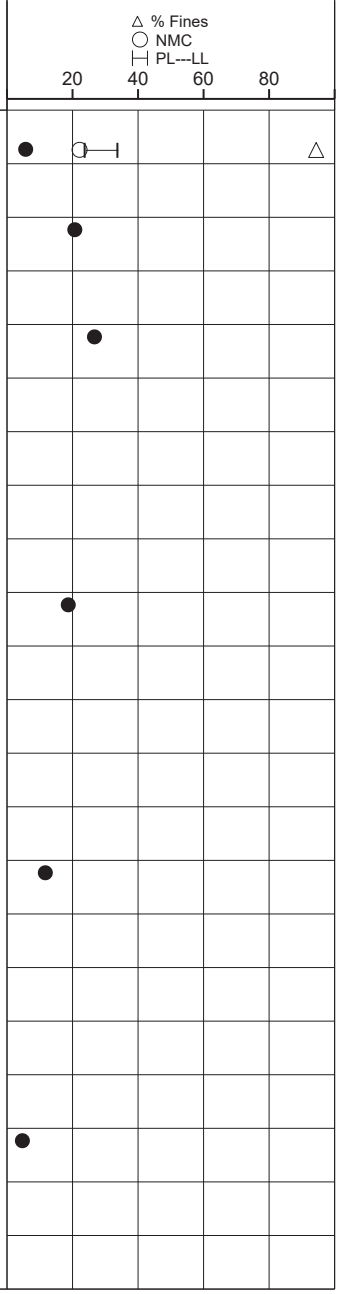
GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Russellville Solar Facility Russellville, Kentucky S&ME Project No. 1280-20-070	BORING LOG: B-07 *Sheet 1 of 1*

DATE DRILLED: 11/18/2020	**ELEVATION:** 620 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 20.0 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3451197.2 **EASTING:** 4572697.8
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		Cultivated Zone		SS-1	SILT (ML), with clay, firm, brown, moist, Cultivated Zone	1-3-3 N = 6 PPV= 1.8	620
1.5		Residuum		SS-2	LEAN CLAY (CL), with silt, very stiff to stiff, yellow brown, slightly moist to moist, Residuum	4-8-13 N = 21 PPV= 3.5	
				SS-3		11-12-15 N = 27 PPV= 2.2	
5							615
				SS-4		5-8-11 N = 19 PPV= 2.2	
10							610
				SS-5		4-5-7 N = 12 PPV= 2.2	
15							605
16.0					LEAN CLAY (CL), with silt, and sand, firm, yellow brown with gray, wet, Residuum		
				SS-6		2-2-3 N = 5 PPV= 0.5	
20							600
20.0					Borehole terminated at 20.0 feet		

STANDARD PENETRATION TEST DATA



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/18/2020		not encountered
END OF DRILLING	▼	11/18/2020		dry
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Russellville Solar Facility Russellville, Kentucky S&ME Project No. 1280-20-070	BORING LOG: B-08 *Sheet 1 of 1*

DATE DRILLED: 11/20/2020	**ELEVATION:** 635 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 14.8 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3450696.3 **EASTING:** 4577051.9
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20, 40, 60, 80)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), firm, dark brown, very moist, Cultivated Zone	1-3-4 N = 7 PPV= 2.5		635
1.5		Residuum		SS-2	LEAN CLAY (CL), some silt, stiff to very stiff, red brown, slightly moist, Residuum	6-6-7 N = 13 PPV= 2.0		
				SS-3		8-11-13 N = 24 PPV= 3.2		
5								630
8.0				SS-4	LEAN CLAY (CL), stiff, tan and gray, slightly moist, Residuum	4-5-7 N = 12 PPV= 3.5		
10								625
13.5		Rock		SS-5	LIMESTONE, light gray, ground from augers	50/1" N = 50/1"		
15	Auger refusal at 14.8 feet				Borehole terminated at 14.8 feet			620
20								615

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/20/2020		not encountered
END OF DRILLING	▼	11/20/2020		dry
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Russellville Solar Facility Russellville, Kentucky S&ME Project No. 1280-20-070	BORING LOG: B-09 *Sheet 1 of 1*

DATE DRILLED: 11/18/2020	**ELEVATION:** 615 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 19.1 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3449535.4 **EASTING:** 4570155.5
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20, 40, 60, 80)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), firm, dark brown, very moist, Cultivated Zone	2-3-4 N = 7 PPV= 1.0		615
1.5		Residuum		SS-2	FAT CLAY (CH), with silt, trace sand, firm to stiff, red brown to orange brown, moist to slightly moist, Residuum	4-4-4 N = 8 PPV= 2.0		
				SS-3		6-6-8 N = 14 PPV= 2.0		
5								610
				SS-4		4-6-7 N = 13 PPV= 2.5		
10								605
				SS-5		4-5-8 N = 13 PPV= 3.2		
15								600
				SS-6	*ground limestone rock*	1-50/1" N = 50/1" PPV= 2.5		
19.1	Auger refusal at 19.1 feet				Borehole terminated at 19.1 feet			
20								595

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/18/2020		not encountered
END OF DRILLING	▼	11/18/2020		dry
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
Russellville, Kentucky
S&ME Project No. 1280-20-070

BORING LOG: B-10
Sheet 1 of 1

DATE DRILLED: 11/19/2020	**ELEVATION:** 648 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 20.0 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3449652.4 **EASTING:** 4574676.1
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), some silt, firm, dark brown, moist, Cultivated Zone	1-2-3 N = 5 PPV= 1.0	648
1.5		Residuum		SS-2	LEAN CLAY (CL), some silt, trace sand, stiff, tan, slightly moist, Residuum	4-5-7 N = 12 PPV= 1.5	
3.5				SS-3	LEAN CLAY (CL), some silt, few rock fragments, trace silt, very stiff to stiff, orange brown with mottled gray, slightly moist, Residuum	7-9-12 N = 21 PPV= 3.5	
5							643
				SS-4		4-8-10 N = 18 PPV= 4.0	
10							638
				SS-5		4-9-12 N = 21	
15							633
				SS-6		4-7-8 N = 15	
20							628
20.0					Borehole terminated at 20.0 feet		

STANDARD PENETRATION TEST DATA
△ % Fines
○ NMC
⊢ PL---LL
20 40 60 80

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/19/2020		not encountered
END OF DRILLING	▼	11/19/2020		dry
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Russellville Solar Facility Russellville, Kentucky S&ME Project No. 1280-20-070	BORING LOG: B-11 *Sheet 1 of 1*

DATE DRILLED: 11/20/2020	**ELEVATION:** 621 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 20.0 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3449262.2 **EASTING:** 4577638.6
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20, 40, 60, 80)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), firm, dark brown, very moist, Cultivated Zone	2-2-4 N = 6 PPV= 1.5		621
1.0		Residuum		SS-2	LEAN CLAY (CL), some silt, stiff, red brown, slightly moist, Residuum	3-4-5 N = 9 PPV= 1.2		
				SS-3		6-6-7 N = 13 PPV= 2.5		
5								616
				SS-4		4-4-7 N = 11 PPV= 4.0		
10								611
				SS-5		4-5-7 N = 12 PPV= 2.5		
15								606
18.0				SS-6	LEAN CLAY (CL), firm, tan with gray, slightly moist, Residuum	4-2-4 N = 6 PPV= 2.0		
20								601
20.0					Borehole terminated at 20.0 feet			

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/20/2020		not encountered
END OF DRILLING	▼	11/20/2020		dry
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Russellville Solar Facility Russellville, Kentucky S&ME Project No. 1280-20-070	BORING LOG: B-12 *Sheet 1 of 1*

DATE DRILLED: 11/18/2020	**ELEVATION:** 630 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 20.0 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3448594.3 **EASTING:** 4571981.6
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20, 40, 60, 80)	ELEVATION
0		Cultivated Zone		SS-1	SILT (ML), soft, brown, moist, Cultivated Zone	1-1-2 N = 3 PPV= 1.5		630
1.0		Residuum		SS-2	FAT CLAY (CH), with silt, trace sand, firm to stiff, red brown, slightly moist, Residuum	2-2-4 N = 6 PPV= 3.0		
				SS-3		6-7-7 N = 14 PPV= 3.2		
5								625
8.0				SS-4	LEAN CLAY (CL), few rock fragments, some silt, very stiff to hard, yellow brown, slightly moist, Residuum	4-5-12 N = 17 PPV= 4.0		
10								620
				SS-5		6-13-21 N = 34 PPV= 4.5		
15								615
				SS-6		6-8-10 N = 18 PPV= 3.5		
20								610
20.0					Borehole terminated at 20.0 feet			

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/18/2020		not encountered
END OF DRILLING	▼	11/18/2020		dry
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Russellville Solar Facility Russellville, Kentucky S&ME Project No. 1280-20-070	BORING LOG: B-13 *Sheet 1 of 1*

DATE DRILLED: 11/19/2020	**ELEVATION:** 640 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 18.6 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3448397.8 **EASTING:** 4573853.6
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20, 40, 60, 80)	ELEVATION
0		Cultivated Zone		SS-1	SILT (ML), some clay, soft, dark brown, very moist, Cultivated Zone	1-2-2 N = 4 PPV= 0.5		640
1.0		Residuum		SS-2	LEAN CLAY (CL), trace sand, some silt, firm to very stiff, tan with mottled gray, moist, Residuum	2-2-4 N = 6 PPV= 1.5		
				SS-3		4-5-5 N = 10 PPV= 2.5		
5								635
				SS-4		6-9-10 N = 19 PPV= 4.5		
10						PPV= 2.5		630
				SS-5		4-5-7 N = 12		
15								625
16.5		Rock			LIMESTONE, light gray, highly weathered with some clay			
18.6	Auger refusal at 18.6 feet			SS-6	Borehole terminated at 18.6 feet	50/1" N = 50/1"		
20								620

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/19/2020		not encountered
END OF DRILLING	▼	11/19/2020		dry
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
Russellville, Kentucky
S&ME Project No. 1280-20-070

BORING LOG: B-14

Sheet 1 of 1

DATE DRILLED: 11/20/2020	**ELEVATION:** 633 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 13.5 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3448475.6 **EASTING:** 4575619.2
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		Cultivated Zone		SS-1	SILT (ML), some clay, firm, dark brown and gray, moist, Cultivated Zone	1-3-2 N = 5 PPV= 1.5	633
				SS-2		2-3-4 N = 7 PPV= 2.0	
3.0		Residuum		SS-3	LEAN CLAY (CL), very stiff, red brown and tan, slightly moist, Residuum	6-8-9 N = 17 PPV= 3.5	
5							628
				SS-4		6-8-12 N = 20 PPV= 4.5	
10							623
13.5	Auger refusal at 13.5 feet				Borehole terminated at 13.5 feet		
15							618
20							613

STANDARD PENETRATION TEST DATA
△ % Fines
○ NMC
⊢⊣ PL---LL
20 40 60 80

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/20/2020		not encountered
END OF DRILLING	▼	11/20/2020		dry
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Russellville Solar Facility Russellville, Kentucky S&ME Project No. 1280-20-070	BORING LOG: B-15 *Sheet 1 of 1*

DATE DRILLED: 11/18/2020	**ELEVATION:** 595 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 17.1 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3447326.0 **EASTING:** 4570271.5
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20, 40, 60, 80)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), with silt, firm to stiff, brown, moist, Cultivated Zone	1-3-3 N = 6 PPV= 1.5		595
				SS-2		4-5-7 N = 12 PPV= 2.0		
	3.0	Residuum		SS-3	LEAN CLAY (CL), with silt, trace rock fragments, and sand, very stiff to firm, yellow brown with gray, slightly moist, Residuum	8-11-11 N = 22 PPV= 2.8		
5								590
				SS-4		5-6-8 N = 14 PPV= 2.5		
10								585
				SS-5		3-3-5 N = 8 PPV= 2.5		
15								580
	Auger refusal at 17.1 feet 17.1				Borehole terminated at 17.1 feet			
20								575

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/18/2020		not encountered
END OF DRILLING	▼	11/18/2020		dry
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Russellville Solar Facility Russellville, Kentucky S&ME Project No. 1280-20-070	BORING LOG: B-16 *Sheet 1 of 1*

DATE DRILLED: 11/18/2020	**ELEVATION:** 613 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 20.0 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3447166.4 **EASTING:** 4572245.4
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20, 40, 60, 80)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), some silt, firm, brown, moist, Cultivated Zone	1-2-3 N = 5 PPV= 1.8		613
1.5		Residuum		SS-2	FAT CLAY (CH), with silt, and sand, stiff, red brown, moist to very moist, Residuum	4-4-5 N = 9 PPV= 1.5		
				SS-3		5-5-7 N = 12 PPV= 1.8		
5								608
				SS-4		4-4-6 N = 10 PPV= 2.0		
10								603
13.0				SS-5	LEAN CLAY (CL), trace sand, and silt, stiff to firm, yellow brown and tan, slightly moist, Residuum	4-6-8 N = 14 PPV= 2.2		
15								598
				SS-6		2-4-3 N = 7 PPV= 1.8		
20								593
20.0					Borehole terminated at 20.0 feet			

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/18/2020		not encountered
END OF DRILLING	▼	11/18/2020		dry
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
Russellville, Kentucky
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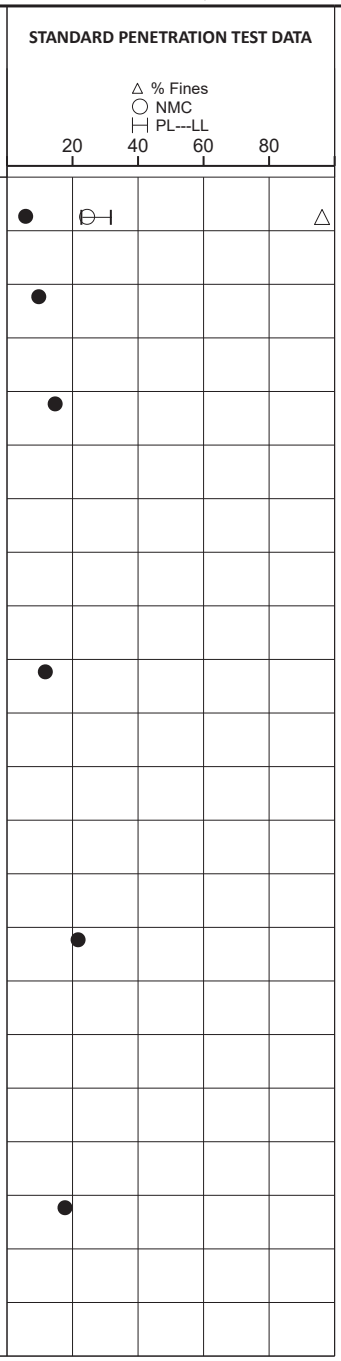
BORING LOG: B-17

Sheet 1 of 1

DATE DRILLED: 11/19/2020	**ELEVATION:** 632 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 20.0 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3447087.6 **EASTING:** 4574919.8
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), firm, dark brown, slightly moist, Cultivated Zone	1-3-3 N = 6 PPV= 0.5	632
1.5		Residuum		SS-2	LEAN CLAY (CL), some silt, trace sand, stiff, dark brown to red brown, moist to slightly moist, Residuum	2-4-6 N = 10 PPV= 1.8	
				SS-3		4-6-9 N = 15 PPV= 3.2	
5							627
				SS-4		4-5-7 N = 12 PPV= 3.2	
10							622
10.0					SANDY LEAN CLAY (CL), with silt, very stiff, yellow brown and mottled gray, slightly moist, Residuum		
				SS-5		6-10-12 N = 22 PPV= 4.5	
15							617
				SS-6		4-8-10 N = 18	
20							612
20.0					Borehole terminated at 20.0 feet		

STANDARD PENETRATION TEST DATA



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/19/2020		not encountered
END OF DRILLING	▼	11/19/2020		dry
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Russellville Solar Facility Russellville, Kentucky S&ME Project No. 1280-20-070	BORING LOG: B-18 *Sheet 1 of 1*

DATE DRILLED: 11/19/2020	**ELEVATION:** 637 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 20.0 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3447646.7 **EASTING:** 4576986.2
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20, 40, 60, 80)	ELEVATION
0		Cultivated Zone		SS-1	SILT (ML), firm, dark brown, slightly moist, Cultivated Zone	1-2-3 N = 5 PPV= 2.5		637
	1.5	Residuum		SS-2	LEAN CLAY (CL), trace sand, some silt, stiff, red brown, slightly moist, Residuum	3-4-5 N = 9		
				SS-3		5-6-8 N = 14 PPV= 2.5		
5								632
				SS-4		4-5-7 N = 12 PPV= 3.5		
10								627
	13.5			SS-5	FAT CLAY (CH), some sand, very stiff to stiff, yellow brown, slightly moist, Residuum	4-7-9 N = 16 PPV= 2.8		
15								622
				SS-6		5-6-8 N = 14 PPV= 3.5		
20	20.0				Borehole terminated at 20.0 feet			617

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/19/2020		not encountered
END OF DRILLING	▼	11/19/2020		dry
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Russellville Solar Facility Russellville, Kentucky S&ME Project No. 1280-20-070	BORING LOG: B-19 *Sheet 1 of 1*

DATE DRILLED: 11/18/2020	**ELEVATION:** 615 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 20.0 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3446684.7 **EASTING:** 4568834.2
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20, 40, 60, 80)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), firm, brown, moist, Cultivated Zone	2-2-4 N = 6 PPV= 2.5		615
1.0		Residuum		SS-2	FAT CLAY (CH), with silt, trace sand, stiff to very stiff, red brown, slightly moist to moist, Residuum	4-5-6 N = 11 PPV= 2.0		
				SS-3		6-8-8 N = 16 PPV= 2.5		
5								610
				SS-4		4-4-7 N = 11 PPV= 3.0		
10								605
				SS-5		5-8-10 N = 18 PPV= 3.5		
15								600
18.0				SS-6	FAT CLAY (CH), very stiff, yellow brown, slightly moist, Residuum	4-8-12 N = 20 PPV= 3.0		
20								595
20.0					Borehole terminated at 20.0 feet			

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/18/2020		not encountered
END OF DRILLING	▼	11/18/2020		dry
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
Russellville, Kentucky
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BORING LOG: B-20

Sheet 1 of 1

DATE DRILLED: 11/19/2020	**ELEVATION:** 584 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 20.0 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3444995.9 **EASTING:** 4569985.0
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20, 40, 60, 80)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), soft, dark brown, very moist, Cultivated Zone	1-2-2 N = 4 PPV= 1.5		584
1.5		Residuum		SS-2	LEAN CLAY (CL), some rock fragments, some silt, soft to very firm, brown to orange brown, very moist, Residuum	2-2-2 N = 4 PPV= 0.5		
				SS-3		3-4-5 N = 9 PPV= 1.0		
5								579
				SS-4		1-1-1 N = 2 PPV= 1.0		
10								574
13.5				SS-5	FAT CLAY WITH SAND (CH), some rock fragments, soft to very soft, yellow brown, wet, Residuum	1-2-2 N = 4		
15								569
				SS-6		1-2-1 N = 3		
20								564
20.0					Borehole terminated at 20.0 feet			

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/19/2020	13.5	
END OF DRILLING	▼	11/19/2020	13.5	
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
Russellville, Kentucky
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BORING LOG: B-21
Sheet 1 of 1

DATE DRILLED: 11/21/2020	**ELEVATION:** 631 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 18.2 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3453829.5 **EASTING:** 4579742.1
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), firm, brown, moist, Cultivated Zone	2-4-4 N = 8	631
1.5		Residuum		SS-2	LEAN CLAY (CL), some silt, very stiff to stiff, brown, slightly moist, Residuum	5-8-10 N = 18	
				SS-3		12-12-18 N = 30	
5							626
				SS-4		5-8-9 N = 17	
10							621
				SS-5		4-6-8 N = 14	
15							616
18.2	Auger refusal at 18.2 feet				Borehole terminated at 18.2 feet		
20							611

STANDARD PENETRATION TEST DATA
△ % Fines
○ NMC
⊢⊣ PL---LL
20 40 60 80

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/21/2020		not encountered
END OF DRILLING	▼	11/21/2020		dry
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
Russellville, Kentucky
S&ME Project No. 1280-20-070

BORING LOG: B-22
Sheet 1 of 1

DATE DRILLED: 11/21/2020	**ELEVATION:** 631 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (ATC)	**DATUM:** NAVD88	
DRILLER: S&ME	**BORING DEPTH:** 19.3 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Eric Conway	**NORTHING:** 3453826.3 **EASTING:** 4579937.1
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), firm, dark brown, moist, Cultivated Zone	2-2-4 N = 6	631
1.5		Residuum		SS-2	LEAN CLAY (CL), some silt, stiff to very stiff, brown, slightly moist, Residuum	4-6-9 N = 15	
				SS-3		6-8-12 N = 20	
5							626
				SS-4		6-8-9 N = 17	
10							621
				SS-5		6-7-9 N = 16	
15							616
18.0		Rock		SS-6	LIMESTONE, gray, highly weathered and ground up	50/1" N = 50/1"	
19.3	Auger refusal at 19.3 feet				Borehole terminated at 19.3 feet		
20							611

STANDARD PENETRATION TEST DATA
△ % Fines
○ NMC
⊢⊣ PL---LL
20 40 60 80

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	11/21/2020		not encountered
END OF DRILLING	▼	11/21/2020		dry
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
333 Watermelon Road; Russellville, Kentucky
S&ME Project No. 22800023

BORING LOG: B-101
Sheet 1 of 1

DATE DRILLED: 04/20/2022	**ELEVATION:** 628 ft
DRILL RIG: Diedrich D-50 (track)	**DATUM:** NAVD88
DRILLER: Blizzard/Godsey	**BORING DEPTH:** 16.3 ft
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Simone Metzger

NOTES:

LATITUDE: 36.809135 **LONGITUDE:** -86.93739

SAMPLING METHOD: SS

PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky South FIPS 1602 Feet

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), soft, dark brown, moist	2-2-2 N = 4	628
1.5		Residuum		SS-2	LEAN CLAY (CL), firm to stiff, red brown, moist	3-3-4 N = 7	
				SS-3		3-4-6 N = 10	
5							623
8.0				SS-4	FAT CLAY (CH), firm to stiff, red brown brown, moist	4-6-7 N = 13	
10							618
				SS-5		3-3-5 N = 8	
15							613
16.3	Auger refusal at 16.3 feet				Borehole terminated at 16.3 feet		
20							608

STANDARD PENETRATION TEST DATA
△ % Fines
○ NMC
⊢ PL---LL
20 40 60 80

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/20/2022		not encountered
END OF DRILLING	▼	04/20/2022		not encountered
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
333 Watermelon Road; Russellville, Kentucky
S&ME Project No. 22800023

BORING LOG: B-102
Sheet 1 of 1

DATE DRILLED: 04/20/2022	**ELEVATION:** 610 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (track)	**DATUM:** NAVD88	
DRILLER: Blizzard/Godsey	**BORING DEPTH:** 18.0 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Simone Metzger	**LATITUDE:** 36.804489 **LONGITUDE:** -86.94398

SAMPLING METHOD: SS
PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky South FIPS 1602 Feet

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20, 40, 60, 80)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), soft, dark brown, very moist	2-2-2 N = 4		610
1.5		Residuum		SS-2	LEAN CLAY (CL), trace sand, firm, red brown, very moist	3-2-3 N = 5		
				SS-3		2-3-3 N = 6		605
7.0				SS-4	FAT CLAY (CH), stiff to very stiff, yellow brown to red brown, moist	6-8-12 N = 20		600
				SS-5		4-5-6 N = 11		595
18.0	Auger refusal at 18.0 feet				Borehole terminated at 18.0 feet			590
20								

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/20/2022		not encountered
END OF DRILLING	▼	04/20/2022		not enounctered
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
333 Watermelon Road; Russellville, Kentucky
S&ME Project No. 22800023

BORING LOG: B-103

Sheet 1 of 1

DATE DRILLED: 04/20/2022	**ELEVATION:** 609 ft
DRILL RIG: Diedrich D-50 (track)	**DATUM:** NAVD88
DRILLER: Blizzard/Godsey	**BORING DEPTH:** 20.0 ft
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Simone Metzger

NOTES:

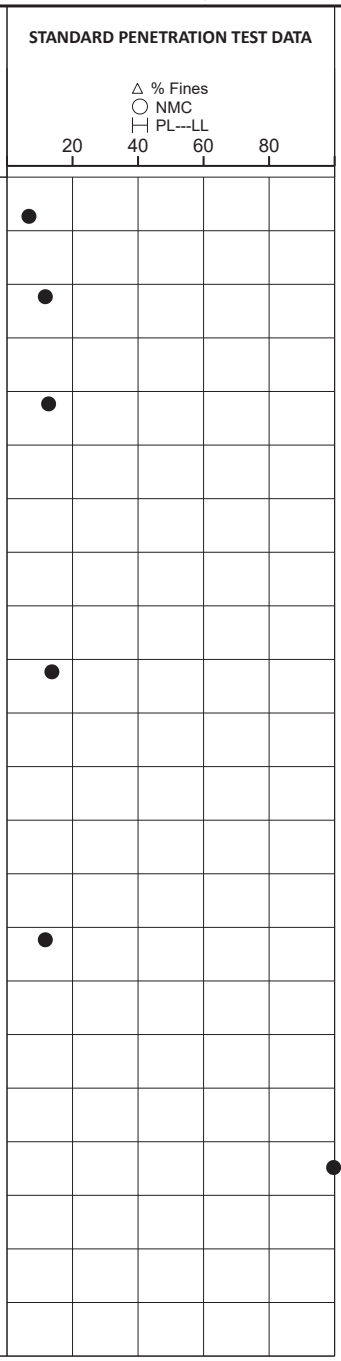
LATITUDE: 36.800107 **LONGITUDE:** -86.94875

SAMPLING METHOD: SS

PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky South FIPS 1602 Feet

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		Cultivated Zone		SS-1	FAT CLAY (CH), some silt, firm, red brown, moist	2-3-4 N = 7	609
1.5		Residuum		SS-2	FAT CLAY (CH), firm to stiff, red brown, moist to slightly moist	5-5-7 N = 12	
				SS-3		5-5-8 N = 13	
5							604
	with rock fragments to about 10 feet			SS-4		5-6-8 N = 14	
10							599
12.0					FAT CLAY (CH), stiff to hard, brown with black, slightly moist, 18.5 no recovery		
				SS-5		4-5-7 N = 12	
15							594
	no sample recovery			SS-6		50/0" N = 50/0"	
20					Borehole terminated at 20.0 feet		589
20.0							

STANDARD PENETRATION TEST DATA



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/20/2022		not encountered
END OF DRILLING	▼	04/20/2022		not encountered
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
333 Watermelon Road; Russellville, Kentucky
S&ME Project No. 22800023

BORING LOG: B-104

Sheet 1 of 1

DATE DRILLED: 04/19/2022	**ELEVATION:** 655 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (track)	**DATUM:** NAVD88	
DRILLER: Blizzard/Godsey	**BORING DEPTH:** 20.0 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Simone Metzger	**LATITUDE:** 36.797330 **LONGITUDE:** -86.92622

SAMPLING METHOD: SS
PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky South FIPS 1602 Feet

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), very soft, dark brown, very moist	2-1-1 N = 2	655
1.5		Residuum		SS-2	LEAN CLAY (CL), trace sand, firm, red brown, moist	2-3-3 N = 6	
				SS-3		2-3-2 N = 5	
5							650
8.0				SS-4	FAT CLAY (CH), stiff, red brown and brown, slightly moist	4-5-9 N = 14	
10							645
				SS-5		4-5-6 N = 11	
15							640
18.0				SS-6	FAT CLAY (CH), firm, brown with black, very moist	3-4-4 N = 8	
20							635
20.0					Borehole terminated at 20.0 feet		

STANDARD PENETRATION TEST DATA
△ % Fines
○ NMC
⊢ PL---LL
20 40 60 80

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/19/2022	16.5	
END OF DRILLING	▼	04/19/2022	16.5	
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
333 Watermelon Road; Russellville, Kentucky
S&ME Project No. 22800023

BORING LOG: B-105

Sheet 1 of 1

DATE DRILLED: 04/19/2022	**ELEVATION:** 614 ft
DRILL RIG: Diedrich D-50 (track)	**DATUM:** NAVD88
DRILLER: Blizzard/Godsey	**BORING DEPTH:** 16.4 ft
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Simone Metzger

NOTES:

LATITUDE: 36.794091 **LONGITUDE:** -86.94338

SAMPLING METHOD: SS

PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky South FIPS 1602 Feet

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), some silt, soft, brown and dark brown, moist	2-1-3 N = 4	614
1.5		Residuum		SS-2	LEAN CLAY (CL), firm to stiff, yellow brown, moist to very moist	3-3-4 N = 7	
				SS-3		3-2-3 N = 5	
5							609
				SS-4		5-6-4 N = 10	
10	Hole Cave at 11.0 feet						604
12.0				SS-5	FAT CLAY (CH), trace silt, some sand, soft, brown with gray, very moist to wet	2-2-2 N = 4	
15							599
16.4	Auger refusal at 16.4 feet				Borehole terminated at 16.4 feet		
20							594

STANDARD PENETRATION TEST DATA
△ % Fines
○ NMC
⊢ PL---LL
20 40 60 80

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/19/2022	6.5	
END OF DRILLING	▼	04/19/2022	6.5	
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
333 Watermelon Road; Russellville, Kentucky
S&ME Project No. 22800023

BORING LOG: B-106
Sheet 1 of 1

DATE DRILLED: 04/19/2022	**ELEVATION:** 633 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (track)	**DATUM:** NAVD88	
DRILLER: Blizzard/Godsey	**BORING DEPTH:** 15.0 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Simone Metzger	**LATITUDE:** 36.792795 **LONGITUDE:** -86.92719

SAMPLING METHOD: SS
PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky South FIPS 1602 Feet

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0					TOPSOIL, 8 inches	2-2-3 N = 5	633
0.7	rock fragments to about 2 feet	Fill		SS-1	LEAN CLAY (CL), firm, light brown, wet	3-3-5 N = 8	
				SS-2			
3.0		Residuum		SS-3	LEAN CLAY (CL), stiff, light brown with black, slightly moist	9-6-9 N = 15	
5							628
				SS-4		5-6-8 N = 14	
10							623
13.5				SS-5	IGM, sampled as LEAN CLAY (CL), hard	50/5" N = 50/5"	
15							618
15.0	Auger refusal at 15.0 feet				Borehole terminated at 15.0 feet		
20							613

STANDARD PENETRATION TEST DATA
△ % Fines
○ NMC
⊢⊣ PL---LL
20 40 60 80

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/19/2022		not encountered
END OF DRILLING	▼	04/19/2022		not encountered
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
333 Watermelon Road; Russellville, Kentucky
S&ME Project No. 22800023

BORING LOG: B-107

Sheet 1 of 1

DATE DRILLED: 04/20/2022	**ELEVATION:** 609 ft
DRILL RIG: Diedrich D-50 (track)	**DATUM:** NAVD88
DRILLER: Blizzard/Godsey	**BORING DEPTH:** 16.3 ft
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Simone Metzger

NOTES:

LATITUDE: 36.791253 **LONGITUDE:** -86.94466

SAMPLING METHOD: SS

PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky South FIPS 1602 Feet

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), trace roots, firm, dark brown, very moist	2-3-3 N = 6	609
				SS-2		2-3-3 N = 6	
3.0		Residuum		SS-3	LEAN CLAY (CL), trace rock fragments, firm to stiff, brown, moist	3-2-3 N = 5	
5							604
				SS-4		3-4-7 N = 11	
10	Hole Cave at 10.0 feet						599
13.0				SS-5	FAT CLAY (CH), soft, brown, very moist	2-2-1 N = 3	
15							594
16.3	Auger refusal at 16.3 feet				Borehole terminated at 16.3 feet		
20							589

STANDARD PENETRATION TEST DATA
△ % Fines
○ NMC
⊢ PL---LL
20 40 60 80

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/20/2022	10.0	
END OF DRILLING	▼	04/20/2022	10.0	
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
333 Watermelon Road; Russellville, Kentucky
S&ME Project No. 22800023

BORING LOG: B-108

Sheet 1 of 1

DATE DRILLED: 04/19/2022	**ELEVATION:** 645 ft
DRILL RIG: Diedrich D-50 (track)	**DATUM:** NAVD88
DRILLER: Blizzard/Godsey	**BORING DEPTH:** 20.0 ft
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Simone Metzger

NOTES:

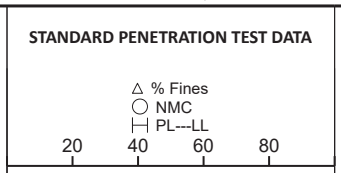
LATITUDE: 36.791012 **LONGITUDE:** -86.93696

SAMPLING METHOD: SS

PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky South FIPS 1602 Feet

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), some silt, trace sand, firm, brown and tan, slightly moist	3-3-4 N = 7	645
1.5		Residuum		SS-2	LEAN CLAY (CL), some sand, trace silt, stiff, brown to red brown, moist	3-4-6 N = 10	
				SS-3		5-6-8 N = 14	
5							640
				SS-4		4-5-8 N = 13	
10							635
				SS-5		4-5-7 N = 12	
15							630
				SS-6		3-4-9 N = 13	
20	20.0				Borehole terminated at 20.0 feet		625

STANDARD PENETRATION TEST DATA



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/19/2022		not encountered
END OF DRILLING	▼	04/19/2022		not encountered
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
333 Watermelon Road; Russellville, Kentucky
S&ME Project No. 22800023

BORING LOG: B-109
Sheet 1 of 1

DATE DRILLED: 04/19/2022	**ELEVATION:** 653 ft
DRILL RIG: Diedrich D-50 (track)	**DATUM:** NAVD88
DRILLER: Blizzard/Godsey	**BORING DEPTH:** 8.0 ft
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Simone Metzger

NOTES:

LATITUDE: 36.789608 **LONGITUDE:** -86.92783

SAMPLING METHOD: SS

PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky South FIPS 1602 Feet

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20, 40, 60, 80)	ELEVATION
0		Cultivated Zone			LEAN CLAY (CL), firm, dark brown, moist	2-2-3 N = 5		653
	0.8	Residuum		SS-1	FAT CLAY (CH), firm, red brown and red brown, moist	3-3-4 N = 7		
				SS-2				
						6-27-7 N = 34		
	N-value elevated due to rock fragments 4.0			SS-3	GRAVELLY LEAN CLAY (GC), with rock fragments, hard, brown, slightly moist			
5								648
	Auger refusal at 8.0 feet 8.0				Borehole terminated at 8.0 feet			
10								643
15								638
20								633

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/19/2022		not encountered
END OF DRILLING	▼	04/19/2022		not encountered
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
333 Watermelon Road; Russellville, Kentucky
S&ME Project No. 22800023

BORING LOG: B-110

Sheet 1 of 1

DATE DRILLED: 04/21/2022	**ELEVATION:** 615 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (track)	**DATUM:** NAVD88	
DRILLER: Blizzard/Godsey	**BORING DEPTH:** 20.0 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Simone Metzger	**LATITUDE:** 36.787810 **LONGITUDE:** -86.94906

SAMPLING METHOD: SS
PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky South FIPS 1602 Feet

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), firm, dark brown, very moist	2-2-3 N = 5	615
2.0		Residuum		SS-2	LEAN CLAY (CL), firm to stiff, red brown to red brown	3-4-4 N = 8	
				SS-3		3-4-6 N = 10	610
8.0				SS-5	FAT CLAY (CH), stiff, red brown and gray, moist	4-5-7 N = 12	605
				SS-4		4-6-8 N = 14	600
				SS-6		3-4-6 N = 10	
20.0					Borehole terminated at 20.0 feet		595

STANDARD PENETRATION TEST DATA
△ % Fines
○ NMC
⊢ PL---LL
20 40 60 80

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/21/2022		not encountered
END OF DRILLING	▼	04/21/2022		not encountered
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
333 Watermelon Road; Russellville, Kentucky
S&ME Project No. 22800023

BORING LOG: B-111

Sheet 1 of 1

DATE DRILLED: 04/21/2022	**ELEVATION:** 618 ft
DRILL RIG: Diedrich D-50 (track)	**DATUM:** NAVD88
DRILLER: Blizzard/Godsey	**BORING DEPTH:** 18.0 ft
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Simone Metzger

NOTES:

LATITUDE: 36.787225 **LONGITUDE:** -86.94520

SAMPLING METHOD: SS

PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky South FIPS 1602 Feet

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), soft, dark brown, moist	2-1-2 N = 3	618
1.5		Residuum		SS-2	LEAN CLAY (CL), firm, red brown, moist	2-3-2 N = 5	
				SS-3		2-3-4 N = 7	
4.5					FAT CLAY (CH), stiff to very stiff, yellow brown and gray, slightly moist		613
				SS-4		4-5-7 N = 12	608
				SS-5		4-7-9 N = 16	603
18.0	Auger refusal at 18.0 feet				Borehole terminated at 18.0 feet		598

STANDARD PENETRATION TEST DATA
△ % Fines
○ NMC
⊢⊣ PL---LL
20 40 60 80

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/21/2022		not encountered
END OF DRILLING	▼	04/21/2022		not encountered
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
333 Watermelon Road; Russellville, Kentucky
S&ME Project No. 22800023

BORING LOG: B-112

Sheet 1 of 1

DATE DRILLED: 04/19/2022	**ELEVATION:** 639 ft
DRILL RIG: Diedrich D-50 (track)	**DATUM:** NAVD88
DRILLER: Blizzard/Godsey	**BORING DEPTH:** 20.0 ft
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Simone Metzger

NOTES:

LATITUDE: 36.787568 **LONGITUDE:** -86.93408

SAMPLING METHOD: SS

PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky South FIPS 1602 Feet

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), with silt, firm, dark brown to brown, very moist	2-3-4 N = 7	639
						3-4-5 N = 9	
2.0		Residuum		SS-2	LEAN CLAY (CL), some silt, trace sand, stiff to very stiff, red brown, moist		
				SS-3		3-4-6 N = 10	
5							634
				SS-4		4-5-6 N = 11	
10							629
				SS-5		4-7-9 N = 16	
15							624
15.0					FAT CLAY (CH), some sand, stiff, red brown and tan, very moist		
				SS-6		4-5-10 N = 15	
20							619
20.0					Borehole terminated at 20.0 feet		

STANDARD PENETRATION TEST DATA

△ % Fines
○ NMC
⊢ PL---LL

20 40 60 80

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/19/2022		not encountered
END OF DRILLING	▼	04/19/2022		not encountered
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
333 Watermelon Road; Russellville, Kentucky
S&ME Project No. 22800023

BORING LOG: B-113
Sheet 1 of 1

DATE DRILLED: 04/21/2022	**ELEVATION:** 609 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (track)	**DATUM:** NAVD88	
DRILLER: Blizzard/Godsey	**BORING DEPTH:** 17.5 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Simone Metzger	**LATITUDE:** 36.784327 **LONGITUDE:** -86.95297

SAMPLING METHOD: SS
PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky South FIPS 1602 Feet

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢⊣ PL---LL; 20, 40, 60, 80)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), soft, dark brown to brown, moist	1-2-2 N = 4		609
1.5		Residuum		SS-2	FAT CLAY (CH), firm to stiff, red brown to yellow brown, moist to slightly moist	2-3-2 N = 5		
				SS-3		3-3-4 N = 7		
5								604
				SS-4		3-5-6 N = 11		
10								599
				SS-5		4-5-6 N = 11		
15								594
17.5	Auger refusal at 17.5 feet				Borehole terminated at 17.5 feet			
20								589

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/21/2022		not encountered
END OF DRILLING	▼	04/21/2022		not encountered
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
333 Watermelon Road; Russellville, Kentucky
S&ME Project No. 22800023

BORING LOG: B-114

Sheet 1 of 1

DATE DRILLED: 04/21/2022	**ELEVATION:** 604 ft
DRILL RIG: Diedrich D-50 (track)	**DATUM:** NAVD88
DRILLER: Blizzard/Godsey	**BORING DEPTH:** 16.0 ft
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Simone Metzger

NOTES:

LATITUDE: 36.784661 **LONGITUDE:** -86.94372

SAMPLING METHOD: SS

PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky South FIPS 1602 Feet

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), very soft, dark brown, moist	1-1-1 N = 2	604
1.5		Residuum		SS-2	LEAN CLAY (CL), firm, red brown, moist	2-3-3 N = 6	
				SS-3		3-3-3 N = 6	
5							599
8.0				SS-4	FAT CLAY (CH), stiff, red brown and brown, moist	4-4-6 N = 10	
10							594
12.0				SS-5	FAT CLAY (CH), little rock fragments, very stiff, brown, moist	9-11-7 N = 18	
15							589
16.0	Auger refusal at 16.0 feet				Borehole terminated at 16.0 feet		
20							584

STANDARD PENETRATION TEST DATA
△ % Fines
○ NMC
⊢ PL---LL
20 40 60 80

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/21/2022	14.0	
END OF DRILLING	▼	04/21/2022	14.0	
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
333 Watermelon Road; Russellville, Kentucky
S&ME Project No. 22800023

BORING LOG: B-115

Sheet 1 of 1

DATE DRILLED: 04/21/2022	**ELEVATION:** 585 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (track)	**DATUM:** NAVD88	
DRILLER: Blizzard/Godsey	**BORING DEPTH:** 10.1 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Simone Metzger	**LATITUDE:** 36.781024 **LONGITUDE:** -86.94970

SAMPLING METHOD: SS

PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky South FIPS 1602 Feet

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢⊣ PL---LL; 20, 40, 60, 80)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), soft to firm, dark brown, very moist	1-1-2 N = 3		585
				SS-2		2-3-3 N = 6		
3.0		Residuum		SS-3	FAT CLAY (CH), firm to very hard, yellow brown, moist	3-4-4 N = 8		
5								580
				SS-4		2-50/2" N = 50/2"		
10	Auger refusal at 10.1 feet				Borehole terminated at 10.1 feet			575
15								570
20								565

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/21/2022	10.1	
END OF DRILLING	▼	04/21/2022	10.1	
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
333 Watermelon Road; Russellville, Kentucky
S&ME Project No. 22800023

BORING LOG: B-116

Sheet 1 of 1

DATE DRILLED: 04/20/2022	**ELEVATION:** 631 ft	**NOTES:**
DRILL RIG: Diedrich D-50 (track)	**DATUM:** NAVD88	
DRILLER: Blizzard/Godsey	**BORING DEPTH:** 21.0 ft	
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Simone Metzger	**LATITUDE:** 36.802276 **LONGITUDE:** -86.91640

SAMPLING METHOD: SS
PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky South FIPS 1602 Feet

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), soft to firm, dark brown, moist	1-2-2 N = 4	631
				SS-2		2-3-4 N = 7	
3.0		Residuum		SS-3	FAT CLAY (CH), trace sand, firm to stiff, brown and gray, slightly moist	3-5-8 N = 13	
5							626
				SS-4		3-3-5 N = 8	
10							621
	▽			SS-5		4-5-6 N = 11	
15							616
18.0				SS-6	FAT CLAY (CH), mostly rock fragments, stiff, brown, very moist	7-9-3 N = 12	
20							611
21.0	Auger refusal at 21.0 feet				Borehole terminated at 21.0 feet		

STANDARD PENETRATION TEST DATA
△ % Fines
○ NMC
⊢ PL---LL
20 40 60 80

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/20/2022	14.3	
END OF DRILLING	▼	04/20/2022	14.3	
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT: Russellville Solar Facility
333 Watermelon Road; Russellville, Kentucky
S&ME Project No. 22800023

BORING LOG: B-117

Sheet 1 of 1

DATE DRILLED: 04/20/2022	**ELEVATION:** 633 ft
DRILL RIG: Diedrich D-50 (track)	**DATUM:** NAVD88
DRILLER: Blizzard/Godsey	**BORING DEPTH:** 20.5 ft
HAMMER TYPE: Auto Hammer (140 lb)	**CLOSURE:** Cuttings
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Simone Metzger

NOTES:

LATITUDE: 36.801586 **LONGITUDE:** -86.91565

SAMPLING METHOD: SS

PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky South FIPS 1602 Feet

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0		Cultivated Zone		SS-1	LEAN CLAY (CL), some silt, soft, dark brown, very moist	2-1-2 N = 3	633
1.5		Residuum		SS-2	FAT CLAY (CH), stiff to firm, red brown and gray, moist to very moist	2-5-7 N = 12	
				SS-3		4-6-7 N = 13	
5							628
				SS-4		4-5-7 N = 12	
10							623
	Hole Cave at 13.2 feet			SS-5		3-4-4 N = 8	
15	N value elevated due to auger refusa						618
16.0					FAT CLAY (CH), some sand, very soft, dark gray and brown, wet		
				SS-6		0-50/4" N = 50/4"	
20							613
20.5	Auger refusal at 20.5 feet				Borehole terminated at 20.5 feet		

STANDARD PENETRATION TEST DATA

△ % Fines
○ NMC
⊢ PL---LL

20 40 60 80

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	04/20/2022	13.2	
END OF DRILLING	▼	04/20/2022	13.2	
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russellville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-01 North-South

Date: 11/17/2020 **Time:** 12:20 PM

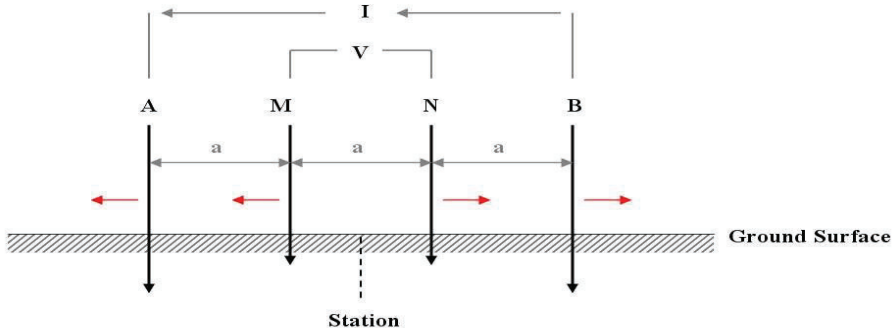
Weather & Temperature: Sunny - 60°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	15.00	5745	188	90	
5	152.40	6	7.50	7182	236	90	
8	243.84	6	4.60	7048	231	90	
12	365.76	12	2.90	6665	219	90	
15	457.20	12	2.30	6607	217	90	
25	762.00	12	2.10	10054	330	90	
40	1219.20	12	1.90	14555	478	90	
60	1828.80	12	1.80	20683	679	90	
75	2286.00	12	1.70	24418	801	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russellville Solar Facility **Project #:** 1280-20-070

Project Location: Baxley, Georgia **Location:** B-01 East-West

Date: 11/17/2020 **Time:** 12:20 PM

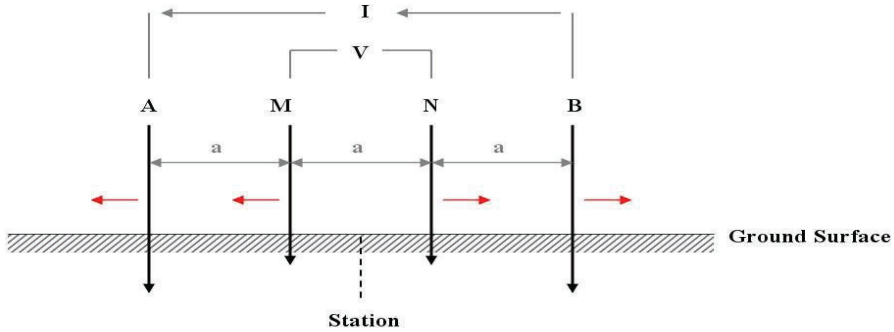
Weather & Temperature: Sunny - 60°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	16.00	6128	201	90	
5	152.40	6	6.80	6511	214	90	
8	243.84	6	4.50	6894	226	90	
12	365.76	12	2.90	6665	219	90	
15	457.20	12	2.40	6894	226	90	
25	762.00	12	2.00	9576	314	90	
40	1219.20	12	2.00	15321	503	90	
60	1828.80	12	1.90	21832	716	90	
75	2286.00	12	1.90	27290	895	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russellville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-02 North-South

Date: 11/17/2020 **Time:** 2:30 PM

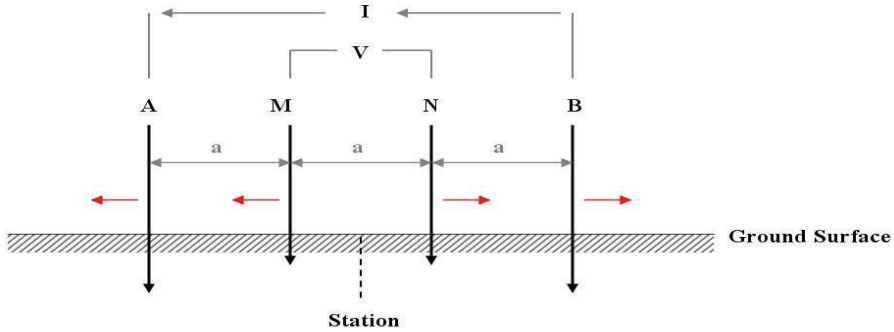
Weather & Temperature: Sunny - 60°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	12.00	4596	151	90	
5	152.40	6	7.40	7086	232	90	
8	243.84	6	5.20	7967	261	90	
12	365.76	12	3.70	8503	279	90	
15	457.20	12	3.00	8618	283	90	
25	762.00	12	2.10	10054	330	90	
40	1219.20	12	1.70	13023	427	90	
60	1828.80	12	1.65	18960	622	90	
75	2286.00	12	1.60	22981	754	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-02 East-West

Date: 11/17/2020 **Time:** 2:30 PM

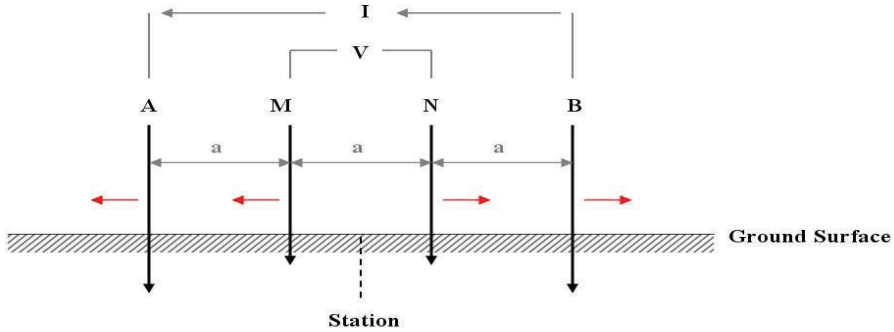
Weather & Temperature: Sunny - 60°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	13.00	4979	163	90	
5	152.40	6	7.50	7182	236	90	
8	243.84	6	5.60	8580	281	90	
12	365.76	12	4.10	9422	309	90	
15	457.20	12	3.30	9480	311	90	
25	762.00	12	2.10	10054	330	90	
40	1219.20	12	1.80	13789	452	90	
60	1828.80	12	1.50	17236	565	90	
75	2286.00	12	1.50	21545	707	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russellville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-03 North-South

Date: 11/20/2020 **Time:** 11:00 AM

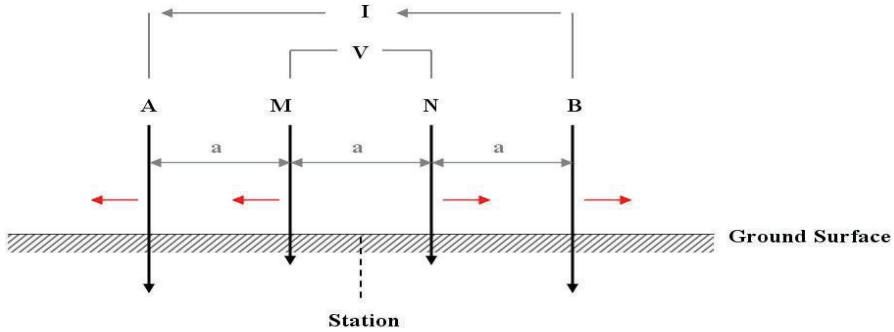
Weather & Temperature: Sunny - 70°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	14.50	5554	182	90	
5	152.40	6	5.90	5650	185	90	
8	243.84	6	3.00	4596	151	90	
12	365.76	12	1.90	4366	143	90	
15	457.20	12	1.50	4309	141	90	
25	762.00	12	1.30	6224	204	90	
40	1219.20	12	1.20	9193	302	90	
60	1828.80	12	1.10	12640	415	90	
75	2286.00	12	1.10	15800	518	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-03 East-West

Date: 11/20/2020 **Time:** 11:00 AM

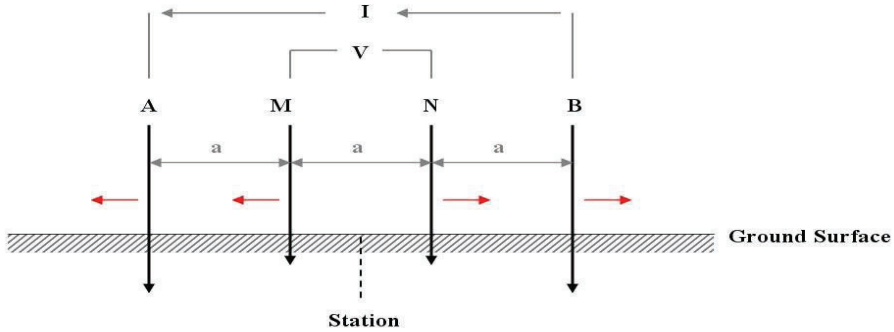
Weather & Temperature: Sunny - 70°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	15.00	5745	188	90	
5	152.40	6	5.70	5458	179	90	
8	243.84	6	3.10	4749	156	90	
12	365.76	12	1.90	4366	143	90	
15	457.20	12	1.50	4309	141	90	
25	762.00	12	1.30	6224	204	90	
40	1219.20	12	1.15	8810	289	90	
60	1828.80	12	1.05	12065	396	90	
75	2286.00	12	1.00	14363	471	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-05 North-South

Date: 11/20/2020 **Time:** 9:00 AM

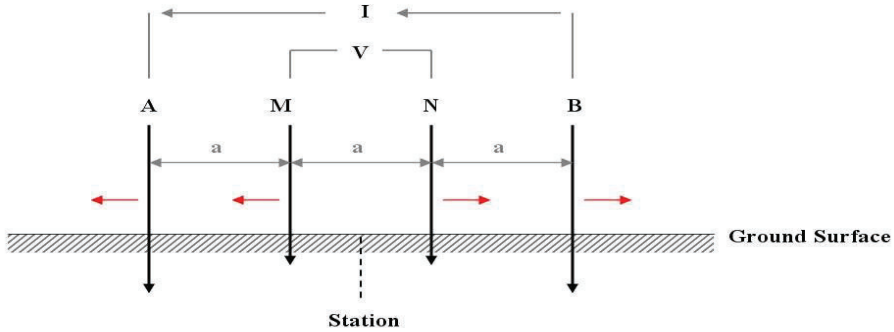
Weather & Temperature: Sunny - 60°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	15.50	5937	195	90	
5	152.40	6	5.80	5554	182	90	
8	243.84	6	2.80	4290	141	90	
12	365.76	12	1.90	4366	143	90	
15	457.20	12	1.50	4309	141	90	
25	762.00	12	1.50	7182	236	90	
40	1219.20	12	1.40	10725	352	90	
60	1828.80	12	1.40	16087	528	90	
75	2286.00	12	1.35	19391	636	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-05 East-West

Date: 11/20/2020 **Time:** 9:00 AM

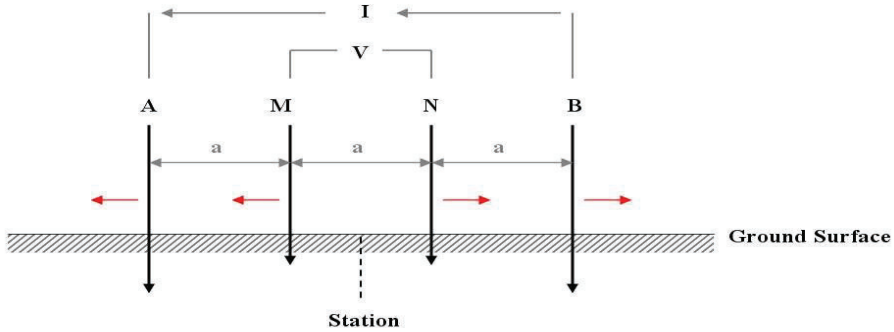
Weather & Temperature: Sunny - 60°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	14.00	5362	176	90	
5	152.40	6	6.00	5745	188	90	
8	243.84	6	2.90	4443	146	90	
12	365.76	12	2.00	4596	151	90	
15	457.20	12	1.60	4596	151	90	
25	762.00	12	1.50	7182	236	90	
40	1219.20	12	1.40	10725	352	90	
60	1828.80	12	1.30	14938	490	90	
75	2286.00	12	1.25	17954	589	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-06 North-South

Date: 11/18/2020 **Time:** 7:00 AM

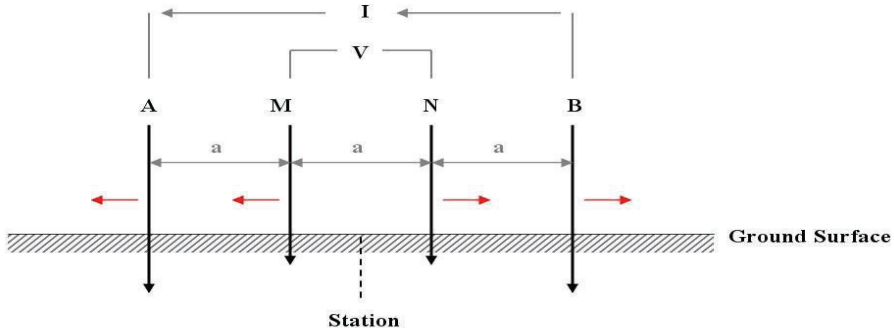
Weather & Temperature: Sunny - 50°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	18.00	6894	226	90	
5	152.40	6	11.00	10533	346	90	
8	243.84	6	7.40	11337	372	90	
12	365.76	12	5.70	13099	430	90	
15	457.20	12	4.80	13789	452	90	
25	762.00	12	3.90	18672	613	90	
40	1219.20	12	3.60	27578	905	90	
60	1828.80	12	3.50	40217	1319	90	
75	2286.00	12	3.50	50272	1649	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-06 East-West

Date: 11/18/2020 **Time:** 7:00 AM

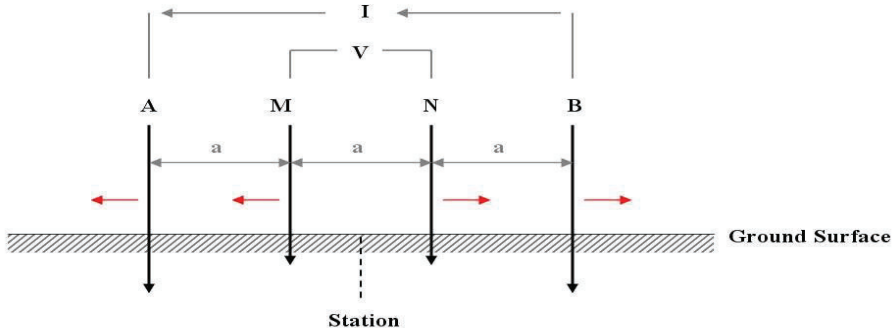
Weather & Temperature: Sunny - 50°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	19.00	7277	239	90	
5	152.40	6	12.00	11491	377	90	
8	243.84	6	7.80	11950	392	90	
12	365.76	12	6.00	13789	452	90	
15	457.20	12	4.50	12927	424	90	
25	762.00	12	3.70	17715	581	90	
40	1219.20	12	3.50	26812	880	90	
60	1828.80	12	3.50	40217	1319	90	
75	2286.00	12	3.40	48835	1602	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-07 North-South

Date: 11/17/2020 **Time:** 4:00 PM

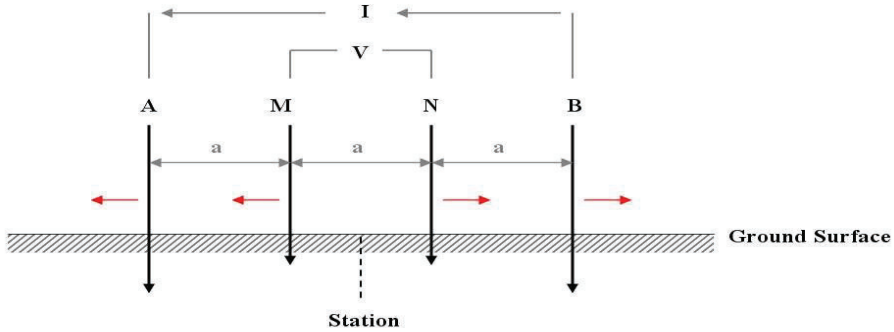
Weather & Temperature: Sunny - 60°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	15.00	5745	188	90	
5	152.40	6	10.00	9576	314	90	
8	243.84	6	7.10	10878	357	90	
12	365.76	12	4.40	10112	332	90	
15	457.20	12	3.40	9767	320	90	
25	762.00	12	2.10	10054	330	90	
40	1219.20	12	1.90	14555	478	90	
60	1828.80	12	1.80	20683	679	90	
75	2286.00	12	1.80	25854	848	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-07 East-West

Date: 11/17/2020 **Time:** 4:00 PM

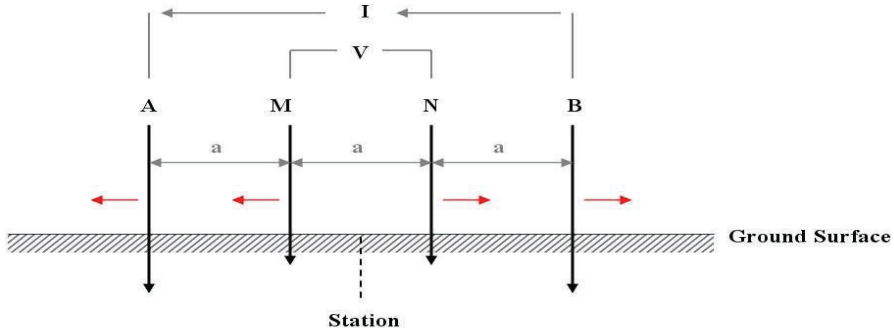
Weather & Temperature: Sunny - 60°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	14.00	5362	176	90	
5	152.40	6	9.60	9193	302	90	
8	243.84	6	6.90	10571	347	90	
12	365.76	12	4.50	10342	339	90	
15	457.20	12	3.40	9767	320	90	
25	762.00	12	2.10	10054	330	90	
40	1219.20	12	1.80	13789	452	90	
60	1828.80	12	1.65	18960	622	90	
75	2286.00	12	1.60	22981	754	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-09 North-South

Date: 11/18/2020 **Time:** 9:00 AM

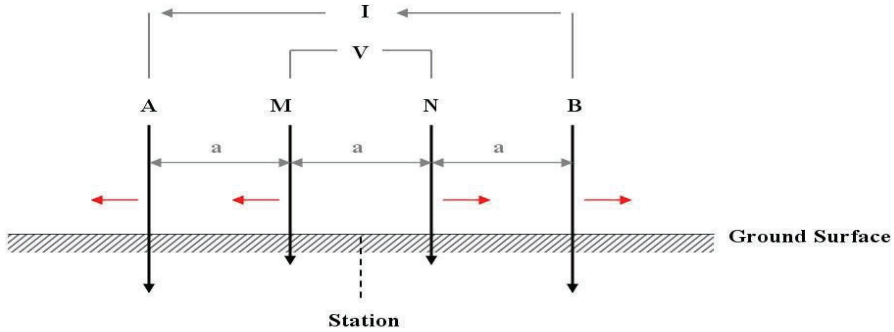
Weather & Temperature: Sunny - 50°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	20.00	7660	251	90	
5	152.40	6	10.00	9576	314	90	
8	243.84	6	7.00	10725	352	90	
12	365.76	12	5.00	11491	377	90	
15	457.20	12	4.10	11778	386	90	
25	762.00	12	3.20	15321	503	90	
40	1219.20	12	2.70	20683	679	90	
60	1828.80	12	2.50	28727	942	90	
75	2286.00	12	2.40	34472	1131	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-09 East-West

Date: 11/18/2020 **Time:** 9:00 AM

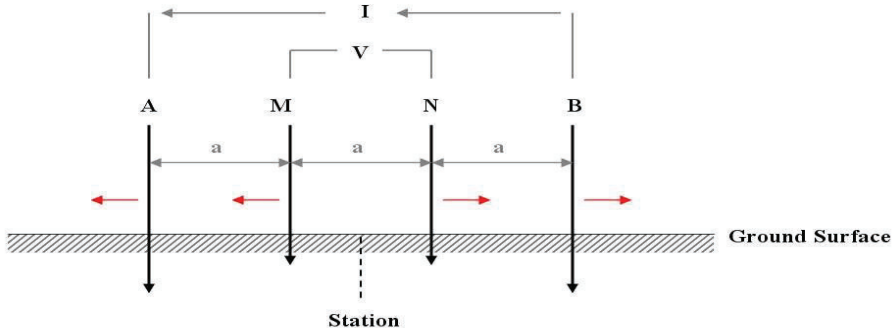
Weather & Temperature: Sunny - 50°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	19.00	7277	239	90	
5	152.40	6	10.40	9959	327	90	
8	243.84	6	7.20	11031	362	90	
12	365.76	12	5.20	11950	392	90	
15	457.20	12	4.30	12352	405	90	
25	762.00	12	3.20	15321	503	90	
40	1219.20	12	2.80	21449	704	90	
60	1828.80	12	2.50	28727	942	90	
75	2286.00	12	2.30	33036	1084	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-10 North-South

Date: 11/19/2020 **Time:** 9:00 AM

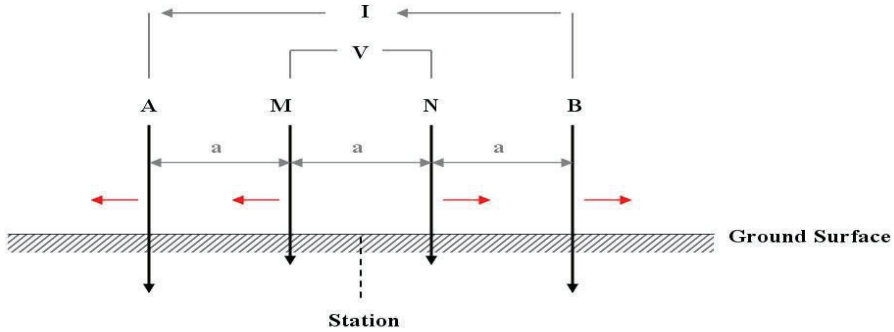
Weather & Temperature: Sunny - 50°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	23.00	8810	289	90	
5	152.40	6	10.30	9863	324	90	
8	243.84	6	7.30	11184	367	90	
12	365.76	12	4.30	9882	324	90	
15	457.20	12	3.00	8618	283	90	
25	762.00	12	1.65	7900	259	90	
40	1219.20	12	1.50	11491	377	90	
60	1828.80	12	1.35	15512	509	90	
75	2286.00	12	1.30	18672	613	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-10 East-West

Date: 11/19/2020 **Time:** 9:00 AM

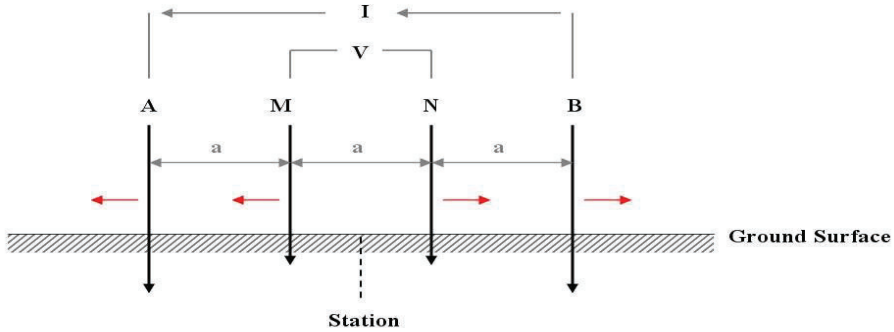
Weather & Temperature: Sunny - 50°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	21.00	8043	264	90	
5	152.40	6	10.50	10054	330	90	
8	243.84	6	7.50	11491	377	90	
12	365.76	12	4.50	10342	339	90	
15	457.20	12	3.10	8905	292	90	
25	762.00	12	1.70	8139	267	90	
40	1219.20	12	1.60	12257	402	90	
60	1828.80	12	1.40	16087	528	90	
75	2286.00	12	1.35	19391	636	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-11 North-South

Date: 11/20/2020 **Time:** 11:00 AM

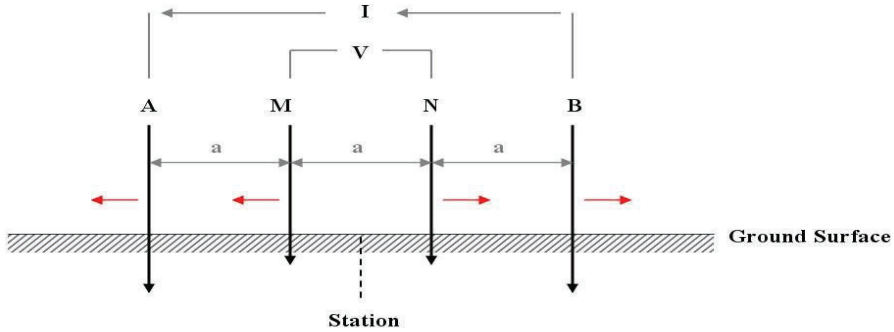
Weather & Temperature: Sunny - 70°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	16.00	6128	201	90	
5	152.40	6	9.80	9384	308	90	
8	243.84	6	6.90	10571	347	90	
12	365.76	12	4.70	10801	354	90	
15	457.20	12	3.70	10629	349	90	
25	762.00	12	2.60	12448	408	90	
40	1219.20	12	2.10	16087	528	90	
60	1828.80	12	1.90	21832	716	90	
75	2286.00	12	1.80	25854	848	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-11 East-West

Date: 11/20/2020 **Time:** 11:00 AM

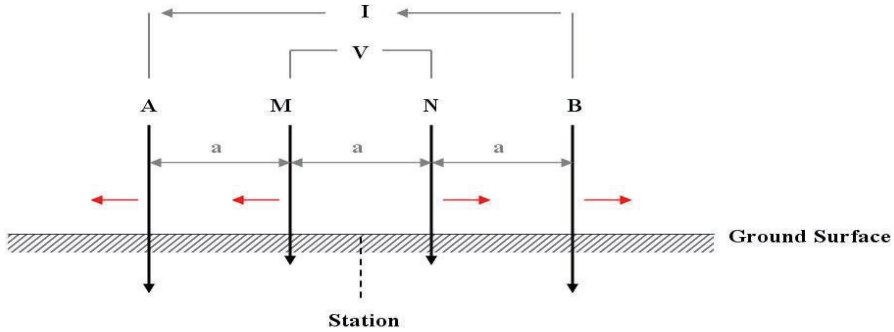
Weather & Temperature: Sunny - 70°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	17.00	6511	214	90	
5	152.40	6	10.20	9767	320	90	
8	243.84	6	7.60	11644	382	90	
12	365.76	12	4.70	10801	354	90	
15	457.20	12	3.60	10342	339	90	
25	762.00	12	2.80	13406	440	90	
40	1219.20	12	2.00	15321	503	90	
60	1828.80	12	1.80	20683	679	90	
75	2286.00	12	1.70	24418	801	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-12 North-South

Date: 11/18/2020 **Time:** 11:00 AM

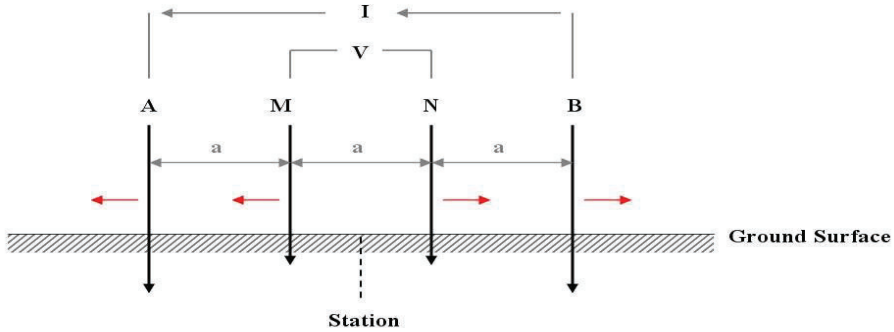
Weather & Temperature: Sunny - 60°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	21.00	8043	264	90	
5	152.40	6	6.50	6224	204	90	
8	243.84	6	3.40	5209	171	90	
12	365.76	12	2.30	5286	173	90	
15	457.20	12	1.80	5171	170	90	
25	762.00	12	1.20	5745	188	90	
40	1219.20	12	1.10	8427	276	90	
60	1828.80	12	1.05	12065	396	90	
75	2286.00	12	1.00	14363	471	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-12 East-West

Date: 11/18/2020 **Time:** 11:00 AM

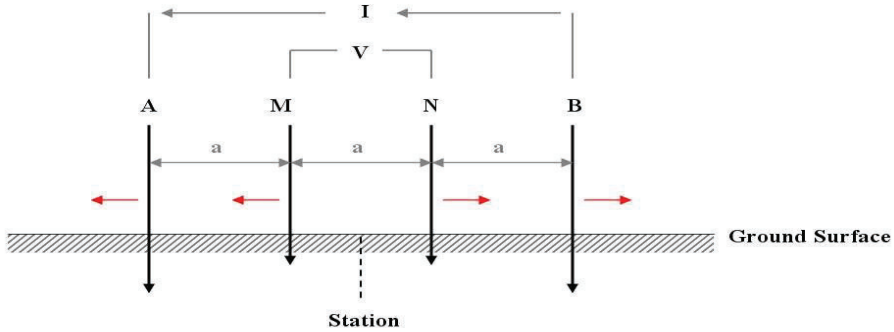
Weather & Temperature: Sunny - 60°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	14.00	5362	176	90	
5	152.40	6	7.10	6799	223	90	
8	243.84	6	2.90	4443	146	90	
12	365.76	12	2.40	5516	181	90	
15	457.20	12	2.00	5745	188	90	
25	762.00	12	1.50	7182	236	90	
40	1219.20	12	1.40	10725	352	90	
60	1828.80	12	1.30	14938	490	90	
75	2286.00	12	1.25	17954	589	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-14 North-South

Date: 11/19/2020 **Time:** 3:30 PM

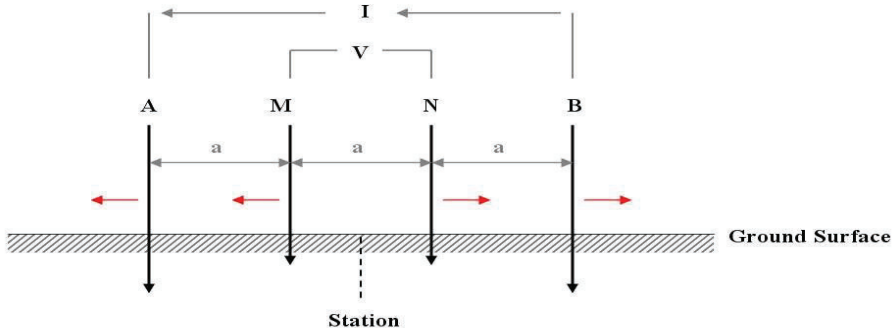
Weather & Temperature: Sunny - 70°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	19.00	7277	239	90	
5	152.40	6	6.00	5745	188	90	
8	243.84	6	3.40	5209	171	90	
12	365.76	12	2.30	5286	173	90	
15	457.20	12	2.10	6033	198	90	
25	762.00	12	1.70	8139	267	90	
40	1219.20	12	1.60	12257	402	90	
60	1828.80	12	1.50	17236	565	90	
75	2286.00	12	1.40	20109	660	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-14 East-West

Date: 11/19/2020 **Time:** 3:30 PM

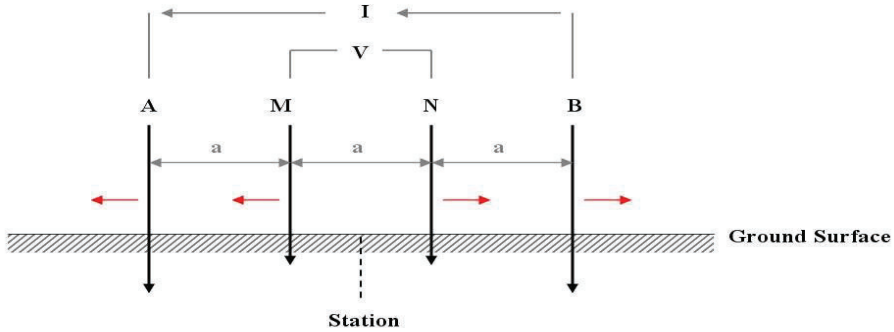
Weather & Temperature: Sunny - 70°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	16.00	6128	201	90	
5	152.40	6	7.20	6894	226	90	
8	243.84	6	3.60	5516	181	90	
12	365.76	12	2.70	6205	204	90	
15	457.20	12	2.50	7182	236	90	
25	762.00	12	2.30	11012	361	90	
40	1219.20	12	2.20	16853	553	90	
60	1828.80	12	2.10	24130	792	90	
75	2286.00	12	2.05	29445	966	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-16 North-South

Date: 11/18/2020 **Time:** 1:30 PM

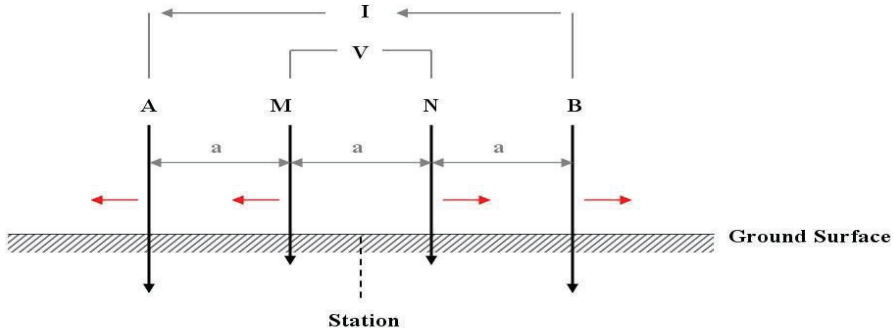
Weather & Temperature: Sunny - 70°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	12.00	4596	151	90	
5	152.40	6	5.70	5458	179	90	
8	243.84	6	4.00	6128	201	90	
12	365.76	12	2.80	6435	211	90	
15	457.20	12	2.30	6607	217	90	
25	762.00	12	1.75	8379	275	90	
40	1219.20	12	1.50	11491	377	90	
60	1828.80	12	1.40	16087	528	90	
75	2286.00	12	1.20	17236	565	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-16 East-West

Date: 11/18/2020 **Time:** 1:30 PM

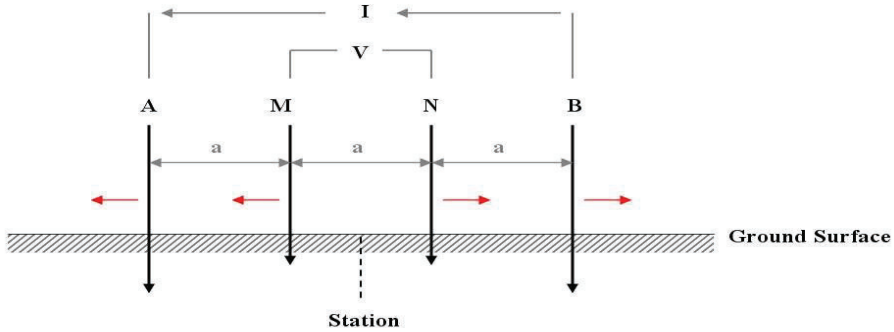
Weather & Temperature: Sunny - 70°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	11.00	4213	138	90	
5	152.40	6	5.20	4979	163	90	
8	243.84	6	4.00	6128	201	90	
12	365.76	12	3.10	7124	234	90	
15	457.20	12	2.60	7469	245	90	
25	762.00	12	1.80	8618	283	90	
40	1219.20	12	1.40	10725	352	90	
60	1828.80	12	1.40	16087	528	90	
75	2286.00	12	1.30	18672	613	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-17 North-South

