



Report of Geotechnical Exploration
and Pile Load Testing Services
Lynn Bark Solar Project
Martin County, Kentucky
S&ME Project No. 24780158

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February 2, 2026



February 2, 2026

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Attention: Mr. Josh Crumpler
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Reference: **Report of Geotechnical Exploration and Pile Load Testing Services
Lynn Bark Solar Project**
Martin County, Kentucky
S&ME Project No. 24780158

Dear Josh:

The following report presents the results of our geotechnical exploration and pile load testing services, conducted in Martin County, Kentucky. The work was performed in general accordance with S&ME Proposal No. 24780158, dated November 14, 2024. The purpose of our exploration was to explore subsurface conditions and to help identify potential geotechnical issues that might affect the design and construction of the planned solar facility. This report describes our understanding of the project, presents the results of the field exploration and laboratory testing, and presents our conclusions and engineering recommendations. Once we receive comments, we will finalize this report.

We appreciate having been given the opportunity to be of service on this project. If you require additional assistance or have any questions, please feel free to contact our office at 513-771-8471.

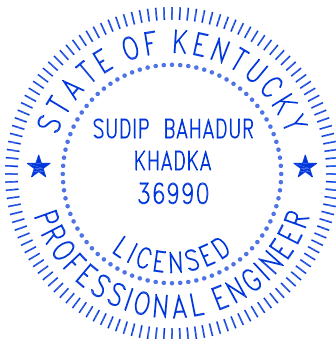
Sincerely,

S&ME, Inc.

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EXECUTIVE SUMMARY

S&ME has completed the Geotechnical Exploration and Pile Load Testing Services for the Lynn Bark Solar Project located in Martin County, Kentucky. The summary provided below is based on the information provided by the client at the time of this report and our subsurface drilling operations. The information presented below is the summary intended for providing an overview of the project and site conditions. This summary cannot be used in lieu of reading the entire geotechnical report. This summary should not be considered apart from the entire text of the report with all the qualifications and considerations mentioned herein. Preliminary information related to the site is presented in the report text.

Category	Key Geotechnical Finding
Project Description	The site is situated in Martin County, Kentucky, within a hilly region characterized by a mix of dense vegetation and clear areas, with woodlands surrounding it on all sides. It is located west of KY-3 in Debord, Kentucky, covering approximately 675 acres. The site was historically utilized for coal mining production and refinement operations. In the past, it served as a stockpiling area for soil, shale, and sandstone (spoil) overburden, which was excavated, blasted, or ripped from a nearby pit mine to expose the underlying coal. The material was then transported, spread across the surface (mine spoil fill), and is now being redeveloped for a solar array field project. According to Google Earth, the site's elevation varies from approximately 1,145 feet to 880 feet, sloping downward from east to west.
Regional Geology	According to the USDA Web Soil Survey, the dominant near-surface soil types on the site include Fiveblock, Fairpoint, and Kaymine soils, which are derived from loamy-skeletal mine spoil or earthy fill originating from sedimentary rock. These soils are found in areas with slopes ranging from 30 to 80 percent, 6 to 30 percent, and 0 to 6 percent. The Kentucky Geology Map Service indicates that the majority of the site is underlain by light gray to gray sandstone, dark bluish-gray to black limestone, and siltstone and shale with calcareous clay shale zones of the Four Corner Formation, which dates to the Middle Pennsylvanian period. The southwest portion of the site is primarily underlain by very light to light gray sandstone, interspersed with quartz-pebble conglomerate lenses, as well as siltstone and shale from the Princess Formation, also of Middle Pennsylvanian age. A small northern portion of the site contains rocks such as shale, limestone, sandstone, and underclay from the Hyden Formation, again of Middle Pennsylvanian age. No bedrock was encountered during the borings conducted on the site to a maximum depth of 50 feet.
Subsurface Conditions	Fifteen (15) soil test borings were performed on this site for this Geotechnical Exploration. Thirteen (13) soil borings were drilled in the PV Array area to a depth of 20 feet below the ground surface and two (2) soil borings were in the substation area to a depth of 50 feet below the ground surface at an interval of 2.5-foot intervals in the upper 10 feet and at 5-foot intervals thereafter. A general summary of subsurface conditions encountered in our borings and recorded groundwater depths are summarized in Section 5.0.
Pile Embedment for Solar Arrays	We recommend the use of Grade 50 W6x9 piles with a minimum embedment of 9 feet for the solar array panels.
Foundations	Substation equipment can be supported on Shallow Foundation with a net allowable bearing capacity of 3,000 psf. Other solar array equipment pads can be supported on a shallow mat foundation with a net allowable bearing capacity of 2,800 psf. The shallow foundations shall be placed 3-feet below the ground surface for frost depth.



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1.0 Introduction

S&ME, Inc. (S&ME) has completed the Geotechnical Exploration for the Lynn Bark Solar Project located in Martin County, Kentucky. The work was performed in general accordance with S&ME Proposal No. 24780158, dated November 14, 2024. The purpose of our exploration was to explore subsurface conditions and to help identify potential geotechnical issues that might affect the design and construction of the planned solar facility. This report describes our understanding of the project, presents the results of the field exploration and laboratory testing, and presents our conclusions and engineering recommendations.

2.0 Project Information

Project information was provided to us on an email request for proposals (RFP) from Josh Crumpler (Savion) to Ben Dusina (S&ME) on October 3, 2024. The RFP email consisted of a Google Earth (KMZ) file depicting the solar array and substation locations and a request for proposal (RFP) document outlining the scope of work for geotechnical exploration, geophysical surveys, and pile load testing.

The project involves developing a solar array field on an approximately 675-acre site in Martin County, Kentucky. The site is situated to the west of KY-3 in Debord, Kentucky. The site was historically utilized for coal mining production and refinement operations. In the past, it served as a stockpiling area for soil, shale, and sandstone (mine spoil) overburden, which was excavated, blasted, or ripped from a nearby pit mine to expose the underlying coal. The material was then transported, spread across the surface. The site is a combination of grass land and wooded areas.

It is our understanding that the development will include a photovoltaic (PV) electric power plant. Ultimately, the power plant will consist of solar panels installed on steel structures and various other equipment and appurtenances associated with the power plant (e.g., switchgear, transformers, inverters, and overhead and underground electrical conveyance). We anticipate the PV structures will consist of steel piles, a racking system and PV modules. The steel pile foundations for the solar arrays are anticipated to consist of wide flange steel piles (W6x9 or similar). We anticipate inverters may also be supported on similar wide flange steel piles, while transformers, and other appurtenant equipment are anticipated to be supported on shallow spread foundations or mat foundations. Typical civil improvements for the project include compacted native natural at grade roads, crushed aggregate roads, grading (if applicable), drainage improvements including infiltration basins (where applicable), and erosion control.

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



3.0 Geology and Observations

3.1 Regional Geology

According to the USDA Web Soil Survey, the dominant near-surface soil types on the site include Fiveblock, Fairpoint, and Kaymine soils, which are derived from loamy-skeletal mine spoil or earthy fill originating from sedimentary rock. These soils are found in areas with slopes ranging from 30 to 80 percent, 6 to 30 percent, and 0 to 6 percent.

The Kentucky Geology Map Service indicates that the majority of the site is underlain by light gray to gray sandstone, dark bluish-gray to black limestone, and siltstone and shale with calcareous clay shale zones of the Four Corner Formation, which dates to the Middle Pennsylvanian period. The southwest portion of the site is primarily underlain by very light to light gray sandstone, interspersed with quartz-pebble conglomerate lenses, as well as siltstone and shale from the Princess Formation, also of Middle Pennsylvanian age. A small northern portion of the site contains rocks such as shale, limestone, sandstone, and underclay from the Hyden Formation, again of Middle Pennsylvanian age. No bedrock was encountered during the borings conducted on the site.

3.2 Review of Regional Karst Sinkholes and Depressions

Our review of the available Kentucky Geologic Map Service indicates that there are not mapped karst sinkholes or depressions within the immediate vicinity of the site.

3.3 Review of Regional Coal and Mining Activities

Our review of the coal and mines records maintained by the Kentucky Geologic Map Service indicates the presence of multiple coal boreholes within the site and its surrounding area. Six (6) coal boreholes, identified as INEZ0037_KY, INEZ0041_KY, INEZ0042_KY, INEZ0044_KY, INEZ0049_KY, and INEZ0059_KY are located within the site. The nearest borehole outside the site, INEZ0040_KY, is situated approximately 0.07 miles south, followed by INEZ0046_KY and INEZ0060_KY, located 0.18 miles and 0.24 miles southwest, respectively. Additionally, INEZ0043_KY is positioned about 0.2 miles southeast, while INEZ0045_KY is approximately 0.3 miles south of the site. Several other coal boreholes identified as INEZ0038_KY, INEZ0039_KY, INEZ0040_KY, INEZ0045_KY, and INEZ0047_KY are located within the immediate vicinity of the site. Historically, the site was used for coal mining production and refinement operations. It served as a stockpiling area for overburden materials such as soil, shale, and sandstone (mine spoil), which were excavated, blasted, or ripped from a nearby pit mine to expose the underlying coal seams.

4.0 Exploration and Testing

The procedures used by S&ME for field and laboratory sampling and testing are in general accordance with ASTM procedures and established engineering practice. Appendix II contains brief descriptions of the procedures used in this exploration.

4.1 Site Surface Conditions

The site is located in Martin County, Kentucky, within an undulating area that features a mix of dense vegetation and clear sections. Dense woodlands surround the site on all sides. The site is accessible via an earthen road that connects it to KY-3 in Debord, Kentucky lies in the west of the site. There are a few thinly scattered residential houses within 3,000 feet of the site to the north and east. A Perry Cemetery is located within 5,000 feet southeast of the site. According to Google Earth, the site's elevation varies from approximately 1,145 feet to 880 feet, sloping downward from east to west. Figure 4-1 below illustrates the Site Map.

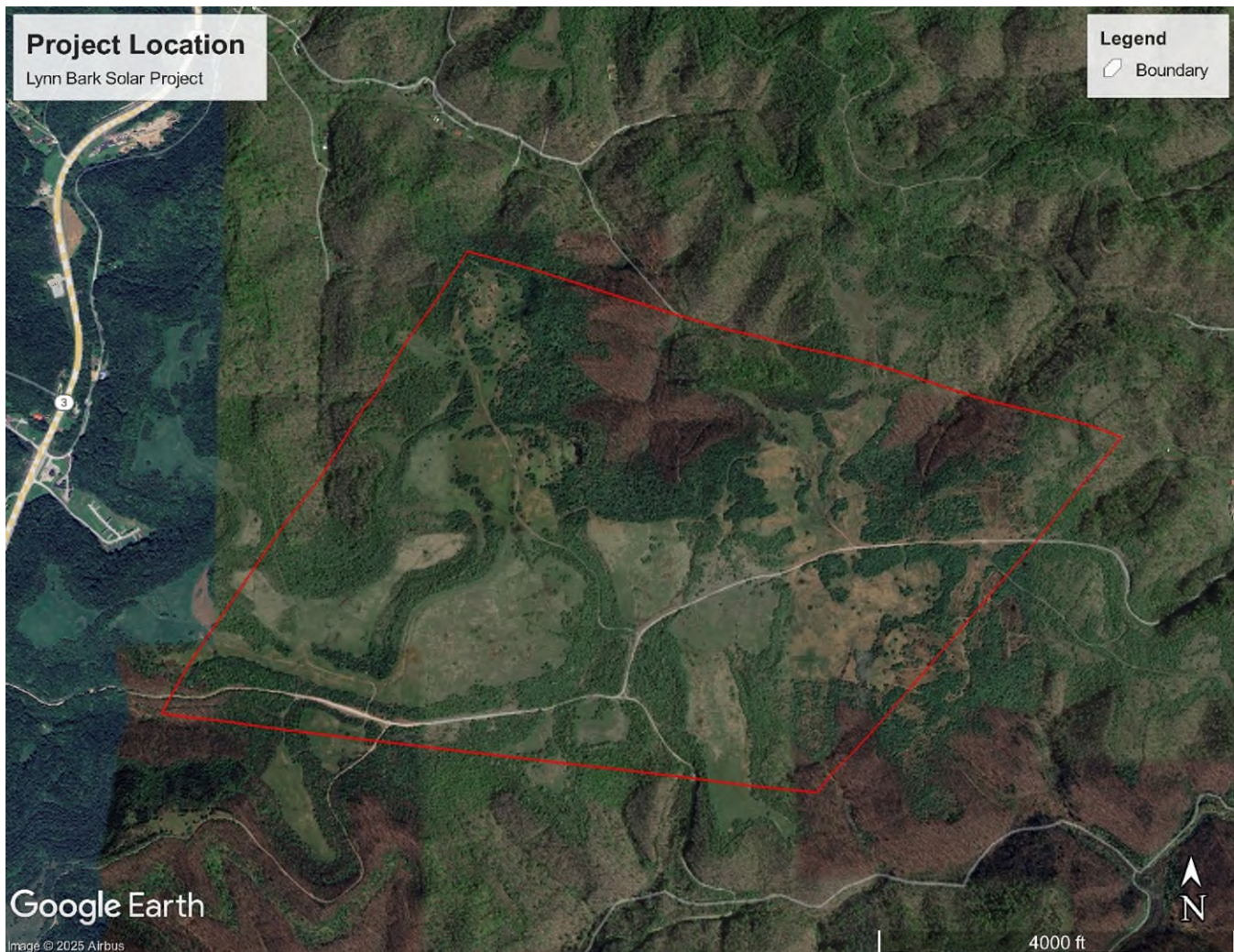


Figure 4-1 – Site Map



4.2 Field Exploration

A general description of our field procedures, a test boring log legend, and boring logs are provided in Appendix II of this report. The stratification lines shown on the Boring Logs represent the approximate boundaries between soil types. The actual transitions may be more gradual than shown.

4.2.1 Standard Penetration Test Borings

The geotechnical field exploration plan consisted of fifteen (15) widely spread exploratory borings, identified as B-01 through B-15, conducted using the Standard Penetration Test (SPT). This included thirteen (13) soil test borings within the planned PV Array field and two (2) borings within the planned substation area. Because of the limited accuracy of the methods used, the boring locations shown on the Site Exploration Plan (Figure 2) in Appendix I should be considered approximate. The soil borings in the PV Array area extended to a depth of 20 feet, while the borings in the substation area reached a depth of 50 feet.

Standard penetration tests (SPT) and split-spoon soil sampling were conducted at 2.5-foot intervals within the upper 10 feet and at 5-foot intervals thereafter. SPT samples were obtained with a 3-1/4" hollow stem auger (HSA) with CME-550X All-Terrain-Vehicle (ATV) drill rig. Samples were obtained using a split-barrel sampler driven by an automatic hammer system in general accordance with ASTM D1586. Split-barrel samples were examined immediately after recovery and representative portions of each sample were placed in air-tight glass jars and retained for subsequent laboratory testing. Undisturbed soil samples and rock coring were not performed during this test.

Boring coordinates and elevations are summarized in Table 4-1. The approximate locations of the borings are shown on the Boring Location Plan in Appendix I.

Table 4-1 – Boring Coordinate Summary

Boring No.	Latitude	Longitude	Surface Elevation (ft)	Topsoil (Inch)	Termination Depth (ft)
B-01	37.791335	-82.549464	1083.0	5.0	50.0
B-02	37.790617	-82.548564	1085.0	5.0	50.0
B-03	37.797763	-82.554568	1076.0	6.0	20.0
B-04	37.794089	-82.554516	1115.0	5.0	20.0
B-05	37.792122	-82.557146	1064.0	6.0	20.0
B-06	37.790866	-82.563256	1067.0	5.0	20.0
B-07	37.788214	-82.558167	1110.0	6.0	20.0
B-08	37.789359	-82.552710	1135.0	6.0	20.0
B-09	37.787090	-82.555929	1089.0	6.0	20.0
B-10	37.795924	-82.542756	1112.0	6.0	20.0
B-11	37.793042	-82.540511	1095.0	6.0	20.0



Boring No.	Latitude	Longitude	Surface Elevation (ft)	Topsoil (Inch)	Termination Depth (ft)
B-12	37.793059	-82.535001	1128.0	6.0	20.0
B-13	37.791057	-82.537615	1113.0	6.0	20.0
B-14	37.789786	-82.541042	1086.0	6.0	20.0
B-15	37.786309	-82.545444	1093.0	6.0	20.0

Note:

1. Latitude, Longitude, and elevations were obtained from Google Earth.

4.2.2 Test Pit Excavations / Bulk Sample Collection

On January 20, 2025, at four (4) locations, identified as TP-01 through TP-04, our field staff performed test pit excavations to a target depth of 10 feet. These locations are shown on the Test Location Plan (Figure 1B) in Appendix I. Each test pit was performed with a tracked excavator (John Deere 160 GLC). The excavated materials were visually classified by our field staff in general accordance with ASTM D2488, the *Standard Practice for Description and Identification of Soils*.

The excavation began by removing the topsoil, followed by progressively deepening the pits. Observations were made regarding the soil's characteristics, including color and moisture, at each layer. Representative bulk Soil samples were collected from each test pit in 5-gallon buckets for subsequent laboratory testing. Photographs from each test pit were taken to document the profile. The test pits were backfilled immediately after samples were collected and photographs were taken. Excavated soils were used to backfill the test pits. Thermal Resistivity test and Corrosion Series test was conducted on the bulk sample collected from the TP-01 through TP-04. The results of laboratory tests are provided in Appendix III of this report. Test pit logs are presented in Appendix II of this report. The generalized subsurface conditions of the soils encountered in test pits are summarized in Table 4-2 below. The coordinates of the test pit locations are listed in Table 4-3 on the following page, with their locations on-site illustrated in Figure 2 of Appendix I, labeled as TP-01 through TP-04.

Table 4-2 – Test Pit Summary

Depth (ft.)	Group	Description
0.0-0.5	N/A (Surface cover)	5 to 6-inches of Cultivate Soil
0.4-10.0	A	Mine Spoil, Fill: Silty Sand with Gravel (SM), Poorly Graded Gravel with Clay and Sand (GP-GC), Clayey Gravel with Sand (GC), Silty Gravel with Sand (GM), Silty Gravel with Sand (GM), Poorly Graded Sand (SP), brown and gray, dry to moist
5.5-10.0	B	Mine Spoil, Fill: Lean Clay (CL), brown and gray, dry



Table 4-3 – Test Pit Coordinates Summary

Test Pit No.	Latitude	Longitude	Surface Elevation (ft)	Topsoil (Inch)	Termination Depth (ft)
TP-01	37.790929	-82.549103	1083.0	6.0	10.0
TP-02	37.790394	-82.556141	1129.0	6.0	10.0
TP-03	37.793229	-82.537205	1121.0	6.0	10.0
TP-04	37.795390	-82.553659	1113.0	6.0	10.0

Note:

1. Latitude, Longitude, and elevations were obtained from Google Earth.

4.2.3 *Field Resistivity Testing (ER)*

We performed field electrical resistivity (ER) testing at the four (4) requested locations (Appendix I; Figure 2) in accordance with the “A” and “B” tests detailed in AEP Specification SS-316000 and in general accordance with ASTM G57 “Standard Test Method for Field Measurement of Soil Resistivity using the Wenner Four-Electrode Method.” Testing was performed with an Advanced Geosciences Incorporated, Inc. (AGI) SuperSting™ R8/IP resistivity meter, which is calibrated annually by the manufacturer. Three (3) ER locations were located within the PV Array Field area and one (1) was located within the Substation area.

The electrical resistivity testing used a Wenner configuration and consisted of two (2) linear arrays at each test location. The arrays intersected perpendicularly and were oriented approximately northwest-southeast (“A” test) and southwest-northeast (“B” test). Resistivity was determined at increasing depths using the following electrode spacings for PV array field area: 0.5, 1, 1.5, 2, 3, 5, 7, 10, 15, 20, 30, 45, 70, 100, 150 and 200 feet and the following electrode spacings for Substation area: 0.5, 1, 1.5, 3, 5, 7, 10, 15, 20, 30, 45, 80, 150, 200 and 300 feet. Stainless steel stakes were used as electrodes, and depending on the “a” spacing, they were inserted from 6 to 12 inches into the ground. Soil conditions were noted at each testing location and listed in the data sheets.

The tabulated results of the field ER testing are provided in Appendix II. The tables present each measurement for the electrode spacing (feet and centimeters), electrode depth (inches), resistance (ohms), apparent resistivity (ohm-feet and ohm-centimeters), injected current (milliamperes), and standard deviation.

4.2.4 *Infiltration Testing*

From January 20 through 22, 2025, double-ring infiltration tests (ASTM D3385) were performed at three (3) locations. The coordinates for the test locations are provided in Table 4-4 on the following page, and their locations are depicted in Figure 2 of Appendix I, labeled Perc-01 through Perc-03.

The double-ring infiltration test involved the use of two (2) rings, one with an outer diameter of 24 inches and the other with an inner diameter of 12 inches. An excavator was used to excavate test pits to their planned depth of 36 inches. After excavation, both rings were placed in the excavation. Both rings penetrated 2 to 3 inches into soil beneath the bottom of the test pit excavation. The rings were then leveled using a torpedo level. Following this, a few inches of water were poured into the rings and around the outside to check for any initial leakage. Water was



poured into both rings to a depth of 6-inches from the ground. The water level inside both rings were made equal before starting to take the readings. Subsequently, water level readings were recorded at specific intervals.

At Perc-02 and Perc-03 locations, water level readings were recorded for five (5) to six (6) hours, however, no water infiltration was observed during the testing period. At Perc-01 location, the water immediately infiltrated into the soil. Mine spoil fill encountered ranged from lean clay to granular soil with cobble and boulders. These varying soil conditions will allow a wide range of water infiltration rates.

After completing the readings, both rings were removed each location was backfilled using excavated soil. The average infiltration rates over the test period for all the test locations are shown on Table 4-5 below.

Table 4-4 – Infiltration Test Location Summary

Infiltration No.	Latitude	Longitude	Surface Elevation (ft)	Topsoil (Inch)
Perc-01	37.795357	-82.556664	1098.0	6.0
Perc-02	37.788644	-82.554914	1132.0	6.0
Perc-03	37.792236	-82.542326	1088.0	6.0

Table 4-5 – Infiltration Rate Summary

Location	Depth (ft)	Average Infiltration Rate (in/hour)
Perc-01	3	Could not be measured
Perc-02	3	0
Perc-03	3	0

4.3 Laboratory Testing

Following retrieval, the S&ME staff on-site preserved the recovered soil samples in airtight containers. The recovered samples were returned to our laboratory where applicable laboratory tests were assigned. These tests are used to assess the engineering properties of the soil. The soil samples were visually classified by a geotechnical engineer according to the Unified Soil Classification System (ASTM D2487). S&ME conducted natural moisture content determinations, Atterberg limits, and grain size analyses to aid in classification. Standard Proctor and corrosion series tests (pH, electrical resistivity, chlorides, and soluble sulfate) were performed on each of test pits from depth 0 to 5-feet from TP-01 to TP-04. The California Bearing Ratio (CBR) test was also performed on bulk sample obtained from depth 0 to 5-feet from boring TP-02. Thermal Resistivity tests were conducted on the bulk sample collected from the depth of 0 to 4 feet from each of the test pits. The results of the laboratory index tests are recorded numerically on individual boring logs and are presented in Appendix II. The results of index testing performed on representative soil samples recovered from borings are summarized in Table 4-6 on the following page.



Table 4-6 – Summary of Laboratory Tests on Soil

Boring No.	Sample Depth (ft)	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Fines (%)	Soil Type
B-01	3.5-5.0	8.3	23	15	8	30.6	Clayey Sand with Gravel (SC)
B-01	8.5-10.0	7.3	19	12	7	19.5	Silty, Clayey Sand with Gravel (SC-SM)
B-01	18.5-20.0	6.3	22	14	8	22.7	Clayey Gravel with Sand (GC)
B-01	38.5-40.0	8.0	25	16	9	61.2	Sandy Lean Clay (CL)
B-02	3.5-5.0	7.8	24	15	9	28.0	Clayey Sand with Gravel (SC)
B-02	13.5-15.0	5.8	NP	NP	NP	24.1	Silty Sand (SM)
B-02	28.5-30.0	10.2	32	18	14	60.9	Sandy Lean Clay (CL)
B-03	3.5-5.0	6.7	32	18	14	60.6	Sandy Lean Clay (CL)
B-04	8.5-10.0	7.6	26	16	10	27.4	Clayey Gravel with Sand (GC)
B-05	6.0-7.5	4.7	24	14	10	18.9	Clayey Gravel with Sand (GC)
B-06	13.5-15.0	6.3	29	17	12	36.0	Clayey Sand with Gravel (SC)
B-07	6.0-7.5	4.5	29	18	11	44.0	Clayey Sand with Gravel (SC)
B-08	3.5-5.0	12.0	21	13	8	35.5	Clayey Sand (SC)
B-09	8.5-10.0	9.3	24	14	10	33.1	Clayey Sand with Gravel (SC)
B-10	3.5-5.0	7.4	22	14	8	25.7	Clayey Sand with Gravel (SC)
B-11	8.5-10.0	3.4	27	17	10	16.0	Clayey Gravel with Sand (GC)
B-12	3.5-5.0	12.9	29	17	12	49.5	Clayey Sand (SC)
B-12	13.5-15.0	6.3	21	14	7	23.2	Silty, Clayey Sand (SC-SM)
B-13	1.0-2.5	8.2	26	16	10	20.3	Clayey Sand with Gravel (SC)
B-14	6.0-7.5	8.4	22	14	8	21.8	Clayey Sand with Gravel (SC)
B-15	1.0-2.5	7.6	21	14	7	18.8	Silty, Clayey Sand with Gravel (SC-SM)
B-15	18.5-20.0	5.8	20	12	8	24.8	Clayey Sand with Gravel (SC)
TP-01	0.0-5.0	9.2	NP	NP	NP	20.5	Silty Sand with Gravel (SM)
TP-02	0.0-5.0	10.6	30	21	9	26.3	Clayey Gravel with Sand (GC)
TP-03	0.0-5.0	11.2	NP	NP	NP	21.6	Silty Gravel with Sand (GM)
TP-04	0.0-5.0	12.2	NP	NP	NP	21.4	Silty Gravel with Sand (GM)

NP = Non-plastic

4.3.1 Resistivity, pH, and Chemical Testing

A representative soil sample from test pits TP-01 through TP-04 at the depth of 0.0 to 5.0 feet were selected for chemical testing, including for resistivity, pH, chlorides, and soluble sulfates. Results of the chemical testing are

included in Appendix III and presented in Table 4-7 below. Data presented in this section is considered informational only and not our interpretation or recommendations of in-depth corrosion of the planned structures. S&ME recommends consulting with a qualified corrosion engineer for cement type and other concerns such as cathodic protection.

Table 4-7 – Soil Test Results for Corrosion

Boring (#)	Sample (#)	Depth (ft)	Resistivity (ohm/cm)	Sulfate (mg/kg)	Chloride (mg/kg)	pH (Distilled Water)
TP-01	Bulk-1	0.0-5.0	8,520	39	11	7.5
TP-02	Bulk-1	0.0-5.0	4,000	50	14	7.6
TP-03	Bulk-1	0.0-5.0	4,820	45	11	7.7
TP-04	Bulk-1	0.0-5.0	4,250	54	17	8.1

The results of laboratory testing were compared to the American Water Works Association (AWWA) 10-point Soil Test Evaluation for Ductile Iron Pipe, shown below in Figure 4-2, for corrosion potential of steel elements within each structure and is presented for reference only. Based on the 10-point system, the soil is found to be non-corrosive. However, specific corrosion potential determinations shall be performed by an experienced engineer with corrosion.

Figure 4-2 – Soil Test Evaluation for Ductile Iron Pipe

Soil Test Evaluation for Ductile Iron Pipe (10-Point System)*			
Soil Characteristics	Points		
Resistivity (ohm-cm)**		Moisture	
<1,500	10	Poor drainage,	
≥1,500-1,800	8	continuously wet	2
>1,800-2,100	5	Fair drainage,	
>2,100-2,500	2	generally moist	1
>2,500-3,000	1	Good drainage,	
>3,000	0	generally dry	0
pH			
0-2	5		
2-4	3		
4-6.5	0		
6.5-7.5	0 ***	*Ten points--corrosive to Ductile Iron pipe.	
7.5-8.5	0	Protection is indicated.	
>8.5	3	**Based on water-saturated soil box. This	
Redox potential		method is designed to obtain the lowest-and	
> +100 mv	0	most accurate--resistivity reading.	
+50 to +100 mv	3.5	***If sulfides are present and low (<100 mv)	
0 to +50 mv	4	or negative redox-potential results are	
Negative	5	obtained, 3 points should be given for	
Sulfides		this range.	
Positive	3.5	Note: DIPRA recommends that the soil sample	
Trace	2	used in the 10-point evaluation be taken at pipe	
Negative	0	depth rather than at the surface. Soil corrosivity	
		readings can vary substantially from the	
		surface to pipe depth.	

The tests were performed in general accordance with Standard testing procedures outlined above. The laboratory testing results are presented on the Summary of Laboratory Test Data and the data sheets in Appendix III.

4.4 Concrete Exposure Categories

Table 4-8 below, is based on the results of our laboratory testing and the American Concrete Institute (ACI) 318 Table 19.3.1.1 – Exposure Categories and Classes (see Figure 4-3 below).

Table 4-8 – Concrete Exposure Summary

Boring / Category	Sample	Depth (ft)	Freezing and Thawing (F)	Sulfate (S)	In Contact with Water (W)	Corrosion Protection of Reinforcement ©
TP-01	Bulk-1	0.0-5.0	F2	S0	W1	C1
TP-02	Bulk-1	0.0-5.0	F2	S0	W1	C1
TP-03	Bulk-1	0.0-5.0	F2	S0	W1	C1
TP-04	Bulk-1	0.0-5.0	F2	S0	W1	C1

Figure 4-3 – ACI 318 Table 19.3.1.1 Exposure Categories and Classes

Category	Class	Condition	
Freezing and thawing (F)	F0	Concrete not exposed to freezing-and-thawing cycles	
	F1	Concrete exposed to freezing-and-thawing cycles with limited exposure to water	
	F2	Concrete exposed to freezing-and-thawing cycles with frequent exposure to water	
	F3	Concrete exposed to freezing-and-thawing cycles with frequent exposure to water and exposure to deicing chemicals	
Sulfate (S)		Water-soluble sulfate (SO_4^{2-}) in soil, percent by mass ^[1]	Dissolved sulfate (SO_4^{2-}) in water, ppm ^[2]
	S0	$\text{SO}_4^{2-} < 0.10$	$\text{SO}_4^{2-} < 150$
	S1	$0.10 \leq \text{SO}_4^{2-} < 0.20$	$150 \leq \text{SO}_4^{2-} < 1500$ or seawater
	S2	$0.20 \leq \text{SO}_4^{2-} \leq 2.00$	$1500 \leq \text{SO}_4^{2-} \leq 10,000$
	S3	$\text{SO}_4^{2-} > 2.00$	$\text{SO}_4^{2-} > 10,000$
In contact with water (W)	W0	Concrete dry in service Concrete in contact with water and low permeability is not required	
	W1	Concrete in contact with water and low permeability is required	
Corrosion protection of reinforcement (C)	C0	Concrete dry or protected from moisture	
	C1	Concrete exposed to moisture but not to an external source of chlorides	
	C2	Concrete exposed to moisture and an external source of chlorides from deicing chemicals, salt, brackish water, seawater, or spray from these sources	

^[1]Percent sulfate by mass in soil shall be determined by ASTM C1580.

^[2]Concentration of dissolved sulfates in water, in ppm, shall be determined by ASTM D516 or ASTM D4130.



5.0 Subsurface Conditions

The following is a generalized description of the subsurface conditions. The stratification of the soil, as shown on the Boring Logs in Appendix II, represents the conditions at the actual boring locations. Lines of demarcation represent the approximate boundary between the soil types, but the transition may be gradual or not clearly defined.

5.1 General Subsurface Profile

Each of the borings were drilled through the topsoil. The subsurface conditions were consistent with the published Geological mapping information. The following Table 5-1 provides the generalized subsurface conditions of the soils encountered.

Table 5-1 – General Subsurface Conditions

Depth (ft.)	Group	Description ⁽¹⁾	Range of SPT N-Values (blows per foot)
0.0-0.5	N/A (Surface cover)	5 to 6-inches of Topsoil	--
0.5-42.0	A	Fill, Mine Spoil: Sandy Lean Clay (CL), Lean Clay (CL), Fat Clay (CH), Shale, soft to hard, red brown to brown to gray to dark gray to black, dry to wet	4-50/5"
0.4-50	B	Fill, Mine Spoil: Clayey Sand with Gravel (SC), Silty, Clayey Sand with Gravel (SC-SM), Clayey Gravel with Sand (GC), Poorly Graded Gravel with Clay and Sand (GP-GC), Poorly Graded Sand with Gravel (SP), Poorly Graded Gravel with Sand (GP), Silty Sand (SM), Poorly Graded Sand (SP), Poorly Graded Gravel (GP), Clayey Sand (SC), Silty, Clayey Sand (SC-SM), Poorly Graded Gravel with Clay (GP), Very Loose to very dense, red brown to brown to gray to dark gray, dry to moist	4-50/2"

Note:

1. This is a generalized summary and may not accurately depict the actual conditions encountered in the test borings. These groups may not encounter at each boring location.

5.2 Groundwater

Seepage and groundwater observations were conducted during drilling operations, immediately after the removal of the tooling from the borings, and again 24 hours after completion. Groundwater was encountered during drilling in borings B-01 and B-13 at depths of 33.5 feet and 6.0 feet, respectively. However, both borings were dry after the tooling was removed and remained dry 24 hours post-completion. All other borings remained dry throughout drilling, after the tooling removal, and during the 24-hour post-completion observation period.

Fluctuations in the level of the groundwater table (or saturated soils/perched water levels) will occur due to seasonal variances in the Great Miami River, rainfall, drainage, types of soils present and other factors. We caution that groundwater can be perched at various elevations above the general static groundwater level after periods of rainfall, especially in the lower elevations and natural drainage paths of the site.

For further details of subsurface conditions encountered, refer to the individual Boring Logs presented in Appendix II. The stratum lines shown on the boring logs should be considered approximate.

6.0 Pile Load Testing Program

6.1 Pile Installation Procedures

We performed the test piles at a total of six (6) locations, identified as PT-1 through PT-6, across the site. The test piles consisted of uncoated ASTM A992 (Grade 50) W6x9 wide flange sections. The approximate pile test locations are shown on the Test Location Plan (Figure 2) in Appendix I. The pile installation procedure generally consisted of the following:

- At each test location, three (3) piles were installed, identified as the A, B, and C piles with target embedment of 7, 9, and 7 feet, respectively. The test piles were installed between January 20 to January 24, 2025. The piles for each test location were installed about 10 feet apart in general accordance with ASTM D3966 Section 6.5.
- The piles were installed with a Vermeer PD-10 track-mounted excavator equipped with a hydraulic hammer.
- Driving times were recorded by S&ME's representative. Total driving time for the piles ranged from about 38 to 147 seconds. Driving time generally increased with pile embedment depth. The pile driving time data (in seconds per foot of penetration) is presented in Figure No. 4 in Appendix IV.
- **Pile PT-1C initially encountered driving refusal at the depth of 3.5 feet. The pile was removed, offset, and then driven successfully to the target depth of 7 feet.**
- The remaining piles reached their planned termination depths without encountering refusal.

6.2 Pile Load Testing Procedures

6.2.1 Axial Tension Load Tests

- The piles were tested following a waiting period of at least three (3) days following driving. Axial tension testing was performed on the A and B piles at each test location. A total of 12 axial tension tests were performed.
- An excavator was located over each test pile. The machine boom 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 excavator tracks contact the ground.
- The test loads were applied using the excavator. 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 axial tensile load test was generally performed by increasing the load in approximately 500-pound increments until an applied load of 10,000 pounds is achieved or pile displacement exceeded 1 inch. We generally held each load increment for approximately 1 minute, or until displacement readings stabilized, before increasing to the next load increment.

Axial tensile test results are presented in Figure 5 in Appendix IV.

6.2.2 Axial Compression Load Tests

- The piles were tested following a waiting period of at least 3 days following driving. Axial compression testing was performed on the C piles at each test location. A total of 6 axial compression tests were performed.
- An excavator was located over each test pile. The machine boom 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 excavator tracks contact 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 axial compressive load test was generally performed by increasing the load in approximately 500-pound increments until an applied load of 13,000 pounds is achieved or pile displacement exceeded 1 inch. We generally held each load increment for approximately 1 minute, or until displacement readings stabilized, before increasing to the next load increment.

Axial compressive test results are presented in Figure 6 in Appendix IV.

6.2.3 Lateral Load Tests

- The piles were tested following a waiting period of at least three (3) days following driving. Lateral load testing was performed on the A and B piles at each test location after completion of the axial tension tests. A total of 12 lateral tests were completed.
- The test loads were applied along the strong axis of the piles using an excavator at a height of about 48 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 6 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 was generally applied at a height of about 48 inches above grade with displacement measured around a height of 6 inches above the ground. Piles were aligned in order to perform testing along the strong axis. The lateral load test was generally performed by increasing the load in approximately 500-pound increments until an applied horizontal load of 7,000 pounds is achieved, the steel of the pile begins to fail, or pile lateral displacement exceeds 1 inch, and the test terminated:

Lateral test results are presented in Figure 7 in Appendix IV.

6.3 Load Test Results

The load test results are summarized in Table 6-1 below. Summary graphs (Figures 4 through 7) and complete load test records are included in Appendix IV. To determine the failure load for each test, the following failure criteria were applied:

- For the axial tension tests, 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. (PT-XA and B Piles).
- For the lateral tests, a failure criterion of 1 inch was applied. (PT-XA and B Piles).
- For the axial compression tests, we applied a similar Davisson failure criterion as above, but with an offset of 0.2 inches. (PT-XC Piles).

Table 6-1 – Pile Load Test Summary

Pile ID	Embedment Depth (ft)	Total Drive Time (sec)	Approximate Axial Tension Load (pounds)		Approximate Lateral Load (pounds)	Approximate Axial Compression Load (pounds)
			Load at 0.15 inch deflection	Load at 1.0 inch deflection	Load ¹ at 1.0 inch deflection ²	Load at 0.2 inch deflection
PT-1A	7	98	6,100	8,100	5,600	Not tested
PT-1B	9	52	3,500	3,700	6,700	
PT-1C (removed)	3.5A ³	16	Not tested			
PT-1C (relocated)	7	50	Not tested			Not reached
PT-2A	7	79	Not reached		5,900	Not tested
PT-2B	9	133	Not reached		6,100	
PT-2C	7	39	Not tested			Not reached



Pile ID	Embedment Depth (ft)	Total Drive Time (sec)	Approximate Axial Tension Load (pounds)		Approximate Lateral Load (pounds)	Approximate Axial Compression Load (pounds)
			Load at 0.15 inch deflection	Load at 1.0 inch deflection	Load ¹ at 1.0 inch deflection ²	Load at 0.2 inch deflection
PT-3A	7	50	Not reached		6,400	Not tested
PT-3B	9	116	Not reached		6,500	
PT-3C	7	54	Not tested			Not reached
PT-4A	7	135	Not reached		6,300	Not tested
PT-4B	9	147	Not reached		6,900	
PT-4C	7	140	Not tested			Not reached
PT-5A	7	38	4,300	5,500	6,300	Not tested
PT-5B	9	78	6,800	8,500	6,600	
PT-5C	7	45	Not tested			Not reached
PT-6A	7	54	5,000	5,400	Not reached	Not tested
PT-6B	9	88	3,500	6,500	5,500	
PT-6C	7	47	Not tested			12,600

1. Load applied at a height of 48 inches

2. Displacement measured from a height of approximately 6 inches above the groundline.

3. Pile driving refusal at PT-1C location at a depth of 3.5 feet. PT-1C was relocated and successfully driven to planned depth.

7.0 Conclusions and Recommendations

7.1 Site Assessment

The data obtained during this exploration and our experience with similar developments indicate that the site is adaptable for the planned development. The following is a summary of the conclusions provided in the section of the report:

- Based on the results of the pile load tests, we recommend that the desired W6x9 piles have a minimum embedment of 9 feet. Pile driving refusal was encountered at one (1) pile load test pile, and should be expected at several locations across the site during production pile installation.
- The proposed substation equipment can be supported on shallow foundations with an allowable bearing pressure of 3,000 pounds per square foot (psf) bearing at least 3 feet below grade.
- The proposed array related equipment can be supported on shallow mat foundations with an allowable bearing pressure of 2,800 psf bearing at least 3 feet below grade.



- The soils encountered are satisfactory for use a structural fill, provided the recommendations provided in Section 7.2 of this report are followed.

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.

7.2 Earthwork

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

7.2.1 Site Preparation and Subgrade Evaluation

It is recommended that all topsoil, and any other weak, wet, or soft soils should be stripped from an area at least 2 feet outside the proposed foundations, and from any areas to receive new structural fill. The trench should be backfilled with approved granular fill. If static groundwater is encountered, the contractor shall implement groundwater dewatering measures to keep the foundation excavation free from any standing water. Any softened, weakened or disturbed materials should be removed and replaced with select granular backfill. 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.

7.2.2 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 4 inches and Plasticity Indexes of 30 or less. Structural fill should be placed in relatively thin (4- to 8-inch) layers and compacted to at least 95 percent of the soil's maximum dry density as determined by the standard Proctor compaction test (ASTM D698). In addition to meeting compaction requirements, the materials should be stable under repeated traffic loads from heavy rubber-tired equipment (i.e., dump trucks, front end loaders, etc.).

Based on the materials encountered in our borings, we expect the on-site soils are 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. Further, trench backfill around cabling should be sieved so that no rock fragments greater than ½ inch in diameter are placed within 1 foot of the cabling to help limit damage potential during backfill operations.

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.



7.3 Foundation Recommendations

7.3.1 Array Equipment Pads and Substation Shallow Foundations

The exploration findings indicate that the equipment pads can be supported by conventional spread footings bearing on natural soils or properly compacted structural fill as previously discussed. We recommend the use of a maximum allowable net soil bearing pressure of 3,000 psf to size footings supported by these materials for the substation equipment, and an allowable net soil bearing pressure of 2,800 psf in for array equipment pads. 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 36 inches below the lowest adjacent exterior grade for protection against seasonal moisture changes and frost penetration.

Footing excavations must 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 are 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.

7.3.2 Solar Array Field Piles

Representative pile-soil interaction models were developed from the results of the pile load test program and the subsurface conditions encountered. The axial parameters were developed by creating a typical soil profile and estimating the ultimate pile skin friction for each layer based on the geotechnical data. Then, the ultimate skin friction values were adjusted from the estimates based on the failure loads from the load test program. The lateral models were developed by estimating soil parameters based on geotechnical data, then refining the values to establish a near-fit with the actual load-deflection curves measured during the pile load testing program. These models may be used by the foundation designer to perform specific analyses of loading scenarios not represented by the pile load tests.

7.3.2.1 General

Based on the results of the axial tension and lateral load tests, we recommend that W6x9 piles have a minimum embedment depth of 9 feet.



7.3.2.2 Axial Parameters

The ultimate skin friction for the piles was based on averaging the test results of the test piles which exceeded the modified Davisson offset limit criterion. A factor of safety of 1.67 was applied to the ultimate skin friction value to determine the recommended allowable skin friction parameters. We recommend using the design allowable skin friction values as listed in Table 7-1 below. These skin friction values should be applied to the "boxed" perimeter of the pile. These skin friction values can be used in axial compression and uplift resistance calculations.

We also determined an allowable end bearing value based on the results of the compression load tests using a factor of safety of 3.

7.3.2.3 Lateral Parameters

Lateral analyses were performed using the proprietary computer program LPile® to simulate the 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 the results of the worst case-performing load tests while disregarding some locations with outlier results. The "fit" of the LPile model to the load test data is shown on Figure 7 in Appendix IV. 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 model, deflection curves were developed that approximate the reasonable lower bound of the measured load test behavior. Based on our multiple evaluations, we recommend the LPile model soil parameters in Table 7-1 below for design/evaluation of production driven piles at the site:

Table 7-1 – Recommended Driven Pile Design 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}	P- Multiplier
0 – 1	0	0	Stiff Clay w/o Free Water	115	1,500	0.006	2.5
>1	6,000	260	Stiff Clay w/o Free Water	115	3,000	0.008	2.5

"BGS" = Below Ground Surface

These values should only be used for axial uplift and compression design of driven piles and for lateral pile behavior analysis of driven piles 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.



7.4 Seismic Hazards

7.4.1 Seismic Site Class

Based on the SPT N-value seismic site classification method (ASCE 7-16, Equation 20.4-2 and Table 20.3-1), ASCE 7-16 classifies the site as "D" – Stiff Soil, based on Table 20.3-1.

7.4.2 Mapped Acceleration Parameters

The mapped acceleration parameters for the site are provided in the table below under the assumption that the site is within Risk Category II and seismic site class "D." Design code reference document, ASCE 7-10 and ASCE 7-16, was referred to in determining these parameters.

Table 7-2 Mapped Acceleration Parameters

Parameter Type	ASCE 7-10	ASCE 7-16
S_s	0.174	0.175
S_1	0.08	0.074
S_{DS}	0.186	0.187
S_{D1}	0.128	0.119
F_a	1.6	1.6
F_v	2.4	2.4
PGA_m	0.132	0.146

7.5 Access Roads

Based on the CBR testing from TP-02, a design CBR value of 6.3 can be utilized to design access roads. We anticipate the access roads will be constructed with a gravel surface. Upon stripping of surficial materials, the exposed foundation soils should be thoroughly compacted, and proofrolled to delineate any soft/loose areas. Failing areas should be undercut and the undercut replaced with compacted structural fill in accordance with our recommendations in Section 7.2 of this report. After failing areas are stabilized and upon successful proofroll test, we recommend placing 6 inches of compacted dense graded aggregate (DGA) such as KY No. 53 as the subgrade treatment. The subgrade treatment DGA should be capped with 4 inches of compacted KY No. 73 aggregate or 6 inches of compacted KY No. 53 aggregate should be placed above the subgrade treatment to complete the aggregate pavement section. At a minimum, the foundation soils and pavement subgrade should be properly crowned and sloped to direct water away from the pavement to adjacent ditches unless other drainage measures are provided. While the site is relatively flat, if aspects of the project construction lead to instances of significant grade changes in the access roads and there are concerns over stability near the transition, this area can be reinforced with additional stone.

An alternative to a gravel surface would be to cement stabilize the subgrade; however, based on the mine spoil encountered thoroughly mixing the cement may be difficult. 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. We recommend a soil cement mix design be performed to aid in determining the appropriate mixture to support the access roads. Sometimes, higher plasticity or very wet materials may require additional cement.

8.0 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 the 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.

S&ME 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 S&ME's 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.

Report of Geotechnical Exploration and Pile Load Testing Services
Lynn Bark Solar
Martin County, Kentucky
S&ME Project No. 24780158



Appendices



Appendix I – Additional Figures

Important Information About Geotechnical Report
Vicinity Map
Field Services Exploration Plan



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.

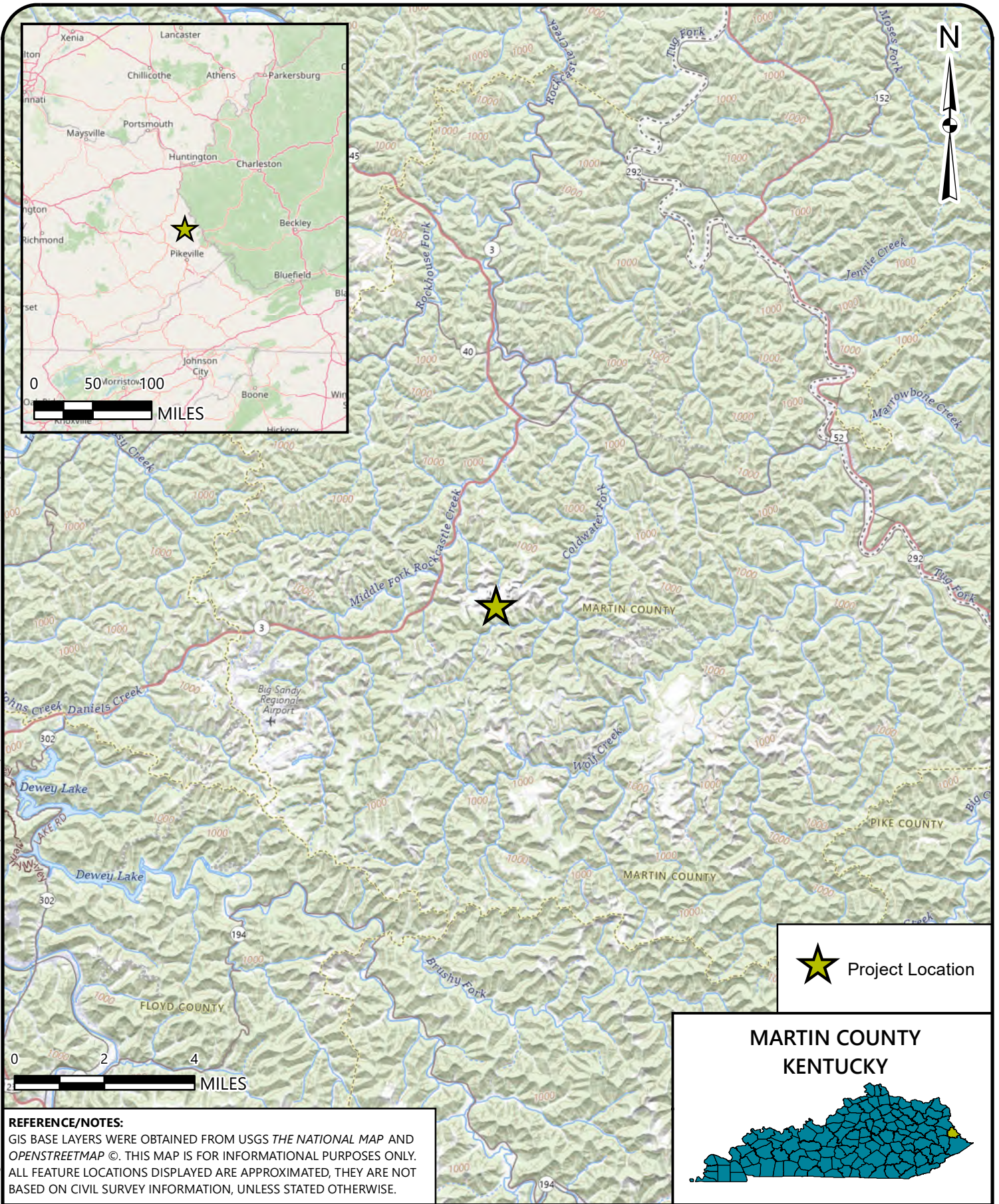
Geo-Environmental Issues

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.

Drawing Path: C:\Users\AGostic\OneDrive - S&ME, Inc\Documents\ArcGIS\Projects\24780158 Lynn Bark Solar\24780158 Lynn Bark Solar_VIC.mxd plotted by agostic 01-20-2025



VICINITY MAP

LYNN BARK SOLAR
MARTIN COUNTY, KENTUCKY

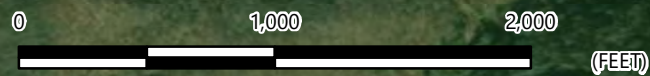
SCALE:
1" = 15,000'
DATE:
1-20-25
PROJECT NUMBER
24780158

FIGURE NO.

1

Drawing Path: C:\Users\AGostic\OneDrive - S&ME, Inc\Documents\ArcGIS\Projects\24780158 Lynn Bark Solar\24780158 Lynn Bark Solar_SEP_11x17.mxd plotted by agostic 04-03-2025

REFERENCE:
GIS BASE LAYERS WERE OBTAINED FROM ESRI. THIS MAP IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED. THEY ARE NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.



-  Percolation Test
-  Pile Load Test
-  Soil Boring
-  Test Pit
-  Electrical Resistivity Lines



SITE EXPLORATION PLAN

LYNN BARK SOLAR
MARTIN COUNTY, KENTUCKY

SCALE:
1" = 750'

DATE:
4-3-25

PROJECT NUMBER
24780158

FIGURE NO.

2



Appendix II – Field Exploration

Soil Log Legend
Boring Logs
Test Pit Logs with Photographs
Electrical Resistivity Test Data
Summary of Field Procedures

SOIL LOG

LEGEND



SOIL PROPERTY SYMBOLS

N - Standard Penetration, bpf **LL** - Liquid Limit, % **PPV** - Pocket Penetrometer Value, tsf
NMC - Natural Moisture Content, % **PL** - Plastic Limit, % **Qu** - Unconfined Compressive Strength
F - Fines Content, % **PI** - Plasticity Index, % **γ_d** - Dry Unit Weight, pcf

The STANDARD PENETRATION TEST (SPT) as defined by ASTM D1586 (or AASHTO T206) 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-inch O.D. split-barrel sampler is driven three 6-inch increments with a 140 lb. hammer freely falling 30 inches. The hammer can either be of a trip, free-fall design, or actuated by a rope and cathead. The SPT N Value is determined by adding the number of blows from the 2nd and 3rd 6-inch increments. A normalized blowcount (N_{60}) may be determined by the following equation: $N_{60} = [\text{Rig Energy Ratio (\%)} / 60] * N$.



SPT



ST

SHELBY TUBE (ST) samples are obtained by hydraulically pushing a thin-walled tube (typically 3-inches in diameter) to obtain a relatively undisturbed sample for testing of fine-grained soils to determine engineering properties such as strength, compressibility, permeability, and density. Shelby tubes are sampled in general accordance with ASTM D1587 (AASHTO T207).

Descriptive Order of Soil Strata: Geologic Disposition (i.e., Fill, Colluvium, Alluvium, etc.), ASTM Group Name (ASTM Group Symbol), quantified/qualified soil constituents, misc. constituents, consistency/density, color, organic description, moisture. ASTM group classifications is determined per ASTM D2487 where lab testing has been performed and ASTM D2488 where lab testing has not been performed.

ASTM GROUP NAME (SYMBOL) AND GRAPHIC

	WELL GRADED GRAVEL (GW)		WELL GRADED SAND (SW)		LEAN CLAY (CL)		TOPSOIL
	POORLY GRADED GRAVEL (GP)		POORLY GRADED SAND (SP)		SILTY CLAY (CL-ML)		ASPHALT
	WELL GRADED GRAVEL WITH SILT (GW-GM)		WELL GRADED SAND WITH SILT (SW-SM)		SILT (ML)		BASE - CEMENT MODIFIED
	WELL GRADED GRAVEL WITH CLAY (GW-GC)		WELL GRADED SAND WITH CLAY (SW-SC)		FAT CLAY (CH)		BASE - CEMENT STABILIZED AGGREGATE
	POORLY GRADED GRAVEL WITH SILT (GP-GM)		POORLY GRADED SAND WITH SILT (SP-SM)		ELASTIC SILT (MH)		BASE - GRAVEL
	POORLY GRADED GRAVEL WITH CLAY (GP-GC)		POORLY GRADED SAND WITH CLAY (SP-SC)		ORGANIC LOW PLASTICITY SILT OR CLAY (OL)		CONCRETE
	SILTY GRAVEL (GM)		SILTY SAND (SM)		ORGANIC HIGH PLASTICITY SILT OR CLAY (OH)		VOID / NO RECOVERY
	CLAYEY GRAVEL (GC)		CLAYEY SAND (SC)		PEAT (PT)		IGM / PWR
	CLAYEY GRAVEL WITH SILT (GC-GM)		CLAYEY SAND WITH SILT (SC-SM)				

FINE-GRAINED SOIL (Relative Consistency)			COARSE-GRAINED SOIL (Relative Density)		MINOR CONSTITUENTS (% By Weight)		ORGANIC CONTENT OF SOIL (Determined by ASTM D2974 or AASHTO T267)	
	N	PPV		N		Percentage	Classification	Percentage
Very Soft	< 2 bpf	< 0.25 tsf	Very Loose	< 5 bpf	Trace	0% - 10%	With Organic Matter	4% - 15%
Soft	2 - 4 bpf	> 0.25 - 0.5 tsf	Loose	5 - 10 bpf	Little	11% - 20%	Organic Soil	16% - 30%
Firm	5 - 8 bpf	> 0.5 - 1.0 tsf	Medium Dense	11 - 30 bpf	Some	21% - 35%	Peat	> 30%
Stiff	9 - 15 bpf	> 1.0 - 2.0 tsf	Dense	31 - 50 bpf	"And"	≥ 36%		
Very Stiff	16 - 30 bpf	> 2.0 - 4.0 tsf	Very Dense	> 50 bpf				
Hard	> 30 bpf	> 4.0 tsf						

MOISTURE CONDITION



At Time of Drilling (ATD)



End of Drilling



After Drilling

Dry	Absence of moisture, dusty, dry to touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

Groundwater observation made anytime during the drilling process. Depending on time of reading and drilling methodologies, this value may be influenced by the drilling process.

Groundwater measurement soon after the drilling processes are complete, and the borehole is at final depth. Drilling fluids, if introduced during drilling, may influence this measurement.

Groundwater measurements made in a borehole hours to days after drilling is complete. Depending on subsurface conditions, elapsed time, drilling process, etc. this observation may reflect a stabilized level.

REFERENCES:

FHWA NHI-16-072, Geotechnical Engineering Circular No. 5 "Geotechnical Site Characterization"

ASTM Specifications D2487 and D2488

DOT Specifications & Design Manuals from NC, SC, OH, MI, IN, PA, VA.

PROJECT: Lynn Bark Solar Martin County, Kentucky S&ME Project No. 24780158				BORING LOG: B-01 <i>Sheet 1 of 3</i>			
DATE DRILLED: 01/14/2025		ELEVATION: 1083 ft		NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.			
DRILL RIG: CME-550X		DATUM: NAVD88					
DRILLER: Brandon Kenyon		BORING DEPTH: 50.0 ft					
HAMMER TYPE: Auto Hammer (140 lb)		CLOSURE: Cuttings					
DRILLING METHOD: 3-1/4"HSA		LOGGED BY: Dylan Fall		LATITUDE: 37.791335 LONGITUDE: -82.549464			
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					ELEVATION
							20	40	60	80	100	
0	0.4				5 INCHES OF TOPSOIL							1083
				SS-1 (14 in)	CLAYEY SAND WITH GRAVEL (SC), medium dense, brown and gray, moist, MINE SPOIL, FILL	4-8-9 N = 17	○●					
				SS-2 (16 in)		7-11-10 N = 21	○●△					1078
5				SS-3 (14 in)	<i>trace organics encountered at 6.0 to 7.5 feet</i>	8-8-8 N = 16	○●					
	8.0			SS-4 (16 in)	SILTY, CLAYEY SAND WITH GRAVEL (SC- SM), some cobbles, very dense, gray, moist, MINE SPOIL, FILL	6-15-48 N = 63	○●△		●			1073
10				SS-5 (12 in)	CLAYEY GRAVEL WITH SAND (GC), medium dense, gray, moist, MINE SPOIL, FILL	5-6-8 N = 14	●					1068
15				SS-6 (10 in)		5-4-10 N = 14	○●△					1063
20												
22.0												

GROUNDWATER	DATE	DEPTH (FT)	REMARKS
ATD	01/14/2025	33.5	
END OF DRILLING	01/14/2025		Dry
AFTER DRILLING			
AFTER DRILLING			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

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, IGM = Intermediate Geomaterial

PROJECT: Lynn Bark Solar Martin County, Kentucky S&ME Project No. 24780158				BORING LOG: B-01 <i>Sheet 2 of 3</i>			
DATE DRILLED: 01/14/2025		ELEVATION: 1083 ft		NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.			
DRILL RIG: CME-550X		DATUM: NAVD88					
DRILLER: Brandon Kenyon		BORING DEPTH: 50.0 ft					
HAMMER TYPE: Auto Hammer (140 lb)		CLOSURE: Cuttings					
DRILLING METHOD: 3-1/4"HSA		LOGGED BY: Dylan Fall		LATITUDE: 37.791335 LONGITUDE: -82.549464			
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					ELEVATION
							20	40	60	80	100	
25				SS-7 (6 in)	POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), some cobbles, very dense, gray, moist, MINE SPOIL, FILL	11-15-43 N = 58			●			1058
30				SS-8 (10 in)	trace coal fragments encountered at 28.5 to 30.0 feet	6-50/3" N = 50/3"				●		1053
35	32.0			SS-9 (18 in)	SANDY LEAN CLAY (CL), trace gravel, trace coal, very stiff, gray, moist, MINE SPOIL, FILL	12-13-15 N = 28			●			1048
40	42.0			SS-10 (6 in)		8-7-10 N = 17 PPV= 3.5	○	●	—	△		1043
					POORLY GRADED SAND WITH GRAVEL (SP), trace shale fragments, medium dense, gray, moist, MINE SPOIL, FILL							

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	☒	01/14/2025	33.5	
END OF DRILLING	☒	01/14/2025		Dry
AFTER DRILLING	☒			
AFTER DRILLING	☒			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

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, IGM = Intermediate Geomaterial

PROJECT: Lynn Bark Solar Martin County, Kentucky S&ME Project No. 24780158				BORING LOG: B-01 <i>Sheet 3 of 3</i>			
DATE DRILLED: 01/14/2025			ELEVATION: 1083 ft		NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.		
DRILL RIG: CME-550X			DATUM: NAVD88				
DRILLER: Brandon Kenyon			BORING DEPTH: 50.0 ft				
HAMMER TYPE: Auto Hammer (140 lb)			CLOSURE: Cuttings				
DRILLING METHOD: 3-1/4"HSA			LOGGED BY: Dylan Fall		LATITUDE: 37.791335 LONGITUDE: -82.549464		
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	ELEVATION
45		Fill		SS-11 (7 in)	POORLY GRADED SAND WITH GRAVEL (SP), trace shale fragments, medium dense, gray, moist, MINE SPOIL, FILL	5-6-9 N = 15	● SPT △ % Fines ○ NMC ├─┤ PL-LL 20406080100	1038
50	50.0			SS-12 (10 in)		10-7-11 N = 18		1033
55					Borehole terminated at 50.0 feet		1028	
60							1023	
65							1018	

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	☒	01/14/2025	33.5	
END OF DRILLING	☒	01/14/2025		Dry
AFTER DRILLING	☒			
AFTER DRILLING	☒			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

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, IGM = Intermediate Geomaterial

PROJECT: Lynn Bark Solar Martin County, Kentucky S&ME Project No. 24780158				BORING LOG: B-02 <i>Sheet 1 of 3</i>			
DATE DRILLED: 01/14/2025		ELEVATION: 1084 ft		NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.			
DRILL RIG: CME-550X		DATUM: NAVD88					
DRILLER: Brandon Kenyon		BORING DEPTH: 50.0 ft					
HAMMER TYPE: Auto Hammer (140 lb)		CLOSURE: Cuttings					
DRILLING METHOD: 3-1/4"HSA		LOGGED BY: Dylan Fall		LATITUDE: 37.790617 LONGITUDE: -82.548564			
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					ELEVATION
							20	40	60	80	100	
0	0.4				5 INCHES OF TOPSOIL							1084
				SS-1 (18 in)	POORLY GRADED GRAVEL WITH SAND (GP), little clay, medium dense, gray, dry, MINE SPOIL, FILL	25-16-13 N = 29	○	●				
	3.0			SS-2 (18 in)	CLAYEY SAND WITH GRAVEL (SC), some coal, medium dense, brown and gray, dry, MINE SPOIL, FILL	8-11-16 N = 27	○	△	△			
5	5.5			SS-3 (10 in)	SILTY SAND (SM), some cobbles, very dense to medium dense, brown and gray, moist, MINE SPOIL, FILL	4-50/5" N = 50/5"					●	
				SS-4 (18 in)	soil consistency changes from very dense to dense at 8.5 to 10.0	19-20-21 N = 41	○	●				
10				SS-5 (15 in)		25-10-4 N = 14	○	●	△			
15	17.0			SS-6 (18 in)	LEAN CLAY (CL), some coal, little shale fragments, very stiff, dark gray and black, moist, MINE SPOIL, FILL	7-10-18 N = 28 PPV= 4.5		●				
20	22.0											

GROUNDWATER	DATE	DEPTH (FT)	REMARKS
ATD	01/14/2025		Not Encountered
END OF DRILLING			
AFTER DRILLING			
AFTER DRILLING			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

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, IGM = Intermediate Geomaterial

PROJECT: Lynn Bark Solar Martin County, Kentucky S&ME Project No. 24780158				BORING LOG: B-02 <i>Sheet 2 of 3</i>			
DATE DRILLED: 01/14/2025		ELEVATION: 1084 ft		NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.			
DRILL RIG: CME-550X		DATUM: NAVD88					
DRILLER: Brandon Kenyon		BORING DEPTH: 50.0 ft					
HAMMER TYPE: Auto Hammer (140 lb)		CLOSURE: Cuttings					
DRILLING METHOD: 3-1/4"HSA		LOGGED BY: Dylan Fall		LATITUDE: 37.790617 LONGITUDE: -82.548564			
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					ELEVATION
							20	40	60	80	100	
25				SS-7 (15 in)	SANDY LEAN CLAY (CL), trace gravel, little coal, firm, dark gray, moist, MINE SPOIL, FILL	4-3-3 N = 6 PPV= 2.0						1059
30				SS-8 (18 in)		3-3-4 N = 7						1054
35				SS-9 (14 in)	SANDY LEAN CLAY (CL), some coal, some shale fragments, firm, brown gray and black, moist, MINE SPOIL, FILL	3-3-3 N = 6						1049
40				SS-10 (18 in)	SANDY LEAN CLAY (CL), some rock fragments, some coal, stiff, gray and gray, moist, MINE SPOIL, FILL	PPV= 3.0 6-6-6 N = 12						1044
42.0					POORLY GRADED GRAVEL WITH SAND (GP), trace clay, some cobbles, medium dense, gray, dry, MINE SPOIL, FILL							