Date: 11/19/2020 **Time:** 11:30 PM

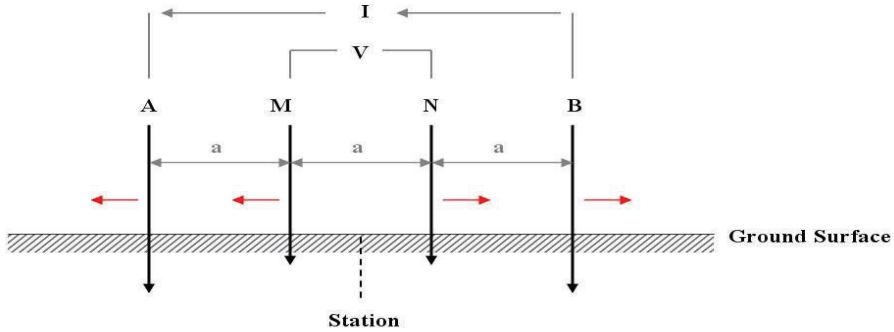
Weather & Temperature: Sunny - 70°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	26.00	9959	327	90	
5	152.40	6	11.00	10533	346	90	
8	243.84	6	7.40	11337	372	90	
12	365.76	12	4.60	10571	347	90	
15	457.20	12	3.50	10054	330	90	
25	762.00	12	1.90	9097	298	90	
40	1219.20	12	1.35	10342	339	90	
60	1828.80	12	1.25	14363	471	90	
75	2286.00	12	1.20	17236	565	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-17 East-West

Date: 11/19/2020 **Time:** 11:30 PM

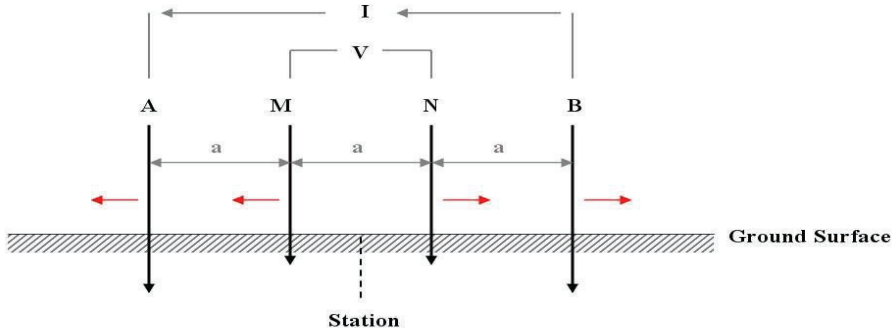
Weather & Temperature: Sunny - 70°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	25.00	9576	314	90	
5	152.40	6	11.00	10533	346	90	
8	243.84	6	7.20	11031	362	90	
12	365.76	12	4.10	9422	309	90	
15	457.20	12	3.10	8905	292	90	
25	762.00	12	1.70	8139	267	90	
40	1219.20	12	1.30	9959	327	90	
60	1828.80	12	1.20	13789	452	90	
75	2286.00	12	1.15	16518	542	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-18 North-South

Date: 11/19/2020 **Time:** 1:30 PM

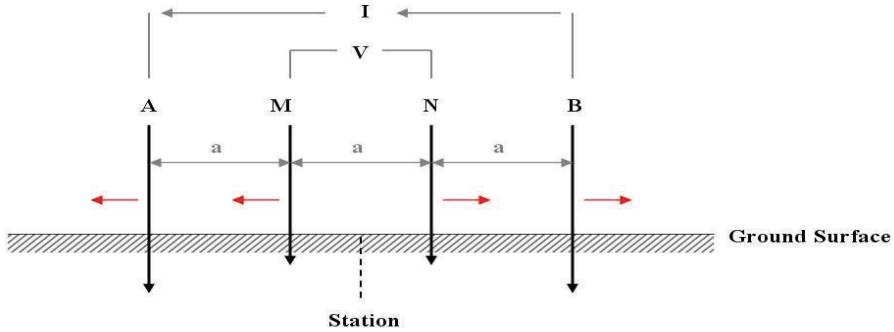
Weather & Temperature: Sunny - 70°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	20.00	7660	251	90	
5	152.40	6	8.80	8427	276	90	
8	243.84	6	6.40	9805	322	90	
12	365.76	12	4.50	10342	339	90	
15	457.20	12	3.80	10916	358	90	
25	762.00	12	2.80	13406	440	90	
40	1219.20	12	2.40	18385	603	90	
60	1828.80	12	2.30	26429	867	90	
75	2286.00	12	2.20	31599	1037	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-18 East-West

Date: 11/19/2020 **Time:** 1:30 PM

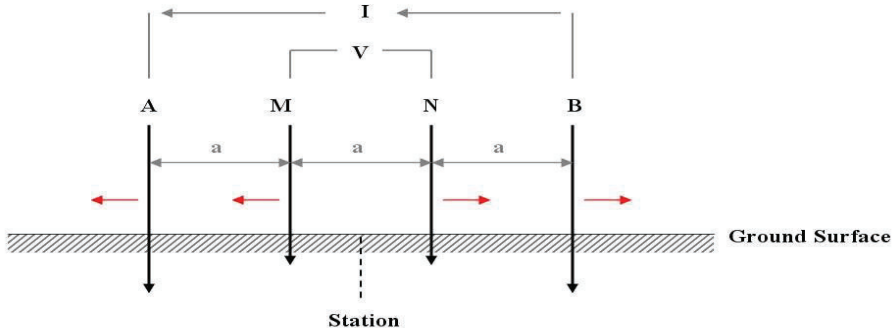
Weather & Temperature: Sunny - 70°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	19.00	7277	239	90	
5	152.40	6	9.40	9001	295	90	
8	243.84	6	6.70	10265	337	90	
12	365.76	12	4.50	10342	339	90	
15	457.20	12	3.80	10916	358	90	
25	762.00	12	2.50	11969	393	90	
40	1219.20	12	2.20	16853	553	90	
60	1828.80	12	2.15	24705	811	90	
75	2286.00	12	2.10	30163	990	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-19 North-South

Date: 11/18/2020 **Time:** 3:30 PM

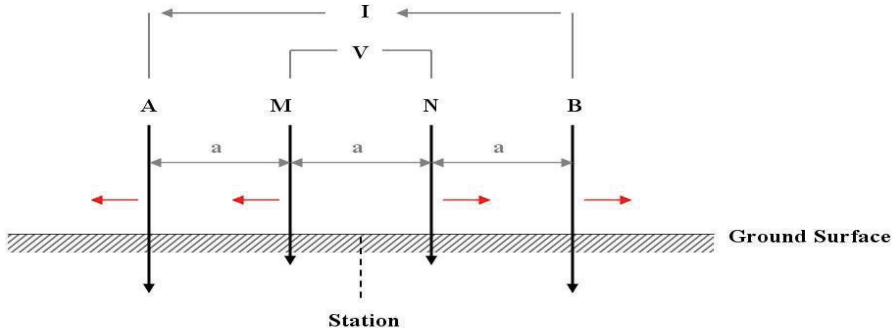
Weather & Temperature: Sunny - 70°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	19.00	7277	239	90	
5	152.40	6	8.90	8522	280	90	
8	243.84	6	6.10	9346	307	90	
12	365.76	12	4.40	10112	332	90	
15	457.20	12	3.60	10342	339	90	
25	762.00	12	2.10	10054	330	90	
40	1219.20	12	1.45	11108	364	90	
60	1828.80	12	1.30	14938	490	90	
75	2286.00	12	1.20	17236	565	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-19 East-West

Date: 11/18/2020 **Time:** 3:30 PM

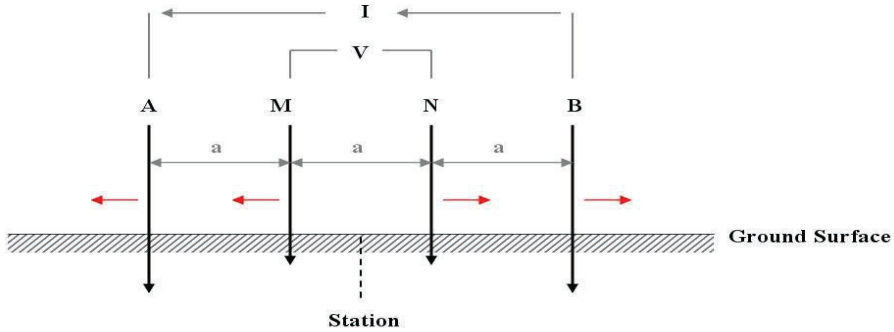
Weather & Temperature: Sunny - 70°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	17.00	6511	214	90	
5	152.40	6	8.10	7756	254	90	
8	243.84	6	6.40	9805	322	90	
12	365.76	12	4.30	9882	324	90	
15	457.20	12	3.50	10054	330	90	
25	762.00	12	2.00	9576	314	90	
40	1219.20	12	1.50	11491	377	90	
60	1828.80	12	1.35	15512	509	90	
75	2286.00	12	1.30	18672	613	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-20 North-South

Date: 11/19/2020 **Time:** 7:00 AM

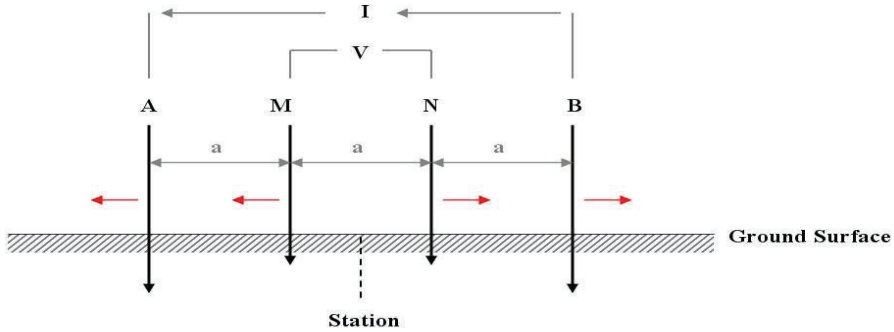
Weather & Temperature: Sunny - 55°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	22.00	8427	276	90	
5	152.40	6	9.20	8810	289	90	
8	243.84	6	5.70	8733	287	90	
12	365.76	12	3.60	8273	271	90	
15	457.20	12	2.70	7756	254	90	
25	762.00	12	1.80	8618	283	90	
40	1219.20	12	1.50	11491	377	90	
60	1828.80	12	1.45	16661	547	90	
75	2286.00	12	1.40	20109	660	90	

Soil Resistivity Data Sheet
Wenner Four-Electrode Method

Project: Russullville Solar Facility **Project #:** 1280-20-070

Project Location: Russellville, KY **Location:** B-20 East-West

Date: 11/19/2020 **Time:** 7:00 AM

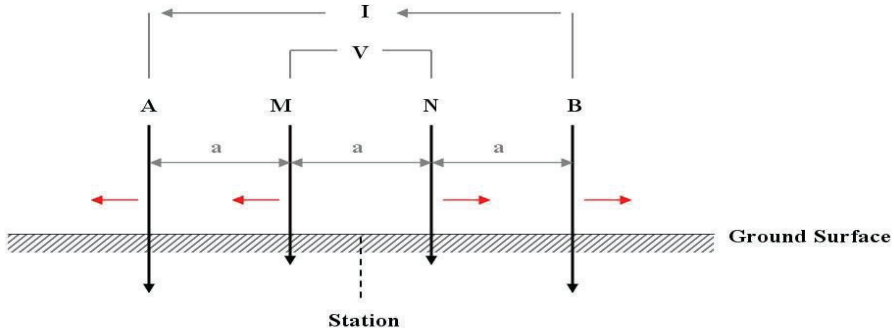
Weather & Temperature: Sunny - 55°

Soil Conditions: cultivated, slightly moist

Performed By (Name of Tester) E. Conway

Additional Notes:

$\rho = 2\pi \cdot a \cdot R$



"a" Spacing (feet)	"a" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Comments
2	60.96	2	20.00	7660	251	90	
5	152.40	6	9.20	8810	289	90	
8	243.84	6	5.40	8273	271	90	
12	365.76	12	3.50	8043	264	90	
15	457.20	12	2.90	8331	273	90	
25	762.00	12	1.70	8139	267	90	
40	1219.20	12	1.50	11491	377	90	
60	1828.80	12	1.50	17236	565	90	
75	2286.00	12	1.40	20109	660	90	

Form No. TR-2370-LEX-SUM-1
Revision No. : 3
Revision Date: 09/29/17

Lab Summary

S&ME, Inc - Lexington 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project No.: 1280-20-070 Report Date: 11/30/20
Project Name: Russellville Solar Facility
Client Name: Silicon Ranch Corporation
Client Address: 222 2nd Avenue S, Suite 1900; Nashville, TN 37201

BORING NO.	SAMPLE DEPTH, FT.	SAMPLE TYPE	USCS	NATURAL MOISTURE CONTENT,%	ATT. LIMITS L.L.	P.L.	P. I.	APPROX % RET.ON #40	MAX DRY DENSITY, PCF @ OPT MC % (STD. PROCTOR)	WET UNIT WEIGHT, PCF	THERMAL RESIST @ OPT, °C-cm/W	SPECIFIC GRAVITY	PH	% FINER THAN NO. 200	LEAST ELECTRICAL RESISTIVITY, Ω-CM
B-01	0-1	Bulk	CL	22.8	34	22	12	<5	102.9 @ 18.4		67	2.666	6.6	95.2	4,600
B-02	0-1	Bulk	CL	22.3	35	20	15	<5	105.2 @ 15.8		62	2.673	7.0	87.6	3,300
B-03	0-1	Bulk	CL	22.1	30	21	9	<5	101.6 @ 18.3		61	2.654	6.2	91.5	5,350
B-05	0-1	Bulk	CL	23.3	36	20	16	<5	104.6 @ 18.4		58	2.695	5.2	91.8	5,250
B-06	0-1	Bulk	CL	22.6	34	21	13	<5	104.5 @ 17.3		66	2.666	6.6	92.4	5,200
B-07	0-1	Bulk	ML	22.3	34	24	10	<5	103.0 @ 18.9		61	2.673	6.3	94.5	4,800
B-09	0-1	Bulk	CL	19.9	34	22	12	<5	106.0 @ 17.7		53	2.672	5.9	92.9	3,100
B-10	0-1	Bulk	CL	23.1	35	20	15	<5	104.7 @ 16.0		66	2.595	5.6	87.8	5,500
B-11	0-1	Bulk	CL	20.9	36	20	16	<5	105.5 @ 18.3		60	2.682	5.7	89.7	4,700
B-12	0-1	Bulk	ML	22.8	28	23	5	<5	103.3 @ 17.6		54	2.662	6.0	88.9	4,200
B-14	0-1	Bulk	ML	26.8	32	25	7	<5	100.9 @ 18.8		68	2.654	5.8	95.1	3,700
B-16	0-1	Bulk	CL	21.5	34	23	11	<5	102.6 @ 17.5		64	2.662	6.8	96.6	5,500
B-17	0-1	Bulk	CL	24.6	32	23	9	<5	102.6 @ 17.7		63	2.582	5.8	96.3	6,900
B-18	0-1	Bulk	ML	24.5	33	24	9	<5	103.1 @ 18.5		58	2.656	6.3	92.5	5,550
B-19	0-1	Bulk	CL	25.4	35	24	11	<5	104.0 @ 17.7		60	2.671	6.4	95.5	3,450
B-20	0-1	Bulk	CL	25.0	37	23	14	<5	101.4 @ 20.6		53	2.669	6.3	98.3	4,300

Notes:

Jacob Folsom
Technical Responsibility

Jacob Folsom

Associate Project Manager
Position

12/02/20
Date

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Form No. TR-2310LEX-SUM1
Revision No. : 0a
Revision Date. : 11/15/20

Lab Summary

S&ME, Inc - Lexington 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project No.: 22800023 Report Date: 05/02/22

Project Name: Russelville Solar Facility

Client Name: Silicon Ranch Corporation

Client Address: 222 Second Avenue South, Suite 1900, Nashville, TN 37201

BORING NO.	SAMPLE DEPTH, FT.	SAMPLE TYPE	USCS	NATURAL MOISTURE CONTENT,%	ATT. LIMITS L.L.	P.L.	P. I.	APPROX % RET.ON #40	MAX DRY DENSITY, PCF @ OPT MC % (STD. PROCTOR)	WET UNIT WEIGHT, PCF	DRY UNIT WEIGHT, PCF	APPROX ROCK UNCONFINED COMPRESSIVE STRENGTH, PSI	SOIL UNCONFINED COMPRESSIVE STRENGTH, PSF	% FINER THAN NO. 200	INTER-POLATED AT 95% CBR, %
B-01	0-2.5	Bulk	ML	21.3	39	26	13	<5	102.1 @ 17.8					92.2	
B-03	0-2.5	Bulk	ML	35.6	33	24	9	<5	100.3 @ 18.8					91.2	
B-05	0-2.5	Bulk	CL	21.7	33	22	11	10	103.4 @ 17.8					81.5	
B-07	0-2.5	Bulk	ML	24.1	38	25	13	<5	100.6 @ 18.5					93.1	
B-09	0-2.5	Bulk	CL	23.7	32	22	10	<5	102.7 @ 18.9					93.2	
B-10	0-2.5	Bulk	CL	19.0	29	20	9	<5	105.7 @ 16.2					82.9	
B-11	0-2.5	Bulk	CL	20.4	30	19	11	<5	109 @ 15.2					82.3	
B-12	0-2.5	Bulk	CL	21.9	33	19	14	<5	99.5 @ 18.5					92.3	
B-17	0-2.5	Bulk	CL	27.8	34	23	11	<5	100.6 @ 18.4					94.5	
B-20	0-2.5	Bulk	CL	22.1	32	19	13	<5	107.3 @ 17.0					92.9	

Notes:

Jacob Folsom — *Technical Responsibility*

Jacob Folsom

Lab Services Manager — *Position*

05/02/22 — *Date*

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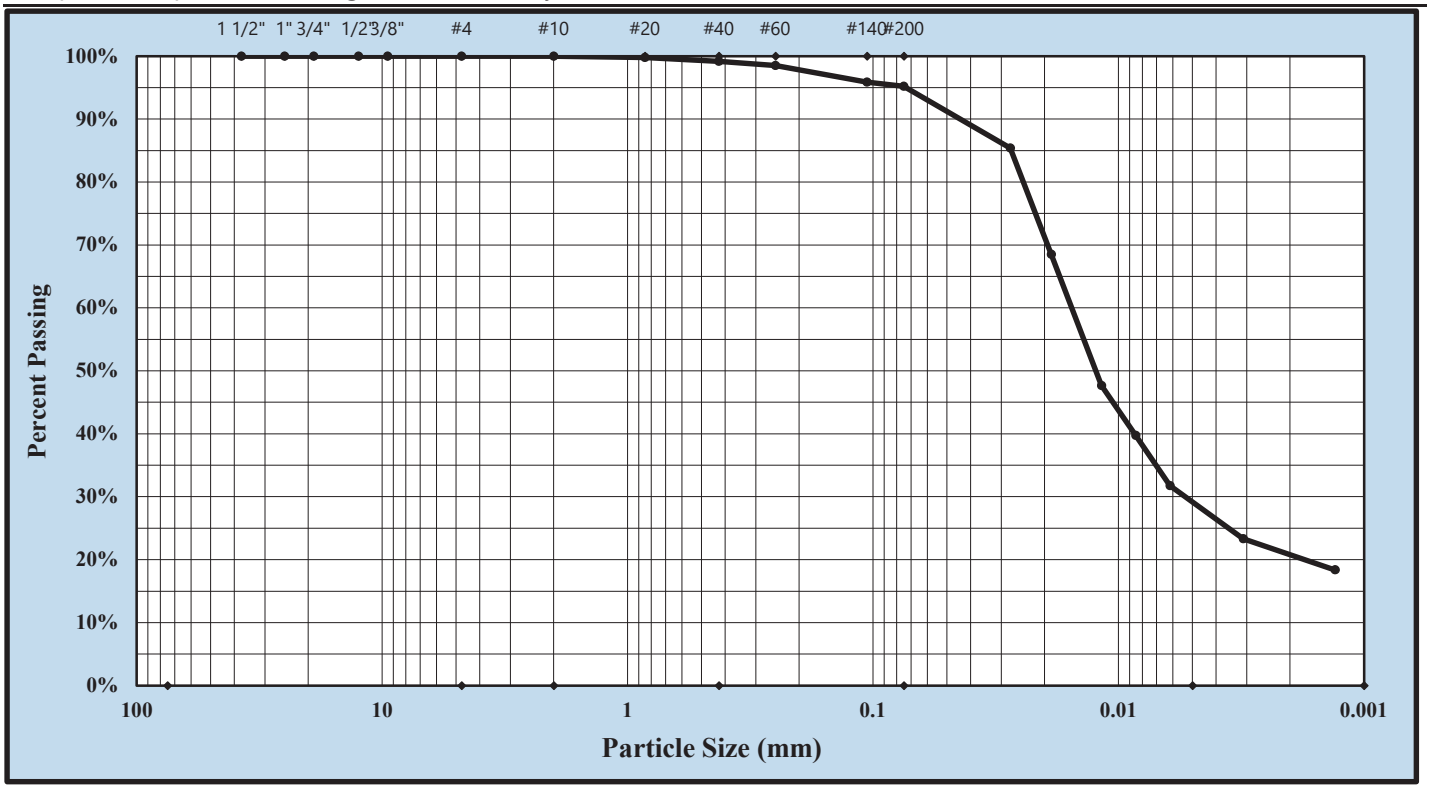
Form No. TR-D422-2
Revision No. 2LEXa
Revision Date: 09/02/20

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/23/20 - 11/25/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
Type:	Bulk Sample No.: P-1	Sample Date:	11/16/20
Location:	B-01	Depth (ft.):	0.0 - 1.0
Sample Description:	Strong brown Lean clay		CL



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	No. 40	Gravel:	0.0%	Silt Size:	66.0%
Silt & Clay (% Passing #200):	95.2%	Total Sand:	4.8%	Clay Size:	29.2%
Apparent Relative Density:	2.666	Moisture Content:	22.8%		
Liquid Limit:	34	Plastic Limit:	22	Plastic Index:	12
Coarse Sand:	0.0%	Medium Sand:	0.8%	Fine Sand:	4.0%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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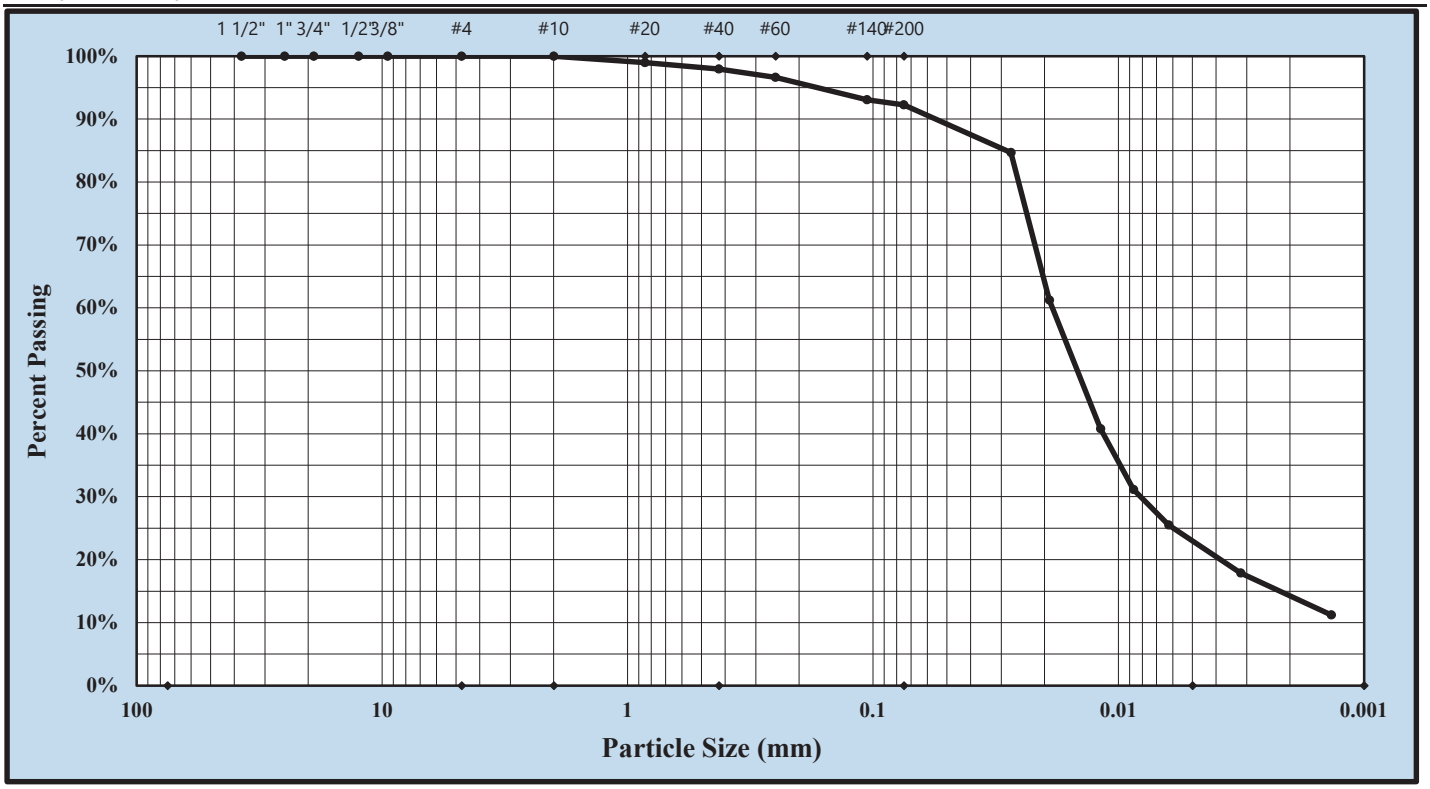
Form No. TR-D422-2
Revision No. 2LEXc
Revision Date: 03/30/22

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/25/22
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Avenue South, Suite 1900, Nashville, TN		
Type:	Bulk	Sample Date:	04/20/22
Location:	B-01	Depth (ft.):	0.0 - 2.5
Sample Description:	SILT (ML), brown		



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	#20	Gravel:	0.0%	Silt Size:	69.3%
Silt & Clay (% Passing #200):	92.2%	Total Sand:	7.8%	Clay Size:	23.0%
Apparent Relative Density:	2.612	Moisture Content:	21.3%		
Liquid Limit:	39	Plastic Limit:	26	Plastic Index:	13
Coarse Sand:	0.0%	Medium Sand:	2.0%	Fine Sand:	5.7%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Lab Services Manager	5/2/2022
Technical Responsibility	*Signature*	*Position*	*Date*

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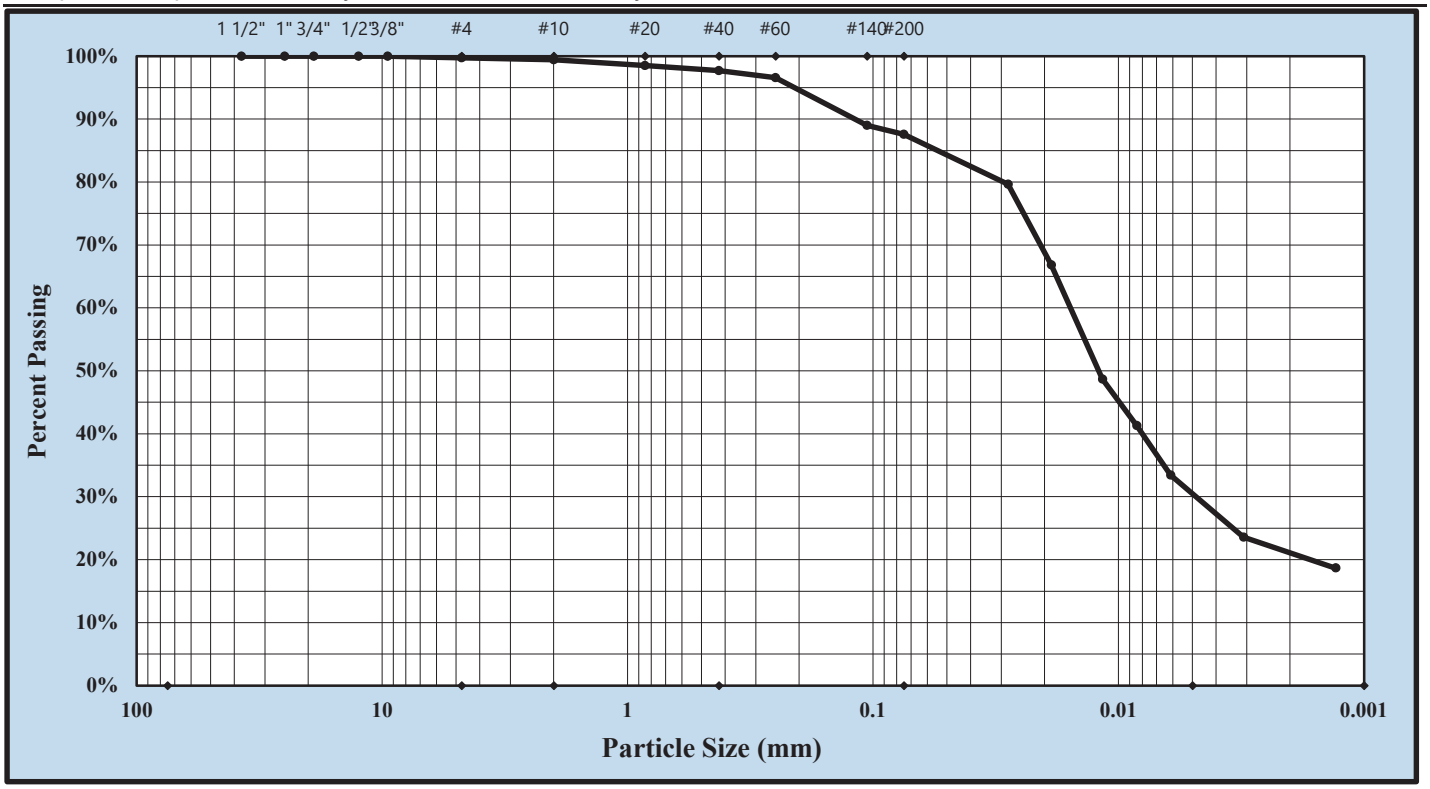
Form No. TR-D422-2
Revision No. 2LEXa
Revision Date: 09/02/20

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/23/20 - 11/25/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
Type:	Bulk Sample No.: P-2	Sample Date:	11/16/20
Location:	B-02	Depth (ft.):	0.0 - 1.0
Sample Description:	Dark yellowish brown Lean clay		CL



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	3/8 in.	Gravel:	0.3%	Silt Size:	57.1%
Silt & Clay (% Passing #200):	87.6%	Total Sand:	12.1%	Clay Size:	30.5%
Apparent Relative Density:	2.673	Moisture Content:	22.3%		
Liquid Limit:	35	Plastic Limit:	20	Plastic Index:	15
Coarse Sand:	0.3%	Medium Sand:	1.7%	Fine Sand:	10.1%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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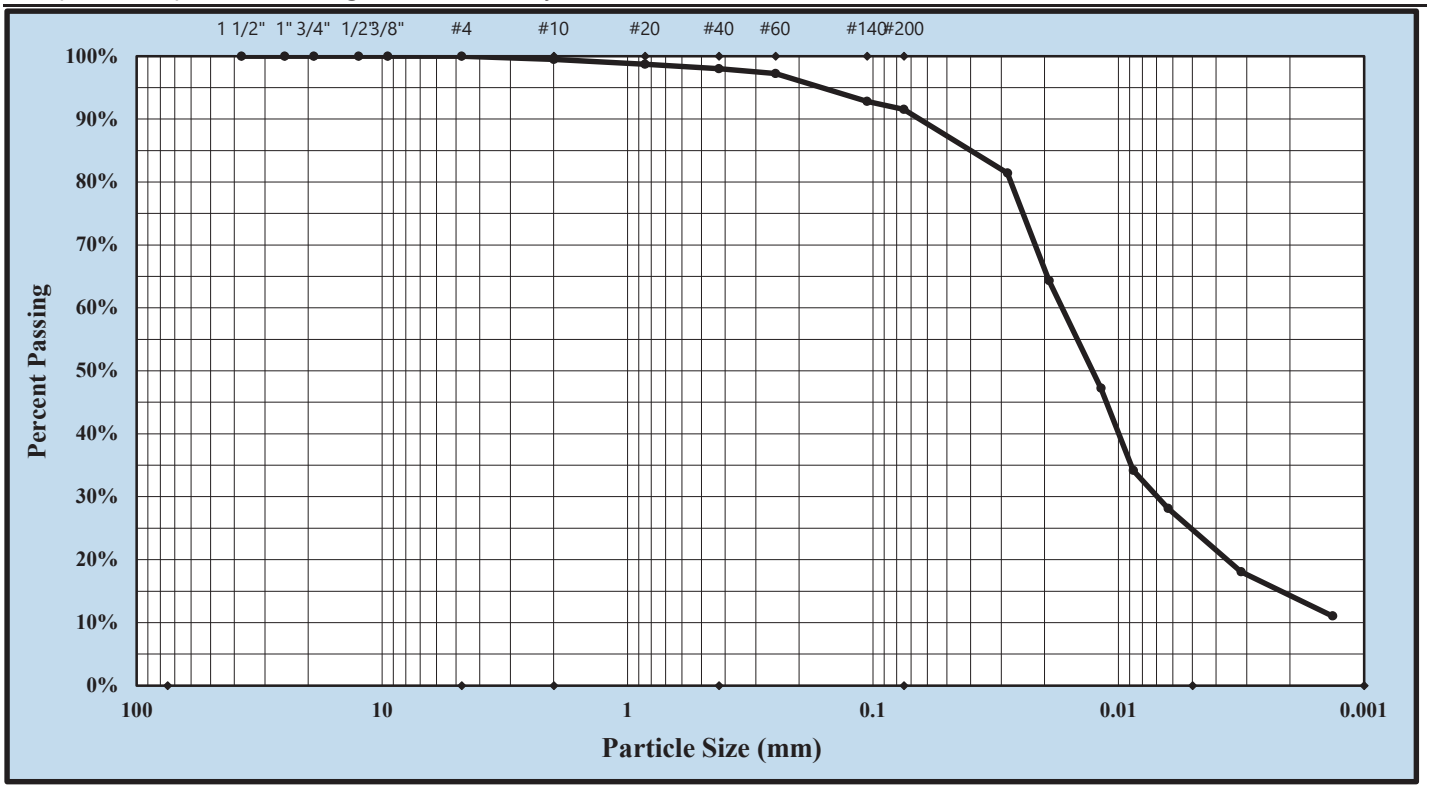
Form No. TR-D422-2
Revision No. 2LEXa
Revision Date: 09/02/20

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/23/20 - 11/25/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
Type:	Bulk Sample No.: P-3	Sample Date:	11/16/20
Location:	B-03	Depth (ft.):	0.0 - 1.0
Sample Description:	Strong brown Lean clay		CL



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	No. 10	Gravel:	0.0%	Silt Size:	66.7%
Silt & Clay (% Passing #200):	91.5%	Total Sand:	8.4%	Clay Size:	24.8%
Apparent Relative Density:	2.654	Moisture Content:	22.1%		
Liquid Limit:	30	Plastic Limit:	21	Plastic Index:	9
Coarse Sand:	0.5%	Medium Sand:	1.5%	Fine Sand:	6.5%

Description of Sand and Gravel: Rounded ☒ Angular ☒ Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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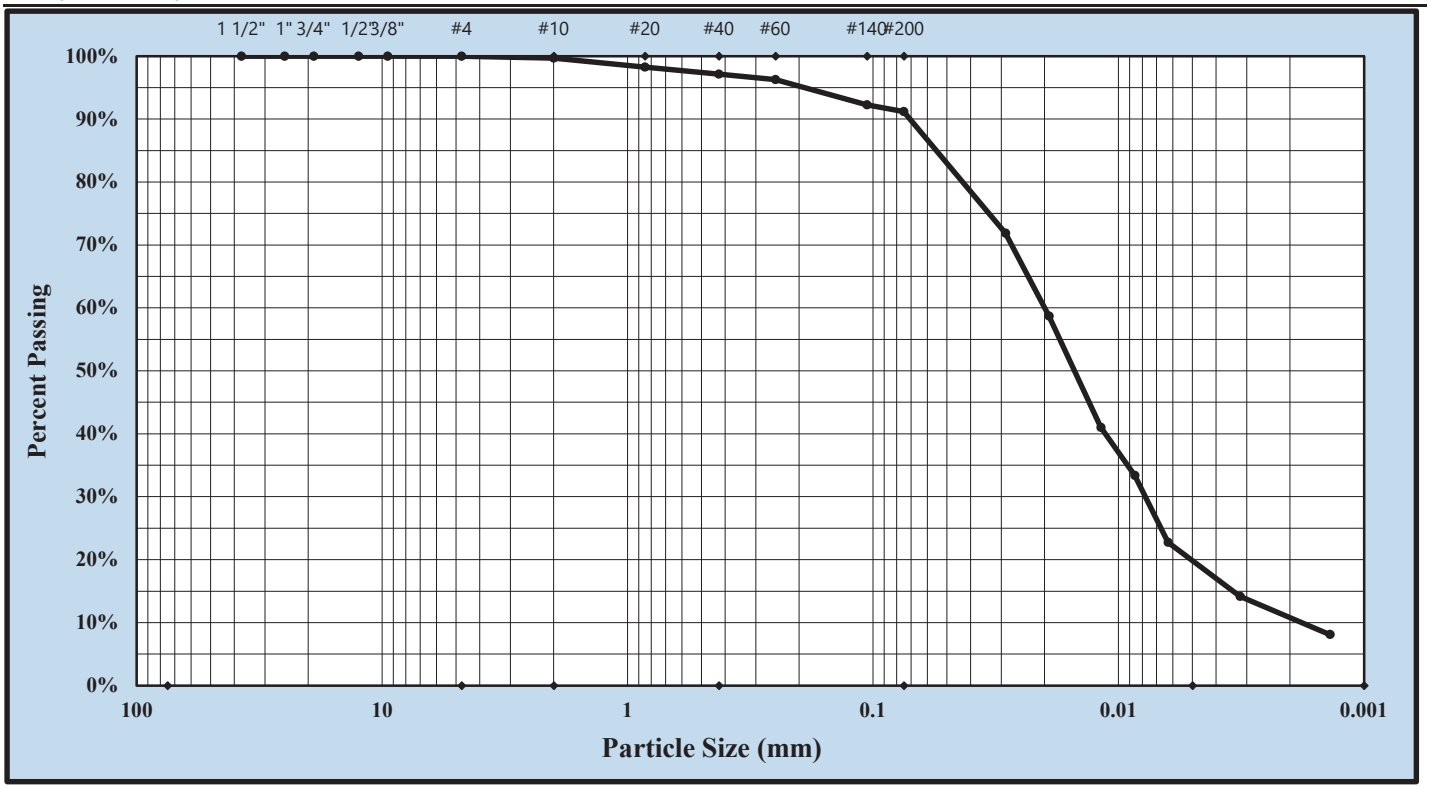
Form No. TR-D422-2
Revision No. 2LEXc
Revision Date: 03/30/22

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/25/22
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Avenue South, Suite 1900, Nashville, TN		
Type:	Bulk	Sample Date:	04/20/22
Location:	B-03	Depth (ft.):	0.0 - 2.5
Sample Description:	SILT (ML), brown		



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	#10	Gravel:	0.0%	Silt Size:	71.3%
Silt & Clay (% Passing #200):	91.2%	Total Sand:	8.8%	Clay Size:	19.9%
Apparent Relative Density:	2.621	Moisture Content:	35.6%		
Liquid Limit:	33	Plastic Limit:	24	Plastic Index:	9
Coarse Sand:	0.3%	Medium Sand:	2.5%	Fine Sand:	6.0%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Lab Services Manager	5/2/2022
Technical Responsibility	*Signature*	*Position*	*Date*

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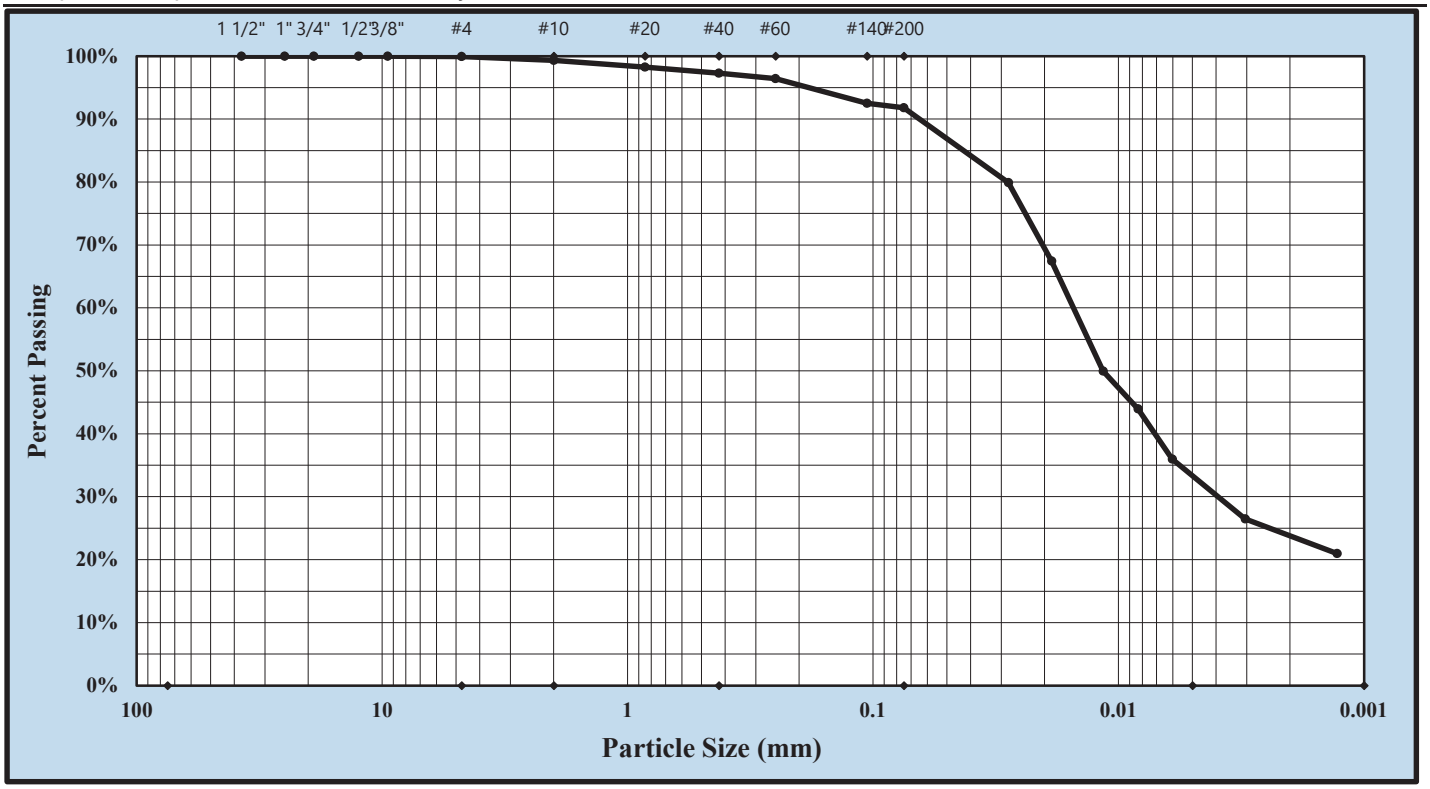
Form No. TR-D422-2
Revision No. 2LEXa
Revision Date: 09/02/20

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/23/20 - 11/25/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
Type:	Bulk Sample No.: P-4	Sample Date:	11/16/20
Location:	B-05	Depth (ft.):	0.0 - 1.0
Sample Description:	Brown Lean clay		CL



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	No. 10	Gravel:	0.1%	Silt Size:	58.5%
Silt & Clay (% Passing #200):	91.8%	Total Sand:	8.1%	Clay Size:	33.3%
Apparent Relative Density:	2.695	Moisture Content:	23.3%		
Liquid Limit:	36	Plastic Limit:	20	Plastic Index:	16
Coarse Sand:	0.6%	Medium Sand:	2.0%	Fine Sand:	5.5%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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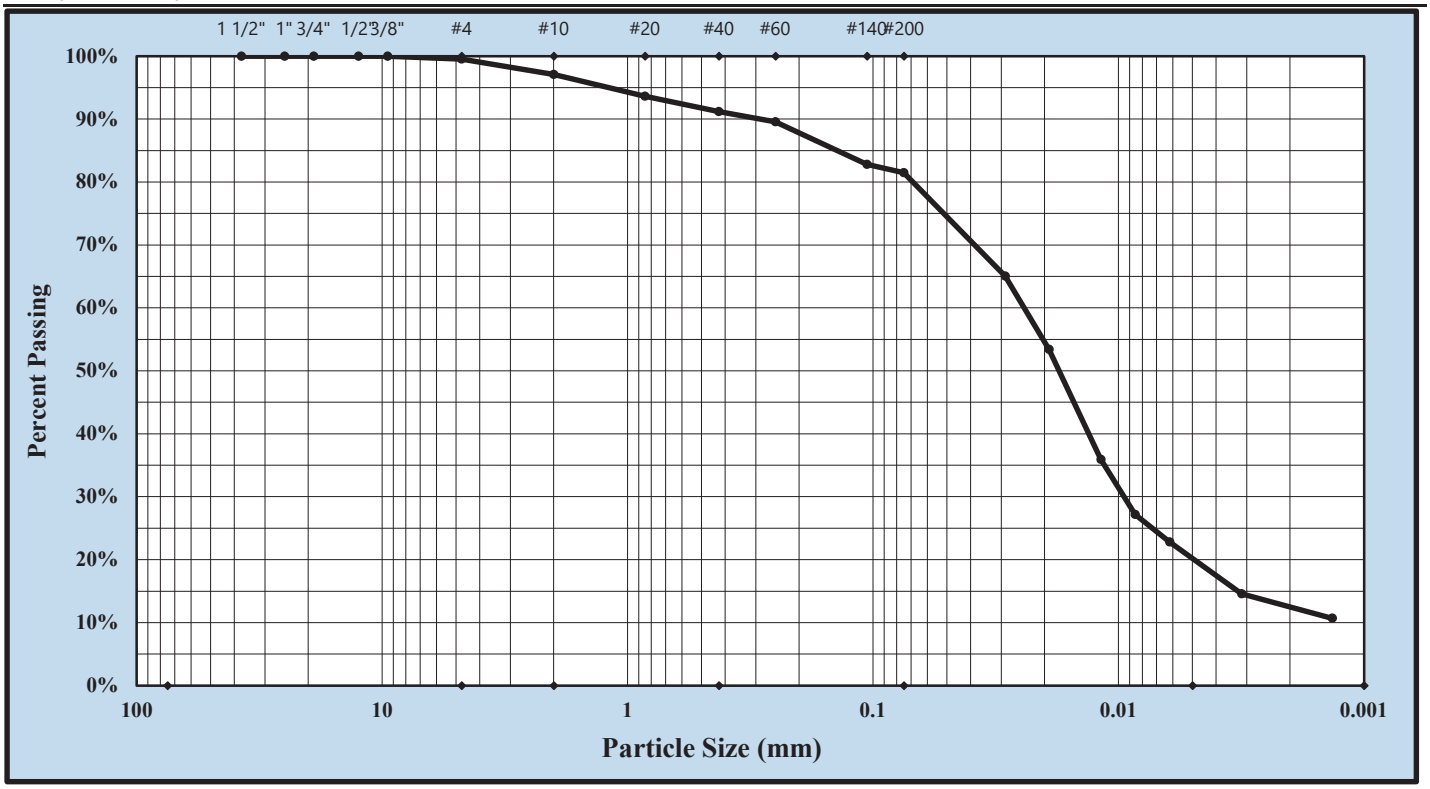
Form No. TR-D422-2
Revision No. 2LEXc
Revision Date: 03/30/22

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/25/22
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Avenue South, Suite 1900, Nashville, TN		
Type:	Bulk	Sample Date:	04/20/22
Location:	B-05	Depth (ft.):	0.0 - 2.5
Sample Description:	LEAN CLAY WITH SAND (CL), brown		



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	#4	Gravel:	0.5%	Silt Size:	61.3%
Silt & Clay (% Passing #200):	81.5%	Total Sand:	18.0%	Clay Size:	20.2%
Apparent Relative Density:	2.662	Moisture Content:	21.7%		
Liquid Limit:	33	Plastic Limit:	22	Plastic Index:	11
Coarse Sand:	2.4%	Medium Sand:	5.9%	Fine Sand:	9.7%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☐ Soft ☒ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Lab Services Manager	5/2/2022
Technical Responsibility	*Signature*	*Position*	*Date*

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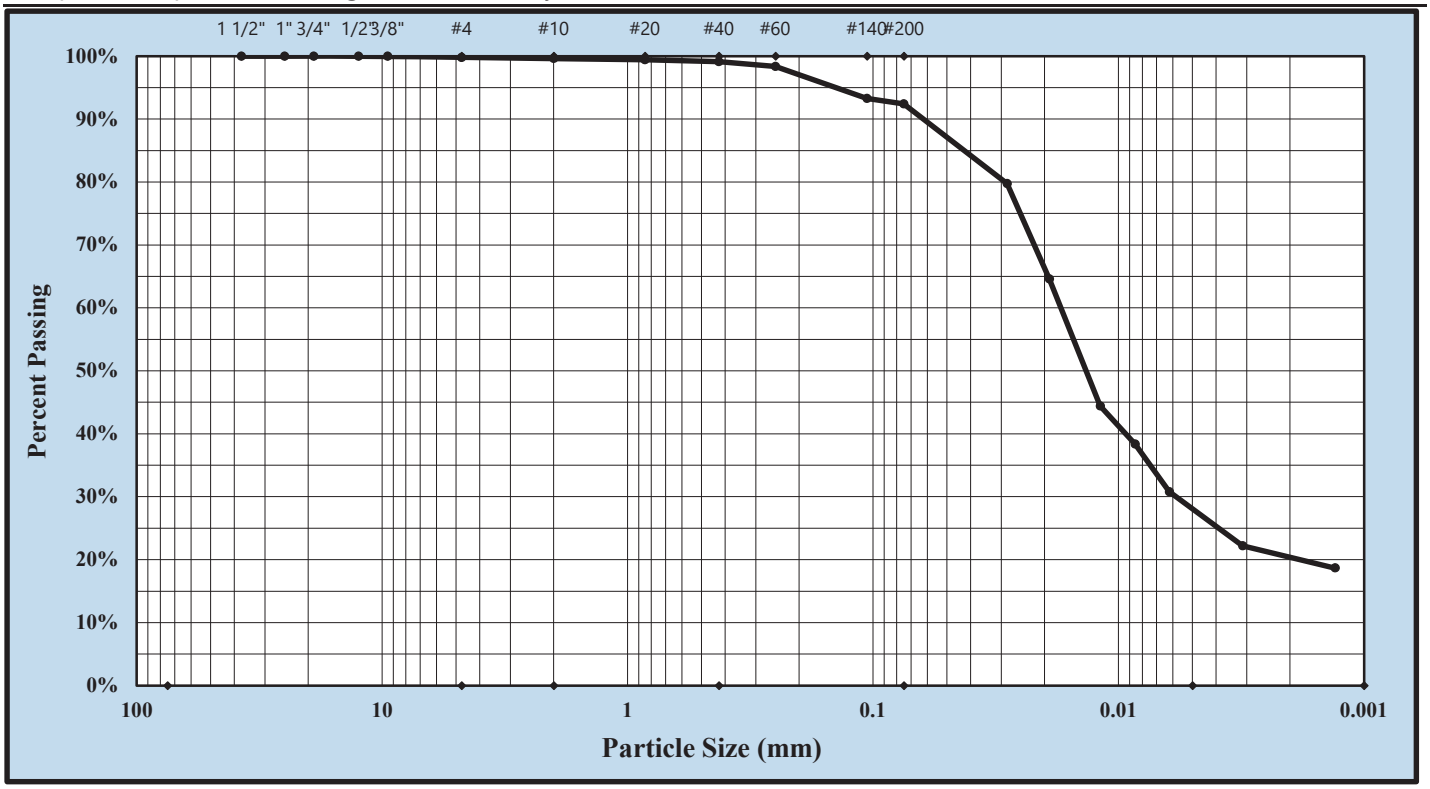
Form No. TR-D422-2
Revision No. 2LEXa
Revision Date: 09/02/20

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/23/20 - 11/25/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
Type:	Bulk Sample No.: P-5	Sample Date:	11/16/20
Location:	B-06	Depth (ft.):	0.0 - 1.0
Sample Description:	Strong brown Lean clay		CL



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	No. 40	Gravel:	0.2%	Silt Size:	64.3%
Silt & Clay (% Passing #200):	92.4%	Total Sand:	7.4%	Clay Size:	28.1%
Apparent Relative Density:	2.666	Moisture Content:	22.6%		
Liquid Limit:	34	Plastic Limit:	21	Plastic Index:	13
Coarse Sand:	0.1%	Medium Sand:	0.5%	Fine Sand:	6.7%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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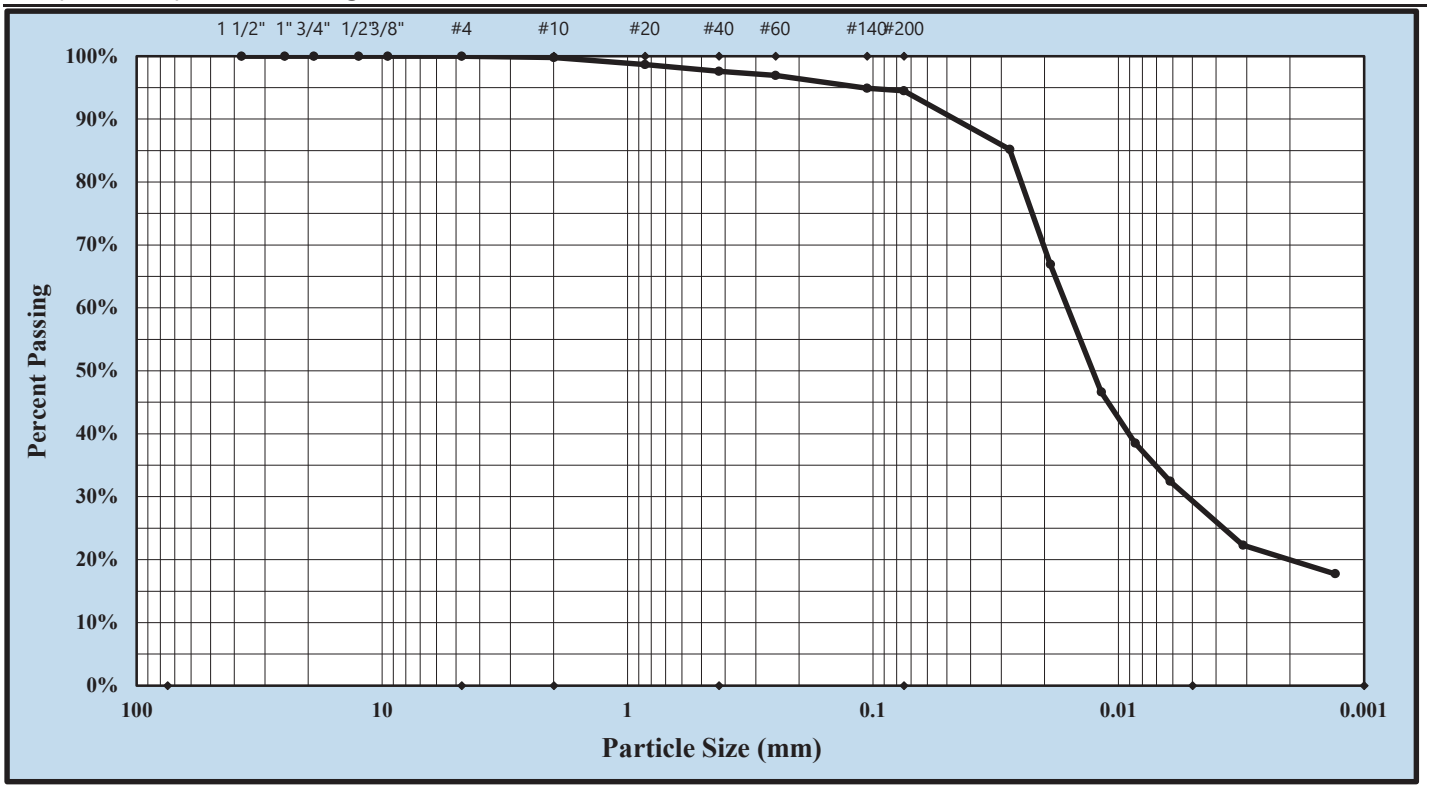
Form No. TR-D422-2
Revision No. 2LEXa
Revision Date: 09/02/20

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/23/20 - 11/25/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
Type:	Bulk Sample No.: P-6	Sample Date:	11/16/20
Location:	B-07	Depth (ft.):	0.0 - 1.0
Sample Description:	Strong brown Silt		ML



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	No. 10	Gravel:	0.0%	Silt Size:	65.1%
Silt & Clay (% Passing #200):	94.5%	Total Sand:	5.5%	Clay Size:	29.3%
Apparent Relative Density:	2.673	Moisture Content:	22.3%		
Liquid Limit:	34	Plastic Limit:	24	Plastic Index:	10
Coarse Sand:	0.2%	Medium Sand:	2.2%	Fine Sand:	3.1%

Description of Sand and Gravel: Rounded ☒ Angular ☐ Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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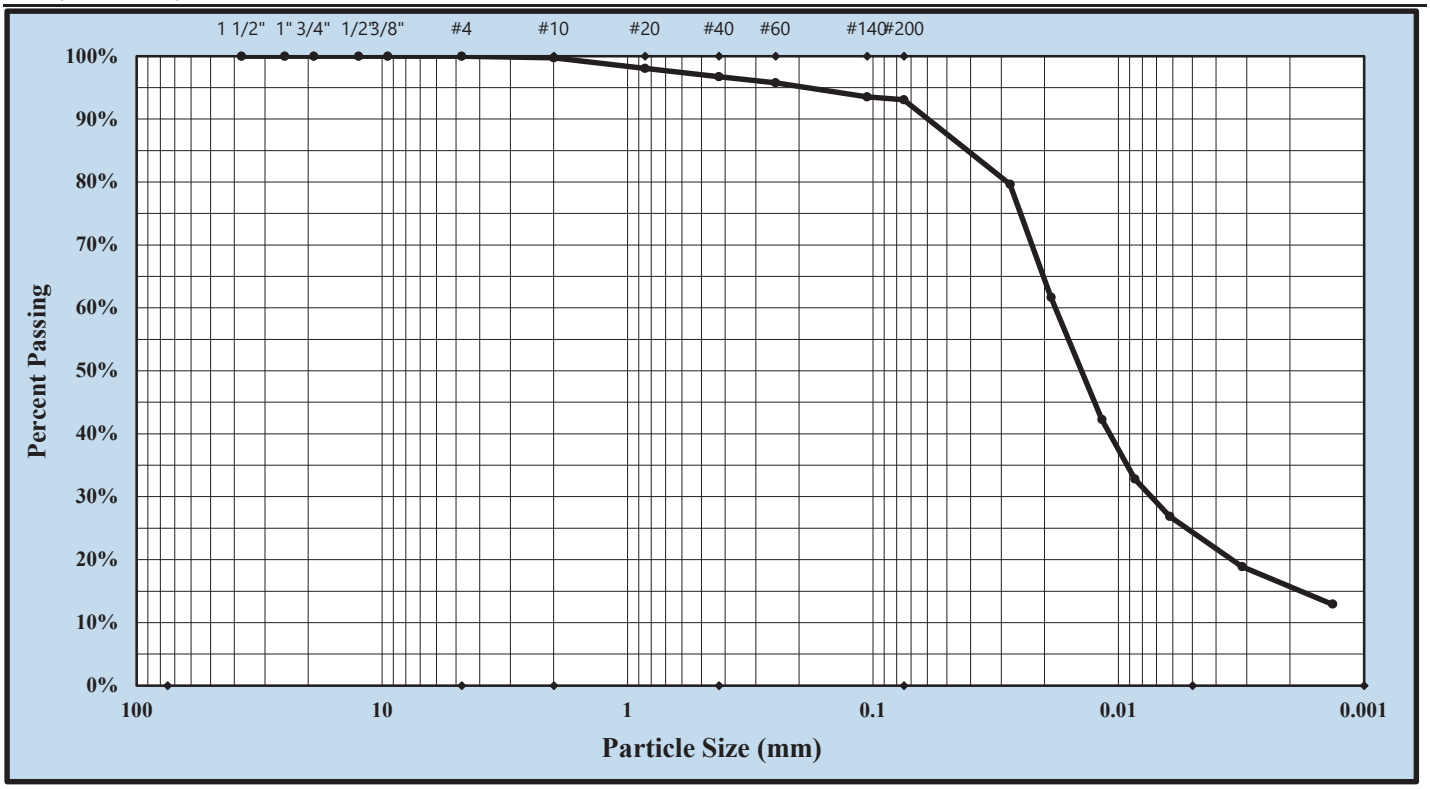
Form No. TR-D422-2
Revision No. 2LEXc
Revision Date: 03/30/22

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	22800023	Report Date:	05/2/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/25/22
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Avenue South, Suite 1900, Nashville, TN		
Type:	Bulk	Sample Date:	04/20/22
Location:	B-07	Depth (ft.):	0.0 - 2.5
Sample Description:	SILT (ML), brown		



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	#10	Gravel:	0.0%	Silt Size:	68.7%
Silt & Clay (% Passing #200):	93.1%	Total Sand:	6.9%	Clay Size:	24.4%
Apparent Relative Density:	2.632	Moisture Content:	24.1%		
Liquid Limit:	38	Plastic Limit:	25	Plastic Index:	13
Coarse Sand:	0.3%	Medium Sand:	3.0%	Fine Sand:	3.7%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Lab Services Manager	5/2/2022
Technical Responsibility	*Signature*	*Position*	*Date*

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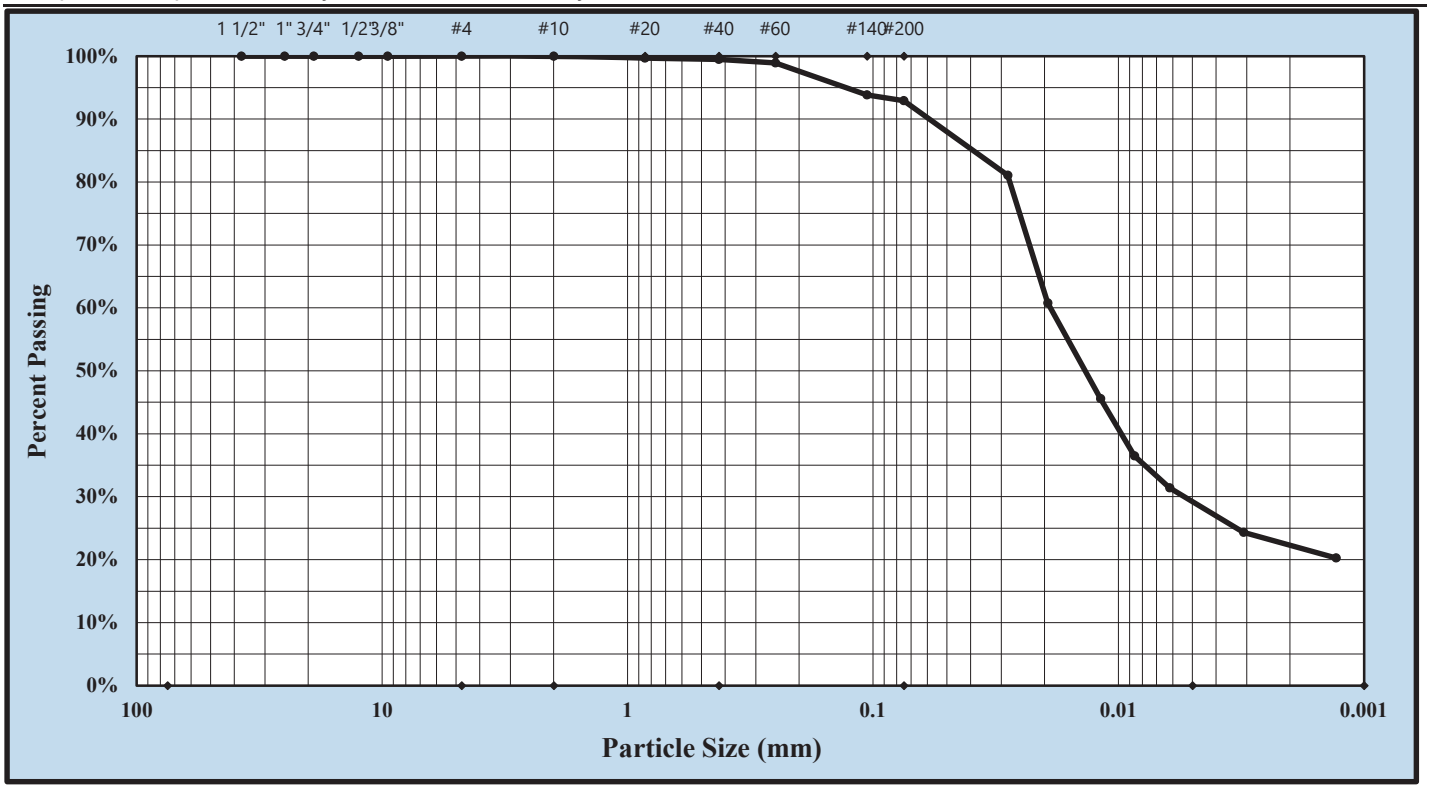
Form No. TR-D422-2
Revision No. 2LEXa
Revision Date: 09/02/20

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/23/20 - 11/25/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
Type:	Bulk Sample No.: P-7	Sample Date:	11/16/20
Location:	B-09	Depth (ft.):	0.0 - 1.0
Sample Description:	Very dark brown Lean clay		CL



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	No. 40	Gravel:	0.0%	Silt Size:	63.7%
Silt & Clay (% Passing #200):	92.9%	Total Sand:	7.1%	Clay Size:	29.2%
Apparent Relative Density:	2.672	Moisture Content:	19.9%		
Liquid Limit:	34	Plastic Limit:	22	Plastic Index:	12
Coarse Sand:	0.0%	Medium Sand:	0.5%	Fine Sand:	6.6%

Description of Sand and Gravel: Rounded ☐ Angular ☐ Hard & Durable ☐ Soft ☐ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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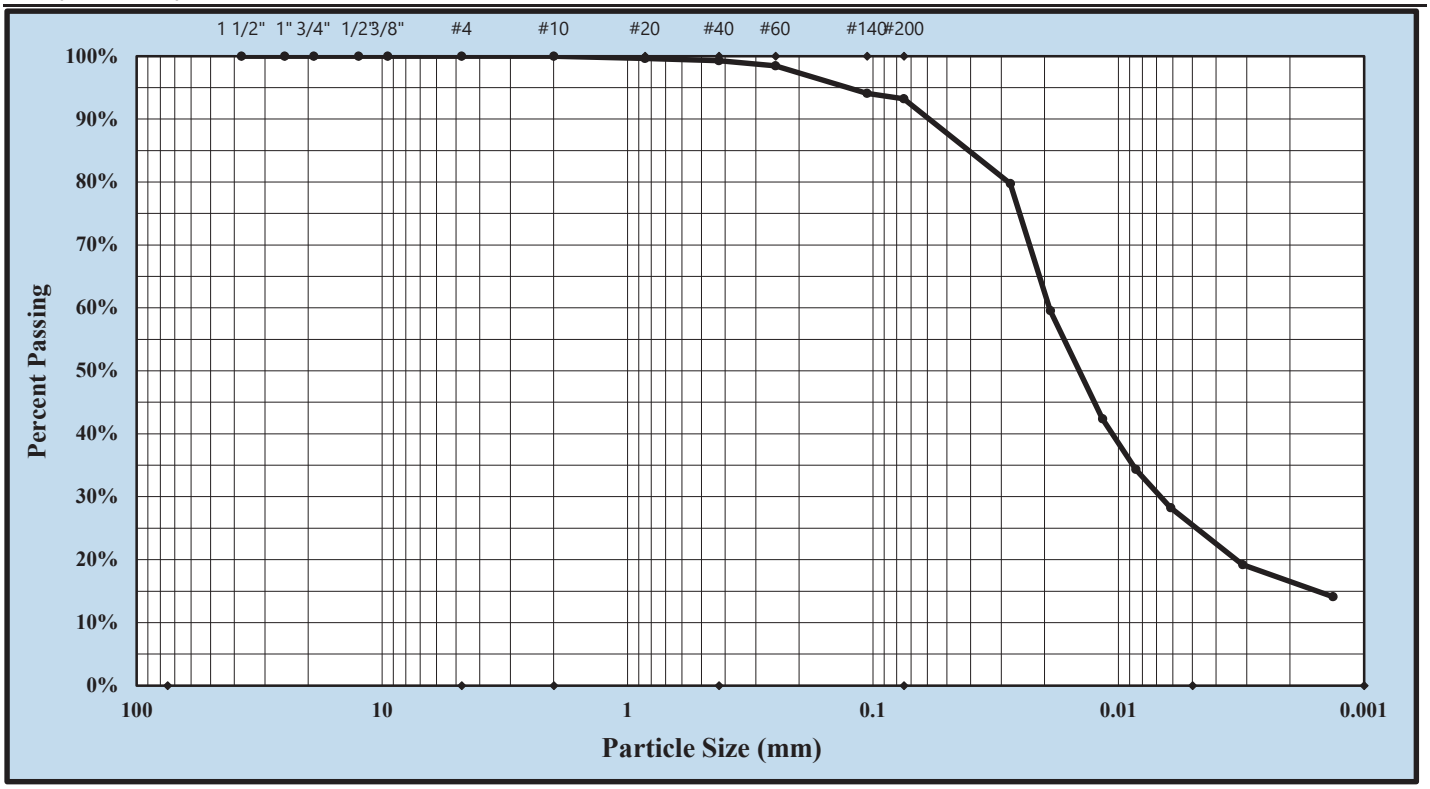
Form No. TR-D422-2
Revision No. 2LEXc
Revision Date: 03/30/22

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/25/22
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Avenue South, Suite 1900, Nashville, TN		
Type:	Bulk	Sample Date:	04/20/22
Location:	B-09	Depth (ft.):	0.0 - 2.5
Sample Description:	LEAN CLAY (CL), brown		



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	#40	Gravel:	0.0%	Silt Size:	67.7%
Silt & Clay (% Passing #200):	93.2%	Total Sand:	6.8%	Clay Size:	25.5%
Assumed Relative Density:	2.652	Moisture Content:	25.7%		
Liquid Limit:	32	Plastic Limit:	22	Plastic Index:	10
Coarse Sand:	0.0%	Medium Sand:	0.7%	Fine Sand:	6.0%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☐ Soft ☒ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Lab Services Manager	5/2/2022
Technical Responsibility	*Signature*	*Position*	*Date*

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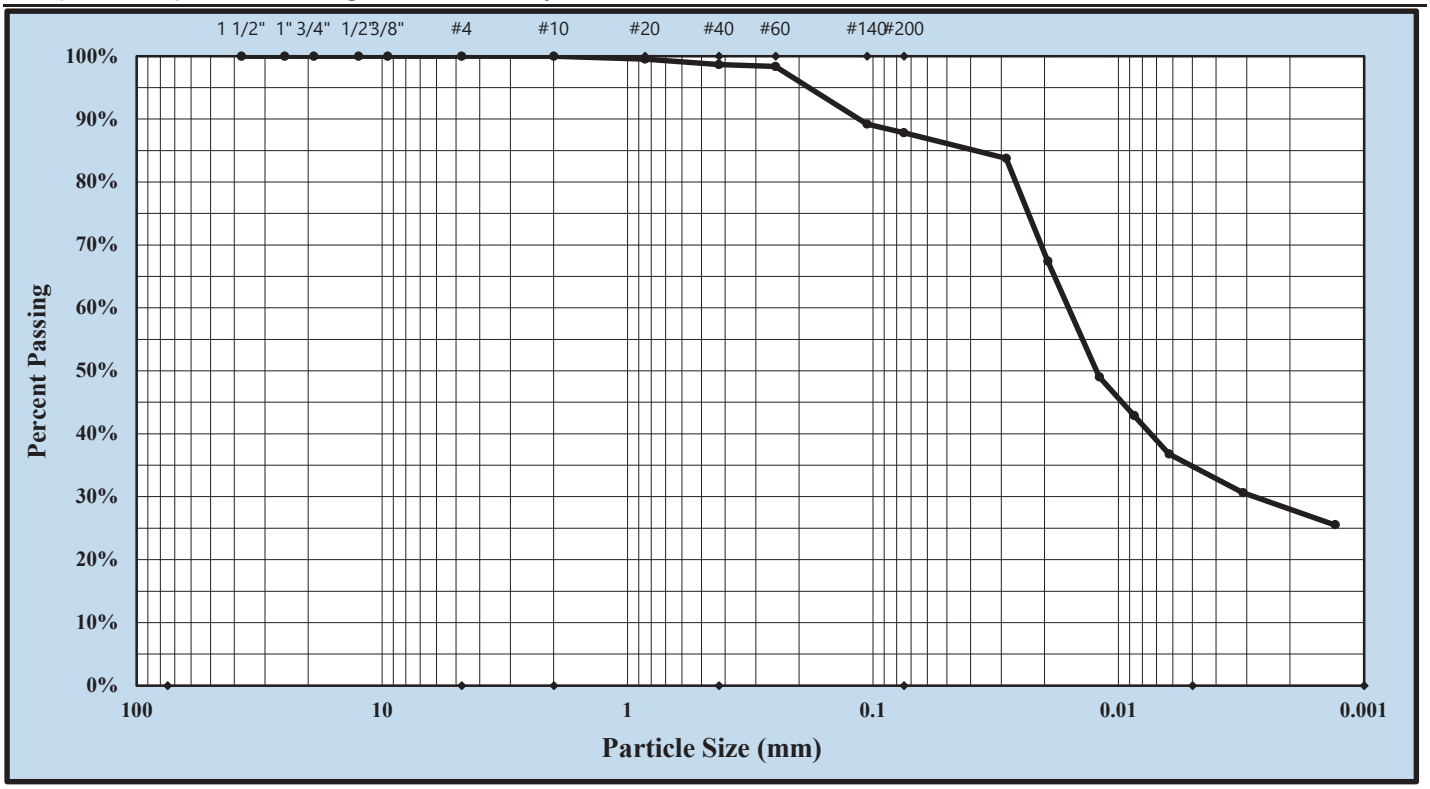
Form No. TR-D422-2
Revision No. 2LEXa
Revision Date: 09/02/20

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/23/20 - 11/25/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
Type:	Bulk Sample No.: P-8	Sample Date:	11/16/20
Location:	B-10	Depth (ft.):	0.0 - 1.0
Sample Description:	Strong brown Lean clay		CL



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	No. 20	Gravel:	0.0%	Silt Size:	53.0%
Silt & Clay (% Passing #200):	87.8%	Total Sand:	12.2%	Clay Size:	34.8%
Apparent Relative Density:	2.595	Moisture Content:	23.1%		
Liquid Limit:	35	Plastic Limit:	20	Plastic Index:	15
Coarse Sand:	0.0%	Medium Sand:	1.3%	Fine Sand:	10.8%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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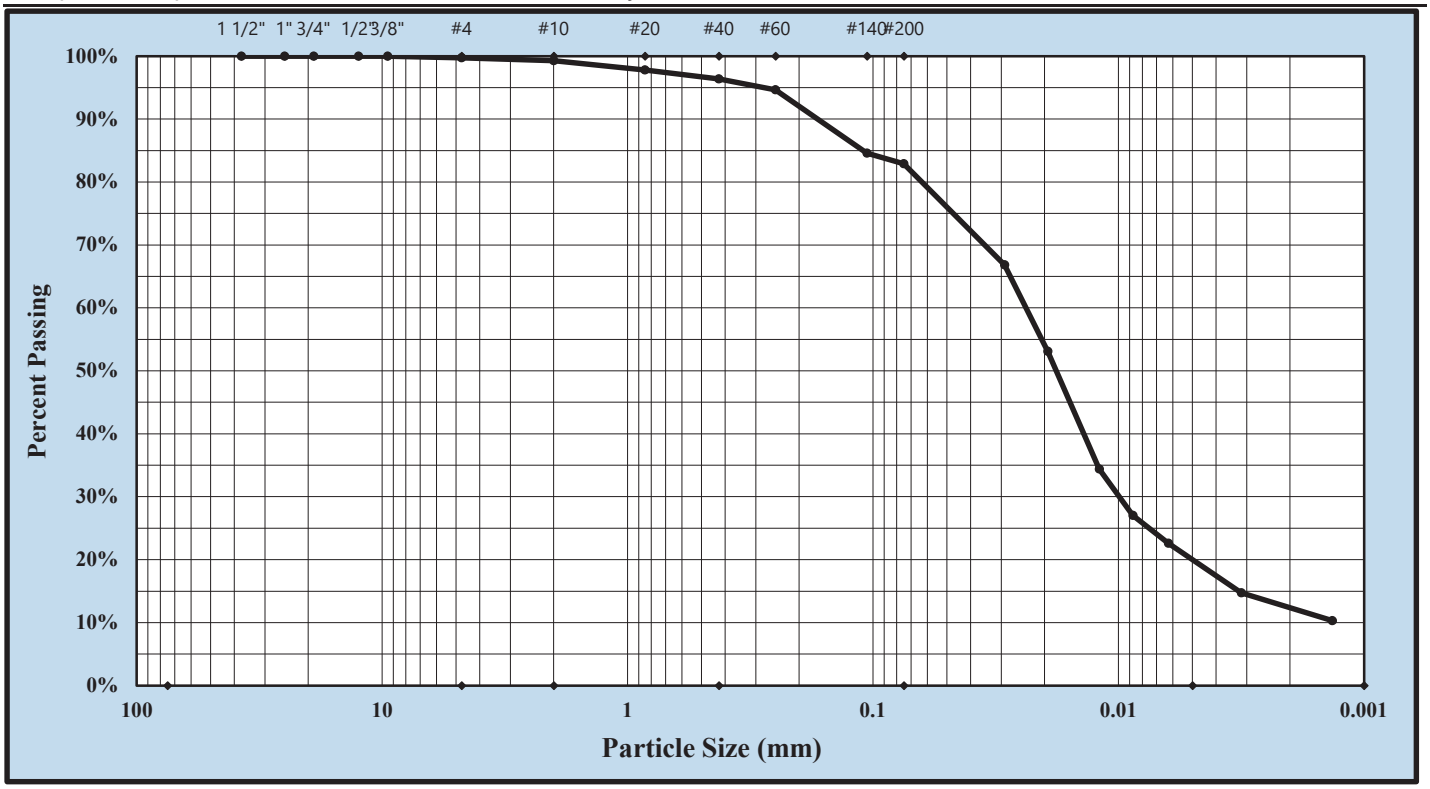
Form No. TR-D422-2
Revision No. 2LEXc
Revision Date: 03/30/22

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/25/22
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Avenue South, Suite 1900, Nashville, TN		
Type:	Bulk	Sample Date:	04/20/22
Location:	B-10	Depth (ft.):	0.0 - 2.5
Sample Description:	LEAN CLAY WITH SAND (CL), yellow brown		



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	#10	Gravel:	0.3%	Silt Size:	62.9%
Silt & Clay (% Passing #200):	82.9%	Total Sand:	16.8%	Clay Size:	20.0%
Apparent Relative Density:	2.651	Moisture Content:	19.0%		
Liquid Limit:	29	Plastic Limit:	20	Plastic Index:	9
Coarse Sand:	0.5%	Medium Sand:	2.9%	Fine Sand:	13.4%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Lab Services Manager	5/2/2022
Technical Responsibility	*Signature*	*Position*	*Date*

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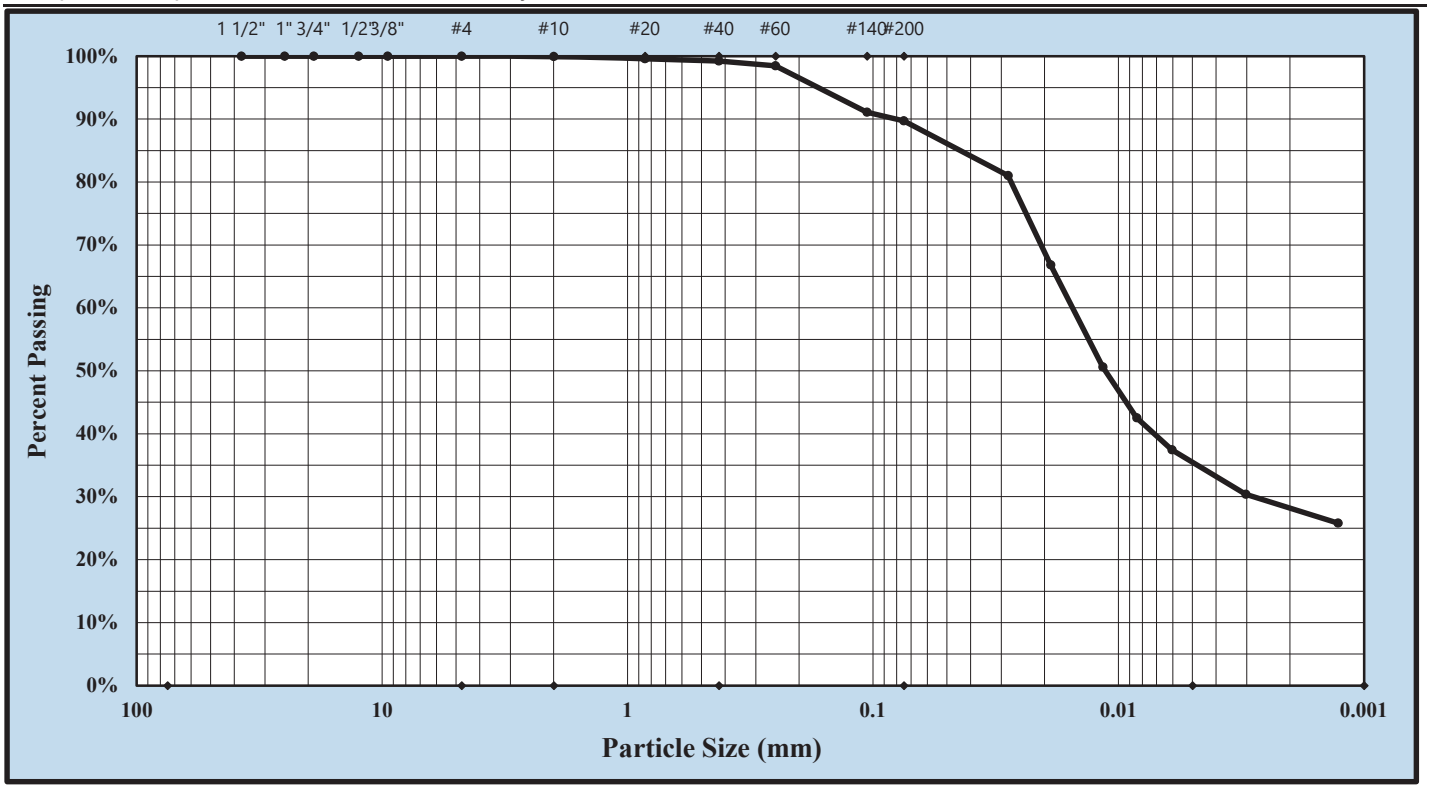
Form No. TR-D422-2
Revision No. 2LEXa
Revision Date: 09/02/20

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/23/20 - 11/26/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
Type:	Bulk Sample No.: P-9	Sample Date:	11/16/20
Location:	B-11	Depth (ft.):	0.0 - 1.0
Sample Description:	Dark brown Lean clay		CL



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	No. 40	Gravel:	0.0%	Silt Size:	54.2%
Silt & Clay (% Passing #200):	89.7%	Total Sand:	10.3%	Clay Size:	35.5%
Apparent Relative Density:	2.682	Moisture Content:	20.9%		
Liquid Limit:	36	Plastic Limit:	20	Plastic Index:	16
Coarse Sand:	0.1%	Medium Sand:	0.7%	Fine Sand:	9.5%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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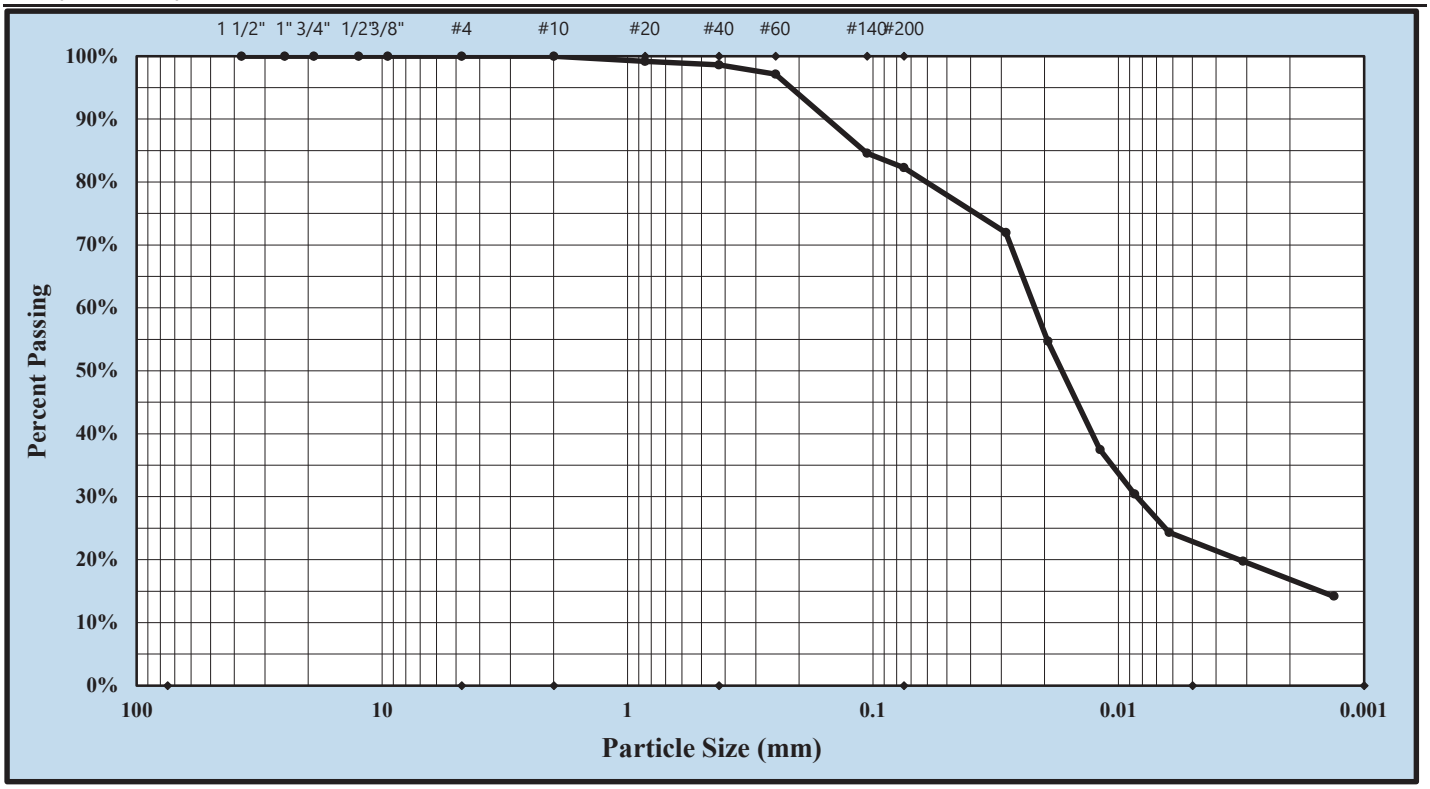
Form No. TR-D422-2
Revision No. 2LEXc
Revision Date: 03/30/22

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/25/22
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Avenue South, Suite 1900, Nashville, TN		
Type:	Bulk	Sample Date:	04/20/22
Location:	B-11	Depth (ft.):	0.0 - 2.5
Sample Description:	LEAN CLAY WITH SAND (CL), red brown		



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	#20	Gravel:	0.0%	Silt Size:	59.4%
Silt & Clay (% Passing #200):	82.3%	Total Sand:	17.7%	Clay Size:	22.9%
Apparent Relative Density:	2.660	Moisture Content:	20.4%		
Liquid Limit:	30	Plastic Limit:	19	Plastic Index:	11
Coarse Sand:	0.0%	Medium Sand:	1.4%	Fine Sand:	16.3%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☐ Soft ☒ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Lab Services Manager	5/2/2022
Technical Responsibility	*Signature*	*Position*	*Date*

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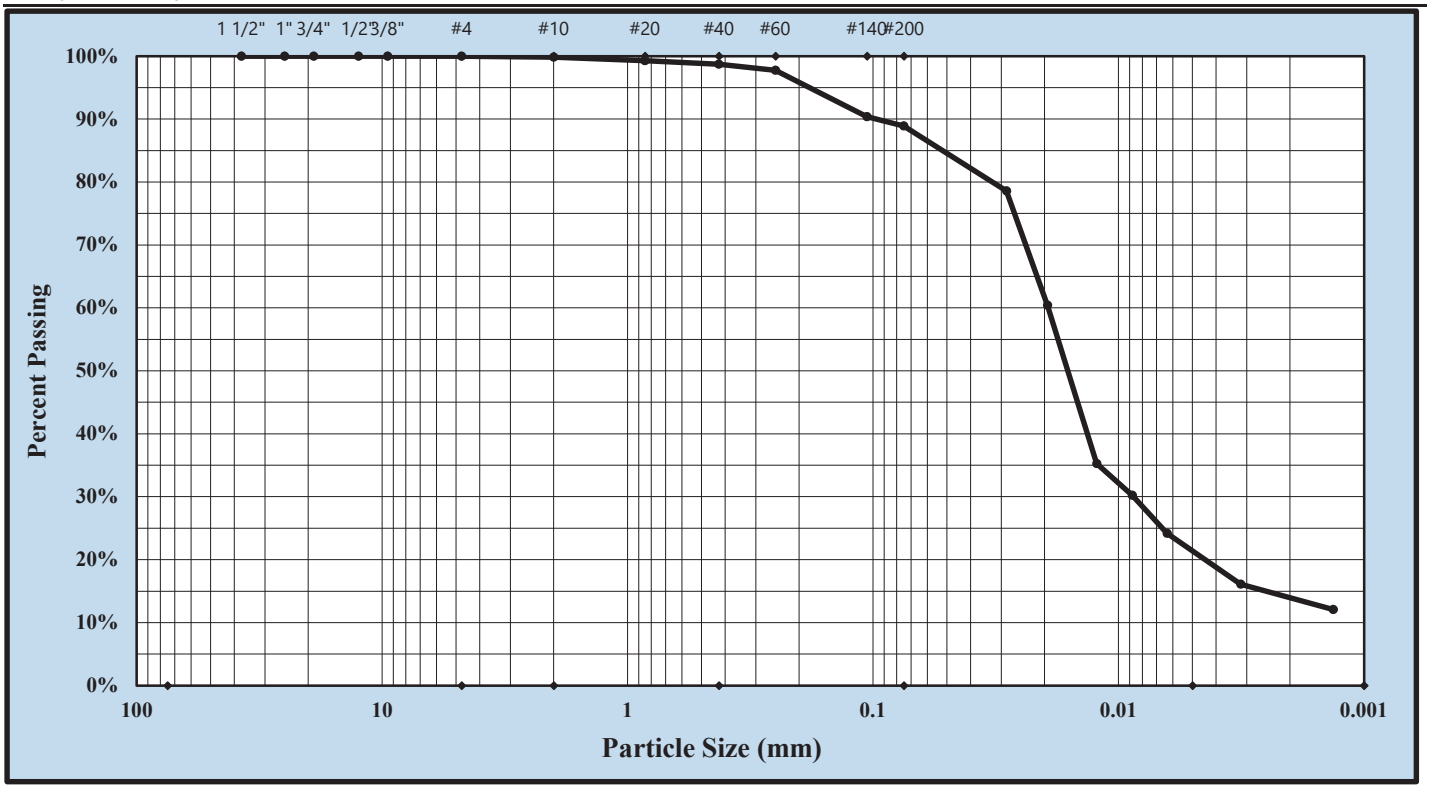
Form No. TR-D422-2
Revision No. 2LEXa
Revision Date: 09/02/20

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/23/20 - 11/26/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
Type:	Bulk Sample No.: P-10	Sample Date:	11/16/20
Location:	B-12	Depth (ft.):	0.0 - 1.0
Sample Description:	Dark brown Silt		ML



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	No. 20	Gravel:	0.0%	Silt Size:	67.5%
Silt & Clay (% Passing #200):	88.9%	Total Sand:	11.1%	Clay Size:	21.4%
Apparent Relative Density:	2.662	Moisture Content:	22.8%		
Liquid Limit:	28	Plastic Limit:	23	Plastic Index:	5
Coarse Sand:	0.2%	Medium Sand:	1.1%	Fine Sand:	9.8%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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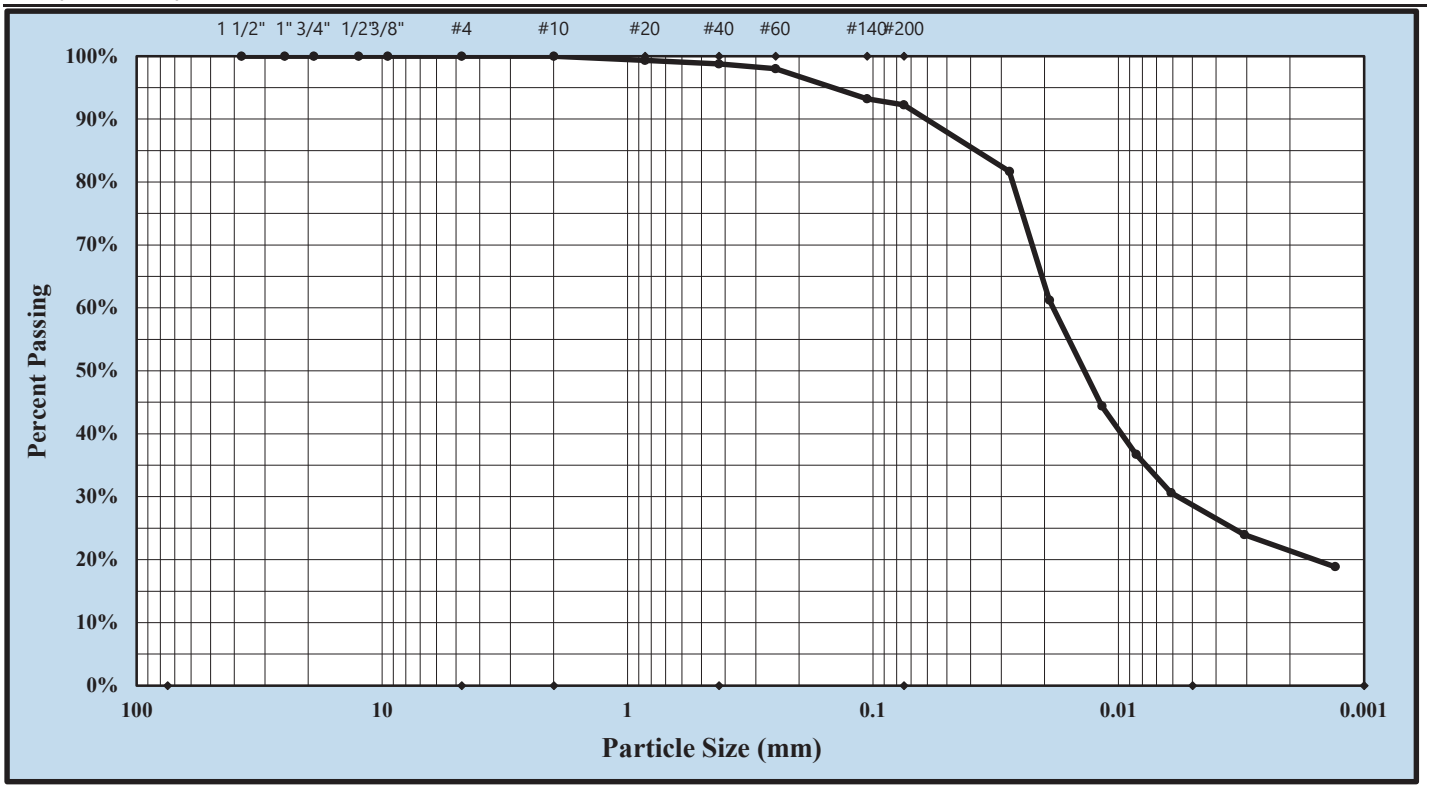
Form No. TR-D422-2
Revision No. 2LEXc
Revision Date: 03/30/22

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/25/22
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Avenue South, Suite 1900, Nashville, TN		
Type:	Bulk	Sample Date:	04/20/22
Location:	B-12	Depth (ft.):	0.0 - 2.5
Sample Description:	LEAN CLAY (CL), red brown		



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	#20	Gravel:	0.0%	Silt Size:	63.6%
Silt & Clay (% Passing #200):	92.3%	Total Sand:	7.7%	Clay Size:	28.7%
Apparent Relative Density:	2.663	Moisture Content:	21.9%		
Liquid Limit:	33	Plastic Limit:	19	Plastic Index:	14
Coarse Sand:	0.0%	Medium Sand:	1.2%	Fine Sand:	6.5%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☐ Soft ☒ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Lab Services Manager	5/2/2022
Technical Responsibility	*Signature*	*Position*	*Date*

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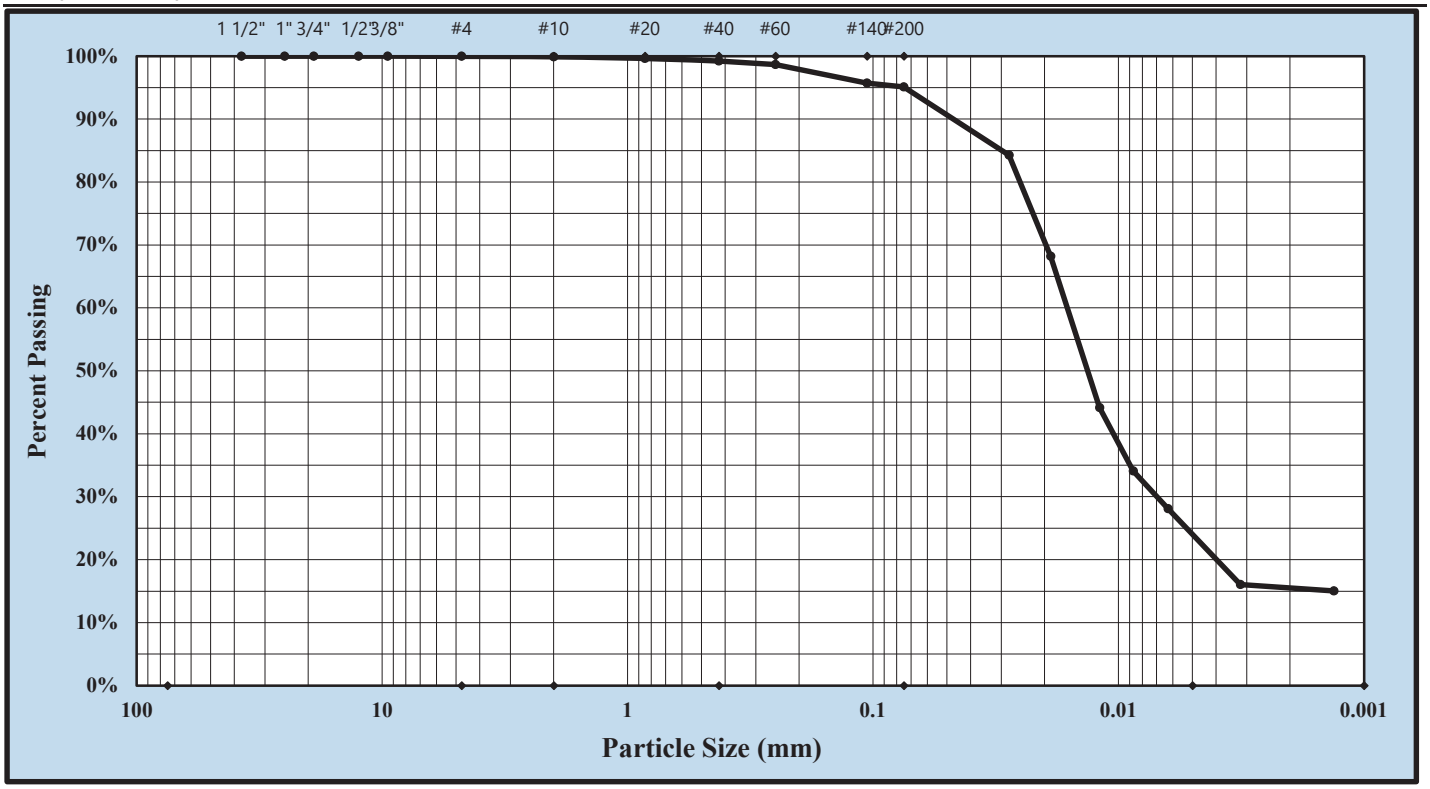
Form No. TR-D422-2
Revision No. 2LEXa
Revision Date: 09/02/20

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/23/20 - 11/26/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
Type:	Bulk	Sample No.: P-11	Sample Date: 11/16/20
Location:	B-14	Depth (ft.):	0.0 - 1.0
Sample Description:	Brown Silt		ML



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	No. 40	Gravel:	0.0%	Silt Size:	71.0%
Silt & Clay (% Passing #200):	95.1%	Total Sand:	4.9%	Clay Size:	24.1%
Apparent Relative Density:	2.654	Moisture Content:	26.8%		
Liquid Limit:	32	Plastic Limit:	25	Plastic Index:	7
Coarse Sand:	0.1%	Medium Sand:	0.7%	Fine Sand:	4.1%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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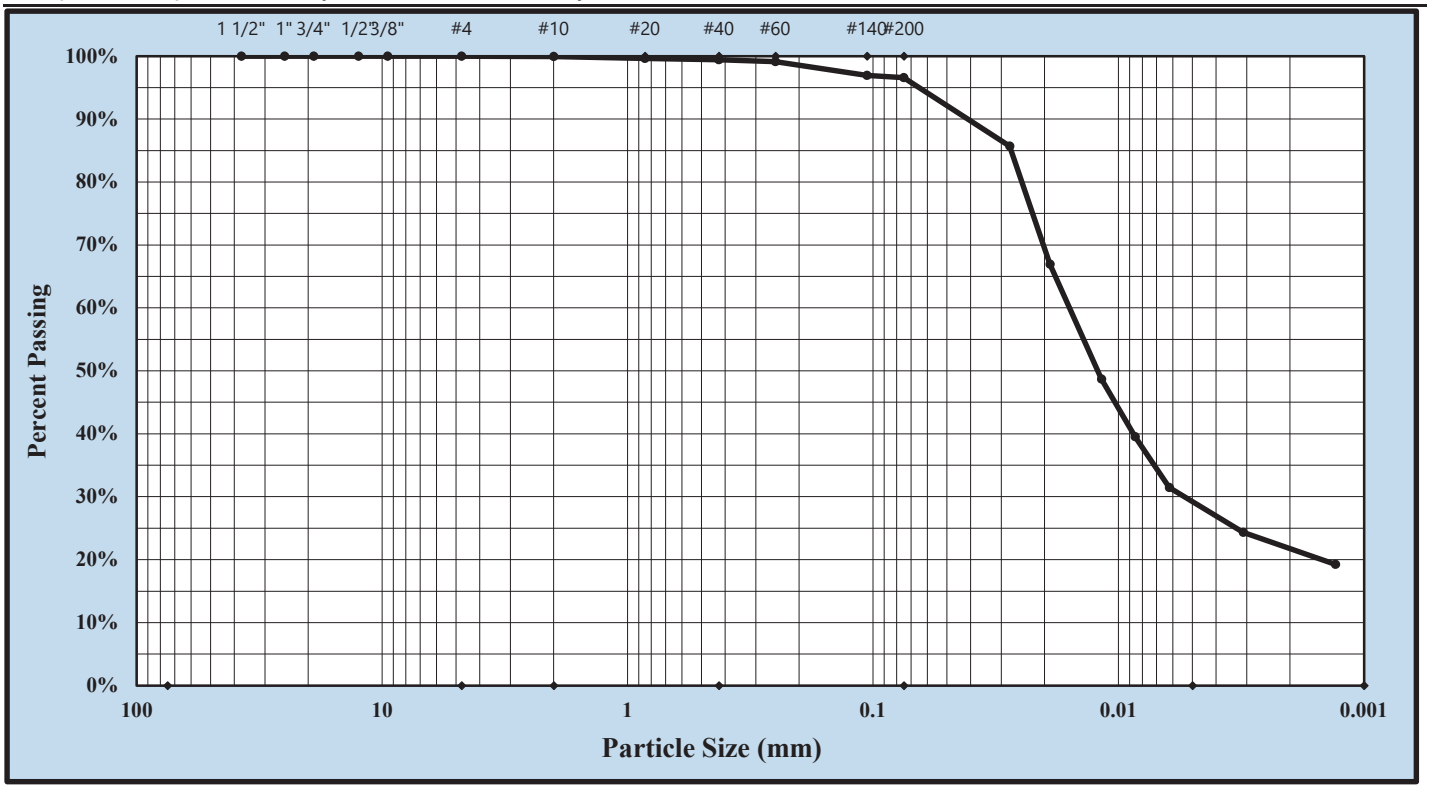
Form No. TR-D422-2
Revision No. 2LEXa
Revision Date: 09/02/20

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/23/20 - 11/26/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
Type:	Bulk Sample No.: P-12	Sample Date:	11/16/20
Location:	B-16	Depth (ft.):	0.0 - 1.0
Sample Description:	Very dark brown Lean clay		CL



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	No. 60	Gravel:	0.0%	Silt Size:	67.4%
Silt & Clay (% Passing #200):	96.6%	Total Sand:	3.4%	Clay Size:	29.2%
Apparent Relative Density:	2.662	Moisture Content:	21.5%		
Liquid Limit:	34	Plastic Limit:	23	Plastic Index:	11
Coarse Sand:	0.1%	Medium Sand:	0.5%	Fine Sand:	2.8%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D422-2
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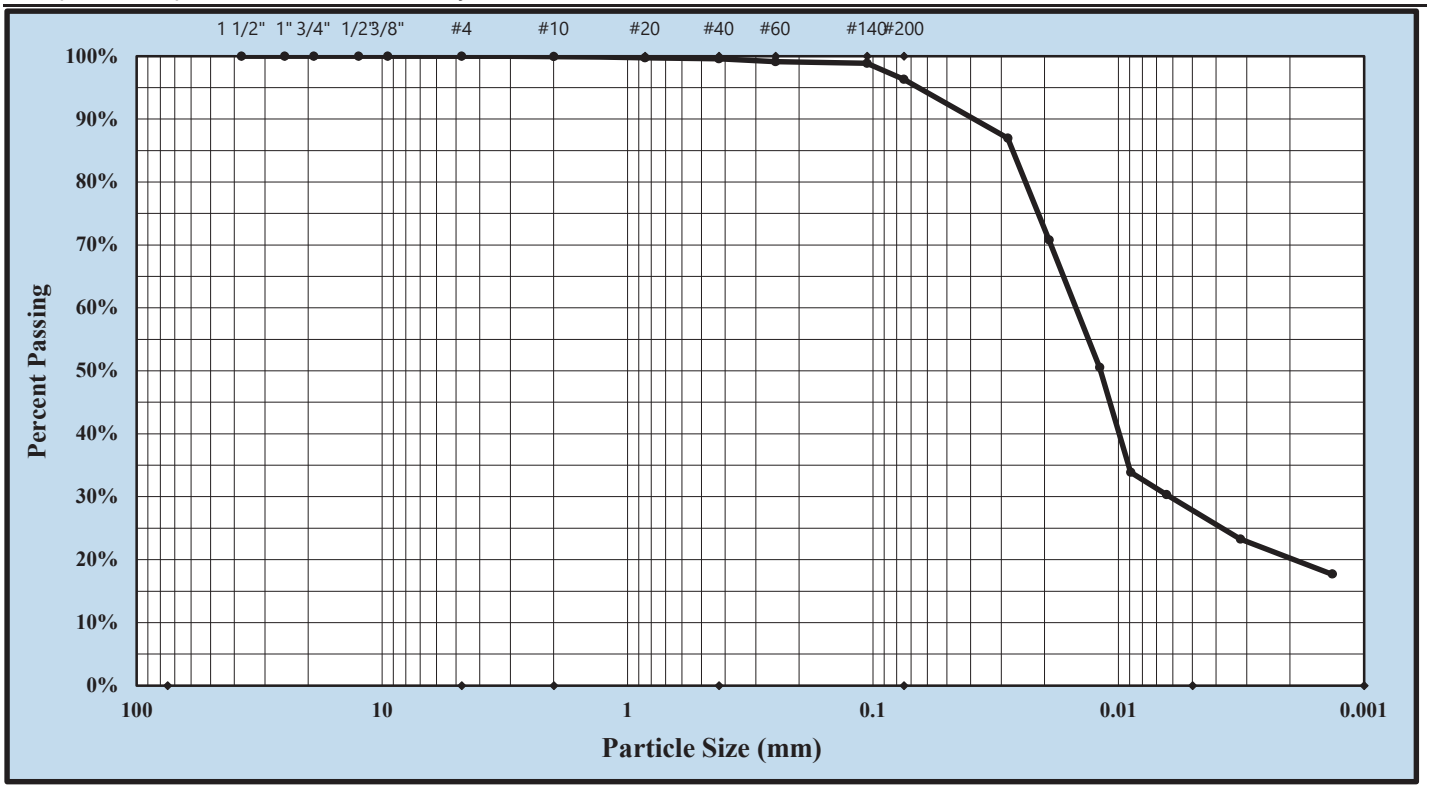
Revision Date: 09/02/20

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/23/20 - 11/26/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
Type:	Bulk Sample No.: P-13	Sample Date:	11/16/20
Location:	B-17	Depth (ft.):	0.0 - 1.0
Sample Description:	Brown Lean clay		CL



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	No. 60	Gravel:	0.0%	Silt Size:	68.5%
Silt & Clay (% Passing #200):	96.3%	Total Sand:	3.7%	Clay Size:	27.9%
Apparent Relative Density:	2.582	Moisture Content:	24.6%		
Liquid Limit:	32	Plastic Limit:	23	Plastic Index:	9
Coarse Sand:	0.1%	Medium Sand:	0.3%	Fine Sand:	3.3%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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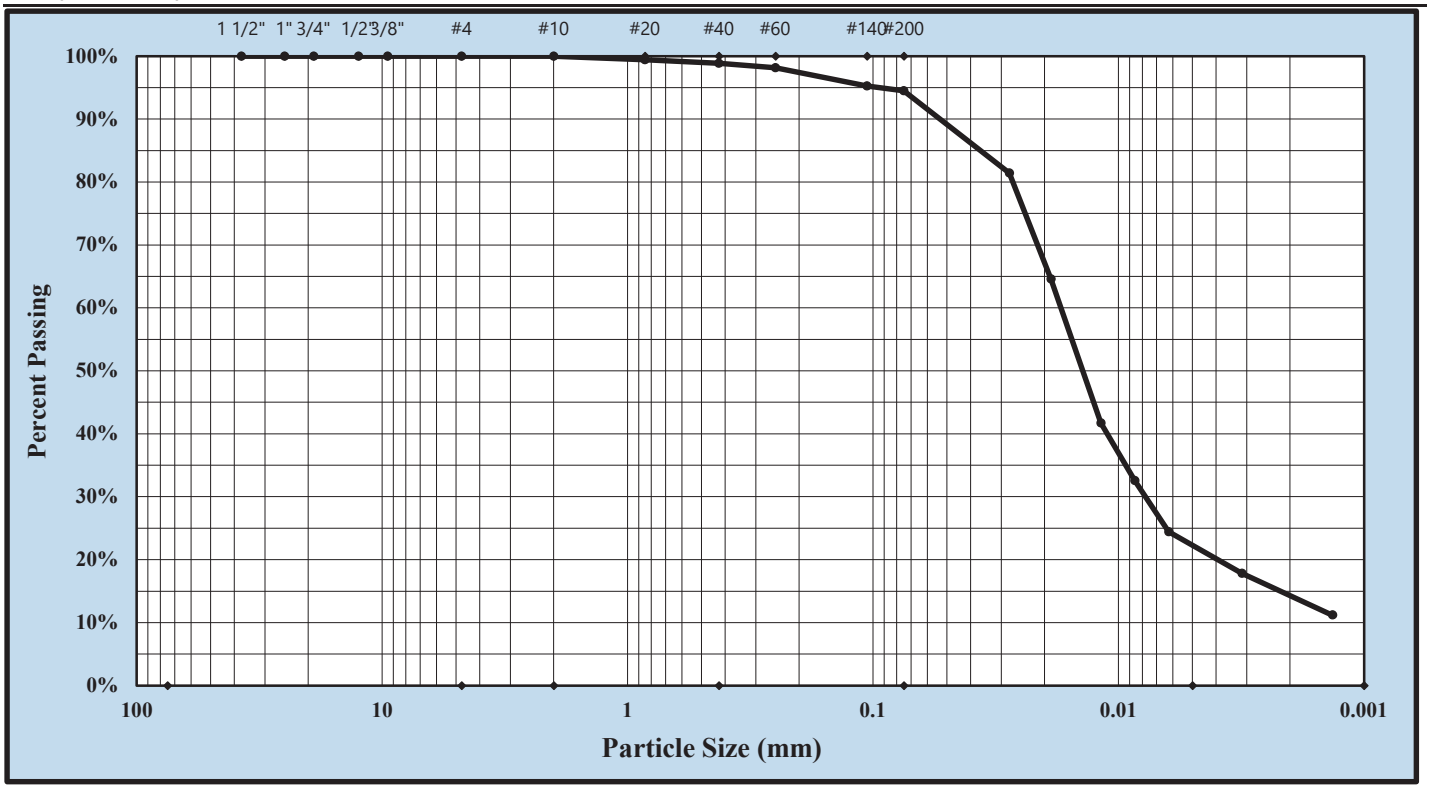
Form No. TR-D422-2
Revision No. 2LEXc
Revision Date: 03/30/22

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/25/22
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Avenue South, Suite 1900, Nashville, TN		
Type:	Bulk	Sample Date:	04/20/22
Location:	B-17	Depth (ft.):	0.0 - 2.5
Sample Description:	LEAN CLAY (CL), brown		



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	#20	Gravel:	0.0%	Silt Size:	72.2%
Silt & Clay (% Passing #200):	94.5%	Total Sand:	5.5%	Clay Size:	22.3%
Apparent Relative Density:	2.647	Moisture Content:	27.8%		
Liquid Limit:	34	Plastic Limit:	23	Plastic Index:	11
Coarse Sand:	0.0%	Medium Sand:	1.1%	Fine Sand:	4.4%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☐ Soft ☒ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Lab Services Manager	5/2/2022
Technical Responsibility	*Signature*	*Position*	*Date*

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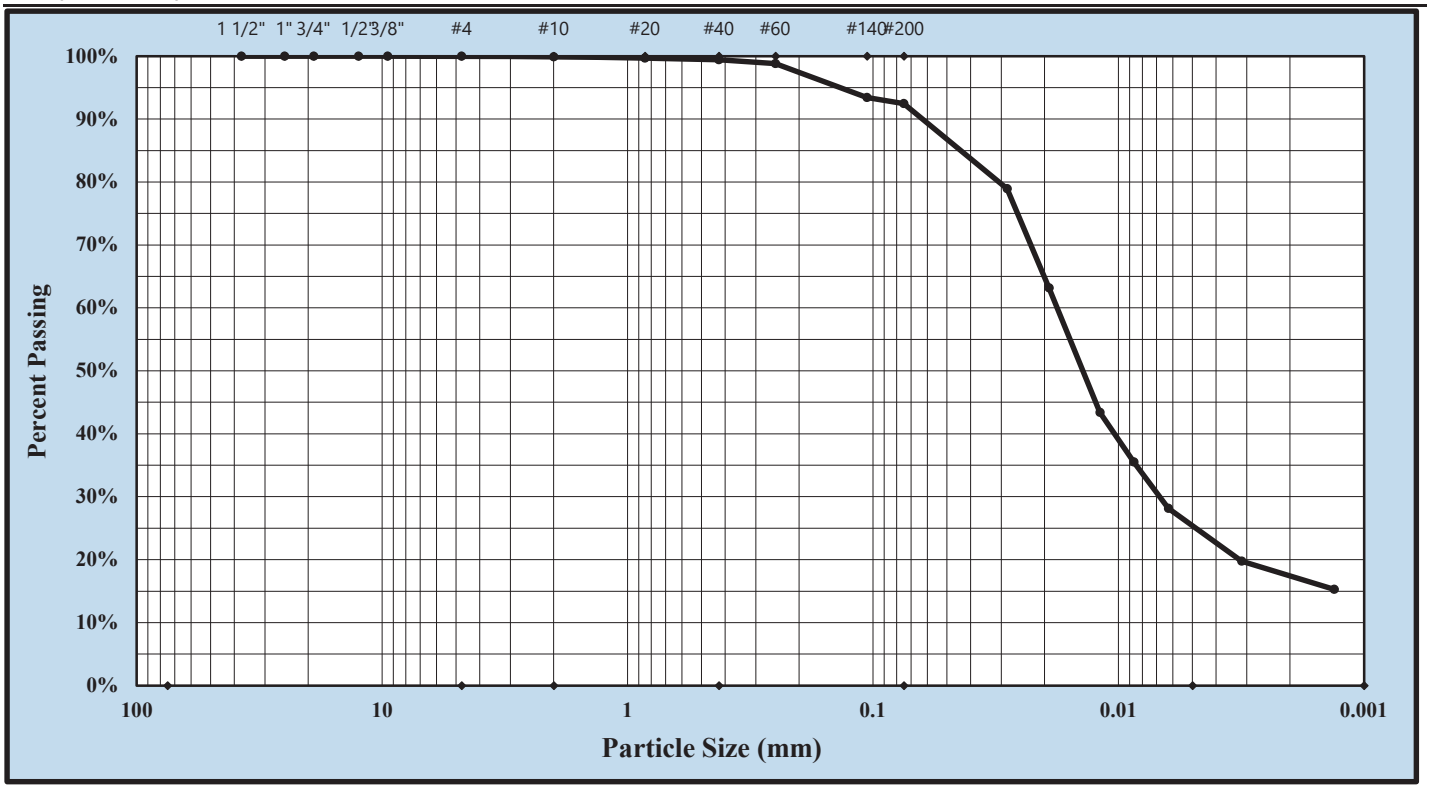
Form No. TR-D422-2
Revision No. 2LEXa
Revision Date: 09/02/20

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/23/20 - 11/26/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
Type:	Bulk Sample No.: P-14	Sample Date:	11/16/20
Location:	B-18	Depth (ft.):	0.0 - 1.0
Sample Description:	Dark brown Silt		ML



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	No. 40	Gravel:	0.0%	Silt Size:	67.1%
Silt & Clay (% Passing #200):	92.5%	Total Sand:	7.5%	Clay Size:	25.4%
Apparent Relative Density:	2.656	Moisture Content:	24.5%		
Liquid Limit:	33	Plastic Limit:	24	Plastic Index:	9
Coarse Sand:	0.1%	Medium Sand:	0.5%	Fine Sand:	7.0%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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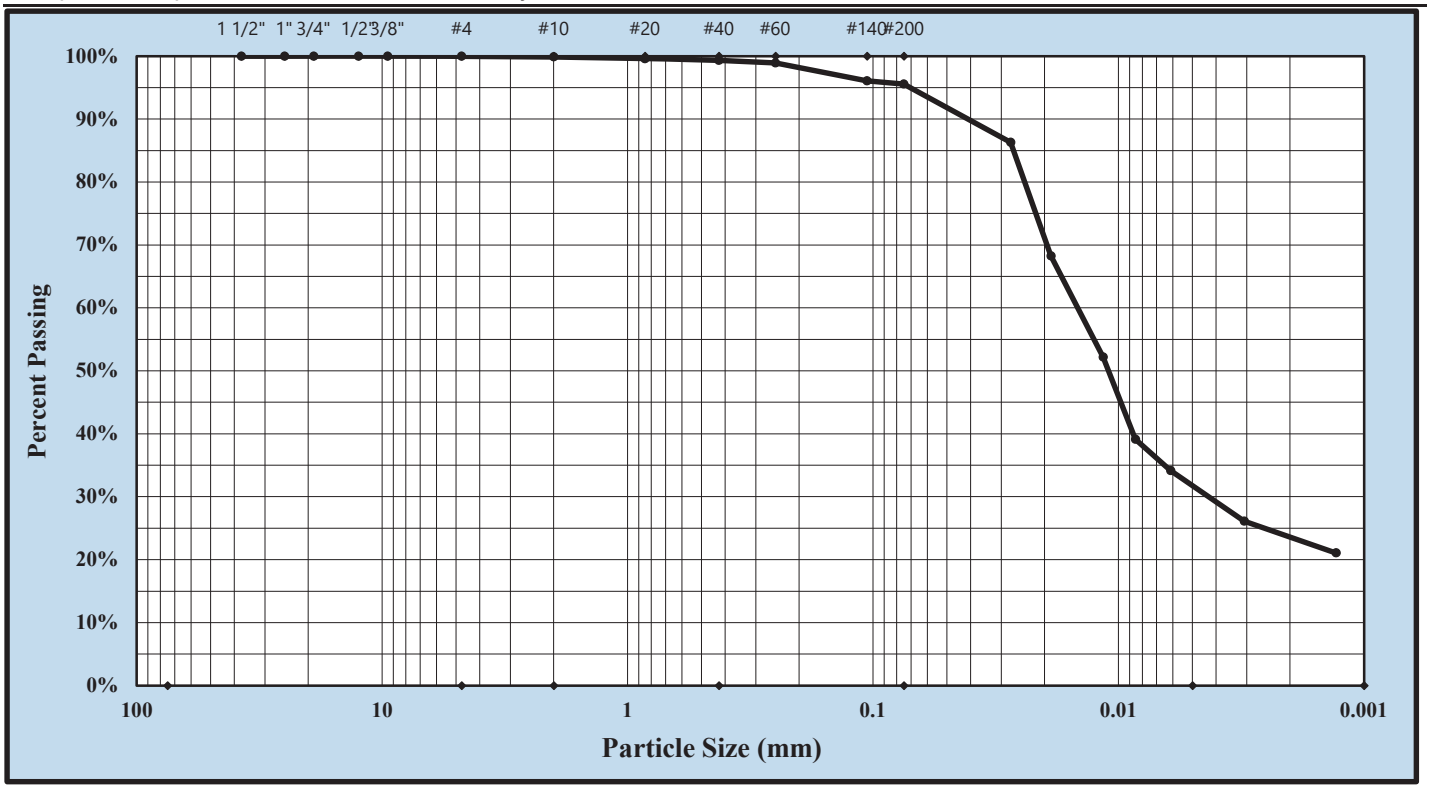
Form No. TR-D422-2
Revision No. 2LEXa
Revision Date: 09/02/20

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/23/20 - 11/26/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
Type:	Bulk	Sample No.: P-15	Sample Date: 11/16/20
Location:	B-19	Depth (ft.):	0.0 - 1.0
Sample Description:	Dark brown Lean clay		CL



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	No. 40	Gravel:	0.0%	Silt Size:	63.8%
Silt & Clay (% Passing #200):	95.5%	Total Sand:	4.5%	Clay Size:	31.7%
Apparent Relative Density:	2.671	Moisture Content:	25.4%		
Liquid Limit:	35	Plastic Limit:	24	Plastic Index:	11
Coarse Sand:	0.1%	Medium Sand:	0.6%	Fine Sand:	3.8%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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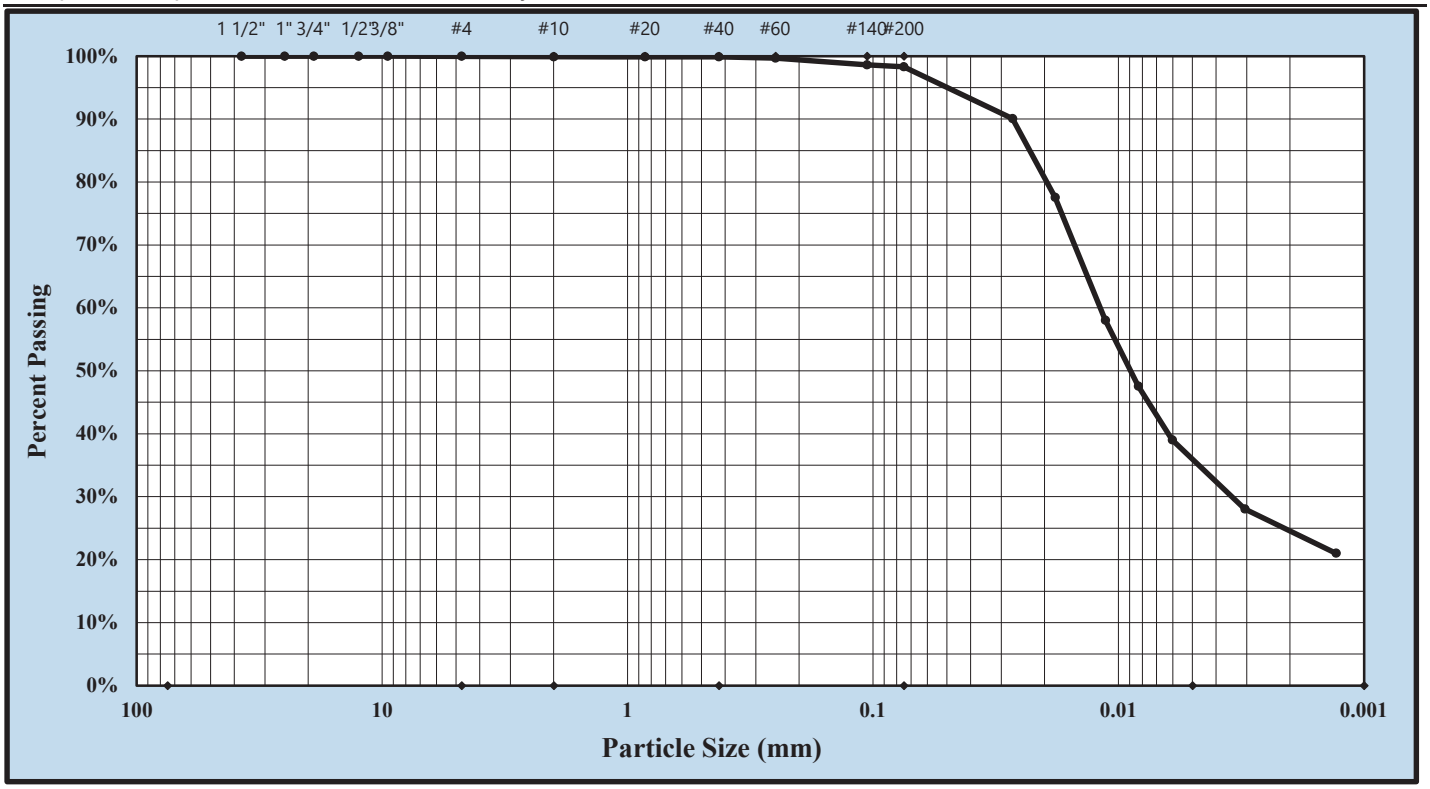
Form No. TR-D422-2
Revision No. 2LEXa
Revision Date: 09/02/20

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/23/20 - 11/26/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
Type:	Bulk Sample No.: P-16	Sample Date:	11/16/20
Location:	B-20	Depth (ft.):	0.0 - 1.0
Sample Description:	Dark brown Lean clay		CL



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	No. 60	Gravel:	0.0%	Silt Size:	62.3%
Silt & Clay (% Passing #200):	98.3%	Total Sand:	1.7%	Clay Size:	36.0%
Apparent Relative Density:	2.669	Moisture Content:	25.0%		
Liquid Limit:	37	Plastic Limit:	23	Plastic Index:	14
Coarse Sand:	0.1%	Medium Sand:	0.0%	Fine Sand:	1.5%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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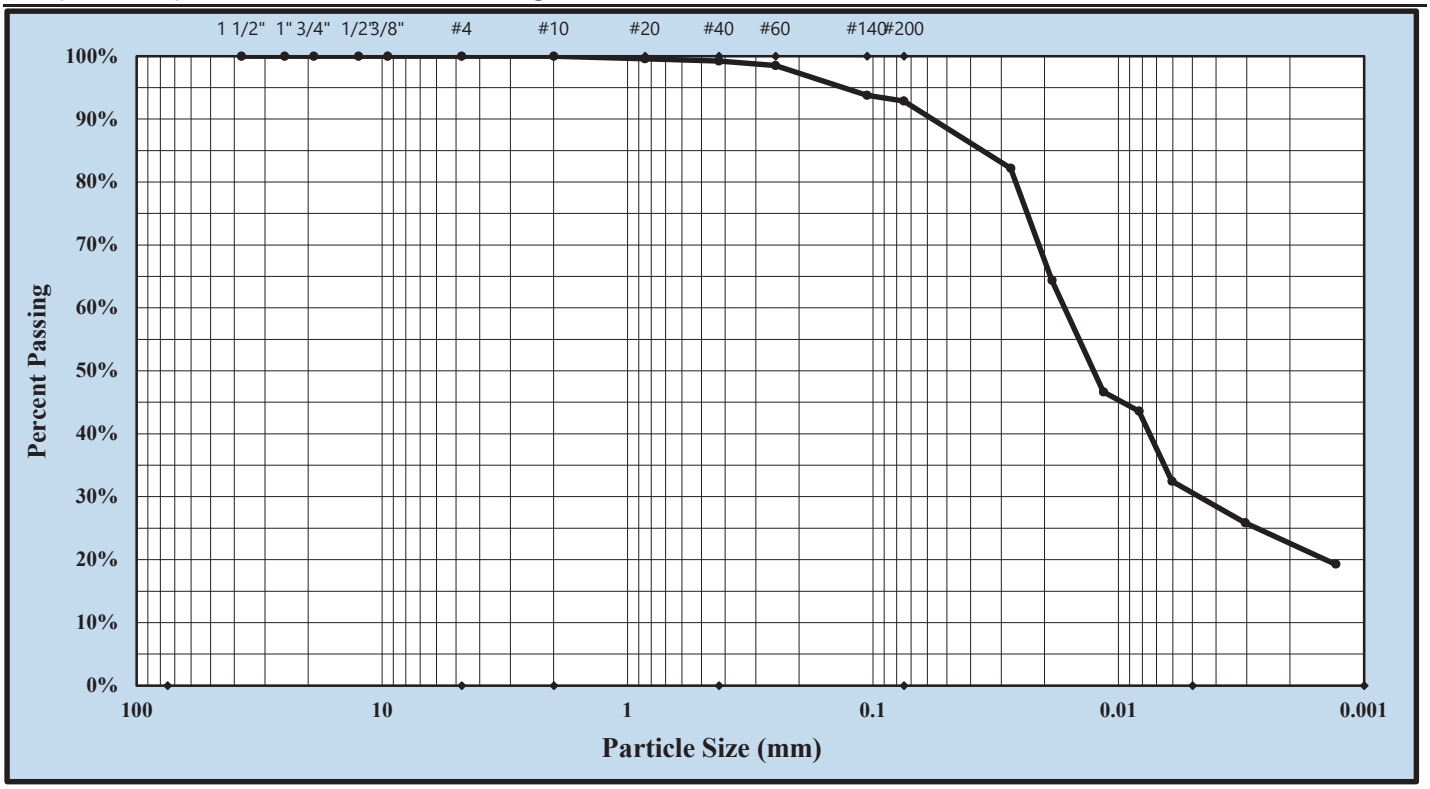
Form No. TR-D422-2
Revision No. 2LEXc
Revision Date: 03/30/22

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D422

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/25/22
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Avenue South, Suite 1900, Nashville, TN		
Type:	Bulk	Sample Date:	04/20/22
Location:	B-20	Depth (ft.):	0.0 - 2.5
Sample Description:	LEAN CLAY (CL), orange brown		



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt Size	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay Size	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Nom. Maximum Particle Size:	#40	Gravel:	0.0%	Silt Size:	62.2%
Silt & Clay (% Passing #200):	92.9%	Total Sand:	7.1%	Clay Size:	30.6%
Apparent Relative Density:	2.673	Moisture Content:	22.1%		
Liquid Limit:	32	Plastic Limit:	19	Plastic Index:	13
Coarse Sand:	0.0%	Medium Sand:	0.8%	Fine Sand:	6.4%

Description of Sand and Gravel: Rounded ☐ Angular ☒ Hard & Durable ☐ Soft ☒ Weathered & Friable ☐

Mechanical Stirring Apparatus A: Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References / Comments / Deviations:

Jacob Folsom	Jacob Folsom	Lab Services Manager	5/2/2022
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXb
Revision Date: 09/02/20

MOISTURE - DENSITY REPORT

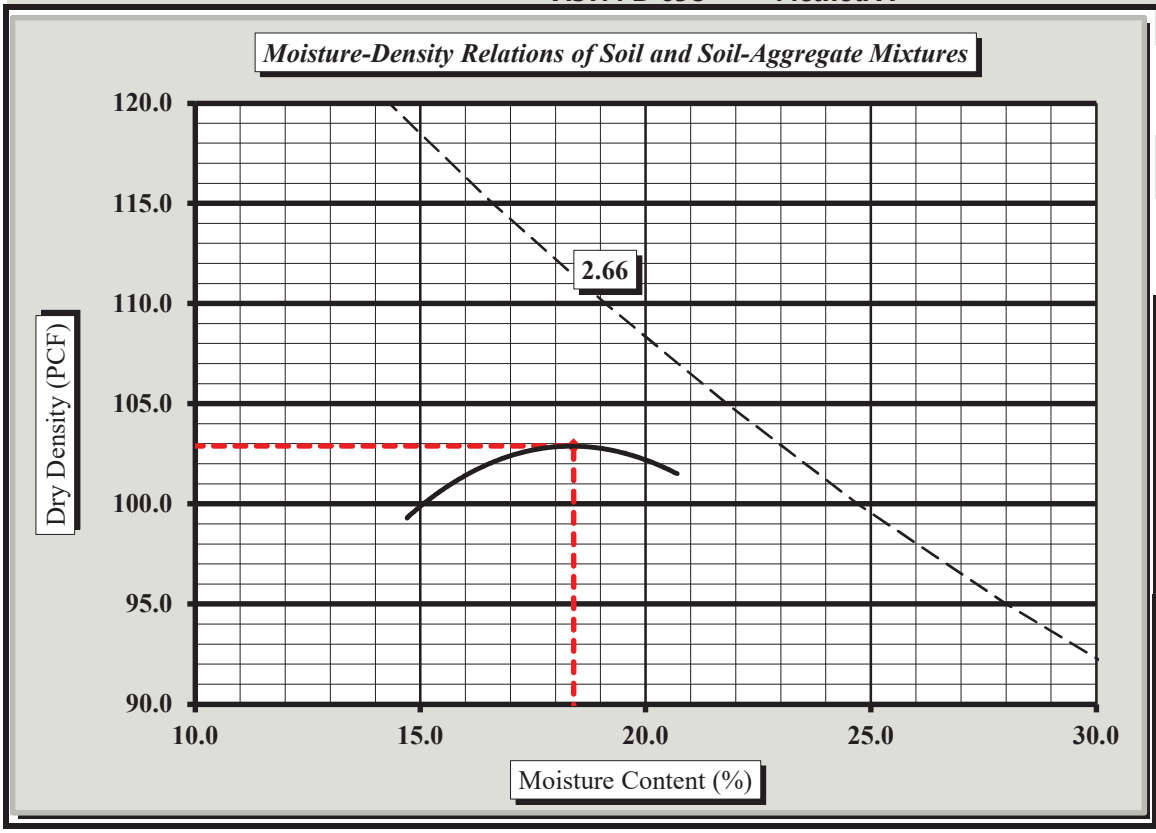
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/20/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
	Sample No.: P-1	Sample Date:	11/16/20
Location:	B-01	Depth (ft.):	0.0 - 1.0
Sample Description:	Strong brown Lean clay		CL

Maximum Dry Density 102.9 PCF. Optimum Moisture Content 18.4%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	22.8%
Specific Gravity of Soil	2.666
Liquid Limit	34
Plastic Limit	22
Plastic Index	12

% Passing	
3/4"	100.0%
3/8"	100.0%
#4	100.0%
#10	100.0%
#40	99.2%
#60	98.5%
#200	95.2%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	<5%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXe
Revision Date: 02/12/21

MOISTURE - DENSITY REPORT

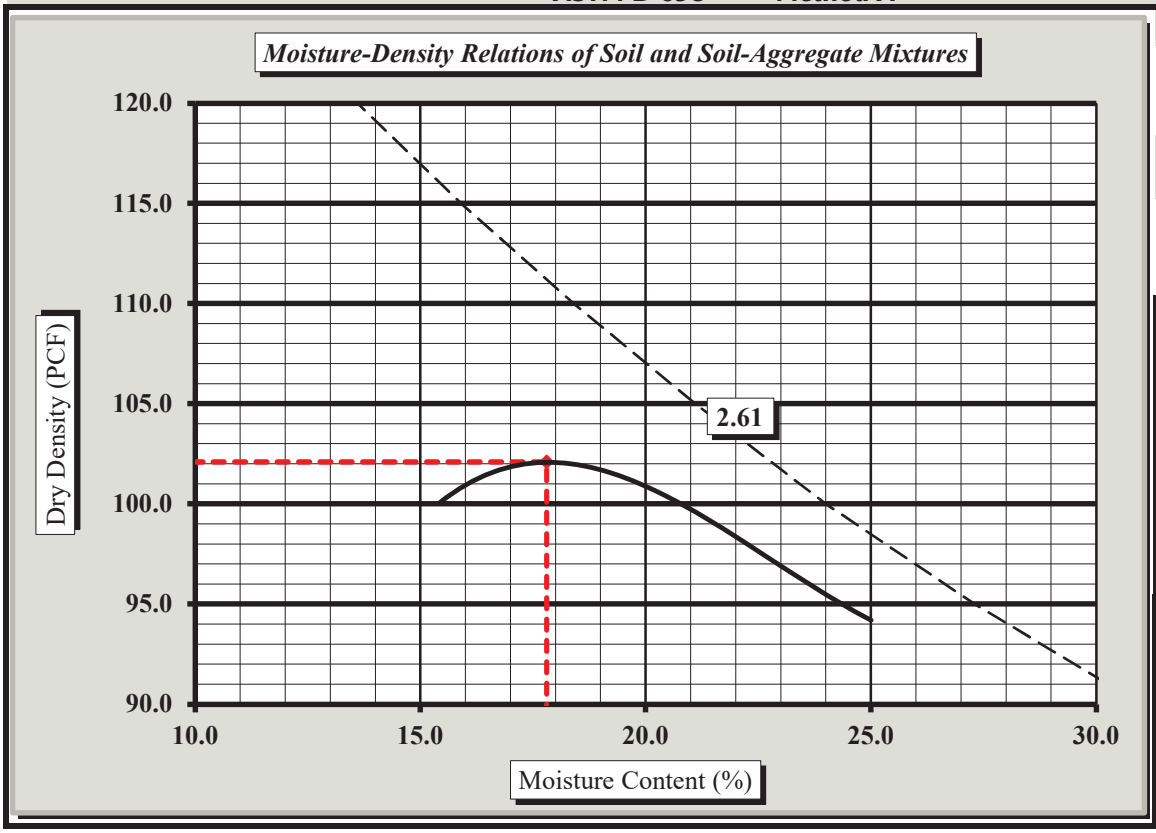
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/23/22
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Avenue South, Suite 1900, Nashville, TN 37201		
		Sample Date:	04/20/22
Location:	B-01	Depth (ft.):	0.0 - 2.5
Sample Description:	SILT (ML), brown		

Maximum Dry Density 102.1 PCF. Optimum Moisture Content 17.8%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	21.3%
Specific Gravity of Soil:	2.612
Liquid Limit	39
Plastic Limit	26
Plastic Index	13

% Passing	
3/4"	100%
3/8"	100%
#4	100%
#10	100%
#40	98%
#60	97%
#200	92.2%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	0%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Lab Services Manager	5/2/2022
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXb
Revision Date: 09/02/20

MOISTURE - DENSITY REPORT

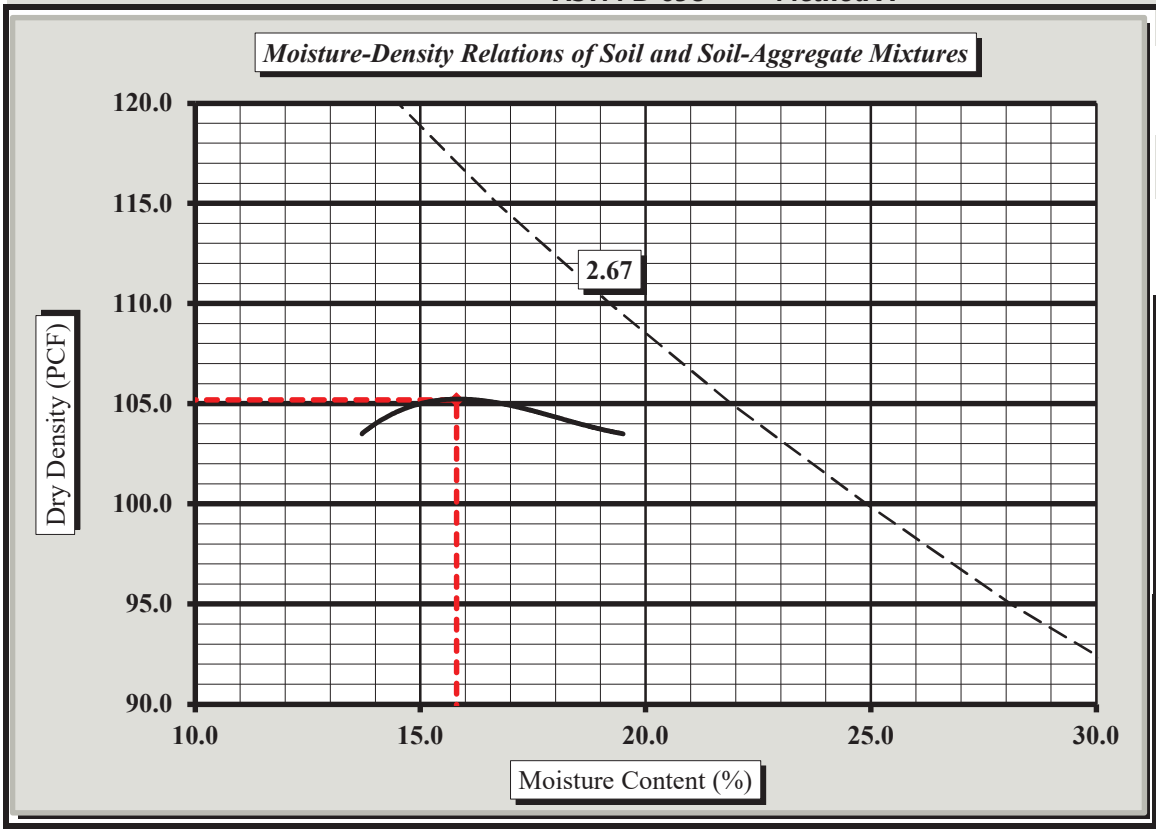
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/19/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
	Sample No.: P-2	Sample Date:	11/16/20
Location:	B-02	Depth (ft.):	0.0 - 1.0
Sample Description:	Dark yellowish brown Lean clay		CL

Maximum Dry Density 105.2 PCF. Optimum Moisture Content 15.8%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	22.3%
Specific Gravity of Soil	2.673
Liquid Limit	35
Plastic Limit	20
Plastic Index	15

% Passing	
3/4"	100.0%
3/8"	100.0%
#4	99.7%
#10	99.4%
#40	97.7%
#60	96.6%
#200	87.6%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	<5%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXb
Revision Date: 09/02/20

MOISTURE - DENSITY REPORT

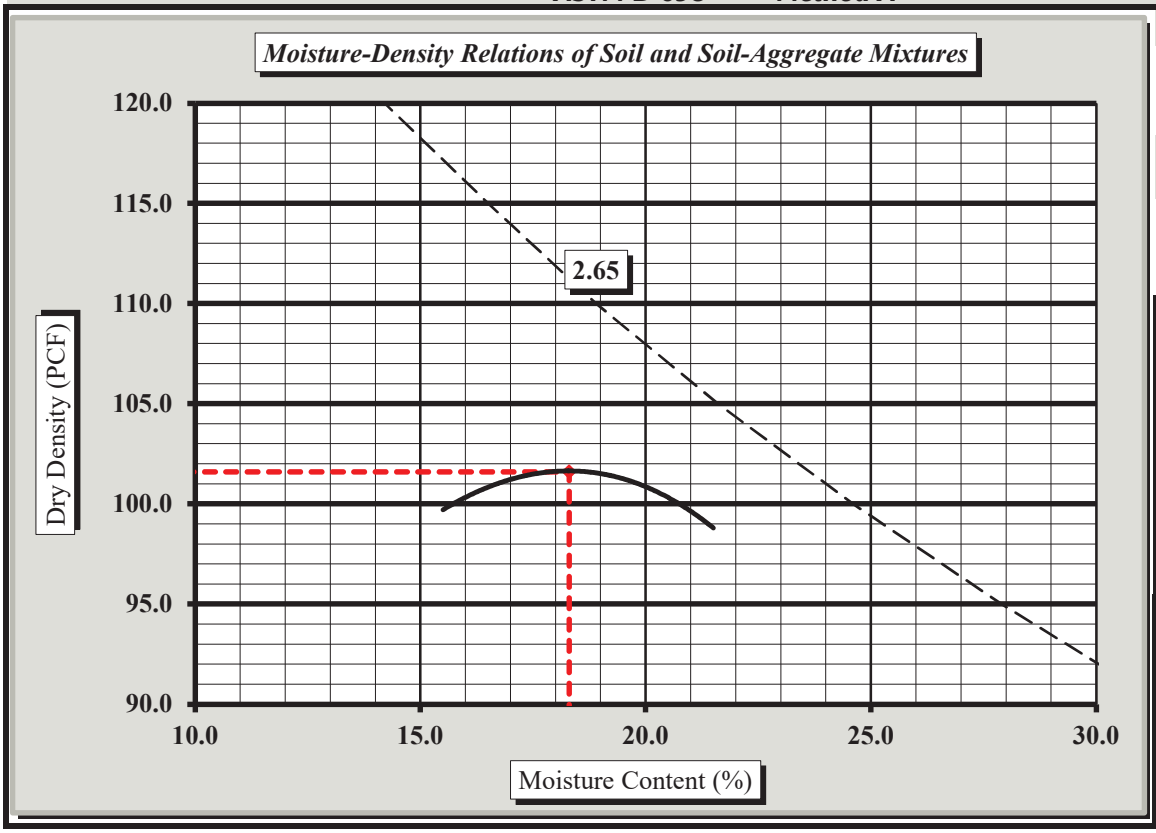
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/19/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
	Sample No.: P-3	Sample Date:	11/16/20
Location:	B-03	Depth (ft.):	0.0 - 1.0
Sample Description:	Strong brown Lean clay		CL

Maximum Dry Density 101.6 PCF. Optimum Moisture Content 18.3%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	22.1%
Specific Gravity of Soil	2.654
Liquid Limit	30
Plastic Limit	21
Plastic Index	9

% Passing	
3/4"	100.0%
3/8"	100.0%
#4	100.0%
#10	99.5%
#40	98.0%
#60	97.3%
#200	91.5%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	<5%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXe
Revision Date: 02/12/21

MOISTURE - DENSITY REPORT

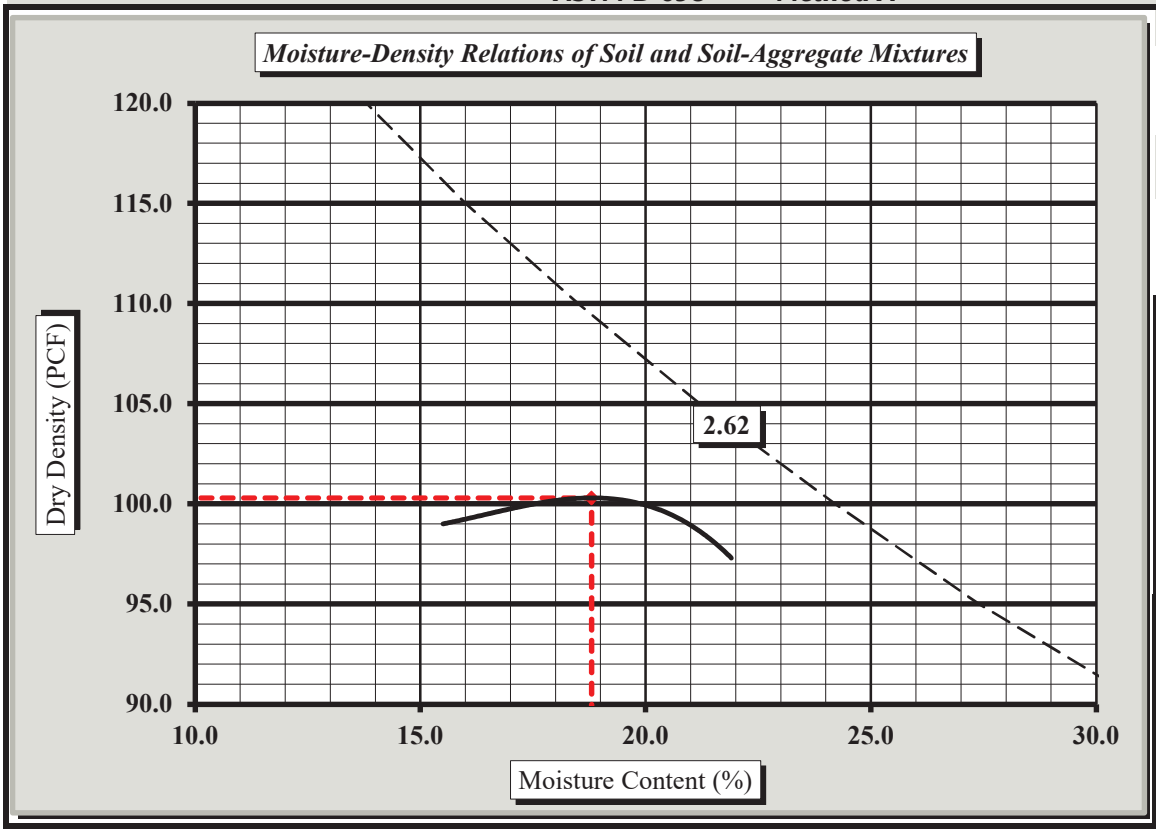
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/25/22
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Avenue South, Suite 1900, Nashville, TN 37201		
		Sample Date:	04/20/22
Location:	B-03	Depth (ft.):	0.0 - 2.5
Sample Description:	SILT (ML), brown		

Maximum Dry Density 100.3 PCF. Optimum Moisture Content 18.8%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	35.6%
Specific Gravity of Soil:	2.621
Liquid Limit	33
Plastic Limit	24
Plastic Index	9

% Passing	
3/4"	100%
3/8"	100%
#4	100%
#10	100%
#40	97%
#60	96%
#200	91.2%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	0%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Lab Services Manager	5/2/2022
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXb
Revision Date: 09/02/20

MOISTURE - DENSITY REPORT

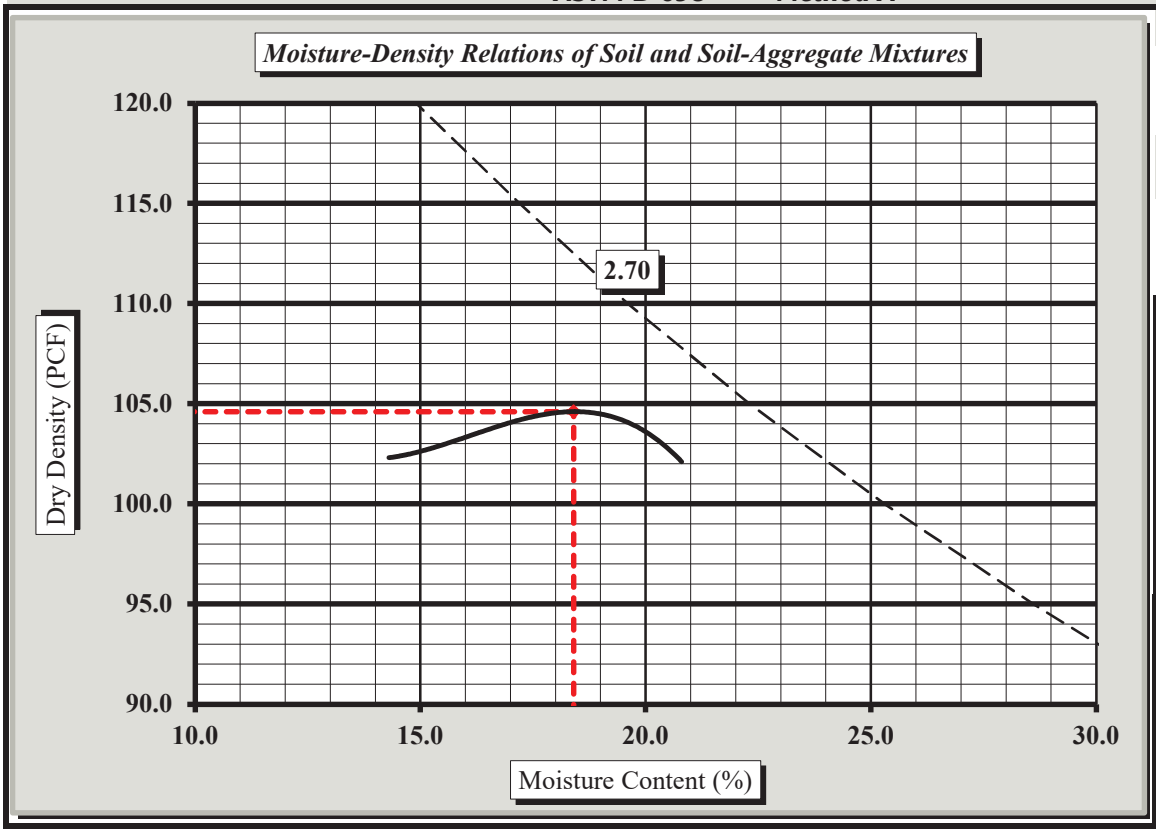
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/19/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
	Sample No.: P-4	Sample Date:	11/16/20
Location:	B-05	Depth (ft.):	0.0 - 1.0
Sample Description:	Brown Lean clay		CL

Maximum Dry Density 104.6 PCF. Optimum Moisture Content 18.4%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	23.3%
Specific Gravity of Soil	2.695
Liquid Limit	36
Plastic Limit	20
Plastic Index	16

% Passing	
3/4"	100.0%
3/8"	100.0%
#4	99.9%
#10	99.3%
#40	97.3%
#60	96.4%
#200	91.8%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	<5%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXe
Revision Date: 02/12/21

MOISTURE - DENSITY REPORT

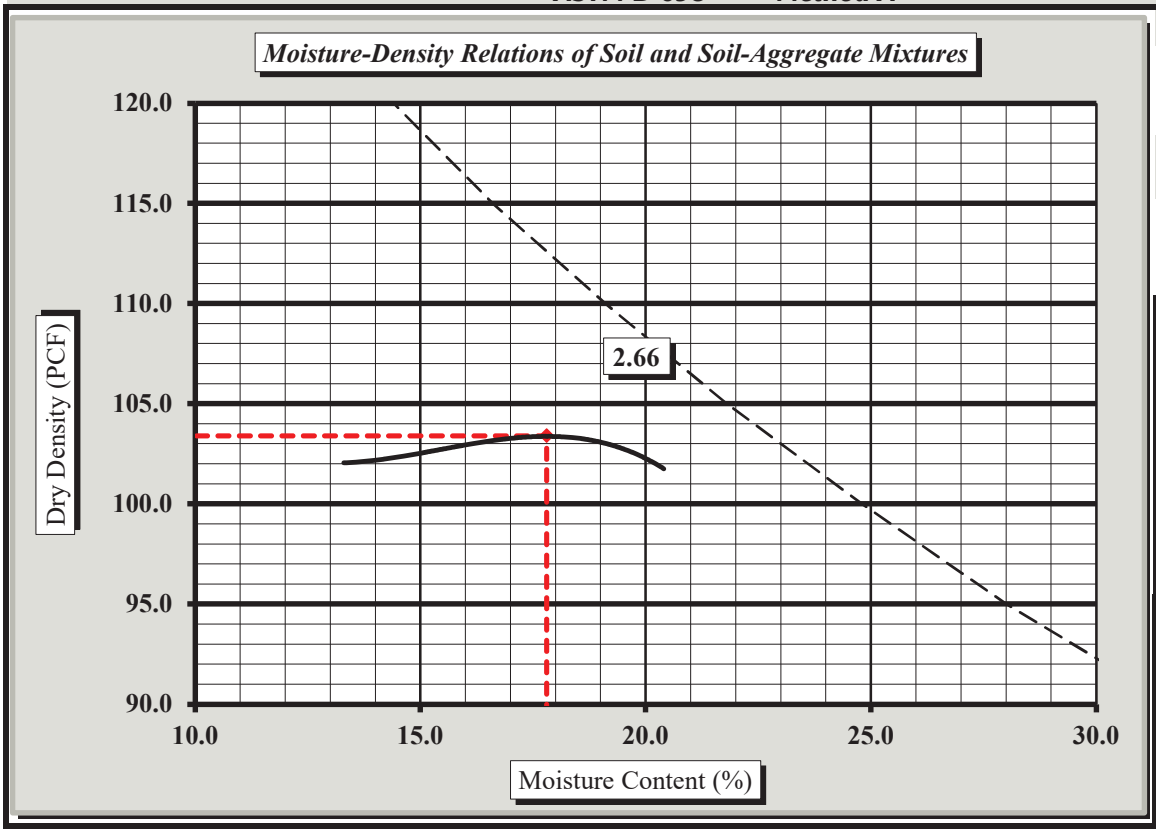
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/23/22
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Avenue South, Suite 1900, Nashville, TN 37201		
		Sample Date:	04/20/22
Location:	B-05	Depth (ft.):	0.0 - 2.5
Sample Description:	LEAN CLAY WITH SAND (CL), brown		

Maximum Dry Density 103.4 PCF. Optimum Moisture Content 17.8%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	21.7%
Specific Gravity of Soil:	2.662
Liquid Limit	33
Plastic Limit	22
Plastic Index	11

% Passing	
3/4"	100%
3/8"	100%
#4	100%
#10	97%
#40	91%
#60	90%
#200	81.5%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	0%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Lab Services Manager	5/2/2022
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXb
Revision Date: 09/02/20

MOISTURE - DENSITY REPORT

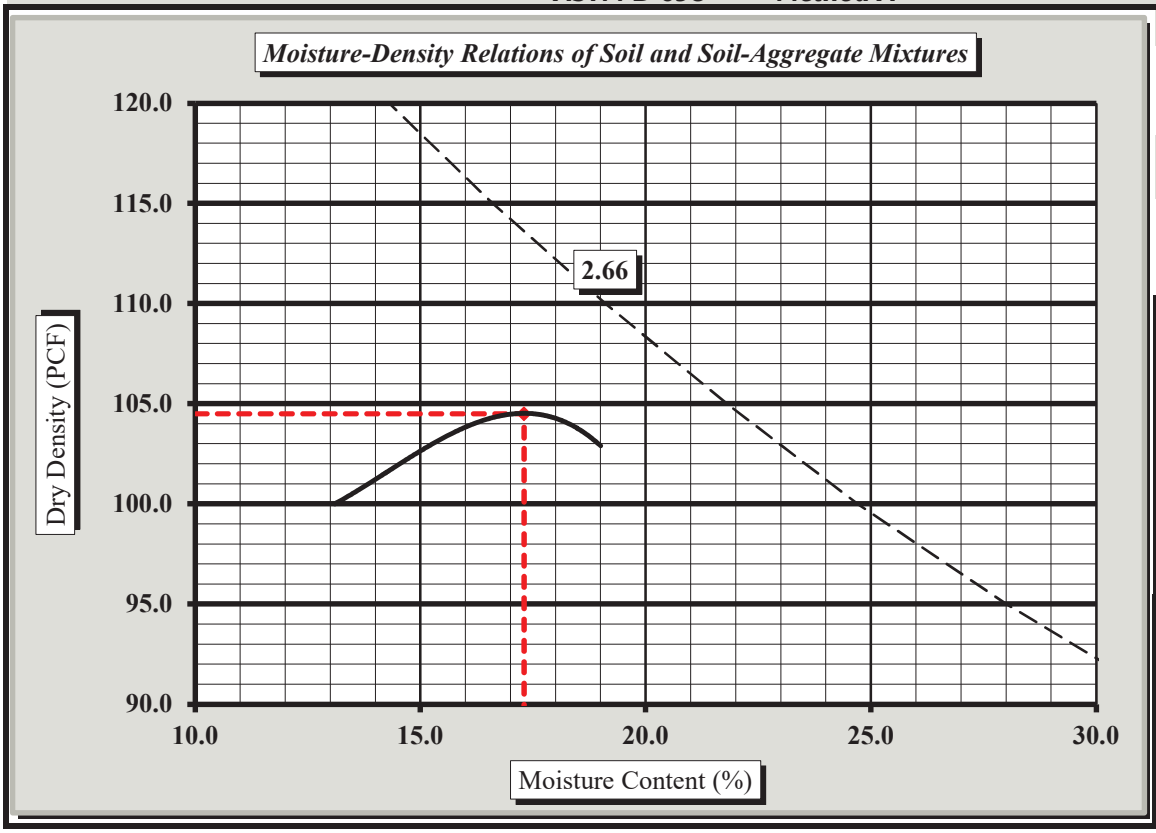
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/19/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
	Sample No.: P-5	Sample Date:	11/16/20
Location:	B-06	Depth (ft.):	0.0 - 1.0
Sample Description:	Strong brown Lean clay		CL