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	☒	01/14/2025		Not Encountered
END OF DRILLING	☒			
AFTER DRILLING	☒			
AFTER DRILLING	☒			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

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, IGM = Intermediate Geomaterial

PROJECT: Lynn Bark Solar Martin County, Kentucky S&ME Project No. 24780158				BORING LOG: B-02 <i>Sheet 3 of 3</i>			
DATE DRILLED: 01/14/2025			ELEVATION: 1084 ft		NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.		
DRILL RIG: CME-550X			DATUM: NAVD88				
DRILLER: Brandon Kenyon			BORING DEPTH: 50.0 ft				
HAMMER TYPE: Auto Hammer (140 lb)			CLOSURE: Cuttings				
DRILLING METHOD: 3-1/4"HSA			LOGGED BY: Dylan Fall		LATITUDE: 37.790617 LONGITUDE: -82.548564		
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	ELEVATION
45	46.0			SS-11 (14 in)	POORLY GRADED GRAVEL WITH SAND (GP), trace clay, some cobbles, medium dense, gray, dry, MINE SPOIL, FILL	6-13-11 N = 24	● SPT △ % Fines ○ NMC ├─┤ PL ├─┤ LL 20 40 60 80 100	1039
				SS-12 (14 in)	POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), some rock fragments, medium dense, gray and brown, moist, MINE SPOIL, FILL	4-12-10 N = 22		1034
50	50.0				Borehole terminated at 50.0 feet			1029
55								1024
60								1019
65								

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	☒	01/14/2025		Not Encountered
END OF DRILLING	☒			
AFTER DRILLING	☒			
AFTER DRILLING	☒			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

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, IGM = Intermediate Geomaterial

PROJECT: Lynn Bark Solar Martin County, Kentucky S&ME Project No. 24780158				BORING LOG: B-04 <i>Sheet 1 of 1</i>			
DATE DRILLED: 01/16/2025		ELEVATION: 1115 ft		NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.			
DRILL RIG: CME-550X		DATUM: NAVD88					
DRILLER: Brandon Kenyon		BORING DEPTH: 20.0 ft					
HAMMER TYPE: Auto Hammer (140 lb)		CLOSURE: Cuttings					
DRILLING METHOD: 3-1/4"HSA		LOGGED BY: Dylan Fall		LATITUDE: 37.794089 LONGITUDE: -82.554516			
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					ELEVATION
							20	40	60	80	100	
0	0.4	Fill			5 INCHES OF TOPSOIL							1115
				SS-1 (12 in)	POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), some sandstone fragments (cobbles), dense, gray, dry, MINE SPOIL, FILL	28-18-7 N = 25		●				
3.0				SS-2 (10 in)	SANDY LEAN CLAY (CL), some rock fragments, some coal, firm to very stiff, brown and gray, moist, MINE SPOIL, FILL	11-2-5 N = 7 PPV = 3.0		●	○			
5				SS-3 (6 in)	CLAYEY GRAVEL WITH SAND (GC), loose, brown and gray, moist, MINE SPOIL, FILL	9-7-11 N = 18 PPV = 3.0		●				
7.0				SS-4 (12 in)		2-5-5 N = 10		●	○	△		
10				SS-5 (3 in)	SANDY LEAN CLAY (CL), some rock fragments, very stiff, brown and gray, dry, MINE SPOIL, FILL	2-10-13 N = 23		●				
12.0												
15												
17.0				SS-6 (6 in)	POORLY GRADED SAND (SP), some rock fragments, trace clay, trace silt, dense, gray, dry, MINE SPOIL, FILL	15-14-20 N = 34		●				
20	20.0				Borehole terminated at 20.0 feet							1095

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	☒	01/16/2025		Not Encountered
END OF DRILLING	☒			
AFTER DRILLING	☒			
AFTER DRILLING	☒			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

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, IGM = Intermediate Geomaterial

PROJECT: Lynn Bark Solar Martin County, Kentucky S&ME Project No. 24780158				BORING LOG: B-05 <i>Sheet 1 of 1</i>			
DATE DRILLED: 01/16/2025		ELEVATION: 1065 ft		NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.			
DRILL RIG: CME-550X		DATUM: NAVD88					
DRILLER: Brandon Kenyon		BORING DEPTH: 20.0 ft					
HAMMER TYPE: Auto Hammer (140 lb)		CLOSURE: Cuttings					
DRILLING METHOD: 3-1/4"HSA		LOGGED BY: Dylan Fall		LATITUDE: 37.792122 LONGITUDE: -82.557146			
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					ELEVATION	
							20	40	60	80	100		
0	0.5	Fill		SS-1 (8 in)	6 INCHES OF TOPSOIL LEAN CLAY (CL), some shale fragments, soft, gray, moist, MINE SPOIL, FILL	2-2-2 N = 4	●					1065	
3.0	SS-2 (8 in)			LEAN CLAY (CL), some shale fragments, hard, gray, moist, MINE SPOIL, FILL	8-8-50/5" N = 50/5"	○				●			
5	5.5				cobble encountered at 4.6 feet								1060
7.0	SS-3 (6 in)			CLAYEY GRAVEL WITH SAND (GC), some shale fragments, medium dense, gray, dry, MINE SPOIL, FILL	13-17-12 N = 29	○	H	●					
	SS-4 (12 in)			LEAN CLAY (CL), some rock fragments, little fine to coarse sand, stiff, brown and gray, dry, MINE SPOIL, FILL	7-6-6 N = 12	●							1055
12.0	SS-5 (3 in)			CLAYEY SAND WITH GRAVEL (SC), some sandstone fragments (cobbles), loose, brown and gray, moist	50/3" N = 50/3"						●		1050
17.0				SS-6 (18 in)	SANDY LEAN CLAY (CL), some shale fragments, some limestone fragments, hard, dark gray, moist, MINE SPOIL, FILL	3-4-6 N = 10	●					1045	
20.0	20.0				cobble encountered at 19.4 feet Borehole terminated at 20.0 feet								

GROUNDWATER	DATE	DEPTH (FT)	REMARKS
ATD	01/16/2025		Not Encountered
END OF DRILLING			
AFTER DRILLING			
AFTER DRILLING			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

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, IGM = Intermediate Geomaterial

PROJECT: Lynn Bark Solar Martin County, Kentucky S&ME Project No. 24780158				BORING LOG: B-06 <i>Sheet 1 of 1</i>			
DATE DRILLED: 01/14/2025		ELEVATION: 1068 ft		NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.			
DRILL RIG: CME-550X		DATUM: NAVD88					
DRILLER: Brandon Kenyon		BORING DEPTH: 20.0 ft					
HAMMER TYPE: Auto Hammer (140 lb)		CLOSURE: Cuttings					
DRILLING METHOD: 3-1/4"HSA		LOGGED BY: Dylan Fall		LATITUDE: 37.790866 LONGITUDE: -82.563256			
SAMPLING METHOD: SS				PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky FIPS 1600 Feet			

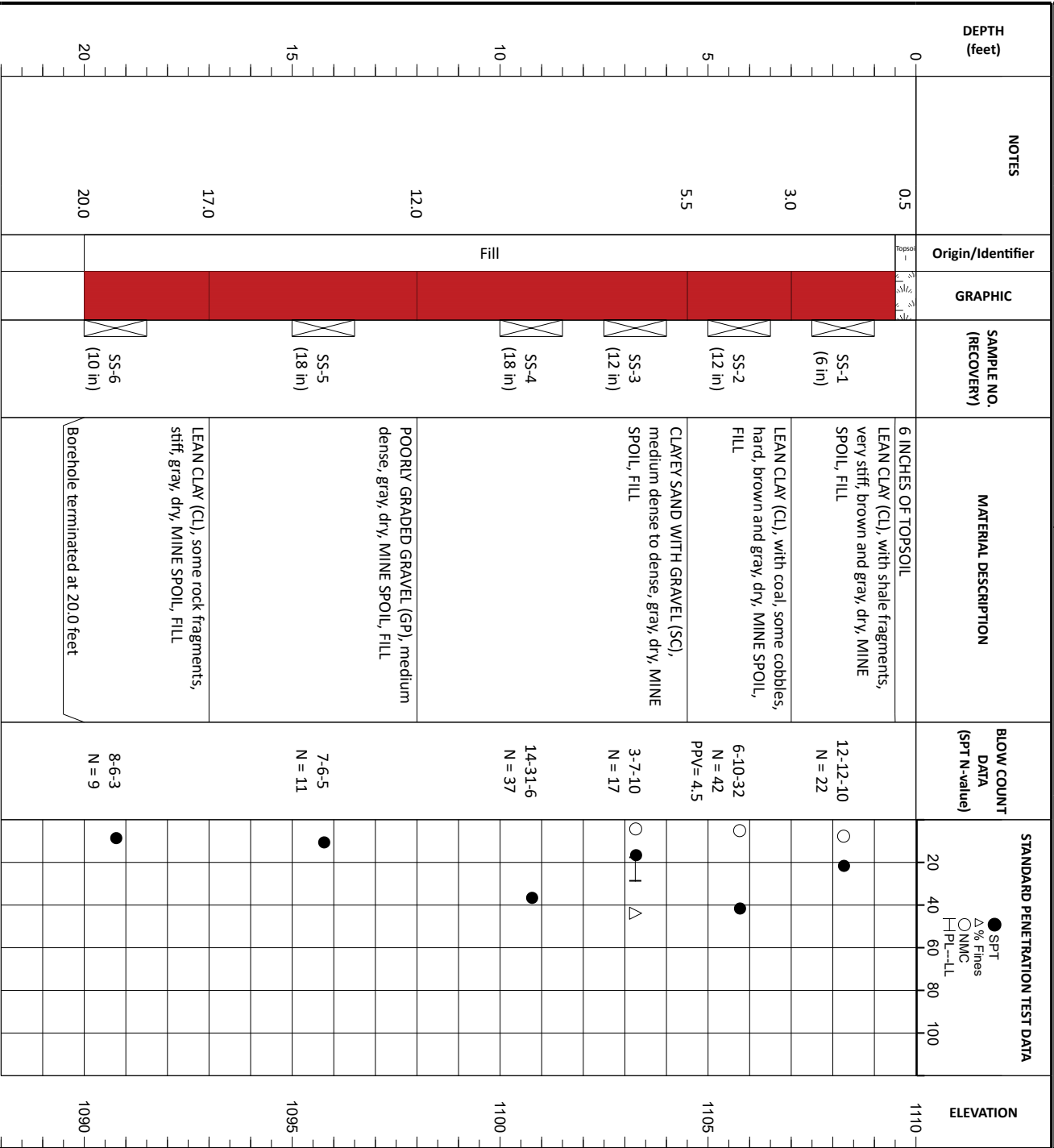
DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA					ELEVATION
							20	40	60	80	100	
0	0.4				5 INCHES OF TOPSOIL							1068
				SS-1 (12 in)	POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), medium dense, brown, dry, MINE SPOIL, FILL	14-15-15 N = 30	○	●				
	3.0			SS-2 (18 in)	SANDY LEAN CLAY (CL), some shale fragments, some coal, stiff, brown and gray, dry, MINE SPOIL, FILL	8-7-8 N = 15		●				
5				SS-3 (18 in)	SHALE, stiff to very stiff, gray, dry, MINE SPOIL, FILL	6-3-7 N = 10	○	●				1063
	5.5			SS-4 (16 in)		8-5-11 N = 16		●				
10		Fill		SS-5 (16 in)	CLAYEY SAND WITH GRAVEL (SC), medium dense, gray, dry, MINE SPOIL, FILL	4-12-5 N = 17	○	●	—	△		1053
	12.0											
				SS-6 (18 in)		8-8-8 N = 16		●				
20	20.0				Borehole terminated at 20.0 feet							1048

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	☒	01/14/2025		Not Encountered
END OF DRILLING	☒			
AFTER DRILLING	☒			
AFTER DRILLING	☒			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

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, IGM = Intermediate Geomaterial

DATE DRILLED: 01/14/2025	ELEVATION: 1110 ft	NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.
DRILL RIG: CME-550X	DATUM: NAVD88	
DRILLER: Brandon Kenyon	BORING DEPTH: 20.0 ft	
HAMMER TYPE: Auto Hammer (140 lb)	CLOSURE: Cuttings	
DRILLING METHOD: 3-1/4" HSA	LOGGED BY: Dyan Fall	LATITUDE: 37.788214 LONGITUDE: -82.558167
SAMPLING METHOD: SS		
PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky FIPS 1600 Feet		



GROUNDWATER	DATE	DEPTH (ft)	REMARKS
ATD	01/14/2025		Not Encountered
END OF DRILLING			
AFTER DRILLING			
AFTER DRILLING			

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



PROJECT: Lynn Bark Solar Martin County, Kentucky S&ME Project No. 24780158				BORING LOG: B-08 <i>Sheet 1 of 1</i>			
DATE DRILLED: 01/16/2025		ELEVATION: 1136 ft		NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.			
DRILL RIG: CME-550X		DATUM: NAVD88					
DRILLER: Brandon Kenyon		BORING DEPTH: 20.0 ft					
HAMMER TYPE: Auto Hammer (140 lb)		CLOSURE: Cuttings					
DRILLING METHOD: 3-1/4"HSA		LOGGED BY: Dylan Fall		LATITUDE: 37.789359 LONGITUDE: -82.552710			
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					ELEVATION
							20	40	60	80	100	
0	0.5				6 INCHES OF TOPSOIL							1136
				SS-1 (0 in)	CLAYEY SAND (SC), trace gravel, trace cobbles, very dense to medium dense, brown and gray, moist, MINE SPOIL, FILL <i>sample not recovered at 1.0 to 2.5 feet</i>	50/2" N = 50/2"						
5	5.5			SS-2 (17 in)		3-7-8 N = 15 PPV= 3.0						1131
				SS-3 (18 in)	SANDY LEAN CLAY (CL), some rock fragments (cobbles), hard to very stiff, brown and gray, moist, MINE SPOIL, FILL	11-18-22 N = 40 PPV= 3.0						
10				SS-4 (18 in)		13-19-10 N = 29						1126
				SS-5 (12 in)	<i>soil consistency changes from very stiff to stiff from 13.5 to 15.0 feet</i>	6-8-6 N = 14 PPV= 2.0						1121
15	17.0				SANDY LEAN CLAY (CL), some rock fragments, very stiff, brown and gray, dry, MINE SPOIL, FILL							
20	20.0			SS-6 (18 in)		6-9-9 N = 18						1116
					Borehole terminated at 20.0 feet							

GROUNDWATER	DATE	DEPTH (FT)	REMARKS
ATD	01/16/2025		Not Encountered
END OF DRILLING			
AFTER DRILLING			
AFTER DRILLING			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
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PROJECT: Lynn Bark Solar Martin County, Kentucky S&ME Project No. 24780158				BORING LOG: B-09 <i>Sheet 1 of 1</i>			
DATE DRILLED: 01/16/2025		ELEVATION: 1086 ft		NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.			
DRILL RIG: CME-550X		DATUM: NAVD88					
DRILLER: Brandon Kenyon		BORING DEPTH: 20.0 ft					
HAMMER TYPE: Auto Hammer (140 lb)		CLOSURE: Cuttings					
DRILLING METHOD: 3-1/4"HSA		LOGGED BY: Dylan Fall		LATITUDE: 37.787090 LONGITUDE: -82.555929			
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					ELEVATION	
							20	40	60	80	100		
0	0.5				6 INCHES OF TOPSOIL							1086	
				SS-1 (18 in)	SANDY LEAN CLAY (CL), some rock fragments, trace organics, trace coal, stiff to firm, brown and gray, moist, MINE SPOIL, FILL	4-4-6 N = 10	●						
				SS-2 (18 in)		4-4-4 N = 8 PPV= 2.0	●						
5	5.5			SS-3 (12 in)	CLAYEY SAND WITH GRAVEL (SC), loose, brown, moist, MINE SPOIL, FILL	3-3-3 N = 6 PPV= 1.8	●						
				SS-4 (6 in)		2-3-3 N = 6	●	—	△				
10		Fill											
	12.0				SS-5 (12 in)	LEAN CLAY (CL), some rock fragments, firm, brown and gray, moist, MINE SPOIL, FILL	2-2-3 N = 5	●					
15													
					SS-6 (17 in)	2-3-3 N = 6 PPV= 1.0	●						
20	20.0				Borehole terminated at 20.0 feet							1066	

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	☒	01/16/2025		Not Encountered
END OF DRILLING	☒			
AFTER DRILLING	☒			
AFTER DRILLING	☒			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
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 AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT: Lynn Bark Solar Martin County, Kentucky S&ME Project No. 24780158				BORING LOG: B-10 <i>Sheet 1 of 1</i>			
DATE DRILLED: 01/15/2025		ELEVATION: 1112 ft		NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.			
DRILL RIG: CME-550X		DATUM: NAVD88					
DRILLER: Brandon Kenyon		BORING DEPTH: 20.0 ft					
HAMMER TYPE: Auto Hammer (140 lb)		CLOSURE: Cuttings					
DRILLING METHOD: 3-1/4"HSA		LOGGED BY: Dylan Fall		LATITUDE: 37.795924 LONGITUDE: -82.542756			
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					ELEVATION
							20	40	60	80	100	
0	0.5				6 INCHES OF TOPSOIL							1112
				SS-1 (18 in)	POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), some cobbles, very dense, brown and gray, dry, MINE SPOIL, FILL	20-23-33 N = 56						
	3.0			SS-2 (12 in)	CLAYEY SAND WITH GRAVEL (SC), some cobbles, very dense, brown and gray, dry, MINE SPOIL, FILL	15-18-50/3" N = 50/3"						
5				SS-3 (16 in)	SANDY LEAN CLAY (CL), some rock fragments, stiff, brown, dry, MINE SPOIL, FILL	10-7-6 N = 13						1107
	6.0			SS-4 (17 in)	CLAYEY SAND (SC), some rock fragments, loose, brown, dry, MINE SPOIL, FILL	7-5-5 N = 10						
	8.0			SS-5 (18 in)	POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), medium dense, red brown, dry, MINE SPOIL, FILL	12-10-6 N = 16						
10				SS-6 (18 in)								1102
	15											1097
	17.0											
20	20.0				Borehole terminated at 20.0 feet							1092

GROUNDWATER	DATE	DEPTH (FT)	REMARKS
ATD	01/15/2025		Not Encountered
END OF DRILLING			
AFTER DRILLING			
AFTER DRILLING			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
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PROJECT: Lynn Bark Solar Martin County, Kentucky S&ME Project No. 24780158				BORING LOG: B-11 <i>Sheet 1 of 1</i>			
DATE DRILLED: 01/15/2025			ELEVATION: 1096 ft		NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.		
DRILL RIG: CME-550X			DATUM: NAVD88				
DRILLER: Brandon Kenyon			BORING DEPTH: 20.0 ft				
HAMMER TYPE: Auto Hammer (140 lb)			CLOSURE: Cuttings				
DRILLING METHOD: 3-1/4"HSA			LOGGED BY: Dylan Fall		LATITUDE: 37.793042 LONGITUDE: -82.540511		
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					ELEVATION
							20	40	60	80	100	
0					6 INCHES OF TOPSOIL							1096
0.5					LEAN CLAY (CL), some shale fragments, some coal, very stiff, brown and black gray, dry, FILL, MINE SPOIL	11-11-19 N = 30 PPV= 4.5	○	●				
3.0				SS-1 (18 in)								
5				SS-2 (12 in)	POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), some rock fragments, medium dense, gray, dry, MINE SPOIL, FILL	11-9-7 N = 16	○	●				1091
8.0				SS-3 (5 in)	cobbles encountered at 6.4 feet	50/5" N = 50/5"				●		
10				SS-4 (17 in)	CLAYEY GRAVEL WITH SAND (GC), dense, dark gray, dry, MINE SPOIL, FILL	3-14-22 N = 36	○	△	—	●		1086
12.0												
15				SS-5 (18 in)	SANDY LEAN CLAY (CL), some rock fragments (cobbles), some coal, hard, brown and red brown, moist	8-13-21 N = 34		●				1081
20				SS-6 (18 in)	soil consistency changes from hard to stiff from 17.5 to 20.0 feet	4-5-8 N = 13	●					1076
20.0					Borehole terminated at 20.0 feet							

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	☒	01/15/2025		Not Encountered
END OF DRILLING	☒			
AFTER DRILLING	☒			
AFTER DRILLING	☒			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
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PROJECT: Lynn Bark Solar Martin County, Kentucky S&ME Project No. 24780158				BORING LOG: B-12 <i>Sheet 1 of 1</i>			
DATE DRILLED: 01/15/2025			ELEVATION: 1127 ft		NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.		
DRILL RIG: CME-550X			DATUM: NAVD88				
DRILLER: Brandon Kenyon			BORING DEPTH: 20.0 ft				
HAMMER TYPE: Auto Hammer (140 lb)			CLOSURE: Cuttings				
DRILLING METHOD: 3-1/4"HSA			LOGGED BY: Dylan Fall		LATITUDE: 37.793059 LONGITUDE: -82.535001		
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					ELEVATION
							20	40	60	80	100	
0					6 INCHES OF TOPSOIL							1127
0.5				SS-1 (18 in)	LEAN CLAY (CL), some rock fragments (cobbles), hard, gray, dry, MINE SPOIL, FILL	8-10-23 N = 33		●				
3.0				SS-2 (18 in)	CLAYEY SAND (SC), trace gravel, loose, brown and gray, dry, MINE SPOIL, FILL	4-4-6 N = 10 PPV= 4.5	●	○	△			
5.5				SS-3 (18 in)	FAT CLAY (CH), little rock fragments, firm, red brown and gray, moist, MINE SPOIL, FILL	4-3-4 N = 7 PPV= 3.0	●					
8.0				SS-4 (14 in)	SILTY, CLAYEY SAND (SC-SM), little gravel, little cobbles, very dense, red brown, dry, MINE SPOIL, FILL	16-10-50/4" N = 50/4"					●	
10												1117
15				SS-5 (12 in)	<i>soil consistency changes from very dense to loose at 13.5 to 15.0 feet</i>	8-3-3 N = 6	●	○	△			
17.0												1112
20.0				SS-6 (4 in)	CLAYEY SAND (SC), little rock fragments, medium dense, red brown, dry, MINE SPOIL, FILL	17-5-10 N = 15	●					
					Borehole terminated at 20.0 feet							1107

GROUNDWATER	DATE	DEPTH (FT)	REMARKS
ATD	01/15/2025		Not Encountered
END OF DRILLING			
AFTER DRILLING			
AFTER DRILLING			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

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 LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf),
 AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT: Lynn Bark Solar Martin County, Kentucky S&ME Project No. 24780158				BORING LOG: B-13 <i>Sheet 1 of 1</i>			
DATE DRILLED: 01/15/2025			ELEVATION: 1114 ft		NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.		
DRILL RIG: CME-550X			DATUM: NAVD88				
DRILLER: Brandon Kenyon			BORING DEPTH: 20.0 ft				
HAMMER TYPE: Auto Hammer (140 lb)			CLOSURE: Cuttings				
DRILLING METHOD: 3-1/4"HSA			LOGGED BY: Dylan Fall		LATITUDE: 37.791057 LONGITUDE: -82.537615		
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					ELEVATION
							20	40	60	80	100	
0					6 INCHES OF TOPSOIL							1114
0.5					CLAYEY SAND WITH GRAVEL (SC), medium dense, brown and gray, dry, MINE SPOIL, FILL	15-12-11 N = 23						
3.0				SS-1 (18 in)								
5.5				SS-2 (14 in)	POORLY GRADED GRAVEL WITH CLAY (GP), some rock fragments (cobbles), medium dense, gray, dry, MINE SPOIL, FILL	13-12-11 N = 23						
7.2				SS-3 (13 in)	SANDY LEAN CLAY (CL), little rock fragments, hard, dark brown gray and red brown, moist, MINE SPOIL, FILL	7-16-50/3" N = 50/3"						
8.8				SS-4 (3 in)	<i>cobble encountered at 7.2 feet</i>							
10.0					<i>seepage and cobbles encountered at 8.8 feet</i>	50/3" N = 50/3"						
12.0												
15.0				SS-5 (12 in)	SANDY LEAN CLAY (CL), some rock fragments, some coal, very stiff to stiff, brown and black, wet, MINE SPOIL, FILL	8-6-10 N = 16 PPV = 2.0						1099
20.0				SS-6 (5 in)	Borehole terminated at 20.0 feet	7-5-5 N = 10						1094

GROUNDWATER	DATE	DEPTH (FT)	REMARKS
ATD	01/15/2025	6.0	
END OF DRILLING	01/15/2025		Dry
AFTER DRILLING			
AFTER DRILLING			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

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 LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf),
 AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT: Lynn Bark Solar Martin County, Kentucky S&ME Project No. 24780158				BORING LOG: B-14 <i>Sheet 1 of 1</i>			
DATE DRILLED: 01/15/2025		ELEVATION: 1086 ft		NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.			
DRILL RIG: CME-550X		DATUM: NAVD88					
DRILLER: Brandon Kenyon		BORING DEPTH: 20.0 ft					
HAMMER TYPE: Auto Hammer (140 lb)		CLOSURE: Cuttings					
DRILLING METHOD: 3-1/4"HSA		LOGGED BY: Dylan Fall		LATITUDE: 37.789786 LONGITUDE: -82.541042			
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					ELEVATION
							20	40	60	80	100	
0	0.5				6 INCHES OF TOPSOIL							1086
				SS-1 (18 in)	POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), some rock fragments, medium dense to very dense, brown, moist, MINE SPOIL, FILL	20-9-9 N = 18	○●					
				SS-2 (3 in)	<i>cobble encountered at 3.8 feet</i>	50/3" N = 50/3"				●		
5	5.5			SS-3 (13 in)	CLAYEY SAND WITH GRAVEL (SC), some rock fragments, loose, brown, moist, MINE SPOIL, FILL	3-2-2 N = 4	●○△					1081
	8.0			SS-4 (12 in)	POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), some rock fragments, loose, brown and gray, dry, MINE SPOIL, FILL	3-3-2 N = 5	●					1076
10		Fill		SS-5 (16 in)		7-5-3 N = 8	●					1071
15	17.0			SS-6 (12 in)	SANDY LEAN CLAY (CL), trace rock fragments, stiff, red brown and gray, moist, MINE SPOIL, FILL	3-2-13 N = 15 PPV= 4.0	●					1066
	20.0				Borehole terminated at 20.0 feet							

GROUNDWATER	DATE	DEPTH (FT)	REMARKS
ATD	01/15/2025		Not Encountered
END OF DRILLING			
AFTER DRILLING			
AFTER DRILLING			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

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, IGM = Intermediate Geomaterial

PROJECT: Lynn Bark Solar Martin County, Kentucky S&ME Project No. 24780158				BORING LOG: B-15 <i>Sheet 1 of 1</i>			
DATE DRILLED: 01/16/2025		ELEVATION: 1093 ft		NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.			
DRILL RIG: CME-550X		DATUM: NAVD88					
DRILLER: Brandon Kenyon		BORING DEPTH: 20.0 ft					
HAMMER TYPE: Auto Hammer (140 lb)		CLOSURE: Cuttings					
DRILLING METHOD: 3-1/4"HSA		LOGGED BY: Dylan Fall		LATITUDE: 37.786309 LONGITUDE: -82.545444			
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					ELEVATION
							20	40	60	80	100	
0	0.5				6 INCHES OF TOPSOIL							1093
				SS-1 (18 in)	SILTY, CLAYEY SAND WITH GRAVEL (SC-SM), some coal, some cobbles, very dense to dense, red brown, dry to moist, MINE SPOIL, FILL	12-24-30 N = 54	○	△	●			
				SS-2 (18 in)		19-13-22 N = 35	○		●			
5				SS-3 (14 in)	<i>soil consistency changes from dense to medium dense from 6.0 to 7.5 feet</i>	13-11-13 N = 24			●			
	8.0			SS-4 (13 in)	SANDY LEAN CLAY (CL), some coal, some rock fragments, firm, red brown, moist, MINE SPOIL, FILL	6-4-4 N = 8			●			
10		Fill		SS-5 (18 in)	SANDY LEAN CLAY (CL), some rock fragments (cobbles), hard, red brown, dry, MINE SPOIL, FILL	9-21-25 N = 46			●			
	12.0											
	17.0				SS-6 (11 in)	CLAYEY SAND WITH GRAVEL (SC), medium dense, brown, dry, MINE SPOIL, FILL	6-5-9 N = 14	○	●	△		
20	20.0					Borehole terminated at 20.0 feet						

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD		01/16/2025		Not Encountered
END OF DRILLING				
AFTER DRILLING				
AFTER DRILLING				

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

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, IGM = Intermediate Geomaterial

PROJECT: Lynn Bark Solar Martin County, Kentucky S&ME Project No. 24780158				TEST PIT LOG: TP-01 <i>Sheet 1 of 1</i>	
DATE: 01/20/2025		ELEVATION: 1083 ft		NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.	
EQUIPMENT: Mini-Excavator		DATUM: NAVD88			
OPERATOR: Bryan Roberts		DEPTH: 10.0 ft			
HAMMER TYPE: Not Applicable		CLOSURE: Cuttings			
EXCAVATION METHOD: Excavator		LOGGED BY: Kodi Akers		LATITUDE: 37.790929 LONGITUDE: -82.549103	
SAMPLING METHOD: Grab				PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

Depth (feet)	NOTES	DEPOSITIONAL ENVIRONMENT	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
0		0.4			5 INCHES OF TOPSOIL	1083
1					SILTY SAND WITH GRAVEL (SM), some cobbles, brown and gray, moist, MINE SPOIL, FILL	1082
2						1081
3						1080
4						1079
5						1078
6						1077
7						1076
8		8.0			POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), some cobbles, gray, moist, MINE SPOIL, FILL	1075
9						1074
10		10.0			Test Pit terminated at 10.0 feet.	1073
11						1072
12						

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	≡	01/14/2025		Not Encountered
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)



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)



			Date: 1/20/2025
			Photographer: Kody Akers.
1	Location / Orientation	TP-01	
	Remarks	Test Pit Photo Log	

			Date: 1/20/2025
			Photographer: Kody Akers.
2	Location / Orientation	TP-01	
	Remarks	Test Pit Photo Log	



		Date: 1/20/2025
		Photographer: Kody Akers.
3	Location / Orientation	TP-01
	Remarks	Test Pit Photo Log

		Date: 1/20/2025
		Photographer: Kody Akers.
4	Location / Orientation	TP-01
	Remarks	Test Pit Photo Log



		Date: 1/20/2025
		Photographer: Kody Akers.
5	Location / Orientation	TP-01
	Remarks	Test Pit Photo Log

PROJECT: Lynn Bark Solar Martin County, Kentucky S&ME Project No. 24780158				TEST PIT LOG: TP-02 <i>Sheet 1 of 1</i>	
DATE: 01/20/2025		ELEVATION: 1130 ft		NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.	
EQUIPMENT: Mini-Excavator		DATUM: NAVD88			
OPERATOR: Bryan Roberts		DEPTH: 10.0 ft			
HAMMER TYPE: Not Applicable		CLOSURE: Cuttings			
EXCAVATION METHOD: Excavator		LOGGED BY: Kodi Akers		LATITUDE: 37.790394 LONGITUDE: -82.556141	
SAMPLING METHOD: Grab				PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

Depth (feet)	NOTES	DEPOSITIONAL ENVIRONMENT	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
0					6 INCHES OF TOPSOIL	1130
0.5		Topsoil	[Topsoil Symbol]			
1					CLAYEY GRAVEL WITH SAND (GC), little shale fragments, some cobbles, gray, moist, MINE SPOIL, FILL	1129
2						1128
3						1127
4						1126
5						1125
5.5		Fill				
6					LEAN CLAY (CL), some rock fragments (cobbles), little fine to coarse sand, brown and gray, dry, MINE SPOIL, FILL	1124
7						1123
8						1122
9						1121
10					Test Pit terminated at 10.0 feet.	1120
11						1119
12						

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	≡	01/14/2025		Not Encountered
END OF DRILLING	≡			
AFTER DRILLING	≡			
AFTER DRILLING	≡			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

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)



			Date: 1/20/2025
			Photographer: Kody Akers.
6	Location / Orientation	TP-02	
	Remarks	Test Pit Photo Log	

			Date: 1/20/2025
			Photographer: Kody Akers.
7	Location / Orientation	TP-02	
	Remarks	Test Pit Photo Log	



		Date: 1/20/2025
		Photographer: Kody Akers.
8	Location / Orientation	TP-02
	Remarks	Test Pit Photo Log

		Date: 1/20/2025
		Photographer: Kody Akers.
9	Location / Orientation	TP-02
	Remarks	Test Pit Photo Log

PROJECT: Lynn Bark Solar Martin County, Kentucky S&ME Project No. 24780158				TEST PIT LOG: TP-03 Sheet 1 of 1	
DATE: 01/20/2025		ELEVATION: 1121 ft		NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.	
EQUIPMENT: Mini-Excavator		DATUM: NAVD88			
OPERATOR: Bryan Roberts		DEPTH: 10.0 ft			
HAMMER TYPE: Not Applicable		CLOSURE: Cuttings			
EXCAVATION METHOD: Excavator		LOGGED BY: Kodi Akers		LATITUDE: 37.793229 LONGITUDE: -82.537205	
SAMPLING METHOD: Grab				PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