Maximum Dry Density 104.5 PCF. Optimum Moisture Content 17.3%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	22.6%
Specific Gravity of Soil	2.666
Liquid Limit	34
Plastic Limit	21
Plastic Index	13

% Passing	
3/4"	100.0%
3/8"	100.0%
#4	99.8%
#10	99.6%
#40	99.1%
#60	98.3%
#200	92.4%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	<5%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXb
Revision Date: 09/02/20

MOISTURE - DENSITY REPORT

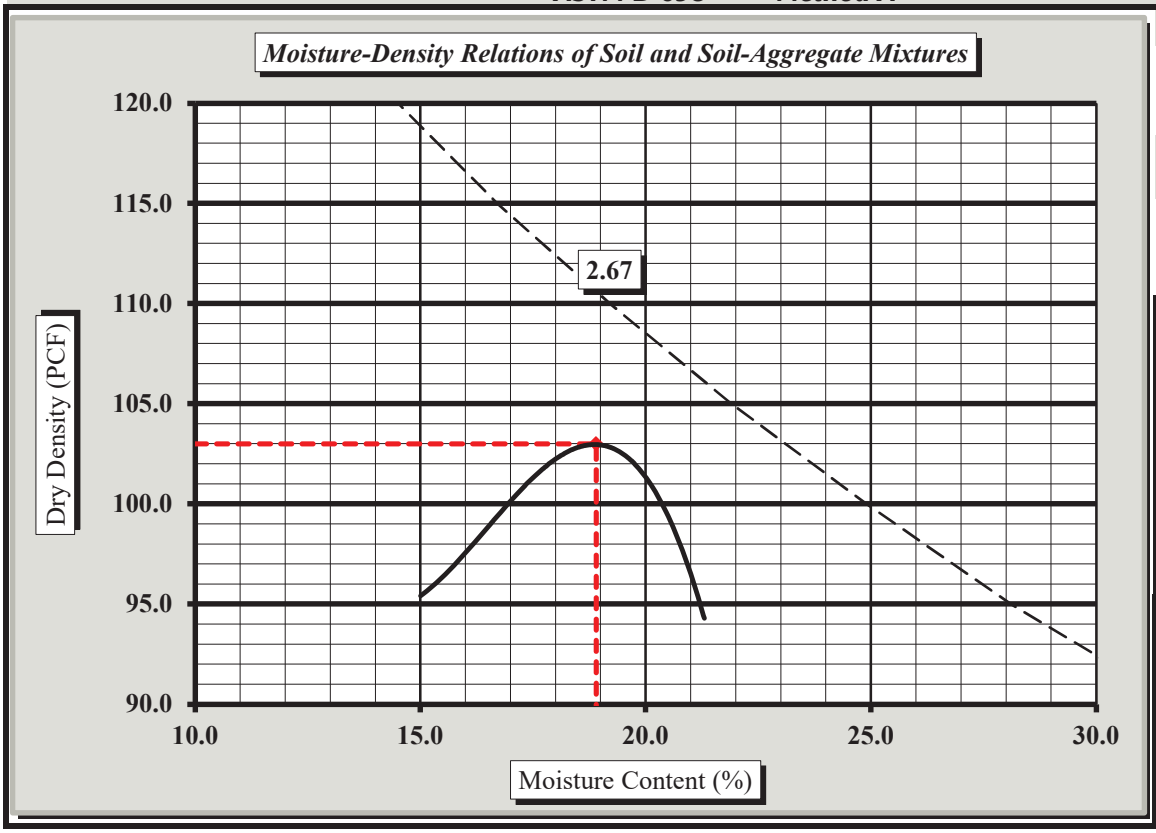
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/19/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
	Sample No.: P-6	Sample Date:	11/16/20
Location:	B-07	Depth (ft.):	0.0 - 1.0
Sample Description:	Strong brown Silt		ML

Maximum Dry Density 103.0 PCF. Optimum Moisture Content 18.9%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	22.3%
Specific Gravity of Soil	2.673
Liquid Limit	34
Plastic Limit	24
Plastic Index	10

% Passing	
3/4"	100.0%
3/8"	100.0%
#4	100.0%
#10	99.8%
#40	97.6%
#60	96.9%
#200	94.5%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	<5%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXe
Revision Date: 02/12/21

MOISTURE - DENSITY REPORT

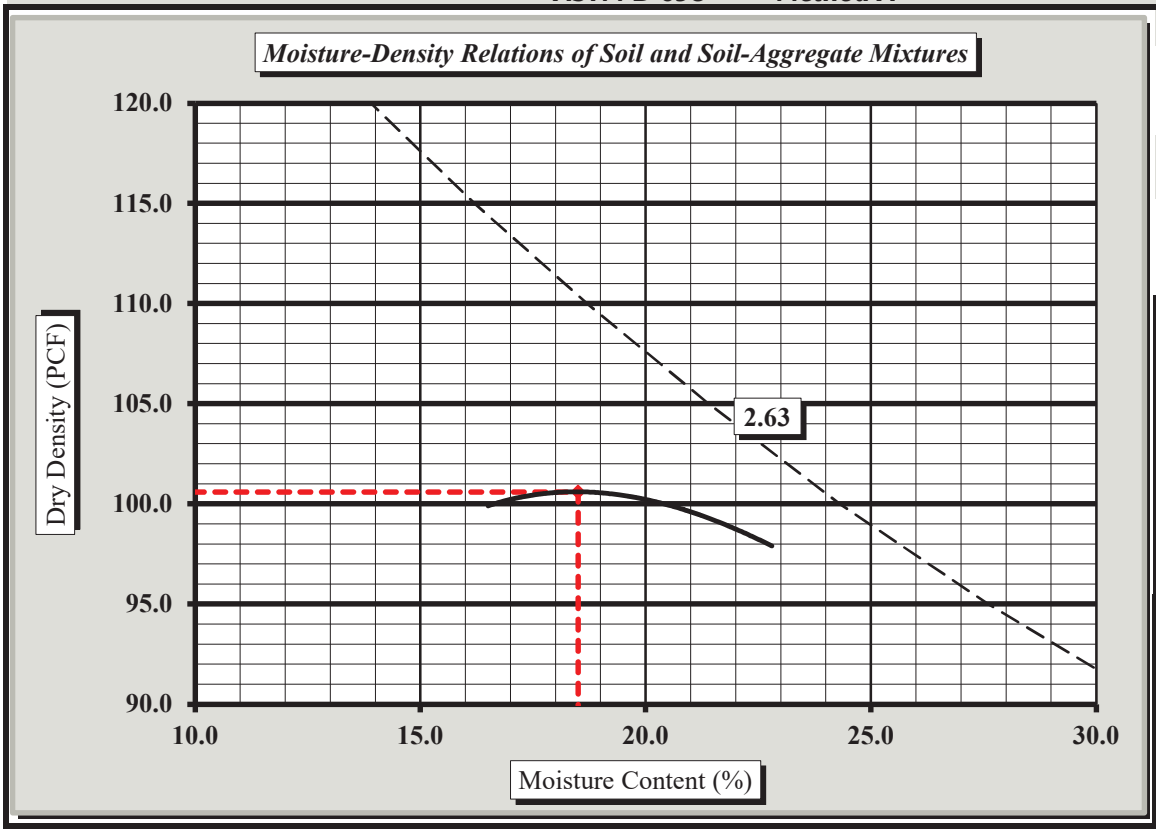
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/25/22
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Avenue South, Suite 1900, Nashville, TN 37201		
		Sample Date:	04/20/22
Location:	B-07	Depth (ft.):	0.0 - 2.5
Sample Description:	SILT (ML), brown		

Maximum Dry Density 100.6 PCF. Optimum Moisture Content 18.5%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	24.1%
Specific Gravity of Soil:	2.632
Liquid Limit	38
Plastic Limit	25
Plastic Index	13

% Passing	
3/4"	100%
3/8"	100%
#4	100%
#10	100%
#40	97%
#60	96%
#200	93.1%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	0%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Lab Services Manager	5/2/2022
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXb
Revision Date: 09/02/20

MOISTURE - DENSITY REPORT

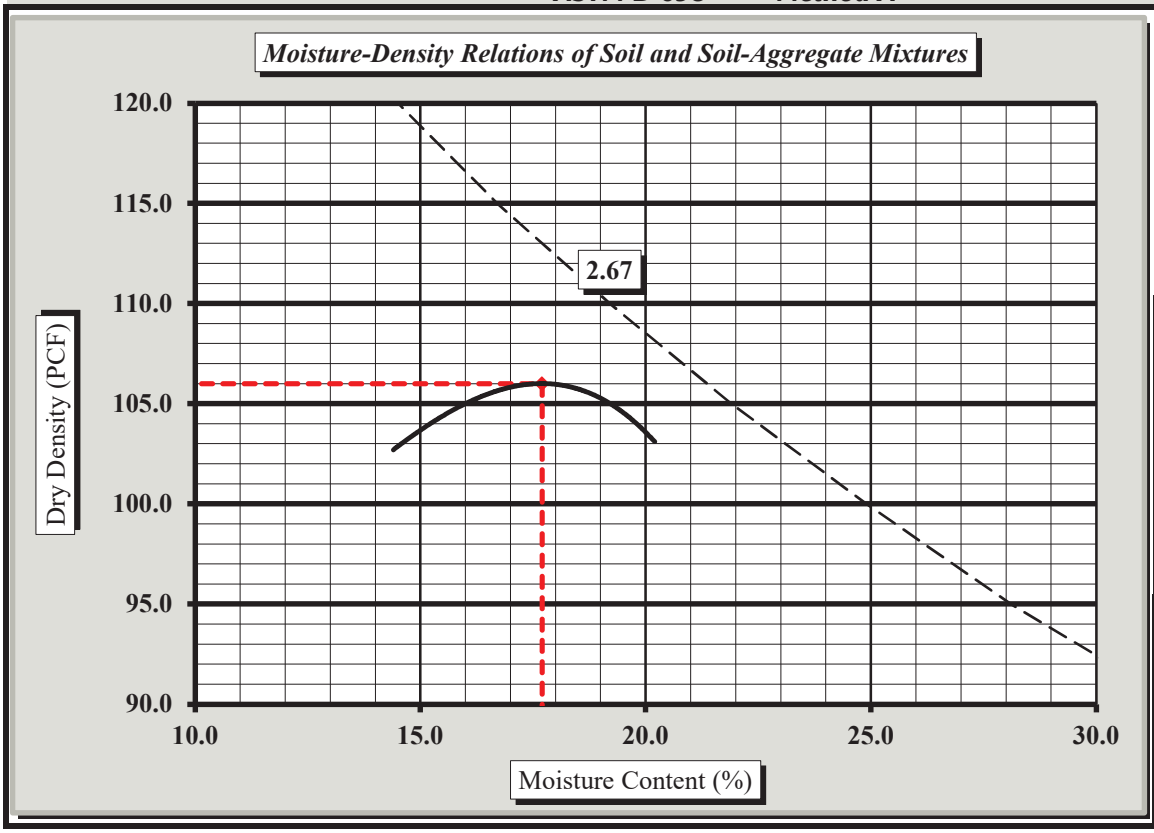
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/20/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
	Sample No.: P-7	Sample Date:	11/16/20
Location:	B-09	Depth (ft.):	0.0 - 1.0
Sample Description:	Very dark brown Lean clay		CL

Maximum Dry Density 106.0 PCF. Optimum Moisture Content 17.7%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	19.9%
Specific Gravity of Soil	2.672
Liquid Limit	34
Plastic Limit	22
Plastic Index	12

% Passing	
3/4"	100.0%
3/8"	100.0%
#4	100.0%
#10	100.0%
#40	99.5%
#60	98.9%
#200	92.9%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	<5%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXe
Revision Date: 02/12/21

MOISTURE - DENSITY REPORT

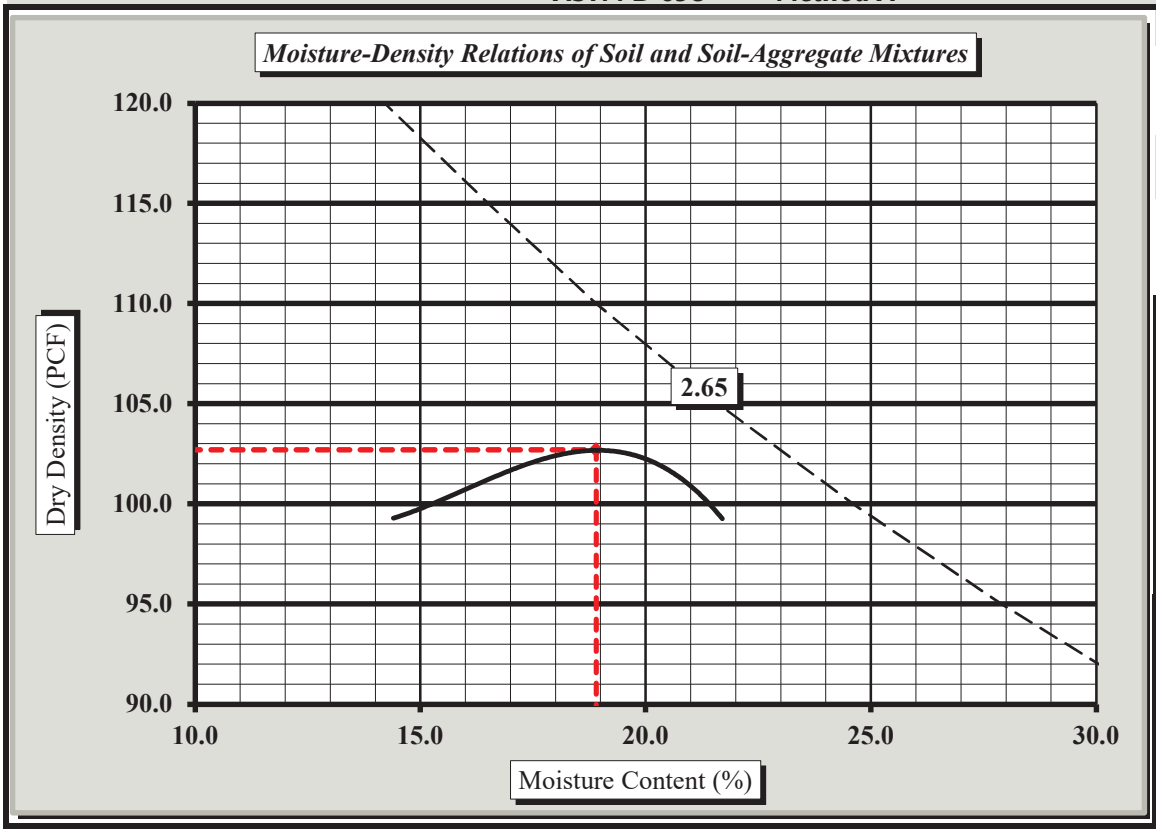
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/23/21
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Avenue South, Suite 1900, Nashville, TN 37201		
		Sample Date:	04/20/22
Location:	B-09	Depth (ft.):	0.0 - 2.5
Sample Description:	LEAN CLAY (CL), brown		

Maximum Dry Density 102.7 PCF. Optimum Moisture Content 18.9%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	25.8%
Specific Gravity of Soil:	2.652
Liquid Limit	32
Plastic Limit	22
Plastic Index	10

% Passing	
3/4"	100%
3/8"	100%
#4	100%
#10	100%
#40	99%
#60	99%
#200	93.2%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	0%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Lab Services Manager	5/2/2022
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXb
Revision Date: 09/02/20

MOISTURE - DENSITY REPORT

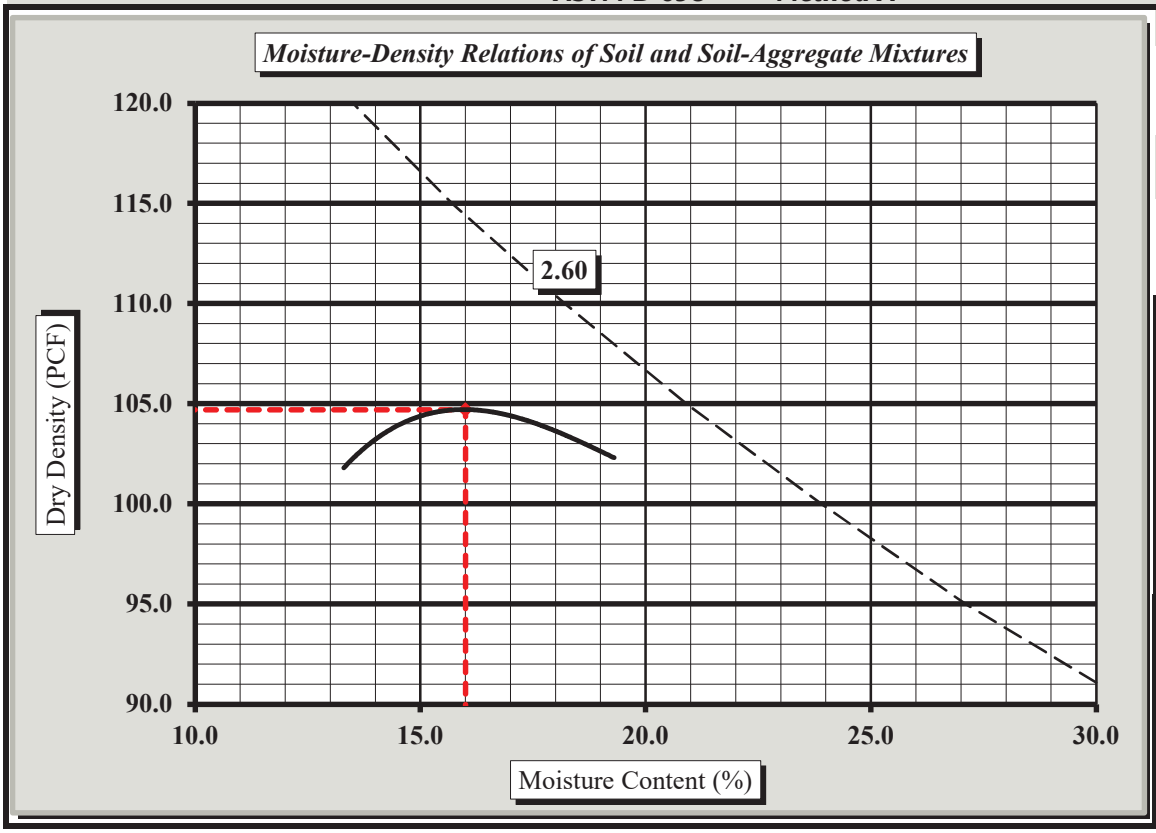
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/20/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
	Sample No.: P-8	Sample Date:	11/16/20
Location:	B-10	Depth (ft.):	0.0 - 1.0
Sample Description:	Strong brown Lean clay		CL

Maximum Dry Density 104.7 PCF. Optimum Moisture Content 16.0%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	23.1%
Specific Gravity of Soil	2.595
Liquid Limit	35
Plastic Limit	20
Plastic Index	15

% Passing	
3/4"	100.0%
3/8"	100.0%
#4	100.0%
#10	100.0%
#40	98.7%
#60	98.4%
#200	87.8%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	<5%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXe
Revision Date: 02/12/21

MOISTURE - DENSITY REPORT

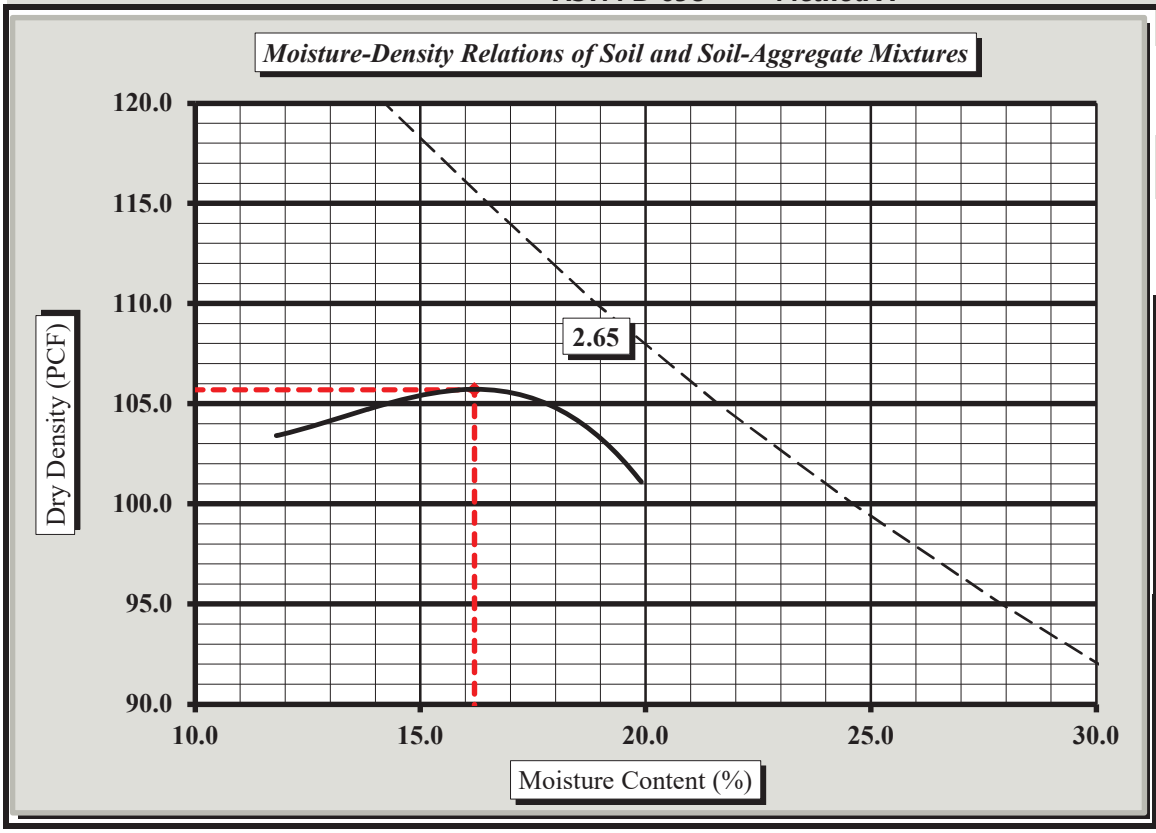
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/25/22
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Avenue South, Suite 1900, Nashville, TN 37201		
		Sample Date:	04/20/22
Location:	B-10	Depth (ft.):	0.0 - 2.5
Sample Description:	LEAN CLAY WITH SAND (CL), yellow brown		

Maximum Dry Density 105.7 PCF. Optimum Moisture Content 16.2%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	19.0%
Specific Gravity of Soil:	2.651
Liquid Limit	29
Plastic Limit	20
Plastic Index	9

% Passing	
3/4"	100%
3/8"	100%
#4	100%
#10	99%
#40	96%
#60	95%
#200	82.9%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	0%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Lab Services Manager	5/2/2022
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXb
Revision Date: 09/02/20

MOISTURE - DENSITY REPORT

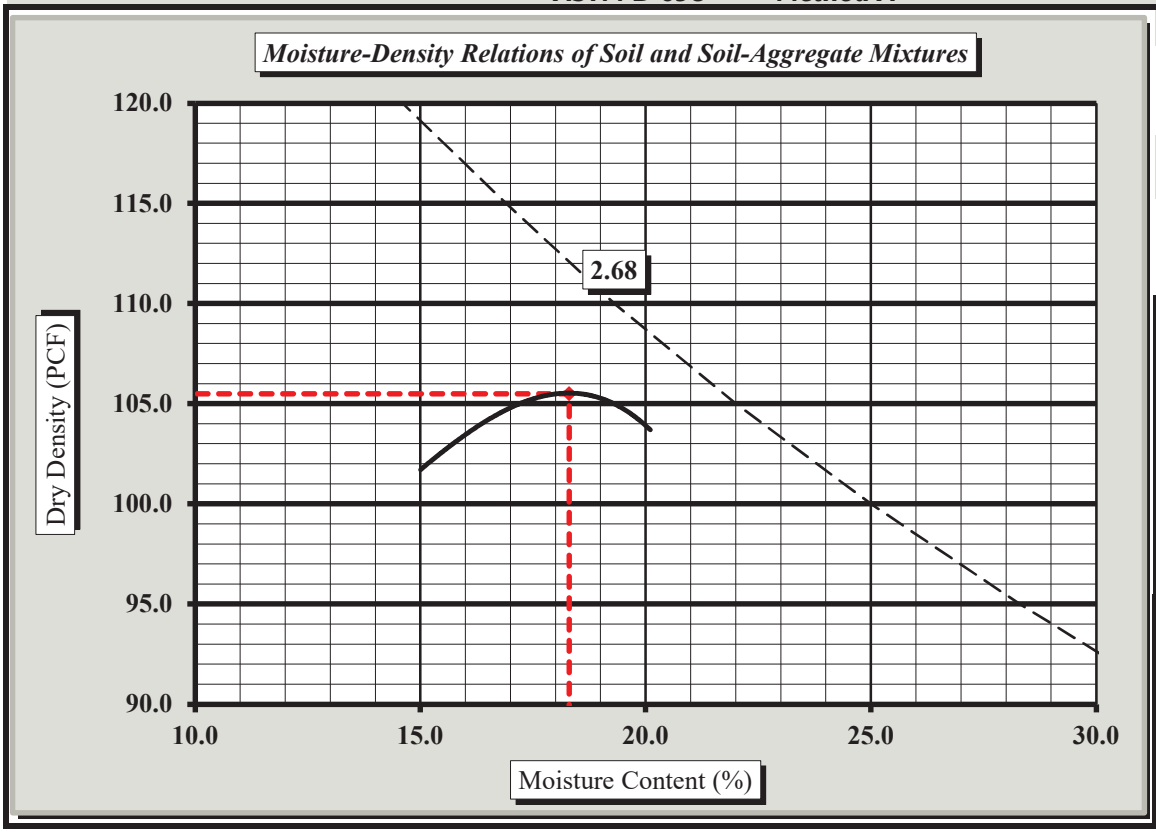
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/20/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
	Sample No.: P-9	Sample Date:	11/16/20
Location:	B-11	Depth (ft.):	0.0 - 1.0
Sample Description:	Dark brown Lean clay		CL

Maximum Dry Density 105.5 PCF. Optimum Moisture Content 18.3%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	20.9%
Specific Gravity of Soil	2.682
Liquid Limit	36
Plastic Limit	20
Plastic Index	16

% Passing	
3/4"	100.0%
3/8"	100.0%
#4	100.0%
#10	99.9%
#40	99.2%
#60	98.4%
#200	89.7%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	<5%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXe
Revision Date: 02/12/21

MOISTURE - DENSITY REPORT

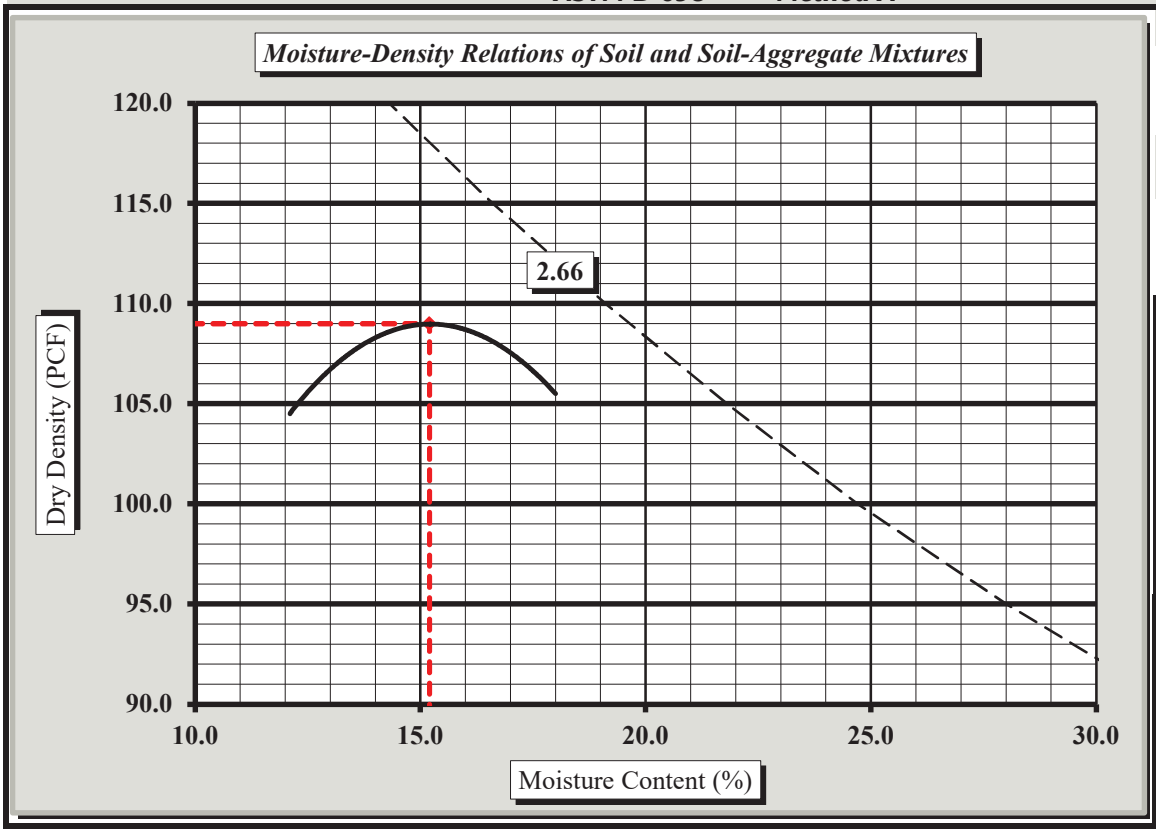
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/25/22
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Avenue South, Suite 1900, Nashville, TN 37201		
		Sample Date:	04/20/22
Location:	B-11	Depth (ft.):	0.0 - 2.5
Sample Description:	LEAN CLAY WITH SAND (CL), red brown		

Maximum Dry Density 109.0 PCF. Optimum Moisture Content 15.2%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	20.4%
Specific Gravity of Soil:	2.660
Liquid Limit	30
Plastic Limit	19
Plastic Index	11

% Passing	
3/4"	100%
3/8"	100%
#4	100%
#10	100%
#40	99%
#60	97%
#200	82.3%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	0%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Lab Services Manager	5/2/2022
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXb
Revision Date: 09/02/20

MOISTURE - DENSITY REPORT

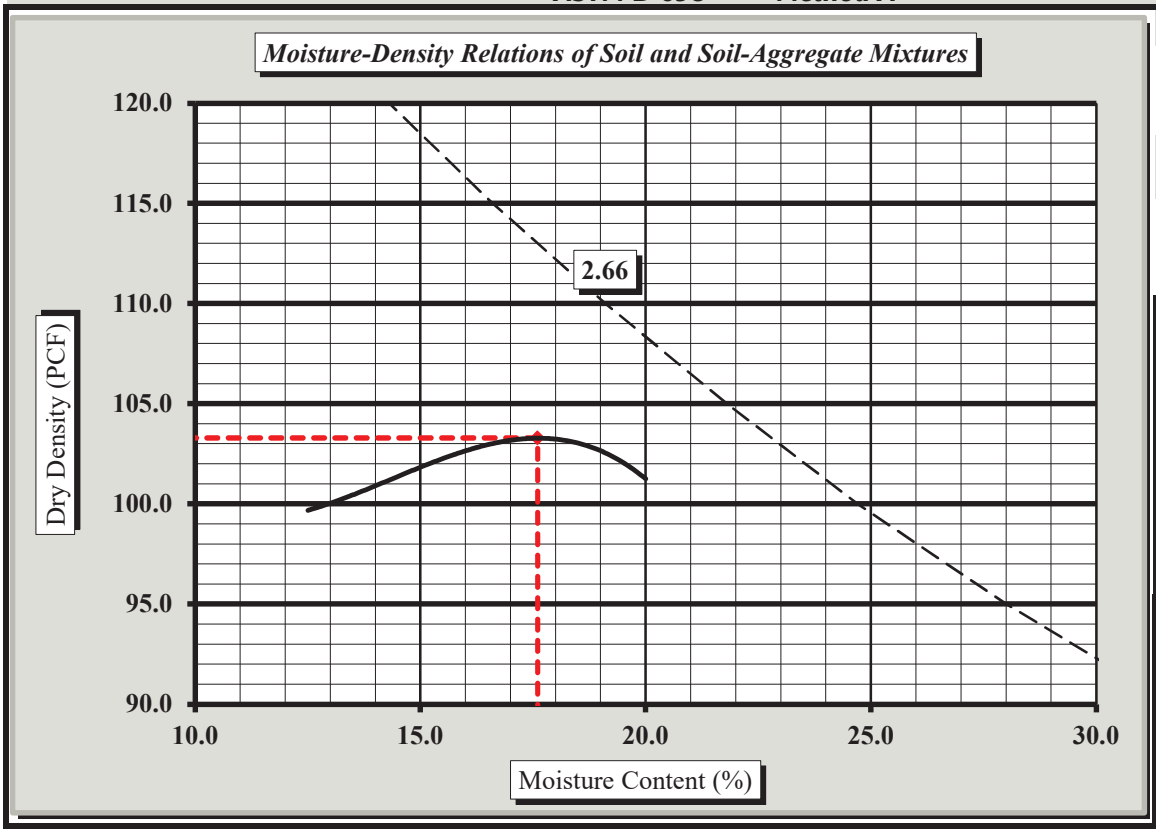
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/20/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
	Sample No.: P-10	Sample Date:	11/16/20
Location:	B-12	Depth (ft.):	0.0 - 1.0
Sample Description:	Dark brown Silt		ML

Maximum Dry Density 103.3 PCF. Optimum Moisture Content 17.6%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	22.8%
Specific Gravity of Soil	2.662
Liquid Limit	28
Plastic Limit	23
Plastic Index	5

% Passing	
3/4"	100.0%
3/8"	100.0%
#4	100.0%
#10	99.8%
#40	98.7%
#60	97.7%
#200	88.9%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	<5%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXe
Revision Date: 02/12/21

MOISTURE - DENSITY REPORT

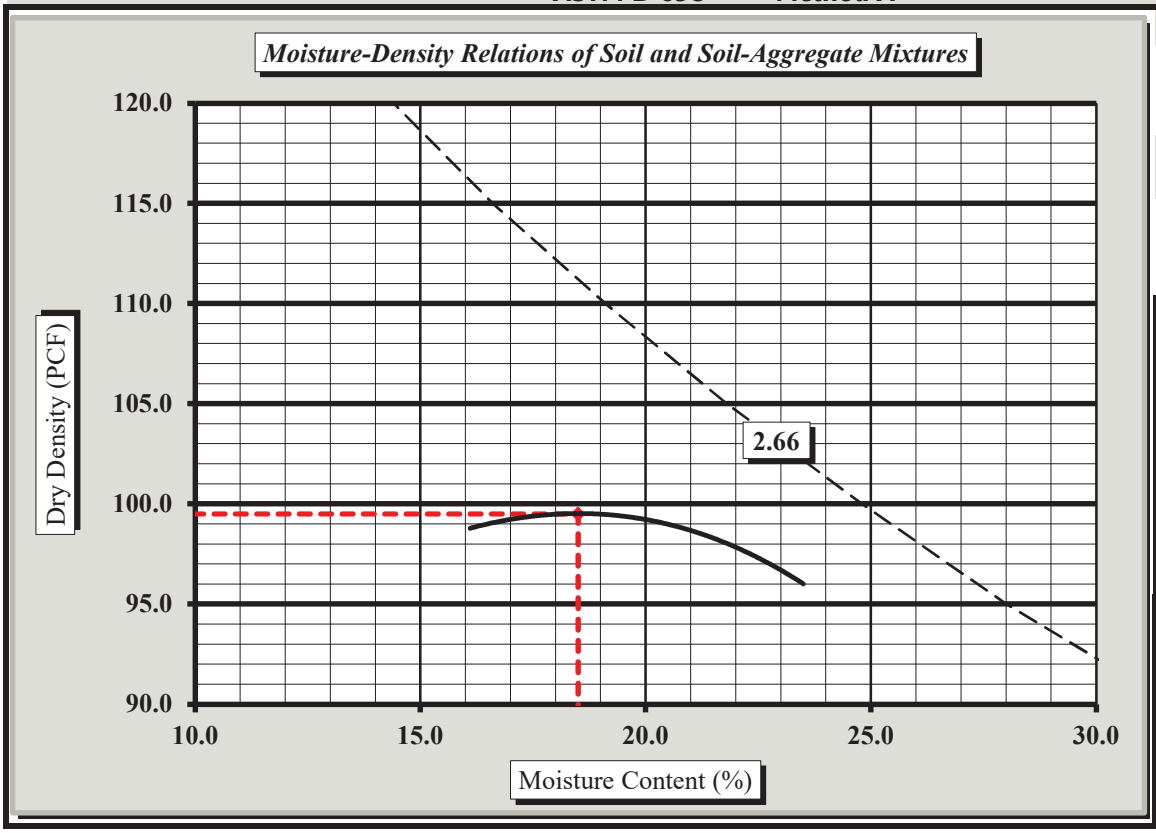
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/23/22
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Avenue South, Suite 1900, Nashville, TN 37201		
		Sample Date:	04/20/22
Location:	B-12	Depth (ft.):	0.0 - 2.5
Sample Description:	LEAN CLAY (CL), red brown		

Maximum Dry Density 99.5 PCF. Optimum Moisture Content 18.5%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	21.9%
Specific Gravity of Soil:	2.663
Liquid Limit	33
Plastic Limit	19
Plastic Index	14

% Passing	
3/4"	100%
3/8"	100%
#4	100%
#10	100%
#40	99%
#60	98%
#200	92.3%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	0%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Lab Services Manager	5/2/2022
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXb
Revision Date: 09/02/20

MOISTURE - DENSITY REPORT

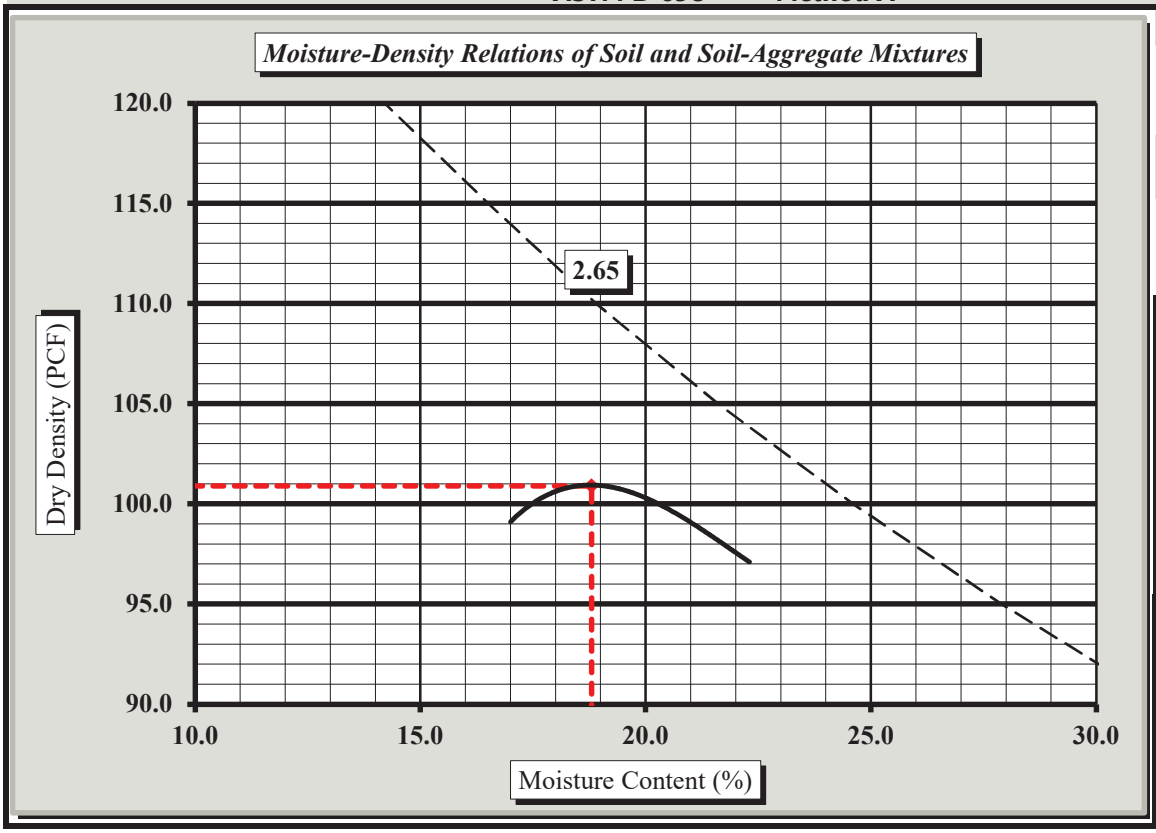
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/19/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
	Sample No.: P-11	Sample Date:	11/16/20
Location:	B-14	Depth (ft.):	0.0 - 1.0
Sample Description:	Brown Silt		ML

Maximum Dry Density 100.9 PCF. Optimum Moisture Content 18.8%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	26.8%
Specific Gravity of Soil	2.654
Liquid Limit	32
Plastic Limit	25
Plastic Index	7

% Passing	
3/4"	100.0%
3/8"	100.0%
#4	100.0%
#10	99.9%
#40	99.2%
#60	98.6%
#200	95.1%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	<5%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXb
Revision Date: 09/02/20

MOISTURE - DENSITY REPORT

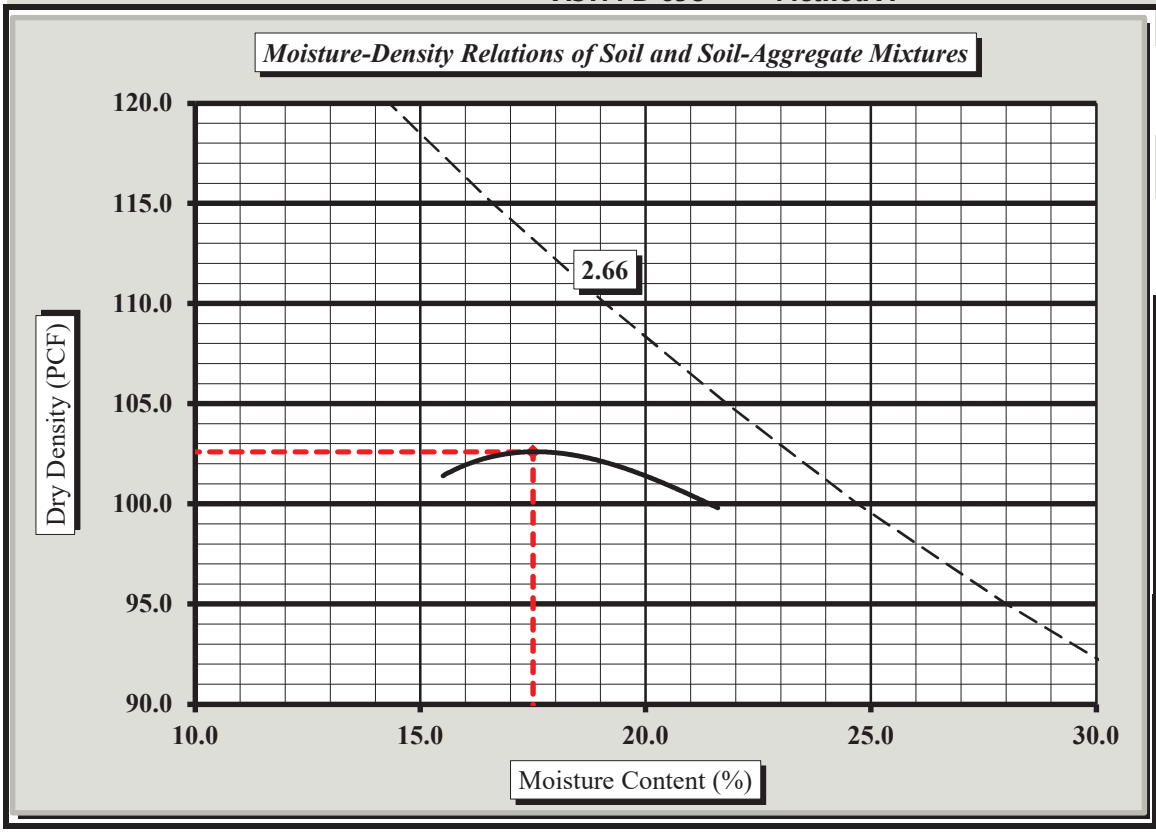
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/19/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
	Sample No.: P-12	Sample Date:	11/16/20
Location:	B-16	Depth (ft.):	0.0 - 1.0
Sample Description:	Very dark brown Lean clay		CL

Maximum Dry Density 102.6 PCF. Optimum Moisture Content 17.5%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	21.5%
Specific Gravity of Soil	2.662
Liquid Limit	34
Plastic Limit	23
Plastic Index	11

% Passing	
3/4"	100.0%
3/8"	100.0%
#4	100.0%
#10	99.9%
#40	99.4%
#60	99.1%
#200	96.6%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	<5%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXb
Revision Date: 09/02/20

MOISTURE - DENSITY REPORT

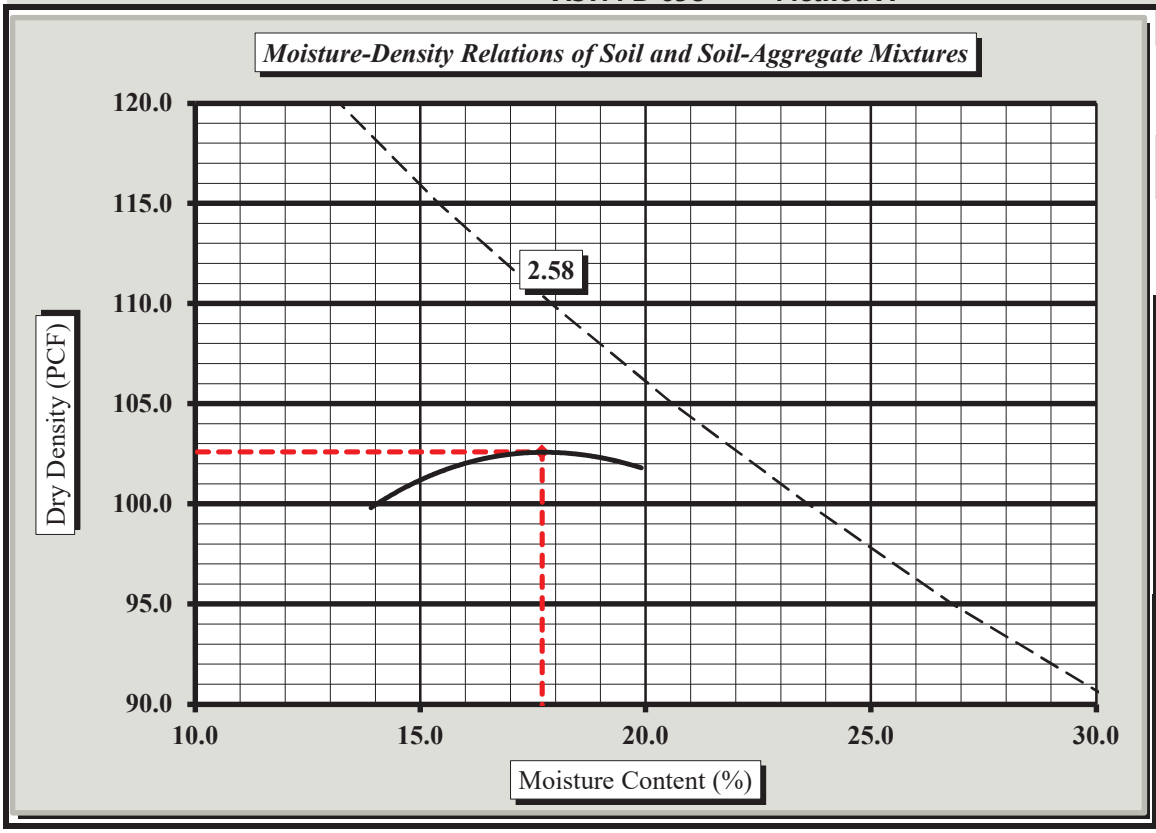
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/20/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
	Sample No.: P-13	Sample Date:	11/16/20
Location:	B-17	Depth (ft.):	0.0 - 1.0
Sample Description:	Brown Lean clay		CL

Maximum Dry Density 102.6 PCF. Optimum Moisture Content 17.7%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	24.6%
Specific Gravity of Soil	2.582
Liquid Limit	32
Plastic Limit	23
Plastic Index	9

% Passing	
3/4"	100.0%
3/8"	100.0%
#4	100.0%
#10	99.9%
#40	99.6%
#60	99.1%
#200	96.3%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	<5%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXe
Revision Date: 02/12/21

MOISTURE - DENSITY REPORT

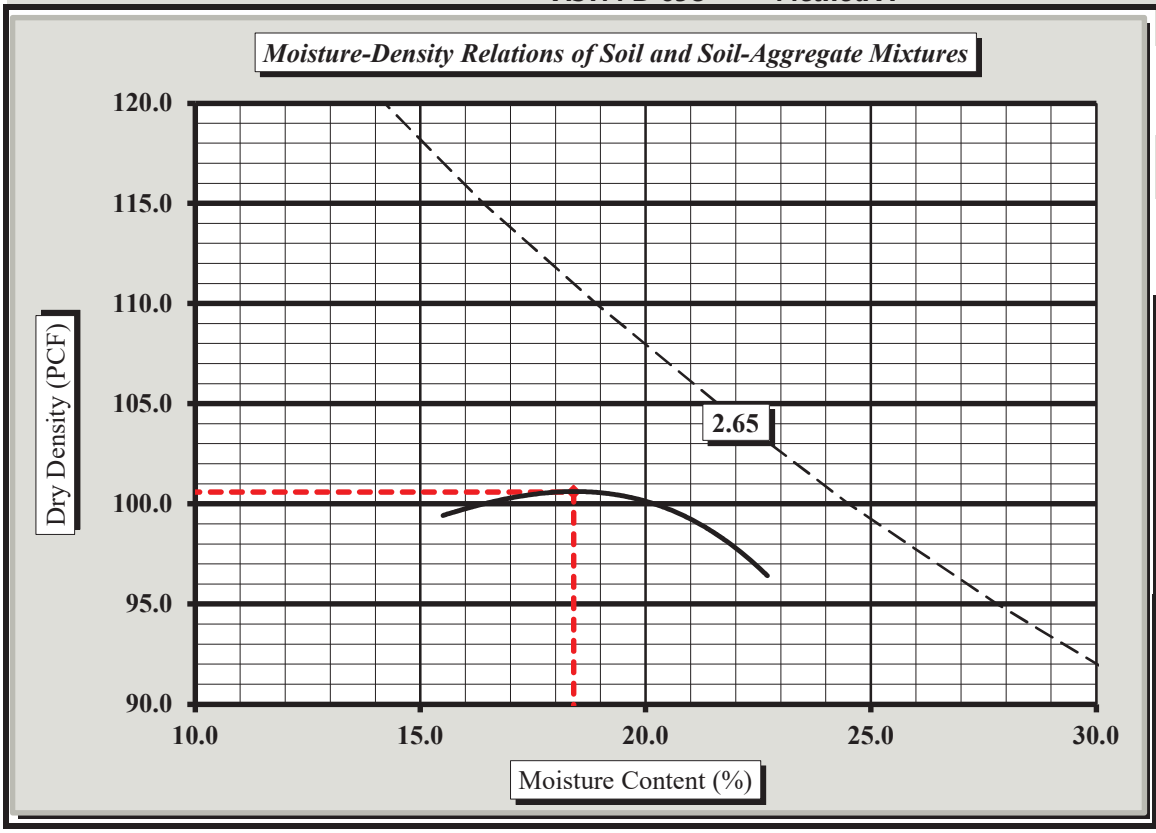
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/25/22
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Avenue South, Suite 1900, Nashville, TN 37201		
		Sample Date:	04/20/22
Location:	B-17	Depth (ft.):	0.0 - 2.5
Sample Description:	LEAN CLAY (CL), brown		

Maximum Dry Density 100.6 PCF. Optimum Moisture Content 18.4%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	27.8%
Specific Gravity of Soil:	2.647
Liquid Limit	34
Plastic Limit	23
Plastic Index	11

% Passing	
3/4"	100%
3/8"	100%
#4	100%
#10	100%
#40	99%
#60	98%
#200	94.5%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	0%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Lab Services Manager	5/2/2022
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXb
Revision Date: 09/02/20

MOISTURE - DENSITY REPORT

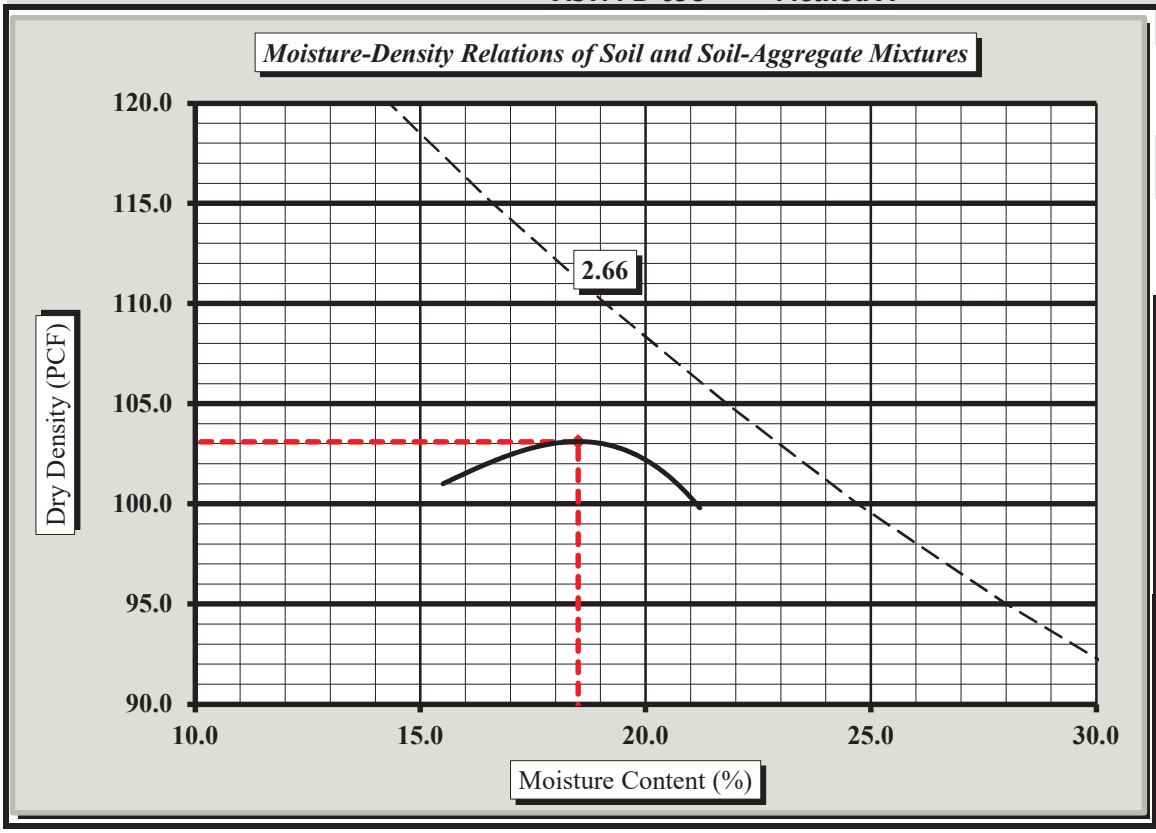
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/20/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
	Sample No.: P-14	Sample Date:	11/16/20
Location:	B-18	Depth (ft.):	0.0 - 1.0
Sample Description:	Dark brown Silt		ML

Maximum Dry Density 103.1 PCF. Optimum Moisture Content 18.5%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	24.5%
Specific Gravity of Soil	2.656
Liquid Limit	33
Plastic Limit	24
Plastic Index	9

% Passing	
3/4"	100.0%
3/8"	100.0%
#4	100.0%
#10	99.9%
#40	99.4%
#60	98.8%
#200	92.5%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	<5%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXb
Revision Date: 09/02/20

MOISTURE - DENSITY REPORT

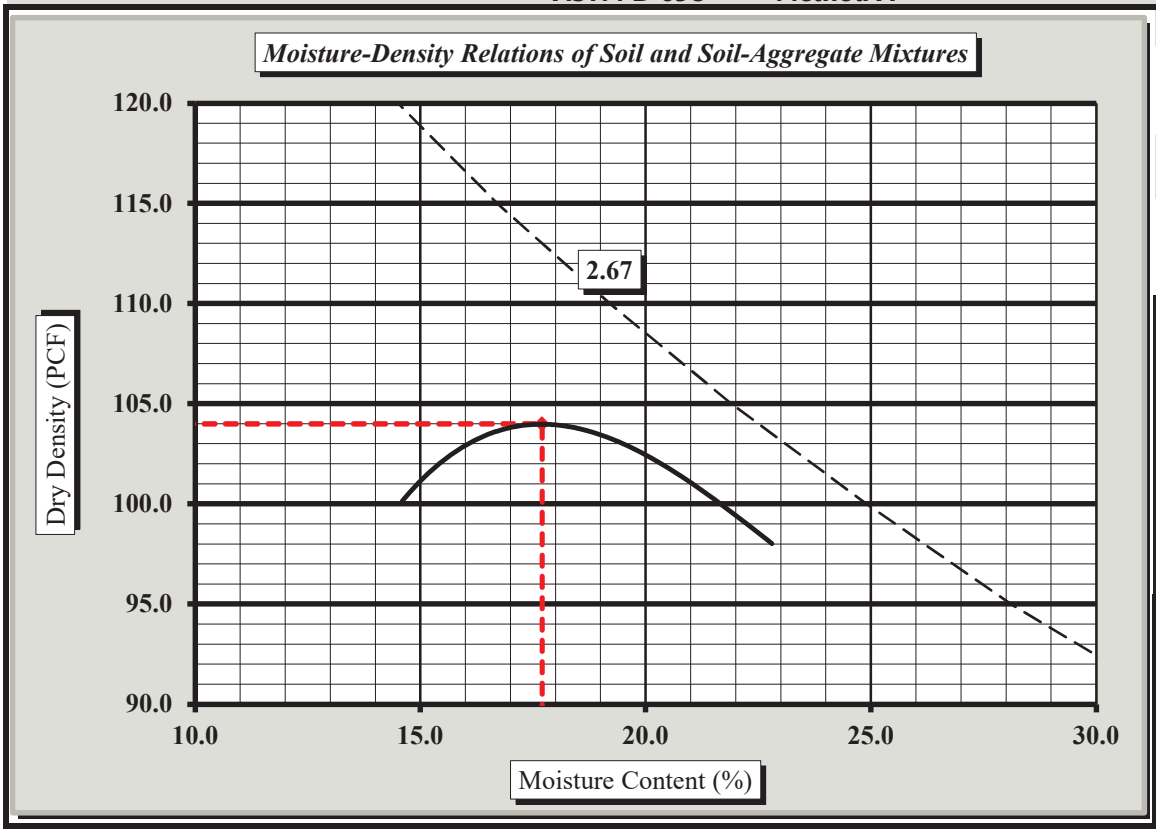
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/19/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
	Sample No.: P-15	Sample Date:	11/16/20
Location:	B-19	Depth (ft.):	0.0 - 1.0
Sample Description:	Dark brown Lean clay		CL

Maximum Dry Density 104.0 PCF. Optimum Moisture Content 17.7%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	25.4%
Specific Gravity of Soil	2.671
Liquid Limit	35
Plastic Limit	24
Plastic Index	11

% Passing	
3/4"	100.0%
3/8"	100.0%
#4	100.0%
#10	99.9%
#40	99.3%
#60	98.9%
#200	95.5%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	<5%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXb
Revision Date: 09/02/20

MOISTURE - DENSITY REPORT

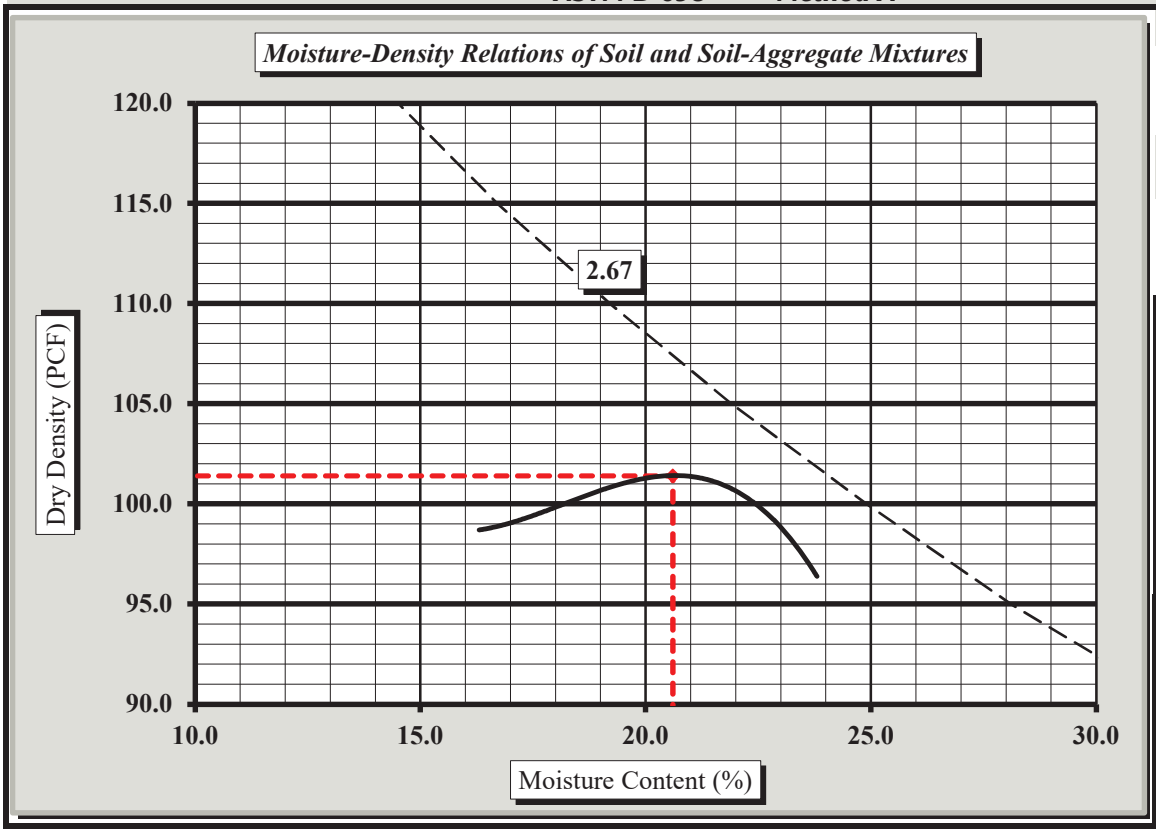
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	1280-20-070	Report Date:	11/30/20
Project Name:	Russellville Solar Facility	Test Date(s):	11/19/20
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Ave S. Suite 1900, Nashville, TN 37201		
	Sample No.: P-16	Sample Date:	11/16/20
Location:	B-20	Depth (ft.):	0.0 - 1.0
Sample Description:	Dark brown Lean clay		CL

Maximum Dry Density 101.4 PCF. Optimum Moisture Content 20.6%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	25.0%
Specific Gravity of Soil	2.669
Liquid Limit	37
Plastic Limit	23
Plastic Index	14

% Passing	
3/4"	100.0%
3/8"	100.0%
#4	100.0%
#10	99.9%
#40	99.9%
#60	99.7%
#200	98.3%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	<5%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Associate Project Manager	12/2/2020
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. 1LEXe
Revision Date: 02/12/21

MOISTURE - DENSITY REPORT

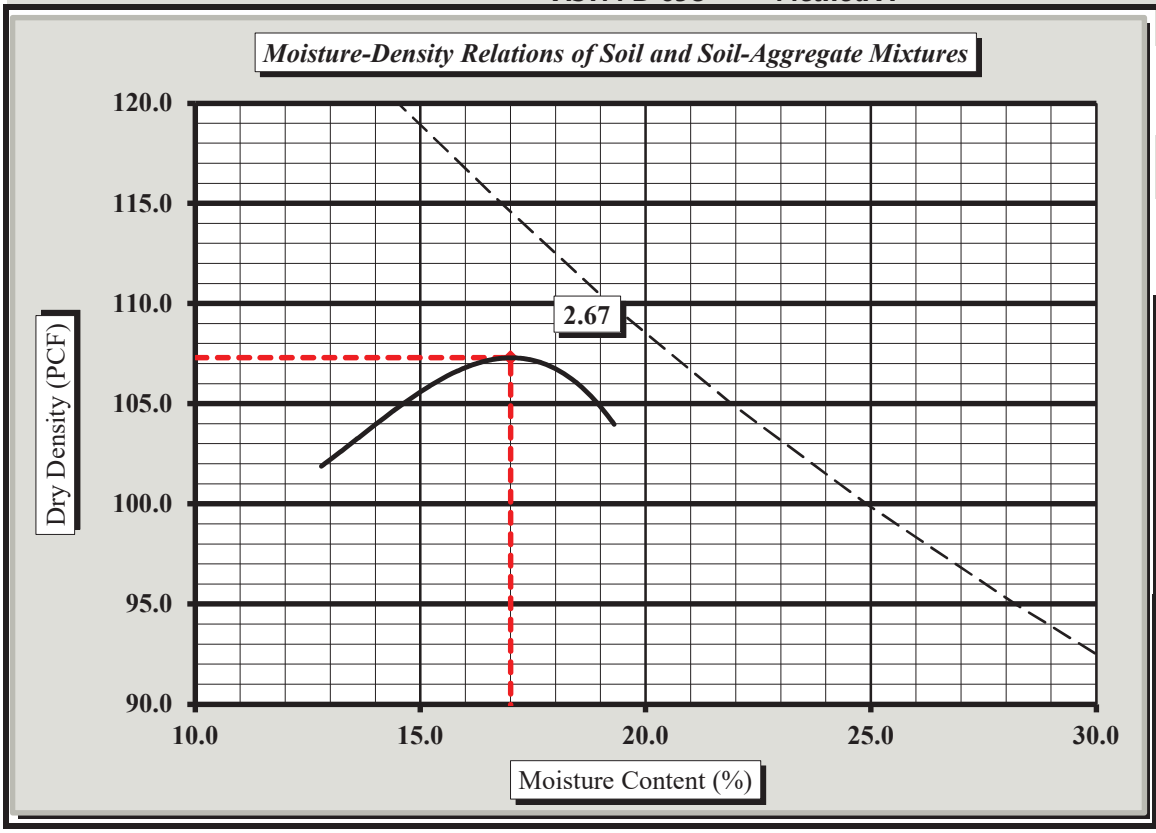
Quality Assurance ASTM D 698 Method A

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/25/22
Client Name:	Silicon Ranch Corporation		
Client Address:	222 Second Avenue South, Suite 1900, Nashville, TN 37201		
		Sample Date:	04/20/22
Location:	B-20	Depth (ft.):	0.0 - 2.5
Sample Description:	LEAN CLAY (CL), orange brown		

Maximum Dry Density 107.3 PCF. Optimum Moisture Content 17.0%

ASTM D 698 - - Method A



Soil Properties

As Received Moisture Content	22.1%
Specific Gravity of Soil:	2.673
Liquid Limit	32
Plastic Limit	19
Plastic Index	13

% Passing	
3/4"	100%
3/8"	100%
#4	100%
#10	100%
#40	99%
#60	99%
#200	92.9%

Oversize Fraction	
Bulk Gravity	ND
% Moisture	ND
% Oversize	0%
MDD	NA
Opt. MC	NA

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☒ Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined

Jacob Folsom	Jacob Folsom	Lab Services Manager	5/2/2022
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-2370-LEX-D5334R3
Revision No. 0d
Revision Date: 05/26/21
Quality Assurance

THERMAL CONDUCTIVITY AND RESISTIVITY OF SOIL

ASTM D5334

S&ME, Inc. - Lexington 2020 Liberty Rd. Suite 105 Lexington, KY 40505

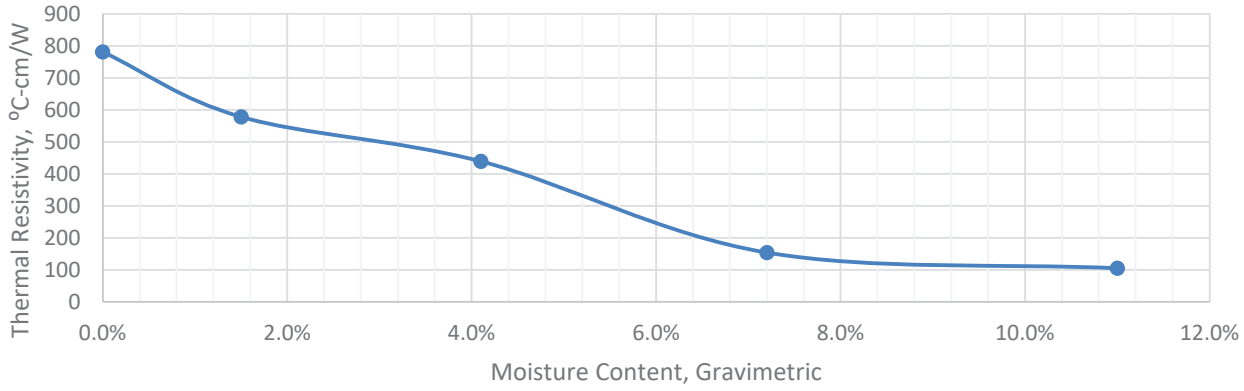
Project No.:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/26/22
Boring #:	B-01	Sample Date:	04/20/22
		Depth (ft):	0.0 - 2.5

SAMPLE INFORMATION

Sample Description:	SILT (ML), brown				
Liquid Limit:	39	Plastic Index:	13	% Fines:	92%
Maximum Dry Density* pcf:	102.1	Opt. Water Content, % grav:	17.8	Method:	ASTM D698A

TEST INFORMATION

Water Content		Dry Density, % of maximum	Thermal Conductivity, W/(m-K)	Thermal Resistivity, ^{0}C-cm/W	Temp. at test, °C
Volumetric	Gravimetric				
0.0%	0.0%	84.0%	0.13	781	24
2.0%	1.5%	82.7%	0.17	578	23
5.7%	4.1%	84.3%	0.23	439	23
10.0%	7.2%	85.0%	0.65	154	23
15.1%	11.0%	84.0%	0.95	105	23



Notes / Deviations:

*Maximum dry density listed here does not include any oversize correction factor that may apply.

Jacob Folsom	Jacob Folsom	Lab Services Manager	05/02/22
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-2370-LEX-D5334R3
Revision No. 0d
Revision Date: 05/26/21
Quality Assurance

THERMAL CONDUCTIVITY AND RESISTIVITY OF SOIL

ASTM D5334

S&ME, Inc. - Lexington 2020 Liberty Rd. Suite 105 Lexington, KY 40505

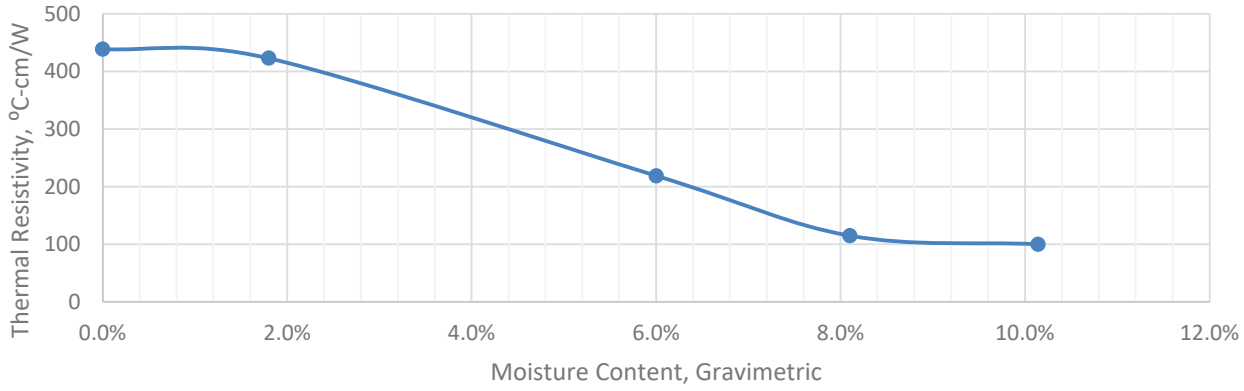
Project No.:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/26/22
Boring #:	B-03	Sample Date:	04/20/22
		Depth (ft):	0.0 - 2.5

SAMPLE INFORMATION

Sample Description:	SILT (ML), brown				
Liquid Limit:	33	Plastic Index:	9	% Fines:	91%
Maximum Dry Density* pcf:	100.3	Opt. Water Content, % grav:	18.8	Method:	ASTM D698A

TEST INFORMATION

Water Content		Dry Density, % of maximum	Thermal Conductivity, W/(m-K)	Thermal Resistivity, ^{0}C-cm/W	Temp. at test, °C
Volumetric	Gravimetric				
0.0%	0.0%	82.6%	0.23	439	24
2.5%	1.8%	86.9%	0.24	423	23
8.2%	6.0%	84.9%	0.46	219	23
11.0%	8.1%	84.6%	0.87	115	23
13.4%	10.1%	82.6%	1.00	100	23



Notes / Deviations:

*Maximum dry density listed here does not include any oversize correction factor that may apply.

Jacob Folsom	Jacob Folsom	Lab Services Manager	05/02/22
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-2370-LEX-D5334R3
Revision No. 0d
Revision Date: 05/26/21
Quality Assurance

THERMAL CONDUCTIVITY AND RESISTIVITY OF SOIL

ASTM D5334

S&ME, Inc. - Lexington 2020 Liberty Rd. Suite 105 Lexington, KY 40505

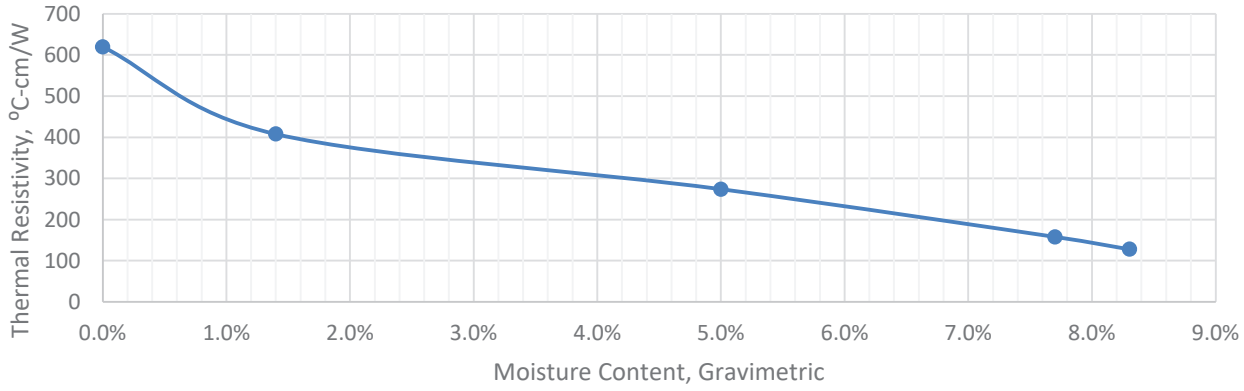
Project No.:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/26/22
Boring #:	B-05	Sample Date:	04/20/22
		Depth (ft):	0.0 - 2.5

SAMPLE INFORMATION

Sample Description:	LEAN CLAY WITH SAND (CL), brown				
Liquid Limit:	33	Plastic Index:	11	% Fines:	82%
Maximum Dry Density* pcf:	103.4	Opt. Water Content, % grav:	17.8	Method:	ASTM D698A

TEST INFORMATION

Water Content		Dry Density, % of maximum	Thermal Conductivity, W/(m-K)	Thermal Resistivity, ^{0}C-cm/W	Temp. at test, °C
Volumetric	Gravimetric				
0.0%	0.0%	87.9%	0.16	620	23
1.9%	1.4%	80.8%	0.24	408	23
7.1%	5.0%	86.0%	0.37	274	23
10.9%	7.7%	85.2%	0.63	158	23
12.1%	8.3%	87.9%	0.78	128	20



Notes / Deviations:

*Maximum dry density listed here does not include any oversize correction factor that may apply.

Jacob Folsom	Jacob Folsom	Lab Services Manager	05/02/22
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-2370-LEX-D5334R3
Revision No. 0d
Revision Date: 05/26/21
Quality Assurance

THERMAL CONDUCTIVITY AND RESISTIVITY OF SOIL

ASTM D5334

S&ME, Inc. - Lexington 2020 Liberty Rd. Suite 105 Lexington, KY 40505

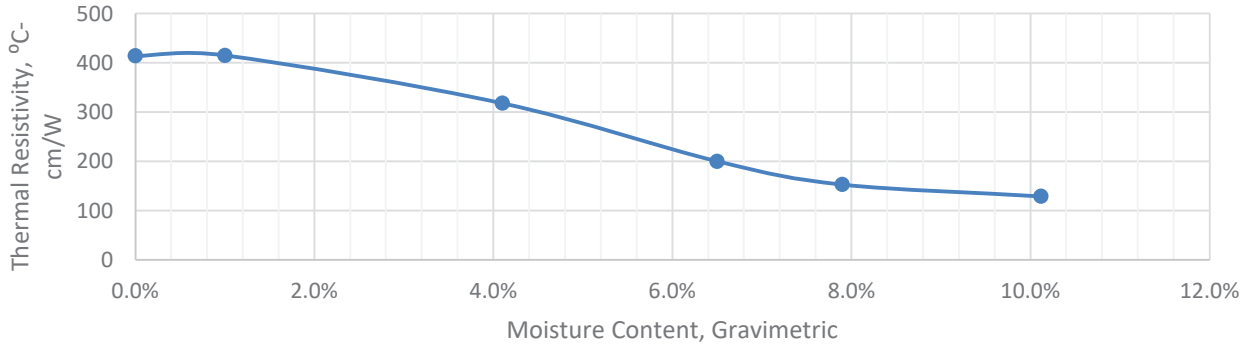
Project No.:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/26/22
Boring #:	B-07	Sample Date:	04/20/22
		Depth (ft):	0.0 - 2.5

SAMPLE INFORMATION

Sample Description:	SILT (ML), brown				
Liquid Limit:	38	Plastic Index:	13	% Fines:	93%
Maximum Dry Density* pcf:	100.6	Opt. Water Content, % grav:	18.5	Method:	ASTM D698A

TEST INFORMATION

Water Content		Dry Density, % of maximum	Thermal Conductivity, W/(m-K)	Thermal Resistivity, ^{0}C-cm/W	Temp. at test, °C
Volumetric	Gravimetric				
0.0%	0.0%	85.5%	0.24	414	23
1.4%	1.0%	86.5%	0.24	415	24
5.6%	4.1%	85.5%	0.31	318	24
9.0%	6.5%	85.8%	0.50	200	23
10.9%	7.9%	85.5%	0.65	153	20
13.9%	10.1%	85.5%	0.77	129	22



Notes / Deviations:

*Maximum dry density listed here does not include any oversize correction factor that may apply.

Jacob Folsom	Jacob Folsom	Lab Services Manager	05/02/22
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-2370-LEX-D5334R3
Revision No. 0d
Revision Date: 05/26/21
Quality Assurance

THERMAL CONDUCTIVITY AND RESISTIVITY OF SOIL

ASTM D5334

S&ME, Inc. - Lexington 2020 Liberty Rd. Suite 105 Lexington, KY 40505

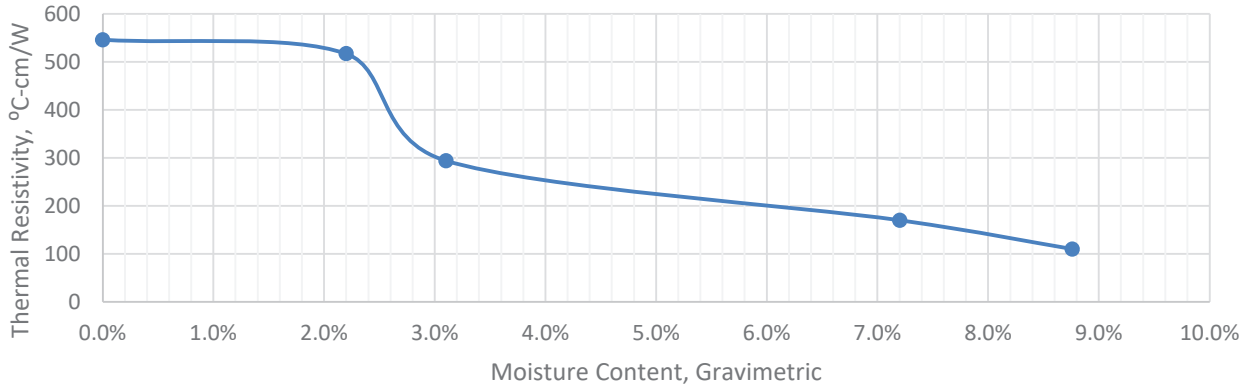
Project No.:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/26/22
Boring #:	B-09	Sample Date:	04/20/22
		Depth (ft):	0.0 - 2.5

SAMPLE INFORMATION

Sample Description:	LEAN CLAY (CL), brown				
Liquid Limit:	32	Plastic Index:	10	% Fines:	93%
Maximum Dry Density* pcf:	102.7	Opt. Water Content, % grav:	18.9	Method:	ASTM D698A

TEST INFORMATION

Water Content		Dry Density, % of maximum	Thermal Conductivity, W/(m-K)	Thermal Resistivity, ^{0}C-cm/W	Temp. at test, °C
Volumetric	Gravimetric				
0.0%	0.0%	84.7%	0.18	546	24
3.2%	2.2%	87.4%	0.19	517	24
4.4%	3.1%	86.8%	0.34	294	23
10.1%	7.2%	85.7%	0.59	170	22
12.2%	8.8%	84.7%	0.91	110	22



Notes / Deviations:

*Maximum dry density listed here does not include any oversize correction factor that may apply.

Jacob Folsom	Jacob Folsom	Lab Services Manager	05/02/22
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-2370-LEX-D5334R3
Revision No. 0d
Revision Date: 05/26/21
Quality Assurance

THERMAL CONDUCTIVITY AND RESISTIVITY OF SOIL

ASTM D5334

S&ME, Inc. - Lexington 2020 Liberty Rd. Suite 105 Lexington, KY 40505

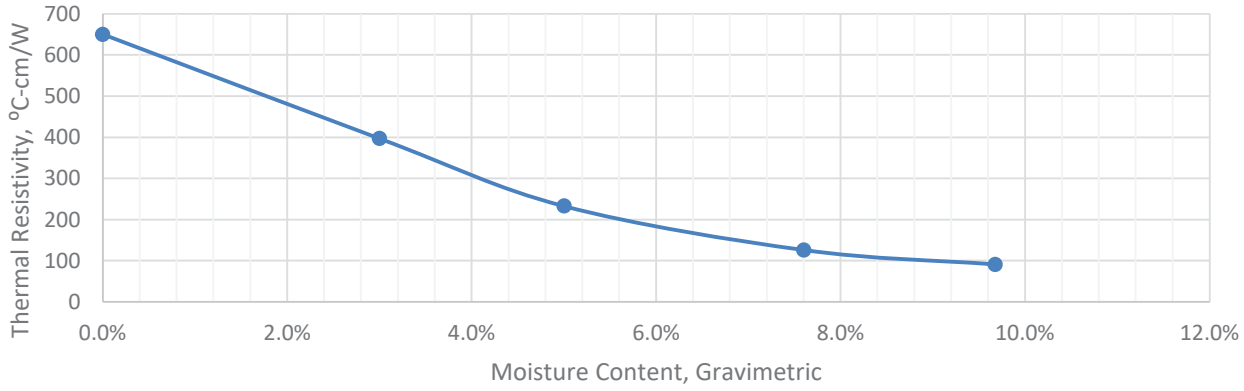
Project No.:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/27/22
Boring #:	B-10	Sample Date:	04/20/22
		Depth (ft):	0.0 - 2.5

SAMPLE INFORMATION

Sample Description:	LEAN CLAY WITH SAND (CL), yellow brown				
Liquid Limit:	29	Plastic Index:	9	% Fines:	84%
Maximum Dry Density* pcf:	105.7	Opt. Water Content, % grav:	16.2	Method:	ASTM D698A

TEST INFORMATION

Water Content		Dry Density, % of maximum	Thermal Conductivity, W/(m-K)	Thermal Resistivity, ^{0}C-cm/W	Temp. at test, °C
Volumetric	Gravimetric				
0.0%	0.0%	84.1%	0.15	650	24
4.3%	3.0%	85.0%	0.25	397	22
7.3%	5.0%	85.7%	0.43	233	22
11.0%	7.6%	85.6%	0.80	126	22
13.8%	9.7%	84.1%	1.10	91	22



Notes / Deviations:

*Maximum dry density listed here does not include any oversize correction factor that may apply.

Jacob Folsom	Jacob Folsom	Lab Services Manager	05/02/22
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-2370-LEX-D5334R3
Revision No. 0d
Revision Date: 05/26/21
Quality Assurance

THERMAL CONDUCTIVITY AND RESISTIVITY OF SOIL

ASTM D5334

S&ME, Inc. - Lexington 2020 Liberty Rd. Suite 105 Lexington, KY 40505

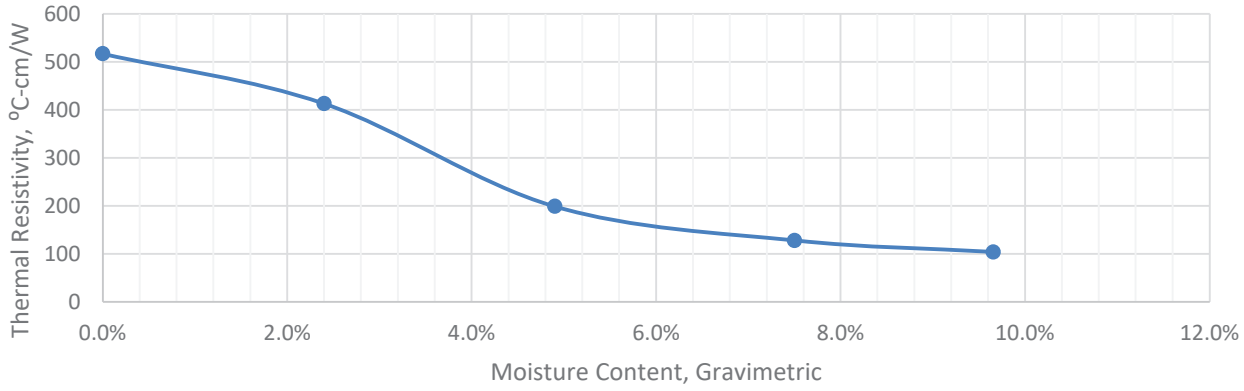
Project No.:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/27/22
Boring #:	B-11	Sample Date:	04/20/22
		Depth (ft):	0.0 - 2.5

SAMPLE INFORMATION

Sample Description:	LEAN CLAY WITH SAND (CL), red brown				
Liquid Limit:	30	Plastic Index:	11	% Fines:	82%
Maximum Dry Density* pcf:	109.0	Opt. Water Content, % grav:	15.2	Method:	ASTM D698A

TEST INFORMATION

Water Content		Dry Density, % of maximum	Thermal Conductivity, W/(m-K)	Thermal Resistivity, ^{0}C-cm/W	Temp. at test, °C
Volumetric	Gravimetric				
0.0%	0.0%	83.9%	0.19	517	24
3.5%	2.4%	82.8%	0.24	413	23
7.3%	4.9%	85.0%	0.50	199	23
11.2%	7.5%	85.9%	0.78	128	23
14.1%	9.7%	83.9%	0.96	104	23



Notes / Deviations:

*Maximum dry density listed here does not include any oversize correction factor that may apply.

Jacob Folsom	Jacob Folsom	Lab Services Manager	05/02/22
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-2370-LEX-D5334R3
Revision No. 0d
Revision Date: 05/26/21
Quality Assurance

THERMAL CONDUCTIVITY AND RESISTIVITY OF SOIL

ASTM D5334

S&ME, Inc. - Lexington 2020 Liberty Rd. Suite 105 Lexington, KY 40505

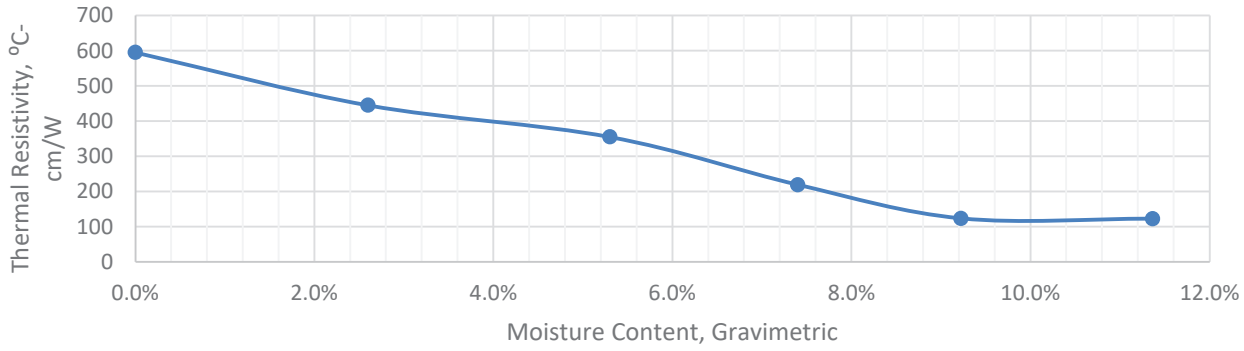
Project No.:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/27/22
Boring #:	B-12	Sample Date:	04/20/22
		Depth (ft):	0.0 - 2.5

SAMPLE INFORMATION

Sample Description:	LEAN CLAY (CL), red brown				
Liquid Limit:	33	Plastic Index:	14	% Fines:	92%
Maximum Dry Density* pcf:	99.5	Opt. Water Content, % grav:	18.5	Method:	ASTM D698A

TEST INFORMATION

Water Content		Dry Density, % of maximum	Thermal Conductivity, W/(m-K)	Thermal Resistivity, ^{0}C-cm/W	Temp. at test, °C
Volumetric	Gravimetric				
0.0%	0.0%	84.5%	0.17	595	23
3.4%	2.6%	81.8%	0.22	445	23
7.2%	5.3%	84.9%	0.28	355	23
10.1%	7.4%	85.4%	0.46	219	23
12.4%	9.2%	84.5%	0.80	124	21
15.4%	11.4%	84.9%	0.81	123	22



Notes / Deviations:

*Maximum dry density listed here does not include any oversize correction factor that may apply.

Jacob Folsom	Jacob Folsom	Lab Services Manager	05/02/22
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-2370-LEX-D5334R3
Revision No. 0d
Revision Date: 05/26/21
Quality Assurance

THERMAL CONDUCTIVITY AND RESISTIVITY OF SOIL

ASTM D5334

S&ME, Inc. - Lexington 2020 Liberty Rd. Suite 105 Lexington, KY 40505

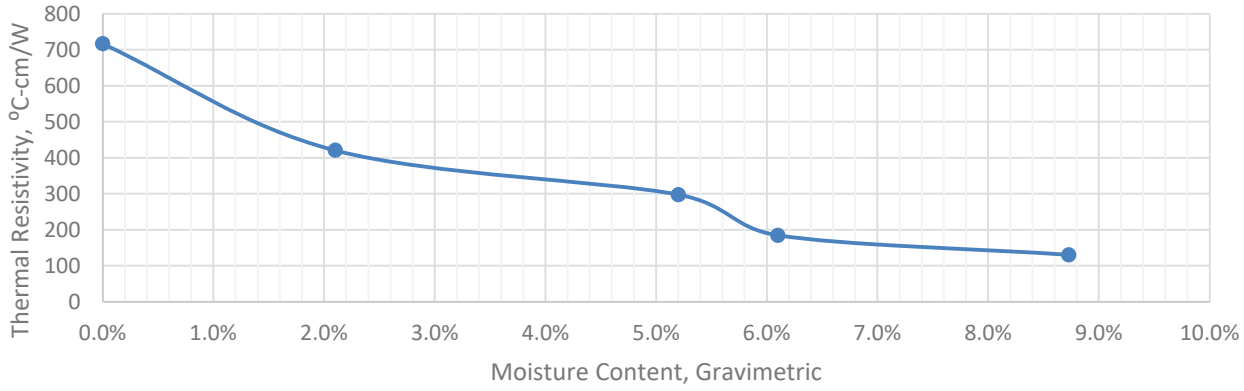
Project No.:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/27/22
Boring #:	B-17	Sample Date:	04/20/22
		Depth (ft):	0.0 - 2.5

SAMPLE INFORMATION

Sample Description:	LEAN CLAY (CL), brown				
Liquid Limit:	34	Plastic Index:	11	% Fines:	95%
Maximum Dry Density* pcf:	100.6	Opt. Water Content, % grav:	18.4	Method:	ASTM D698A

TEST INFORMATION

Water Content		Dry Density, % of maximum	Thermal Conductivity, W/(m-K)	Thermal Resistivity, ^{0}C-cm/W	Temp. at test, °C
Volumetric	Gravimetric				
0.0%	0.0%	85.5%	0.14	717	24
2.9%	2.1%	85.4%	0.24	421	23
7.1%	5.2%	84.7%	0.34	298	22
8.5%	6.1%	86.3%	0.54	185	22
12.0%	8.7%	85.5%	0.77	131	22



Notes / Deviations:

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Jacob Folsom	Jacob Folsom	Lab Services Manager	05/02/22
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-2370-LEX-D5334R3
Revision No. 0d
Revision Date: 05/26/21
Quality Assurance

THERMAL CONDUCTIVITY AND RESISTIVITY OF SOIL

ASTM D5334

S&ME, Inc. - Lexington 2020 Liberty Rd. Suite 105 Lexington, KY 40505

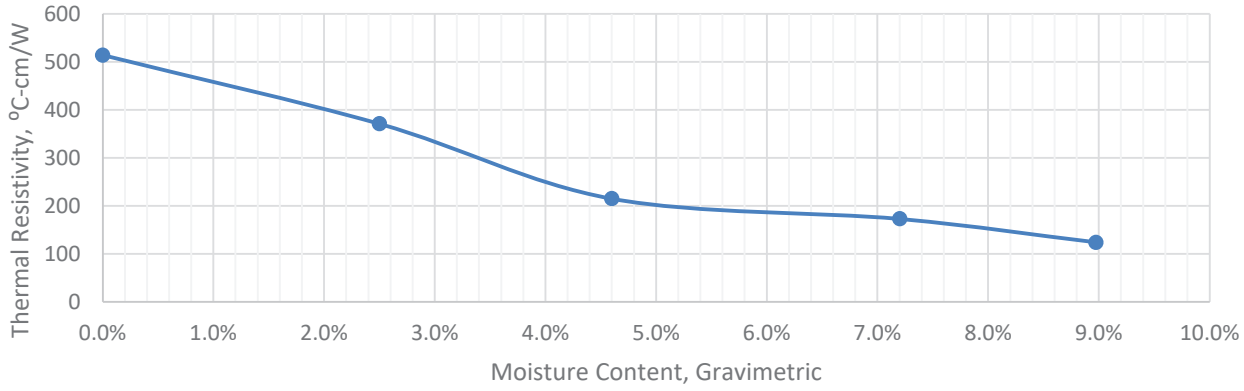
Project No.:	22800023	Report Date:	05/02/22
Project Name:	Russelville Solar Facility	Test Date(s):	04/28/22
Boring #:	B-20	Sample Date:	04/20/22
		Depth (ft):	0.0 - 2.5

SAMPLE INFORMATION

Sample Description:	LEAN CLAY (CL), orange brown				
Liquid Limit:	32	Plastic Index:	13	% Fines:	93%
Maximum Dry Density* pcf:	107.3	Opt. Water Content, % grav:	17.0	Method:	ASTM D698A

TEST INFORMATION

Water Content		Dry Density, % of maximum	Thermal Conductivity, W/(m-K)	Thermal Resistivity, ^{0}C-cm/W	Temp. at test, °C
Volumetric	Gravimetric				
0.0%	0.0%	85.1%	0.19	514	24
3.6%	2.5%	83.8%	0.27	371	23
6.6%	4.6%	84.0%	0.46	215	22
10.6%	7.2%	85.3%	0.58	173	22
13.1%	9.0%	85.1%	0.81	124	22



Notes / Deviations:

*Maximum dry density listed here does not include any oversize correction factor that may apply.

Jacob Folsom	Jacob Folsom	Lab Services Manager	05/02/22
Technical Responsibility	*Signature*	*Position*	*Date*

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GEOTESTING EXPRESS INCORPORATED
2358 PERIMETER PARK DRIVE SUITE 320
ATLANTA GA 30341-1315
USA

Analysis No.	TS-A2009192
Report Date	27 November 2020
Date Sampled	18 November 2020
Date Received	20 November 2020
Where Sampled	Atlanta, GA USA
Sampled By	Client

This is to attest that we have examined: Soil for Project Name: Russelville Facility; Site Location: - ; Job Number: GTX-312763

When examined to the applicable requirements of:

ASTM D 512-12	"Standard Test Methods for Chloride Ion in Water" Method B
ASTM D 516-16	"Standard Test Method for Sulfate Ion in Water"
USEPA 600/4	"Sulfide Method 376.2 (Colorimetric, Methylene Blue)"

Results:

ASTM D 512 – Chloride Method B

Sample		Results		Detection Limit
		ppm (mg/kg)	%[1]	
B-01		11.	0.0011	10.
-	0 – 1'			
B-02		29.	0.0029	
-	0 – 1'			
B-03		18.	0.0018	
-	0 – 1'			
B-05		< 10.	< 0.0010	
-	0 – 1'			
B-06		< 10.	< 0.0010	
-	0 – 1'			
B-07		13.	0.0013	
-	0 – 1'			
B-09		23.	0.0023	
-	0 – 1'			

NOTE: [1]Percent by weight after drying and sample prepared in accordance with the Requirements of the Standard.

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ASTM D 512 – Chloride Method B Continued

Sample		Results		Detection Limit
		ppm (mg/kg)	%[1]	
B-10		< 10.	< 0.0010	10.
-	0 – 1’			
B-11		< 10.	< 0.0010	
-	0 – 1’			
B-12		11.	0.0010	
-	0 – 1’			
B-14		37.	0.0037	
-	0 – 1’			
B-16		31.	0.0031	
-	0 – 1’			
B-17		19.	0.0019	
-	0 – 1’			
B-18		13.	0.0013	
-	0 – 1’			
B-19		27.	0.0027	
-	0 – 1’			
B-20		26.	0.0026	
-	0 – 1’			

NOTE: [1]Percent by weight after drying and sample prepared in accordance with the Requirements of the Standard.

ASTM D 516 – Sulfate (soluble)

Sample		Results		Detection Limit
		ppm (mg/kg)	%[1]	
B-01		16.	0.0016	10.
-	0 – 1’			
B-02		14.	0.0014	
-	0 – 1’			
B-03		< 10.	< 0.0010	
-	0 – 1’			

NOTE: [1]Percent by weight after drying and sample prepared in accordance with the Requirements of the Standard.

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ASTM D 516 – Sulfate (soluble)

Sample		Results		Detection Limit
		ppm (mg/kg)	%[1]	
B-05		20.	0.0020	10.
-	0 – 1’			
B-06		36.	0.0036	
-	0 – 1’			
B-07		28.	0.0028	
-	0 – 1’			
B-09		26.	0.0026	
-	0 – 1’			
B-10		14.	0.0014	
-	0 – 1’			
B-11		< 10.	< 0.0010	
-	0 – 1’			
B-12		14.	0.0014	
-	0 – 1’			
B-14		< 10.	< 0.0010	
-	0 – 1’			
B-16		< 10.	< 0.0010	
-	0 – 1’			
B-17		12.	0.0012	
-	0 – 1’			
B-18		12.	0.0012	
-	0 – 1’			
B-19		< 10.	< 0.0010	
-	0 – 1’			
B-20		< 10.	< 0.0010	
-	0 – 1’			

NOTE: [1]Percent by weight after drying and sample prepared in accordance with the Requirements of the Standard.

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Analysis TS-A2009192
GeoTesting Express, Inc.
Page 4 of 5
Report Date: 27 November 2020

CERTIFICATE OF ANALYSIS

USEPA Method 376.2 – Sulfide (soluble)

Sample		Results		Detection Limit
		ppb (µg/kg)	%[1]	
B-01		380.	0.0000380	10.
-	0 – 1’			
B-02		380.	0.0000380	
-	0 – 1’			
B-03		340.	0.0000340	
-	0 – 1’			
B-05		150.	0.0000150	
-	0 – 1’			
B-06		140.	0.0000140	
-	0 – 1’			
B-07		140.	0.0000140	
-	0 – 1’			
B-09		130.	0.0000130	
-	0 – 1’			
B-10		100.	0.0000100	
-	0 – 1’			
B-11		230.	0.0000230	
-	0 – 1’			
B-12		310.	0.0000310	
-	0 – 1’			
B-14		370.	0.0000370	
-	0 – 1’			
B-16		280.	0.0000280	
-	0 – 1’			

NOTE: [1]Percent by weight after drying and sample prepared in accordance with the Requirements of the Standard.

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CERTIFICATE OF ANALYSIS

USEPA Method 376.2 – Sulfide (soluble) Continued

Sample		Results		Detection Limit
		ppb (µg/kg)	%[1]	
B-17		450.	0.0000450	10.
-	0 – 1’			
B-18		310.	0.0000310	
-	0 – 1’			
B-19		350.	0.0000350	
-	0 – 1’			
B-20		530.	0.0000530	
-	0 – 1’			

NOTE: [1]Percent by weight after drying and sample prepared in accordance with the Requirements of the Standard.

END OF ANALYSIS

USEPA Laboratory ID UT00930

Merrill Gee P.E. – Engineer in Charge

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Conway, Eric
658 Grassmere Park Drive Ste 100
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phone: 706-542-5350
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Soil Samples

Ag & Environmental Services Labs
Soil, Plant, and Water Laboratory

Completed: May 06, 2022

		Total Acid Digestion																	
		ppm (parts per million)																	
Lab	**Sample**	**Al** aluminum	**As** arsenic	**B** boron	**Ca** calcium	**Cd** cadmium	**Cr** chromium	**Cu** copper	**Fe** iron	**K** potassium	**Mg** magnesium	**Mn** manganese	**Mo** molybdenum	**Na** sodium	**Ni** nickel	**P** phosphorus	**Pb** lead	**S** sulfur	**Zn** zinc
Values smaller than these pose minimal health risk		no limit	<20	no limit	no limit	<2	<100	<100	no limit	no limit	no limit	<3500	<440	no limit	<50	no limit	<75	no limit	<100
59561	B-01 Proj.#217634	14571	3.59	8.37	1774	0.68	13.1	7.69	13603	980	863	1773	1.22	<25.0	13.27	341	11.94	141.0	41.6
59562	B-03 Proj.#217634	11067	2.20	6.07	1508	<0.50	11.2	4.51	8964	616	583	1025	<0.50	<25.0	8.08	408	8.97	169.8	45.0
59563	B-05 Proj.#217634	13475	6.97	14.08	1303	1.08	32.4	5.39	26599	472	699	898	1.12	<25.0	7.69	381	15.27	133.4	33.5
59564	B-07 Proj.#217634	16661	5.25	12.28	1645	0.90	21.8	6.82	21796	703	863	935	1.24	<25.0	9.54	318	14.81	121.6	32.0
59565	B-09 Proj.#217634	15958	4.21	9.55	493	0.75	14.8	7.99	15736	1162	865	1562	0.52	<25.0	13.00	292	11.99	109.6	35.8
59566	B-10 Proj.#217634	11386	5.24	8.27	994	0.68	16.8	5.59	13698	538	620	953	<0.50	<25.0	7.75	357	3.59	141.7	35.4
59567	B-11 Proj.#217634	14114	5.71	9.67	934	0.66	25.9	7.34	16806	841	821	353	0.59	<25.0	9.75	341	17.06	105.7	35.4
59568	B-12 Proj.#217634	15226	5.95	10.18	1673	0.82	32.4	8.33	16996	1153	848	1125	<0.50	<25.0	11.87	383	16.94	171.6	36.9
59569	B-17 Proj.#217634	17188	2.28	9.98	985	0.72	16.3	8.70	16562	1291	914	1743	<0.50	<25.0	13.50	285	34.08	130.2	40.7
59570	B-20 Proj.#217634	17956	3.74	9.79	1403	0.72	17.2	8.76	17642	976	1083	722	0.55	<25.0	13.47	333	17.83	89.0	41.7

For additional information, see http://extension.uga.edu/publications/files/pdf/C%201075_2.PDF

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Ag & Environmental Services Labs
Soil, Plant, and Water Laboratory

Soil Samples

Completed: May 06, 2022

		Saturated Paste Extract							
		mg/L (ppm)					mmhos/cm	ppm	
Lab	Sample	Ca	Mg	K	Na	pH	Electrical Conductivity	Total Soluble Salts	Sodium Adsorption Ratio
59561	B-01 Proj.#217634	12.05	8.58	34.81	1.36	6.97	0.10	66.7	0.07
59562	B-03 Proj.#217634	8.78	3.69	20.66	0.78	6.69	0.10	64.0	0.06
59563	B-05 Proj.#217634	6.71	3.75	9.93	0.79	6.53	0.05	35.6	0.06
59564	B-07 Proj.#217634	16.62	11.84	28.22	1.46	6.69	0.08	54.1	0.07
59565	B-09 Proj.#217634	4.69	0.93	16.68	<0.50	5.31	0.11	70.6	<0.06
59566	B-10 Proj.#217634	11.84	5.97	18.78	1.10	5.77	0.10	65.3	0.07
59567	B-11 Proj.#217634	10.26	8.71	28.94	1.15	5.51	0.10	66.0	0.06
59568	B-12 Proj.#217634	16.00	9.82	32.57	1.13	6.14	0.10	67.3	0.06
59569	B-17 Proj.#217634	10.95	1.36	12.35	<0.50	5.65	0.13	85.8	<0.04
59570	B-20 Proj.#217634	6.45	4.86	19.10	0.70	6.34	0.06	42.2	0.05

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Soil, Plant, and Water Laboratory

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phone: 706-542-5350
email: soiltest@uga.edu
http://aesl.ces.uga.edu

Completed: May 06, 2022

Soil Samples

		%	
Lab	**Sample**	**C**	**N**
59561	B-01 Proj.#217634	1.16	0.10
59562	B-03 Proj.#217634	1.72	0.17
59563	B-05 Proj.#217634	1.06	0.11
59564	B-07 Proj.#217634	0.85	0.10
59565	B-09 Proj.#217634	0.69	0.08
59566	B-10 Proj.#217634	1.25	0.12
59567	B-11 Proj.#217634	0.79	0.08
59568	B-12 Proj.#217634	1.43	0.15
59569	B-17 Proj.#217634	0.89	0.10
59570	B-20 Proj.#217634	0.70	0.09

Project X
Corrosion Engineering
Corrosion Control – Soil & Forensics Lab

Soil Corrosivity Evaluation Report for Russellville Solar Facility

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1 Executive Summary

A corrosion evaluation of the soils at Russellville Solar Facility was performed to provide corrosion control recommendations for general construction materials. The site is located at 333 **Watermelon Road, Russellville, Kentucky 42276**. Twenty (20) samples were tested to a depth of 5.0 ft. Site ground water and topography information was provided by S&ME, Inc. Groundwater depth was determined to be Greater than 5 ft feet below finished grade.

Every material has its weakness. Aluminum alloys, galvanized/zinc coatings, and copper alloys do not survive well in very alkaline or very acidic pH environments. Copper and brasses do not survive well in high nitrate or ammonia environments. Steels and irons do not survive well in low soil resistivity and high chloride environments. High chloride environments can even overcome and attack steel encased in normally protective concrete. Concrete does not survive well in high sulfate environments. And nothing survives well in high sulfide and low redox potential environments with corrosive bacteria. This is why Project X tests for these 8 factors to determine a soil's corrosivity towards various construction materials. **Depending solely on soil resistivity or Caltrans corrosion guidelines (which concentrate on concrete/steel highways), will over-simplify descriptions as corrosive or non-corrosive. This approach will not detect these other factors attacking other metals because it is possible to have bad levels of corrosive ions and still have greater than 1,100 ohm-cm soil resistivity. We have observed this fact on thousands of soil samples tested in our laboratory.**

It should not be forgotten that import soil should also be tested for all factors to avoid making your site more corrosive than it was to begin with.

The recommendations outlined herein are not a substitute for any design documents previously prepared for the purpose of construction and apply only to the depth of samples collected.

Soil samples were tested for minimum resistivity, pH, chlorides, sulfates, ammonia, nitrates, sulfides and redox.

As-Received soil resistivities ranged between 2,345 ohm-cm and 18,090.0 ohm-cm. This data would be similar to a Wenner 4 pin test in the field and used in the design of a cathodic protection or grounding bed system. This resistivity can change seasonally depending on the weather and moisture in the ground. This reading alone can be misleading because condensation or minor water leaks will occur underground along pipe surfaces creating a saturated soil environment in the trench on infrastructure surfaces. This is why minimum or saturated soil resistivity measurements are more important than as-received resistivities.

Saturated soil resistivities ranged between 871 ohm-cm to 16,080 ohm-cm. The worst of these values is considered to be severely corrosive to general metals but most samples were considered to be moderately corrosive to general metals.

PH levels ranged between 5.4 to 8.2 pH. PH levels were determined to be at levels not detrimental to copper or aluminum alloys. The pH of these samples can allow corrosion of steel and iron in moist environments.

Chlorides ranged between 3 mg/kg to 82 mg/kg. Chloride levels in these samples are low and may cause insignificant corrosion of metals.

Sulfates ranged between 10 mg/kg to 173 mg/kg. Sulfate levels in these samples are negligible for corrosion of cement. Any type of cement can be used that does not contain encased metal.

Ammonia ranged between 0.0 mg/kg to 12.9 mg/kg. Nitrates ranged between 0.1 mg/kg to 65.0 mg/kg.Concentrations of these elements were not high enough to cause accelerated corrosion of copper and copper alloys such as brass.

Sulfides presence was determined to be trace. REDOX ranged between + 126 mV to + 200 mV. The probability of corrosive bacteria was determined to be low due to the sulfide and positive REDOX levels determined in these samples.

2 Corrosion Control Recommendations

The following recommendations are based upon the results of soil testing.

2.1 Cement

The highest reading for sulfates was 173 mg/kg or 0.0173 percent by weight.

Per ACI 318-14, Table 19.3.1.1, sulfate levels in these samples categorized as S0 and are negligible for corrosion of metals and cement. Per ACI 318-14 Table 19.3.2.1 any type of cement not containing steel or other metal can be used.

2.2 Steel Reinforced Cement/ Cement Mortar Lined & Coated (CML&C)

Chlorides in soil can overcome the corrosion inhibiting property of cement for steel, as it can also break through passivated surfaces of aluminum and stainless steels.[1,2] The highest concentration of chlorides was 82 mg/kg.

Chloride levels in these samples are not significantly corrosive to metals not in tension. Standard cement cover may be used in these soils.

Though soils at some locations are significantly corrosive to various metals, per ACI 318-14 Chapter 19 Table 19.3.1.1, all slabs on this site exposure categories and class for **Corrosion Protection of Reinforcement (C) would be considered C1** as Concrete exposed to moisture [mud/rain] (slab sides and bottom) but not to an external source of chlorides. Though there are chlorides in the soil, ACI 318's definition of "external source of chlorides" consists of deicing chemicals, salt, brackish water, seawater, or spray from these sources. The chloride levels in seawater are typically over 19,000 mg/L or 19,000 ppm.

When concrete is tested for water-soluble chloride ion content, the tests should be made at an age of 28 to 42 days. The limits in Per ACI 318-14 Table 5.3.2.1 are to be applied to chlorides contributed from the concrete ingredients, not those from the environment surrounding the concrete.[3]

[1] Design Manual 303: Cement Cylinder Pipe. Ameron. p.65
[2] *Chapter 19, Table 1904.2.2(1), 2012 International Building Code*

[3] ACI 381-14., BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE (ACI 318-14) AND COMMENTARY (ACI 318R-14)

2.3 Stainless Steel Pipe/Conduit/Fittings

Stainless steels derive their corrosion resistance from their chromium content and oxide layer which needs oxygen to regenerate if damaged. Thus stainless steel is not good for deep soil applications where oxygen levels are extremely low. Stainless steels should not be installed deeper than a plant root zone. Stainless steels typically have the same nobility as copper on the galvanic series and can be connected to copper. If stainless steel must be used, it must be backfilled with soil having greater than 10,000 ohm-cm resistivity and excellent drainage. 304 Stainless steel will also corrode if in contact with carbon materials such as activated carbon. Stainless steel welds should be pickled.

The soil at this site has low probability for anaerobic corrosive bacteria and low chloride levels. Per Nickel Institute guidelines, 304 or 316 Stainless steels can be used in these soils.

2.4 Steel Post Tensioning Systems

The proper sealing of stressing holes is of utmost importance in PT Systems. Cut off excess strand 1/2" to 3/4" back in the hole. Coat or paint exposed anchorage, grippers, and stub of strands with "Rust-o-leum" or equal. After tendons have been coated, the cement contractor shall dry pack blockouts within ten (10) days. A non-shrink, non-metallic, non-porous moisture-insensitive grout (Master EMACO S 488 or equivalent), or epoxy grout shall be used for this purpose. If an encapsulated post-tension system is used, regular non-shrink grout can be used.

Due to the low chloride concentrations measured on samples obtained from this site, post-tensioned slabs should be protected in accordance with soil considered normal (non-corrosive).[4,5] Addition of grease caps to the cut strand at live end anchors can deter construction defect accusations but are not needed.

2.5 Steel Piles

Steel piles are most susceptible to corrosion in disturbed soil where oxygen is available. Further, a dissimilar environment corrosion cell would exist between the steel embedded in cement, such as pile caps and the steel in the soil. In the cell, the steel in the soil is the anode (corroding metal), and the steel in cement is the cathode (protected metal). This cell can be minimized by coating the part of the steel piles that will be embedded in cement to prevent contact with cement and reinforcing steel.

Piles driven into soils without disturbing soils will avoid oxygen introduction and low corrosion rates unless there is a probability for corrosive anaerobic bacteria. Galvanized steel's zinc coating can provide significant protection for driven piles. In corrosive soils in which normal zinc coatings are not enough, the life of piles can be extended by increasing zinc coating thickness, using sacrificial metal, or providing a combination of epoxy coatings and cathodic protection. Corrosion has been observed to be extremely localized even at and below underground water tables. Pit depths of this magnitude do not have an appreciable effect on the strength or useful life of piling structures because the reduction in pile cross section is not

[4] *Standard Requirements for Design and Analysis of Shallow Post-Tensioned Concrete Foundations on Expansive Soils, PTI DC10.5-12,Table 4.1, pg 16*
[5] *Specification for Unbonded Single Strand Tendons. Post-tensioning Institute (PTI), Phoenix, AZ, 2000.*

significant.[6] Pitting is of more importance to pipes transporting liquids or gases which should not be leaked into the ground.

The following recommendations are recommended to achieve desired life. We defer to structural engineers to use our estimated corrosion rates and to choose from the corrosion control options listed below.

1) Sacrificial metal by use of thicker piles per non-disturbed soil corrosion rates, or
2) Galvanized steel piles per non-disturbed soil corrosion rates, or
3) Combination of galvanized and sacrificial metal per non-disturbed soil corrosion rates, or
4) For no loss of metal, coat entire pile with abrasion resistant epoxy coating such as 3M Scotchkote 323, or PowercreteDD, or equivalent, or
5) Use high yield steel which will corrode at the same rate as mild steel but have greater yield strength and thus be able to suffer more material loss than mild steel.

2.5.1 Expected Corrosion Rate of Steel and Zinc in disturbed soil

In general, the corrosion rate of metals in soil depends on the electrical resistivity, the elemental composition, and the oxygen content of the soil. Soils can vary greatly from one acre to the next, especially at earthquake faults. The better a soil is for farming; the easier it will be for corrosion to take place. Expansive soils will also be considered disturbed simply because of their nature from dry to wet seasons.

In Melvin Romanoff's NBS Circular 579, the corrosion rates of carbon steels and various metals was studied over long term periods. Various metals were placed in various soil types to gather corrosion rate data of all metals in all soil types. Samples were collected and material loss measured over the course of 20 years in some sites. The following corrosion rates were estimated by comparing the worst results of soils tested with similar soils in Romanoff's studies and Highway Research Board's publications.[7] The corrosion rate of zinc in disturbed soils is determined per Romanoff studies and King Nomograph.[8]

Expected Corrosion Rate for Steel = 1.54 mils/year for one sided attack

Expected Corrosion Rate for Zinc = 0.08 mils/year for one sided attack.

Note: 1 mil = 0.001 inch

In undisturbed soils, a corrosion rate of 1.00 mil/year for steel is expected with little change in the corrosion rate of zinc due to it's low nobility in the galvanic series.

Per CTM 643: Years to perforation of corrugated galvanized steel culverts

- 33.7 Years to Perforation for a 18 gage metal culvert
- 43.9 Years to Perforation for a 16 gage metal culvert
- 54.0 Years to Perforation for a 14 gage metal culvert

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[6] Melvin Romanoff, Corrosion of Steel Pilings in Soils, National Bureau of Standards Monograph 58, pg 20.

[7] Field test for Estimating Service Life of Corrugated Metal Culverts, J.L. Beaton, Proc. Highway Research Board, Vol 41, P. 255, 1962

[8] King, R.A. 1977, Corrosion Nomograph, TRRC Supplementary Report, British Corrosion Journal

- 74.2 Years to Perforation for a 12 gage metal culvert
- 94.5 Years to Perforation for a 10 gage metal culvert
- 114.7 Years to Perforation for a 8 gage metal culvert

2.5.2 Expected Corrosion Rate of Steel and Zinc in Undisturbed soil

Expected Corrosion Rate for Steel = 1.00 mils/year for one sided attack

Expected Corrosion Rate for Zinc = 0.08 mils/year for one sided attack.

Note: 1 mil = 0.001 inch

2.6 Steel Storage tanks

Underground fuel tanks must be constructed and protected in accordance with California Underground Storage Tank Regulations, CCR, Title 23, Division 3, Chapter 16. Metals should be protected with cathodic protection or isolated from backfill material with an epoxy coating.

2.7 Steel Pipelines

Though a site may not be corrosive in nature at the time of construction, **installation of corrosion test stations and electrical continuity joint bonding should be performed during construction** so that future corrosion inspections can be performed. If steel pipes with gasket joints or other possibly non-conductive type joints are installed, their joints should be bonded across by welding or pin brazing a #8 AWG copper strand bond cable. Electrical continuity is necessary for corrosion inspections and for cathodic protection.

Corrosion test stations should be installed every 1,000 feet of pipeline.

Test stations shall have two #8 HMWPE copper strand wire test leads welded or pin brazed to the underground pipe, brought up into the test station hand hole and marked CTS. Wires should be brought into test station hand hole at finished grade with 12 inches of wire coiled within test station.

At isolation joints and pipe casings, 4 wire test stations shall be installed using #8 HMWPE copper strand wire test leads. Use different color wires to distinguish which wires are bonded to one side of isolation joint or to casing. Wires should be brought into test station hand hole at finished grade with 12 inches of wire coiled within test station.

Prevent dissimilar metal corrosion cells per NACE SP0286:

1) Electrically isolate dissimilar metal connections
2) Electrically isolate dissimilar coatings (Epoxy vs CML&C) segments connections
3) Electrically isolate river crossing segments
4) Electrically isolate freeway crossing segments
5) Electrically isolate old existing pipelines from new pipelines
6) Electrically isolate aboveground and underground pipe segments with flange isolation joint kits per NACE SP0286 to avoid galvanic corrosion cells. **These are especially important for fire risers.**

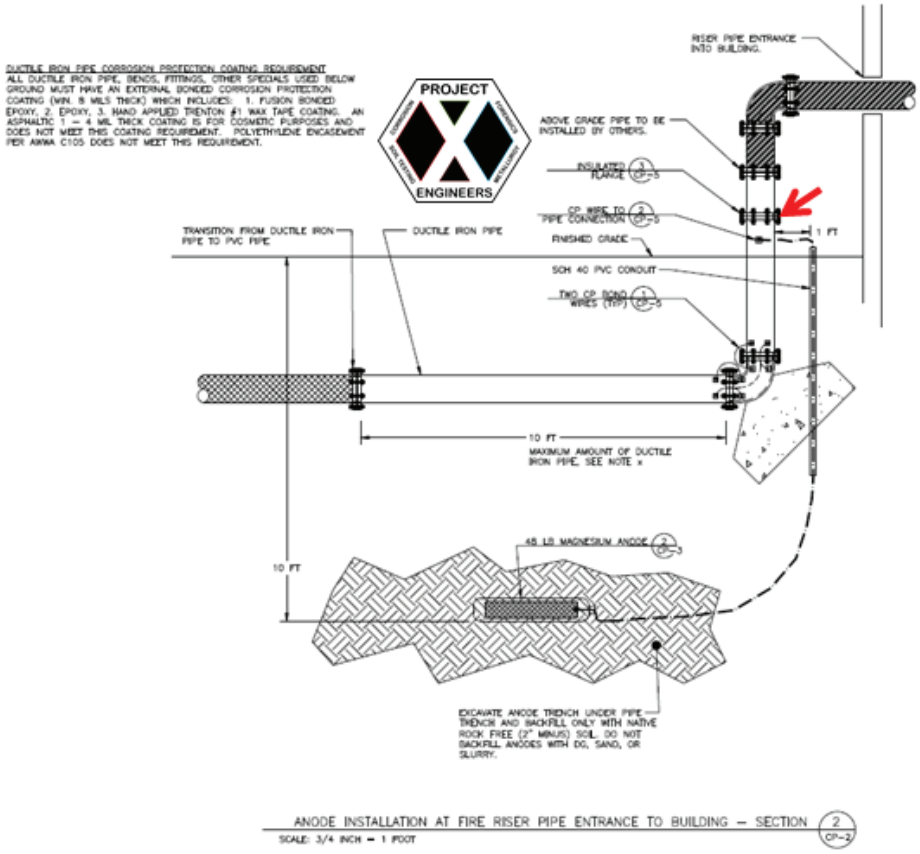

Figure 1- Fire Riser Detail: Install Isolation joint at red arrow

The bare steel surfaces, the corrosivity at this site is mildly corrosive to steel. The corrosion control options for this site are as follows:

1) Apply impermeable dielectric coating such as minimum 10 mil thick polyethylene, or
2) Tape coating system per AWWA C214, or
3) Wax tape per AWWA C217, or
4) Coal tar enamel per AWWA C203, or
5) Fusion bonded epoxy per AWWA C213, or
6) For bare steel surfaces, such as welded pipe joints, apply 3 inch thick field coating of Type II cement or high pH slurry that will maintain pH higher than 12. Cement is both a corrosion inhibitor and a coating for ferrous metals. Cement naturally holds a pH of 12 or higher for many years if not exposed to high levels of carbon dioxide. (For CML&C pipes, CML&C factory applied 3/4 inch thick coating is equivalent and needs no extra thickness added.)

It is critical for the life of the pipe that the protective wrap contains no openings or holes. Prevent damage to the protective sleeve during backfilling of the pipe trench. Penetrations of any kind within these or other protective materials generally leads to accelerated corrosion failure due to the fact that the corrosion attack is concentrated at the location of these penetrations. Cathodic protection will protect these defects. The better the coating, the less

expensive a cathodic protection system will be in anode material and power requirement if needed.

2.8 Steel Fittings

The corrosivity at this site is mildly corrosive to steel. The corrosion control options for this site can be one of the following:

1) Apply impermeable dielectric coating such as minimum 10 mil thick polyethylene, or
2) Tape coating system per AWWA C214, or
3) Wax tape per AWWA C217, or
4) Coal tar enamel per AWWA C203, or
5) Fusion bonded epoxy per AWWA C213
6) Use powder coated steel with minimum 60 micron (2-3 mil) thick coating[9], or
7) Galvanized steel, or
8) Apply standard concrete cover of Type II cement or high pH slurry that will maintain pH higher than 12. Cement is both a corrosion inhibitor and a coating for ferrous metals. Cement naturally holds a pH of 12 or higher for many years if not exposed to high levels of carbon dioxide.

It is critical for the life of the metal that the protective wrap contains no openings or holes. Prevent damage to the protective sleeve during backfilling of the pipe trench. Penetrations of any kind within these or other protective materials generally leads to accelerated corrosion failure due to the fact that the corrosion attack is concentrated at the location of these penetrations. Cathodic protection will protect these defects. The better the coating, the less expensive a cathodic protection system will be in anode material and power requirement if needed.

2.9 Ductile Iron (DI) & Cast Iron Fittings

AWWA C105 developed a 10 point system to classify sites as aggressive or non-aggressive to ductile iron materials. The 10-point system does not, and was never intended to, quantify the corrosivity of a soil. It is a tool used to distinguish nonaggressive from aggressive soils relative to iron pipe. Soils <10 points are considered nonaggressive to iron pipe, whereas soils ≥10 points are considered aggressive. A 15 and a 20 point soil are both considered aggressive to iron pipe, however, because of the nature of the soil parameters measured, the 20 point soil may not necessarily be more aggressive than the 15 point soil. The criterion is based upon soil resistivities, soil drainage, pH, sulfide presence, and reduction-oxidation (REDOX) potential. The soil samples tested for this site resulted in a score of 11 out of 25.5. A score greater or equal

[9] Manish Kumar Bhadu, Akshya Kumar Guin, Veena Singh, Shyam K. Choudhary, "Corrosion Study of Powder-Coated Galvanised Steel", International Scholarly Research Notices, vol. 2013, Article ID 464710, 9 pages, 2013

to 10 points classifies soils as aggressive to iron materials. The black coating on iron pipes is purely for aesthetic purposes and should not be relied upon for corrosion protection.[10]

The corrosivity at this site is mildly corrosive to iron. The corrosion control options for this site are as follows:

1) Apply impermeable dielectric coating such as minimum 10 mil thick polyethylene, or
2) Tape coating system per AWWA C214, or
3) Wax tape per AWWA C217, or
4) Coal tar enamel per AWWA C203, or
5) Fusion bonded epoxy per AWWA C213
6) Apply standard concrete cover of Type II cement or high pH slurry that will maintain pH higher than 12. Cement is both a corrosion inhibitor and a coating for ferrous metals. Cement naturally holds a pH of 12 or higher for many years if not exposed to high levels of carbon dioxide.

It is critical for the life of the metal that the protective wrap contains no openings or holes. Prevent damage to the protective sleeve during backfilling of the pipe trench. Penetrations of any kind within these or other protective materials generally leads to accelerated corrosion failure due to the fact that the corrosion attack is concentrated at the location of these penetrations. Cathodic protection will protect these defects. The better the coating, the less expensive a cathodic protection system will be in anode material and power requirement if needed.

2.10 Ductile Iron & Cast Iron Pipe

AWWA C105 developed a 10 point system to classify sites as aggressive or non-aggressive to ductile iron materials. The 10-point system does not, and was never intended to, quantify the corrosivity of a soil. It is a tool used to distinguish nonaggressive from aggressive soils relative to iron pipe. Soils <10 points are considered nonaggressive to iron pipe, whereas soils ≥10 points are considered aggressive. A 15 and a 20 point soil are both considered aggressive to iron pipe, however, because of the nature of the soil parameters measured, the 20 point soil may not necessarily be more aggressive than the 15 point soil. The criterion is based upon soil resistivities, soil drainage, pH, sulfide presence, and reduction-oxidation (REDOX) potential. The soil samples tested for this site resulted in a score of 11 out of 25.5. A score greater or equal to 10 points classifies soils as aggressive to iron materials. The black coating on iron pipes is purely for aesthetic purposes and should not be relied upon for corrosion protection.[11]

Though a site may not be corrosive in nature at the time of construction, **installation of corrosion test stations and electrical continuity joint bonding should be performed during construction** so that future corrosion inspections can be performed. If steel pipes with gasket joints or other possibly non-conductive type joints are installed, their joints should be bonded across by welding or pin brazing a #8 AWG copper strand bond cable. Electrical continuity is necessary for corrosion inspections and for cathodic protection. **If using thermite, perform one**

[10] https://www.dipra.org/ductile-iron-pipe-resources/frequently-asked-questions/corrosion-control

[11] https://www.dipra.org/ductile-iron-pipe-resources/frequently-asked-questions/corrosion-control

test bond using a half-charge then pressure test to confirm excess heat and pinholes were not created.

Pea gravel is used by plumbers to lay pipes and establish slopes. If the gravel has more than 200 ppm chlorides or is not tested, a 25 mil plastic should be placed between the gravel and pipe to avoid corrosion.

Corrosion test stations should be installed every 1,000 feet of pipeline.

Test stations shall have two #8 HMWPE copper strand wire test leads welded or pin brazed to the underground pipe, brought up into the test station hand hole and marked CTS. Wires should be brought into test station hand hole at finished grade with 12 inches of wire coiled within test station.

At isolation joints and pipe casings, 4 wire test stations shall be installed using #8 HMWPE copper strand wire test leads. Use different color wires to distinguish which wires are bonded to one side of isolation joint or to casing. Wires should be brought into test station hand hole at finished grade with 12 inches of wire coiled within test station.

Prevent dissimilar metal corrosion cells per NACE SP0286:

1) Electrically isolate dissimilar metal connections
2) Electrically isolate dissimilar coatings (Epoxy vs CML&C) segments connections
3) Electrically isolate river crossing segments
4) Electrically isolate freeway crossing segments
5) Electrically isolate old existing pipelines from new pipelines
6) Electrically isolate aboveground and underground pipe segments with flange isolation joint kits per NACE SP0286**. These are especially important for fire risers.**

The corrosivity at this site is mildly corrosive to iron. The corrosion control options for this site are as follows:

1) Apply impermeable dielectric coating such as minimum 10 mil thick polyethylene, or
2) Tape coating system per AWWA C214, or
3) Wax tape per AWWA C217, or
4) Coal tar enamel per AWWA C203, or
5) Fusion bonded epoxy per AWWA C213
6) Apply standard concrete cover of Type II cement or high pH slurry that will maintain pH higher than 12. Cement is both a corrosion inhibitor and a coating for ferrous metals. Cement naturally holds a pH of 12 or higher for many years if not exposed to high levels of carbon dioxide.

It is critical for the life of the metal that the protective wrap contains no openings or holes. Prevent damage to the protective sleeve during backfilling of the pipe trench. Penetrations of any kind within these or other protective materials generally leads to accelerated corrosion failure due to the fact that the corrosion attack is concentrated at the location of these penetrations. Cathodic protection will protect these defects. The better the coating, the less

expensive a cathodic protection system will be in anode material and power requirement if needed.

2.11 Copper Materials

Copper is an amphoteric material which is susceptible to corrosion at very high and very low pH. It is one of the most noble metals used in construction thus typically making it a cathode when connected to dissimilar metals. Copper's nobility can change with temperature, similar to the phenomenon in zinc. When zinc is at room temperature, it is less noble than steel and can provide cathodic protection to steel. But when zinc is at a temperature above 140F such as in a water heater, it becomes more noble than the steel and the steel becomes the sacrificial anode. This is why zinc is not used in steel water heaters or boilers. Cold copper has one native potential, but when heated it develops a more electronegative electro-potential aka open circuit potential. Thus hot and cold copper pipes should be electrically isolated from each other to avoid creation of a thermo-galvanic corrosion cell.

2.11.1 Copper Pipes

The lowest pH for this area was measured to be 5.4. Copper is greatly affected by pH, ammonia and nitrate concentrations[12]. The highest nitrate concentration was 65.0 mg/kg and the highest ammonia concentration was 12.9 mg/kg at this site.

These soils were determined mildly corrosive to copper and copper alloys such as brass.

Underground, aboveground, cold water, and hot water pipes should be electrically isolated from each other by use of dielectric unions and plastic in-wall pipe supports per NACE SP0286. The following are corrosion control options for underground copper water pipes.

1) Cover cold copper piping with minimum 8 mil polyethylene and backfill with clean sand with 2 inch minimum cover above and below tubing. Backfill should have a pH between 6 and 8 with electrical resistivity greater than 2,000 ohm-cm
2) Heat increases corrosion rates. Hot water pipes should be installed within PVC piping to prevent soil contact, or
3) Cover hot water pipes with minimum 8 mil polyethylene sleeve or incase in double 4-mil thick polyethylene sleeves over a suitable primer

It is critical for the life of the metal that the protective wrap contains no openings or holes. Prevent damage to the protective sleeve during backfilling of the pipe trench. Penetrations of any kind within these or other protective materials generally leads to accelerated corrosion failure due to the fact that the corrosion attack is concentrated at the location of these penetrations. Cathodic protection will protect these defects. The better the coating, the less expensive a cathodic protection system will be in anode material and power requirement if needed.

2.11.2 Brass Fittings

Brass fittings should be electrically isolated from dissimilar metals by use of dielectric unions or isolation joint kits per NACE SP0286.

[12] Corrosion Data Handbook, Table 6, Corrosion Resistance of copper alloys to various environments, 1995

These soils were determined to be mildly corrosive to copper and copper alloys such as brass.

The following are corrosion control options for underground brass.

1) Cover with minimum 10 mil polyethylene or other impermeable coating and backfill with clean sand with 4 inch minimum cover above and below brass. Backfill should have a pH between 6 and 8 with electrical resistivity greater than 2,000 ohm-cm, or
2) Wrap fitting or valves in wax tape

It is critical for the life of the metal that the protective wrap contains no openings or holes. Prevent damage to the protective sleeve during backfilling of the pipe trench. Penetrations of any kind within these or other protective materials generally leads to accelerated corrosion failure due to the fact that the corrosion attack is concentrated at the location of these penetrations. Cathodic protection will protect these defects. The better the coating, the less expensive a cathodic protection system will be in anode material and power requirement if needed.

2.11.3 Bare Copper Grounding Wire

It is assumed that corrosion will occur at all sides of the bare wire, thus the corrosion rate is calculated as a two sided attack determining the time it takes for the corrosion from two sides to meet at the center of the wire. The estimated life of bare copper wire for this site is the following:[13]

Size (AWG)	**Diameter (mils)**	**Est. Time to penetration (Yrs)**
14	64.1	1068.3
13	72	1200.0
12	80.8	1346.7
11	90.7	1511.7
10	101.9	1698.3
9	114.4	1906.7
8	128.5	2141.7
7	144.3	2405.0
6	162	2700.0
5	181.9	3031.7
4	204.3	3405.0
3	229.4	3823.3
2	257.6	4293.3
1	289.3	4821.7

If the bare copper wire is being used as a grounding wire connected to less noble metals such as galvanized steel or carbon steel, the less noble metals will provide additional cathodic protection to the copper reducing the corrosion rate of the copper.

[13] Soil-Corrosion studies 1946 and 1948: Copper Alloys, Lead, and Zinc, Melvin Romanoff, National Bureau of Standards, Research Paper RP2077, 1950

It is recommended that a corrosion inhibiting and water-repelling coating be applied to aboveground and belowground copper-to-dissimilar metal connections to reduce risk of dissimilar corrosion. This can be wax tape, or other epoxy coating.

Tinned copper wiring or laying copper wire in conductive concrete can protect against chemical attack in soils with high nitrates, ammonia, sulfide and severely low soil electrical resistivity.

2.12 Aluminum Pipe/Conduit/Fittings

Aluminum is an amphoteric material prone to pitting corrosion in environments that are very acidic or very alkaline or high in chlorides.

Conditions at this site are safe for aluminum.

Aluminum derives its corrosion resistance from its oxide layer which needs oxygen to regenerate if damaged, similar to stainless steels. Thus aluminum is not good for deep soil applications. Since aluminum corrodes at very alkaline environments, it cannot be encased or placed against cement or mortar such as brick wall mortar up against an aluminum window frame.

Aluminum is also very low on the galvanic series scale making it most likely to become a sacrificial anode when in contact with dissimilar metals in moist environments. Avoid electrical continuity with dissimilar metals by use of insulators, dielectric unions, or isolation joints per NACE SP0286. Pooling of water at post bottoms or surfaces should be avoided by integrating good drainage.

2.13 Carbon Fiber or Graphite Materials

Carbon fiber or other graphite materials are extremely noble on the galvanic series and should always be electrically isolated from dissimilar metals. They can conduct electricity and will create corrosion cells if placed in contact within a moist environment with any metal.

2.14 Plastic and Vitrified Clay Pipe

No special precautions are required for plastic and vitrified clay piping from a corrosion viewpoint.

Protect all metallic fittings and pipe restraining joints with wax tape per AWWA C217, cement if previously recommended, or epoxy.

3 CLOSURE

In addition to soils chemistry and resistivity, another contributing influence to the corrosion of buried metallic structures is stray electrical currents. These electrical currents flowing through the earth originate from buried electrical systems, grounding of electrical systems in residences, commercial buildings, and from high voltage overhead power grids. Therefore, it is imperative that the application of protective wraps and/or coatings and electrical isolation joints be properly applied and inspected.

It is the responsibility of the builder and/or contractor to closely monitor the installation of such materials requiring protection in order to assure that the protective wraps or coatings are not damaged.

The recommendations outlined herein are in conformance with current accepted standards of practice that meet or exceed the provisions of the Uniform Building Code (UBC), the International Building Code (IBC), California Building Code (CBC), the American Cement Institute (ACI), Nickel Institute, National Association of Corrosion Engineers (NACE International), Post-Tensioning Institute Guide Specifications and State of California Department of Transportation, Standard Specifications, American Water Works Association (AWWA) and the Ductile Iron Pipe Research Association (DIPRA).

Our services have been performed with the usual thoroughness and competence of the engineering profession. No other warranty or representation, either expressed or implied, is included or intended.

Please call if you have any questions.

Respectfully Submitted,

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Sr. Corrosion Consultant
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Professional Engineer
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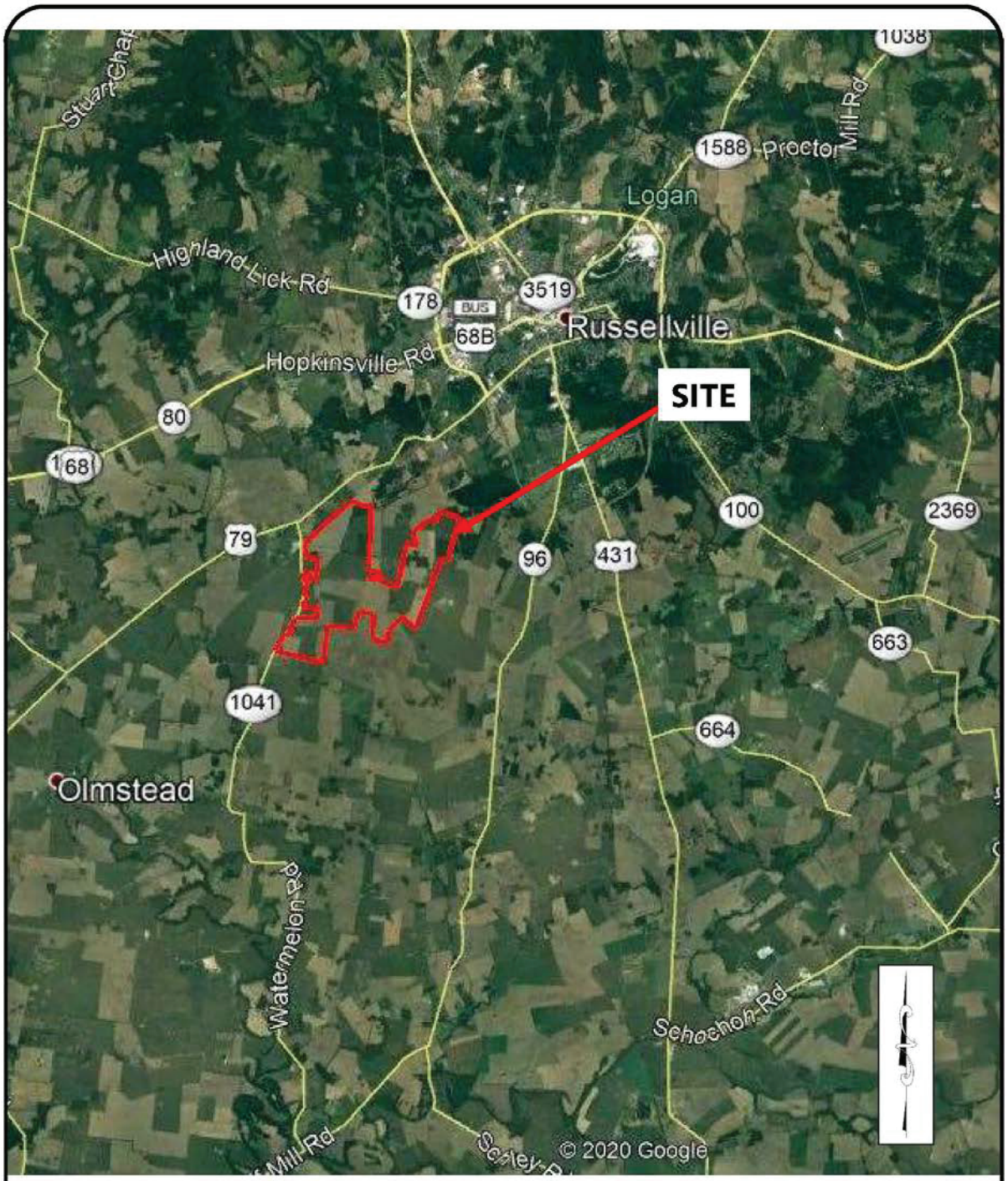
4 SOIL ANALYSIS LAB RESULTS

Client: S&ME, Inc.
Job Name: Russellville Solar Facility
Client Job Number: 22800023
Project X Job Number: S220427H
May 2, 2022

	Method	ASTM D4327		ASTM D4327		ASTM G187		ASTM G51	ASTM G200	SM 4500-D	ASTM D4327	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D4327	ASTM D4327
Bore# / Description	**Depth**	**Sulfates** SO_4^{2-}		**Chlorides** Cl^-		**Resistivity** As Rec'd	Minimum	**pH**	**Redox**	**Sulfide** S^{2-}	**Nitrate** NO_3^-	**Ammonium** NH_4^+	**Lithium** Li^+	**Sodium** Na^+	**Potassium** K^+	**Magnesium** Mg^{2+}	**Calcium** Ca^{2+}	**Fluoride** F_2^{--}	**Phosphate** PO_4^{3-}
	(ft)	(mg/kg)	(wt%)	(mg/kg)	(wt%)	(Ohm-cm)	(Ohm-cm)		(mV)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
B-101	0-1.5	38.5	0.0038	11.4	0.0011	5,226	5,092	6.6	181	0.15	1.0	3.0	ND	12.2	3.4	20.0	111.4	3.1	1.0
B-101	3.5-5	36.7	0.0037	13.4	0.0013	12,730	10,050	5.4	179	0.09	5.6	2.2	ND	13.2	2.8	18.7	88.7	1.4	0.6
B-103	0-1.5	30.2	0.0030	10.0	0.0010	2,948	2,747	7.5	153	0.39	1.9	12.9	0.02	11.7	1.9	19.8	80.6	4.4	2.7
B-103	3.5-5	25.5	0.0026	21.8	0.0022	8,710	7,370	5.4	200	0.36	5.9	4.2	ND	13.6	3.2	18.3	75.5	1.9	0.1
B-104	0-1.5	61.2	0.0061	24.5	0.0025	6,566	6,499	7.7	159	2.50	7.8	7.4	ND	25.0	7.7	20.9	90.1	2.7	1.7
B-104	3.5-5	51.2	0.0051	17.4	0.0017	16,080	15,410	7.0	191	0.33	8.2	6.2	ND	15.7	2.3	16.7	69.3	1.5	2.9
B-105	0-1.5	54.7	0.0055	14.6	0.0015	5,963	5,896	7.4	168	0.15	10.9	4.4	ND	16.7	2.2	19.2	74.9	3.0	0.5
B-105	3.5-5	9.5	0.0010	6.2	0.0006	16,750	16,080	7.5	161	<0.01	6.4	7.2	ND	10.8	2.7	17.4	59.2	1.8	0.7
B-108	0-1.5	67.8	0.0068	10.3	0.0010	8,710	8,040	7.3	172	<0.01	6.0	3.3	ND	14.1	3.8	16.0	51.5	2.8	1.8
B-108	3.5-5	129.5	0.0129	9.9	0.0010	12,730	11,390	7.2	126	<0.01	12.0	0.0	3.56	28.0	1.5	14.6	51.4	2.7	0.0
B-109	0-1.5	29.6	0.0030	5.8	0.0006	3,819	3,752	7.7	162	2.50	5.7	3.4	0.02	299.3	4.5	12.7	32.8	3.0	0.4
B-109	3.5-5	10.3	0.0010	3.4	0.0003	2,345	2,077	7.8	181	<0.01	0.1	1.0	ND	20.3	1.2	15.8	64.1	2.5	0.6
B-110	0-1.5	13.1	0.0013	2.9	0.0003	5,494	5,494	7.5	163	3.20	2.9	0.9	ND	4.9	19.0	15.3	104.2	2.0	12.7
B-110	3.5-5	53.2	0.0053	26.0	0.0026	10,720	871	6.5	171	<0.01	16.5	10.0	ND	17.8	22.0	11.5	64.1	1.8	0.1
B-114	0-1.5	17.2	0.0017	6.8	0.0007	8,710	8,710	7.1	159	0.70	16.0	7.3	ND	12.1	5.0	10.3	60.5	1.9	5.3
B-114	3.5-5	33.1	0.0033	4.7	0.0005	5,762	5,226	7.5	157	<0.01	6.5	9.1	ND	9.8	2.9	11.6	48.6	2.5	0.9
B-115	0-1.5	16.2	0.0016	5.3	0.0005	5,025	4,891	7.4	162	<0.01	4.3	10.1	ND	11.6	2.3	10.3	58.9	2.1	0.6
B-115	3.5-5	33.3	0.0033	11.3	0.0011	3,618	3,551	8.2	186	<0.01	5.2	2.1	ND	12.7	1.0	11.8	39.2	1.2	1.0
B-116	0-1.5	173.3	0.0173	82.2	0.0082	2,546	2,479	7.8	180	0.03	65.0	3.4	ND	84.7	4.8	18.2	33.2	3.6	2.3
B-116	3.5-5	55.6	0.0056	28.0	0.0028	18,090	14,070	7.7	182	<0.01	8.0	3.4	ND	23.0	2.2	18.7	36.8	2.7	1.3

Unk = Unknown
NT = Not Tested
ND = 0 = Not Detected
mg/kg = milligrams per kilogram (parts per million) of dry soil weight
Chemical Analysis performed on 1:3 Soil-To-Water extract
Anions and Cations tested via Ion Chromatograph except Sulfide.

Figure 2- Soil Sample Locations



REFERENCE:
GOOGLE EARTH

SITE LOCATION PLAN	SCALE: NOT TO SCALE	FIGURE NO.
RUSSELLVILLE SOLAR FACILITY 333 WATERMELON ROAD RUSSELLVILLE, KENTUCKY	DATE: 4-18-2022 PROJECT NUMBER 22800023	1

Figure 3- Vicinity Map

5 Corrosion Basics

In general, the corrosion rate of metals in soil depends on the electrical resistivity, the elemental composition, and the oxygen content of the soil. Soils can vary greatly from one acre to the next, especially at earthquake faults. The better a soil is for farming; the easier it will be for corrosion to take place. Expansive soils should be considered disturbed simply because of their nature from dry to wet seasons.

5.1 Pourbaix Diagram – In regards to a material's environment

All metals are unique and have a weakness. Some metals do not like acidic (low pH) environments. Some metals do not like alkaline (high pH) environments. Some metals don't like either high or low pH environments such as aluminum. These are called amphoteric materials. Some metals become passivated and do not corrode at high pH environments such as steel. These characteristics are documented in Marcel Pourbaix's book "Atlas of electrochemical equilibria in aqueous solutions"

In the mid 1900's, Marcel Pourbaix developed the Pourbaix diagram which describes a metal's reaction to an environment dependent on pH and voltage conditions. It describes when a metal remains passive (non-corroding) and in which conditions metals become soluble (corrode). Steels are passive in pH over 12 such as the condition when it is encased in cement. If the cement were to carbonate and its pH reduce to below 12, the cement would no longer be able to act as a corrosion inhibitor and the steel will begin to corrode when moist.

Some metals such as aluminum are amphoteric, meaning that they react with acids and bases. They can corrode in low pH and in high pH conditions. Aluminum alloys are generally passive within a pH of 4 and 8.5 but will corrode outside of those ranges. This is why aluminum cannot be embedded in cement and why brick mortar should not be laid against an aluminum window frame without a protective barrier between them.

5.2 Galvanic Series – In regards to dissimilar metal connections

All metals have a natural electrical potential. This electrical potential is measured using a high impedance voltmeter connected to the metal being tested and with the common lead connected to a copper copper-sulfate reference electrode (CSE) in water or soil. There are many types of reference electrodes. In laboratory measurements, a Standard Hydrogen Electrode (SHE) is commonly used. When different metal alloys are tested they can be ranked into an order from most noble (less corrosion), to least noble (more active corrosion). When a more noble metal is connected to a less noble metal, the less noble metal will become an anode and sacrifice itself through corrosion providing corrosion protection to the more noble metal. This hierarchy is known as the galvanic series named after Luigi Galvani whose experiments with electricity and muscles led Alessandro Volta to discover the reactions between dissimilar metals leading to the early battery. The greater the voltage difference between two metals, the faster the corrosion rate will be.

Table 1- Dissimilar Metal Corrosion Risk

	Zinc	Galvanized Steel	Aluminum	Cast Iron	Lead	Mild Steel	Tin	Copper	Stainless Steel
Zinc	None	Low	Medium	High	High	High	High	High	High
Galvanized Steel	Low	None	Medium	Medium	Medium	High	High	High	High
Aluminum	Medium	Medium	None	Medium	Medium	Medium	Medium	High	High
Cast Iron	High	Medium	Medium	None	Low	Low	Low	Medium	Medium
Lead	High	Medium	Medium	Low	None	Low	Low	Medium	Medium
Mild Steel	High	High	Medium	Low	Low	None	Low	Medium	Medium
Tin	High	High	Medium	Low	Low	Low	None	Medium	Medium
Copper	High	High	High	Medium	Medium	Medium	Medium	None	Low
Stainless Steel	High	High	High	Medium	Medium	Medium	Medium	Low	None

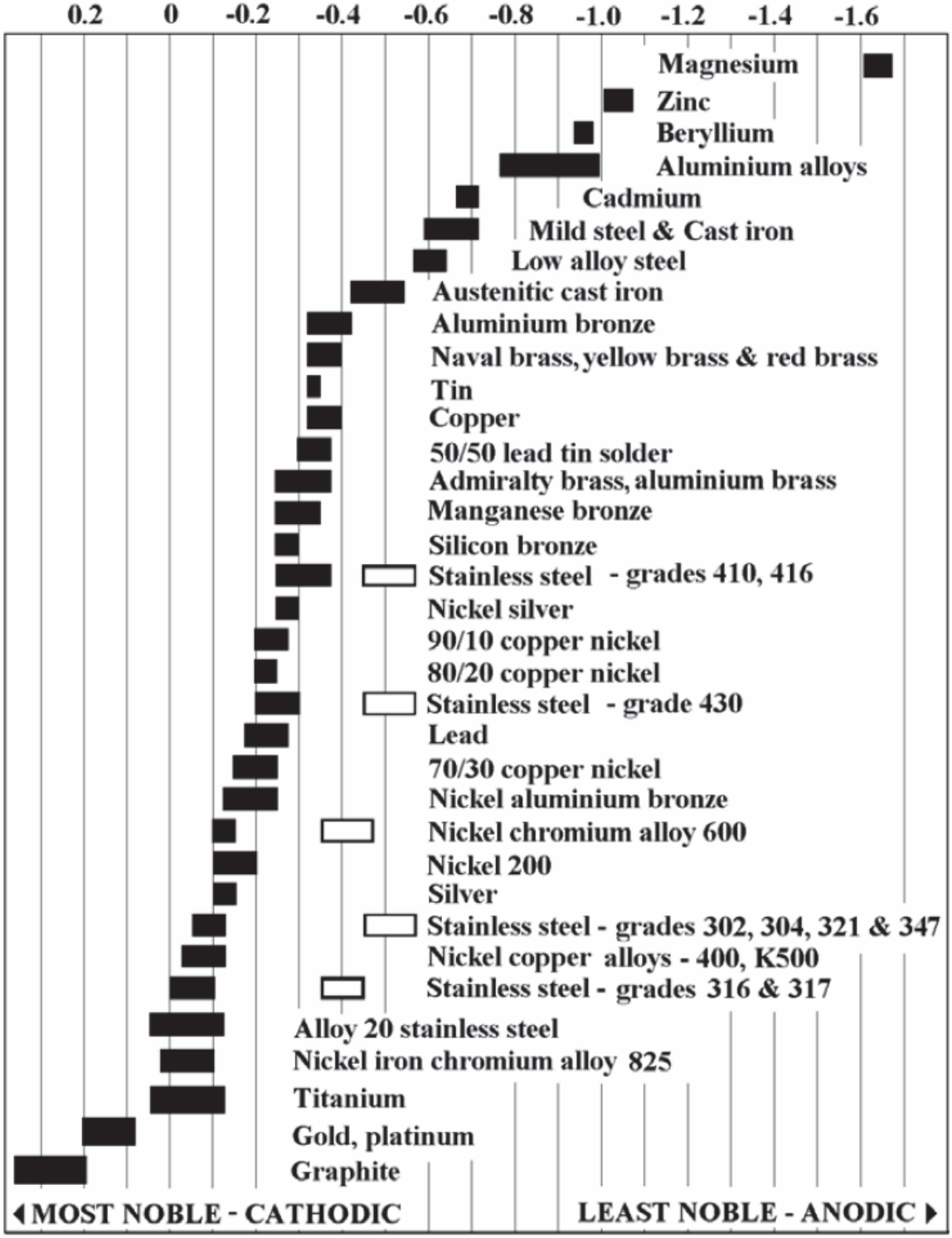
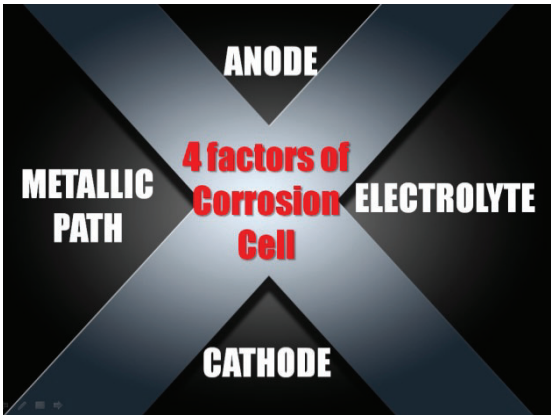
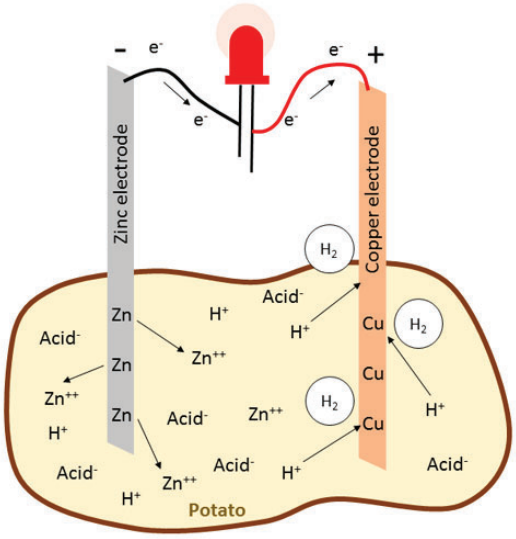


Figure 4 - Galvanic series of metals relative to CSE half cell.

5.3 Corrosion Cell



In order for corrosion to occur, four factors must be present. (1) The anode (2) the cathode (3) the electrolyte and (4) the metallic or conductive path joining the anode and the cathode. If any one of these is removed, corrosion activity will stop. This is how a simple battery produces electricity. An example of a non-metallic yet conductive material is graphite. Graphite is similar in nobility to gold. Do not connect graphite to anything in moist environments.



The anode is where the corrosion occurs, and the cathode is the corrosion free material. Sometimes the anode and cathode are different materials connected by a wire or union. Sometimes the anode and cathode are on the same pipe with one area of the pipe in a low oxygen zone while the other part of the pipe is in a high oxygen zone. A good example of this is a post in the ocean that is repeatedly splashed. Deep underwater, corrosion is minimal, but at the splash zone, the corrosion rate is greatest.

Low oxygen zones and crevices can also harbor corrosive bacteria which in moist environments will lead to corrosion. This is why pipes are laid on backfill instead of directly on native cut soil in a trench. Filling a trench slightly with backfill before installing pipe then finishing the backfill creates a uniform environment around the entire surface of the pipe.

The electrolyte is generally water, seawater, or moist soil which allows for the transfer of ions and electrical current. Pure water itself is not very conductive. It is when salts and minerals dissolve into pure water that it becomes a good conductor of electricity and chemical reactions. Metal ores are turned into metal alloys which we use in construction. They naturally want to return to their natural metal ore state but it requires energy to return to it. The corrosion cell, creates the energy needed to return a metal to its natural ore state.

The metallic or conductive path can be a wire or coupling. Examples are steel threaded into a copper joint, or an electrician grounding equipment to steel pipes inadvertently connecting electrical grid copper grounding systems to steel or iron underground pipes.

The ratio of surface area between the anode and the cathode is very important. If the anode is very large, and the cathode is very small, then the corrosion rate will be very small and the anode may live a long life. An example of this is when short copper laterals were connected to a large and long steel pipeline. The steel had plenty of surface area to spread the copper's attack, thus corrosion was not

noticeable. But if the copper was the large pipe and the steel the short laterals, the steel would corrode at an amazing rate.

5.4 Design Considerations to Avoid Corrosion

The following recommendations are based upon typical observations and conclusions made by forensic engineers in construction defect lawsuits and NACE International (Corrosion Society) recommendations.

5.4.1 Testing Soil Factors (Resistivity, pH, REDOX, SO, CL, NO3, NH3)

As previously mentioned, different factors can cause corrosion. The most useful and common test for categorizing a soil's corrosivity has been the measure of soil resistivity which is typically measured in units of (ohm-cm) by corrosion engineers and geologists. Soil resistivity is the ability of soil to conduct or resist electrical currents and ion transfer. The lower the soil resistivity, the more conductive and corrosive it is. The following are "generally" accepted categories but keep in mind, the question is not "Is my soil corrosive?", the question should be, "What is my soil corrosive to?" and to answer that question, soil resistivity and chemistry must be tested. Though **soil resistivity is a good corrosivity indicator for steel materials, high chlorides or other corrosive elements do not always lower soil resistivity, thus if you don't test for chlorides and other water soluble salts, you can get an unpleasant surprise.** The largest contributing factor to a soil's electrical resistivity is its clay, mineral, metal, or sand make-up.