Depth (feet)	NOTES	DEPOSITIONAL ENVIRONMENT	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
0		0.5			6 INCHES OF TOPSOIL	1121
1					SILTY GRAVEL WITH SAND (GM), some coal, brown and black gray, dry, MINE SPOIL, FILL	1120
2						1119
3						1118
4						1117
5		5.0				1116
6					POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), some rock fragments (cobbles), gray, dry, MINE SPOIL, FILL	1115
7						1114
8						1113
9						1112
10		10.0			Test Pit terminated at 10.0 feet.	1111
11						1110
12						

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	≍	01/14/2025		Not Encountered
END OF DRILLING	≍			
AFTER DRILLING	≍			
AFTER DRILLING	≍			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)



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)



			Date: 1/20/2025
			Photographer: Kody Akers.
10	Location / Orientation	TP-03	
	Remarks	Test Pit Photo Log	

			Date: 1/20/2025
			Photographer: Kody Akers.
11	Location / Orientation	TP-03	
	Remarks	Test Pit Photo Log	



		Date: 1/20/2025
		Photographer: Kody Akers.
12	Location / Orientation	TP-03
	Remarks	Test Pit Photo Log

		Date: 1/20/2025
		Photographer: Kody Akers.
13	Location / Orientation	TP-03
	Remarks	Test Pit Photo Log

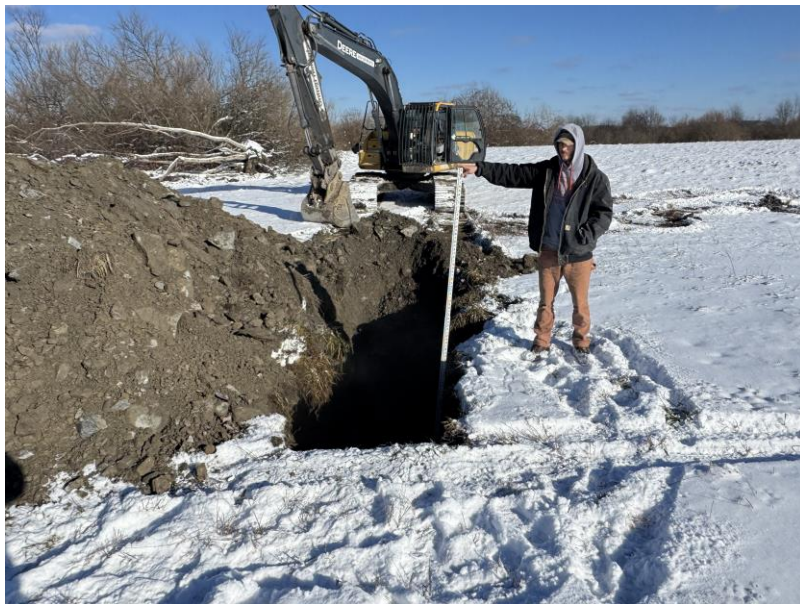
PROJECT: Lynn Bark Solar Martin County, Kentucky S&ME Project No. 24780158				TEST PIT LOG: TP-04 <i>Sheet 1 of 1</i>	
DATE: 01/20/2025		ELEVATION: 1114 ft		NOTES: Location coordinates were obtained from handheld GPS. Elevation noted on the logs are obtained from available mapping.	
EQUIPMENT: Mini-Excavator		DATUM: NAVD88			
OPERATOR: Bryan Roberts		DEPTH: 10.0 ft			
HAMMER TYPE: Not Applicable		CLOSURE: Cuttings			
EXCAVATION METHOD: Excavator		LOGGED BY: Kodi Akers		LATITUDE: 37.795390 LONGITUDE: -82.553659	
SAMPLING METHOD: Grab				PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

Depth (feet)	NOTES	DEPOSITIONAL ENVIRONMENT	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	ELEVATION
0					6 INCHES OF TOPSOIL	1114
1		0.5	Topsoil		SILTY GRAVEL WITH SAND (GM), some cobbles brown and gray, moist, MINE SPOIL, FILL	1113
2						1112
3						1111
4						1110
5		5.5	Fill			1109
6					POORLY GRADED SAND (SP), some sandstone fragments (cobbles), trace clay, brown, dry, MINE SPOIL, FILL	1108
7		7.0			POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), some rock fragments (cobbles), brown and gray, moist, MINE SPOIL, FILL	1107
8						1106
9						1105
10		10.0			Test Pit terminated at 10.0 feet.	1104
11						1103
12						

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	≡	01/14/2025		Not Encountered
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Elevation (Rounded to 1 ft), Horizontal (Rounded to 1 ft)

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)

14			Date: 1/20/2025
	Location / Orientation	TP-04	Photographer: Kody Akers.
	Remarks	Test Pit Photo Log	

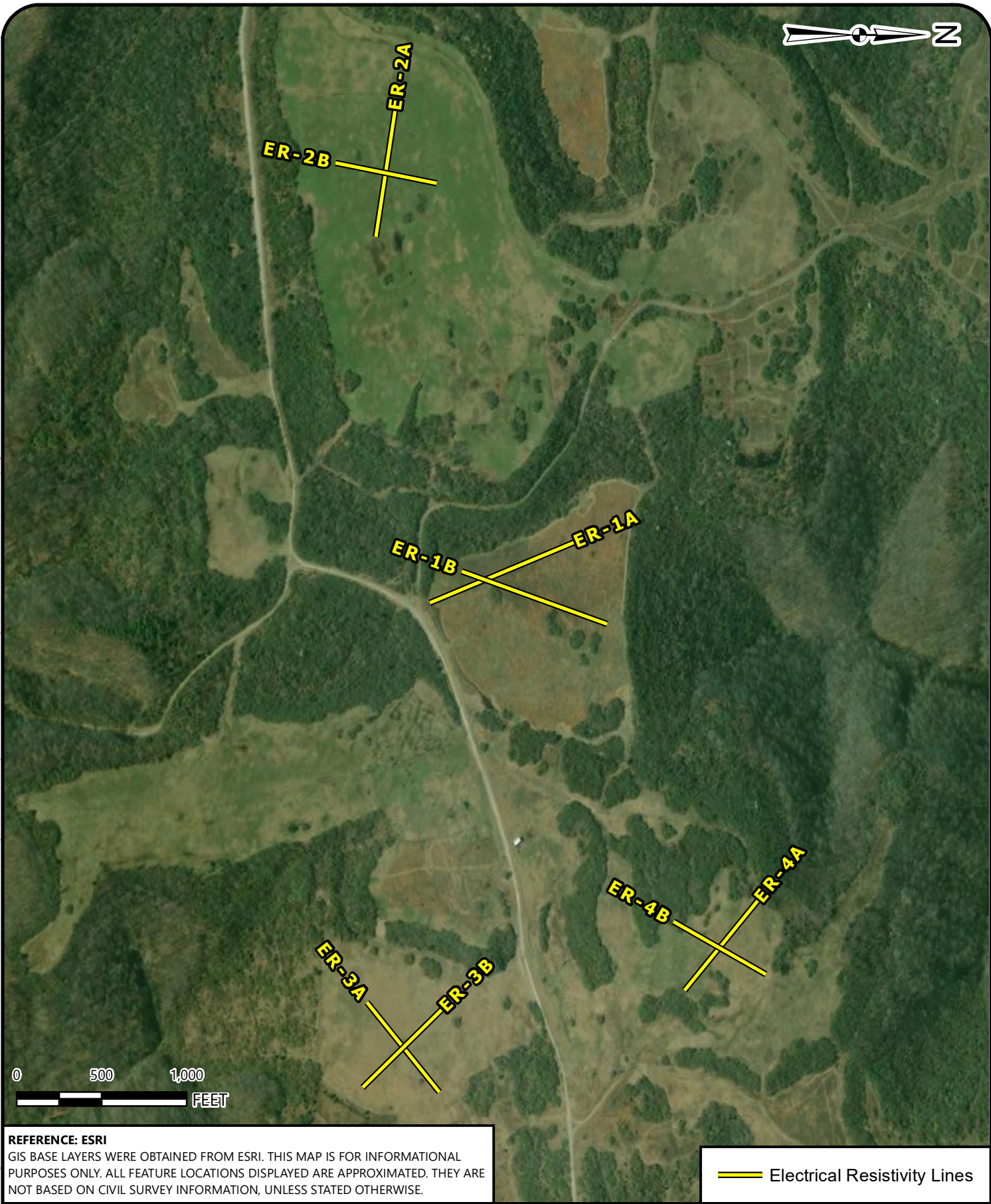
15			Date: 1/20/2025
	Location / Orientation	TP-04	Photographer: Kody Akers.
	Remarks	Test Pit Photo Log	



		Date: 1/20/2025
		Photographer: Kody Akers.
16	Location / Orientation	TP-04
	Remarks	Test Pit Photo Log

		Date: 1/20/2025
		Photographer: Kody Akers.
17	Location / Orientation	TP-04
	Remarks	Test Pit Photo Log

Drawing Path: C:\Users\AGostic\OneDrive - S&ME, Inc\Documents\ArcGIS\Projects\24780158 Lynn Bark Solar\24780158 Lynn Bark Solar_POB.mxd plotted by agostic 01-20-2025



REFERENCE: ESRI

GIS BASE LAYERS WERE OBTAINED FROM ESRI. THIS MAP IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED. THEY ARE NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.

— Electrical Resistivity Lines

ELECTRICAL RESISTIVITY TESTING

LYNN BARK SOLAR
MARTIN COUNTY, KENTUCKY

SCALE:
1" = 750'

DATE:
1-20-25
PROJECT NUMBER
24780158

FIGURE NO.

3

Electrical Resistivity Data Sheet

Wenner Four-Electrode Method



Project: Lynn Bark Solar

Project #: 24780158

Project Location: Threeforks, KY

Station #: ER-1A

Date: 1/15/2025

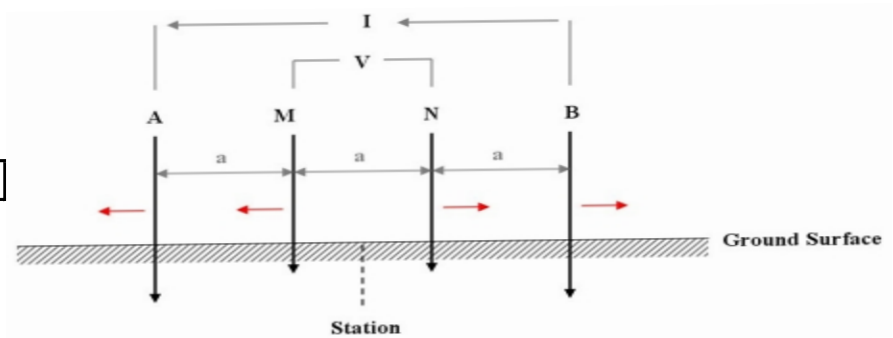
Time: 1:30PM

Weather & Temperature: 26°F Clear

Soil Conditions: Frozen topsoil with 2 to 3 inches of snow.

Performed By (Name of Tester) Amber Lacy, Adam Gostic

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



"s" Spacing (feet)	"s" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Standard Deviation (%)
0.5	15.24	1	300.300	28755.52	943.42	10.73	0.00%
1	30.48	1	220.100	42151.78	1382.93	4.94	0.00%
1.5	45.72	1	154.600	44411.62	1457.07	5.07	0.00%
2	60.96	1	127.400	48797.24	1600.96	10.35	0.00%
3	91.44	1	79.070	45428.55	1490.44	15.55	0.00%
5	152.40	1	41.530	39767.45	1304.71	89.69	0.00%
7	213.36	2	25.440	34104.45	1118.91	121.20	0.00%
10	304.80	4	14.890	28516.13	935.57	87.20	0.00%
15	457.20	12	7.975	22909.62	751.63	101.00	0.00%
20	609.60	12	5.512	21112.28	692.66	70.29	0.00%
30	914.40	12	3.137	18023.19	591.31	79.61	0.00%
45	1371.60	12	1.481	12763.31	418.74	65.55	0.00%
80	2438.40	12	0.631	9670.59	317.28	82.73	0.00%
150	4572.00	12	0.292	8385.35	275.11	70.25	0.00%
200	6096.00	12	0.276	10556.14	346.33	202.50	0.00%
300	9144.00	12	0.275	15816.97	518.93	300.70	0.00%

Electrical Resistivity Data Sheet

Wenner Four-Electrode Method



Project: Lynn Bark Solar

Project #: 24780158

Project Location: Threeforks, KY

Station #: ER-1B

Date: 1/15/2025

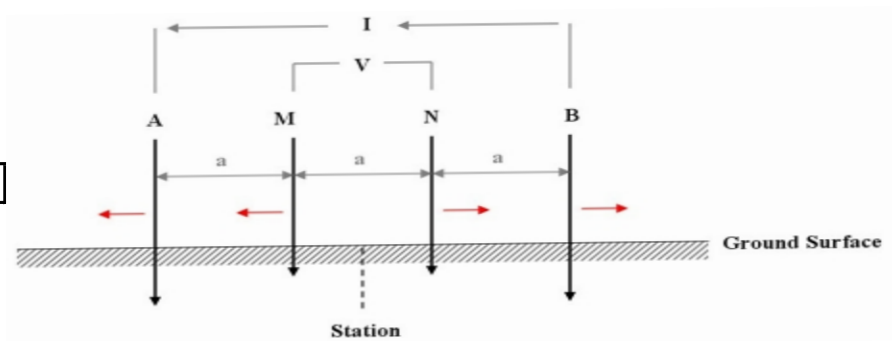
Time: 3:10PM

Weather & Temperature: 29°F Clear

Soil Conditions: Frozen topsoil with 2 to 3 inches of snow.

Performed By (Name of Tester) Amber Lacy, Adam Gostic

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



"s" Spacing (feet)	"s" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Standard Deviation (%)
0.5	15.24	1	529.100	50664.48	1662.22	5.23	0.00%
1	30.48	1	256.000	49027.06	1608.50	4.99	0.00%
1.5	45.72	1	160.700	46163.95	1514.57	4.96	0.00%
2	60.96	1	119.300	45694.75	1499.17	4.81	0.00%
3	91.44	1	56.760	32610.65	1069.90	60.35	0.00%
5	152.40	1	29.120	27884.14	914.83	68.66	0.00%
7	213.36	2	18.980	25444.28	834.79	96.23	0.00%
10	304.80	4	10.740	20568.38	674.82	93.44	0.00%
15	457.20	12	6.394	18367.91	602.62	82.65	0.00%
20	609.60	12	4.648	17802.95	584.09	89.41	0.00%
30	914.40	12	2.855	16403.00	538.16	61.61	0.00%
45	1371.60	12	1.568	13513.08	443.34	60.53	0.00%
80	2438.40	12	0.597	9142.01	299.93	61.18	0.00%
150	4572.00	12	0.263	7558.02	247.97	75.40	0.10%
200	6096.00	12	0.225	8621.87	282.87	89.32	0.20%
300	9144.00	12	0.187	10743.82	352.49	136.90	0.00%

Electrical Resistivity Data Sheet

Wenner Four-Electrode Method



Project: Lynn Bark Solar

Project #: 24780158

Project Location: Threeforks, KY

Station #: ER-2A

Date: 1/15/2025

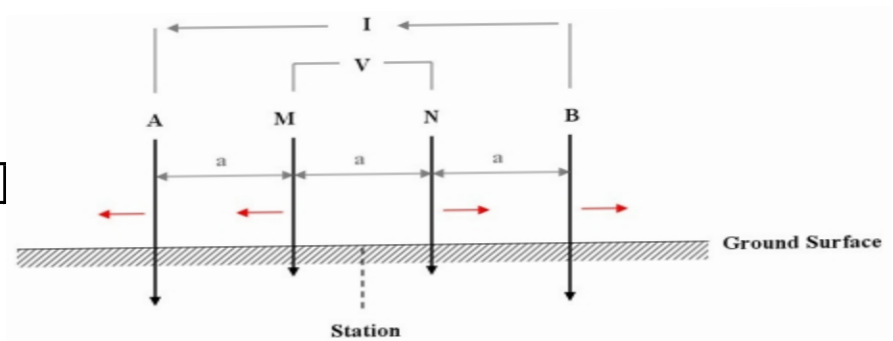
Time: 11:20AM

Weather & Temperature: 22°F Clear

Soil Conditions: Frozen topsoil with 2 to 3 inches of snow.

Performed By (Name of Tester) Amber Lacy, Adam Gostic

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



"s" Spacing (feet)	"s" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Standard Deviation (%)
0.5	15.24	1	195.900	18758.59	615.44	4.85	0.00%
1	30.48	1	132.800	25432.79	834.41	10.25	0.00%
1.5	45.72	1	100.400	28841.70	946.25	15.31	0.00%
2	60.96	1	75.880	29063.85	953.54	15.14	0.00%
3	91.44	1	52.640	30243.56	992.24	16.27	0.00%
5	152.40	1	29.900	28631.03	939.34	15.48	0.00%
7	213.36	2	17.410	23339.56	765.73	141.40	0.10%
10	304.80	12	10.190	19515.07	640.26	186.00	0.00%
15	457.20	12	6.120	17580.80	576.80	175.50	0.00%
20	609.60	12	4.040	15474.16	507.68	186.70	0.00%
30	914.40	12	2.195	12611.06	413.75	142.20	0.00%
45	1371.60	12	1.516	13064.94	428.64	196.80	0.00%
70	2133.60	12	1.003	13446.05	441.14	221.80	0.00%
100	3048.00	12	0.722	13817.59	453.33	112.30	0.00%
150	4572.00	12	0.551	15828.46	519.31	84.09	0.00%
200	6096.00	12	0.476	18224.28	597.91	125.70	0.00%

Electrical Resistivity Data Sheet

Wenner Four-Electrode Method



Project: Lynn Bark Solar

Project #: 24780158

Project Location: Threeforks, KY

Station #: ER-2B

Date: 1/15/2025

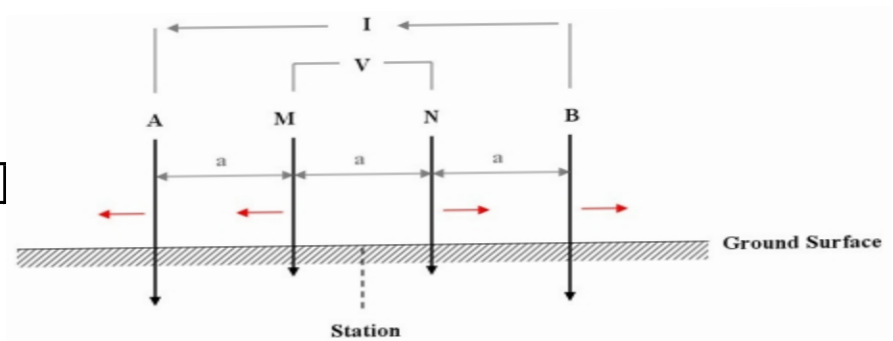
Time: 12:10PM

Weather & Temperature: 25°F Clear

Soil Conditions: Frozen topsoil with 2 to 3 inches of snow.

Performed By (Name of Tester) Amber Lacy, Adam Gostic

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



"s" Spacing (feet)	"s" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Standard Deviation (%)
0.5	15.24	1	189.300	18126.60	594.70	5.37	0.00%
1	30.48	1	122.900	23536.82	772.21	10.37	0.00%
1.5	45.72	1	93.520	26865.29	881.41	15.77	0.00%
2	60.96	1	69.740	26712.08	876.38	16.36	0.00%
3	91.44	1	43.190	24814.20	814.11	15.85	0.00%
5	152.40	1	24.240	23211.25	761.52	161.20	0.10%
7	213.36	2	15.890	21301.87	698.88	162.40	0.00%
10	304.80	4	10.040	19227.80	630.83	180.30	0.00%
15	457.20	12	5.886	16908.59	554.74	157.70	0.00%
20	609.60	12	3.949	15125.61	496.25	187.30	0.00%
30	914.40	12	2.334	13409.67	439.95	174.10	0.00%
45	1371.60	12	1.502	12944.29	424.68	131.60	0.00%
70	2133.60	12	0.991	13279.82	435.69	144.80	0.00%
100	3048.00	12	0.744	14250.40	467.53	123.00	0.00%
150	4572.00	12	0.510	14636.30	480.19	197.20	0.00%
200	6096.00	12	0.402	15389.90	504.92	150.70	0.00%

Electrical Resistivity Data Sheet

Wenner Four-Electrode Method



Project: Lynn Bark Solar

Project #: 24780158

Project Location: Threeforks, KY

Station #: ER-3A

Date: 1/15/2025

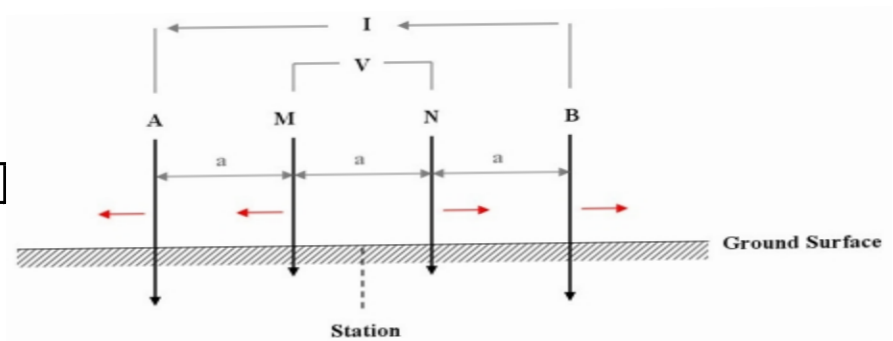
Time: 8:50AM

Weather & Temperature: 11°F Clear

Soil Conditions: Frozen topsoil with 2 to 3 inches of snow.

Performed By (Name of Tester) Amber Lacy, Adam Gostic

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



"s" Spacing (feet)	"s" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Standard Deviation (%)
0.5	15.24	1	401.800	38474.75	1262.29	5.37	0.00%
1	30.48	1	255.600	48950.45	1605.99	5.14	0.00%
1.5	45.72	1	182.300	52368.94	1718.14	4.96	0.00%
2	60.96	1	134.700	51593.32	1692.69	5.20	0.00%
3	91.44	1	66.770	38361.76	1258.59	4.96	0.00%
5	152.40	1	33.410	31992.07	1049.61	73.81	0.00%
7	213.36	2	19.820	26570.37	871.73	82.09	0.00%
10	304.80	4	14.570	27903.29	915.46	89.75	0.00%
15	457.20	12	9.121	26201.71	859.64	102.30	0.00%
20	609.60	12	6.081	23291.68	764.16	69.92	0.00%
30	914.40	12	3.630	20855.65	684.24	80.31	0.00%
45	1371.60	12	1.647	14193.91	465.68	51.69	0.10%
70	2133.60	12	0.842	11287.71	370.33	61.76	0.00%
100	3048.00	12	0.551	10544.65	345.95	95.84	0.00%
150	4572.00	12	0.359	10312.92	338.35	82.56	0.00%
200	6096.00	12	0.287	10977.46	360.15	105.40	0.10%

Electrical Resistivity Data Sheet

Wenner Four-Electrode Method



Project: Lynn Bark Solar

Project #: 24780158

Project Location: Threeforks, KY

Station #: ER-3B

Date: 1/15/2025

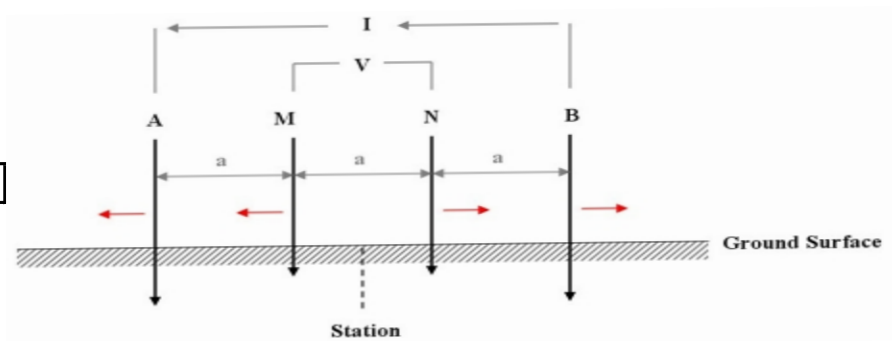
Time: 9:35AM

Weather & Temperature: 16°F Clear

Soil Conditions: Frozen topsoil with 2 to 3 inches of snow.

Performed By (Name of Tester) Amber Lacy, Adam Gostic

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



"s" Spacing (feet)	"s" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Standard Deviation (%)
0.5	15.24	1	415.500	39786.60	1305.33	5.16	0.00%
1	30.48	1	254.700	48778.09	1600.33	4.92	0.00%
1.5	45.72	1	142.500	40935.68	1343.03	5.06	0.00%
2	60.96	1	121.000	46345.89	1520.53	2.24	0.00%
3	91.44	1	67.590	38832.88	1274.04	4.86	0.00%
5	152.40	1	34.100	32652.79	1071.29	83.66	0.00%
7	213.36	2	21.360	28634.86	939.46	80.55	0.00%
10	304.80	4	14.440	27654.32	907.29	87.70	0.00%
15	457.20	12	9.155	26299.38	862.84	84.10	0.00%
20	609.60	12	6.478	24812.29	814.05	91.75	0.00%
30	914.40	12	3.372	19373.35	635.61	76.04	0.00%
45	1371.60	12	1.571	13538.94	444.19	90.28	0.00%
70	2133.60	12	0.706	9460.50	310.38	116.10	0.00%
100	3048.00	12	0.430	8227.35	269.93	87.70	0.00%
150	4572.00	12	0.320	9183.95	301.31	130.40	0.00%
200	6096.00	12	0.281	10747.65	352.61	148.20	0.00%

Electrical Resistivity Data Sheet

Wenner Four-Electrode Method



Project: Lynn Bark Solar

Project #: 24780158

Project Location: Threeforks, KY

Station #: ER-4A

Date: 1/14/2025

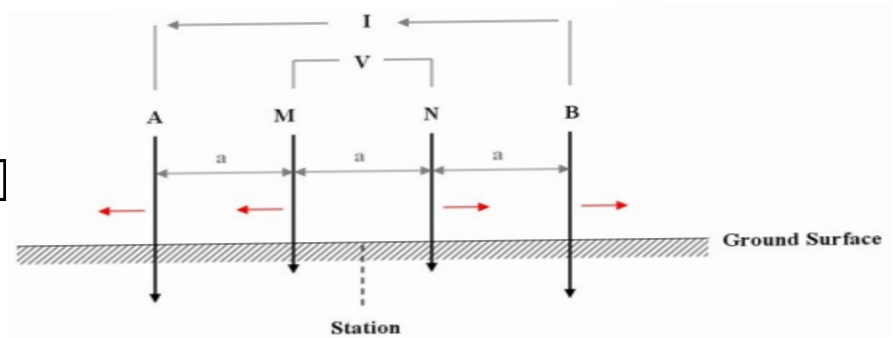
Time: 3:15PM

Weather & Temperature: 36°F Partly Cloudy

Soil Conditions: Frozen topsoil with 2 to 3 inches of snow.

Performed By (Name of Tester) Amber Lacy, Adam Gostic

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



"s" Spacing (feet)	"s" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity ($\Omega \cdot \text{cm}$)	ρ Apparent Resistivity ($\Omega \cdot \text{ft}$)	Injected Current (mA)	Standard Deviation (%)
0.5	15.24	1	926.300	88698.75	2910.06	20.00	0.10%
1	30.48	1	348.900	66818.51	2192.21	20.00	0.00%
1.5	45.72	1	224.900	64606.55	2119.64	20.00	0.10%
2	60.96	1	171.700	65765.20	2157.65	20.00	0.10%
3	91.44	1	108.700	62452.04	2048.95	20.00	0.20%
5	152.40	1	59.580	57051.41	1871.77	20.00	0.10%
7	213.36	2	35.370	47416.44	1555.66	20.00	0.10%
10	304.80	4	20.260	38800.32	1272.98	20.00	0.10%
15	457.20	12	9.003	25862.73	848.51	20.00	0.20%
20	609.60	12	4.661	17852.74	585.72	20.00	0.20%
30	914.40	12	2.198	12628.30	414.31	20.00	0.10%
45	1371.60	12	1.028	8860.20	290.69	20.00	0.10%
70	2133.60	12	0.854	11451.26	375.70	20.00	0.10%
100	3048.00	12	0.669	12812.15	420.35	20.00	0.30%
150	4572.00	12	0.548	15736.54	516.29	20.00	0.10%
200	6096.00	12	0.469	17979.14	589.87	119.40	0.00%

Electrical Resistivity Data Sheet

Wenner Four-Electrode Method



Project: Lynn Bark Solar

Project #: 24780158

Project Location: Threeforks, KY

Station #: ER-4B

Date: 1/14/2025

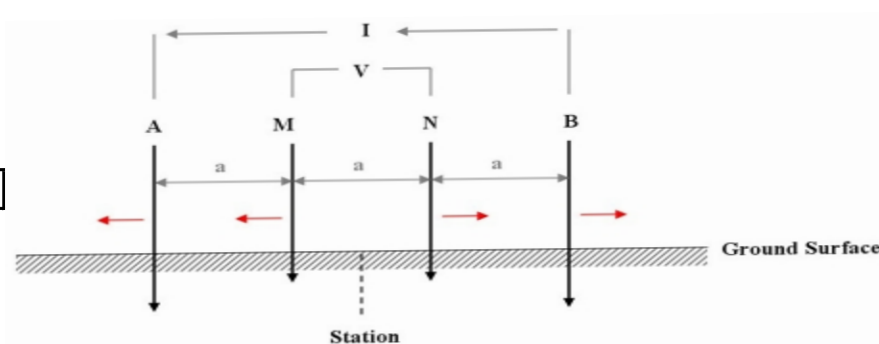
Time: 4:03PM

Weather & Temperature: 38°F Cloudy

Soil Conditions: Frozen topsoil with 2 to 3 inches of snow.

Performed By (Name of Tester) Amber Lacy, Adam Gostic

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



"s" Spacing (feet)	"s" Spacing (centimeters)	Electrode Depth (Inches)	Resistance (Ω)	ρ Apparent Resistivity (Ω·cm)	ρ Apparent Resistivity (Ω·ft)	Injected Current (mA)	Standard Deviation (%)
0.5	15.24	1	691.000	66167.37	2170.85	4.81	0.00%
1	30.48	1	456.700	87463.50	2869.54	5.16	0.00%
1.5	45.72	2	255.700	73454.40	2409.92	5.07	0.00%
2	60.96	2	201.200	77064.40	2528.36	5.09	0.00%
3	91.44	4	123.200	70782.81	2322.27	5.08	0.00%
5	152.40	6	72.420	69346.47	2275.15	56.21	0.00%
7	213.36	12	50.630	67873.75	2226.83	35.72	0.00%
10	304.80	12	22.510	43109.34	1414.35	49.01	0.00%
15	457.20	12	9.512	27324.92	896.49	34.18	0.00%
20	609.60	12	5.009	19185.67	629.45	39.89	0.00%
30	914.40	12	2.387	13714.17	449.94	48.79	0.00%
45	1371.60	12	1.374	11841.18	388.49	85.63	0.00%
70	2133.60	12	0.888	11899.02	390.39	76.34	0.00%
100	3048.00	12	0.709	13572.45	445.29	75.05	0.00%
150	4572.00	12	0.536	15388.94	504.89	75.54	0.00%
200	6096.00	12	0.451	17262.89	566.37	103.10	0.00%



Summary of Field Procedures

◆ Boring and Sampling

Soil Test Boring with Flight Auger

Soil sampling and penetration testing were performed in general accordance with ASTM D1586, *Standard Test Method for Penetration Test and Split Barrel Sampling of Soils*. Borings were made by mechanically twisting a continuous steel flight auger into the soil. At regular intervals, soil samples were obtained with a standard 1.4-inch I. D., 2-inch O. D., split barrel sampler. The sampler was first seated six inches to penetrate any loose cuttings, then driven an additional 12 inches with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler through the two final six inch increments was recorded as the penetration resistance (SPT N) value. The N-value, when properly interpreted by qualified professional staff, is an index of the soil strength and foundation support capability.

Soil Test Boring with Hollow-Stem Auger

Soil sampling and penetration testing were performed in general accordance with ASTM D1586, *Standard Test Method for Penetration Test and Split Barrel Sampling of Soils*. Borings were made by mechanically twisting a continuous steel hollow stem auger into the soil. At regular intervals, soil samples were obtained with a standard 1.4-inch I. D., 2-inch O. D., split barrel sampler. The sampler was first seated six inches to penetrate any loose cuttings, then driven an additional 12 inches with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler through the two final six inch increments was recorded as the penetration resistance (SPT N) value. The N-value, when properly interpreted by qualified professional staff, is an index of the soil strength and foundation support capability.

Undisturbed (UD) Sampling

Split spoon or split barrel sampling provide samples suitable for visual examination and classification tests but not sufficiently intact for quantitative laboratory testing. To provide samples for quantitative tests, relatively undisturbed samples were obtained by pushing sections of 3-inch O.D., 16-gauge, steel tubing (Shelby tube) into the soil at the desired sampling intervals. The procedures used generally followed those described in ASTM D1587, *Standard Practice for Thin-Walled Tube Geotechnical Sampling of Soils*. Each tube, together with the encased soil, was carefully removed from the ground and the length of the recovered soil measured. Locations and depths of undisturbed samples were recorded on each field test boring record.

Borehole Closure

Following collection of relevant geotechnical data, boreholes were filled by slowly pouring auger cuttings into the open hole such that minimal "bridging" of the material occurred in the hole. Backfilling of the upper two feet of each hole was tamped as heavily as possible with a shovel handle or other hand held equipment, and the backfill crowned to direct rainfall away on the surface. Where boreholes exceeded five feet in depth, a plastic hole plug was firmly tamped into place within the backfill at a depth of about two feet.

Bulk Samples

At selected locations and depths, representative bulk samples of the soils were obtained by randomly taking shovel loads from the cuttings or spoil brought to the surface, until a sample of 30 to 50 pounds was obtained. The sample was placed in a cloth or plastic sack marked with appropriate descriptive information. Samples were protected from freezing at all times.

Borehole Closure

Following collection of relevant geotechnical data, boreholes were filled by slowly pouring auger cuttings into the open hole such that minimal "bridging" of the material occurred in the hole. Backfilling on holes where mud rotary drilling was performed was performed using cement-bentonite grout. Backfilling of the upper two feet of each hole was tamped as heavily as possible with a shovel handle or other hand held equipment, and the backfill crowned to direct rainfall away on the surface. Where boreholes exceeded five feet in depth, a plastic hole plug was firmly tamped into place within the backfill at a depth of about two feet.

Preservation and Transporting of Soil Samples with Control of Field Moisture

Procedures for preserving soil samples obtained in the field and transportation of samples to the laboratory generally followed those given in ASTM D4220, *Standard Practice for Preserving and Transporting Soil Samples* for Group B samples as defined in Section 4. Group B samples are those samples not suspected of being contaminated and for which only water content and classification, proctor, relative density, or profile logging will be performed. Group B samples also include bulk samples that are intended to be remolded in the laboratory for compaction, swell pressure, percent swell, consolidation, permeability, CBR, or shear testing. Representative samples of the cuttings or split spoon samples, or representative bulk samples, were placed in suitably identified, sealed glass jars or plastic containers and transported to the laboratory. Sample identification numbers on the containers corresponded to sample numbers recorded on field boring records or test pit records. Thin-walled tube samples were sealed at the ends with paraffin and capped with plastic end caps.

◆ Field Tests of Earth Materials

The subsurface conditions encountered during drilling were reported on a field test boring record by the chief driller. The record contains information about the drilling method, samples attempted and sample recovery, indications of materials in the borings such as coarse gravel, cobbles, etc., and indications of materials encountered between sample intervals. Representative soil samples were placed in glass jars and transported to the laboratory along with the field boring records. Recovered samples not expended in laboratory tests are commonly retained in our laboratory for 60 days following completion of drilling. Field boring records are retained at our office.

Measurement of Static Water Levels

Water level readings were made in the open boreholes immediately after completing drilling and withdrawal of the tools. Where feasible, measurements were repeated after an elapsed period of 24 hours to gauge the stabilized water level. Procedures for measurement of liquid levels in open boreholes are described in ASTM D4750, *Standard Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitoring Well (Observation Well)*. A weighted measuring tape was slowly lowered into each borehole until the liquid surface

was penetrated by the weighted end. The reading on the tape was recorded at a reference point on the surface and compared to the reading at the demarcation of the wetted and unwetted portions of the tape. The difference between the two readings was recorded as the depth of the liquid surface below the reference point. Measurements made by this method were then repeated until approximately consistent values were obtained.

Field Resistivity Testing

Apparent resistivity of the soil was measured at selected locations in the field by measuring the voltage potential between four equally spaced, in-line direct current electrodes in the Wenner Electrode Arrangement as described in ASTM D6431, *Standard Guide for Using the Direct Current Resistivity Method for Subsurface Investigation*. Using the measured voltages, resistivity was estimated using the approach described in *A Method of Measuring Earth Resistivity*, U. S. Bureau of Standards Bulletin No. 258, by Dr. F. Wenner, in which the average resistivity of the soil to a depth of "A" is given by:

$$r = 191.5 \times AE/I, \text{ where:}$$

r = Average resistivity of soil, ohm-cm

A = Distance between electrodes, cm

E = Measured Voltage, Volts

I = Current, Amperes

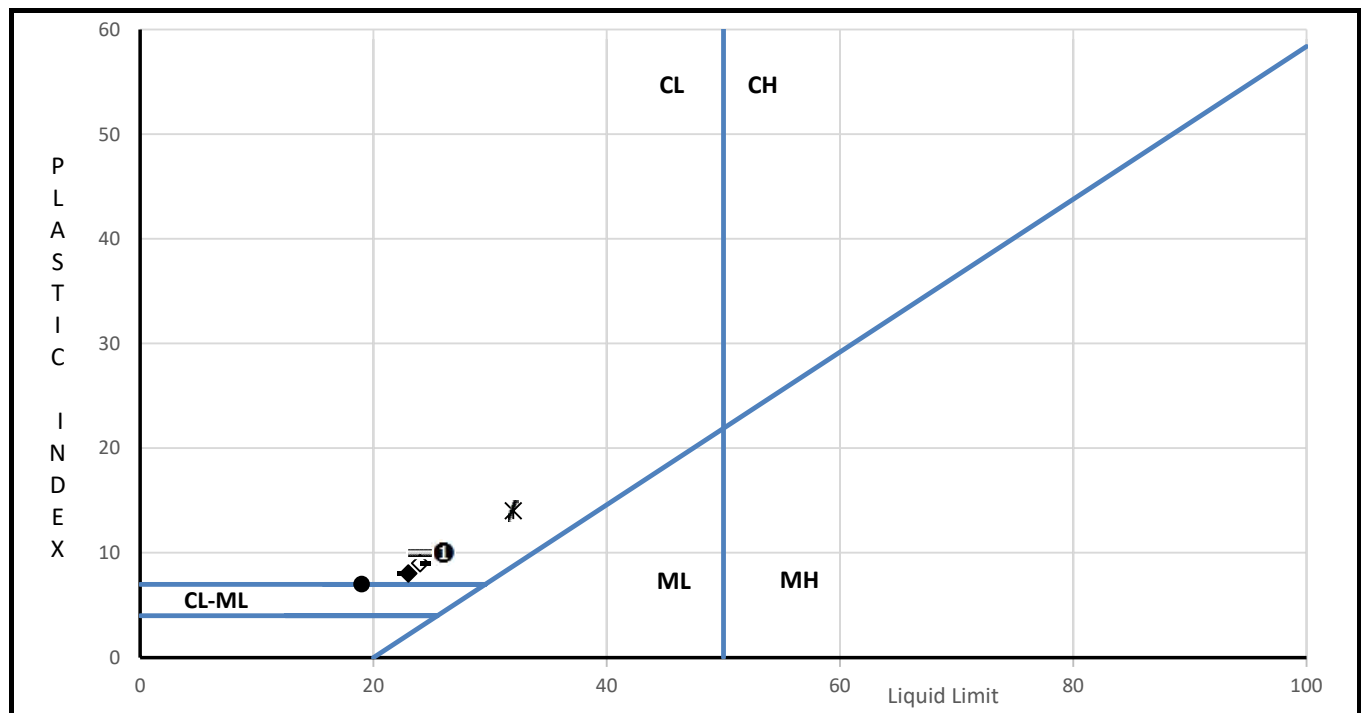
Double Ring Infiltrometer Tests

The infiltration rate of water through the near surface soil was measured using a modified double ring infiltrometer testas described by ASTM D5093, *Standard Test Method for Field Measurement of Infiltration Rate Using a Double Ring Infiltrometer*. The infiltrometer consists of an open outer ring and a sealed inner ring which are embedded and sealed in trenches excavated in the soil. Both rings are filled with water and represents the amount of water that infiltrated into the soil from the inner ring over a set time interval.



Appendix III– Laboratory Testing

Lab Summary
Particle Size Distribution Charts
Standard Proctor Test Result
California Bearing Test Report
Corrosion Series Test Report
Electrical Resistivity and pH Test Result
Thermal Resistivity Report
Summary of Laboratory Procedures



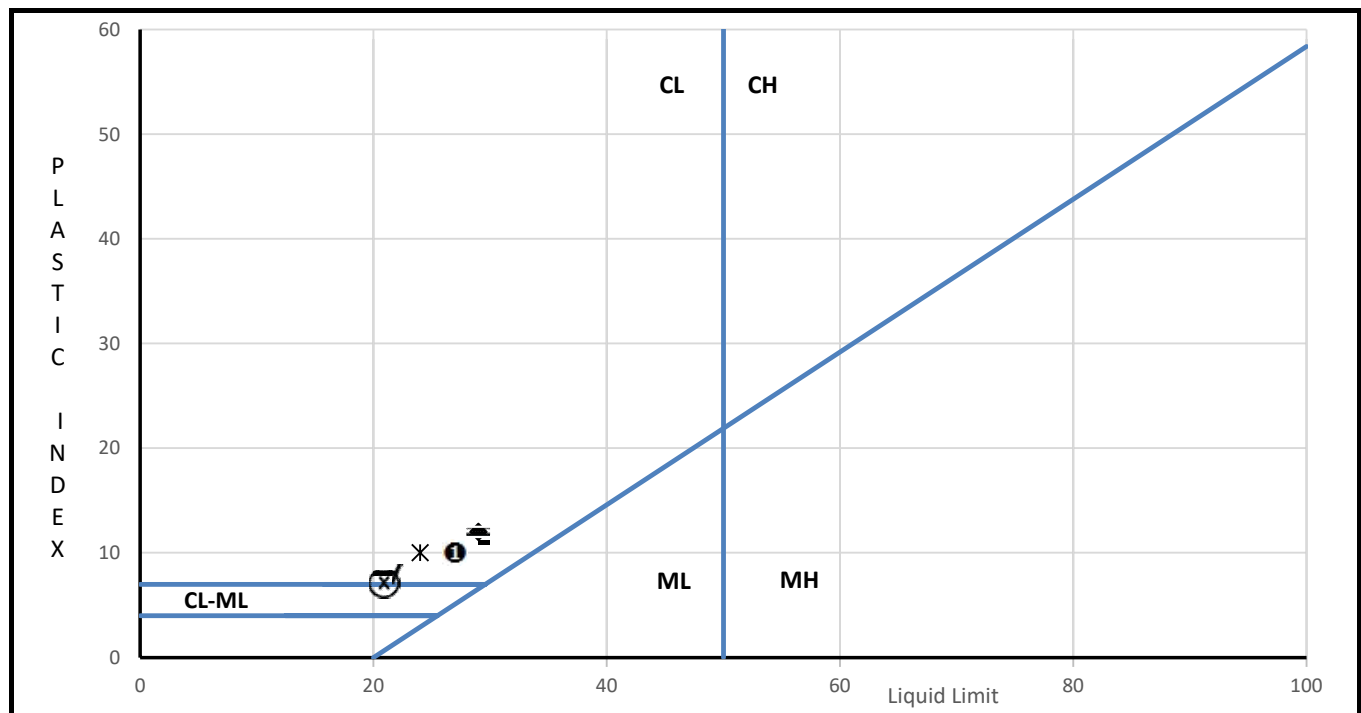
Specimen Identification				MC	LL	PL	PI	Fines	Classification (symbol is based on minus 40 material only when no grain size information is present.)	
	ID	No.	Top Depth						Symbol	Name
	B-01	SS-1	1	10.2						
◆	B-01	SS-2	3.5	8.3	23	15	8	30.6	SC	CLAYEY SAND WITH GRAVEL
	B-01	SS-3	6	6.2						
●	B-01	SS-4	8.5	7.3	19	12	7	19.5	SC-SM	SILTY, CLAYEY SAND WITH GRAVEL
—	B-01	SS-6	18.5	6.3	22	14	8	22.7	GC	CLAYEY GRAVEL WITH SAND
—	B-01	SS-10	38.5	8.0	25	16	9	61.2	CL	SANDY LEAN CLAY
	B-02	SS-1	1	6.3						
◇	B-02	SS-2	3.5	7.8	24	15	9	28.0	SC	CLAYEY SAND WITH GRAVEL
	B-02	SS-4	8.5	6.8						
	B-02	SS-5	13.5	5.8		0		24.1	SM	SILTY SAND
*	B-02	SS-8	28.5	10.2	32	18	14	60.9	CL	SANDY LEAN CLAY
	B-03	SS-1	1	11.4						
/	B-03	SS-2	3.5	6.7	32	18	14	60.6	CL	SANDY LEAN CLAY
	B-03	SS-4	8.5	9.2						
	B-04	SS-1	1	8.8						
	B-04	SS-2	3.5	12.3						
①	B-04	SS-4	8.5	7.6	26	16	10	27.4	GC	CLAYEY GRAVEL WITH SAND
	B-05	SS-2	3.5	8.2						
=	B-05	SS-3	6	4.7	24	14	10	18.9	GC	CLAYEY GRAVEL WITH SAND
	B-06	SS-1	1	7.2						

INDEX TEST RESULTS



Report No.
Report Date

Project Name	Lynn Bark Solar	
Project Number	24780158	
Approved by		Date
		2/17/2025 15:36



Specimen Identification				MC	LL	PL	PI	Fines	Classification (symbol is based on minus 40 material only when no grain size information is present.)	
	ID	No.	Top Depth						Symbol	Name
	B-06	SS-3	6	4.6						
◆	B-06	SS-5	13.5	6.3	29	17	12	36.0	SC	CLAYEY SAND WITH GRAVEL
	B-07	SS-1	1	7.9						
	B-07	SS-2	3.5	5.3						
—	B-07	SS-3	6	4.5	29	18	11	44.0	SC	CLAYEY SAND WITH GRAVEL
—	B-08	SS-2	3.5	12.0	21	13	8	35.5	SC	CLAYEY SAND
	B-08	SS-3	6	10.4						
	B-09	SS-1	1	10.3						
	B-09	SS-2	3.5	8.9						
	B-09	SS-3	6	10.3						
*	B-09	SS-4	8.5	9.3	24	14	10	33.1	SC	CLAYEY SAND WITH GRAVEL
	B-10	SS-1	1	9.1						
/	B-10	SS-2	3.5	7.4	22	14	8	25.7	SC	CLAYEY SAND WITH GRAVEL
	B-10	SS-3	6	7.5						
	B-11	SS-1	1	10.6						
	B-11	SS-2	3.5	5.1						
①	B-11	SS-4	8.5	3.4	27	17	10	16.0	GC	CLAYEY GRAVEL WITH SAND
	B-12	SS-1	1	4.9						
=	B-12	SS-2	3.5	12.9	29	17	12	49.5	SC	CLAYEY SAND
⊗	B-12	SS-5	13.5	6.3	21	14	7	23.2	SC-SM	SILTY, CLAYEY SAND

INDEX TEST RESULTS



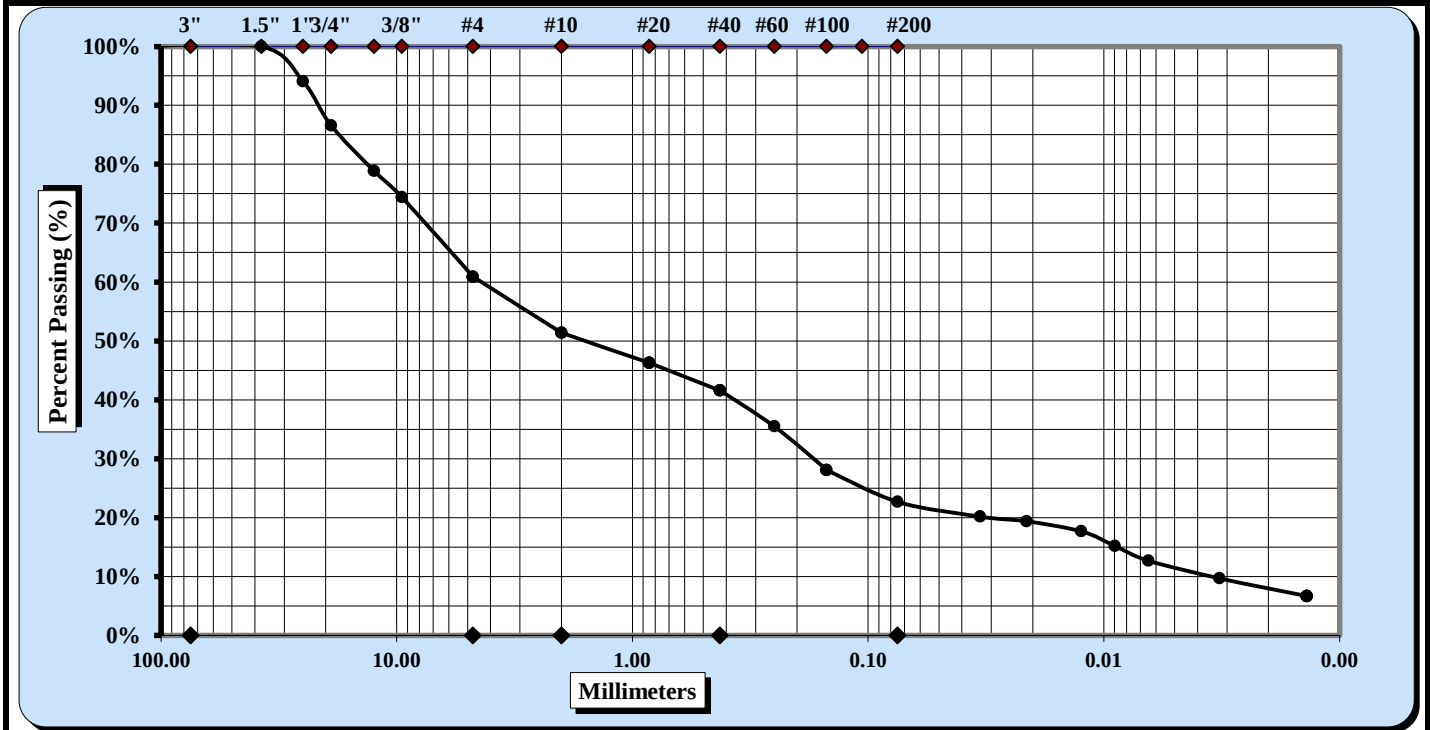
Report No.
Report Date

Project Name	Lynn Bark Solar	
Project Number	24780158	
Approved by		Date
		2/17/2025 15:39

Pres Cannard

Pres Cannard

	ASTM D422: Standard Test Methods for Particle-Size Distribution (Gradation) of Soils	Report Number	
		Report Date	
		Test Date	2/5/2025
		Sample Date	
Project Number	24780158		
Project Name	Lynn Bark Solar		
Client Name	Savion, LLC		
Client Address			
KeyLAB ID	CINC202502175	Sample Type	SS
Location ID	B-01	Sample Top Depth	18.5
Sample Reference	SS-6	Sample Base Depth	20
Description		Method	ASTM D422
Classification:	CLAYEY GRAVEL WITH SAND (GC)		



ASTM PARTICLE SIZE DEFINITIONS			
Cobbles	< 300 mm (12") and > 75 mm (3")	Medium Sand	< 2.00 mm and > 0.425 mm (#40)
Gravel	< 75 mm and > 4.75 mm (#4)	Fine Sand	< 0.425 mm and > 0.075 mm
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Silt & Clay	< 0.075
Maximum Particle Size	37.5 mm	Coarse Sand	9.5
		Fine Sand	18.9
Gravel	39.1	Medium Sand	9.8
		Silt & Clay	22.7
Liquid Limit	22	Plastic Limit	14
		Plastic Index	8
Cc = 1.93 Cu = 1263.86			
Description of Sand & Gravel Particles:		Rounded	☒
		Angular	☐
Hard & Durable		☒	Soft
		☐	Weathered & Friable
		☐	☐
Dispersion Method:	Stirrer	Dispersion Period:	1 min
		Dispersing Agent:	Sodium Hex. Solution

References / Comments / Deviations:

	ASTM D422: Standard Test Methods for Particle-Size Distribution (Gradation) of Soils	Report Number	
		Report Date	
		Test Date	2/5/2025
		Sample Date	
Project Number	24780158		
Project Name	Lynn Bark Solar		
Client Name	Savion, LLC		
Client Address			
KeyLAB ID	CINC202502177	Sample Type	SS
Location ID	B-02	Sample Top Depth	3.5
Sample Reference	SS-2	Sample Base Depth	5
Description		Method	ASTM D422
Classification:	CLAYEY SAND WITH GRAVEL (SC)		



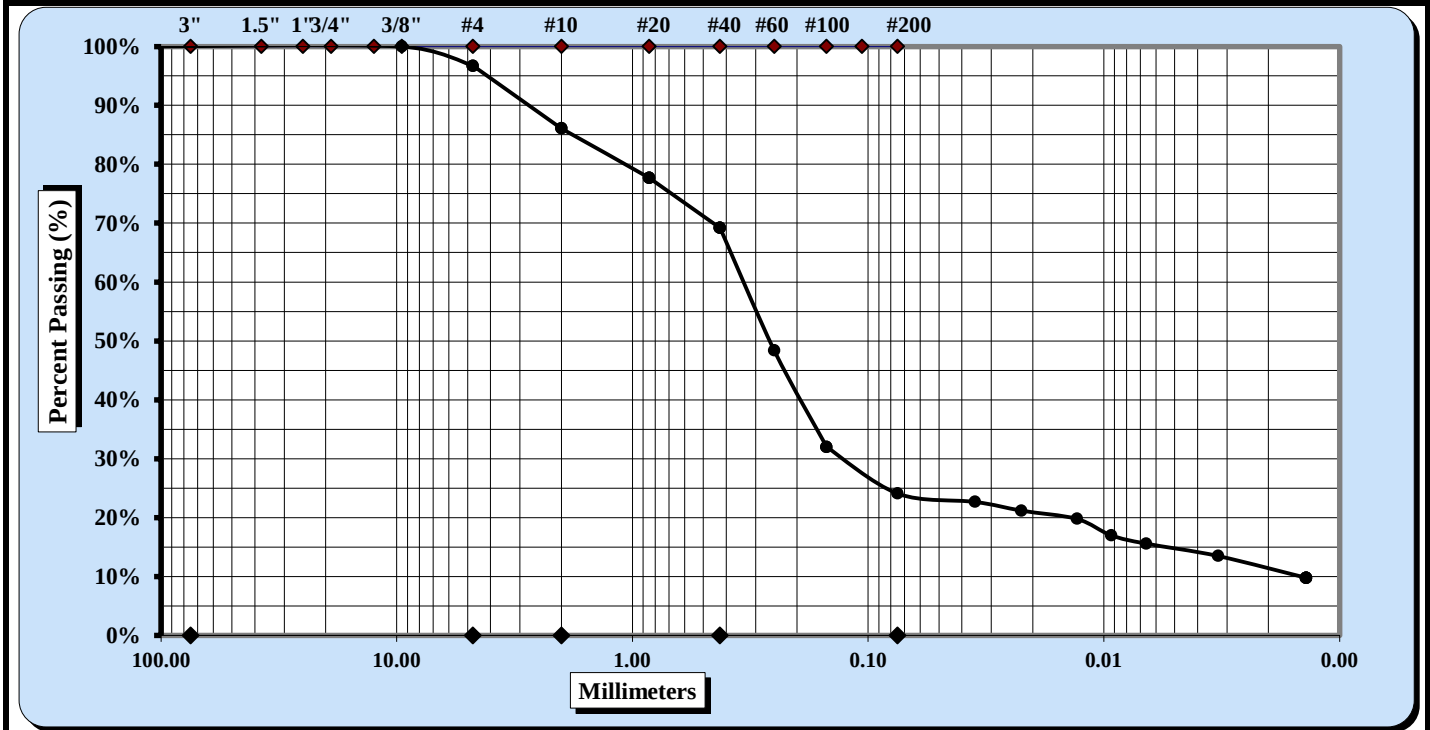
ASTM PARTICLE SIZE DEFINITIONS			
Cobbles	< 300 mm (12") and > 75 mm (3")	Medium Sand	< 2.00 mm and > 0.425 mm (#40)
Gravel	< 75 mm and > 4.75 mm (#4)	Fine Sand	< 0.425 mm and > 0.075 mm
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Silt & Clay	< 0.075
Maximum Particle Size	25 mm	Coarse Sand	9.9
Gravel	33.4	Medium Sand	9.9
Liquid Limit	24	Plastic Limit	15
Cc = 2.03		Cu = 1594.78	
Description of Sand & Gravel Particles:		Rounded	☒
Hard & Durable		Angular	☐
Soft		Weathered & Friable	☐
Dispersion Method: Stirrer		Dispersion Period: 1 min	Dispensing Agent: Sodium Hex. Solution

References / Comments / Deviations:

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MPaskevicius	KCannady	
Tested by	Approved by	Signature
Cincinnati	862 E Crescentville Road, West Chester Township, OH 45246	

	ASTM D422: Standard Test Methods for Particle-Size Distribution (Gradation) of Soils	Report Number	
		Report Date	
		Test Date	2/5/2025
		Sample Date	
Project Number	24780158		
Project Name	Lynn Bark Solar		
Client Name	Savion, LLC		
Client Address			
KeyLAB ID	CINC202502179	Sample Type	SS
Location ID	B-02	Sample Top Depth	13.5
Sample Reference	SS-5	Sample Base Depth	15
Description		Method	ASTM D422
Classification:	SILTY SAND (SM)		



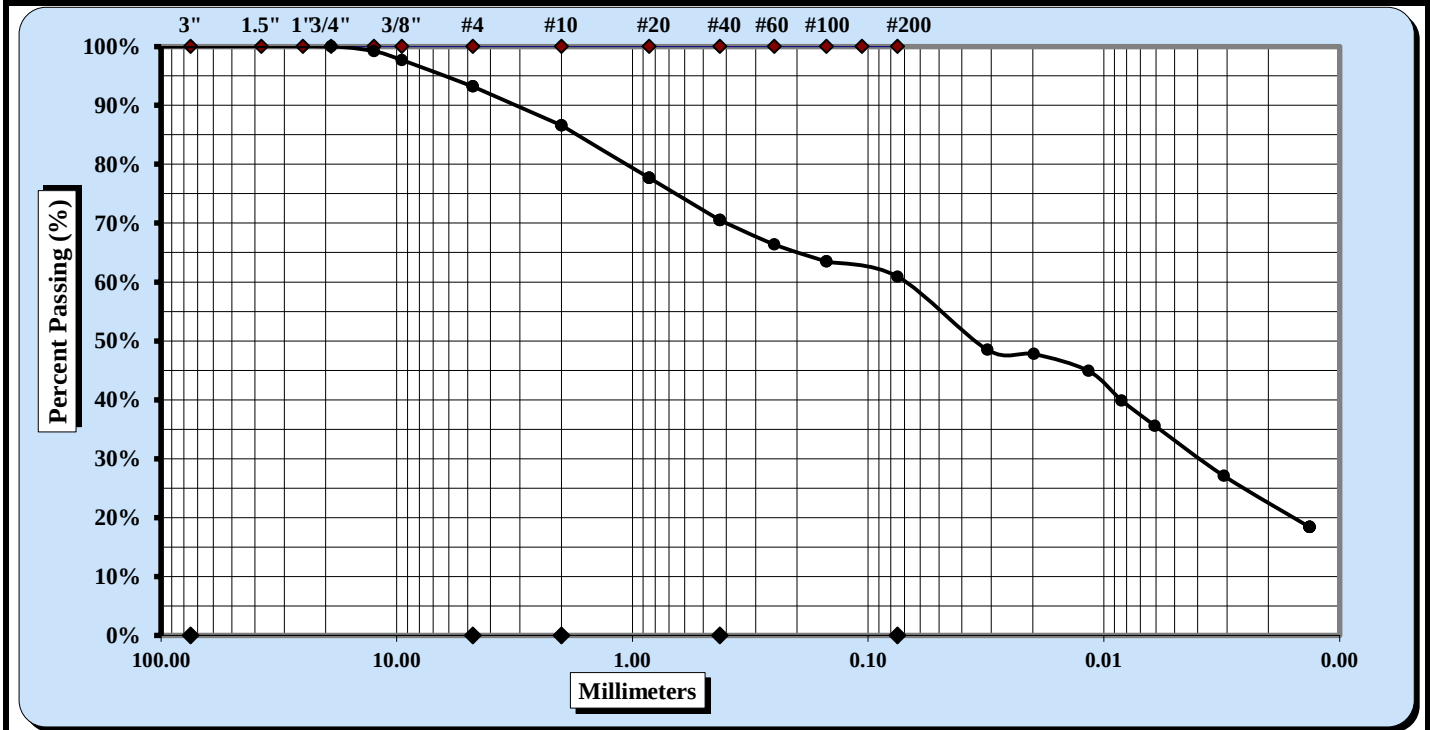
ASTM PARTICLE SIZE DEFINITIONS					
Cobbles	< 300 mm (12") and > 75 mm (3")	Medium Sand	< 2.00 mm and > 0.425 mm (#40)		
Gravel	< 75 mm and > 4.75 mm (#4)	Fine Sand	< 0.425 mm and > 0.075 mm		
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Silt & Clay	< 0.075		
Maximum Particle Size	9.5 mm	Coarse Sand	10.6		
Gravel	3.3	Medium Sand	16.9		
Liquid Limit		Plastic Limit	0		
	Cc = 32.52	Cu = 231.90			
Description of Sand & Gravel Particles:		Rounded	☒		
Hard & Durable		☒	Angular	☐	
Soft		☐	Weathered & Friable	☐	
Dispersion Method:	Stirrer	Dispersion Period:	1 min	Dispersing Agent:	Sodium Hex. Solution

References / Comments / Deviations:

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Cincinnati	862 E Crescentville Road, West Chester Township, OH 45246	

	ASTM D422: Standard Test Methods for Particle-Size Distribution (Gradation) of Soils		Report Number	
			Report Date	
			Test Date	2/5/2025
			Sample Date	
Project Number	24780158			
Project Name	Lynn Bark Solar			
Client Name	Savion, LLC			
Client Address				
KeyLAB ID	CINC2025021710	Sample Type	SS	
Location ID	B-02	Sample Top Depth	28.5	
Sample Reference	SS-8	Sample Base Depth	30	
Description		Method	ASTM D422	
Classification:	SANDY LEAN CLAY (CL)			



ASTM PARTICLE SIZE DEFINITIONS			
Cobbles	< 300 mm (12") and > 75 mm (3")	Medium Sand	< 2.00 mm and > 0.425 mm (#40)
Gravel	< 75 mm and > 4.75 mm (#4)	Fine Sand	< 0.425 mm and > 0.075 mm
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Silt & Clay	< 0.075
Maximum Particle Size	12.5 mm	Coarse Sand	6.6
Gravel	6.8	Medium Sand	16.1
Liquid Limit	32	Plastic Limit	18
		Fine Sand	9.6
		Silt & Clay	60.9
		Plastic Index	14

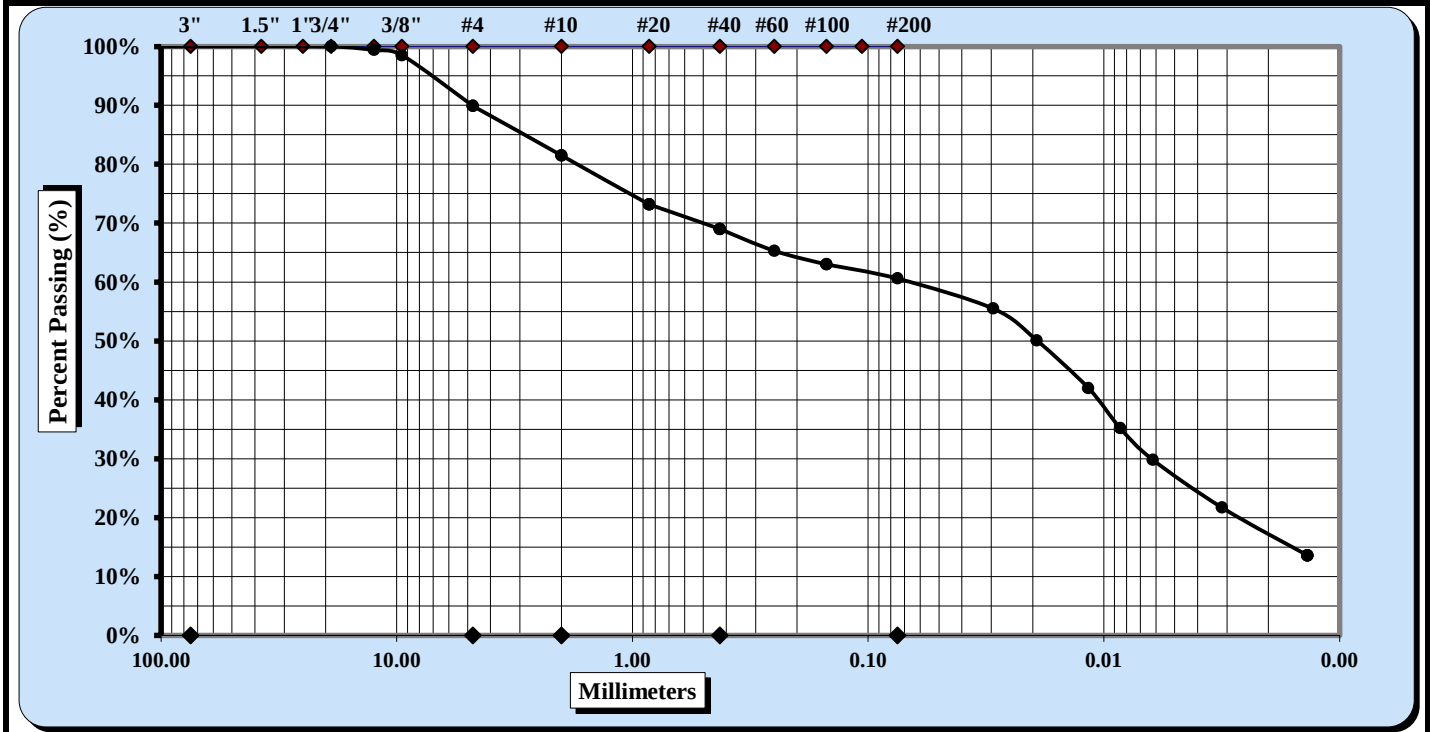
Description of Sand & Gravel Particles:		Rounded	☒	Angular	☐
Hard & Durable	☒	Soft	☐	Weathered & Friable	☐
Dispersion Method:	Stirrer	Dispersion Period:	1 min	Dispersing Agent:	Sodium Hex. Solution