Table 2 - Corrosion Basics- An Introduction, NACE, 1984, pg 191

(Ohm-cm)	Corrosivity Description
0-500	Very Corrosive
500-1,000	Corrosive
1,000-2,000	Moderately Corrosive
2,000-10,000	Mildly Corrosive
Above 10,000	Progressively less corrosive

Testing a soil's pH provides information to reference the Pourbaix diagram of specific metals. Some elements such as ammonia and nitrates can create localized alkaline conditions which will greatly affect amphoteric materials such as aluminum and copper alloys.

Excess sulfates can break-down the structural integrity of cement and high concentrations of chlorides can overcome cement's corrosion inhibiting effect on encased ferrous metals and break down protective passivated surface layers on stainless steels and aluminum.

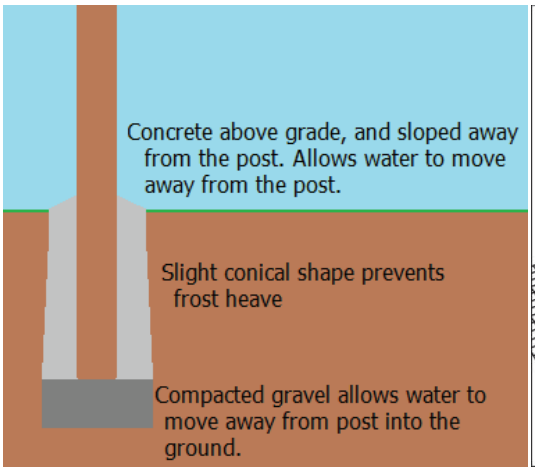
Corrosive bacteria are everywhere but can multiply significantly in anaerobic conditions with plentiful sulfates. The bacteria themselves do not eat the metal but their by-products can form corrosive sulfuric acids. The probability of corrosive bacteria is tested by measuring a soil's oxidation-reduction (REDOX) electro-potential and by testing for the presence of sulfides.

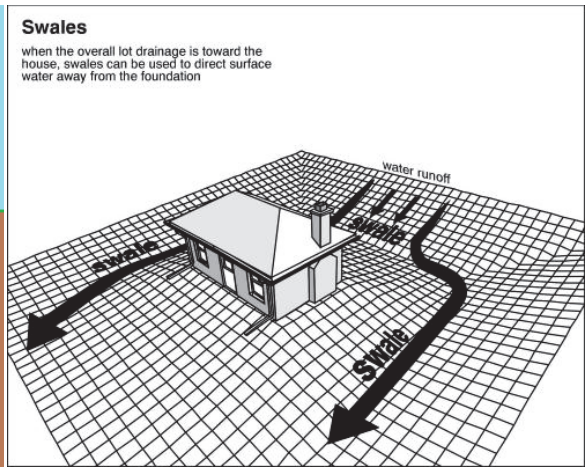
Only by testing a soil's chemistry for minimum resistivity, pH, chlorides, sulfates, sulfides, ammonia, nitrate, and redox potential can one have the information to evaluate the corrosion risk to construction materials such as steel, stainless steel, galvanized steel, iron, copper, brass, aluminum, and concrete.

5.4.2 Proper Drainage

It cannot be emphasized enough that pooled stagnant water on metals will eventually lead to corrosion. This stands for internal corrosion and external corrosion situations. In soils, providing good drainage will lower soil moisture content reducing corrosion rates. Attention to properly sealing polyethylene wraps around valves and piping will avoid water intrusion which would allow water to pool against metals. Above ground structures should not have cupped or flat surfaces that will pond water after rain or irrigation events.

Buildings typically are built on pads and have swales when constructed to drain water away from buildings directing it towards an acceptable exit point such as a driveway where it continues draining to a local storm drain. Many homeowners, landscapers and flatwork contractors appear to not be aware of this and destroy swales during remodeling. The majority of garage floor and finished grade elevations are governed by drainage during design. [14,15]





5.4.3 Avoiding Crevices

Crevices are excellent locations for oxygen differential induced corrosion cells to begin. Crevices can also harbor corrosive bacteria even in the most chemically treated waters. Crevices will also gather salts. If water's total alkalinity is low, its ability to maintain a stable pH can also become more difficult within a crevice allowing the pH to drop to acidic levels continuing a pitting process. Welds in extremely corrosive environments should be complete and well filleted without sharp edges to avoid crevices. Sharp edges should be avoided to allow uniform coating of protective epoxy. Detection of crevices in welds should be treated immediately. If pressures and loads are low, sanding and rewelding or epoxy patching can be suitable repairs. Damaged coatings can usually be repaired with Direct to Metal paints. **Scratches and crevice corrosion are like infections, they should not be left to fester or the infection will spread making things worse.**

[14] https://www.fencedaddy.com/blogs/tips-and-tricks/132606467-how-to-repair-a-broken-fence-post

[15] http://southdownstudio.co.uk/problme-drainage-maison.html

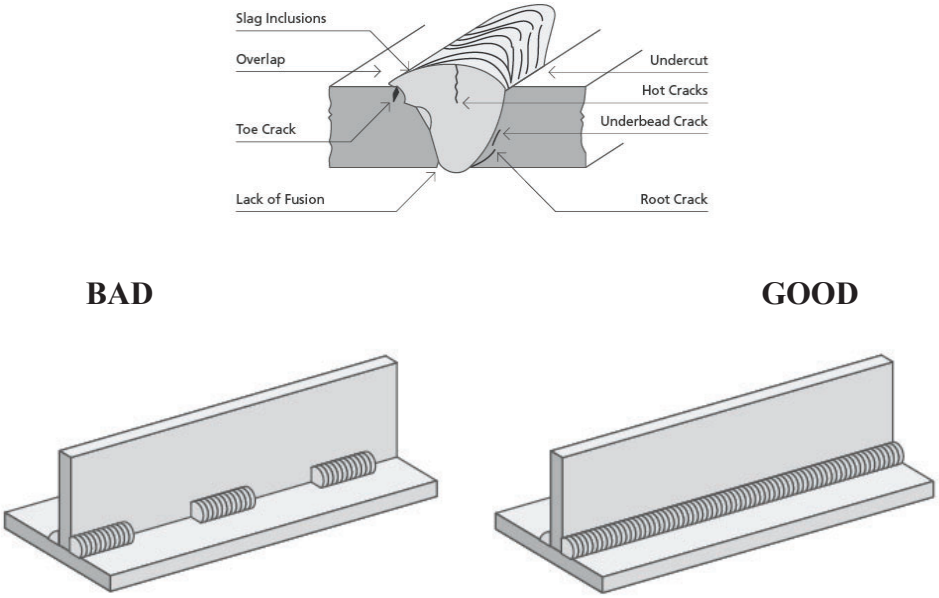


Figure 5- Defects which form weld crevices[16]

5.4.4 Coatings and Cathodic Protection

When faced with a corrosive environment, the best defense against corrosion is removing the electrolyte from the corrosion cell by applying coatings to separate the metal from the soil. During construction and installation, there is always some scratch or damage made to a coating. NACE training recommends that coatings be used as a first line of defense and that sacrificial or impressed current cathodic protection is used as a 2nd line of defense to protect the scratched areas. Use of a good coating dramatically reduces the amount of anodes a CP system would need. If CP is not installed as a 2nd line of defense in an extremely corrosive environment, the small scratched zones will suffer accelerated corrosion. CP details such as anode installation instructions must be designed by corrosion engineers or vessel manufacturers on a per project basis because it depends on electrolyte resistivity, surface area of infrastructure to be protected, and system geometry.

There are two types of cathodic protection systems, a Galvanic Anode Cathodic Protection (GACP) system and an Impressed Current Cathodic Protection (ICCP) system. A Galvanic Anode Cathodic Protection (GACP) system is simpler to install and maintain than an Impressed Current Cathodic Protection (ICCP) system. To protect the metals, they must all be electrically continuous to each other. In a GACP system, sacrificial zinc or magnesium anodes are then buried at locations per the CP design and connected by wire to a structure at various points in system. At the connection points, a wire connecting to the structure and the wire from the anode are joined in a Cathodic Protection Test Station hand hole which looks similar in size and shape to an irrigation valve pull box. By coating the underground structures, one can reduce the number of anodes needed to provide cathodic protection by 80% in many instances.

An ICCP system requires a power source, a rectifier, significantly more trenching, and more expensive type anodes. These systems are typically specified when bare metal is requiring protection

[16] http://www.daroproducts.co.uk/makes-good-weld/

in severely corrosive environments in which galvanic anodes do not provide enough power to polarize infrastructure to -850 mV structure-to-soil potential or be able to create a 100 mV potential shift as required by NACE SP169 to control corrosion. In severely corrosive environments, a GACP system simply may not last a required lifetime due to the high rate of consumption of the sacrificial anodes. ICCP system rectifiers must be inspected and adjusted quarterly or at a minimum bi-annually per NACE recommendations. Different anode installations may be possible but for large sites, anodes are placed evenly throughout the site and all anode wires must be trenched to the rectifier. For a large site, it may be beneficial to use two or more rectifiers to reduce wire lengths or trenching.

To simplify, a GACP system can be installed and practically forgotten with minor trenching because the anodes can be installed very close to the structures. An ICCP system must be inspected annually and anode wires run back to the rectifier which itself connects to the pile system. If any type of trenching or development is expected to occur at the site during the life of the site, it is a good idea to inspect the anode connections once a year to make sure wires are not cut and that the infrastructure is still being provided adequate protection. A common situation that occurs with ICCP systems is that a contractor accidently cuts the wires during construction then reconnects them incorrectly, turning the once cathode, into a sacrificing anode.

Design of a cathodic protection system protecting against soil side corrosion requires that Wenner Four Pin ground resistance measurements per ASTM G57 be performed by corrosion engineers at various locations of the site to determine the best depths and locations for anode installations. Ideally, a sample pile is installed and experiments determining current requirement are conducted. Using this data, the decision is made whether a GACP system is feasible or if an ICCP must be used.

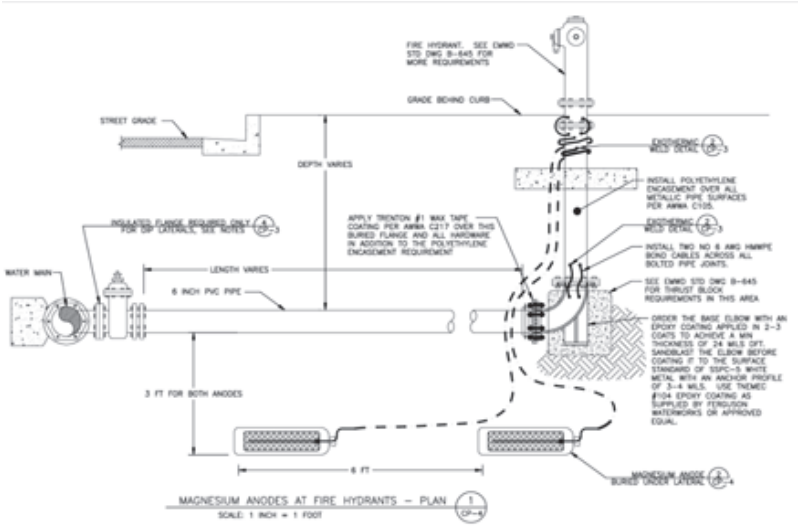


Figure 6- Sample anode design for fire hydrant underground piping

Vessels such as water tanks will have protective interior coatings and anodes to protect the interior surfaces. Anodes can also be buried on site and connected to system skid supports to protect the metal in contact with soil. A good example of a vessel cathodic protection system exists in all home water heaters which contain sacrificial aluminum or magnesium anodes. In environments that exceed 140F, zinc anodes cannot be used with carbon steel because they become the aggressor (Cathodic) to

the steel instead of sacrificial (anodic). Anodes in vessels containing extremely brackish water with chloride levels over 2,000 ppm should inspect or change out their anodes every 6 months.

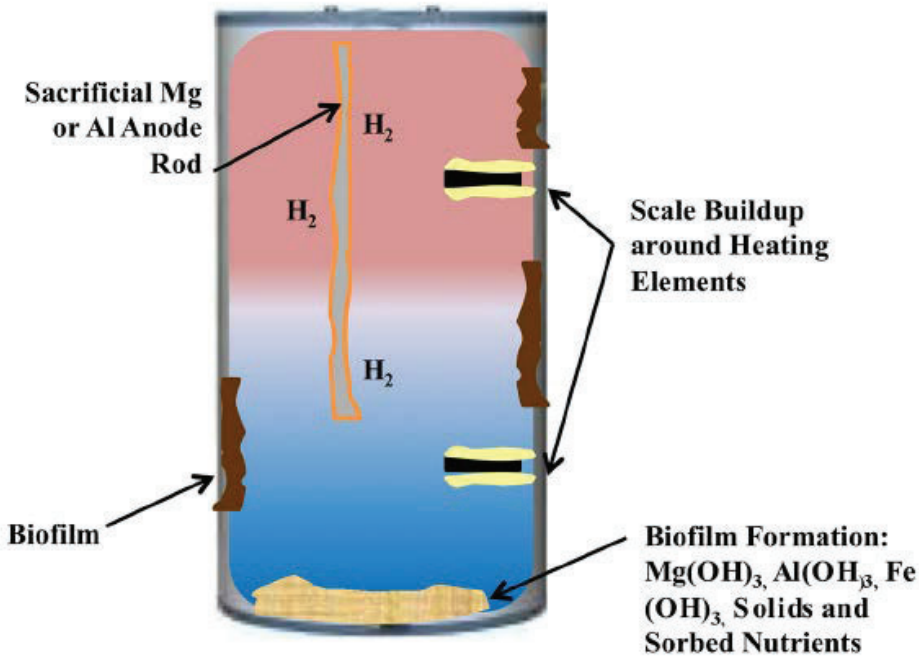


Figure 7- Cross section of boiler with anode

Cathodic protection can only protect a few diameters within a pipeline thus it is not recommended for small diameter pipelines and tubing internal corrosion protection. Anodes are like a lamp shining light in a room. They can only protect along their line of sight.

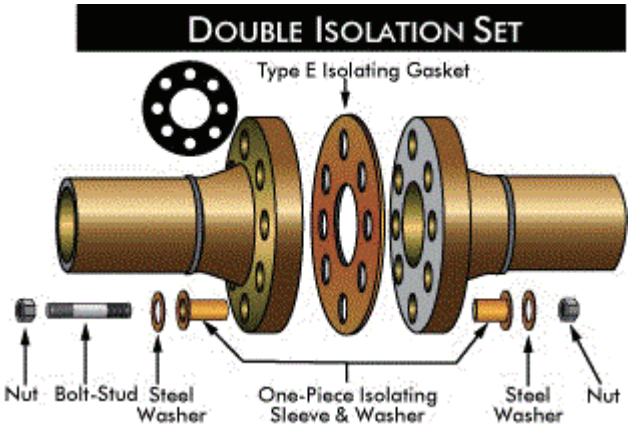
5.4.5 Good Electrical Continuity

In order for cathodic protection to protect a long pipeline or system of pipes from external soil side corrosion, they must all be electrically continuous to each other so that the electric current from the anode can travel along the pipes, then return through the earth to the anode. Electrical continuity is achieved by welding or pin brazing #8 AWG copper strand bond cable to the end of pipe sticks which have rubber gaskets at bell and spigots. If steel pipes are joined by full weld, bonding wires are not needed.

Electrical continuity between dissimilar metals is not desirable. Isolation joints or di-electric unions should be installed between dissimilar metals, such as steel pipes connecting to a brass valve per NACE SP0286. Bonding wires should then be welded onto the steel pipes by-passing the brass valve so that the cathodic protection system's current can continue to travel along the steel piping but isolate the brass valve from the steel pipeline. Another option would be to provide a separate cathodic protection system for steel pipes on both sides of the brass valve.

Typically, water heater inlets and outlets, gas meters and water meters have dielectric unions installed in them to separate utility property from homeowner property. This also protects them in the case that a home owner somehow electrically connects water pipes or gas pipes to a neighborhood electrical grounding system which can potentially have less noble steel in soil now connected to much

more noble copper in soil which will then create a corrosion cell. This is exactly how a lemon powered clock works when a galvanized zinc nail and a steel nail are inserted into a lemon then connected to a clock. The clock is powered by the corrosion cell created.



5.4.6 Bad Electrical Continuity

Bad electrical continuity is when two different materials or systems are made electrically continuous (aka shorted) when they were not designed to be electrically continuous. Examples of this would be when gas lines are shorted to water lines or to electrical grounding beds. Very often, fire risers are shorted to electrical grounding systems, and water pipes at business parks. Since fire risers usually have a very short ductile iron pipe in the ground which connects to PVC pipe systems, they tend to experience leaks after 7 to 10 years of being attacked by underground copper systems.

It is absolutely imperative that any copper water piping or other metal conduits penetrating cement slab or footings, not come in contact with the reinforcing steel or post-tensioning tendons to avoid creation of galvanic corrosion cells.

5.4.7 Corrosion Test Stations

Corrosion test stations should be installed every 1,000 feet along pipelines in order to measure corrosion activity in the future. For a simple pipeline, two #8 AWG copper strand bond cable welded or pin brazed onto the pipeline are run up to finished grade and left in a hand hole. Corrosion test stations are used to measure pipe-to-soil electro potential relative to a copper copper-sulfate reference electrode to determine if the pipe is experiencing significant corrosion activity. By measuring test stations along a pipeline, hot spots can be determined, if any. The wires also allow for electrical continuity testing, condition assessment, and a multitude of other types of tests.

At isolation joints and pipe casings, two wires should be welded to either side of the isolation joint for a total of 4 wires to be brought up to the hand hole. This allows for future tests of the isolation joint, casing separation confirmation, and pipe-to-soil potential readings during corrosion surveys.

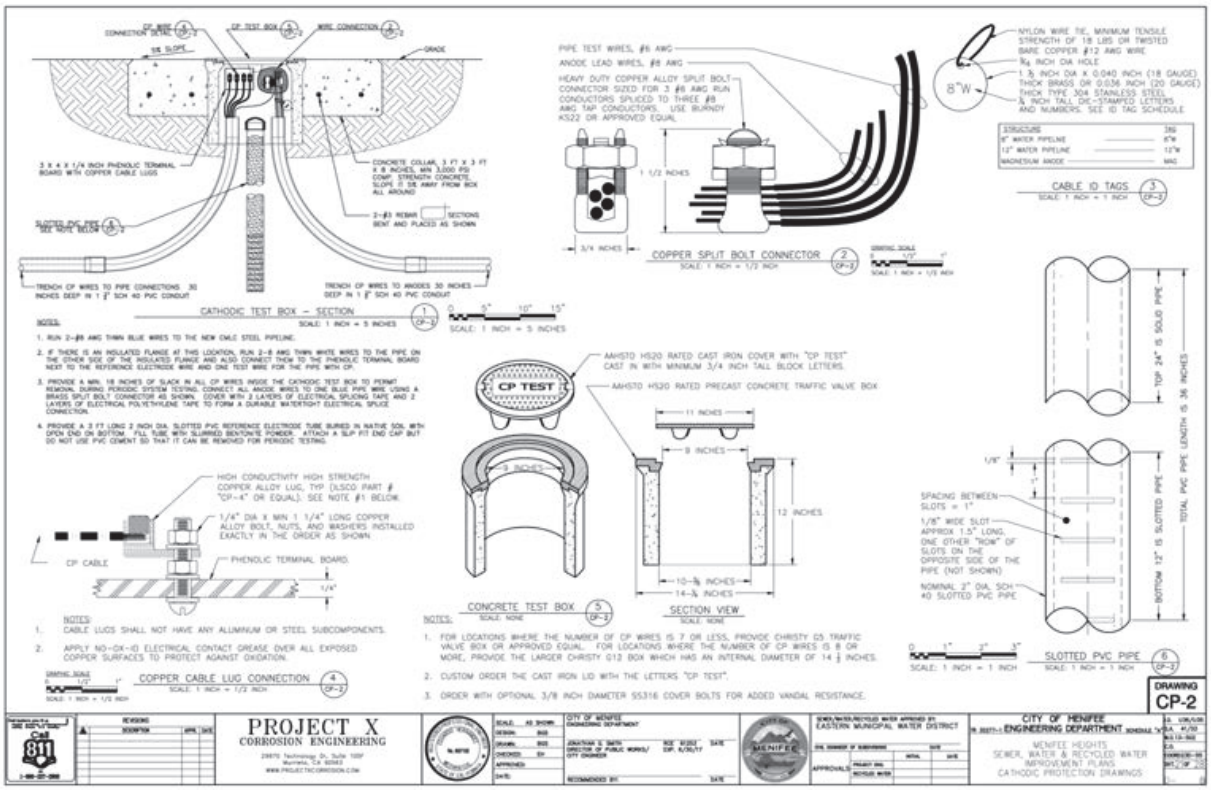


Figure 8- Sample of corrosion test station specification drawing

5.4.8 Excess Flux in Plumbing

Investigations of internal corrosion of domestic water plumbing systems almost always finds excess flux to be the cause of internal pitting of copper pipes. Some people believe that there is no such thing as too much flux. Flux runs have been observed to travel up to 20 feet with pitting occurring along the flux run. Flushing a soldered plumbing system with hot water for 15 minutes can remove significant amounts of excess flux left in the pipes. If a plumbing system is expected to be stagnant for some time, it should be drained to avoid stagnant water conditions that can lead to pitting and dezincification of yellow brasses.

5.4.9 Landscapers and Irrigation Sprinkler Systems

A significant amount of corrosion of fences is due to landscaper tools scratching fence coatings and irrigation sprinklers spraying these damaged fences. Recycled water typically has a higher salt content than potable drinking water, meaning that it is more corrosive than regular tap water. The same risk from damage and water spray exists for above ground pipe valves and backflow preventers. Fiber glass covers, cages, and cement footings have worked well to keep tools at an arm's length.

5.4.10 Roof Drainage splash zones

Unbelievably, even the location where your roof drain splashes down can matter. We have seen drainage from a home's roof valley fall directly down onto a gas meter causing it's piping to corrode at an accelerated rate reaching 50% wall thickness within 4 years. It is the same effect as a splash

zone in the ocean or in a pool which has a lot of oxygen and agitation that can remove material as it corrodes.

5.4.11 Stray Current Sources

Stray currents which cause material loss when jumping off of metals may originate from direct-current distribution lines, substations, or street railway systems, etc., and flow into a pipe system or other steel structure. Alternating currents may occasionally cause corrosion. The corrosion resulting from stray currents (external sources) is similar to that from galvanic cells (which generate their own current) but different remedial measures may be indicated. In the electrolyte and at the metal-electrolyte interfaces, chemical and electrical reactions occur and are the same as those in the galvanic cell; specifically, the corroding metal is again considered to be the anode from which current leaves to flow to the cathode. Soil and water characteristics affect the corrosion rate in the same manner as with galvanic-type corrosion.

However, stray current strengths may be much higher than those produced by galvanic cells and, as a consequence, corrosion may be much more rapid. Another difference between galvanic-type currents and stray currents is that the latter are more likely to operate over long distances since the anode and cathode are more likely to be remotely separated from one another. Seeking the path of least resistance, the stray current from a foreign installation may travel along a pipeline causing severe corrosion where it leaves the line. Knowing when stray currents are present becomes highly important when remedial measures are undertaken since a simple sacrificial anode system is likely to be ineffectual in preventing corrosion under such circumstances.[17] Stray currents can be avoided by installing proper electrical shielding, installation of isolation joints, or installation of sacrificial jump off anodes at crossings near protected structures such as metal gas pipelines or electrical feeders.

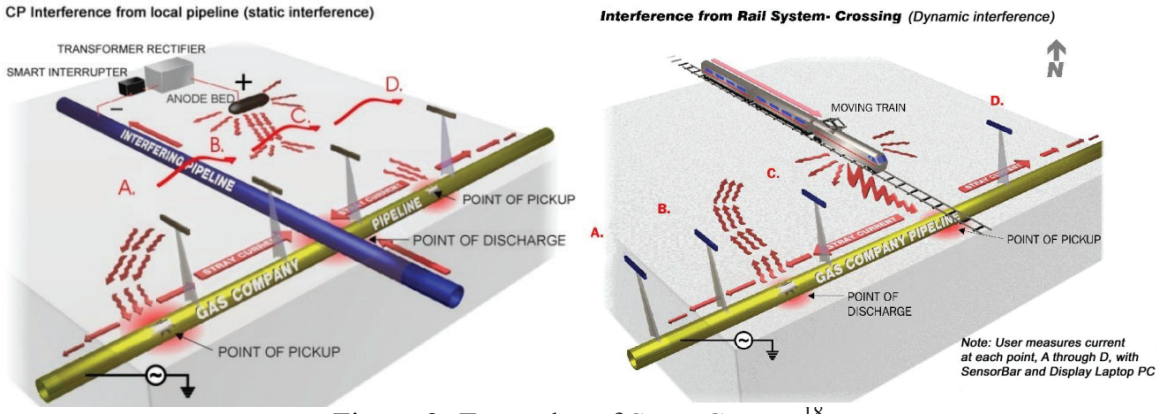


Figure 9- Examples of Stray Current[18]

[17] http://corrosion-doctors.org/StrayCurrent/Introduction.htm

[18] http://www.eastcomassoc.com/

Project X
Corrosion Engineering
Corrosion Control - Soil, Water, and Metallurgy Lab

Lab Requisition & Chain of Custody
Phone: (213) 928-7213 · Fax (951) 226-1720 · www.projectxcorrosion.com

Ship Samples To: 29990 Technology Dr, Suite 13, Murrieta, CA 92563

Pg 1

Project X Job Number S220427H S&ME 22800023 Russellville S 20 Full + Rpt

IMPORTANT: Please complete Project and Sample Identification Data as you would like it to appear in report & include this form with samples.

Company Name:	S&ME Inc.	**Contact Name:**	Eric Conway
Phone No:			
Mailing Address:	658 Grassmere Park Drive; Suite 100, Nashville, TN 37211	**Contact Email:**	econway@smeinc.com
Accounting Contact:		**Invoice Email:**	AP@smeinc.com
Client Project No:	22800023	**Project Name:**	Russellville Solar Facility

P.O. #:		3-5 Day Standard	3 Day Guarantee 50% mark-up	2 Day RUSH 100% mark-up
(Business Days) Turn Around Time:		✔		

Results By: ☐ Phone ☐ Fax ☑ Email

Date & Received by :

Default Method

Special Instructions:
Ground water not encountered.

ANALYSIS REQUESTED (Please circle)

Default Method	Soil Resistivity	pH	Sulfate	Chloride	Redox Potential	Sulfide	Ammonia	Nitrate	Flouride	Phosphate	Lithium	Sodium	Potassium	Magnesium	Calcium	BiCarbonate	Full Corrosion Series	Soil Corrosivity Evaluation Report	Water Corrosivity Mini Report	Moisture Content	Total Alkalinity	Thermal Resistivity	(ANC) Alk Neutr Cap	(SRB) Sulfate Reducing	Puckorius Index	XRF Elemental Analysis	Water Hardness
	Caltrans CTM643	Caltrans CTM643	Caltrans CTM417	Caltrans CTM422																						ASTM A591	
	AASHTO T2888	AASHTO T 289	AASHTO T 290	AASHTO T 291	SM 2580B		SM 4500-NH3	SM 4500-NO3														ASTM D5334				ASTM E322	
	ASTM G187	ASTM G 51	ASTM D4327	ASTM D4327	ASTM G200	SM 4500-S2	ASTM D4327	ASTM D4327	SM 2320B	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	SM 2320B		*Req: Min. 3 Samples, site map, and groundwater info		ASTM D2216	SM 2320B	IEEE 442		HACH BART		ASTM E1621	
	Full Corrosion Serries																	Reports									
	Geo Quad																										

	SAMPLE ID - BORE #	DEPTH (ft)	DATE COLLECTED	Full Corrosion Series	Soil Corrosivity Evaluation Report
388	B-101	0-1.5	4-20-2022	✔	✔
389 2	B-101	3.5-5	4-20-2022	✔	
390 3	B-103	0-1.5	4-20-2022	✔	
391 4	B-103	3.5-5	4-20-2022	✔	
392 5	B-104	0-1.5	4-20-2022	✔	
393 6	B-104	3.5-5	4-20-2022	✔	
394 7	B-105	0-1.5	4-20-2022	✔	
395 8	B-105	3.5-5	4-20-2022	✔	
396 9	B-108	0-1.5	4-20-2022	✔	
397 10	B-108	3.5-5	4-20-2022	✔	
398 11	B-109	0-1.5	4-20-2022	✔	
399 12	B-109	3.5-5	4-20-2022	✔	
400 13	B-110	0-1.5	4-20-2022	✔	
401 14	B-110	3.5-5	4-20-2022	✔	
15					

Project X
Corrosion Engineering
Corrosion Control - Soil, Water, and Metallurgy Lab

Lab Request/Chain of Custody
Phone: (213) 928-7213 · Fax (951) 226-1720 · www.projectxcorrosion.com

Ship Samples To: 29990 Technology Dr, Suite 13, Murrieta, CA 92563

Pg 2

Project X Job Number

IMPORTANT: Please complete Project and Sample Identification Data as you would like it to appear in report & include this form with samples.

Company Name:	S&ME Inc.	**Contact Name:**	Eric Conway
Phone No:			
Mailing Address:	658 Grassmere Park Drive; Suite 100, Nashville, TN 37211	**Contact Email:**	econway@smeinc.com
Accounting Contact:		**Invoice Email:**	AP@smeinc.com
Client Project No:	22800023	**Project Name:**	Russellville Solar Facility

P.O. #:		3-5 Day Standard	3 Day Guarantee 50% mark-up	2 Day RUSH 100% mark-up
(Business Days) Turn Around Time:		✔		

Results By: ☐ Phone ☐ Fax ☐ Email

Date & Received by :

Default Method

Special Instructions:
Ground water not encountered.

ANALYSIS REQUESTED (Please circle)

Default Method	Soil Resistivity	pH	Sulfate	Chloride	Redox Potential	Sulfide	Ammonia	Nitrate	Flouride	Phosphate	Lithium	Sodium	Potassium	Magnesium	Calcium	BiCarbonate	Full Corrosion Series	Soil Corrosivity Evaluation Report	Water Corrosivity Mini Report	Moisture Content	Total Alkalinity	Thermal Resistivity	(ANC) Alk Neutr Cap	(SRB) Sulfate Reducing	Puckorius Index	XRF Elemental Analysis	Water Hardness
	Geo Quad				Full Corrosion Serries													Reports									
	Caltrans CTM643	Caltrans CTM643	Caltrans CTM417	Caltrans CTM422																						ASTM A531	
	AASHTO T2888	AASHTO T 289	AASHTO T 290	AASHTO T 291	SM 2580B		SM 4500-NH3	SM 4500-NO3														ASTM D5334				ASTM F322	
	ASTM G187	ASTM G 51	ASTM D4327	ASTM D4327	ASTM G200	SM 4500-S2	ASTM D4327	ASTM D4327	SM 2320B	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	SM 2320B				ASTM D2216	SM 2320B	IEEE 442		HACH HART		ASTM E1621	

*Req. Min. 3 Samples, site map, and groundwater info

	SAMPLE ID - BORE #	DEPTH (ft)	DATE COLLECTED	Soil Resistivity	pH	Sulfate	Chloride	Redox Potential	Sulfide	Ammonia	Nitrate	Flouride	Phosphate	Lithium	Sodium	Potassium	Magnesium	Calcium	BiCarbonate	Full Corrosion Series	Soil Corrosivity Evaluation Report	Water Corrosivity Mini Report	Moisture Content	Total Alkalinity	Thermal Resistivity	(ANC) Alk Neutr Cap	(SRB) Sulfate Reducing	Puckorius Index	XRF Elemental Analysis	Water Hardness
40~ 1	B-114	0-1.5	4-20-2022																	✔										
40~ 2	B-114	3.5-5	4-20-2022																	✔										
40~ 3	B-115	0-1.5	4-20-2022																	✔										
40~ 4	B-115	3.5-5	4-20-2022																	✔										
40~ 5	B-116	0-1.5	4-20-2022																	✔										
40~ 6	B-116	3.5-5	4-20-2022																	✔										
7																														
8																														
9																														
10																														
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12																														
13																														
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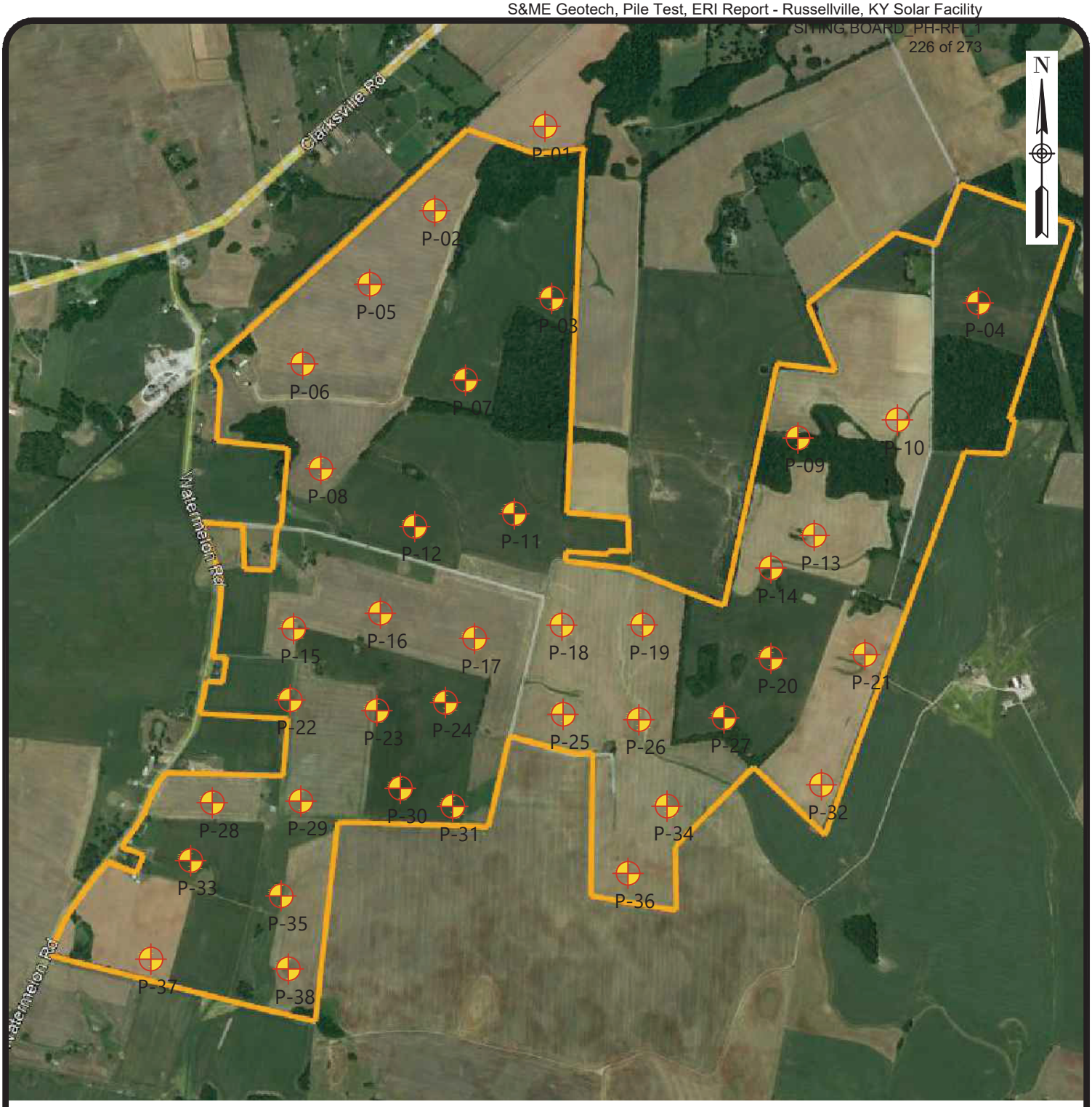
15																														



Legend:

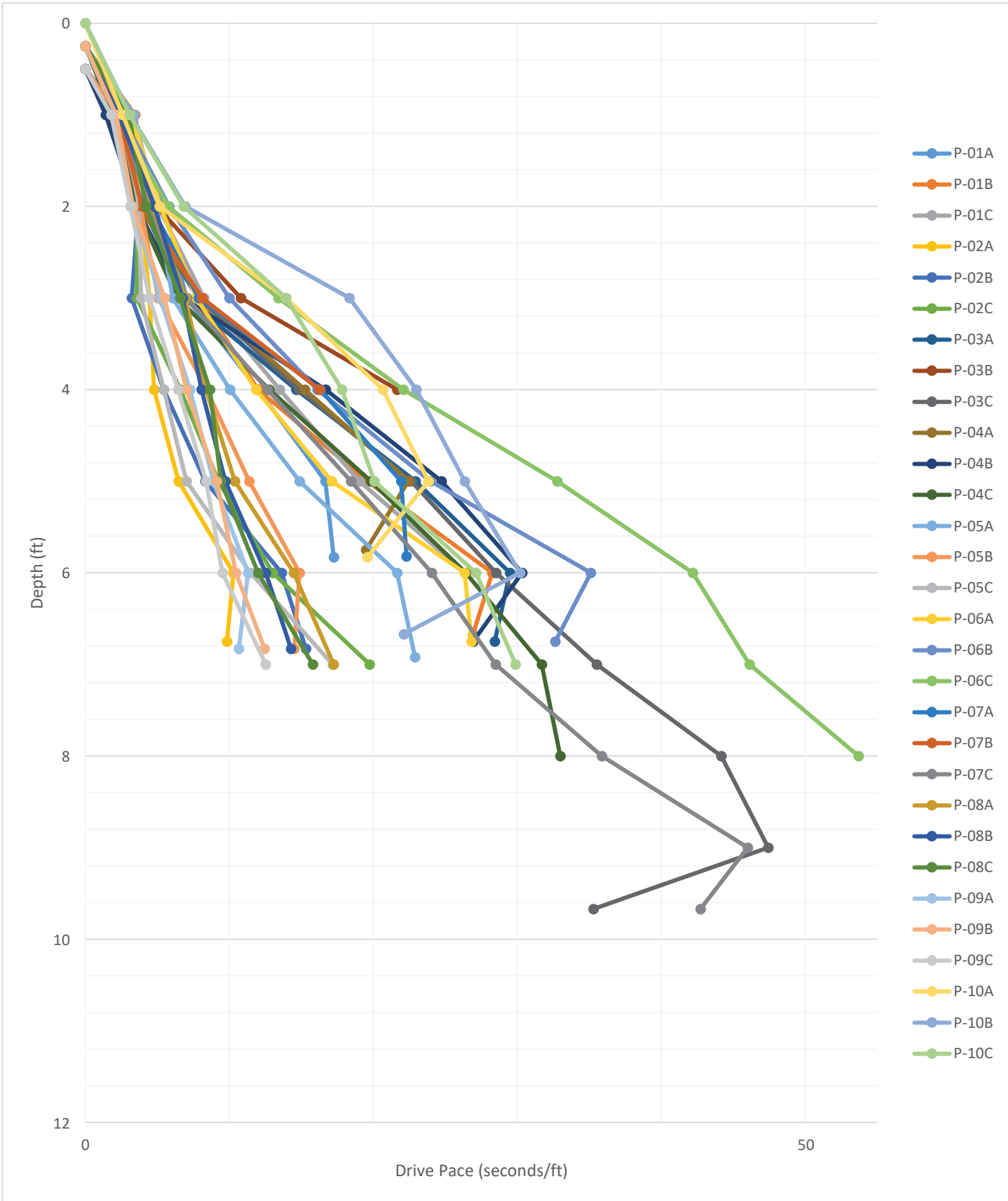
Approximate Location of Pile Tests

Notes:

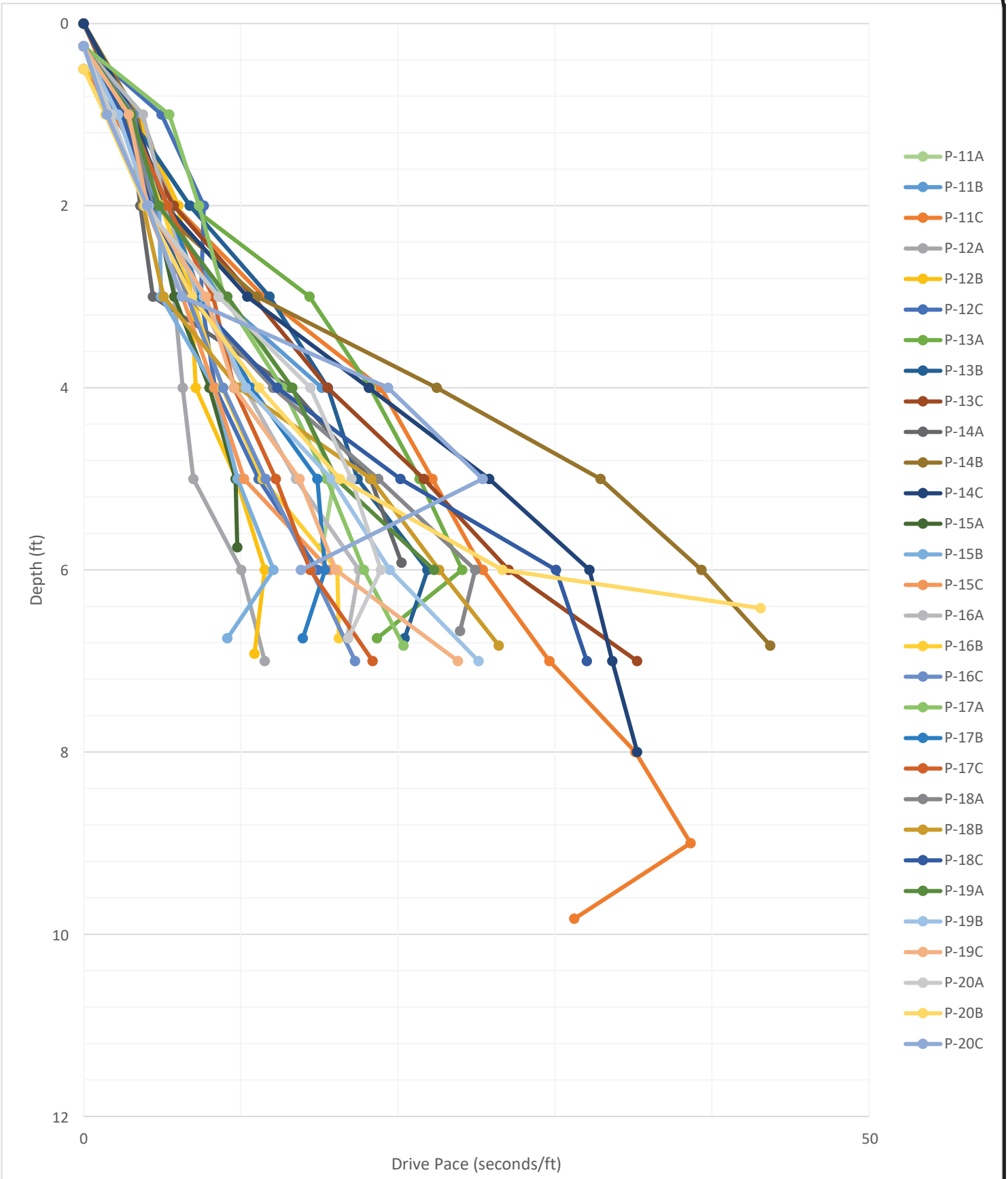
1) Pile test locations are shown in general arrangement only.
2) Do not use boring locations for determination of distances or quantities.
3) Base map from Google Earth Pro accessed on April 26, 2022.

Drawing Path: T:\GEO\Projects\2022\22800023_Silicon Ranch_Russellville KY Solar Facility_Russellville, KY\4 GEO\110 Geotech\CAD\Figure 6 Pile Test Location Plan.dwg

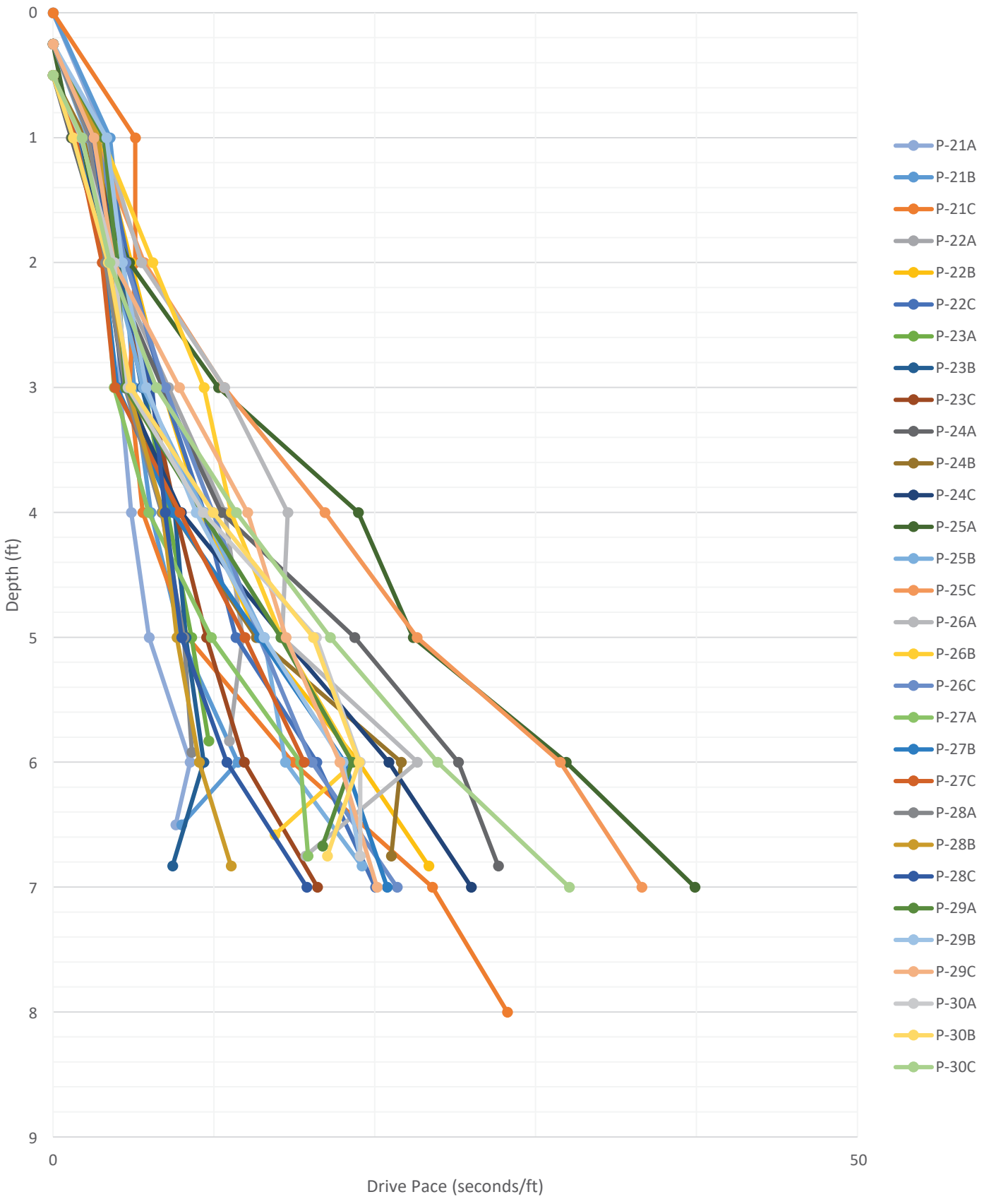
	Pile Test Location Plan	SCALE: Not to Scale	FIGURE NO.
	Russellville Solar Facility Watermelon Road Russellville, Kentucky	DATE: 5/2/2022 PROJECT NUMBER 22800023	25



PILE INSTALLATION DATA (P-01 to P-10)	SCALE: NOT TO SCALEE	FIGURE NO.
Russellville Solar Facility Watermelon Road Russellville, Kentucky	DATE: 5/3/2022 PROJECT NUMBER 22800023	26



PILE INSTALLATION DATA (P-11 to P-20)	SCALE: NOT TO SCALEE	FIGURE NO.
Russellville Solar Facility Watermelon Road Russellville, Kentucky	DATE: 5/3/2022 PROJECT NUMBER 22800023	27



	PILE INSTALLATION DATA (P-21 to P-30)	SCALE: NOT TO SCALEE	FIGURE NO.
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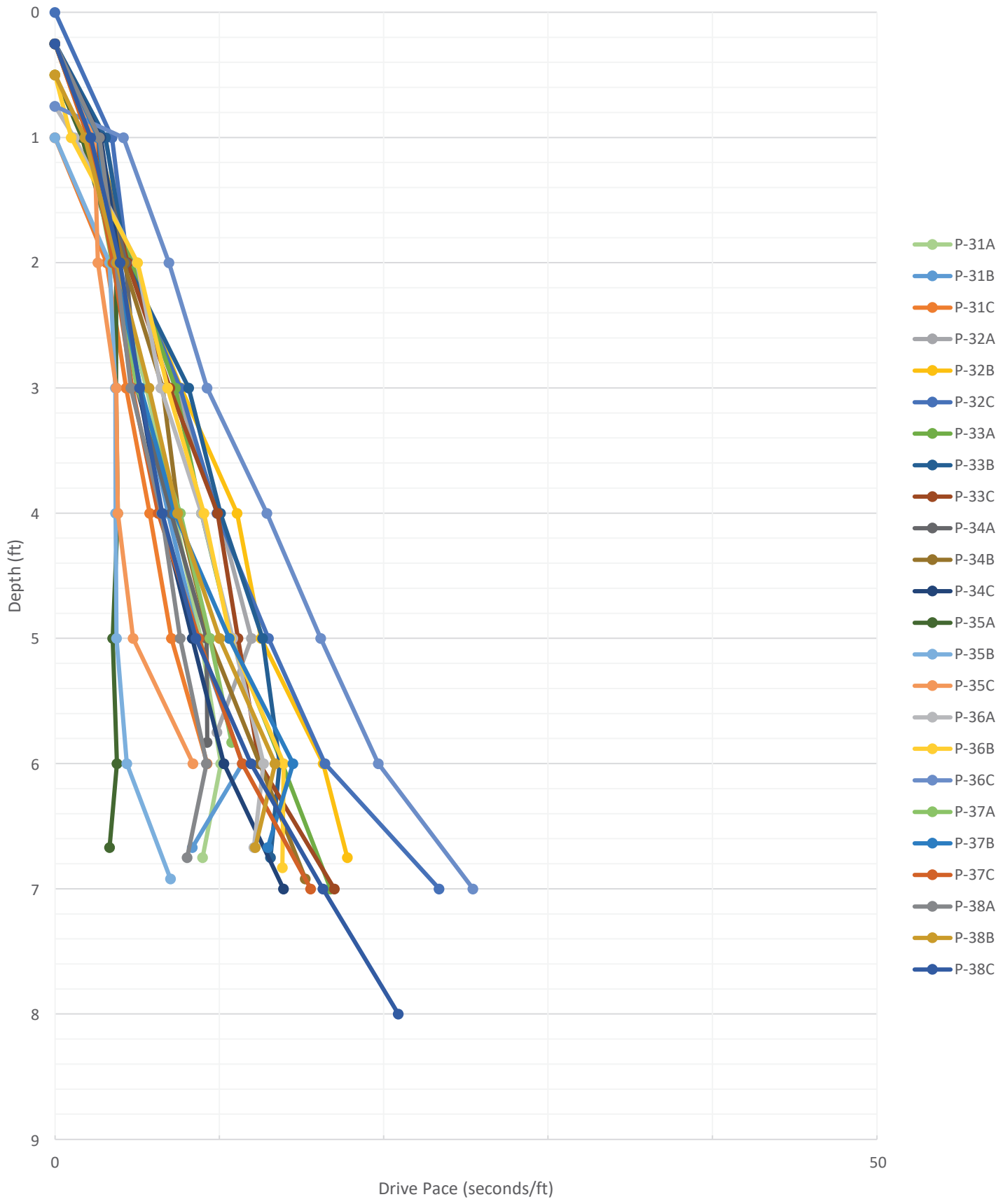
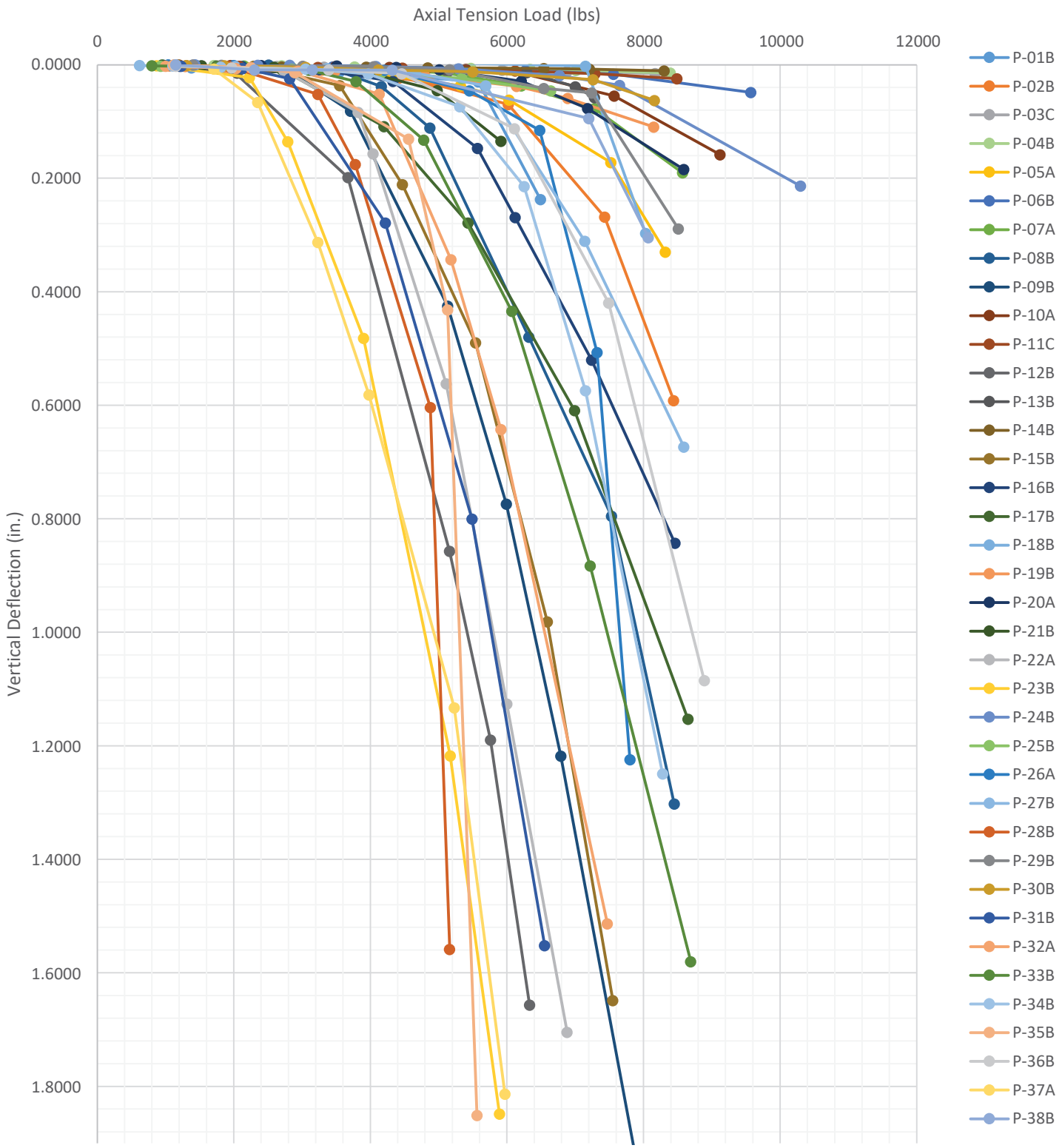
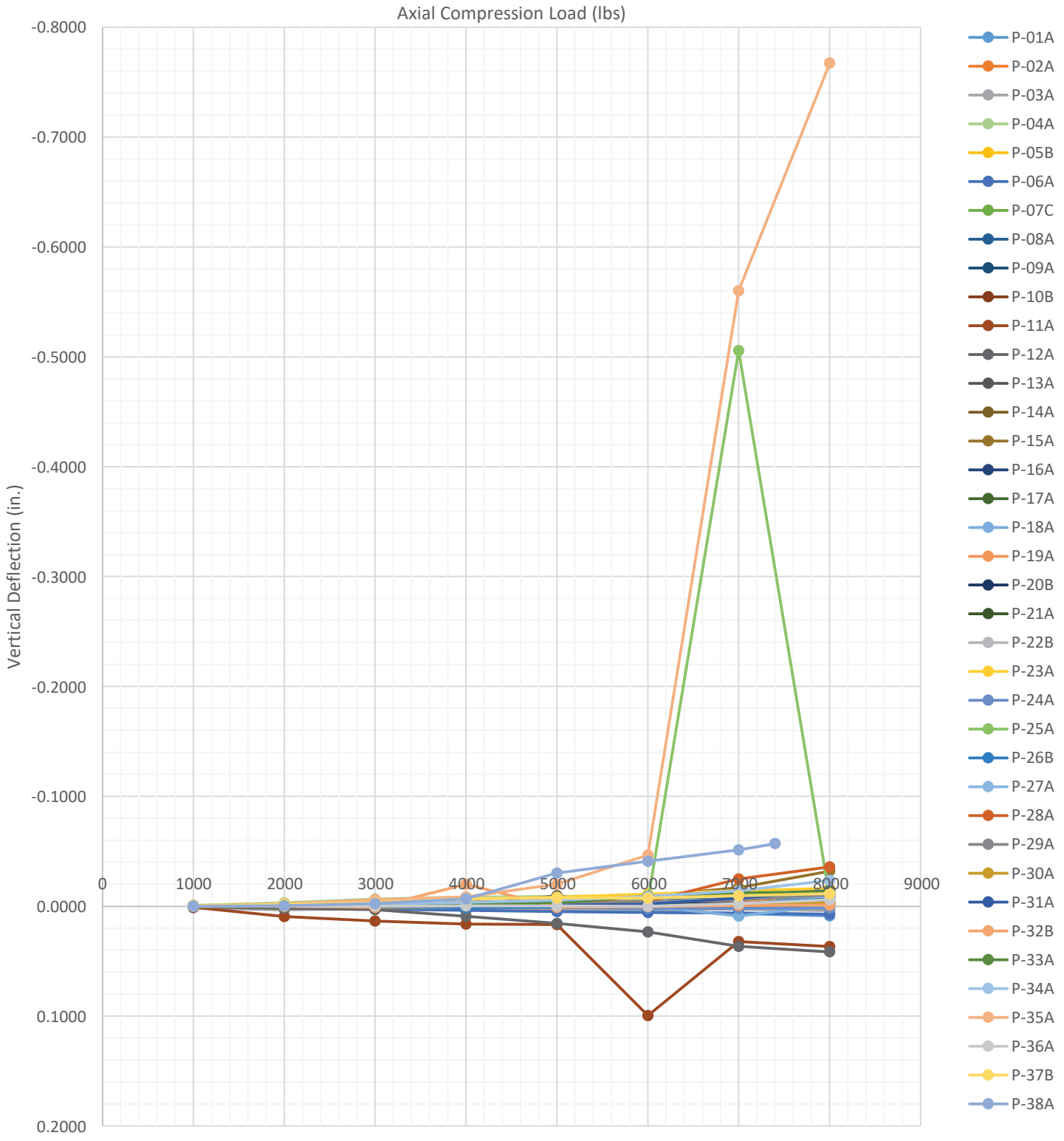


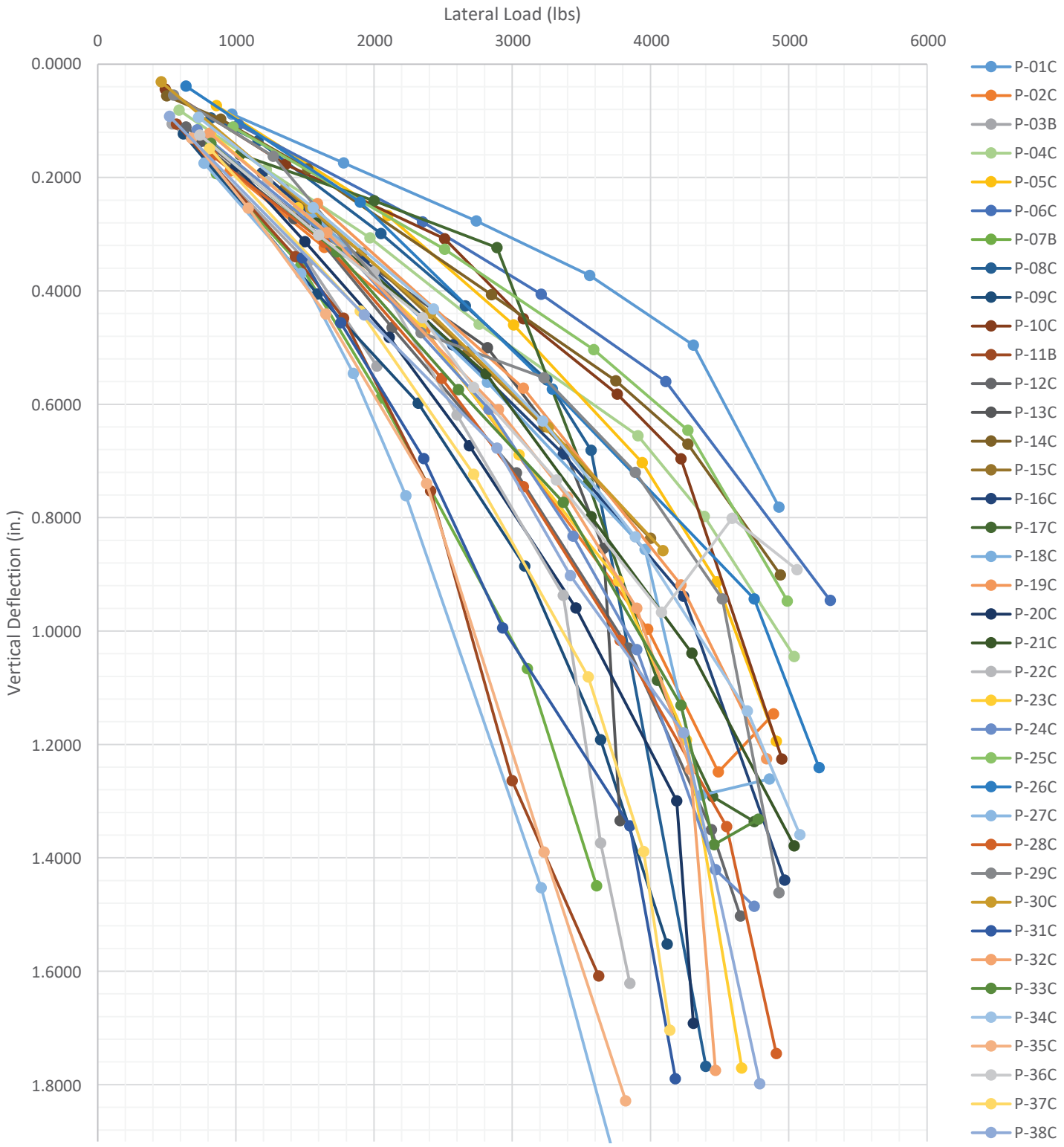
	PILE INSTALLATION DATA (P-31 to P-38)	SCALE: NOT TO SCALEE	FIGURE NO.
	Russellville Solar Facility Watermelon Road Russellville, Kentucky	DATE: 5/3/2022 PROJECT NUMBER 22800023	29



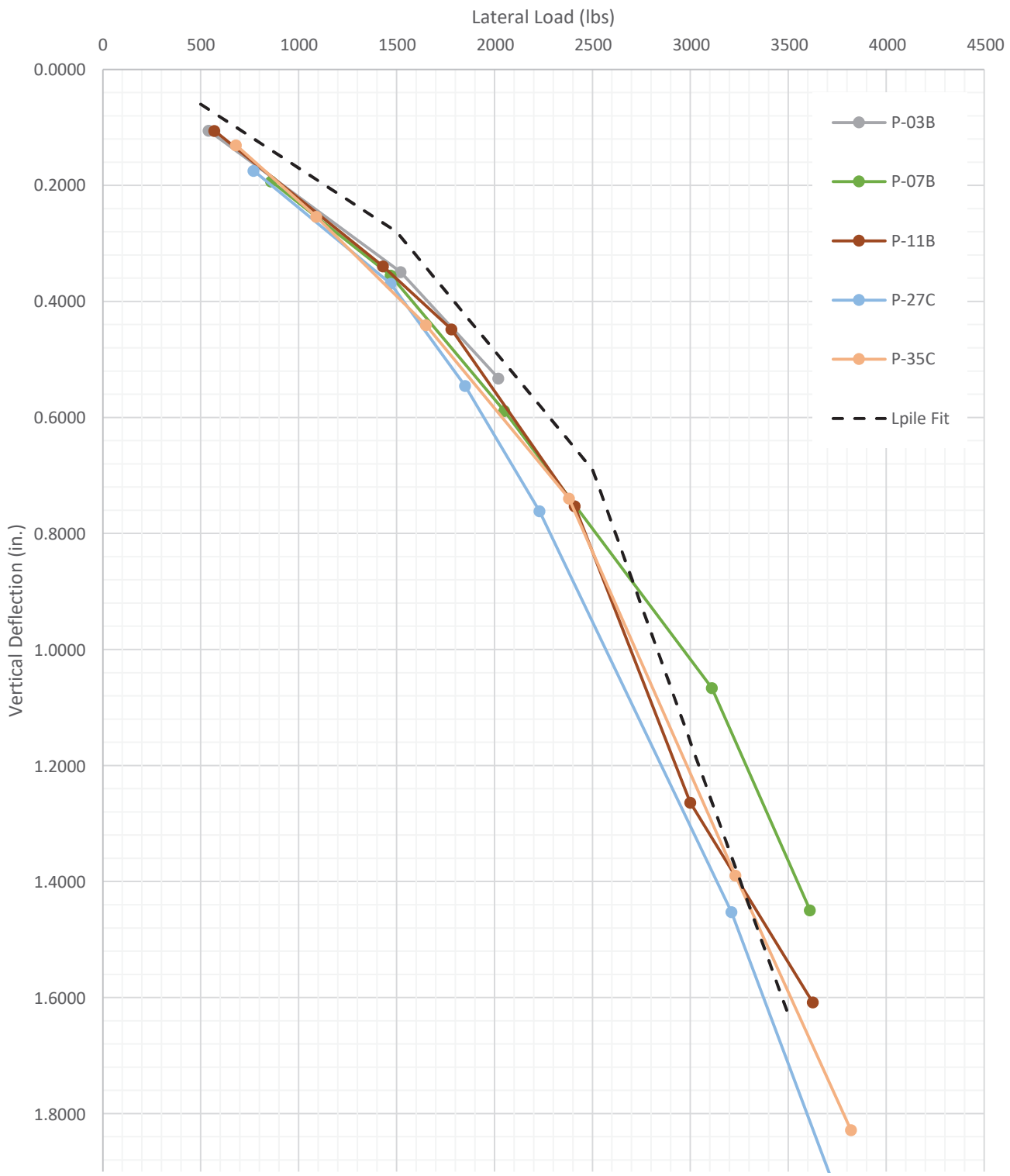
	AXIAL TENSION TEST DATA	SCALE: NOT TO SCALE	FIGURE NO.
	Russellville Solar Facility Watermelon Road Russellville, Kentucky	DATE: 5/6/2022 PROJECT NUMBER 22800023	30



AXIAL COMPRESSION TEST DATA	SCALE: NOT TO SCALE	FIGURE NO.	
Russellville Solar Facility Watermelon Road Russellville, Kentucky	DATE: 5/6/2022	31	
	PROJECT NUMBER 22800023		



	LATERAL TEST DATA	SCALE: NOT TO SCALE	FIGURE NO.
	Russellville Solar Facility Watermelon Road Russellville, Kentucky	DATE: 5/6/2022 PROJECT NUMBER 22800023	32



	LPILE TEST DATA FIT	SCALE: NOT TO SCALE	FIGURE NO.
	Russellville Solar Facility Watermelon Road Russellville, Kentucky	DATE: 5/6/2022 PROJECT NUMBER 22800023	33

Pile Load Test Data

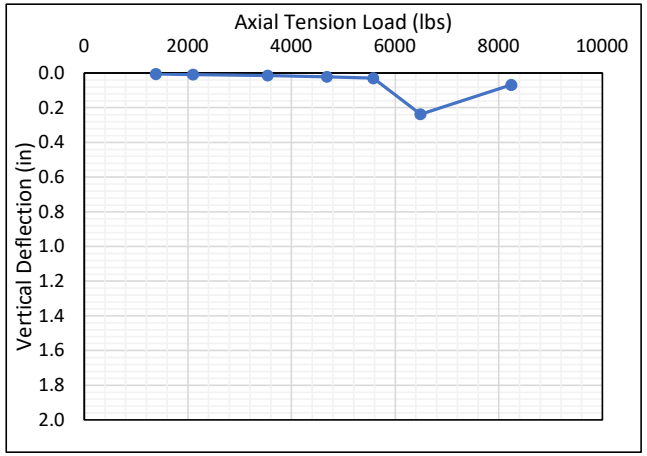
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/26/2022

Axial Tension Test

Pile ID: P-01B
Embedment: 7

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1380	0.0055	0.0050	0.0053
2000	2100	0.0085	0.0070	0.0078
3000	3540	0.0155	0.0120	0.0138
4000	4680	0.0240	0.0190	0.0215
5000	5580	0.0335	0.0265	0.0300
6000	6490	0.4400	0.0345	0.2373
7000				
8000	8240	0.0750	0.0610	0.0680
0		0.0395	0.0375	0.0385

Failure Load:
Gauge heght:
Notes:

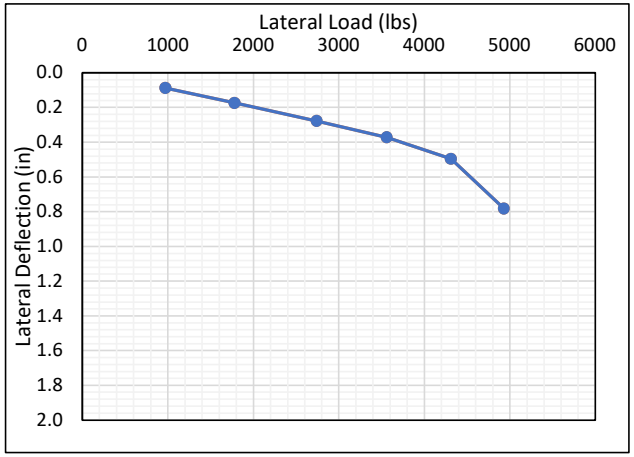


Lateral Test

Pile ID: P-01C
Embedment: 6

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	971	0.1160	0.0600	0.0880
1250				
1875	1780	0.3025	0.0455	0.1740
2500	2740	0.5260	0.0275	0.2768
3125				
3750	3560	0.7365	0.0085	0.3725
4375	4310	0.9790	0.0125	0.4958
5000	4930	1.5550	0.0080	0.7815
0				
0				
0		0.4715	0.0055	0.2385

Load height: 55"
Gauge heght: 11"
Notes:

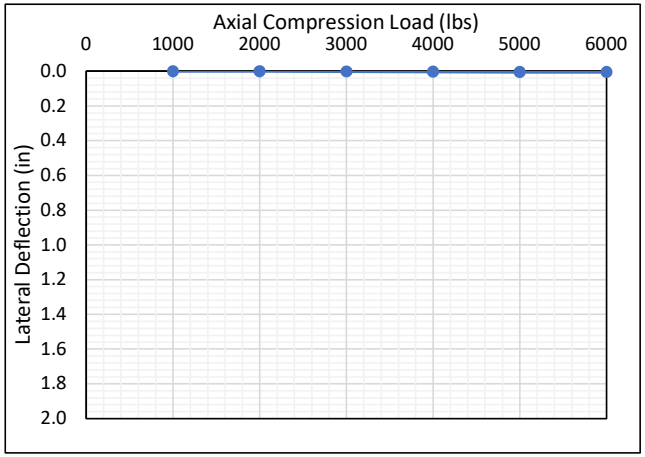


Axial Compression Test

Pile ID: P-01A
Embedment: 8

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	0.0000	0.0000	0.0000
3000	3000	0.0030	0.0010	0.0020
4000	4000	0.0030	0.0030	0.0030
5000	5000	0.0035	0.0045	0.0040
6000	6000	0.0035	0.0045	0.0040
7000	7000	0.0060	0.0075	0.0068
8000	8000	0.0075	0.0100	0.0088
0		0.0005	0.0020	0.0013

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

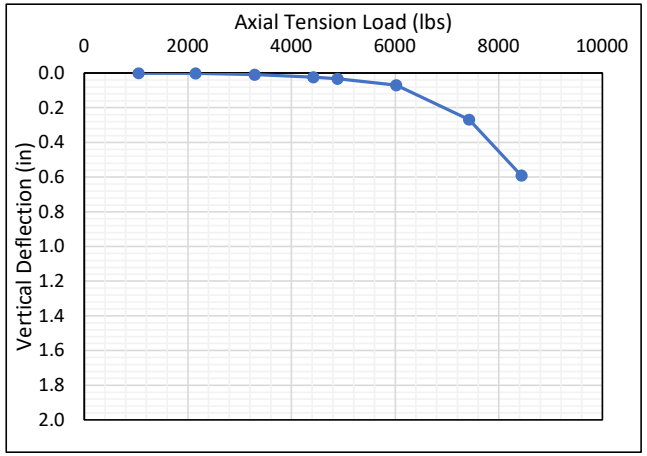
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/26/2022

Axial Tension Test

Pile ID: P-02B
Embedment: 7

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1050	0.0010	0.0020	0.0015
2000	2150	0.0030	0.0025	0.0028
3000	3290	0.0085	0.0095	0.0090
4000	4420	0.0215	0.0250	0.0233
5000	4890	0.0305	0.0355	0.0330
6000	6020	0.0660	0.0745	0.0703
7000	7430	0.2600	0.2765	0.2683
8000	8440	0.5800	0.6030	0.5915
0		0.5565	0.5585	0.5575

Failure Load:
Gauge heght:
Notes:

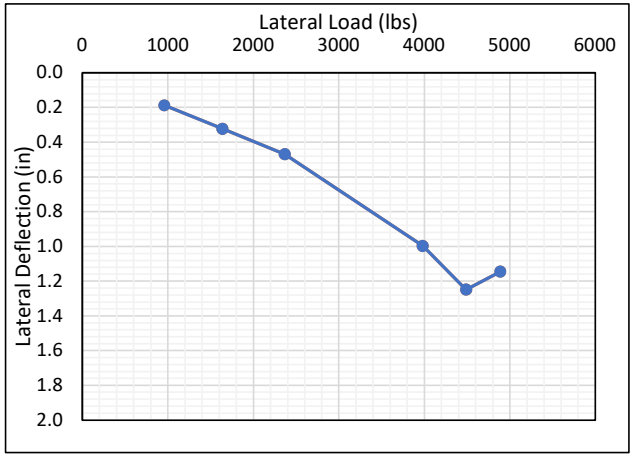


Lateral Test

Pile ID: P-02C
Embedment: 7

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	960	0.1875	0.1895	0.1885
1250				
1875	1640	0.3440	0.3020	0.3230
2500	2370	0.5270	0.4115	0.4693
3125				
3750	3980	1.0295	0.9640	0.9968
4375	4490	1.2550	1.2420	1.2485
5000	4890	1.2980	0.9940	1.1460
0		0.1645	0.2510	0.2078

Load height: 54"
Gauge heght: 12"
Notes:

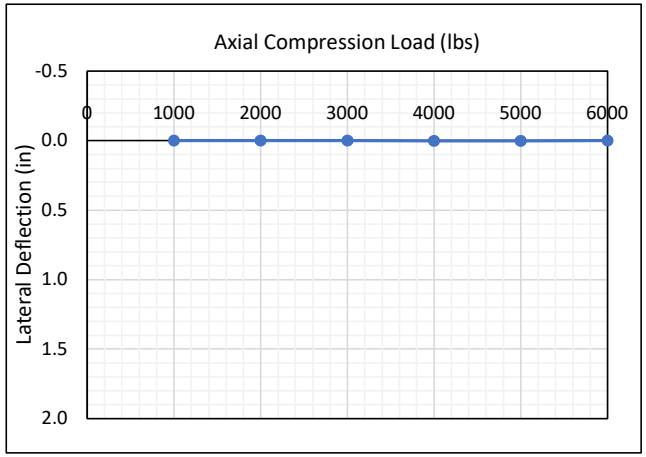


Axial Compression Test

Pile ID: P-02A
Embedment: 7

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	0.0015	-0.0005	0.0005
3000	3000	0.0020	-0.0010	0.0005
4000	4000	0.0065	-0.0030	0.0018
5000	5000	0.0070	-0.0050	0.0010
6000	6000	0.0080	-0.0085	-0.0003
7000	7000	0.0065	-0.0110	-0.0023
8000	8000	0.0040	-0.0140	-0.0050
0		0.0035	0.0005	0.0020

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

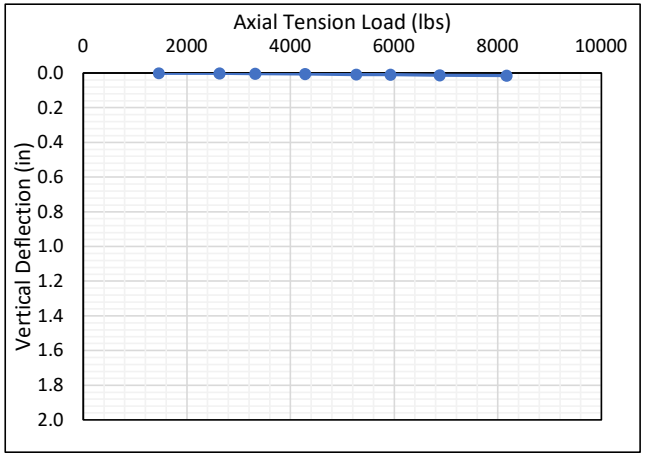
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/26/2022

Axial Tension Test

Pile ID: P-03C
Embedment: 10

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1460	0.0015	0.0010	0.0013
2000	2630	0.0035	0.0025	0.0030
3000	3320	0.0050	0.0030	0.0040
4000	4280	0.0075	0.0035	0.0055
5000	5270	0.0110	0.0050	0.0080
6000	5930	0.0130	0.0060	0.0095
7000	6880	0.0165	0.0075	0.0120
8000	8170	0.0210	0.0095	0.0153
0		0.0045	0.0035	0.0040

Failure Load:
Gauge heght:
Notes:

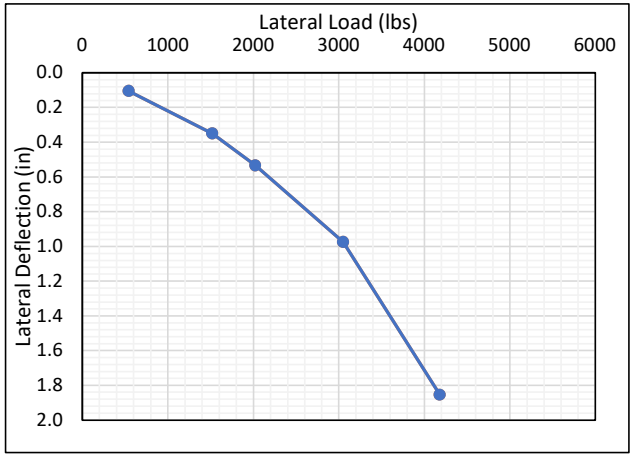


Lateral Test

Pile ID: P-03B
Embedment: 4

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	540	0.1035	0.1070	0.1053
1250	1520	0.3550	0.3430	0.3490
1875	2020	0.5455	0.5195	0.5325
2500				
3125	3050	1.0065	0.9421	0.9743
3750				
4375	4180	1.9150	1.7935	1.8543
5000				
0				
0				
0		1.0260	0.9515	0.9888

Load height:
Gauge heght:
Notes:

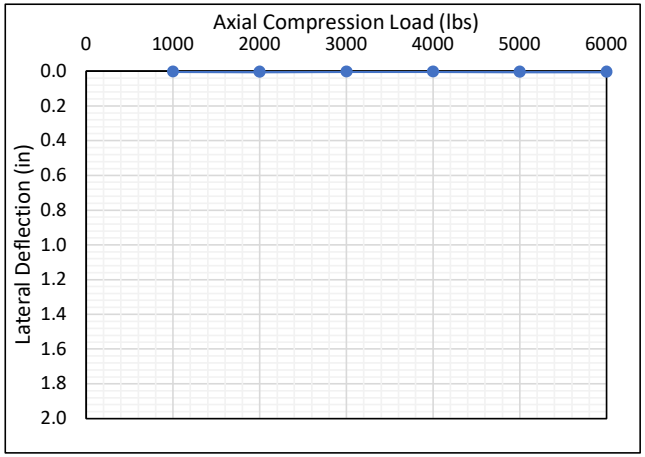


Axial Compression Test

Pile ID: P-03A
Embedment: 7

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0005	0.0025	0.0015
2000	2000	0.0020	0.0050	0.0035
3000	3000	0.0030	0.0010	0.0020
4000	4000	0.0030	0.0015	0.0023
5000	5000	0.0035	0.0020	0.0028
6000	6000	0.0045	0.0015	0.0030
7000	7000	0.0045	0.0010	0.0028
8000	8000	0.0065	0.0015	0.0040
0		0.0030	0.0005	0.0018

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

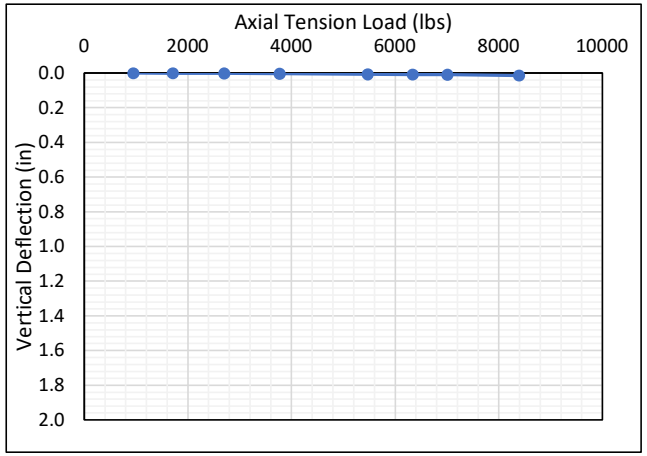
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 5/4/2022

Axial Tension Test

Pile ID: P-04B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	950	0.0005	0.0000	0.0003
2000	1710	0.0010	0.0010	0.0010
3000	2700	0.0015	0.0020	0.0018
4000	3770	0.0035	0.0035	0.0035
5000	5470	0.0065	0.0055	0.0060
6000	6340	0.0090	0.0070	0.0080
7000	7010	0.0115	0.0085	0.0100
8000	8390	0.0165	0.0125	0.0145
0		0.0065	0.0060	0.0063

Failure Load:
Gauge heght:
Notes:

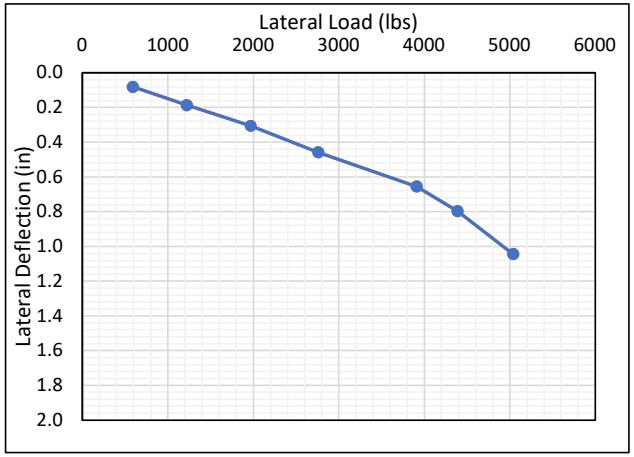


Lateral Test

Pile ID: P-04C
Embedment: 8'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	590	0.0845	0.0780	0.0813
1250	1220	0.1905	0.1815	0.1860
1875	1970	0.3110	0.3015	0.3063
2500	2760	0.4630	0.4540	0.4585
3125				
3750	3910	0.6420	0.6690	0.6555
4375	4390	0.7880	0.8075	0.7978
5000	5040	1.0470	1.0430	1.0450
0				
0				
0		0.0660	0.0545	0.0603

Load height: 43"
Gauge heght: 11"
Notes:

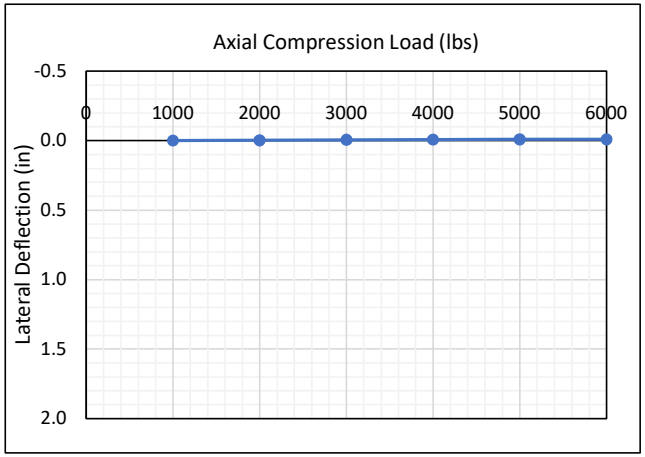


Axial Compression Test

Pile ID: P-04A
Embedment: 6'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	-0.0010	-0.0005	-0.0008
2000	2000	-0.0030	-0.0030	-0.0030
3000	3000	-0.0070	-0.0060	-0.0065
4000	4000	-0.0085	-0.0080	-0.0083
5000	5000	-0.0090	-0.0085	-0.0088
6000	6000	-0.0105	-0.0090	-0.0098
7000	7000	-0.0105	-0.0105	-0.0105
8000	8000	-0.0105	-0.0105	-0.0105
0		0.0000	0.0010	0.0005

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/26/2022

Axial Tension Test

Pile ID: P-05A
Embedment: 7

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000				
2000	2210	0.0090	0.0010	0.0050
3000	2770	0.0120	0.0030	0.0075
4000	4210	0.0240	0.0115	0.0178
5000	5320	0.0445	0.0295	0.0370
6000	6030	0.0695	0.0550	0.0623
7000	7520	0.1790	0.1655	0.1723
8000	8320	0.3305	0.3295	0.3300
0		0.3165	0.3175	0.3170

Failure Load:
Gauge heght:
Notes:

Lateral Test

Pile ID: P-05C
Embedment: 7

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	860	0.0085	0.1380	0.0733
1250				
1875	2100	0.1515	0.3825	0.2670
2500				
3125	3010	0.3110	0.6085	0.4598
3750	3940	0.5050	0.9010	0.7030
4375	4480	0.6390	1.1875	0.9133
5000	4910	0.7235	1.6650	1.1943
0				
0				
0		0.5050	0.4400	0.4725

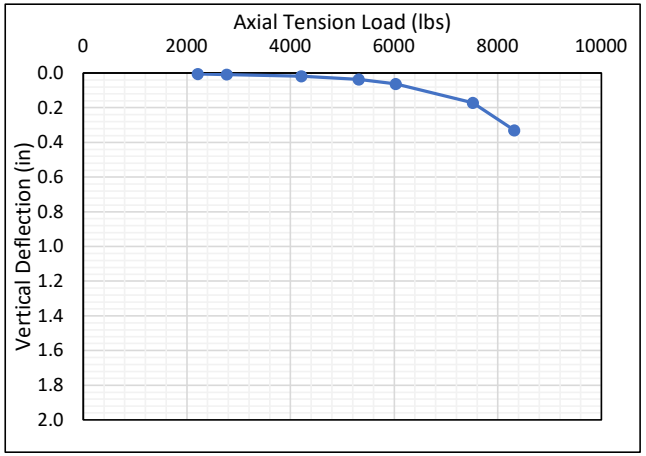
Load height: 54"
Gauge heght: 9"
Notes:

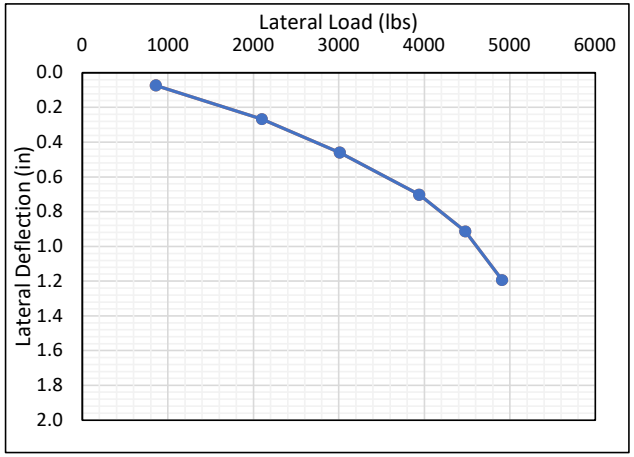
Axial Compression Test

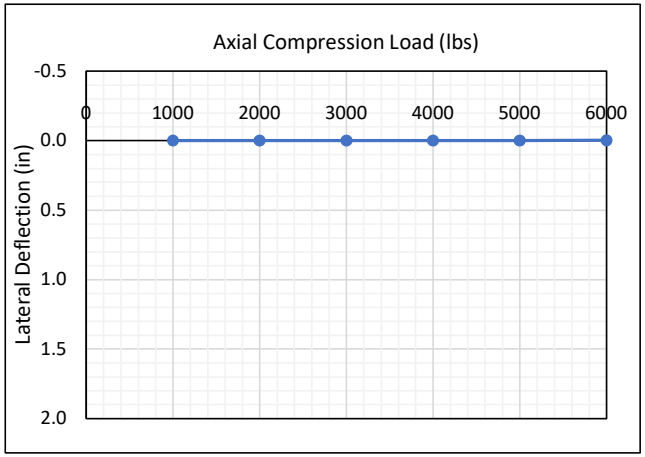
Pile ID: P-05B
Embedment: 7

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	-0.0005	0.0000	-0.0003
3000	3000	-0.0015	0.0005	-0.0005
4000	4000	-0.0030	0.0010	-0.0010
5000	5000	-0.0035	0.0015	-0.0010
6000	6000	-0.0050	-0.0010	-0.0030
7000	7000	-0.0070	-0.0020	-0.0045
8000	8000	-0.0090	-0.0035	-0.0063
0		-0.0055	-0.0040	-0.0048

Failure Load:
Gauge heght:
Notes:







Pile Load Test Data

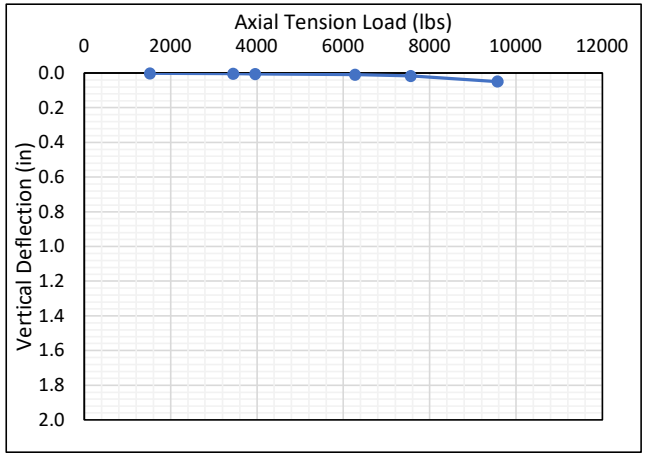
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/26/2022

Axial Tension Test

Pile ID: P-06B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1520	0.0030	0.0010	0.0020
2000				
3000	3450	0.0050	0.0020	0.0035
4000	3960	0.0065	0.0030	0.0048
5000				
6000	6270	0.0120	0.0085	0.0103
7000	7560	0.0180	0.0155	0.0168
8000	9570	0.0495	0.0480	0.0488
0		0.0375	0.0375	0.0375

Failure Load:
Gauge heght:
Notes:

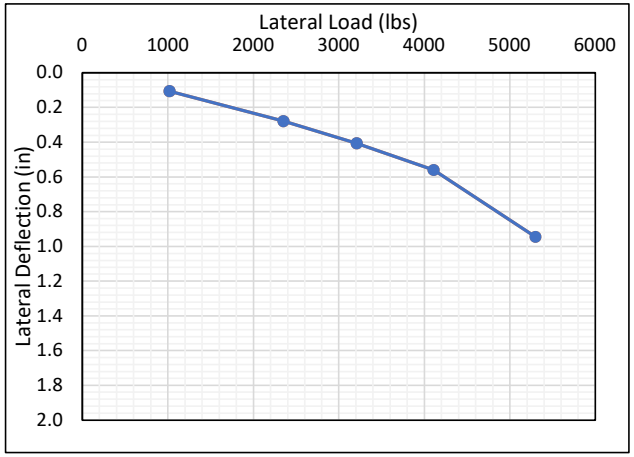


Lateral Test

Pile ID: P-06C
Embedment: 8'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	1020	0.1055	0.1080	0.1068
1250				
1875				
2500	2350	0.2845	0.2720	0.2783
3125	3210	0.4145	0.3975	0.4060
3750				
4375	4110	0.5725	0.5470	0.5598
5000	5300	0.9995	0.8925	0.9460
0				
0				
0		0.2510	0.1660	0.2085

Load height: 54"
Gauge heght: 9"
Notes:

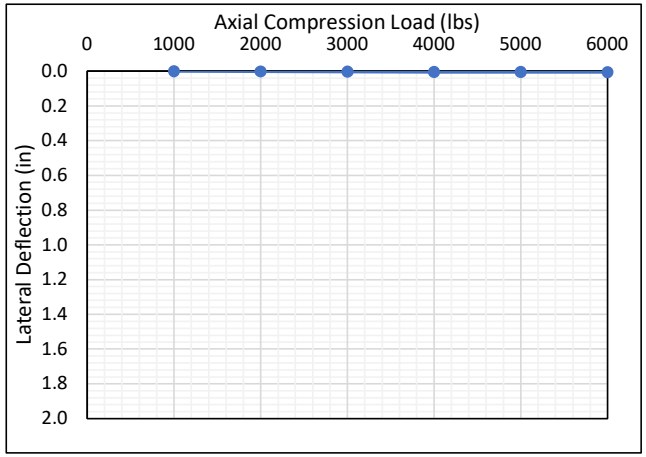


Axial Compression Test

Pile ID: P-06A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	0.0035	0.0000	0.0018
3000	3000	0.0050	0.0000	0.0025
4000	4000	0.0070	0.0010	0.0040
5000	5000	0.0100	0.0000	0.0050
6000	6000	0.0110	0.0005	0.0058
7000	7000	0.0120	0.0005	0.0063
8000	8000	0.0135	0.0010	0.0073
0		0.0010	0.0005	0.0008

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/26/2022

Axial Tension Test

Pile ID: P-07A
Embedment: 6'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000				
2000	2150	0.0010	0.0030	0.0020
3000	2840	0.0035	0.0045	0.0040
4000	3940	0.0060	0.0075	0.0068
5000	5100	0.0150	0.0140	0.0145
6000	6210	0.0400	0.0345	0.0373
7000	7280	0.0813	0.0730	0.0771
8000	8570	0.1985	0.1821	0.1903
0		0.1695	0.1640	0.1668

Failure Load:
Gauge heght:
Notes:

Lateral Test

Pile ID: P-07B
Embedment: 4'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	860	0.1925	0.1935	0.1930
1250	1470	0.3750	0.3350	0.3550
1875	2050	0.6165	0.5610	0.5888
2500				
3125	3110	0.9755	1.1570	1.0663
3750	3610	0.9755	1.9230	1.4493
4375				
5000				
0				
0				
0		0.0153	1.0660	0.5407

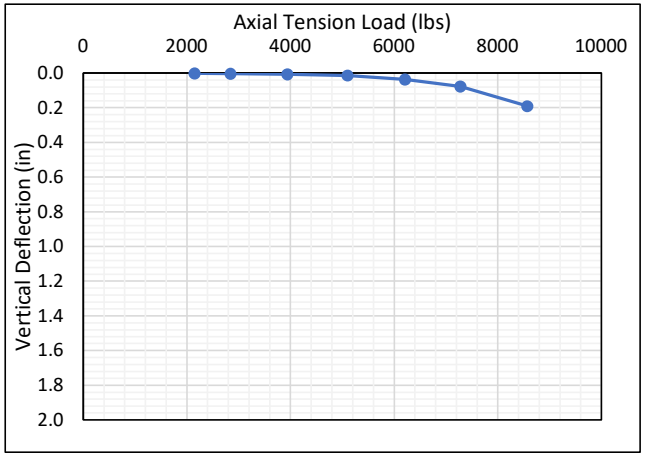
Load height: 55"
Gauge heght: 9"
Notes:

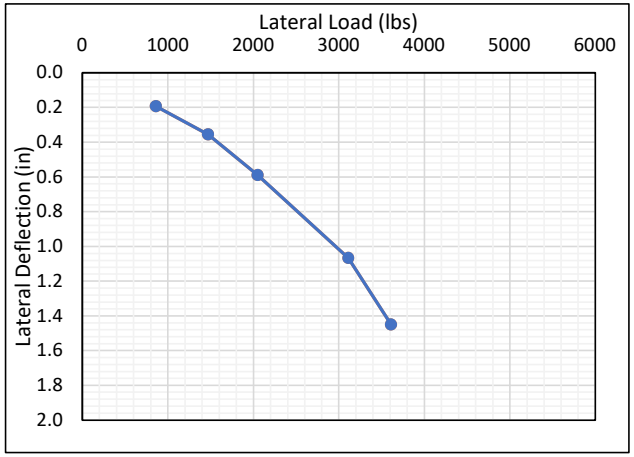
Axial Compression Test

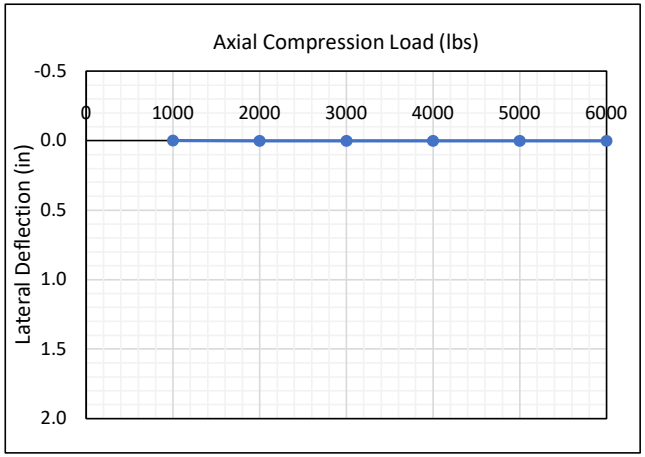
Pile ID: P-07C
Embedment: 10'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	0.0015	0.0025	0.0020
3000	3000	0.0010	0.0015	0.0013
4000	4000	0.0010	0.0015	0.0013
5000	5000	0.0015	0.0010	0.0013
6000	6000	0.0020	-0.0005	0.0008
7000	7000	0.0025	-0.0025	0.0000
8000	8000	0.0005	-0.0035	-0.0015
0		0.0030	0.0020	0.0025

Failure Load:
Gauge heght:
Notes:







Pile Load Test Data

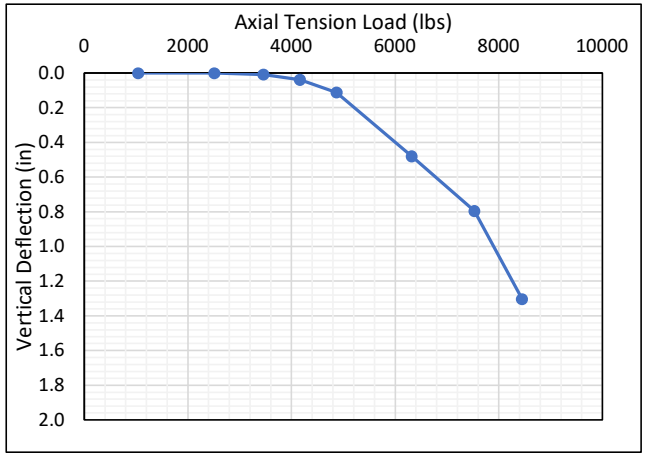
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/27/2022

Axial Tension Test

Pile ID: P-08B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1040	0.0000	0.0010	0.0005
2000	2510	0.0000	0.0010	0.0005
3000	3460	0.0000	0.0165	0.0083
4000	4160	0.0275	0.0495	0.0385
5000	4870	0.1010	0.1215	0.1113
6000	6320	0.3660	0.5935	0.4798
7000	7530	0.7860	0.8050	0.7955
8000	8450	1.2930	1.3120	1.3025
0		1.2885	1.2700	1.2793

Failure Load:
Gauge heght:
Notes:

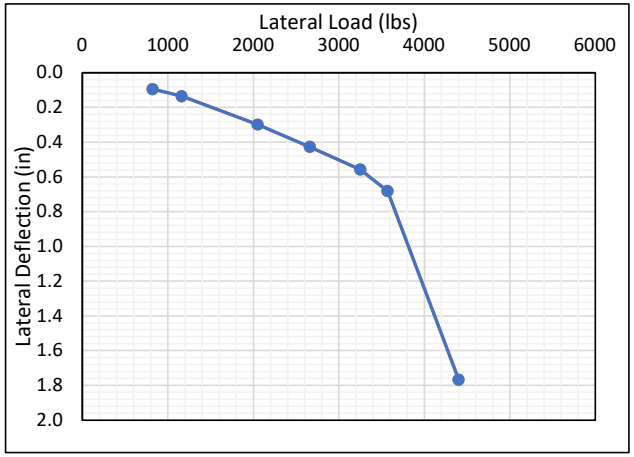


Lateral Test

Pile ID: P-08C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	820	0.0770	0.1125	0.0948
1250	1160	0.1150	0.1550	0.1350
1875	2050	0.2640	0.3340	0.2990
2500	2660	0.3960	0.4570	0.4265
3125	3250	0.5265	0.5875	0.5570
3750	3570	0.6780	0.6845	0.6813
4375	4400	1.6355	1.9000	1.7678
5000				
0				
0				
0		0.6495	0.2615	0.4555

Load height: 55"
Gauge heght: 10"
Notes:

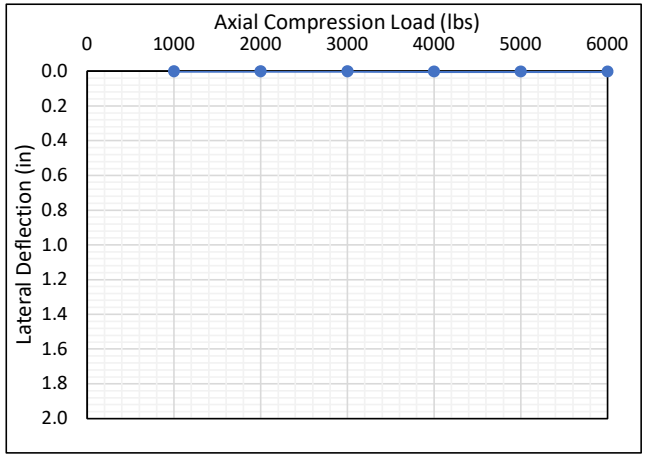


Axial Compression Test

Pile ID: P-08A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	0.0000	0.0000	0.0000
3000	3000	0.0000	0.0005	0.0003
4000	4000	0.0010	0.0010	0.0010
5000	5000	0.0005	0.0015	0.0010
6000	6000	0.0005	0.0025	0.0015
7000	7000	0.0005	0.0025	0.0015
8000	8000	0.0005	0.0020	0.0013
0		0.0000	0.0010	0.0005

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

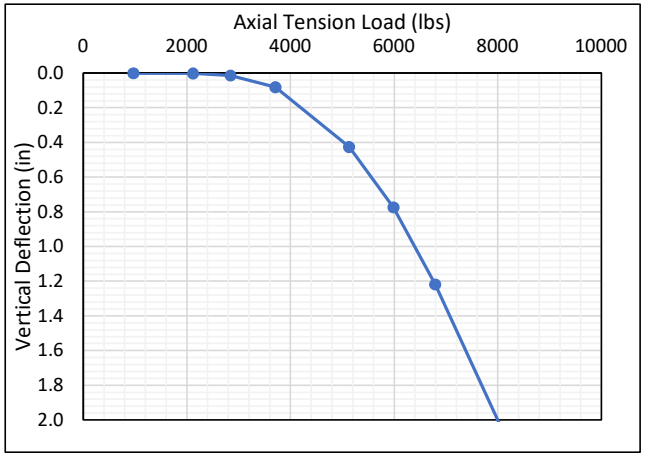
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 5/4/2022

Axial Tension Test

Pile ID: P-09B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	970	0.0010	0.0005	0.0008
2000	2120	0.0030	0.0030	0.0030
3000	2840	0.0135	0.0140	0.0138
4000	3710	0.0800	0.0835	0.0818
5000	5130	0.4250	0.4255	0.4253
6000	5990	0.7735	0.7750	0.7743
7000	6790	1.2175	1.2190	1.2183
8000	8060	2.0875	1.9910	2.0393
0		2.0875	1.9910	2.0393

Failure Load: 8060
Gauge heght:
Notes:

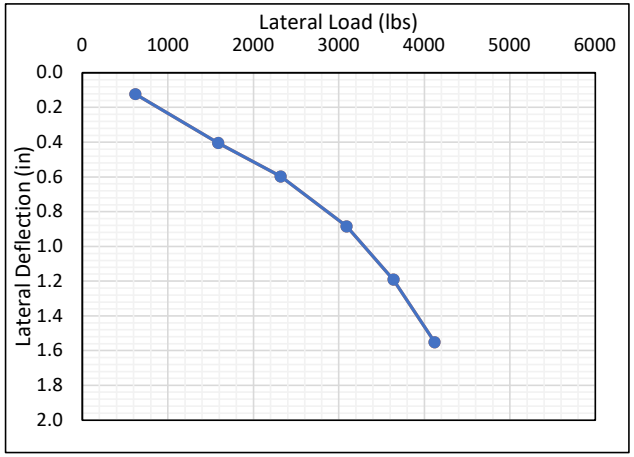


Lateral Test

Pile ID: P-09C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	620	0.1270	0.1190	0.1230
1250	1590	0.5120	0.2990	0.4055
1875				
2500	2320	0.6050	0.5910	0.5980
3125	3090	0.8940	0.8770	0.8855
3750	3640	1.1990	1.1845	1.1918
4375	4120	1.5485	1.5555	1.5520
5000				
0				
0				
0		0.3605	0.3925	0.3765

Load height: 51"
Gauge heght: 10"
Notes:

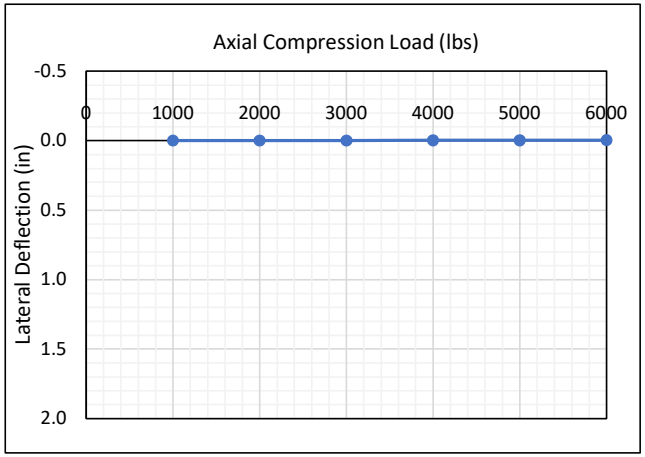


Axial Compression Test

Pile ID: P-09A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	-0.0005	0.0000	-0.0003
2000	2000	-0.0015	0.0005	-0.0005
3000	3000	-0.0030	0.0010	-0.0010
4000	4000	-0.0045	0.0005	-0.0020
5000	5000	-0.0070	0.0010	-0.0030
6000	6000	-0.0090	0.0000	-0.0045
7000	7000	-0.0145	-0.0015	-0.0080
8000	8000	-0.0220	-0.0100	-0.0160
0		-0.0155	-0.0005	-0.0080

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

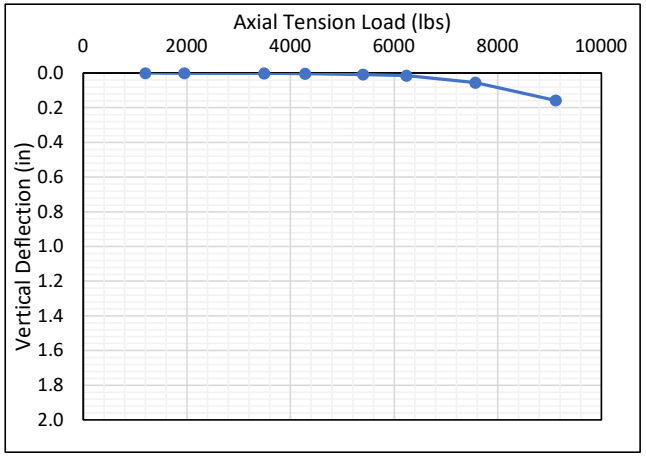
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 5/4/2022

Axial Tension Test

Pile ID: P-10A
Embedment: 6'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1200	0.0010	0.0000	0.0005
2000	1950	0.0020	0.0005	0.0013
3000	3490	0.0045	0.0010	0.0028
4000	4280	0.0065	0.0025	0.0045
5000	5400	0.0105	0.0050	0.0078
6000	6240	0.0195	0.0125	0.0160
7000	7570	0.0590	0.0510	0.0550
8000	9120	0.1640	0.1530	0.1585
0		0.1430	0.1405	0.1418

Failure Load:
Gauge heght:
Notes:

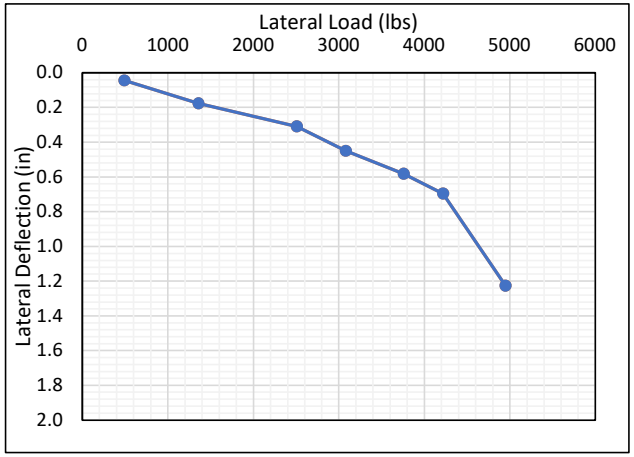


Lateral Test

Pile ID: P-10C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	490	0.0450	0.0435	0.0443
1250	1360	0.1900	0.1635	0.1768
1875				
2500	2510	0.3260	0.2905	0.3083
3125	3080	0.4675	0.4305	0.4490
3750	3760	0.6020	0.5620	0.5820
4375	4220	0.7205	0.6715	0.6960
5000	4950	1.2765	1.1745	1.2255
0				
0				
0		0.4890	0.4175	0.4533

Load height: 53"
Gauge heght: 14"
Notes:

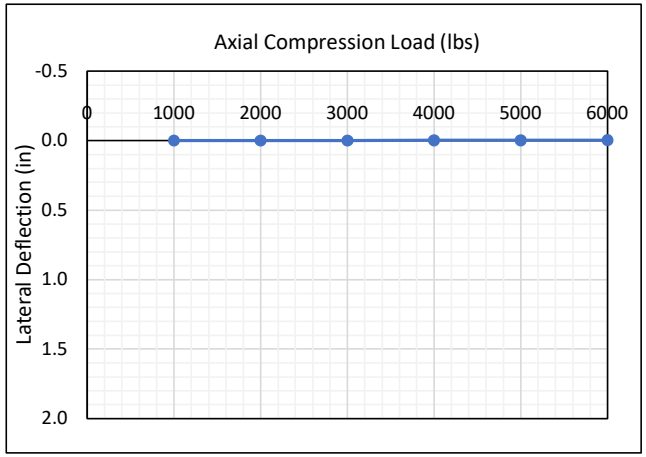


Axial Compression Test

Pile ID: P-10B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	-0.0005	0.0000	-0.0003
2000	2000	-0.0005	0.0000	-0.0003
3000	3000	-0.0020	0.0000	-0.0010
4000	4000	-0.0045	-0.0010	-0.0028
5000	5000	-0.0050	-0.0010	-0.0030
6000	6000	-0.0075	-0.0020	-0.0048
7000	7000	-0.0080	-0.0020	-0.0050
8000	8000	-0.0085	-0.0030	-0.0058
0		0.0030	0.0030	0.0030

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

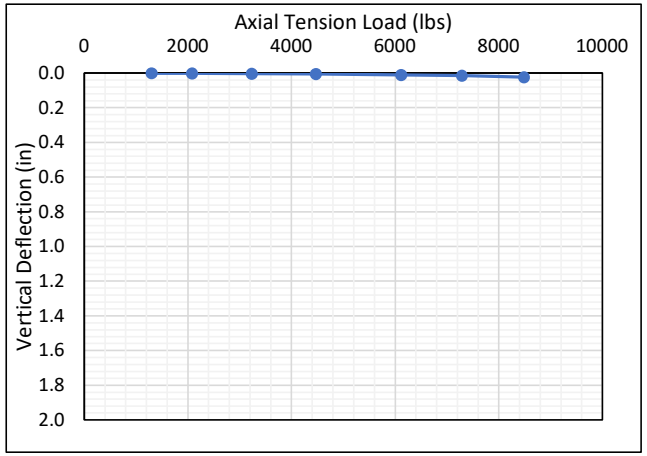
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/26/2022

Axial Tension Test

Pile ID: P-11C
Embedment: 10'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1300	0.0015	0.0015	0.0015
2000	2080	0.0025	0.0025	0.0025
3000	3230	0.0045	0.0045	0.0045
4000	4470	0.0060	0.0055	0.0058
5000				
6000	6120	0.0110	0.0105	0.0108
7000	7290	0.0160	0.0155	0.0158
8000	8490	0.0250	0.0240	0.0245
0		0.0175	0.0175	0.0175

Failure Load:
Gauge heght:
Notes:

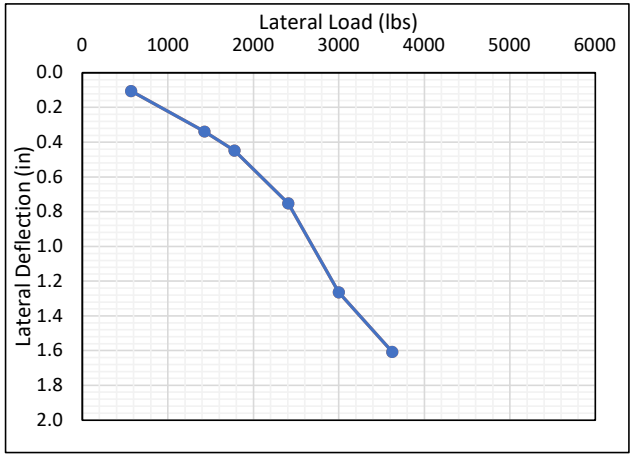


Lateral Test

Pile ID: P-11B
Embedment: 4'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	570	0.1015	0.1100	0.1058
1250	1430	0.3350	0.3440	0.3395
1875	1780	0.4060	0.4900	0.4480
2500	2410	0.7450	0.7605	0.7528
3125	3000	1.2050	1.3230	1.2640
3750	3625	1.2050	2.0115	1.6083
4375				
5000				
0				
0				
0		0.3750	1.2435	0.8093

Load height: 53"
Gauge heght: 9"
Notes:

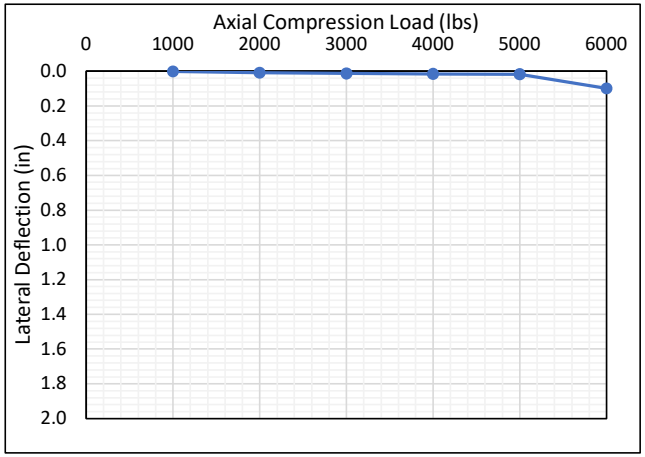


Axial Compression Test

Pile ID: P-11A
Embedment: 6'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0020	0.0000	0.0010
2000	2000	0.0140	0.0050	0.0095
3000	3000	0.0205	0.0065	0.0135
4000	4000	0.0245	0.0080	0.0163
5000	5000	0.0250	0.0085	0.0168
6000	6000	0.0390	0.1600	0.0995
7000	7000	0.0450	0.0195	0.0323
8000	8000	0.0490	0.0245	0.0368
0		0.0180	0.0180	0.0180

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

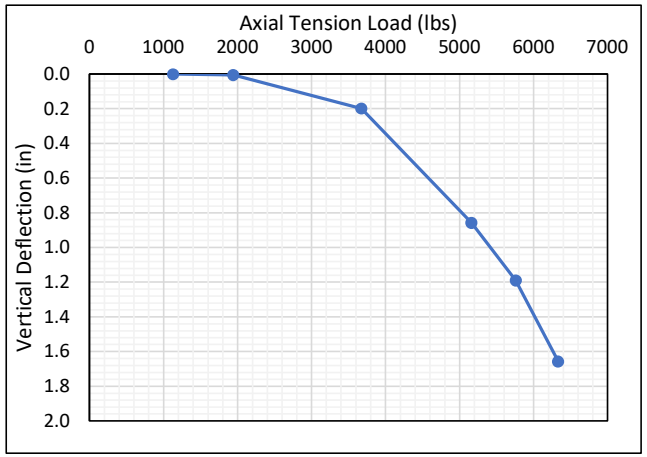
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/26/2022

Axial Tension Test

Pile ID: P-12B
Embedment: 6'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1130	0.0010	0.0000	0.0005
2000	1940	0.0070	0.0045	0.0058
3000				
4000	3670	0.2005	0.1965	0.1985
5000	5160	0.8580	0.8560	0.8570
6000	5760	1.1800	1.1990	1.1895
7000	6330	1.6490	1.6640	1.6565
8000				
0		1.6350	1.6420	1.6385

Failure Load: 6330
Gauge heght:
Notes:

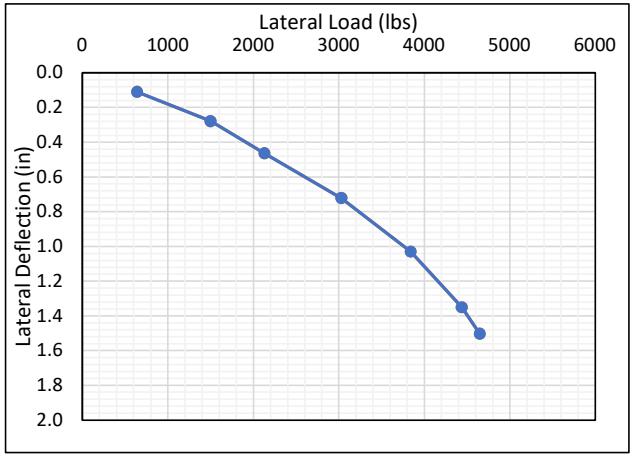


Lateral Test

Pile ID: P-12C
Embedment: 6'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	640	0.1095	0.1120	0.1108
1250	1500	0.2735	0.2825	0.2780
1875	2130	0.4570	0.4720	0.4645
2500				
3125	3030	0.7105	0.7315	0.7210
3750	3840	1.0155	1.0445	1.0300
4375	4440	1.3360	1.3650	1.3505
5000	4650	1.6050	1.4005	1.5028
0				
0				
0		0.6650	0.6110	0.6380

Load height: 54"
Gauge heght: 8"
Notes:

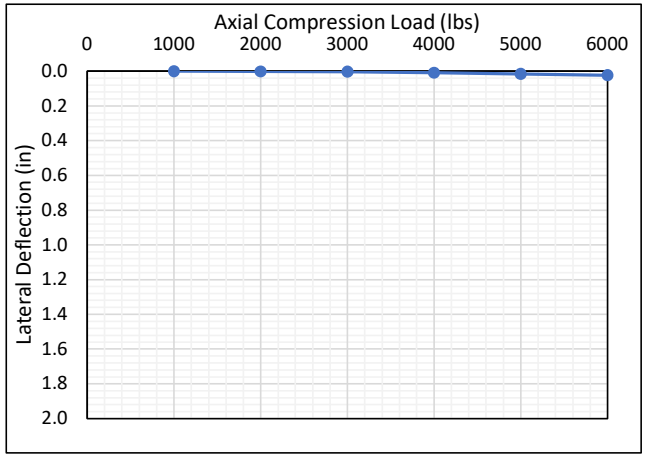


Axial Compression Test

Pile ID: P-12A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0010	0.0005
2000	2000	0.0005	0.0035	0.0020
3000	3000	0.0010	0.0055	0.0033
4000	4000	0.0050	0.0135	0.0093
5000	5000	0.0105	0.0210	0.0158
6000	6000	0.0170	0.0300	0.0235
7000	7000	0.0350	0.0380	0.0365
8000	8000	0.0330	0.0500	0.0415
0		0.0190	0.0200	0.0195

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

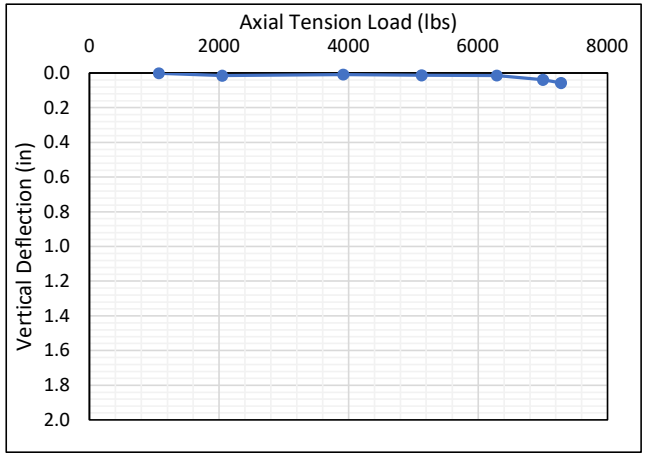
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 5/3/2022

Axial Tension Test

Pile ID: P-13B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1070	0.0010	0.0015	0.0013
2000	2050	0.0250	0.0045	0.0148
3000				
4000	3920	0.0060	0.0090	0.0075
5000	5130	0.0105	0.0140	0.0123
6000	6290	0.0022	0.0250	0.0136
7000	7000	0.0375	0.0400	0.0388
8000	7280	0.0565	0.0590	0.0578
0		0.0440	0.0415	0.0428

Failure Load:
Gauge heght:
Notes:

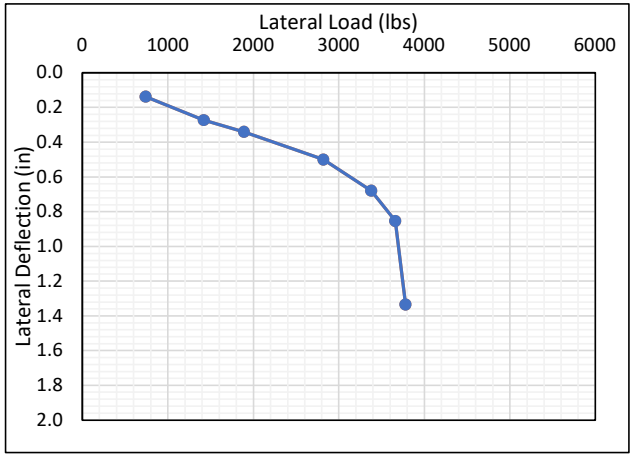


Lateral Test

Pile ID: P-13C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	740	0.1430	0.1315	0.1373
1250	1420	0.2600	0.2850	0.2725
1875	1890	0.3515	0.3305	0.3410
2500	2820	0.5175	0.4830	0.5003
3125	3380	0.6990	0.6600	0.6795
3750	3660	0.9105	0.7975	0.8540
4375	3780	1.5420	1.1270	1.3345
5000				
0				
0				
0		0.8330	0.7155	0.7743

Load height: 53"
Gauge heght: 10"
Notes:

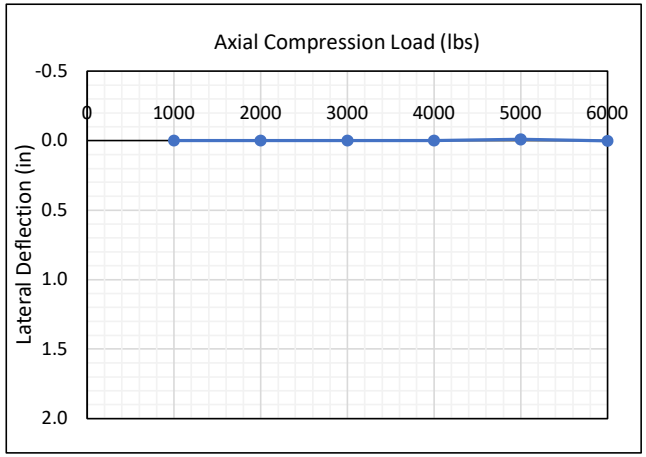


Axial Compression Test

Pile ID: P-13A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	-0.0010	0.0005	-0.0003
3000	3000	-0.0015	0.0005	-0.0005
4000	4000	-0.0020	0.0015	-0.0003
5000	5000	-0.0225	0.0035	-0.0095
6000	6000	-0.0035	0.0060	0.0013
7000	7000	-0.0045	0.0060	0.0008
8000	8000	-0.0055	0.0045	-0.0005
0		0.0040	0.0000	0.0020

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 5/3/2022

Axial Tension Test

Pile ID: P-14B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	970	0.0010	0.0010	0.0010
2000	1800	0.0025	0.0015	0.0020
3000	2700	0.0040	0.0030	0.0035
4000	3940	0.0050	0.0030	0.0040
5000	4840	0.0065	0.0040	0.0053
6000	6540	0.0085	0.0045	0.0065
7000	7210	0.0100	0.0055	0.0078
8000	8300	0.0130	0.0085	0.0108
0		0.0045	0.0045	0.0045

Failure Load:
Gauge heght:
Notes:

Lateral Test

Pile ID: P-14C
Embedment: 8'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	500	0.0585	0.0535	0.0560
1250	890	0.1005	0.0935	0.0970
1875	1520	0.1920	0.1770	0.1845
2500	2850	0.4160	0.3975	0.4068
3125				
3750	3750	0.5685	0.5490	0.5588
4375	4270	0.6780	0.6620	0.6700
5000	4940	0.9100	0.8920	0.9010
0				
0				
0		0.0935	0.0695	0.0815

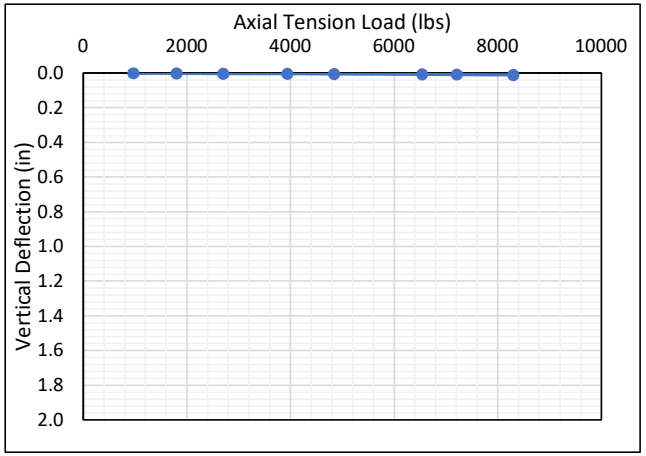
Load height: 45"
Gauge heght: 14"
Notes:

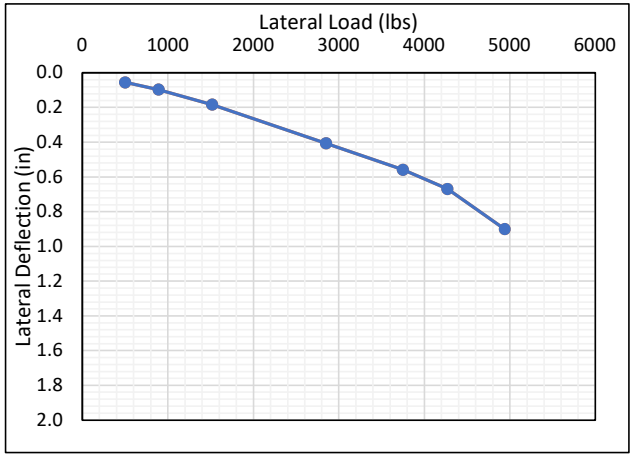
Axial Compression Test

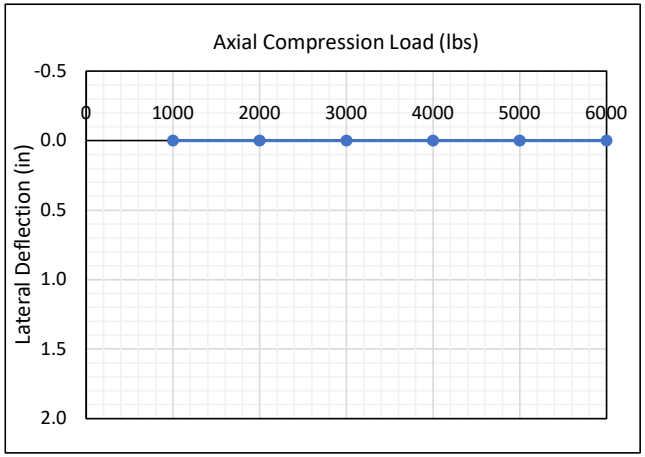
Pile ID: P-14A
Embedment: 6'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	0.0000	0.0000	0.0000
3000	3000	0.0000	0.0000	0.0000
4000	4000	0.0000	0.0000	0.0000
5000	5000	0.0000	0.0000	0.0000
6000	6000	0.0000	0.0000	0.0000
7000	7000	0.0000	0.0000	0.0000
8000	8000	-0.0015	-0.0030	-0.0023
0		0.0010	0.0030	0.0020

Failure Load:
Gauge heght:
Notes:







Pile Load Test Data

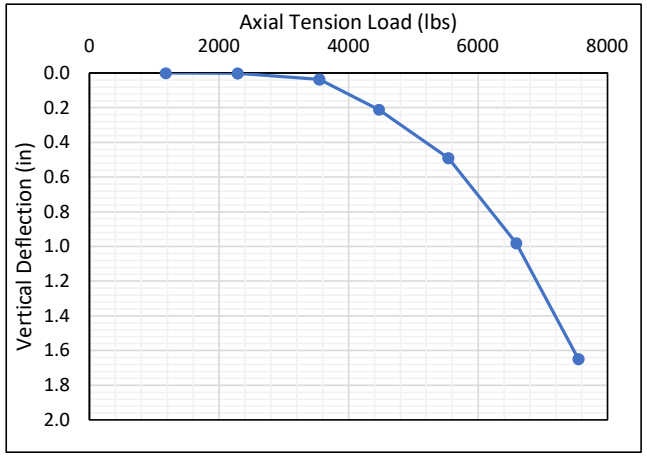
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/28/2022

Axial Tension Test

Pile ID: P-15B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1180	0.0010	-0.0005	0.0003
2000	2290	0.0045	0.0000	0.0023
3000	3550	0.0405	0.0330	0.0368
4000	4470	0.2160	0.2065	0.2113
5000	5540	0.4955	0.4845	0.4900
6000	6590	0.9880	0.9750	0.9815
7000	7550	1.6565	1.6413	1.6489
8000				
0		1.6250	1.6200	1.6225

Failure Load: 7550
Gauge heght:
Notes:

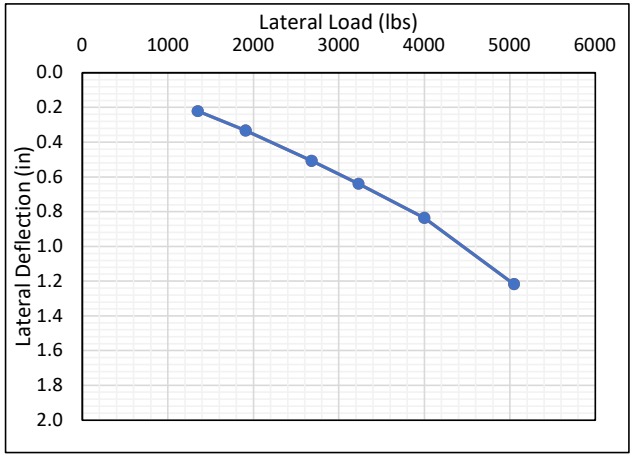


Lateral Test

Pile ID: P-15C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625				
1250	1350	0.2250	0.2170	0.2210
1875	1910	0.3365	0.3290	0.3328
2500	2680	0.5100	0.5050	0.5075
3125	3230	0.6420	0.6360	0.6390
3750	4000	0.8410	0.8320	0.8365
4375				
5000	5050	1.2380	1.1965	1.2173
0				
0				
0		0.1895	0.1765	0.1830

Load height: 54"
Gauge heght: 13"
Notes:

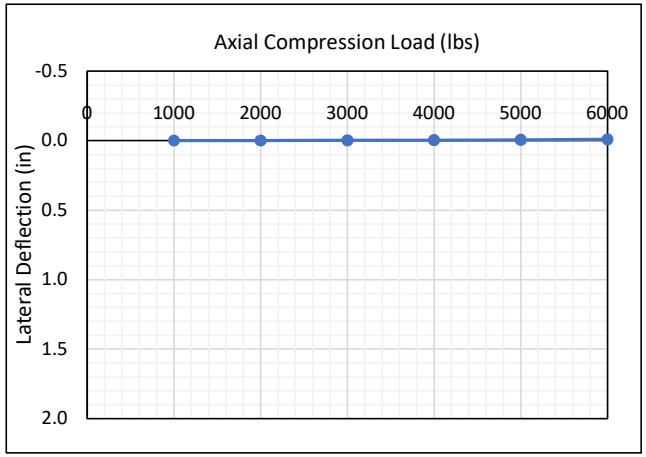


Axial Compression Test

Pile ID: P-15A
Embedment: 6'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	-0.0010	-0.0005	-0.0008
3000	3000	-0.0025	-0.0010	-0.0018
4000	4000	-0.0045	-0.0030	-0.0038
5000	5000	-0.0065	-0.0040	-0.0053
6000	6000	-0.0120	-0.0065	-0.0093
7000	7000	-0.0210	-0.0125	-0.0168
8000	8000	-0.0395	-0.0245	-0.0320
0		-0.0235	-0.0240	-0.0238

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/28/2022

Axial Tension Test

Pile ID: P-16B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1210	0.0025	0.0020	0.0023
2000	1950	0.0040	0.0035	0.0038
3000	3250	0.0085	0.0085	0.0085
4000	4330	0.0285	0.0295	0.0290
5000	5570	0.1470	0.1475	0.1473
6000	6120	0.2700	0.2685	0.2693
7000	7240	0.5225	0.5185	0.5205
8000	8460	0.8480	0.8380	0.8430
0		0.8205	0.8100	0.8153

Failure Load:
Gauge heght:
Notes:

Lateral Test

Pile ID: P-16C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625				
1250	1190	0.1975	0.1860	0.1918
1875	1930	0.3550	0.3400	0.3475
2500	2570	0.5045	0.4860	0.4953
3125	3370	0.6985	0.6770	0.6878
3750				
4375	4240	0.9540	0.9235	0.9388
5000	4970	1.5380	1.3405	1.4393
0				
0				
0		0.4475	0.1850	0.3163

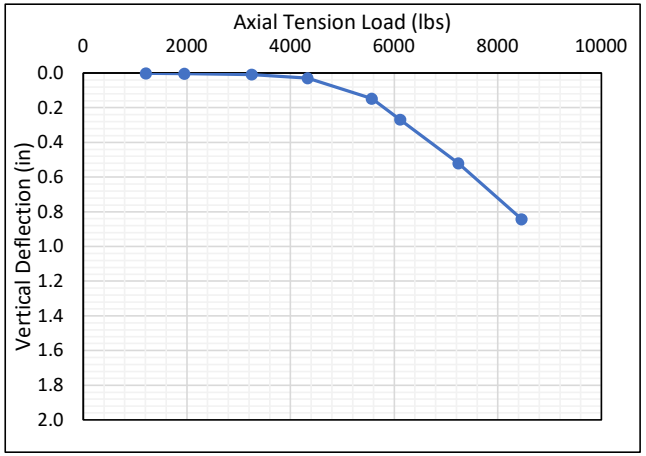
Load height: 54"
Gauge heght: 11"
Notes:

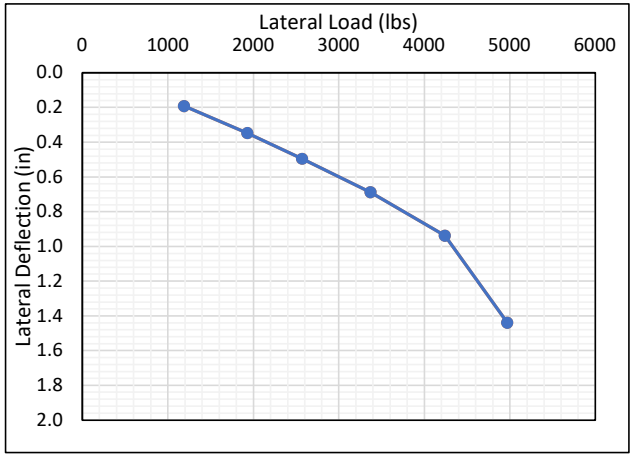
Axial Compression Test

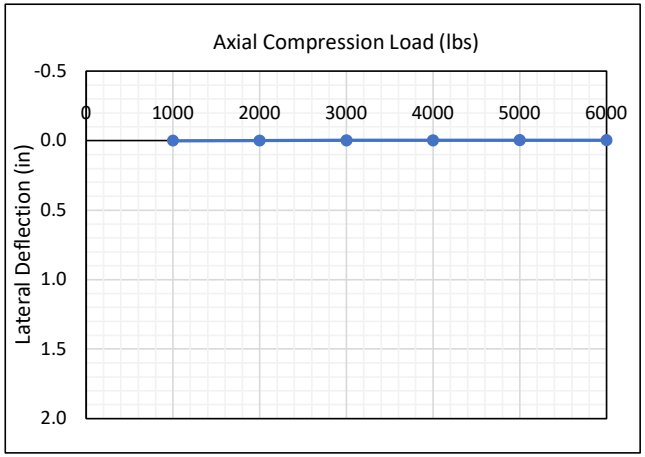
Pile ID: P-16A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0010	0.0005
2000	2000	-0.0010	0.0005	-0.0003
3000	3000	-0.0025	0.0000	-0.0013
4000	4000	-0.0040	0.0000	-0.0020
5000	5000	-0.0055	-0.0010	-0.0033
6000	6000	-0.0065	-0.0010	-0.0038
7000	7000	-0.0095	-0.0010	-0.0053
8000	8000	-0.0145	-0.0010	-0.0078
0		0.0010	0.0045	0.0028

Failure Load:
Gauge heght:
Notes:







Pile Load Test Data

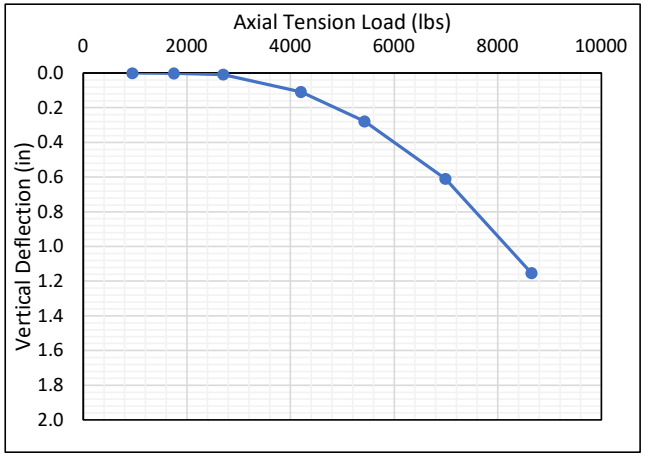
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/27/2022

Axial Tension Test

Pile ID: P-17B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	950	0.0010	0.0000	0.0005
2000	1750	0.0025	0.0015	0.0020
3000	2700	0.0085	0.0080	0.0083
4000	4200	0.1075	0.1100	0.1088
5000	5430	0.2760	0.2810	0.2785
6000				
7000	6990	0.6060	0.6125	0.6093
8000	8650	1.1460	1.1600	1.1530
0		1.1380	1.1260	1.1320

Failure Load:
Gauge heght:
Notes:

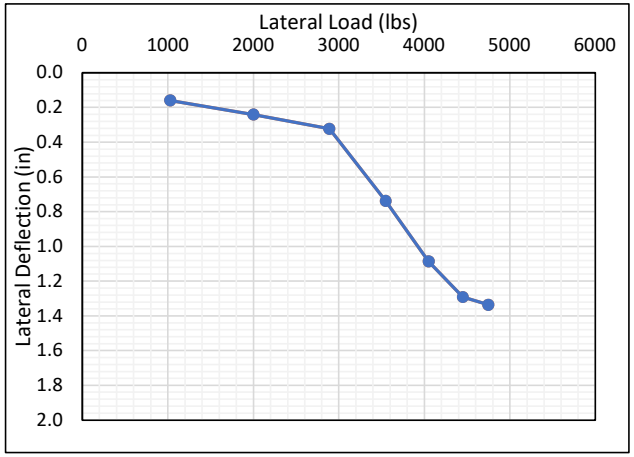


Lateral Test

Pile ID: P-17C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	1030	0.1635	0.1555	0.1595
1250				
1875	2000	0.3545	0.1275	0.2410
2500	2890	0.5850	0.0625	0.3238
3125	3550	0.7890	0.6895	0.7393
3750	4050	1.0475	1.1260	1.0868
4375	4450	1.2920		1.2920
5000	4750	1.3360		1.3360
0				
0				
0		0.6825		0.6825

Load height: 53"
Gauge heght: 11"
Notes: Pile twisted pushing gauge 2 out of position.

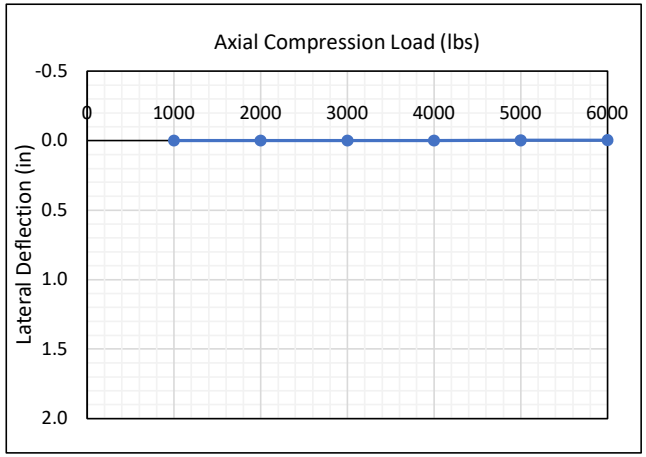


Axial Compression Test

Pile ID: P-17A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	-0.0010	-0.0005
2000	2000	0.0005	-0.0010	-0.0003
3000	3000	0.0010	-0.0015	-0.0003
4000	4000	0.0025	-0.0030	-0.0003
5000	5000	0.0040	-0.0065	-0.0013
6000	6000	0.0010	-0.0080	-0.0035
7000	7000	-0.0030	-0.0090	-0.0060
8000	8000	-0.0105	-0.0140	-0.0123
0		0.0850	0.0050	0.0450

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/27/2022

Axial Tension Test

Pile ID: P-18B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000				
2000	2390	-0.0030	-0.0030	-0.0030
3000	3280	-0.0050	-0.0045	-0.0048
4000	4410	-0.0045	-0.0035	-0.0040
5000	5400	-0.0030	-0.0025	-0.0028
6000				
7000	7150	0.0015	0.0030	0.0023
8000	8030	0.2650	0.3290	0.2970
0		0.0050	0.0030	0.0040

Failure Load:
Gauge heght:
Notes:

Lateral Test

Pile ID: P-18C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625				
1250	1550	0.2570	0.2695	0.2633
1875				
2500	2820	0.5636	0.5585	0.5611
3125				
3750	3960	0.8305	0.8815	0.8560
4375	4370	1.3125	1.2660	1.2893
5000	4860		1.2610	1.2610
0				
0				
0			0.4145	0.4145

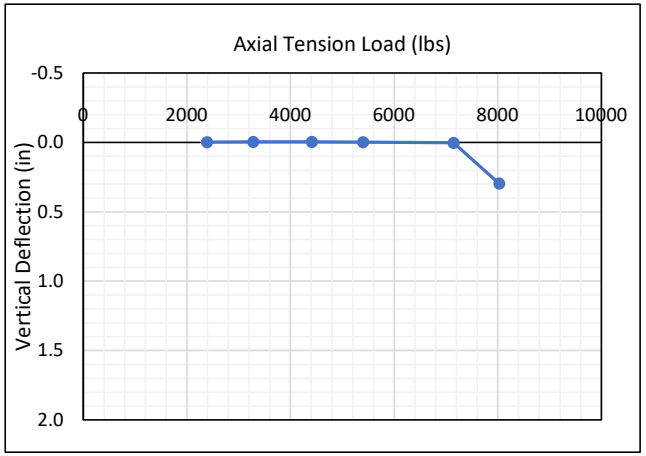
Load height: 54"
Gauge heght: 11"
Notes: At final load pile moved enough to knock gauge 1 over.

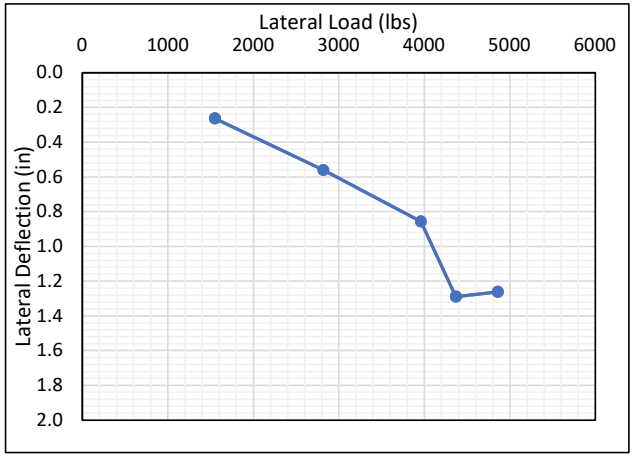
Axial Compression Test

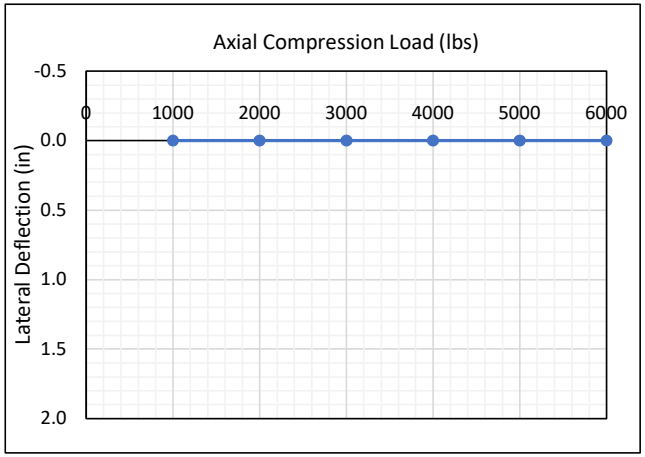
Pile ID: P-18A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	0.0000	0.0000	0.0000
3000	3000	-0.0005	0.0005	0.0000
4000	4000	-0.0010	0.0005	-0.0003
5000	5000	-0.0020	0.0020	0.0000
6000	6000	-0.0025	0.0025	0.0000
7000	7000	-0.0020	0.0200	0.0090
8000	8000	-0.0050	0.0030	-0.0010
0		0.0020	0.0045	0.0033

Failure Load:
Gauge heght:
Notes:







Pile Load Test Data

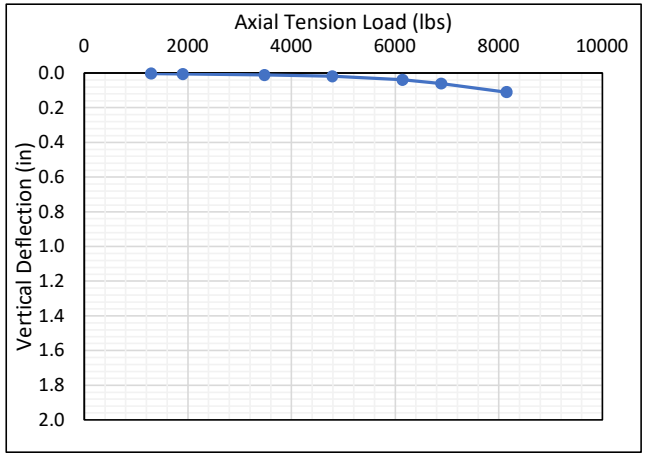
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/27/2022

Axial Tension Test

Pile ID: P-19B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1290	0.0045	0.0015	0.0030
2000	1900	0.0070	0.0030	0.0050
3000	3480	0.0155	0.0070	0.0113
4000				
5000	4790	0.0245	0.0130	0.0188
6000	6140	0.0435	0.0320	0.0378
7000	6890	0.0645	0.0540	0.0593
8000	8150	0.1145	0.1045	0.1095
0		0.0790	0.0780	0.0785

Failure Load:
Gauge heght:
Notes:

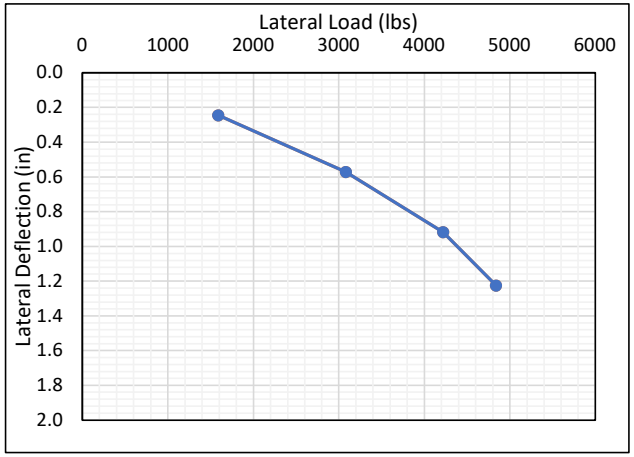


Lateral Test

Pile ID: P-19C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625				
1250	1590	0.2550	0.2365	0.2458
1875				
2500				
3125	3080	0.5895	0.5540	0.5718
3750				
4375	4220	0.9505	0.8865	0.9185
5000	4840	1.3385	1.1120	1.2253
0				
0				
0		0.3790	0.2020	0.2905

Load height: 54"
Gauge heght: 9"
Notes:

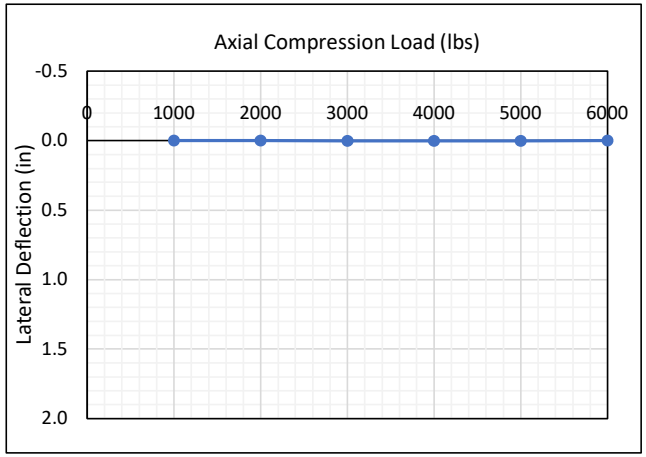


Axial Compression Test

Pile ID: P-19A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	0.0000	0.0010	0.0005
3000	3000	0.0005	0.0015	0.0010
4000	4000	0.0005	0.0020	0.0013
5000	5000	0.0000	0.0030	0.0015
6000	6000	-0.0015	0.0010	-0.0003
7000	7000	-0.0050	-0.0035	-0.0043
8000	8000	-0.0100	-0.0105	-0.0103
0		-0.0010	0.0015	0.0003

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 5/3/2022

Axial Tension Test

Pile ID: P-20A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1400	0.0005	0.0010	0.0008
2000	2400	0.0010	0.0010	0.0010
3000	3510	0.0030	0.0010	0.0020
4000	4380	0.0060	0.0030	0.0045
5000	5010	0.0100	0.0070	0.0085
6000	6210	0.0320	0.0265	0.0293
7000	7180	0.0805	0.0740	0.0773
8000	8590	0.1900	0.1790	0.1845
0		0.1645	0.1610	0.1628

Failure Load:
Gauge heght:
Notes:

Lateral Test

Pile ID: P-20C
Embedment: 6'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	1000	0.1790	0.1810	0.1800
1250	1500	0.3105	0.3160	0.3133
1875	2110	0.4755	0.4880	0.4818
2500	2690	0.6765	0.6700	0.6733
3125	3460	0.9670	0.9515	0.9593
3750	4190	1.3230	1.2765	1.2998
4375	4310	1.7010	1.6825	1.6918
5000				
0				
0				
0		0.5545	0.5845	0.5695

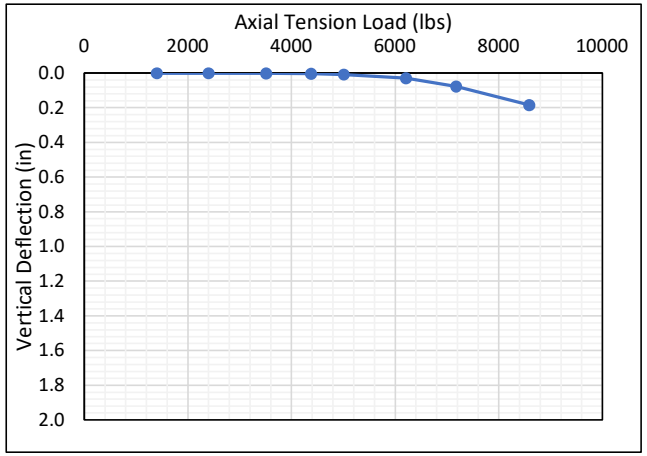
Load height: 53"
Gauge heght: 11"
Notes:

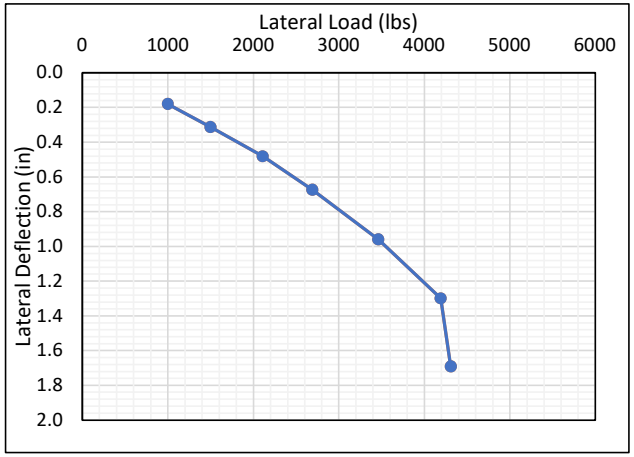
Axial Compression Test

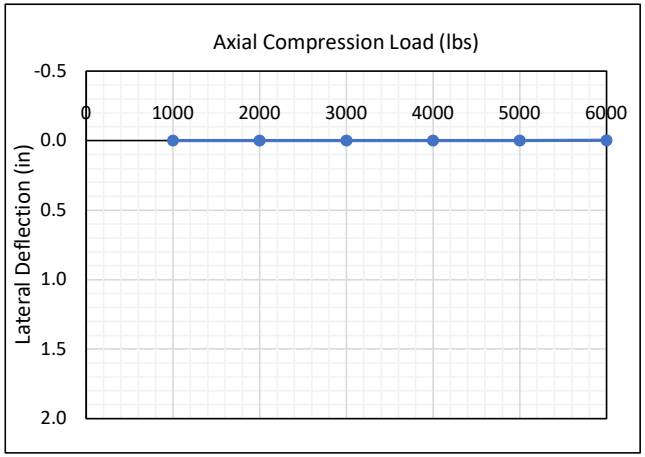
Pile ID: P-20B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0005	0.0003
2000	2000	0.0000	0.0005	0.0003
3000	3000	-0.0005	-0.0005	-0.0005
4000	4000	-0.0010	-0.0005	-0.0008
5000	5000	-0.0015	-0.0005	-0.0010
6000	6000	-0.0025	-0.0005	-0.0015
7000	7000	-0.0045	-0.0010	-0.0028
8000	8000	-0.0045	-0.0020	-0.0033
0		0.0065	0.0005	0.0035

Failure Load:
Gauge heght:
Notes:







Pile Load Test Data

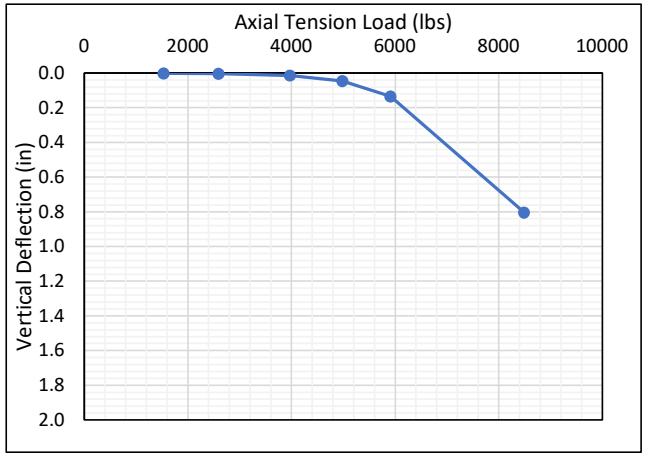
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 5/4/2022

Axial Tension Test

Pile ID: P-21B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1530	0.0015	0.0020	0.0018
2000	2590	0.0040	0.0045	0.0043
3000				
4000	3970	0.0140	0.0150	0.0145
5000	4980	0.0455	0.0455	0.0455
6000	5910	0.1350	0.1345	0.1348
7000				
8000	8490	0.8025	0.8045	0.8035
0		0.7790	0.7805	0.7798

Failure Load:
Gauge heght:
Notes:

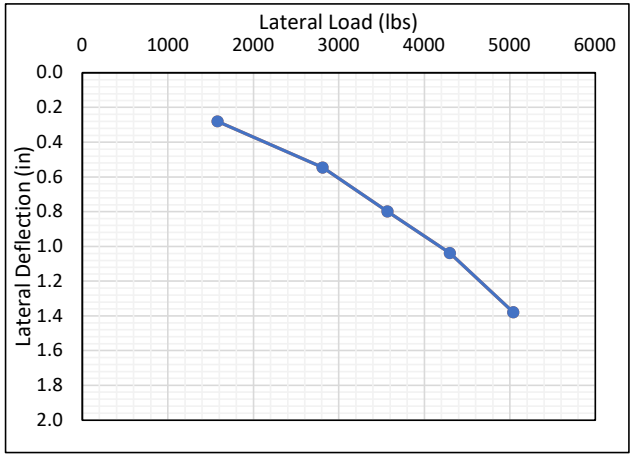


Lateral Test

Pile ID: P-21C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625				
1250	1580	0.2850	0.2760	0.2805
1875				
2500	2810	0.5565	0.5355	0.5460
3125	3570	0.8160	0.7805	0.7983
3750				
4375	4300	1.0585	1.0195	1.0390
5000	5040	1.4010	1.3570	1.3790
0				
0				
0		0.0550	0.0490	0.0520

Load height: 40"
Gauge heght: 14"
Notes:

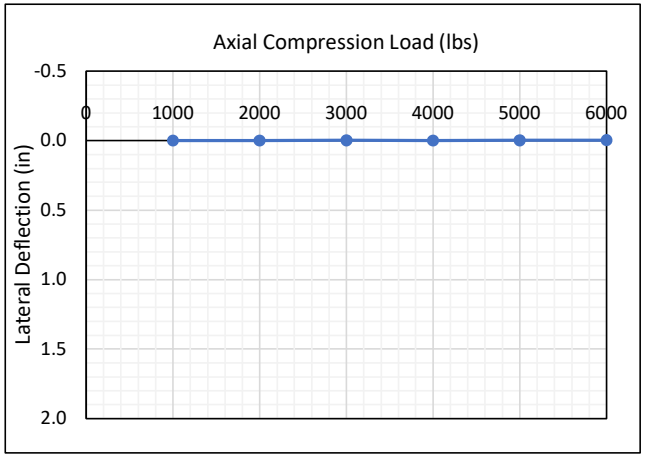


Axial Compression Test

Pile ID: P-21A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	-0.0005	-0.0005	-0.0005
3000	3000	-0.0010	-0.0015	-0.0013
4000	4000	0.0010	-0.0030	-0.0010
5000	5000	0.0000	-0.0045	-0.0023
6000	6000	-0.0020	-0.0055	-0.0038
7000	7000	-0.0090	-0.0090	-0.0090
8000	8000	-0.0140	-0.0095	-0.0118
0		-0.0125	-0.0075	-0.0100

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

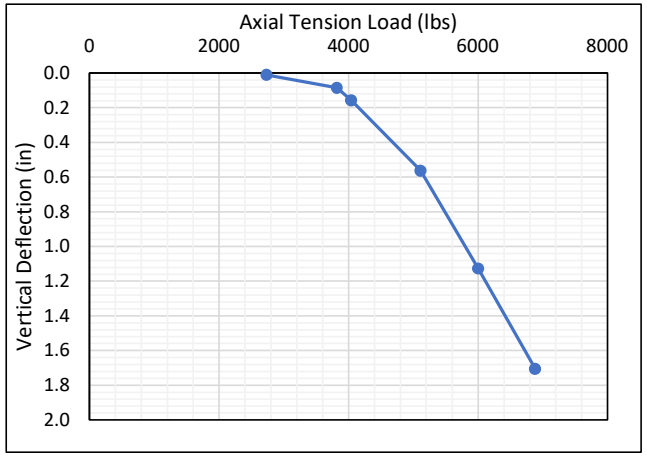
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/28/2022

Axial Tension Test

Pile ID: P-22A
Embedment: 6'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000				
2000				
3000	2730	0.0090	0.0110	0.0100
4000	3820	0.0825	0.0855	0.0840
5000	4040	0.1545	0.1590	0.1568
6000	5110	0.5605	0.5640	0.5623
7000	6000	1.1290	1.1235	1.1263
8000	6880	1.6845	1.7250	1.7048
0		1.6725	1.6885	1.6805

Failure Load: 6880
Gauge heght:
Notes:

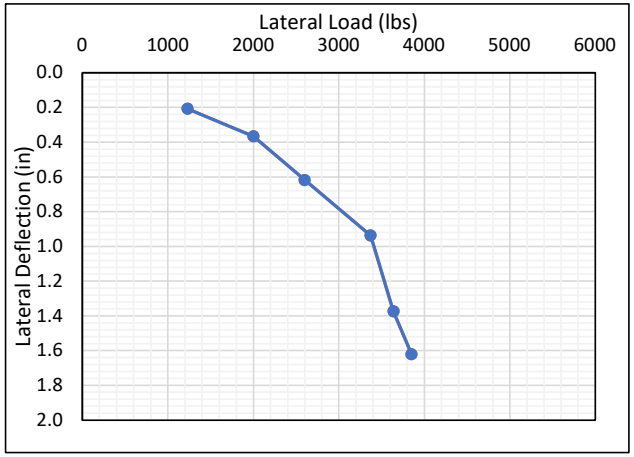


Lateral Test

Pile ID: P-22C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625				
1250	1230	0.2085	0.2065	0.2075
1875	2000	0.3770	0.3550	0.3660
2500	2600	0.6380	0.5990	0.6185
3125	3370	0.9655	0.9085	0.9370
3750	3640	1.4295	1.3185	1.3740
4375	3850	1.6175	1.6250	1.6213
5000				
0				
0				
0		0.8930	0.8950	0.8940

Load height: 54"
Gauge heght: 12"
Notes:

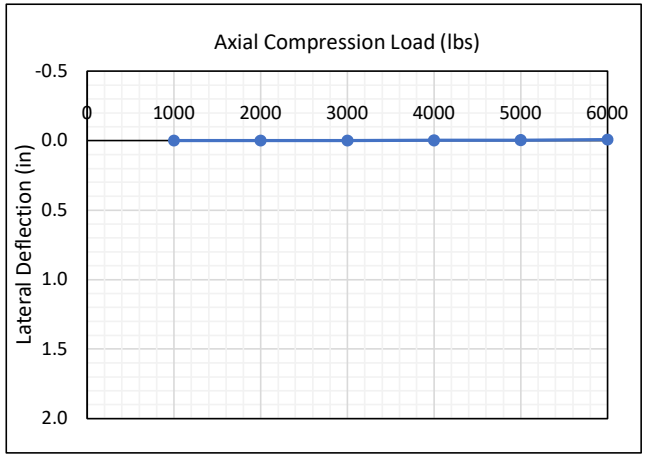


Axial Compression Test

Pile ID: P-22B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	0.0000	-0.0005	-0.0003
3000	3000	-0.0010	-0.0010	-0.0010
4000	4000	-0.0020	-0.0025	-0.0023
5000	5000	-0.0040	-0.0045	-0.0043
6000	6000	-0.0070	-0.0080	-0.0075
7000	7000	-0.0090	-0.0095	-0.0093
8000	8000	-0.0120	-0.0140	-0.0130
10000				
0		0.0025	0.0020	0.0023

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

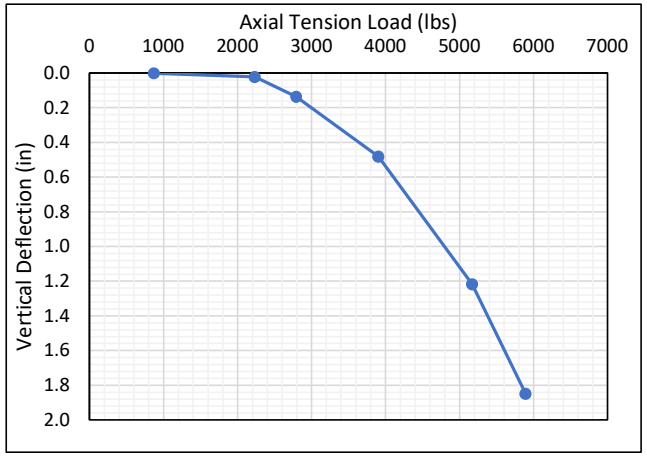
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/28/2022

Axial Tension Test

Pile ID: P-23B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	870	0.0010	0.0020	0.0015
2000	2230	0.0220	0.0230	0.0225
3000	2790	0.1350	0.1365	0.1358
4000	3900	0.4810	0.4825	0.4818
5000	5170	1.2170	1.2180	1.2175
6000	5890	1.8490	1.8485	1.8488
7000				
8000				
0		1.8160	1.8175	1.8168

Failure Load: 5890
Gauge heght:
Notes:

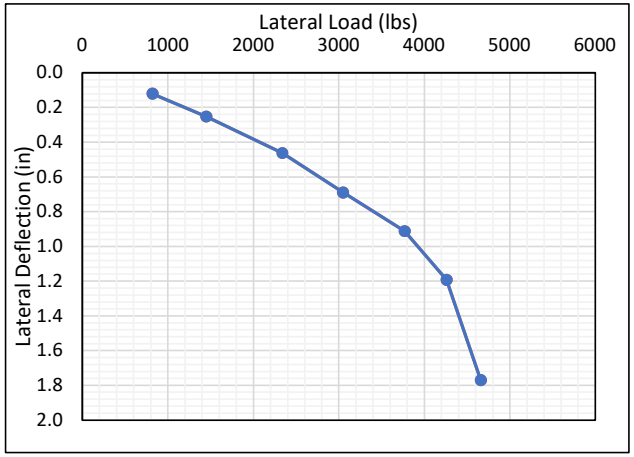


Lateral Test

Pile ID: P-23C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	820	0.1220	0.1200	0.1210
1250	1450	0.2505	0.2565	0.2535
1875	2340	0.4570	0.4675	0.4623
2500				
3125	3050	0.6820	0.6960	0.6890
3750	3770	0.9065	0.9175	0.9120
4375	4260	1.2010	1.1830	1.1920
5000	4660	1.8765	1.6650	1.7708
0				
0				
0		0.7195	0.6685	0.6940

Load height: 53"
Gauge heght: 9"
Notes:

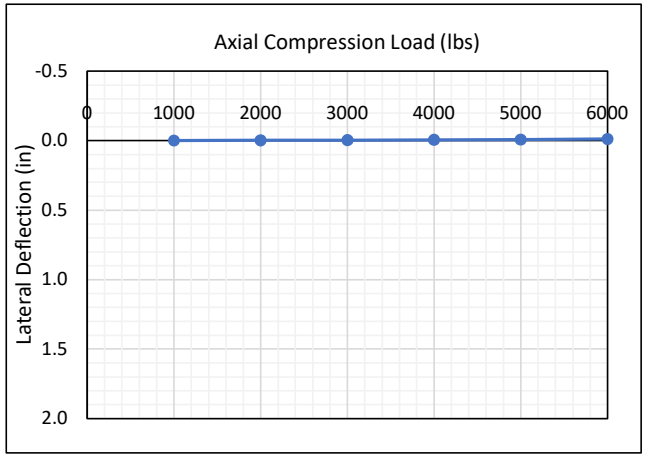


Axial Compression Test

Pile ID: P-23A
Embedment: 6'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	-0.0010	-0.0005	-0.0008
2000	2000	-0.0010	-0.0020	-0.0015
3000	3000	-0.0035	-0.0045	-0.0040
4000	4000	-0.0065	-0.0065	-0.0065
5000	5000	-0.0085	-0.0080	-0.0083
6000	6000	-0.0115	-0.0105	-0.0110
7000	7000	-0.0150	-0.0135	-0.0143
8000	8000	-0.0165	-0.0160	-0.0163
0		-0.0035	-0.0005	-0.0020

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

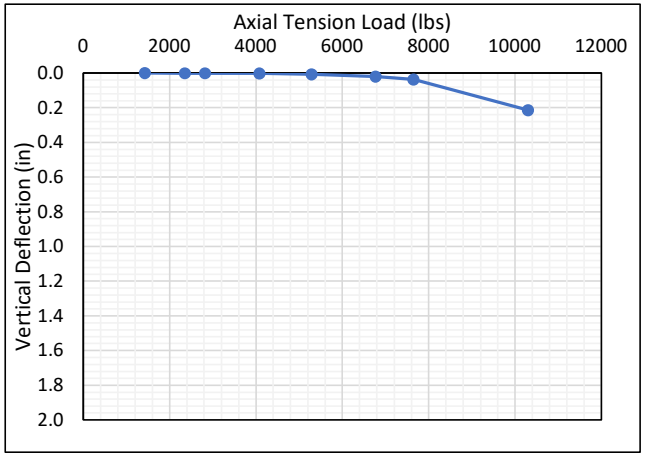
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/28/2022

Axial Tension Test

Pile ID: P-24B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1430	0.0025	-0.0025	0.0000
2000	2350	0.0045	-0.0030	0.0008
3000	2820	0.0045	-0.0030	0.0008
4000	4080	0.0085	-0.0030	0.0028
5000	5290	0.0135	0.0005	0.0070
6000	6770	0.0270	0.0115	0.0193
7000	7650	0.0455	0.0270	0.0363
8000	10300	0.2240	0.2035	0.2138
0		0.2045	0.2015	0.2030

Failure Load:
Gauge heght:
Notes:

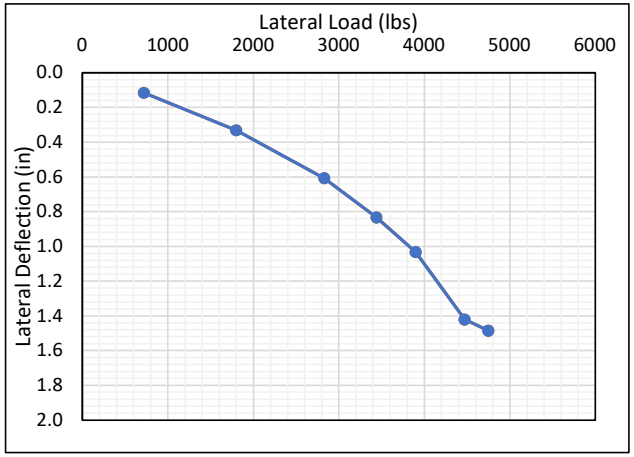


Lateral Test

Pile ID: P-24C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	720	0.1215	0.1100	0.1158
1250				
1875	1800	0.3390	0.3250	0.3320
2500	2830	0.6135	0.6035	0.6085
3125	3440	0.8345	0.8310	0.8328
3750	3900	1.0310	1.0345	1.0328
4375	4470	1.3735	1.4685	1.4210
5000	4750	1.5920	1.3785	1.4853
0				
0				
0		0.5245	0.1880	0.3563

Load height: 53"
Gauge heght: 11"
Notes:

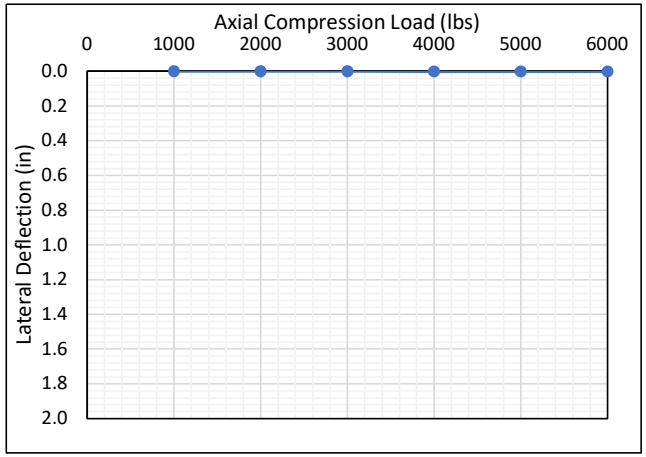


Axial Compression Test

Pile ID: P-24A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	0.0000	0.0000	0.0000
3000	3000	0.0000	0.0005	0.0003
4000	4000	0.0010	0.0015	0.0013
5000	5000	0.0010	0.0015	0.0013
6000	6000	0.0015	0.0020	0.0018
7000	7000	0.0015	0.0025	0.0020
8000	8000	0.0010	0.0025	0.0018
0		0.0055	0.0065	0.0060

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/27/2022

Axial Tension Test

Pile ID: P-25B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	930	0.0020	0.0025	0.0023
2000	1770	0.0045	0.0045	0.0045
3000	2850	0.0075	0.0085	0.0080
4000	4160	0.0135	0.0145	0.0140
5000	5340	0.0230	0.0250	0.0240
6000	6640	0.0420	0.0495	0.0458
7000				
8000	8950	0.1885	0.2067	0.1976
0		0.1765	0.1785	0.1775

Failure Load:
Gauge heght:
Notes:

Lateral Test

Pile ID: P-25C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	980	0.1190	0.1030	0.1110
1250				
1875				
2500	2510	0.3400	0.3130	0.3265
3125	3590	0.5185	0.4885	0.5035
3750				
4375	4270	0.6605	0.6310	0.6458
5000	4990	0.9325	0.9615	0.9470
0				
0				
0		0.2195	0.2340	0.2268

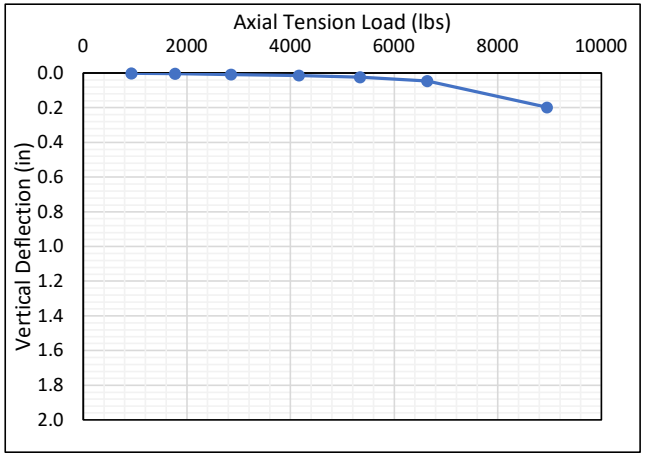
Load height: 55"
Gauge heght: 9"
Notes:

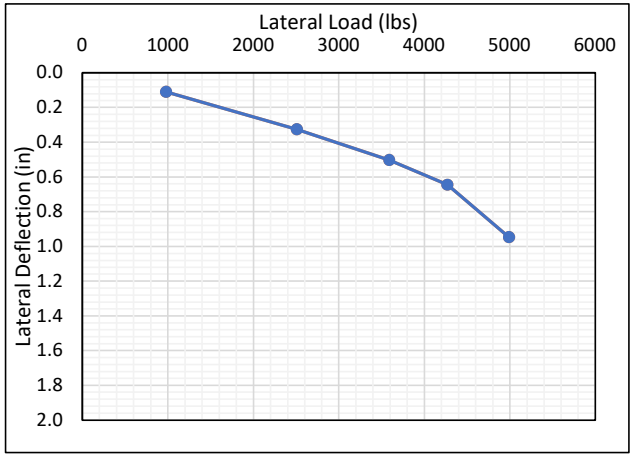
Axial Compression Test

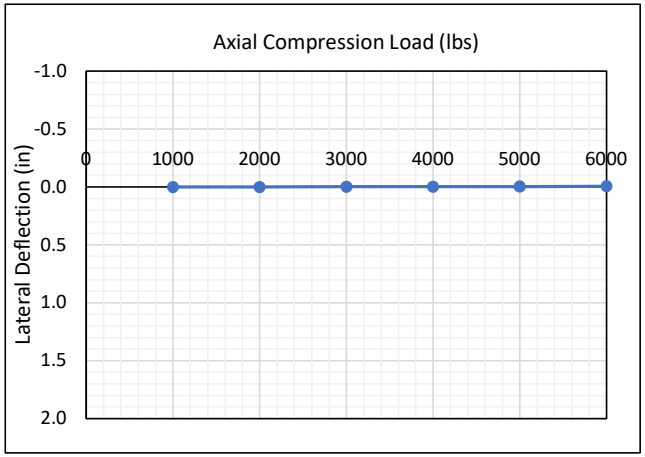
Pile ID: P-25A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	-0.0005	0.0005	0.0000
3000	3000	-0.0030	0.0010	-0.0010
4000	4000	-0.0040	0.0010	-0.0015
5000	5000	-0.0055	0.0000	-0.0028
6000	6000	-0.0095	-0.0005	-0.0050
7000	7000	-0.0115	-1.0000	-0.5058
8000	8000	-0.0120	-0.0015	-0.0068
0		0.0000	0.0005	0.0003

Failure Load:
Gauge heght:
Notes:







Pile Load Test Data

Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/27/2022

Axial Tension Test

Pile ID: P-26A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1040	0.0005	0.0005	0.0005
2000	2000	0.0005	0.0020	0.0013
3000	3020	0.0030	0.0040	0.0035
4000	4210	0.0085	0.0105	0.0095
5000	5450	0.0440	0.0480	0.0460
6000	6480	0.1140	0.1170	0.1155
7000	7320	0.4910	0.5230	0.5070
8000	7800	1.2090	1.2400	1.2245
0		1.2060	1.2320	1.2190

Failure Load:
Gauge heght:
Notes:

Lateral Test

Pile ID: P-26C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	640	0.0075	0.0700	0.0388
1250				
1875	1900	0.2720	0.2150	0.2435
2500				
3125	3290	0.5830	0.5635	0.5733
3750				
4375	4750	0.9510	0.9360	0.9435
5000	5220	1.2480	1.2340	1.2410
0				
0				
0		0.2185	0.2140	0.2163

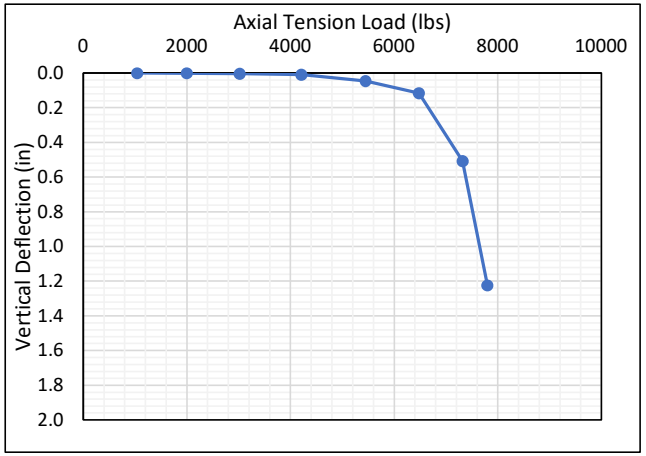
Load height: 53"
Gauge heght: 8"
Notes:

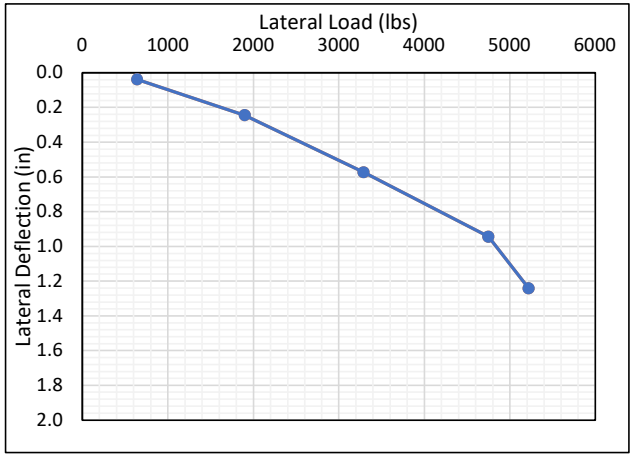
Axial Compression Test

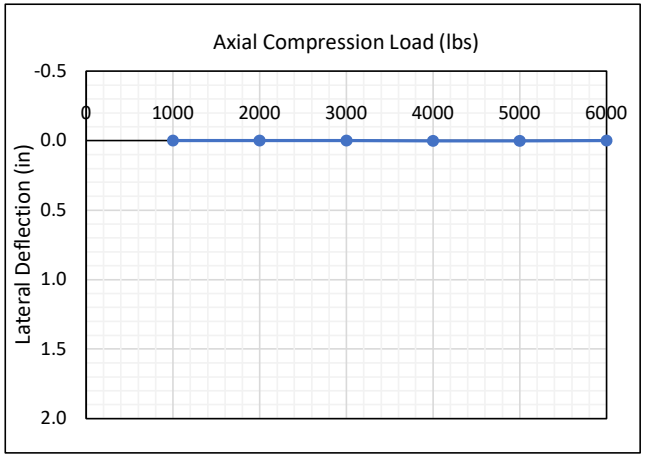
Pile ID: P-26B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	0.0005	0.0000	0.0003
3000	3000	0.0010	0.0000	0.0005
4000	4000	0.0025	0.0000	0.0013
5000	5000	0.0030	-0.0015	0.0008
6000	6000	0.0030	-0.0030	0.0000
7000	7000	0.0020	-0.0045	-0.0013
8000	8000	-0.0015	-0.0160	-0.0088
0		-0.0005	-0.0065	-0.0035

Failure Load:
Gauge heght:
Notes:







Pile Load Test Data

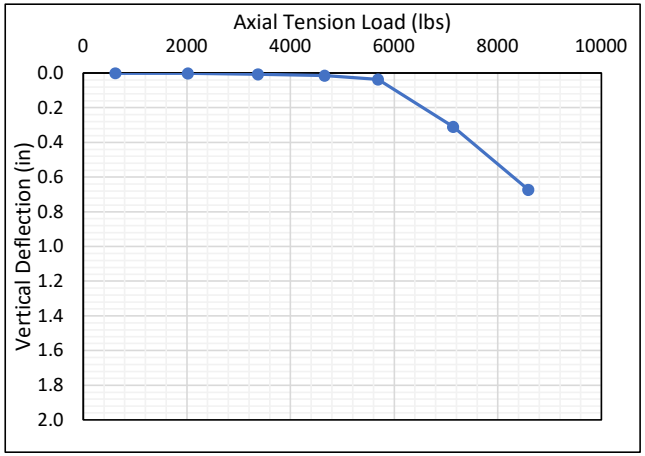
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 5/3/2022

Axial Tension Test

Pile ID: P-27B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	620	0.0015	0.0010	0.0013
2000	2020	0.0030	0.0025	0.0028
3000	3370	0.0075	0.0055	0.0065
4000	4660	0.0160	0.0140	0.0150
5000	5690	0.0385	0.0360	0.0373
6000				
7000	7140	0.3135	0.3085	0.3110
8000	8590	0.6770	0.6700	0.6735
0		0.6455	0.6415	0.6435

Failure Load:
Gauge heght:
Notes:

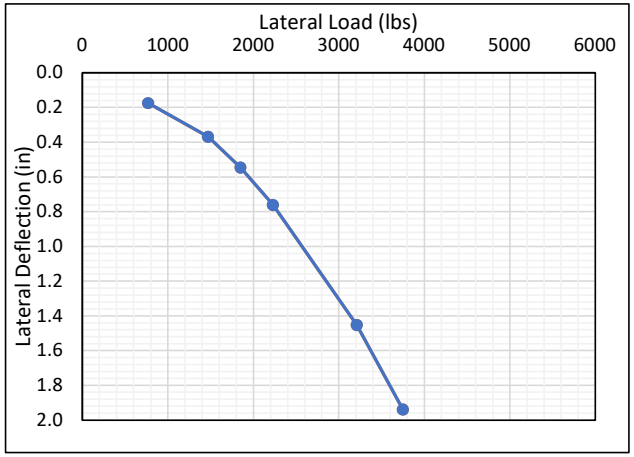


Lateral Test

Pile ID: P-27C
Embedment: 6'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	770	0.1795	0.1695	0.1745
1250	1470	0.3730	0.3655	0.3693
1875	1850	0.5455	0.5455	0.5455
2500	2230	0.7440	0.7785	0.7613
3125	3210	1.4455	1.4595	1.4525
3750	3750	1.9505	1.9285	1.9395
4375				
5000				
0				
0				
0		0.8725	0.8175	0.8450

Load height: 54"
Gauge heght: 11"
Notes:

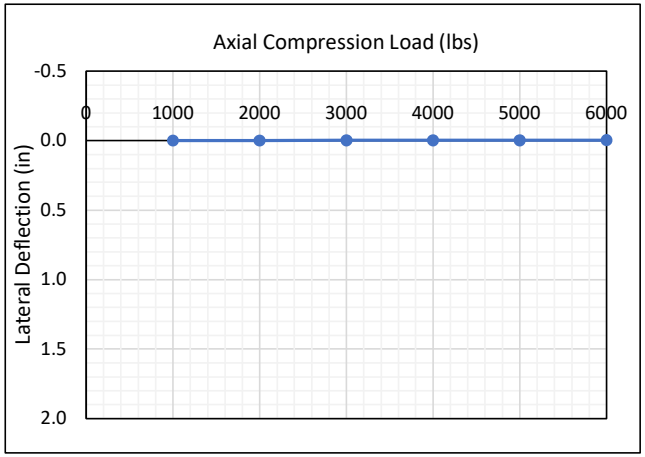


Axial Compression Test

Pile ID: P-27A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	0.0000	-0.0010	-0.0005
3000	3000	0.0005	-0.0030	-0.0013
4000	4000	0.0005	-0.0035	-0.0015
5000	5000	0.0010	-0.0065	-0.0028
6000	6000	0.0000	-0.0085	-0.0043
7000	7000	-0.0025	-0.0105	-0.0065
8000	8000	-0.0050	-0.0130	-0.0090
0		0.0000	0.0035	0.0018

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/29/2022

Axial Tension Test

Pile ID: P-28B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1110	0.0010	0.0010	0.0010
2000	1930	0.0030	0.0035	0.0033
3000	3230	0.0510	0.0530	0.0520
4000	3780	0.1735	0.1780	0.1758
5000	4880	0.5975	0.6100	0.6038
6000	5160	1.5560	1.5610	1.5585
7000				
8000				
0		1.5385	1.5385	1.5385

Failure Load: 6160
Gauge heght:
Notes:

Lateral Test

Pile ID: P-28C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	830	0.1640	0.1585	0.1613
1250	1640	0.3240	0.3050	0.3145
1875				
2500	2490	0.5680	0.5405	0.5543
3125	3080	0.7630	0.7275	0.7453
3750	3780	1.0405	0.9920	1.0163
4375	4550	1.3810	1.3090	1.3450
5000	4910	1.8005	1.6900	1.7453
0				
0				
0		0.4450	0.3950	0.4200

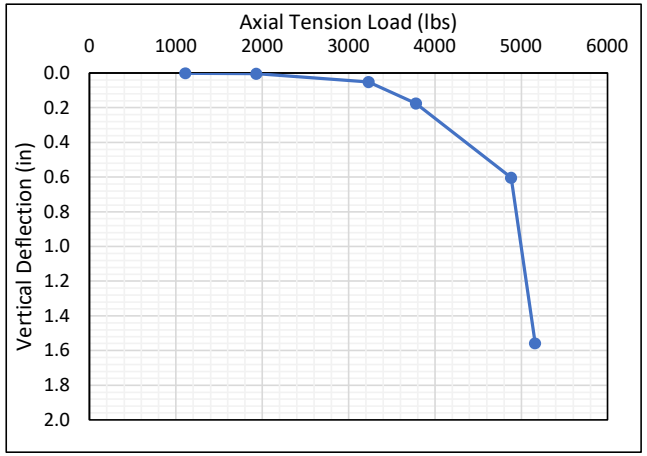
Load height: 54"
Gauge heght: 10"
Notes:

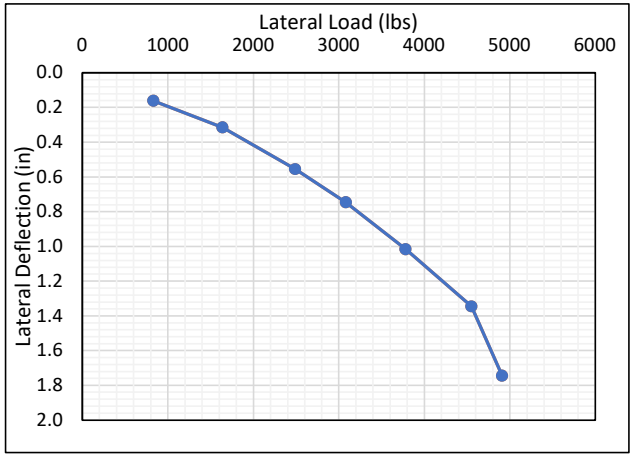
Axial Compression Test

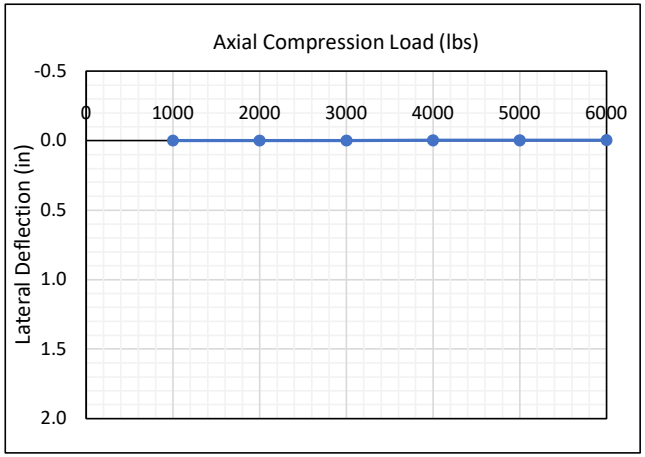
Pile ID: P-28A
Embedment: 6'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	-0.0005	0.0005	0.0000
3000	3000	-0.0010	0.0000	-0.0005
4000	4000	-0.0020	-0.0010	-0.0015
5000	5000	-0.0035	-0.0025	-0.0030
6000	6000	-0.0008	-0.0075	-0.0041
7000	7000	-0.0270	-0.0225	-0.0248
8000	8000	-0.0380	-0.0335	-0.0358
0		-0.0270	0.0100	-0.0085

Failure Load:
Gauge heght:
Notes:







Pile Load Test Data

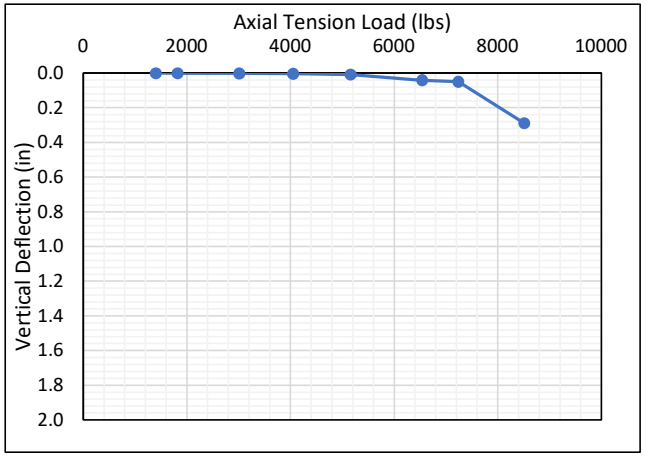
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/28/2022

Axial Tension Test

Pile ID: P-29B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1400	0.0005	0.0000	0.0003
2000	1820	0.0010	0.0005	0.0008
3000	3010	0.0025	0.0020	0.0023
4000	4050	0.0035	0.0030	0.0033
5000	5160	0.0090	0.0085	0.0088
6000	6540	0.0420	0.0410	0.0415
7000	7240	0.0910	0.0085	0.0498
8000	8510	0.2900	0.2885	0.2893
0		0.2765	0.2750	0.2758

Failure Load:
Gauge heght:
Notes:

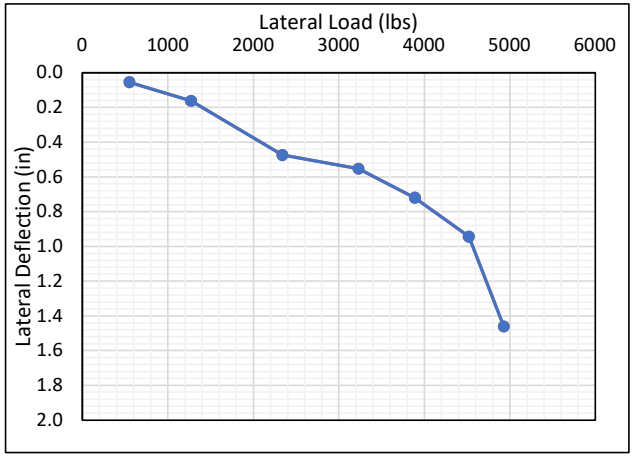


Lateral Test

Pile ID: P-29C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	550	0.0525	0.0565	0.0545
1250	1270	0.1585	0.1660	0.1623
1875	2340	0.3480	0.6000	0.4740
2500				#DIV/0!
3125	3230	0.5455	0.5605	0.5530
3750	3890	0.7115	0.7286	0.7201
4375	4520	0.9450	0.9420	0.9435
5000	4930	1.5550	1.3680	1.4615
0				
0				
0		0.5580	0.4290	0.4935

Load height: 54"
Gauge heght: 11"
Notes:

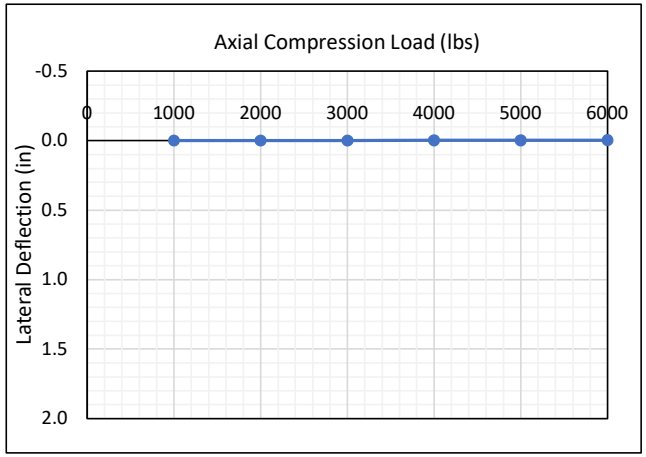


Axial Compression Test

Pile ID: P-29A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	-0.0005	0.0000	-0.0003
3000	3000	-0.0010	-0.0005	-0.0008
4000	4000	-0.0010	-0.0015	-0.0013
5000	5000	-0.0015	-0.0030	-0.0023
6000	6000	-0.0020	-0.0060	-0.0040
7000	7000	-0.0045	-0.0070	-0.0058
8000	8000	-0.0095	-0.0110	-0.0103
0		0.0030	0.0065	0.0048

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

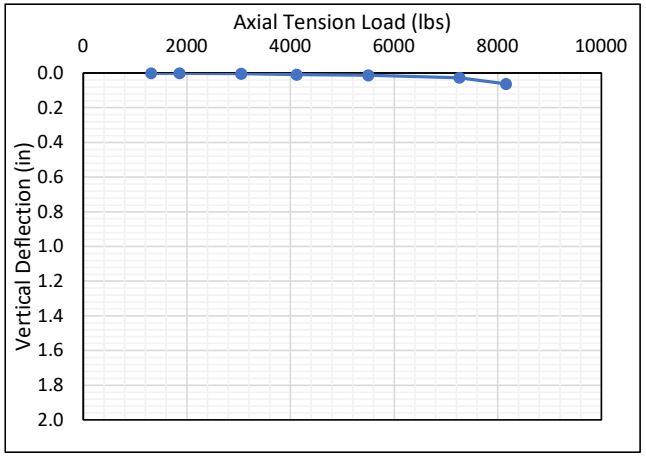
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/28/2022

Axial Tension Test

Pile ID: P-30B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1310	0.0020	0.0000	0.0010
2000	1860	0.0030	0.0000	0.0015
3000	3050	0.0060	0.0030	0.0045
4000	4120	0.0090	0.0095	0.0093
5000	5500	0.0150	0.0095	0.0123
6000				
7000	7260	0.0290	0.0235	0.0263
8000	8160	0.0650	0.0605	0.0628
0		0.0475	0.0480	0.0478

Failure Load:
Gauge heght:
Notes:

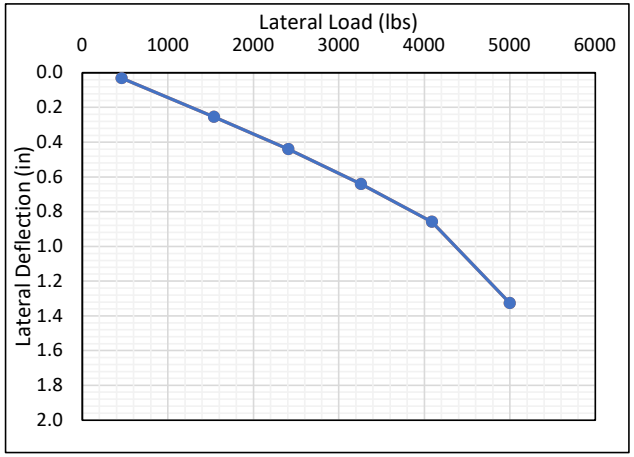


Lateral Test

Pile ID: P-30C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	460	0.0065	0.0560	0.0313
1250	1540	0.2620	0.2455	0.2538
1875				
2500	2410	0.4500	0.4290	0.4395
3125	3260	0.6510	0.6305	0.6408
3750	4090	0.8660	0.8500	0.8580
4375				
5000	5000	1.3195	1.3325	1.3260
0				
0				
0		0.2730	0.2950	0.2840

Load height: 54"
Gauge heght: 11"
Notes:

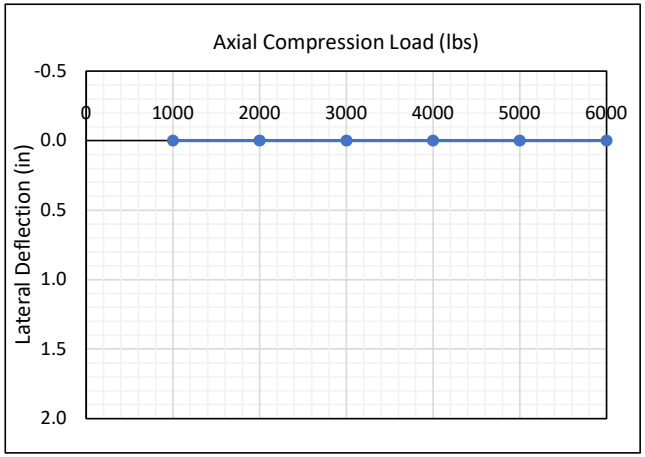


Axial Compression Test

Pile ID: P--30A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0005	0.0003
2000	2000	-0.0005	0.0005	0.0000
3000	3000	-0.0010	0.0000	-0.0005
4000	4000	-0.0010	0.0000	-0.0005
5000	5000	-0.0010	-0.0005	-0.0008
6000	6000	-0.0010	-0.0010	-0.0010
7000	7000	-0.0020	-0.0010	-0.0015
8000	8000	-0.0030	-0.0035	-0.0033
0		0.0020	-0.0030	-0.0005

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/28/2022

Axial Tension Test

Pile ID: P-31B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1230	0.0030	0.0015	0.0023
2000	2130	0.0065	0.0055	0.0060
3000	2820	0.0250	0.0240	0.0245
4000	4220	0.2800	0.2770	0.2785
5000	5490	0.8015	0.7995	0.8005
6000	6550	1.5590	1.5450	1.5520
7000				
8000				
0		1.5250	1.5160	1.5205

Failure Load: 6550
Gauge heght:
Notes:

Lateral Test

Pile ID: P-31C
Embedment: 6'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625				
1250	1480	0.3470	0.3360	0.3415
1875	1760	0.4605	0.4520	0.4563
2500	2360	0.6975	0.6940	0.6958
3125	2930	1.0630	0.9260	0.9945
3750	3850	1.6305	1.0570	1.3438
4375	4180	1.7895		1.7895
5000				
0				
0				
0		0.7955		0.7955

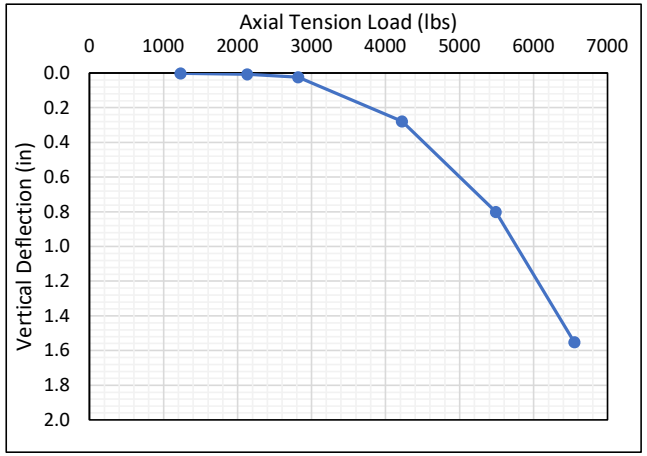
Load height: 53"
Gauge heght: 12"
Notes: Pile gave way at 4180 knocking gauge 2 off.

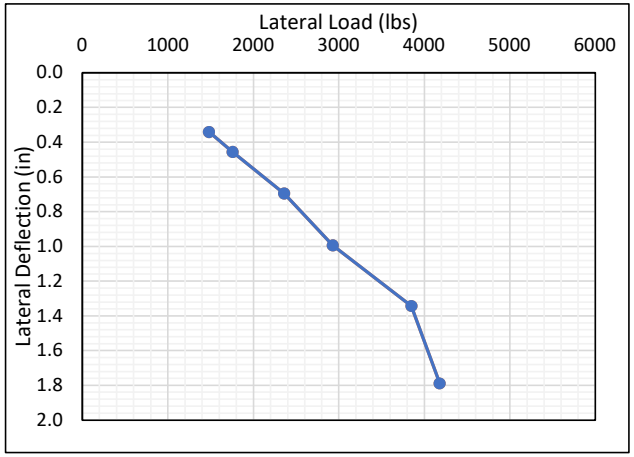
Axial Compression Test

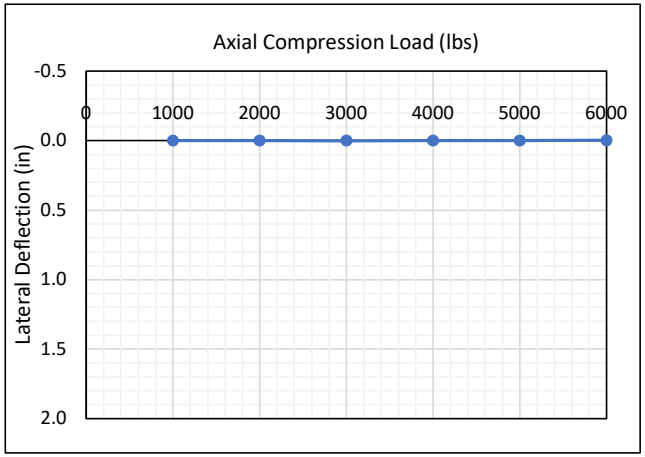
Pile ID: P-31A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	0.0005	0.0000	0.0003
3000	3000	0.0010	0.0000	0.0005
4000	4000	0.0000	-0.0005	-0.0003
5000	5000	-0.0010	-0.0010	-0.0010
6000	6000	-0.0030	-0.0005	-0.0018
7000	7000	-0.0080	-0.0065	-0.0073
8000	8000	-0.0140	-0.0145	-0.0143
0		-0.0065	-0.0100	-0.0083

Failure Load:
Gauge heght:
Notes:







Pile Load Test Data

Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 5/3/2022

Axial Tension Test

Pile ID: P-32A
Embedment: 6'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0015	0.0035	0.0025
2000	2030	0.0045	0.0085	0.0065
3000	2940	0.0085	0.0140	0.0113
4000	4130	0.0475	0.0560	0.0518
5000	5180	0.3305	0.3560	0.3433
6000	5910	0.6420	0.6435	0.6428
7000	7470	1.5190	1.5085	1.5138
8000				
0		1.4805	1.4610	1.4708

Failure Load: 7470
Gauge heght:
Notes:

Lateral Test

Pile ID: P-32C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	810	0.1235	0.1205	0.1220
1250	1660	0.3010	0.2935	0.2973
1875				
2500	2900	0.6175	0.6010	0.6093
3125	3400	0.7750	0.7525	0.7638
3750	3900	0.9760	0.9435	0.9598
4375	4290	1.2690	1.2195	1.2443
5000	4470	1.7160	1.8335	1.7748
0				
0				
0		0.6565	1.0030	0.8298

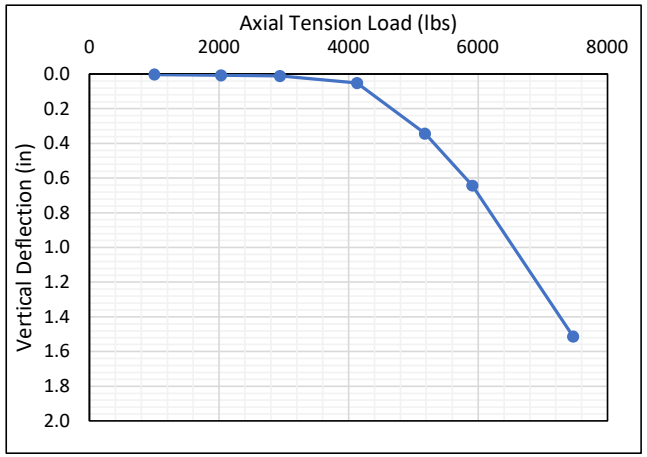
Load height: 53"
Gauge heght: 10"
Notes:

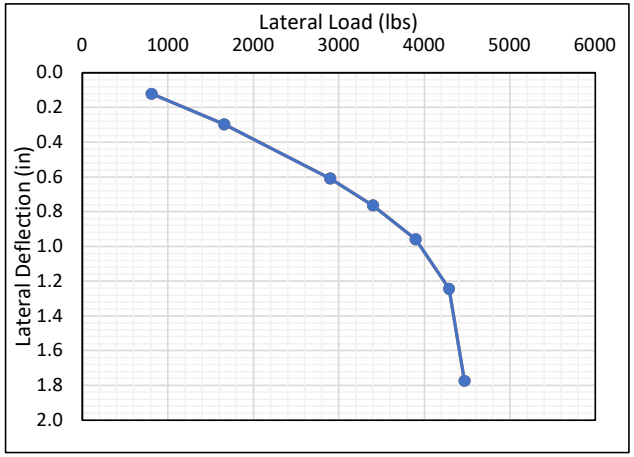
Axial Compression Test

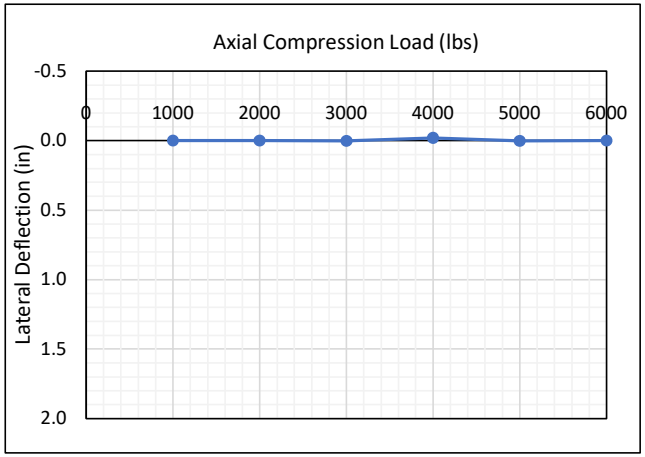
Pile ID: P-32B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	-0.0005	-0.0003
2000	2000	-0.0015	0.0020	0.0003
3000	3000	-0.0030	0.0045	0.0008
4000	4000	-0.0450	0.0050	-0.0200
5000	5000	-0.0045	0.0060	0.0008
6000	6000	-0.0045	0.0055	0.0005
7000	7000	-0.0065	0.0050	-0.0008
8000	8000	-0.0065	0.0045	-0.0010
0		0.0070	0.0020	0.0045

Failure Load:
Gauge heght:
Notes:







Pile Load Test Data

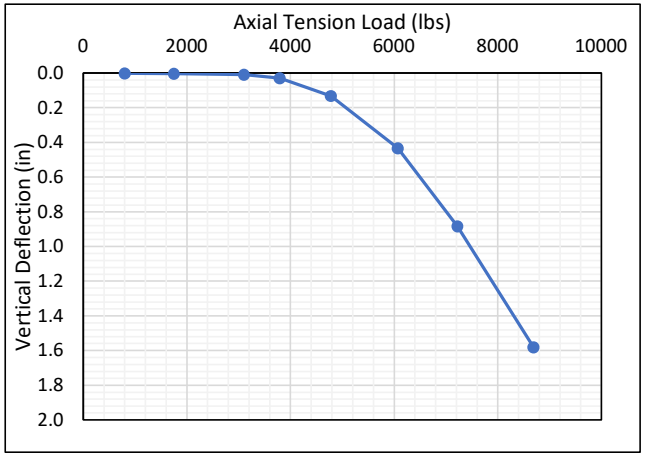
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/28/2022

Axial Tension Test

Pile ID: P-33B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	800	0.0025	0.0010	0.0018
2000	1750	0.0050	0.0020	0.0035
3000	3100	0.0120	0.0070	0.0095
4000	3790	0.0325	0.0270	0.0298
5000	4780	0.1360	0.1290	0.1325
6000	6070	0.4380	0.4305	0.4343
7000	7220	0.8870	0.8790	0.8830
8000	8690	1.5850	1.5755	1.5803
0		1.5420	1.5445	1.5433

Failure Load: 8690
Gauge heght:
Notes:

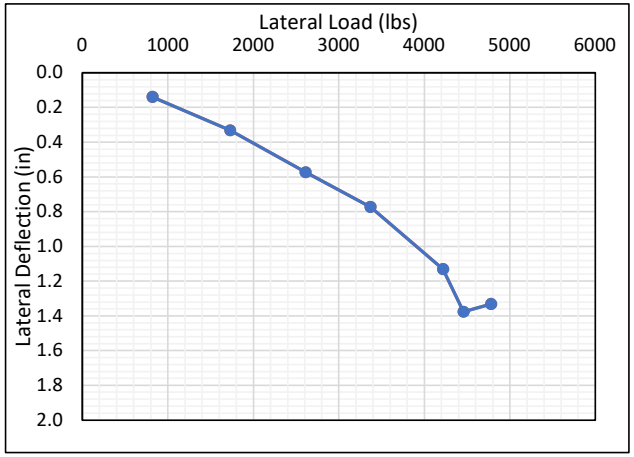


Lateral Test

Pile ID: P-33C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	820	0.1445	0.1350	0.1398
1250				
1875	1730	0.3425	0.3200	0.3313
2500	2610	0.5915	0.5565	0.5740
3125	3370	0.7955	0.7505	0.7730
3750	4220	1.1790	1.0830	1.1310
4375	4460	1.5100	1.2435	1.3768
5000	4780	1.4110	1.2530	1.3320
0				
0				
0		0.8365	1.0455	0.9410

Load height: 55"
Gauge heght: 14"
Notes: Pile twisted at 4780 causing mirrors to turn.

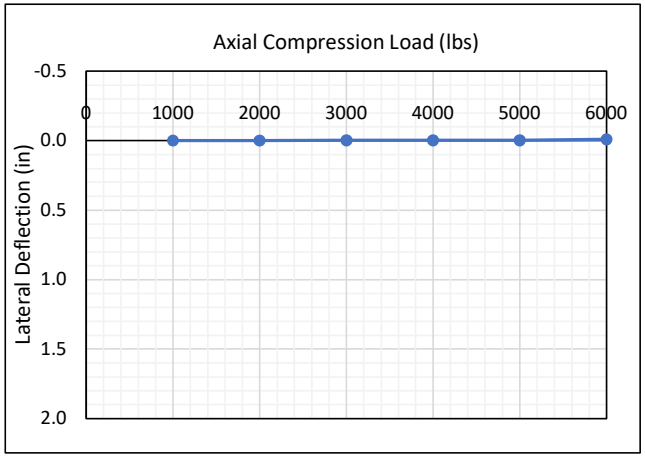


Axial Compression Test

Pile ID: P-33A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	-0.0010	-0.0005	-0.0008
3000	3000	-0.0010	-0.0025	-0.0018
4000	4000	-0.0015	-0.0030	-0.0023
5000	5000	-0.0030	-0.0030	-0.0030
6000	6000	-0.0100	-0.0080	-0.0090
7000	7000	-0.0145	-0.0095	-0.0120
8000	8000	-0.0160	-0.0105	-0.0133
0		0.0005	0.1000	0.0503

Failure Load:
Gauge heght:
Notes:



Pile Load Test Data

Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/27/2022

Axial Tension Test

Pile ID: P-34B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1110	0.0020	0.0020	0.0020
2000	1810	0.0040	0.0040	0.0040
3000	3050	0.0075	0.0075	0.0075
4000	3970	0.0160	0.0165	0.0163
5000	5310	0.0730	0.0750	0.0740
6000	6250	0.2110	0.2180	0.2145
7000	7150	0.5690	0.5790	0.5740
8000	8280	1.2430	1.2560	1.2495
0		1.2135	1.2280	1.2208

Failure Load:
Gauge heght:
Notes:

Lateral Test

Pile ID: P-34C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	730	0.0945	0.0925	0.0935
1250	1560	0.2560	0.2500	0.2530
1875				
2500	2430	0.4305	0.4335	0.4320
3125	3220	0.6350	0.6240	0.6295
3750	3890	0.8380	0.8295	0.8338
4375	4700	1.1400	1.1420	1.1410
5000	5080	1.2380	1.4800	1.3590
0				
0				
0		0.1860	0.3675	0.2768

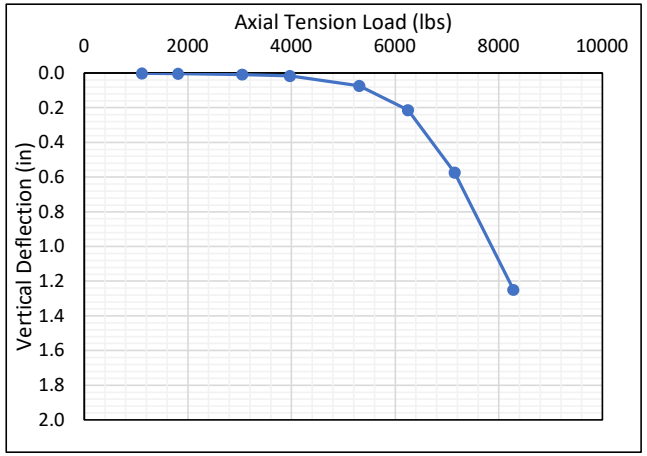
Load height: 53"
Gauge heght: 9"
Notes:

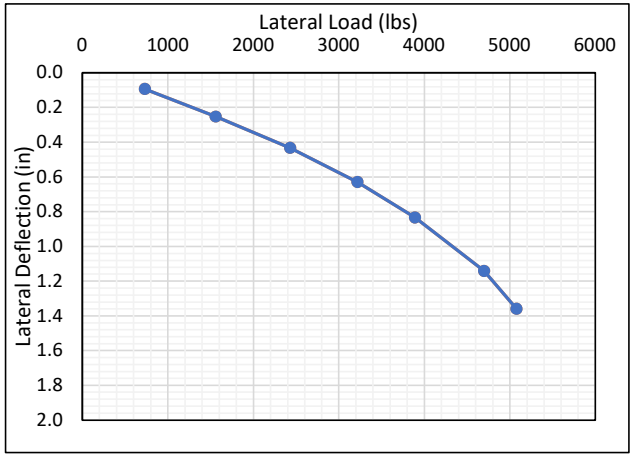
Axial Compression Test

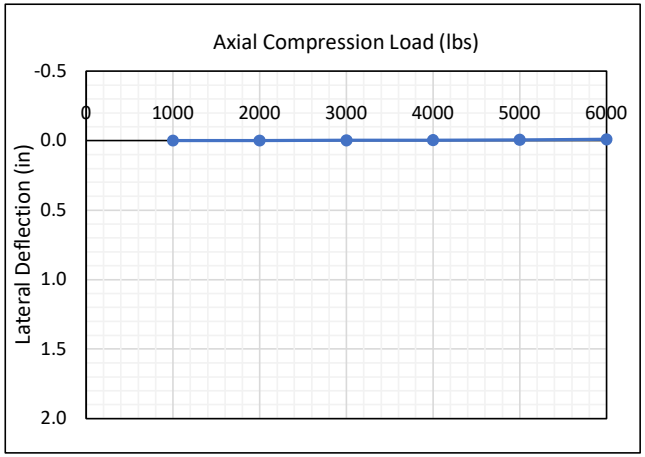
Pile ID: P-34A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	-0.0005	0.0005	0.0000
2000	2000	-0.0030	0.0010	-0.0010
3000	3000	-0.0050	0.0010	-0.0020
4000	4000	-0.0080	0.0010	-0.0035
5000	5000	-0.0105	-0.0005	-0.0055
6000	6000	-0.0145	-0.0030	-0.0088
7000	7000	-0.0210	-0.0070	-0.0140
8000	8000	-0.0325	-0.0145	-0.0235
0		-0.0215	-0.0085	-0.0150

Failure Load:
Gauge heght:
Notes:







Pile Load Test Data

Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/29/2022

Axial Tension Test

Pile ID: P-35B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1120	0.0005	0.0000	0.0003
2000	2250	0.0055	0.0045	0.0050
3000	2890	0.0145	0.0130	0.0138
4000	4560	0.1330	0.1290	0.1310
5000	5130	0.4345	0.4295	0.4320
6000	5560	1.9020	1.8005	1.8513
7000				
8000				
0		1.8150	1.7150	1.7650

Failure Load: 5560
Gauge heght:
Notes:

Lateral Test

Pile ID: P-35C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	680	0.1375	0.1235	0.1305
1250	1090	0.2640	0.2435	0.2538
1875	1650	0.4565	0.4245	0.4405
2500	2380	0.7775	0.7020	0.7398
3125	3230	1.4660	1.3135	1.3898
3750	3820	1.9595	1.6975	1.8285
4375				
5000				
0				
0				
0		0.7155	0.4175	0.5665

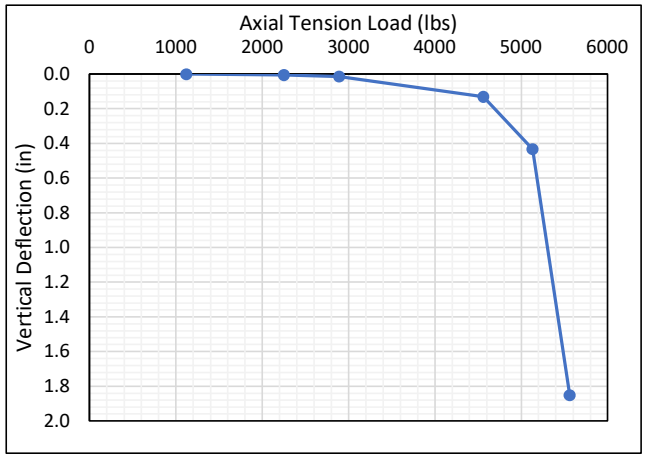
Load height: 54"
Gauge heght: 10"
Notes:

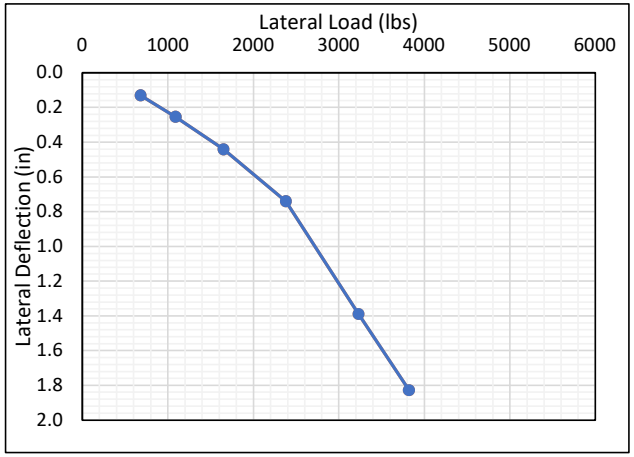
Axial Compression Test

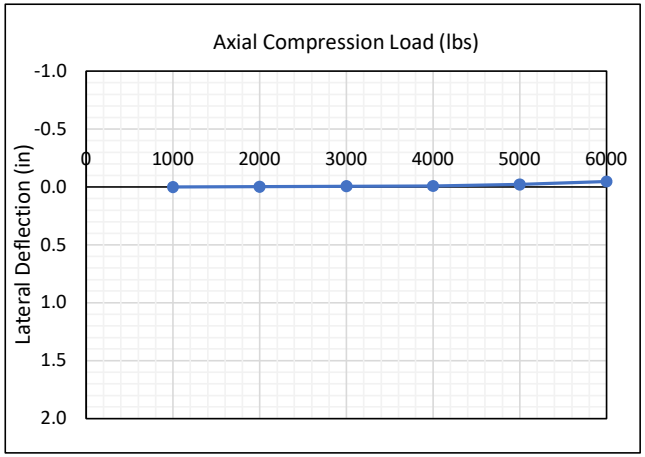
Pile ID: P-35A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0005	-0.0005	0.0000
2000	2000	-0.0015	-0.0030	-0.0023
3000	3000	-0.0070	-0.0045	-0.0058
4000	4000	-0.0105	-0.0065	-0.0085
5000	5000	-0.0215	-0.0185	-0.0200
6000	6000	-0.0480	-0.0450	-0.0465
7000	7000	-0.5610	-0.5595	-0.5603
8000	8000	-0.7675	-0.7675	-0.7675
0		-0.7435	-0.7435	-0.7435

Failure Load:
Gauge heght:
Notes:







Pile Load Test Data

Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 4/27/2022

Axial Tension Test

Pile ID: P-36B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1150	0.0030	0.0015	0.0023
2000	1970	0.0060	0.0045	0.0053
3000	3390	0.0105	0.0080	0.0093
4000	4460	0.0175	0.0145	0.0160
5000				
6000	6110	0.1120	0.1130	0.1125
7000	7490	0.4175	0.4220	0.4198
8000	8890	1.0850	1.0850	1.0850
0		1.0660	1.0560	1.0610

Failure Load:
Gauge heght:
Notes:

Lateral Test

Pile ID: P-36C
Embedment: 8'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	740	0.1250	0.1250	0.1250
1250	1600	0.2975	0.3055	0.3015
1875	2350	0.4440	0.4505	0.4473
2500	2720	0.5675	0.5735	0.5705
3125	3320	0.7270	0.7400	0.7335
3750	4080	0.9535	0.9805	0.9670
4375	4590	0.7600	0.8420	0.8010
5000	5060	0.8085	0.9750	0.8918
0				
0				
0		0.0128	0.0610	0.0369

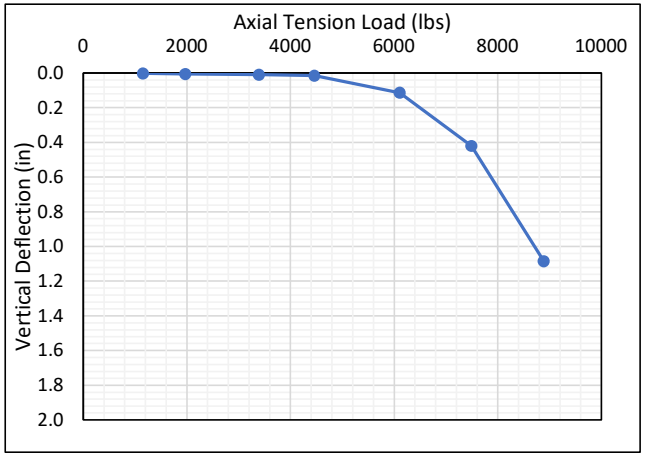
Load height: 44"
Gauge heght: 10"
Notes:

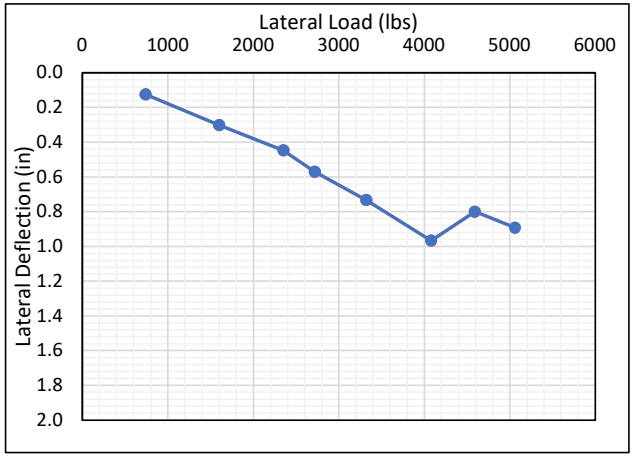
Axial Compression Test

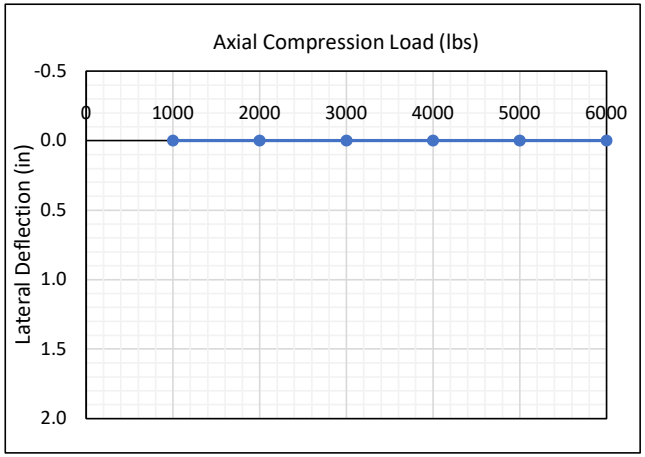
Pile ID: P-36A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	-0.0005	0.0000	-0.0003
2000	2000	-0.0005	0.0000	-0.0003
3000	3000	0.0000	0.0000	0.0000
4000	4000	0.0000	-0.0005	-0.0003
5000	5000	0.0005	-0.0010	-0.0003
6000	6000	0.0010	-0.0010	0.0000
7000	7000	-0.0015	-0.0035	-0.0025
8000	8000	-0.0050	-0.0070	-0.0060
0		-0.0020	-0.0050	-0.0035

Failure Load:
Gauge heght:
Notes:







Pile Load Test Data

Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 5/2/2022

Axial Tension Test

Pile ID: P-37A
Embedment: 6'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1710	0.0085	0.0065	0.0075
2000	2350	0.0680	0.0645	0.0663
3000	3230	0.3155	0.3105	0.3130
4000	3980	0.5850	0.5785	0.5818
5000	5230	1.1370	1.1285	1.1328
6000	5970	1.8195	1.8075	1.8135
7000				
8000				
0		1.7805	1.7000	1.7403

Failure Load: 5970
Gauge heght:
Notes:

Lateral Test

Pile ID: P-37C
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	810	0.1455	0.1525	0.1490
1250				
1875	1900	0.4310	0.4405	0.4358
2500	2720	0.7235	0.7235	0.7235
3125	3550	1.0995	1.0620	1.0808
3750	3950	1.4500	1.3280	1.3890
4375	4140	1.8580	1.5500	1.7040
5000				
0				
0				
0		0.6450	0.4870	0.5660

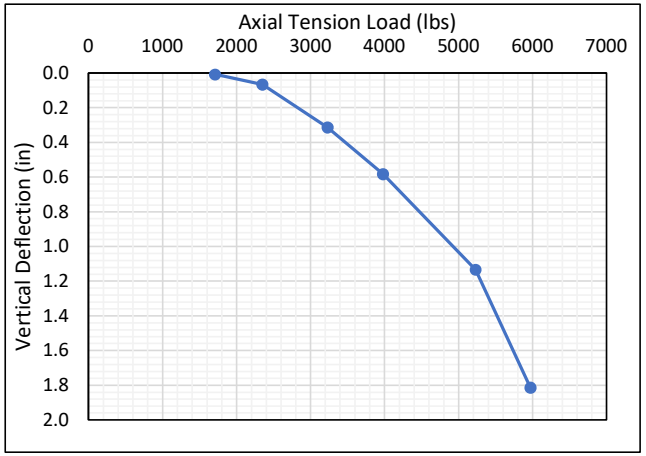
Load height: 53"
Gauge heght: 10"
Notes:

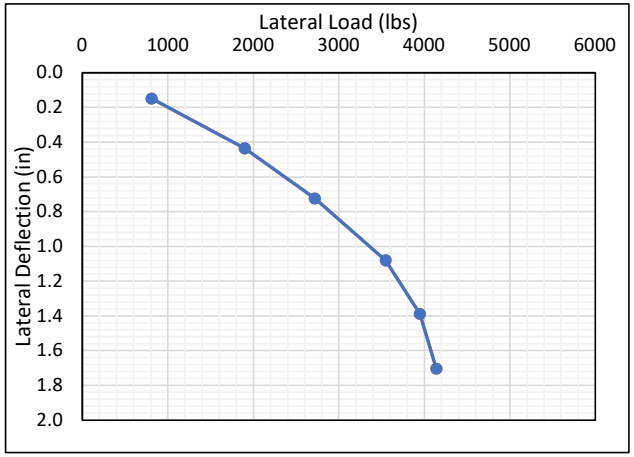
Axial Compression Test

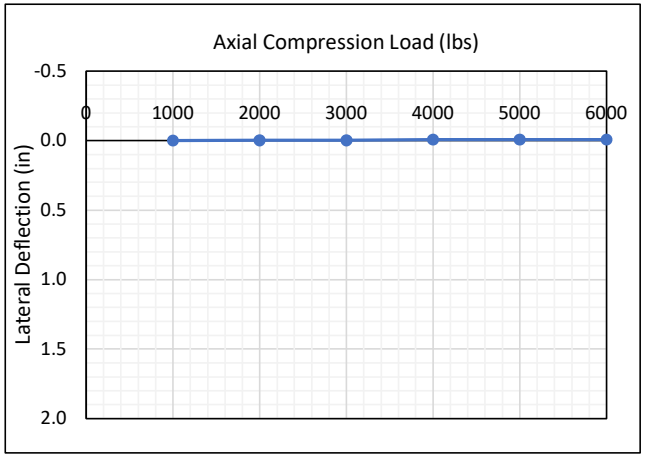
Pile ID: P-37B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	-0.0030	-0.0005	-0.0018
3000	3000	-0.0045	-0.0015	-0.0030
4000	4000	-0.0095	-0.0045	-0.0070
5000	5000	-0.0105	-0.0045	-0.0075
6000	6000	-0.0115	-0.0030	-0.0073
7000	7000	-0.0130	-0.0060	-0.0095
8000	8000	-0.0140	-0.0090	-0.0115
0		0.0080	0.0090	0.0085

Failure Load:
Gauge heght:
Notes:







Pile Load Test Data

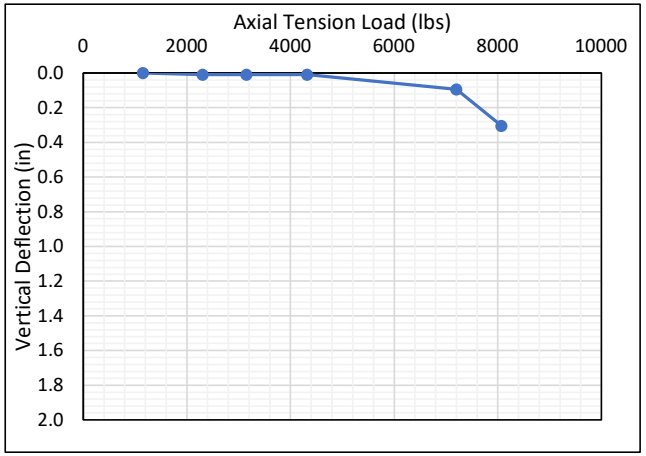
Project Name: Russellville Solar Facility
Project Number: 22800023
Location: Russellville, KY
Date: 5/2/2022

Axial Tension Test

Pile ID: P-38B
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1150	0.0000	0.0000	0.0000
2000	2300	0.0195	-0.0010	0.0093
3000	3150	0.0195	-0.0015	0.0090
4000	4320	0.0195	-0.0005	0.0095
5000				
6000				
7000	7200	0.0885	0.1010	0.0948
8000	8070	0.2935	0.3155	0.3045
0		0.2935	0.3155	0.3045

Failure Load:
Gauge heght:
Notes:

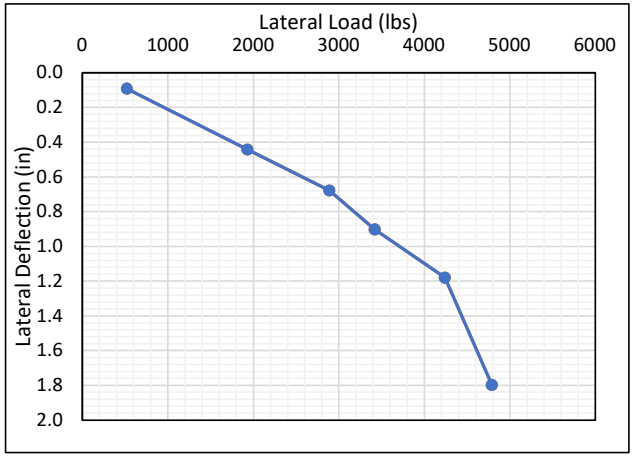


Lateral Test

Pile ID: P-38C
Embedment: 8'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
625	520	0.0920	0.0920	0.0920
1250				
1875	1930	0.4800	0.4045	0.4423
2500	2890	0.6810	0.6740	0.6775
3125	3420	0.9005	0.9035	0.9020
3750				
4375	4240	1.1675	1.1920	1.1798
5000	4790	1.7420	1.8545	1.7983
0				
0				
0		0.3795	0.4585	0.4190

Load height: 44"
Gauge heght: 10"
Notes:

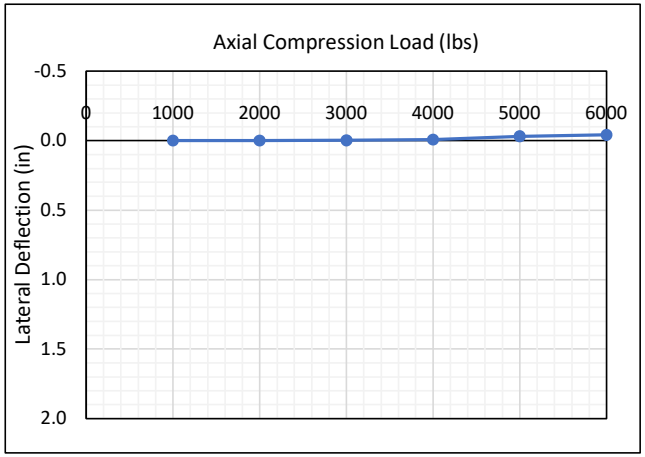


Axial Compression Test

Pile ID: P-38A
Embedment: 7'

Target Load (lbs)	Measured Load (lb)	Deflections (inches) Gauge 1	Gauge 2	Average
1000	1000	0.0000	0.0000	0.0000
2000	2000	0.0000	-0.0010	-0.0005
3000	3000	-0.0010	-0.0040	-0.0025
4000	4000	-0.0050	-0.0085	-0.0068
5000	5000	-0.0285	-0.0320	-0.0303
6000	6000	-0.0370	-0.0450	-0.0410
7000	7000	-0.0490	-0.0535	-0.0513
8000	7400	-0.0555	-0.0585	-0.0570
0		-0.0475	-0.0500	-0.0488

Failure Load:
Gauge heght:
Notes: Ran out of stroke on hydrualic cylinder.



Important Information About Your Geotechnical Engineering Report

Variations in subsurface conditions can be a principal cause of construction delays, cost overruns and claims. The following information is provided to assist you in understanding and managing the risk of these variations.

Geotechnical Findings Are Professional Opinions

Geotechnical engineers cannot specify material properties as other design engineers do. Geotechnical material properties have a far broader range on a given site than any manufactured construction material, and some geotechnical material properties may change over time because of exposure to air and water, or human activity.

Site exploration identifies subsurface conditions at the time of exploration and only at the points where subsurface tests are performed or samples obtained. Geotechnical engineers review field and laboratory data and then apply their judgment to render professional opinions about site subsurface conditions. Their recommendations rely upon these professional opinions. Variations in the vertical and lateral extent of subsurface materials may be encountered during construction that significantly impact construction schedules, methods and material volumes. While higher levels of subsurface exploration can mitigate the risk of encountering unanticipated subsurface conditions, no level of subsurface exploration can eliminate this risk.

Scope of Geotechnical Services

Professional geotechnical engineering judgment is required to develop a geotechnical exploration scope to obtain information necessary to support design and construction. A number of unique project factors are considered in developing the scope of geotechnical services, such as the exploration objective; the location, type, size and weight of the proposed structure; proposed site grades and improvements; the construction schedule and sequence; and the site geology.

Geotechnical engineers apply their experience with construction methods, subsurface conditions and exploration methods to develop the exploration scope. The scope of each exploration is unique based on available project and site information. Incomplete project information or constraints on the scope of exploration increases the risk of variations in subsurface conditions not being identified and addressed in the geotechnical report.

Services Are Performed for Specific Projects

Because the scope of each geotechnical exploration is unique, each geotechnical report is unique. Subsurface conditions are explored and recommendations are made for a specific project. Subsurface information and recommendations may not be adequate for other uses. Changes in a proposed structure location, foundation loads, grades, schedule, etc. may require additional geotechnical exploration, analyses, and consultation. The geotechnical engineer should be consulted to determine if additional services are required in response to changes in proposed construction, location, loads, grades, schedule, etc.

Geo-Environmental Issues

The equipment, techniques, and personnel used to perform a geo-environmental study differ significantly from those used for a geotechnical exploration. Indications of environmental contamination may be encountered incidental to performance of a geotechnical exploration but go unrecognized. Determination of the presence, type or extent of environmental contamination is beyond the scope of a geotechnical exploration.

Geotechnical Recommendations Are Not Final

Recommendations are developed based on the geotechnical engineer's understanding of the proposed construction and professional opinion of site subsurface conditions. Observations and tests must be performed during construction to confirm subsurface conditions exposed by construction excavations are consistent with those assumed in development of recommendations. It is advisable to retain the geotechnical engineer that performed the exploration and developed the geotechnical recommendations to conduct tests and observations during construction. This may reduce the risk that variations in subsurface conditions will not be addressed as recommended in the geotechnical report.

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