References / Comments / Deviations:

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	ASTM D422: Standard Test Methods for Particle-Size Distribution (Gradation) of Soils		Report Number	
			Report Date	
			Test Date	2/6/2025
			Sample Date	
Project Number		24780158		
Project Name		Lynn Bark Solar		
Client Name		Savion, LLC		
Client Address				
KeyLAB ID	CINC2025021712	Sample Type	SS	
Location ID	B-03	Sample Top Depth	3.5	
Sample Reference	SS-2	Sample Base Depth	5	
Description		Method	ASTM D422	
Classification:	SANDY LEAN CLAY (CL)			

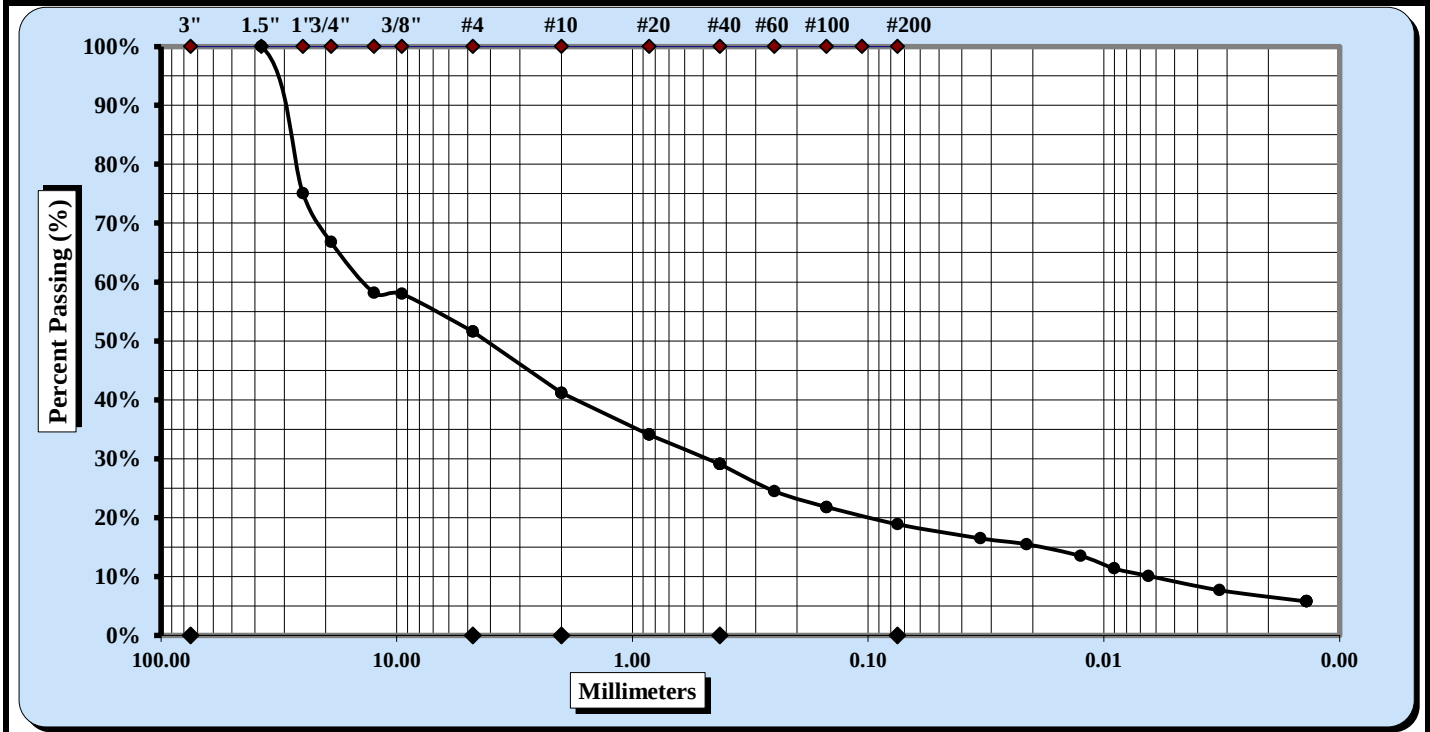


ASTM PARTICLE SIZE DEFINITIONS							
Cobbles	< 300 mm (12") and > 75 mm (3")		Medium Sand		< 2.00 mm and > 0.425 mm (#40)		
Gravel	< 75 mm and > 4.75 mm (#4)		Fine Sand		< 0.425 mm and > 0.075 mm		
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)		Silt & Clay		< 0.075		
Maximum Particle Size	12.5 mm	Coarse Sand	8.4	Fine Sand	8.4		
Gravel	10.1	Medium Sand	12.5	Silt & Clay	60.6		
Liquid Limit	32	Plastic Limit	18	Plastic Index	14		
Description of Sand & Gravel Particles:			Rounded	☒	Angular	☐	
Hard & Durable			☒	Soft	☐	Weathered & Friable	☐
Dispersion Method:	Stirrer	Dispersion Period:	1 min	Dispersing Agent:	Sodium Hex. Solution		

References / Comments / Deviations:

Peter Cannade

	ASTM D422: Standard Test Methods for Particle-Size Distribution (Gradation) of Soils		Report Number	
			Report Date	
			Test Date	2/6/2025
			Sample Date	
Project Number		24780158		
Project Name		Lynn Bark Solar		
Client Name		Savion, LLC		
Client Address				
KeyLAB ID	CINC2025021718	Sample Type	SS	
Location ID	B-05	Sample Top Depth	6	
Sample Reference	SS-3	Sample Base Depth	7.5	
Description		Method	ASTM D422	
Classification:	CLAYEY GRAVEL WITH SAND (GC)			



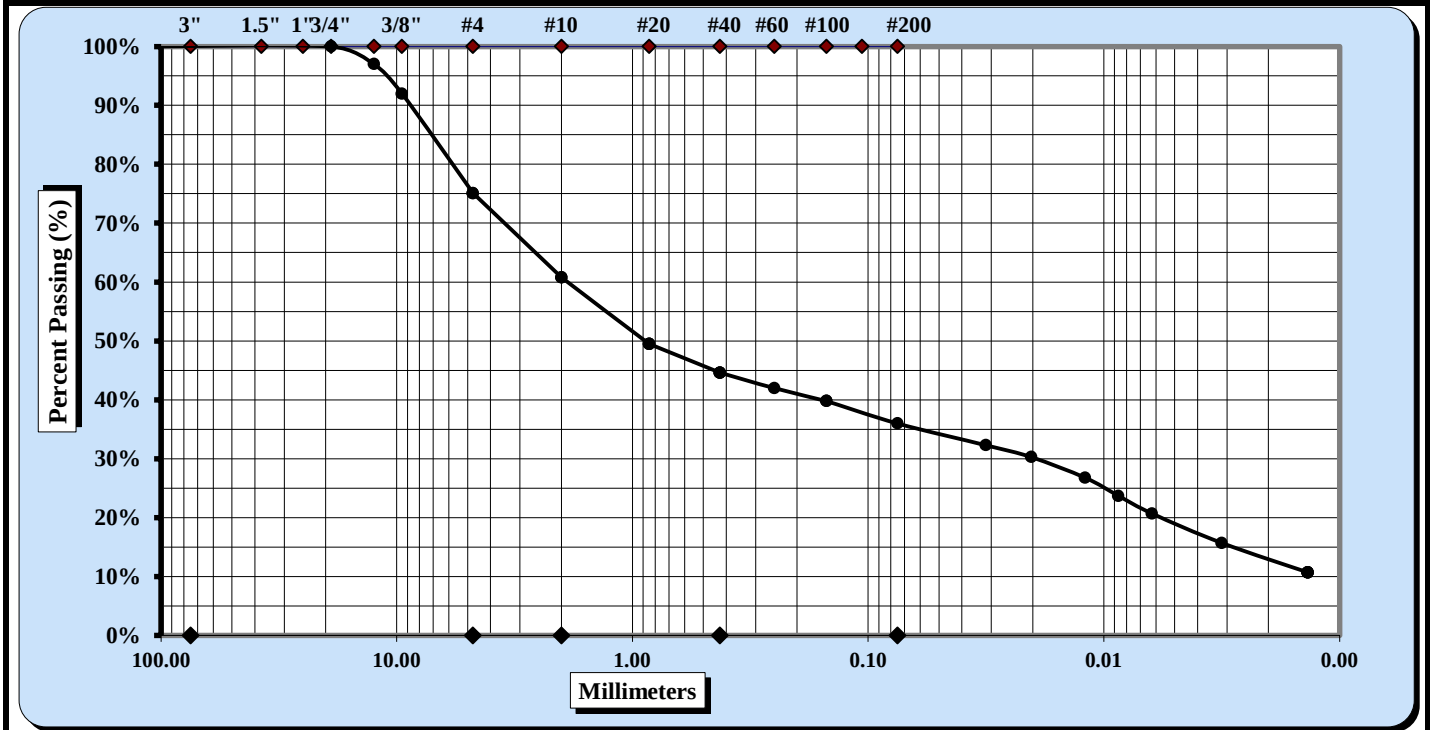
ASTM PARTICLE SIZE DEFINITIONS			
Cobbles	< 300 mm (12") and > 75 mm (3")	Medium Sand	< 2.00 mm and > 0.425 mm (#40)
Gravel	< 75 mm and > 4.75 mm (#4)	Fine Sand	< 0.425 mm and > 0.075 mm
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Silt & Clay	< 0.075
Maximum Particle Size	37.5 mm	Coarse Sand	10.4
		Fine Sand	10.2
Gravel	48.4	Medium Sand	12.1
		Silt & Clay	18.9
Liquid Limit	24	Plastic Limit	14
		Plastic Index	10
Cc = 2.71		Cu = 2173.41	
Description of Sand & Gravel Particles:		Rounded	☒ Angular ☐
Hard & Durable ☒ Soft ☐		Weathered & Friable ☐	
Dispersion Method:	Stirrer	Dispersion Period:	1 min
		Dispersing Agent:	Sodium Hex. Solution

References / Comments / Deviations:

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	ASTM D422: Standard Test Methods for Particle-Size Distribution (Gradation) of Soils	Report Number	
		Report Date	
		Test Date	2/6/2025
		Sample Date	
Project Number	24780158		
Project Name	Lynn Bark Solar		
Client Name	Savion, LLC		
Client Address			
KeyLAB ID	CINC2025021721	Sample Type	SS
Location ID	B-06	Sample Top Depth	13.5
Sample Reference	SS-5	Sample Base Depth	15
Description		Method	ASTM D422
Classification:	CLAYEY SAND WITH GRAVEL (SC)		



ASTM PARTICLE SIZE DEFINITIONS			
Cobbles	< 300 mm (12") and > 75 mm (3")	Medium Sand	< 2.00 mm and > 0.425 mm (#40)
Gravel	< 75 mm and > 4.75 mm (#4)	Fine Sand	< 0.425 mm and > 0.075 mm
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Silt & Clay	< 0.075
Maximum Particle Size	19 mm	Coarse Sand	14.3
		Fine Sand	8.6
Gravel	24.9	Medium Sand	16.2
		Silt & Clay	36.0
Liquid Limit	29	Plastic Limit	17
		Plastic Index	12

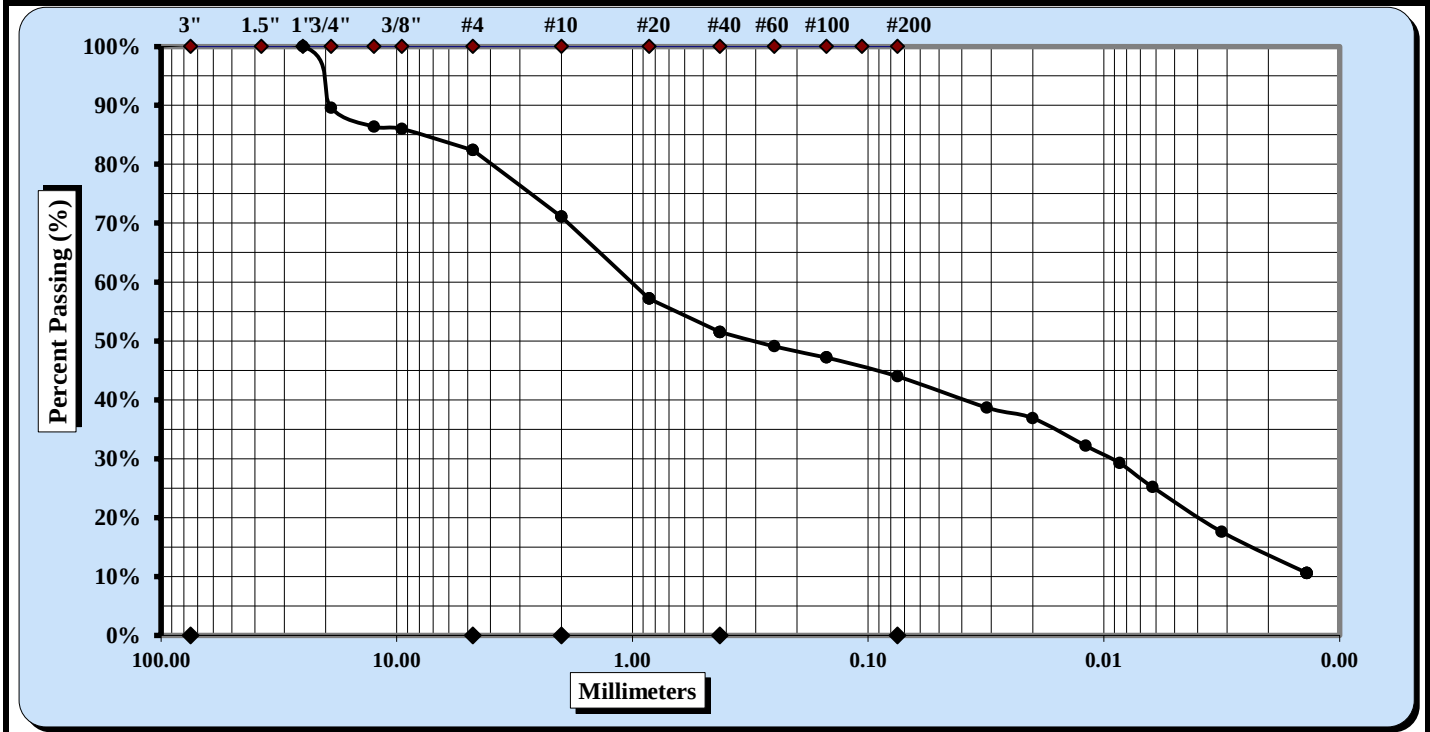
Description of Sand & Gravel Particles:	Rounded	☒	Angular	☐	
Hard & Durable	☒	Soft	☐	Weathered & Friable	☐
Dispersion Method:	Stirrer	Dispersion Period:	1 min	Dispersing Agent:	Sodium Hex. Solution

References / Comments / Deviations:

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	ASTM D422: Standard Test Methods for Particle-Size Distribution (Gradation) of Soils		Report Number	
			Report Date	
			Test Date	2/6/2025
			Sample Date	
Project Number		24780158		
Project Name		Lynn Bark Solar		
Client Name		Savion, LLC		
Client Address				
KeyLAB ID	CINC2025021724	Sample Type	SS	
Location ID	B-07	Sample Top Depth	6	
Sample Reference	SS-3	Sample Base Depth	7.5	
Description		Method	ASTM D422	
Classification:	CLAYEY SAND WITH GRAVEL (SC)			

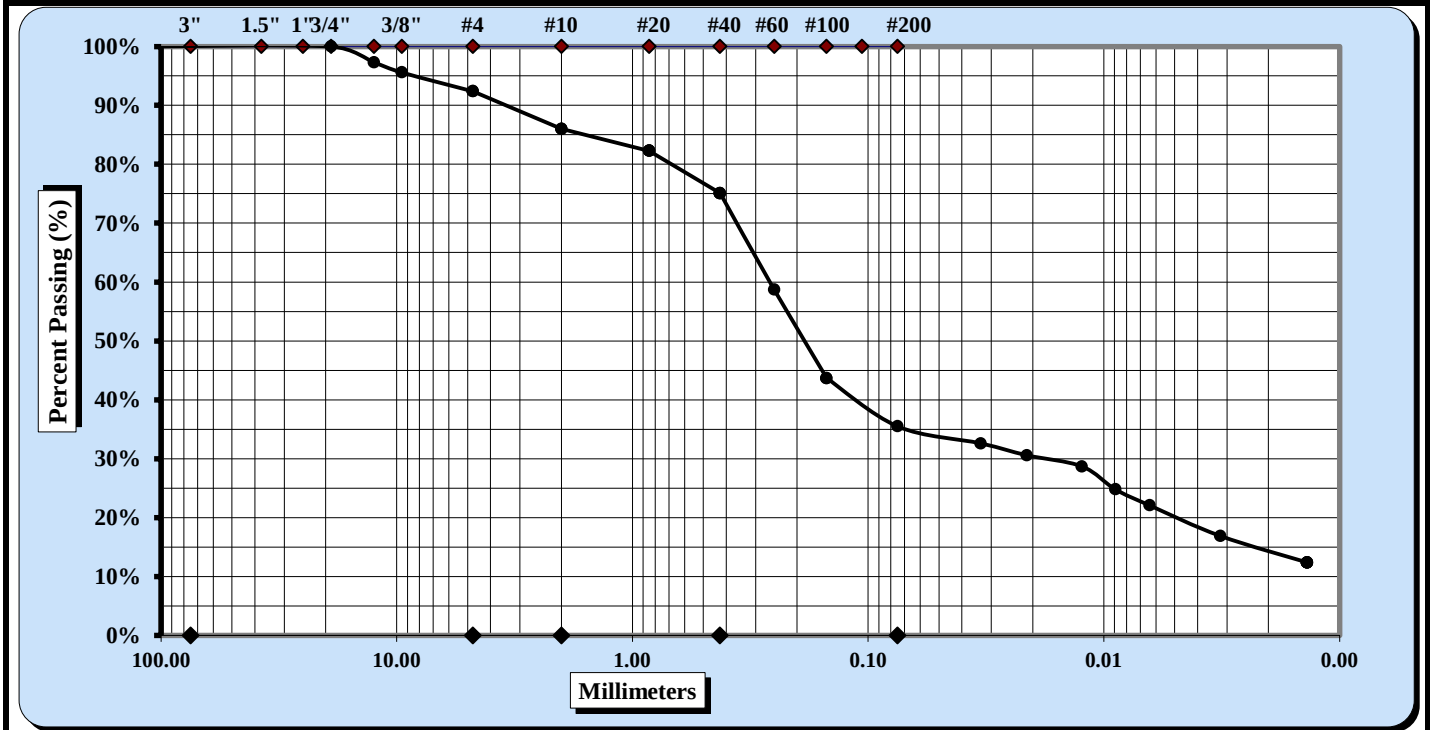


ASTM PARTICLE SIZE DEFINITIONS					
Cobbles	< 300 mm (12") and > 75 mm (3")	Medium Sand	< 2.00 mm and > 0.425 mm (#40)		
Gravel	< 75 mm and > 4.75 mm (#4)	Fine Sand	< 0.425 mm and > 0.075 mm		
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Silt & Clay	< 0.075		
Maximum Particle Size	25 mm	Coarse Sand	11.3	Fine Sand	7.5
Gravel	17.6	Medium Sand	19.6	Silt & Clay	44.0
Liquid Limit	29	Plastic Limit	18	Plastic Index	11

Description of Sand & Gravel Particles:		Rounded	☒	Angular	☐
Hard & Durable	☒	Soft	☐	Weathered & Friable	☐
Dispersion Method:	Stirrer	Dispersion Period:	1 min	Dispersing Agent:	Sodium Hex. Solution

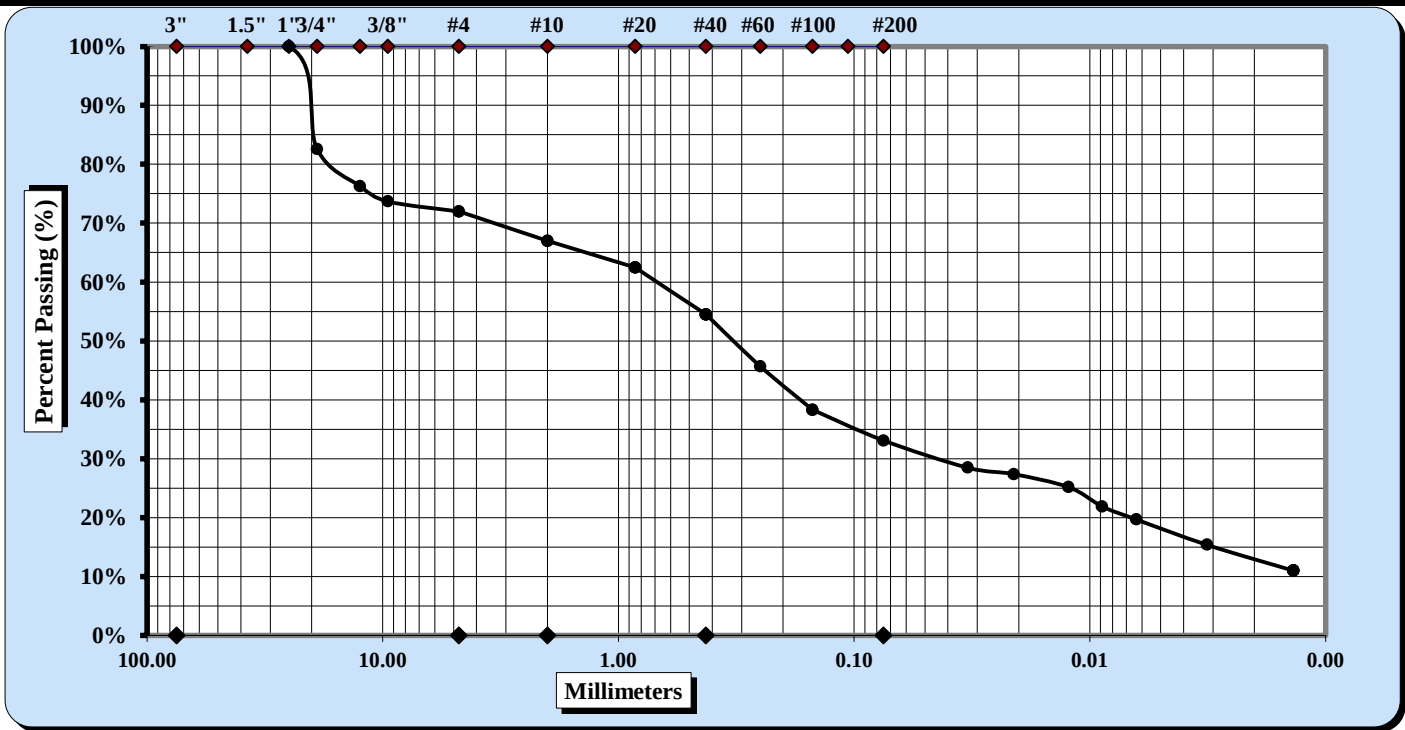
References / Comments / Deviations:

	ASTM D422: Standard Test Methods for Particle-Size Distribution (Gradation) of Soils	Report Number	
		Report Date	
		Test Date	2/6/2025
		Sample Date	
Project Number	24780158		
Project Name	Lynn Bark Solar		
Client Name	Savion, LLC		
Client Address			
KeyLAB ID	CINC2025021725	Sample Type	SS
Location ID	B-08	Sample Top Depth	3.5
Sample Reference	SS-2	Sample Base Depth	5
Description		Method	ASTM D422
Classification:	CLAYEY SAND (SC)		



	ASTM D422: Standard Test Methods for Particle-Size Distribution (Gradation) of Soils	Report Number	
		Report Date	
		Test Date	2/6/2025
		Sample Date	

Project Number	24780158		
Project Name	Lynn Bark Solar		
Client Name	Savion, LLC		
Client Address			
KeyLAB ID	CINC2025021730	Sample Type	SS
Location ID	B-09	Sample Top Depth	8.5
Sample Reference	SS-4	Sample Base Depth	10
Description		Method	ASTM D422
Classification:	CLAYEY SAND WITH GRAVEL (SC)		



ASTM PARTICLE SIZE DEFINITIONS					
Cobbles	< 300 mm (12") and > 75 mm (3")	Medium Sand	< 2.00 mm and > 0.425 mm (#40)		
Gravel	< 75 mm and > 4.75 mm (#4)	Fine Sand	< 0.425 mm and > 0.075 mm		
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Silt & Clay	< 0.075		
Maximum Particle Size	25 mm	Coarse Sand	5.0	Fine Sand	21.4
Gravel	28.0	Medium Sand	12.5	Silt & Clay	33.1
Liquid Limit	24	Plastic Limit	14	Plastic Index	10

Description of Sand & Gravel Particles:	Rounded	☒	Angular	☐	
Hard & Durable	☒	Soft	☐	Weathered & Friable	☐
Dispersion Method:	Stirrer	Dispersion Period:	1 min	Dispersing Agent:	Sodium Hex. Solution

References / Comments / Deviations:

	ASTM D422: Standard Test Methods for Particle-Size Distribution (Gradation) of Soils	Report Number	
		Report Date	
		Test Date	2/6/2025
		Sample Date	
Project Number	24780158		
Project Name	Lynn Bark Solar		
Client Name	Savion, LLC		
Client Address			
KeyLAB ID	CINC2025021732	Sample Type	SS
Location ID	B-10	Sample Top Depth	3.5
Sample Reference	SS-2	Sample Base Depth	5
Description		Method	ASTM D422
Classification:	CLAYEY SAND WITH GRAVEL (SC)		



ASTM PARTICLE SIZE DEFINITIONS			
Cobbles	< 300 mm (12") and > 75 mm (3")	Medium Sand	< 2.00 mm and > 0.425 mm (#40)
Gravel	< 75 mm and > 4.75 mm (#4)	Fine Sand	< 0.425 mm and > 0.075 mm
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Silt & Clay	< 0.075
Maximum Particle Size	25 mm	Coarse Sand	8.1
		Fine Sand	28.3
Gravel	28.2	Medium Sand	9.7
		Silt & Clay	25.7
Liquid Limit	22	Plastic Limit	14
		Plastic Index	8
Cc = 6.11		Cu = 552.80	
Description of Sand & Gravel Particles:		Rounded	☒
		Angular	☐
Hard & Durable ☒		Soft	☐
		Weathered & Friable	☐
Dispersion Method:	Stirrer	Dispersion Period:	1 min
		Dispersing Agent:	Sodium Hex. Solution

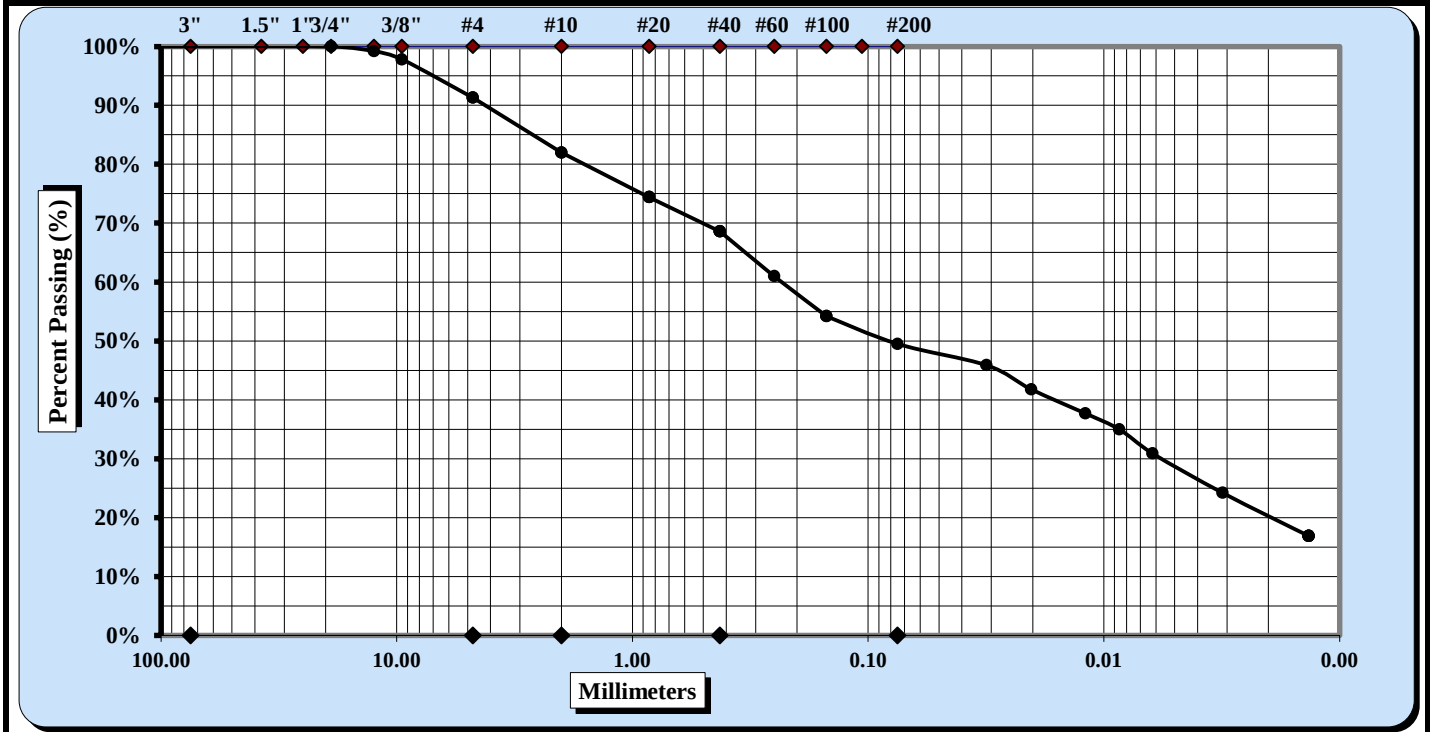
References / Comments / Deviations:

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Cincinnati	862 E Crescentville Road, West Chester Township, OH 45246	

Peter Cannade

	ASTM D422: Standard Test Methods for Particle-Size Distribution (Gradation) of Soils		Report Number	
			Report Date	
			Test Date	2/12/2025
			Sample Date	
Project Number		24780158		
Project Name		Lynn Bark Solar		
Client Name		Savion, LLC		
Client Address				
KeyLAB ID	CINC2025021738	Sample Type	SS	
Location ID	B-12	Sample Top Depth	3.5	
Sample Reference	SS-2	Sample Base Depth	5	
Description		Method	ASTM D422	
Classification:	CLAYEY SAND (SC)			



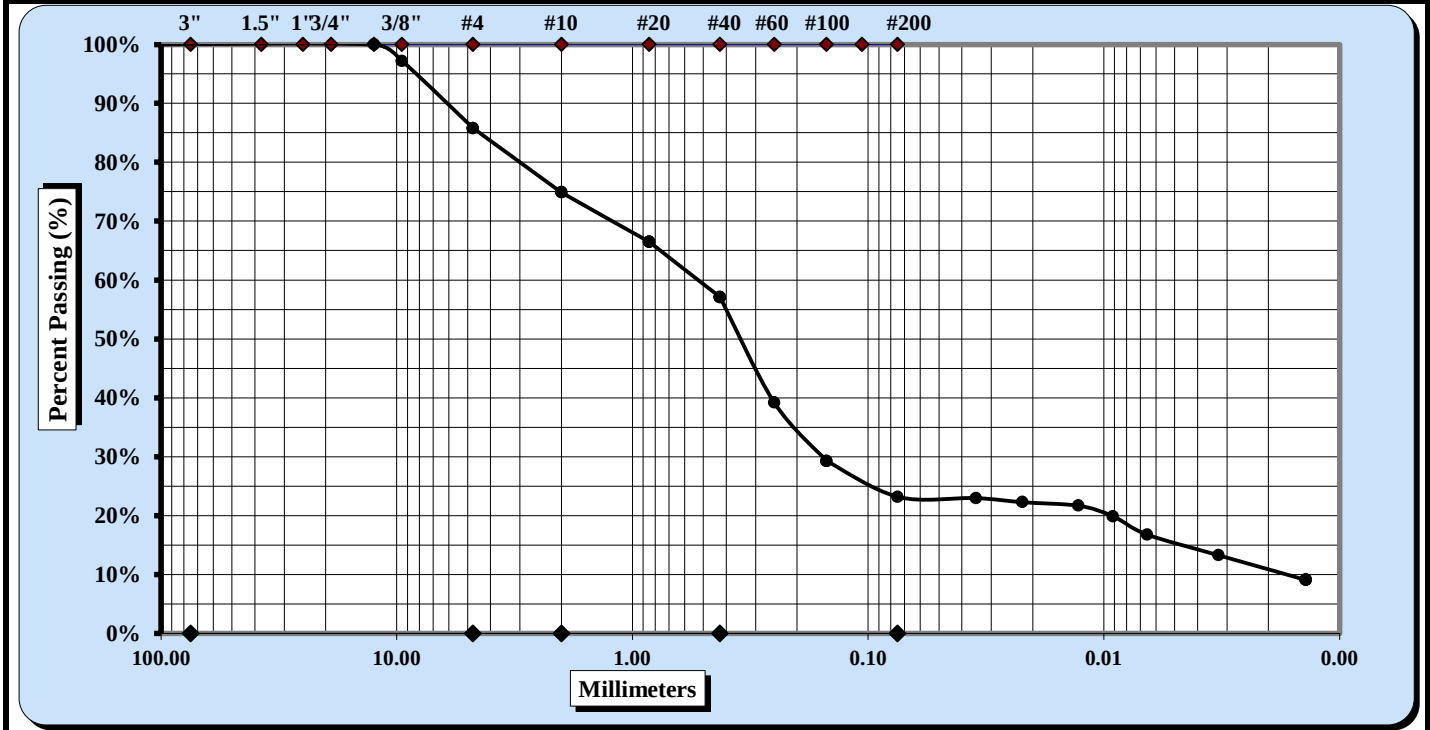
ASTM PARTICLE SIZE DEFINITIONS					
Cobbles	< 300 mm (12") and > 75 mm (3")	Medium Sand	< 2.00 mm and > 0.425 mm (#40)		
Gravel	< 75 mm and > 4.75 mm (#4)	Fine Sand	< 0.425 mm and > 0.075 mm		
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Silt & Clay	< 0.075		
Maximum Particle Size	12.5 mm	Coarse Sand	9.3	Fine Sand	19.1
Gravel	8.7	Medium Sand	13.4	Silt & Clay	49.5
Liquid Limit	29	Plastic Limit	17	Plastic Index	12

Description of Sand & Gravel Particles:		Rounded	☒	Angular	☐
Hard & Durable	☒	Soft	☐	Weathered & Friable	☐
Dispersion Method:	Stirrer	Dispersion Period:	1 min	Dispersing Agent:	Sodium Hex. Solution

References / Comments / Deviations:

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	ASTM D422: Standard Test Methods for Particle-Size Distribution (Gradation) of Soils	Report Number	
		Report Date	
		Test Date	2/12/2025
		Sample Date	
Project Number	24780158		
Project Name	Lynn Bark Solar		
Client Name	Savion, LLC		
Client Address			
KeyLAB ID	CINC2025021739	Sample Type	SS
Location ID	B-12	Sample Top Depth	13.5
Sample Reference	SS-5	Sample Base Depth	15
Description		Method	ASTM D422
Classification:	SILTY, CLAYEY SAND (SC-SM)		

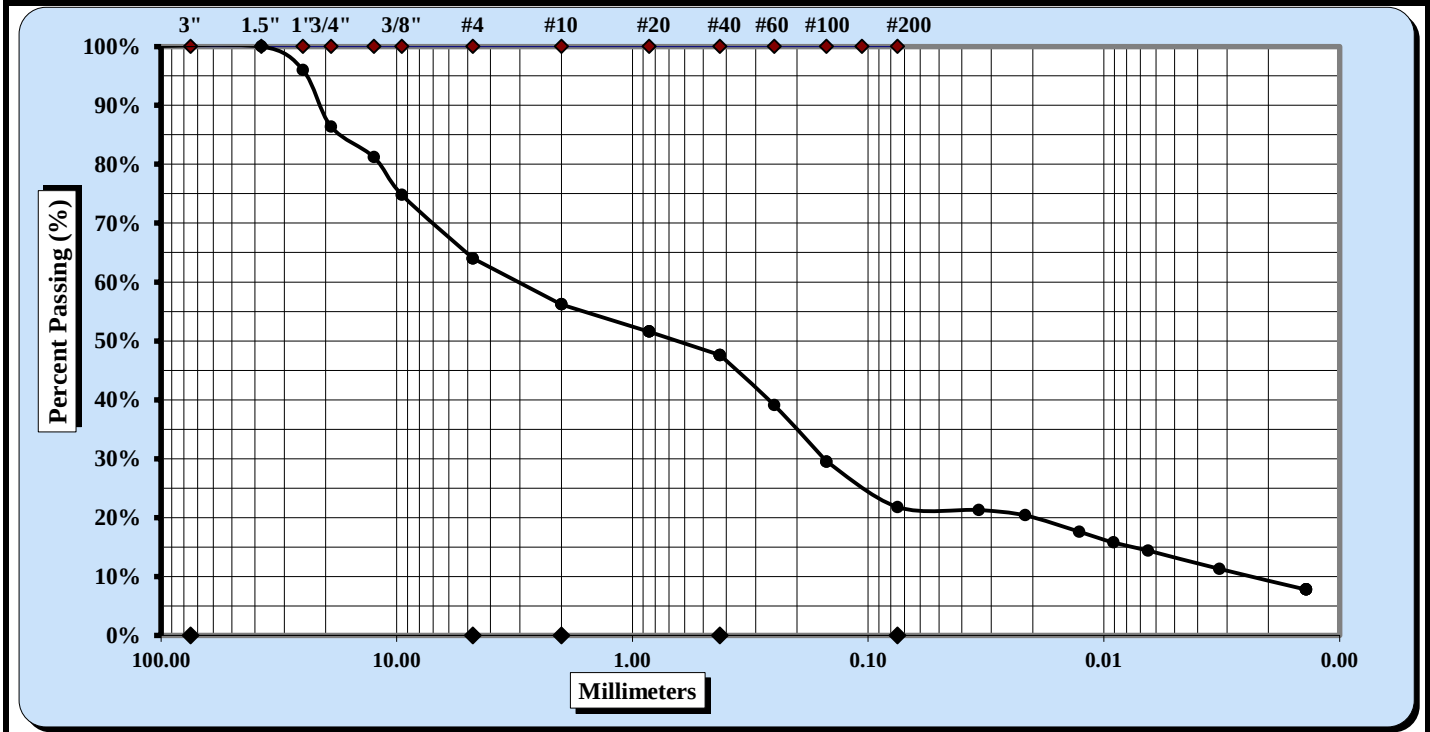


ASTM PARTICLE SIZE DEFINITIONS			
Cobbles	< 300 mm (12") and > 75 mm (3")	Medium Sand	< 2.00 mm and > 0.425 mm (#40)
Gravel	< 75 mm and > 4.75 mm (#4)	Fine Sand	< 0.425 mm and > 0.075 mm
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Silt & Clay	< 0.075
Maximum Particle Size	12.5 mm	Coarse Sand	10.9
		Fine Sand	33.9
Gravel	14.2	Medium Sand	17.8
		Silt & Clay	23.2
Liquid Limit	21	Plastic Limit	14
		Plastic Index	7
Cc = 27.52 Cu = 315.21			
Description of Sand & Gravel Particles:		Rounded	☒
		Angular	☐
Hard & Durable		☒	Soft
		☐	Weathered & Friable
		☐	☐
Dispersion Method:	Stirrer	Dispersion Period:	1 min
		Dispersing Agent:	Sodium Hex. Solution

References / Comments / Deviations:

ASTM D422: Standard Test Methods for Particle-Size Distribution (Gradation) of Soils

	ASTM D6913: Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis		Report Number	
			Report Date	
			Test Date	2/12/2025
			Sample Date	
Project Number		24780158		
Project Name		Lynn Bark Solar		
Client Name		Savion, LLC		
Client Address				
KeyLAB ID	CINC2025021744	Sample Type	SS	
Location ID	B-14	Sample Top Depth	6	
Sample Reference	SS-3	Sample Base Depth	7.5	
Description		Method	ASTM D6913 Method B	
Classification:	CLAYEY SAND WITH GRAVEL (SC)			



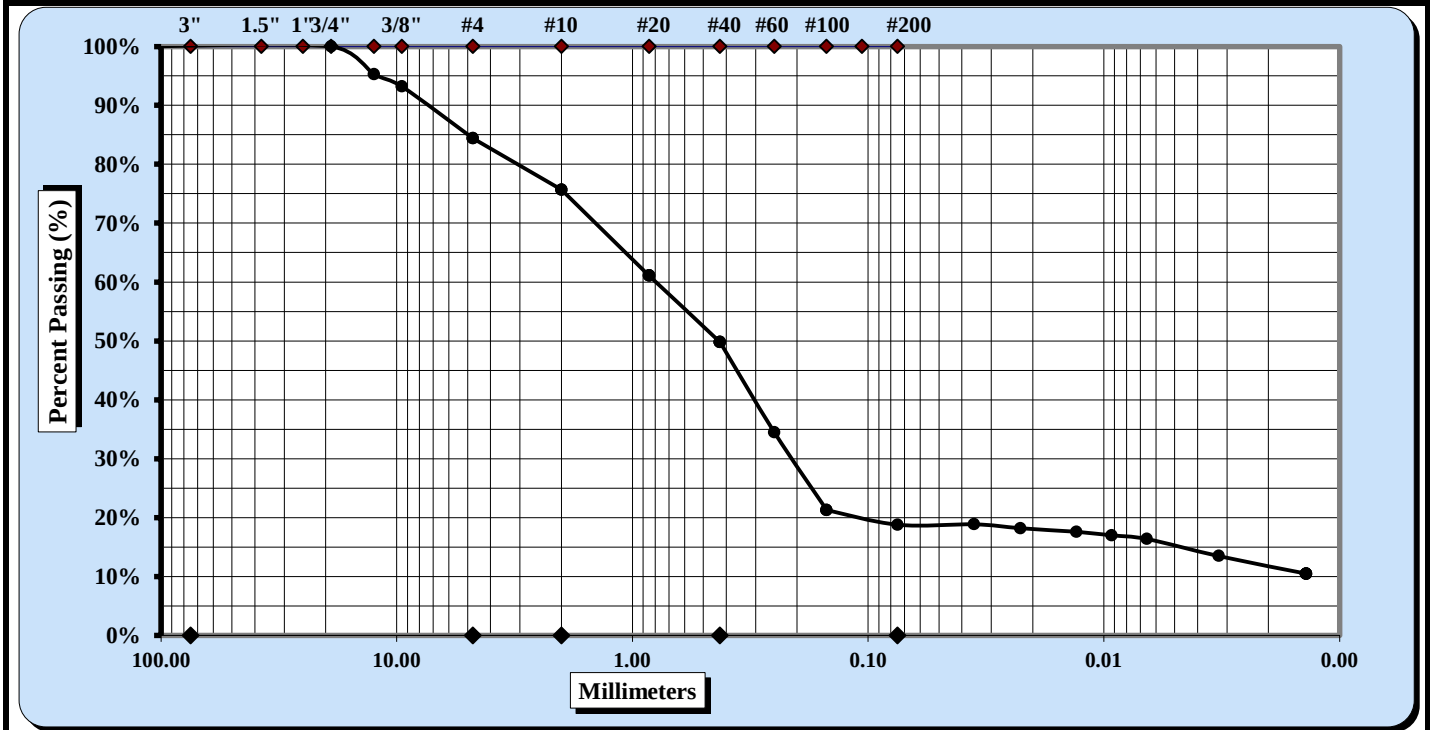
ASTM PARTICLE SIZE DEFINITIONS			
Cobbles	< 300 mm (12") and > 75 mm (3")	Medium Sand	< 2.00 mm and > 0.425 mm (#40)
Gravel	< 75 mm and > 4.75 mm (#4)	Fine Sand	< 0.425 mm and > 0.075 mm
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Silt & Clay	< 0.075

Maximum Particle Size	37.5 mm	Coarse Sand	7.8	Fine Sand	25.8
Gravel	36.0	Medium Sand	8.6	Silt & Clay	21.8
Liquid Limit	22	Plastic Limit	14	Plastic Index	8
Cc =		3.30	Cu =		1292.47

Description of Sand & Gravel Particles:		Rounded	☒	Angular	☐
Hard & Durable	☒	Soft	☐	Weathered & Friable	☐
Dispersion Method:	Stirrer	Dispersion Period:	1 min	Dispersing Agent:	Sodium Hex. Solution

References / Comments / Deviations:

	ASTM D422: Standard Test Methods for Particle-Size Distribution (Gradation) of Soils	Report Number	
		Report Date	
		Test Date	2/12/2025
		Sample Date	
Project Number	24780158		
Project Name	Lynn Bark Solar		
Client Name	Savion, LLC		
Client Address			
KeyLAB ID	CINC2025021745	Sample Type	SS
Location ID	B-15	Sample Top Depth	1
Sample Reference	SS-1	Sample Base Depth	2.5
Description		Method	ASTM D422
Classification:	SILTY, CLAYEY SAND WITH GRAVEL (SC-SM)		



ASTM PARTICLE SIZE DEFINITIONS			
Cobbles	< 300 mm (12") and > 75 mm (3")	Medium Sand	< 2.00 mm and > 0.425 mm (#40)
Gravel	< 75 mm and > 4.75 mm (#4)	Fine Sand	< 0.425 mm and > 0.075 mm
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Silt & Clay	< 0.075
Maximum Particle Size	19 mm	Coarse Sand	8.7
		Fine Sand	31.0
Gravel	15.6	Medium Sand	25.9
		Silt & Clay	18.8
Liquid Limit	21	Plastic Limit	14
		Plastic Index	7

Description of Sand & Gravel Particles:	Rounded	☒	Angular	☐	
Hard & Durable	☒	Soft	☐	Weathered & Friable	☐
Dispersion Method:	Stirrer	Dispersion Period:	1 min	Dispersing Agent:	Sodium Hex. Solution

References / Comments / Deviations:

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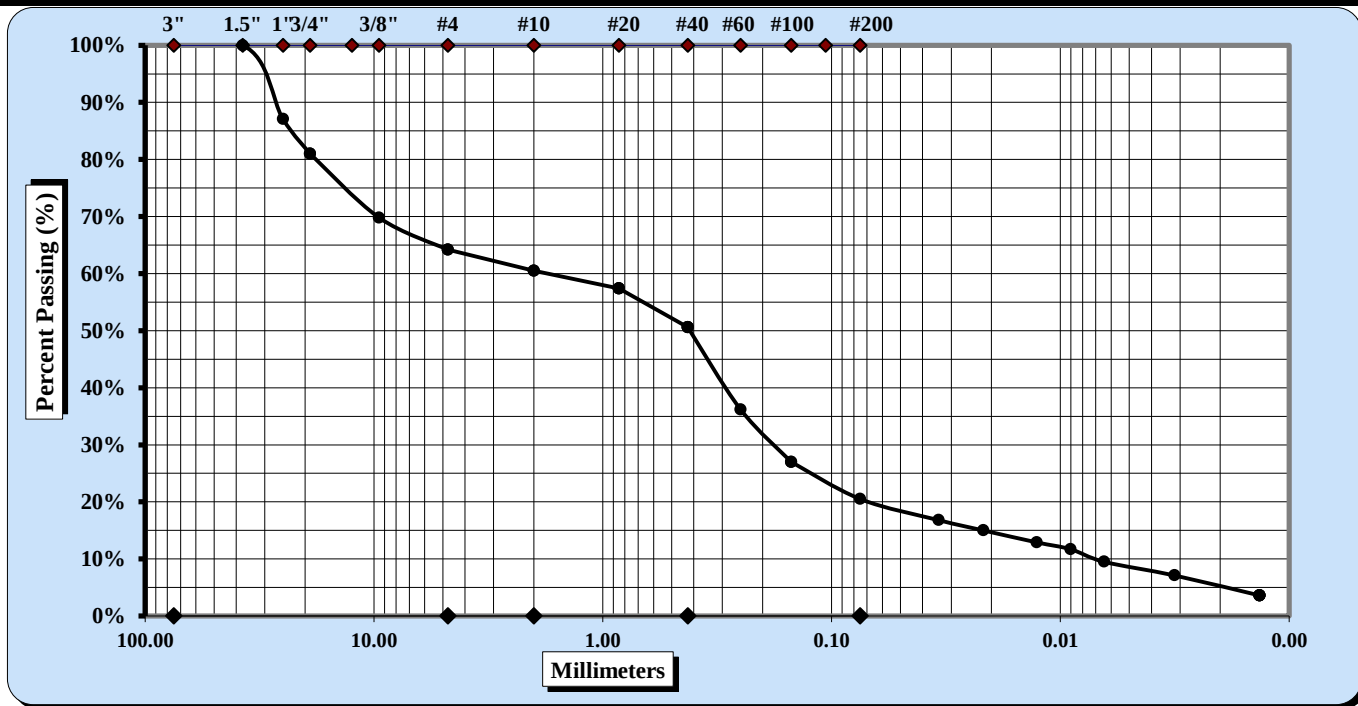
Signature



**ASTM D6913: Standard Test Methods for
Particle-Size Distribution (Gradation) of Soils
Using Sieve Analysis**

Report Number	LEXI_25001668
Report Date	2/24/2025
Test Date	2/10/2025
Sample Date	

Project Number	24780158TP		
Project Name	Lynn Bark Solar		
Client Name	Savion, LLC		
Client Address	4300 Market Pointe Dr.Minneapolis, MN 55435		
KeyLAB ID	LEXI202502190	Sample Type	Grab
Location ID	TP-01	Sample Top Depth	0
Sample Reference	Bulk-1	Sample Base Depth	5
Description	brown	Method	ASTM D6913 Method B
Classification:	SILTY SAND WITH GRAVEL (SM)		

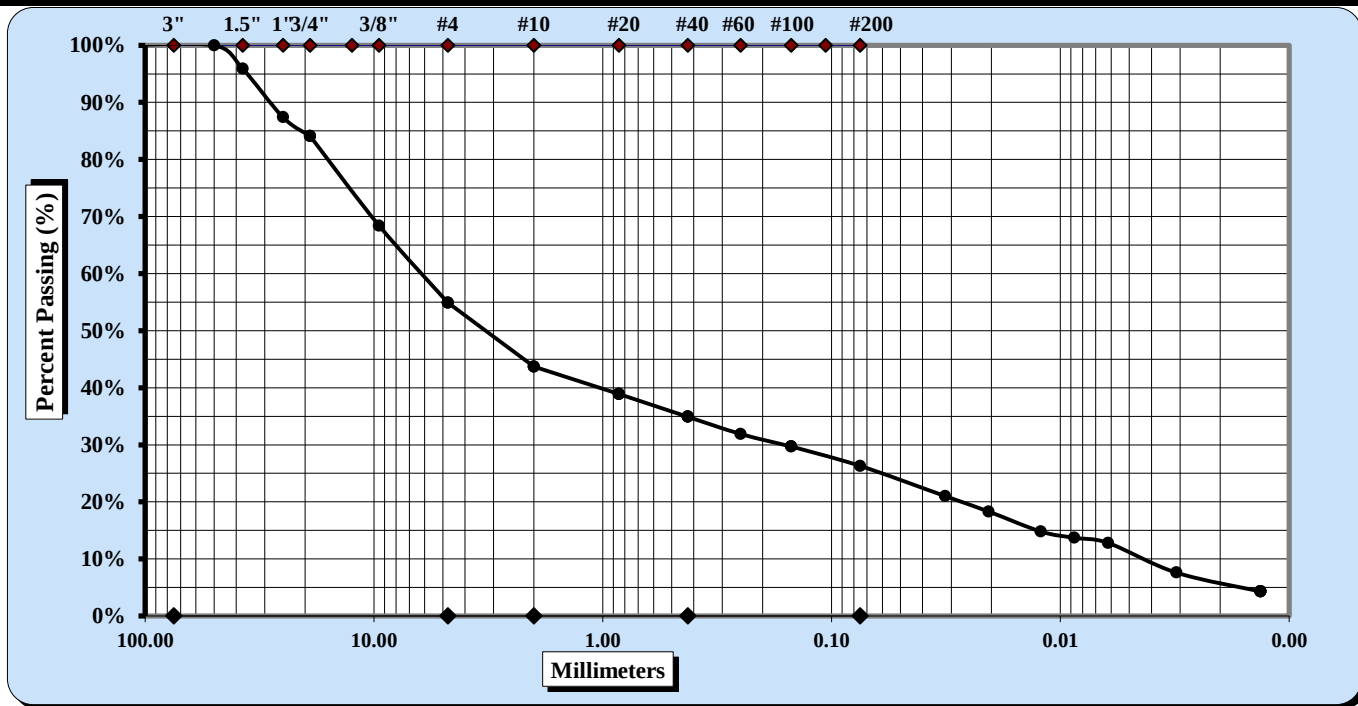




**ASTM D6913: Standard Test Methods for
Particle-Size Distribution (Gradation) of Soils
Using Sieve Analysis**

Report Number	LEXI_25001669
Report Date	2/24/2025
Test Date	2/10/2025
Sample Date	

Project Number	24780158TP		
Project Name	Lynn Bark Solar		
Client Name	Savion, LLC		
Client Address	4300 Market Pointe Dr.Minneapolis, MN 55435		
KeyLAB ID	LEXI202502191	Sample Type	Grab
Location ID	TP-02	Sample Top Depth	0
Sample Reference	Bulk-1	Sample Base Depth	5
Description	dark gray	Method	ASTM D6913 Method B
Classification:	CLAYEY GRAVEL WITH SAND (GC)		



ASTM PARTICLE SIZE DEFINITIONS

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

Maximum Particle Size	50 mm	Coarse Sand	11.2	Fine Sand	8.6
Gravel	45.1	Medium Sand	8.8	Silt & Clay	26.3
Liquid Limit	30	Plastic Limit	21	Plastic Index	9

Cc = 0.98 Cu = 1443.48

Description of Sand & Gravel Particles:		Rounded	☐	Angular	☒
Hard & Durable	☐	Soft	☐	Weathered & Friable	☒
Dispersion Method:	Stirrer				

References / Comments / Deviations:

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JLamothe

Tested by

Lexington

jfolson

Approved by

2020 Liberty Road, Suite 105, Lexington, KY 40505

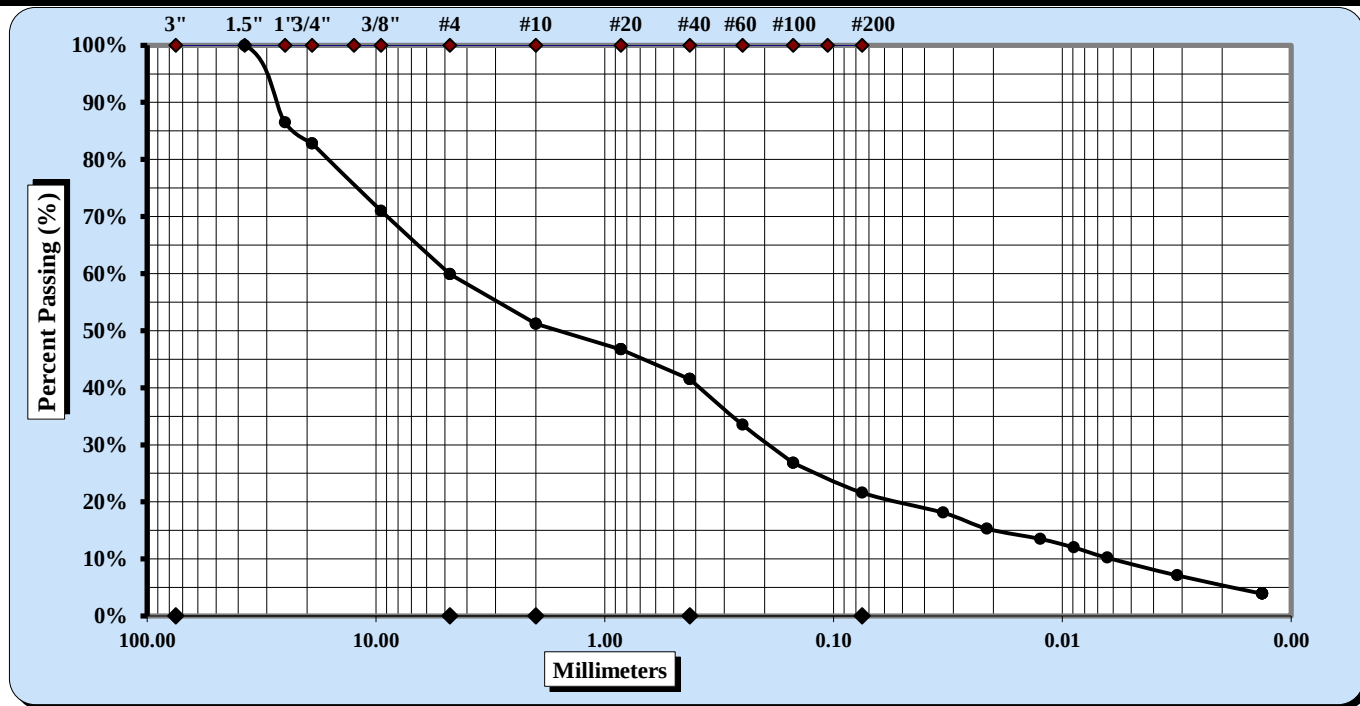
Signature



**ASTM D6913: Standard Test Methods for
Particle-Size Distribution (Gradation) of Soils
Using Sieve Analysis**

Report Number	LEXI_25001670
Report Date	2/24/2025
Test Date	2/10/2025
Sample Date	

Project Number	24780158TP		
Project Name	Lynn Bark Solar		
Client Name	Savion, LLC		
Client Address	4300 Market Pointe Dr.Minneapolis, MN 55435		
KeyLAB ID	LEXI202502192	Sample Type	Grab
Location ID	TP-03	Sample Top Depth	0
Sample Reference	Bulk-1	Sample Base Depth	5
Description	dark brown	Method	ASTM D6913 Method B
Classification:	SILTY GRAVEL WITH SAND (GM)		

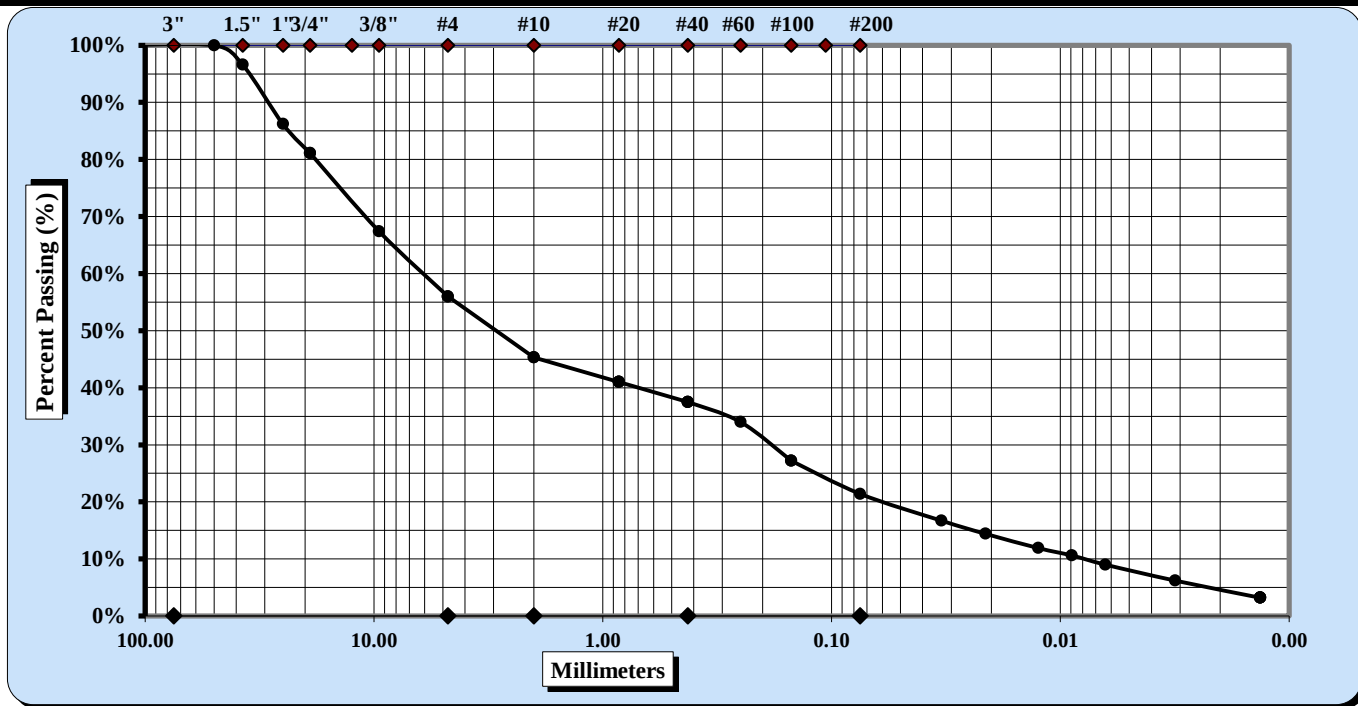




**ASTM D6913: Standard Test Methods for
Particle-Size Distribution (Gradation) of Soils
Using Sieve Analysis**

Report Number	LEXI_25001671
Report Date	2/24/2025
Test Date	2/10/2025
Sample Date	

Project Number	24780158TP		
Project Name	Lynn Bark Solar		
Client Name	Savion, LLC		
Client Address	4300 Market Pointe Dr.Minneapolis, MN 55435		
KeyLAB ID	LEXI202502193	Sample Type	Grab
Location ID	TP-04	Sample Top Depth	0
Sample Reference	Bulk-1	Sample Base Depth	5
Description	gray	Method	ASTM D6913 Method B
Classification:	SILTY GRAVEL WITH SAND (GM)		



ASTM PARTICLE SIZE DEFINITIONS

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

Maximum Particle Size	50 mm	Coarse Sand	10.7	Fine Sand	16.1
Gravel	44.0	Medium Sand	7.8	Silt & Clay	21.4
Liquid Limit		Plastic Limit	0	Plastic Index	
Cc = 0.72		Cu = 771.48			

Description of Sand & Gravel Particles:		Rounded	☐	Angular	☒
Hard & Durable	☐	Soft	☒	Weathered & Friable	☐
Dispersion Method:	Stirrer				

References / Comments / Deviations:

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JLamothe

Tested by

Lexington

jfolson

Approved by

2020 Liberty Road, Suite 105, Lexington, KY 40505

Signature

MOISTURE - DENSITY REPORT



*Note: An oversize correction, found in bottom right box,
applies to these density/moisture values.*

Quality Assurance

ASTM D 698 Method C

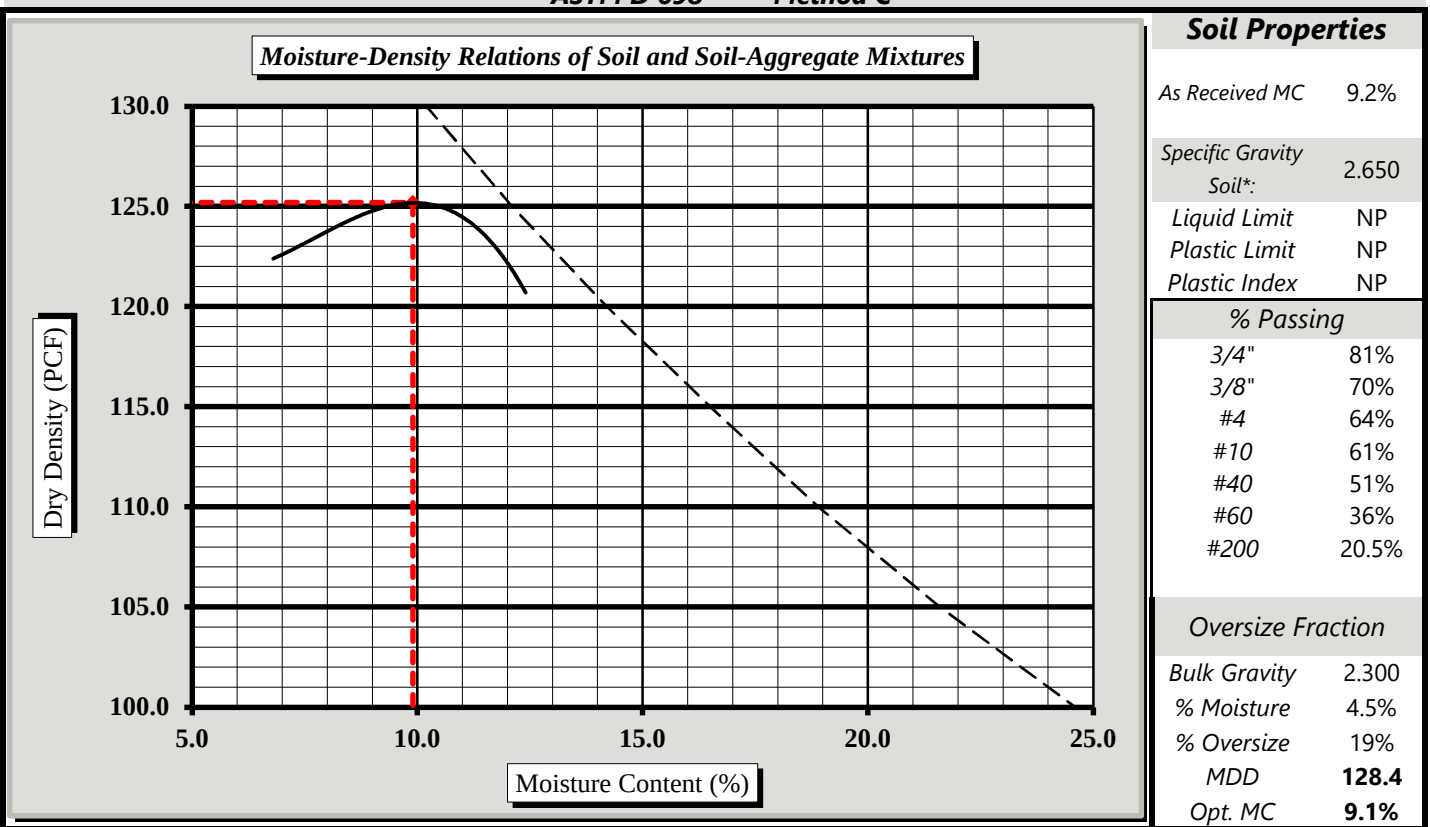
S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	24780158	Report Date:	02/20/25	
Project Name:	Lynn Bark Solar	Test Date(s):	02/05/25	
Client Name:	Savion, LLC			
Client Address:	4300 Market Pointe Dr. Minneapolis, MN 55435			
	Sample No.:	P-1	Sample Date:	01/16/25
Location:	TP-01	Depth (ft.):	0.0 - 5.0	
Sample Description:	SILTY SAND WITH GRAVEL (SM)			

Maximum Dry Density 125.2 PCF.

Optimum Moisture Content 9.9%

ASTM D 698 - - Method C



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 ☒ sector face Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒
References / Comments / Deviations: NA = Not Applicable; ND = Not Determined. *Specific gravity of soil assumed.

Jacob Folsom
Technical Responsibility

Jacob Folsom
Signature

Lab Services Manager
Position

2/24/2025
Date

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MOISTURE - DENSITY REPORT



Note: An oversize correction, found in bottom right box, applies to these density/moisture values.

Quality Assurance

ASTM D 698 Method C

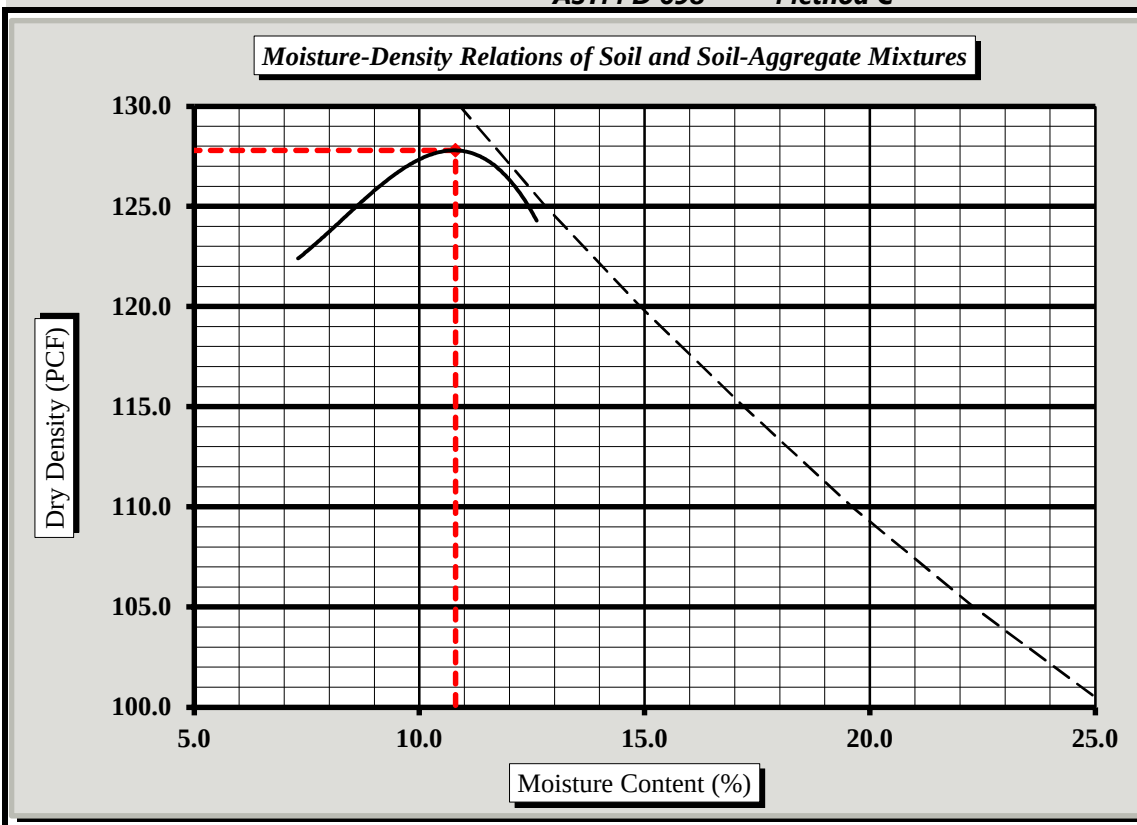
S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	24780158	Report Date:	02/20/25
Project Name:	Lynn Bark Solar	Test Date(s):	02/05/25
Client Name:	Savion, LLC		
Client Address:	4300 Market Pointe Dr. Minneapolis, MN 55435		
Sample No.:	P-2	Sample Date:	01/16/25
Location:	TP-02	Depth (ft.):	0.0 - 5.0
Sample Description:	CLAYEY GRAVEL WITH SAND (GC)		

Maximum Dry Density 127.8 PCF.

Optimum Moisture Content 10.8%

ASTM D 698 - - Method C



Soil Properties

As Received MC 10.6%

Specific Gravity Soil*: 2.700

Liquid Limit 30

Plastic Limit 21

Plastic Index 9

% Passing

3/4"	84%
3/8"	68%
#4	55%
#10	44%
#40	35%
#60	32%
#200	26.3%

Oversize Fraction**

Bulk Gravity	2.464
% Moisture	4.4%
% Oversize	8%
MDD	129.5
Opt. MC	10.3%

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 ☒ sector face Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined. *Specific gravity of soil assumed.

**Gravel particles were friable; degradation of the sample led to discrepancies in oversize fraction.

Jacob Folsom
Technical Responsibility

Jacob Folsom
Signature

Lab Services Manager
Position

2/24/2025
Date

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MOISTURE - DENSITY REPORT



*Note: An oversize correction, found in bottom right box,
applies to these density/moisture values.*

Quality Assurance

ASTM D 698 Method C

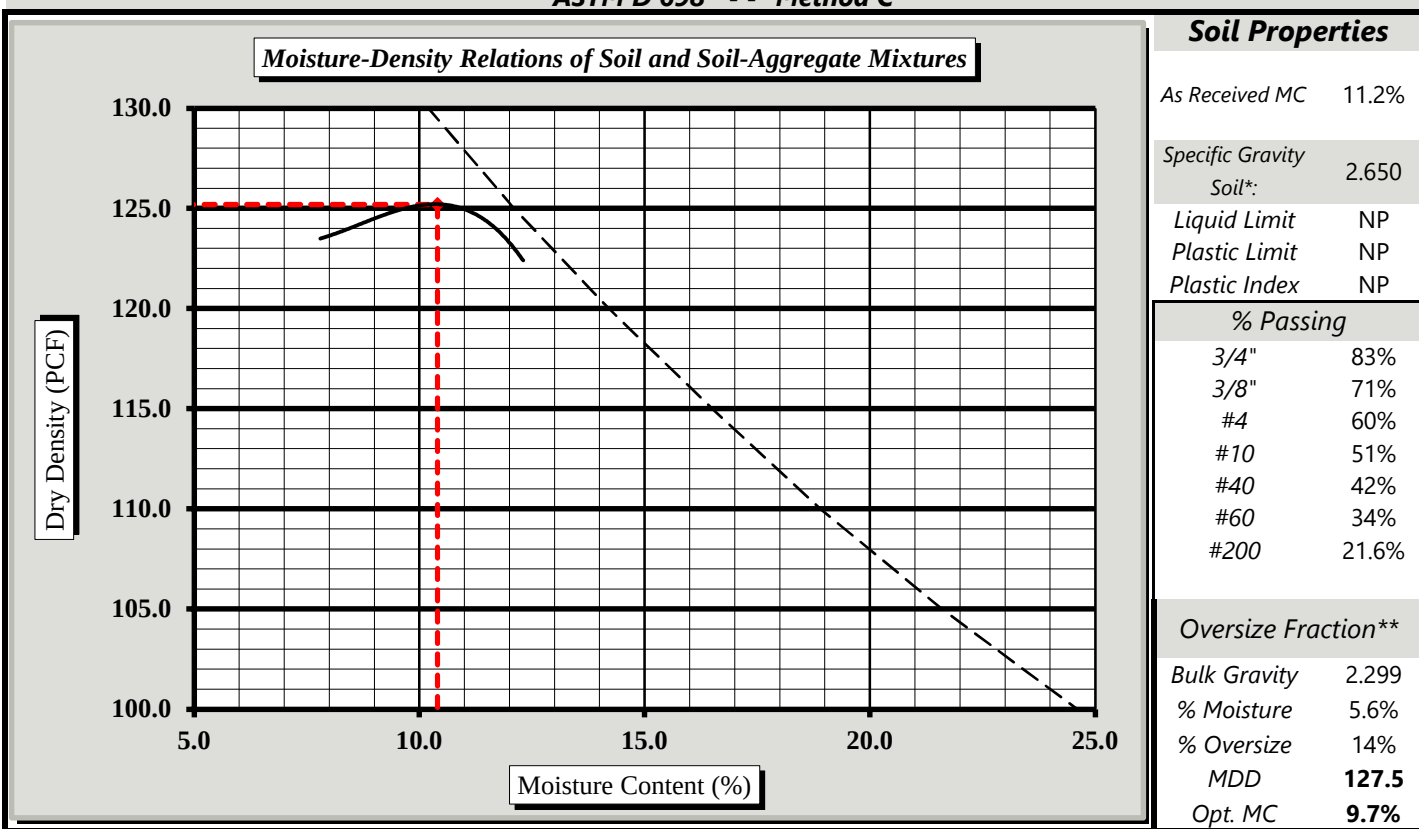
S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	24780158	Report Date:	02/20/25
Project Name:	Lynn Bark Solar	Test Date(s):	02/06/25
Client Name:	Savion, LLC		
Client Address:	4300 Market Pointe Dr. Minneapolis, MN 55435		
Sample No.:	P-3	Sample Date:	01/16/25
Location:	TP-03	Depth (ft.):	0.0 - 5.0
Sample Description:	SILTY GRAVEL WITH SAND (GM)		

Maximum Dry Density 125.2 PCF.

Optimum Moisture Content 10.4%

ASTM D 698 - - Method C



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 ☒ sector face Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒
References / Comments / Deviations: NA = Not Applicable; ND = Not Determined. *Specific gravity of soil assumed.

**Gravel particles were friable; degradation of the sample led to discrepancies in oversize fraction.

Jacob Folsom
Technical Responsibility

Jacob Folsom
Signature

Lab Services Manager
Position

2/24/2025
Date

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MOISTURE - DENSITY REPORT



Note: An oversize correction, found in bottom right box, applies to these density/moisture values.

Quality Assurance

ASTM D 698 Method C

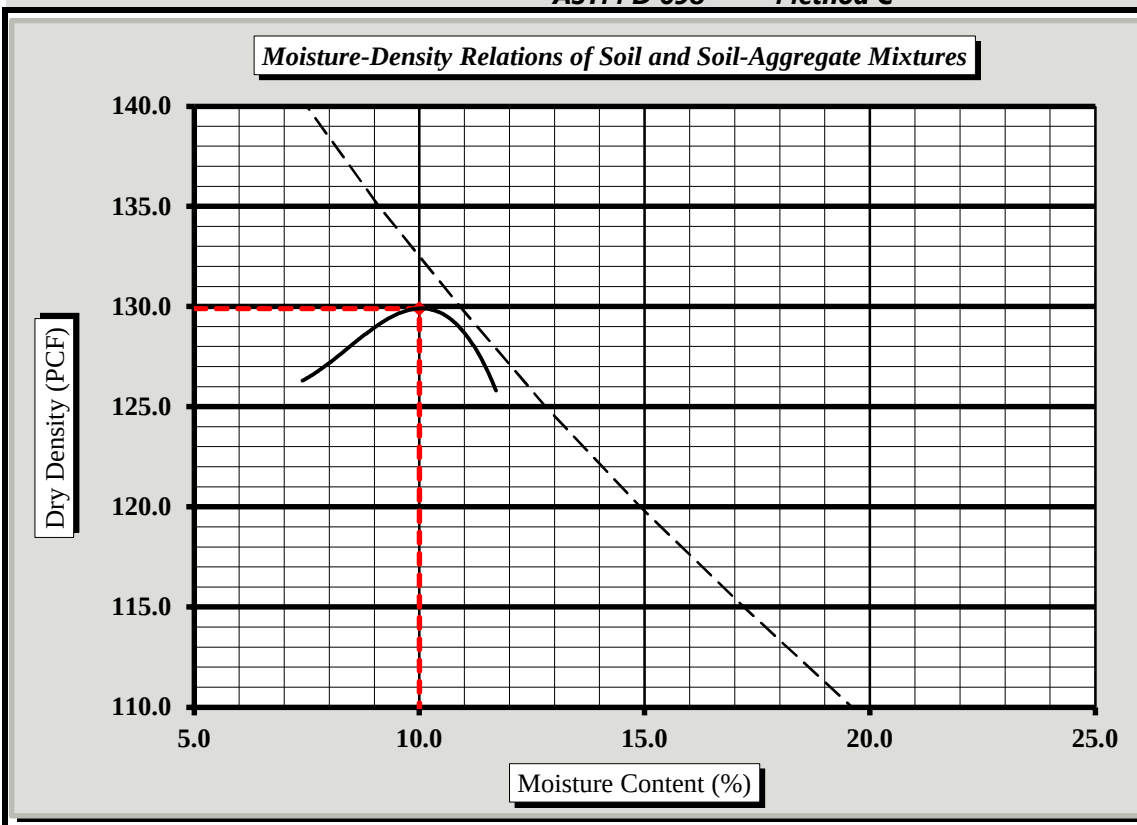
S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	24780158	Report Date:	02/20/25
Project Name:	Lynn Bark Solar	Test Date(s):	02/06/25
Client Name:	Savion, LLC		
Client Address:	4300 Market Pointe Dr. Minneapolis, MN 55435		
Sample No.:	P-4	Sample Date:	01/16/25
Location:	TP-04	Depth (ft.):	0.0 - 5.0
Sample Description:	SILTY GRAVEL WITH SAND (GM)		

Maximum Dry Density 129.9 PCF.

Optimum Moisture Content 10.0%

ASTM D 698 - - Method C



Soil Properties

As Received MC 12.2%

Specific Gravity Soil*: 2.700

Liquid Limit NP

Plastic Limit NP

Plastic Index NP

% Passing

3/4"	81%
3/8"	67%
#4	56%
#10	45%
#40	38%
#60	34%
#200	21.4%

Oversize Fraction**

Bulk Gravity	2.399
% Moisture	4.5%
% Oversize	31%
MDD	135.4
Opt. MC	8.3%

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 ☒ sector face Manual Rammer ☐ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: NA = Not Applicable; ND = Not Determined. *Specific gravity of soil assumed.

**Gravel particles were friable; degradation of the sample led to discrepancies in oversize fraction.

Jacob Folsom
Technical Responsibility

Jacob Folsom
Signature

Lab Services Manager
Position

2/24/2025
Date

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CBR (CALIFORNIA BEARING RATIO) OF LABORATORY COMPACTED SOIL



ASTM D 1883

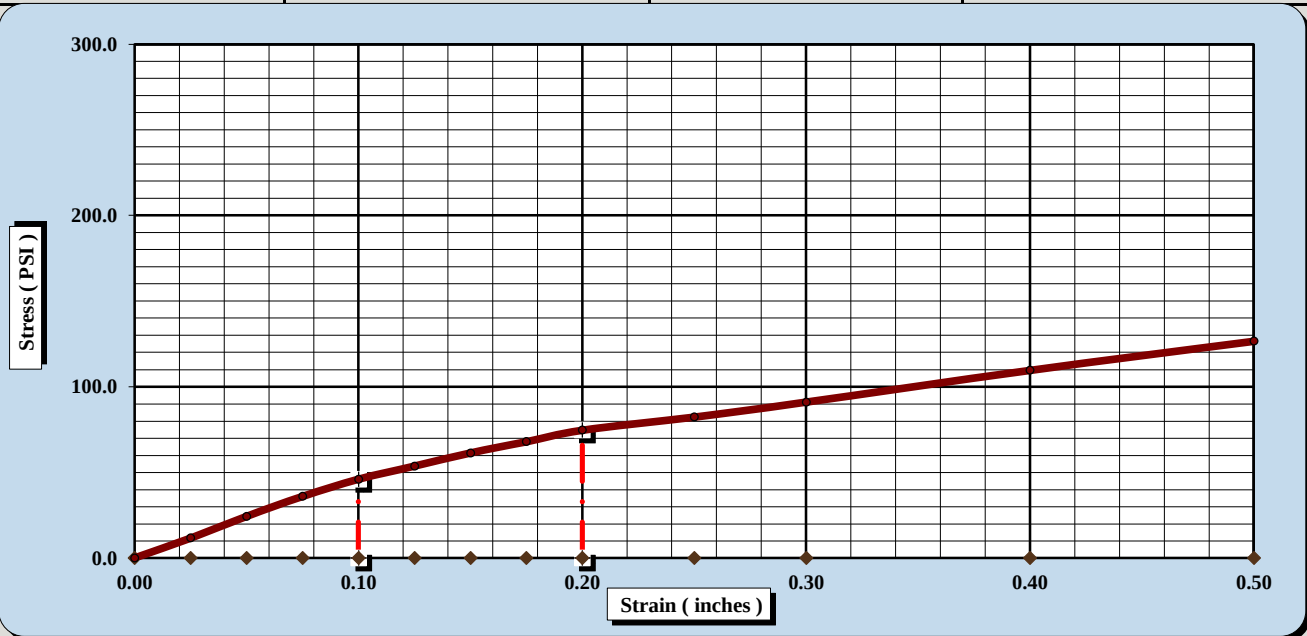
S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	24780158	Report Date:	02/20/25
Project Name:	Lynn Bark Solar	Test Date(s)	02/13/25
Client Name:	Savion, LLC		
Client Address:	4300 Market Pointe Dr. Minneapolis, MN 55435		
Type:	Bulk	Sample #:	P-2
		Sample Date:	01/16/25
Location:	TP-02	Depth (ft.):	0.0 - 5.0

Sample Description: CLAYEY GRAVEL WITH SAND (GC)

ASTM D 698	Method C	Maximum Dry Density:	127.8	PCF	Optimum Moisture Content:	10.8%
Compaction Test performed on grading complying with CBR spec.					% Retained on the 3/4" sieve:	15.9%

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in.	4.6	CBR at 0.1 in.	4.6
CBR at 0.2 in.	5.0	CBR at 0.2 in.	5.0



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with ASTM D1883, Section 6.1.1

Before Soaking		After Soaking	
Compactive Effort (Blows per Layer)	20		
Initial Dry Density (PCF)	118.6	Final Dry Density (PCF)	118.6
Moisture Content of the Compacted Specimen	10.7%	Moisture Content (top 1" after soaking)	12.7%
Percent Compaction	92.8%	Percent Swell	0.2%

Soak Time:	96	Surcharge Weight:	10.0	Surcharge Wt. per sq. Ft.:	50.9
Liquid Limit:	30	Plastic Index:	9		

Notes/Deviations/References:

Jacob Folsom
Technical Responsibility

Jacob Folsom
Signature

Lab Services Manager
Position

2/24/2025
Date

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CBR (CALIFORNIA BEARING RATIO) OF LABORATORY COMPACTED SOIL



ASTM D 1883

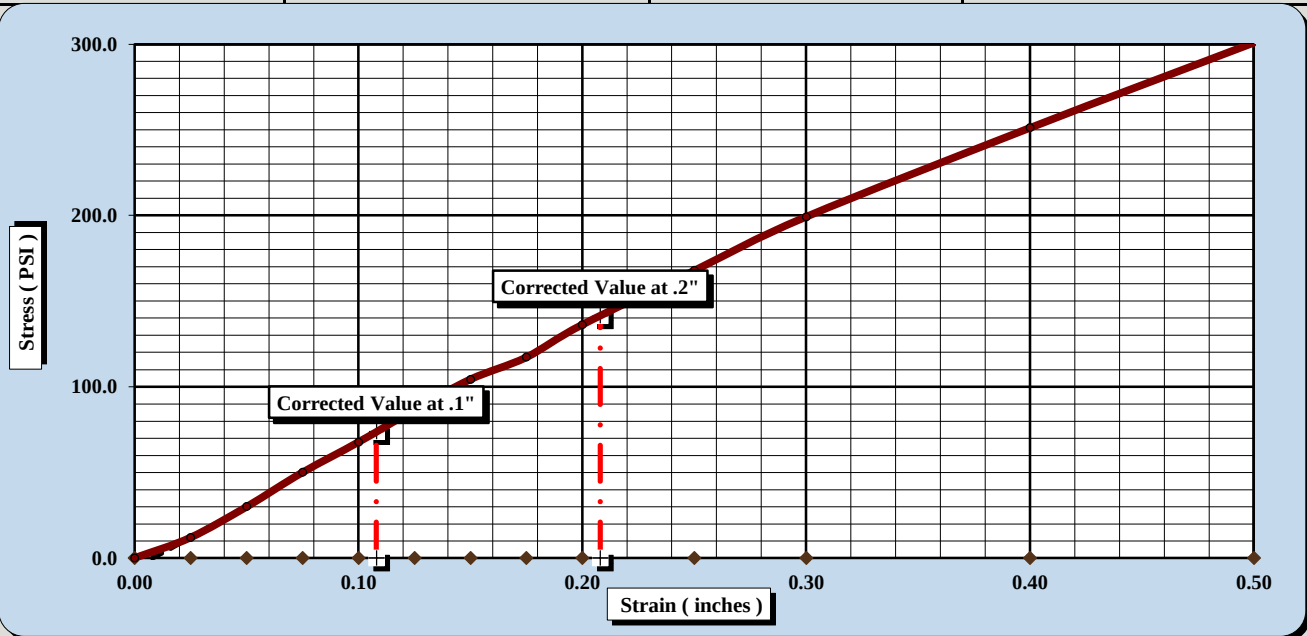
S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project #:	24780158	Report Date:	02/20/25
Project Name:	Lynn Bark Solar	Test Date(s)	02/13/25
Client Name:	Savion, LLC		
Client Address:	4300 Market Pointe Dr. Minneapolis, MN 55435		
Type:	Bulk	Sample #:	P-2
		Sample Date:	01/16/25
Location:	TP-02	Depth (ft.):	0.0 - 5.0

Sample Description: CLAYEY GRAVEL WITH SAND (GC)

ASTM D 698	Method C	Maximum Dry Density:	127.8	PCF	Optimum Moisture Content:	10.8%
Compaction Test performed on grading complying with CBR spec.					% Retained on the 3/4" sieve:	15.9%

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in.	6.8	CBR at 0.1 in.	7.4
CBR at 0.2 in.	9.1	CBR at 0.2 in.	9.4



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with ASTM D1883, Section 6.1.1

Before Soaking		After Soaking	
Compactive Effort (Blows per Layer)	56	Final Dry Density (PCF)	128.0
Initial Dry Density (PCF)	128.1	Moisture Content (top 1" after soaking)	11.8%
Moisture Content of the Compacted Specimen	11.0%	Percent Swell	0.2%
Percent Compaction	100.2%		

Soak Time:	96	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	50.8
Liquid Limit	30	Plastic Index	9		

Notes/Deviations/References:

Jacob Folsom
Technical Responsibility

Jacob Folsom
Signature

Lab Services Manager
Position

2/24/2025
Date

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CBR (CALIFORNIA BEARING RATIO) OF LABORATORY COMPACTED SOIL

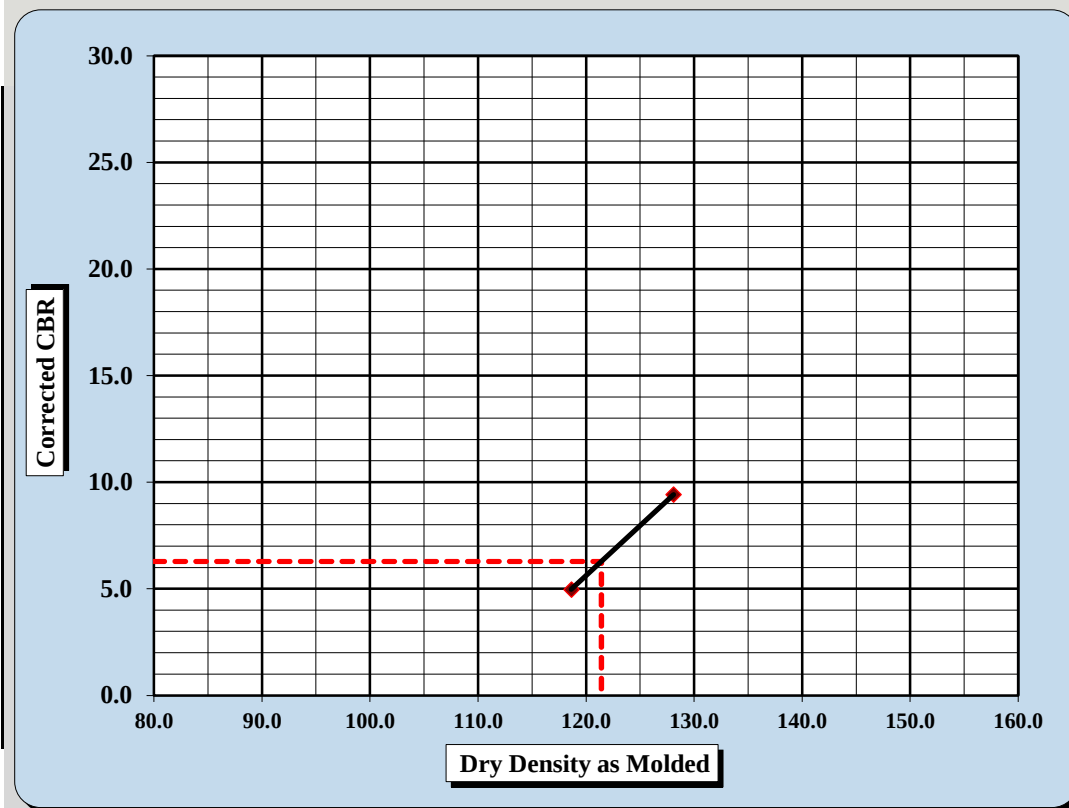


ASTM D 1883

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

Project #:	24780158	Report Date:	02/20/25
Project Name:	Lynn Bark Solar	Test Date(s)	02/13/25
Client Name:	Savion, LLC		
Client Address:	4300 Market Pointe Dr. Minneapolis, MN 55435		
Type:	Bulk	Sample #:	P-2
		Sample Date:	01/16/25
Location:	TP-02	Depth (ft.):	0.0 - 5.0
Sample Description:	CLAYEY GRAVEL WITH SAND (GC)		

Dry Unit Weight vs. Corrected CBR Values



Series 1	
Dry Wt. PCF	CBR
118.6	5.0
128.1	9.4
Series 2: Design CBR	
80	6.3
121.4	6.3
121.4	0

Notes / Deviations / References: Interpolated CBR Value for 95% compaction: **6.3**Jacob Folsom

Technical Responsibility

Jacob Folsom

Signature

Lab Services Manager

Position

2/24/2025

Date

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ANALYTICAL REPORT

PREPARED FOR

Attn: Jacob Folsom
S&ME Inc
2020 Liberty Rd
Suite 105
Lexington, Kentucky 40505

Generated 2/24/2025 11:43:09 AM

JOB DESCRIPTION

Lynn Bark Solar

JOB NUMBER

705-20883-1

Client Sample Results

Client: S&ME Inc
Project/Site: Lynn Bark Solar

Job ID: 705-20883-1

Client Sample ID: TP-01

Lab Sample ID: 705-20883-1

Date Collected: 02/16/25 12:00

Matrix: Solid

Date Received: 02/17/25 15:40

Percent Solids: 92.3

Method: SW846 9056A - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	11		11	mg/Kg	☼		02/18/25 20:32	1
Sulfate	39		11	mg/Kg	☼		02/18/25 20:32	1

Client Sample ID: TP-02

Lab Sample ID: 705-20883-2

Date Collected: 02/16/25 12:00

Matrix: Solid

Date Received: 02/17/25 15:40

Percent Solids: 90.1

Method: SW846 9056A - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	14		11	mg/Kg	☼		02/18/25 20:44	1
Sulfate	50		11	mg/Kg	☼		02/18/25 20:44	1

Client Sample ID: TP-03

Lab Sample ID: 705-20883-3

Date Collected: 02/16/25 12:00

Matrix: Solid

Date Received: 02/17/25 15:40

Percent Solids: 87.9

Method: SW846 9056A - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	11		11	mg/Kg	☼		02/18/25 20:56	1
Sulfate	45		11	mg/Kg	☼		02/18/25 20:56	1

Client Sample ID: TP-04

Lab Sample ID: 705-20883-4

Date Collected: 02/16/25 12:00

Matrix: Solid

Date Received: 02/17/25 15:40

Percent Solids: 89.1

Method: SW846 9056A - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	17		11	mg/Kg	☼		02/18/25 21:43	1
Sulfate	54		11	mg/Kg	☼		02/18/25 21:43	1

Detection Summary

Client: S&ME Inc
Project/Site: Lynn Bark Solar

Job ID: 705-20883-1

Client Sample ID: TP-01

Lab Sample ID: 705-20883-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	11		11	mg/Kg	1	✱	9056A	Soluble
Sulfate	39		11	mg/Kg	1	✱	9056A	Soluble

Client Sample ID: TP-02

Lab Sample ID: 705-20883-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	14		11	mg/Kg	1	✱	9056A	Soluble
Sulfate	50		11	mg/Kg	1	✱	9056A	Soluble

Client Sample ID: TP-03

Lab Sample ID: 705-20883-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	11		11	mg/Kg	1	✱	9056A	Soluble
Sulfate	45		11	mg/Kg	1	✱	9056A	Soluble

Client Sample ID: TP-04

Lab Sample ID: 705-20883-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	17		11	mg/Kg	1	✱	9056A	Soluble
Sulfate	54		11	mg/Kg	1	✱	9056A	Soluble

This Detection Summary does not include radiochemical test results.

Eurofins Atlanta

Lab Chronicle

Client: S&ME Inc
Project/Site: Lynn Bark Solar

Job ID: 705-20883-1

Client Sample ID: TP-01

Lab Sample ID: 705-20883-1

Date Collected: 02/16/25 12:00

Matrix: Solid

Date Received: 02/17/25 15:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	D 2216		1	37597	ASA	EET ATL	02/21/25 08:51

Client Sample ID: TP-01

Lab Sample ID: 705-20883-1

Date Collected: 02/16/25 12:00

Matrix: Solid

Date Received: 02/17/25 15:40

Percent Solids: 92.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Soluble	Leach	DI Leach			36880	MS	EET ATL	02/18/25 15:02
Soluble	Analysis	9056A		1	36852	MS	EET ATL	02/18/25 20:32

Client Sample ID: TP-02

Lab Sample ID: 705-20883-2

Date Collected: 02/16/25 12:00

Matrix: Solid

Date Received: 02/17/25 15:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	D 2216		1	37597	ASA	EET ATL	02/21/25 08:51

Client Sample ID: TP-02

Lab Sample ID: 705-20883-2

Date Collected: 02/16/25 12:00

Matrix: Solid

Date Received: 02/17/25 15:40

Percent Solids: 90.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Soluble	Leach	DI Leach			36880	MS	EET ATL	02/18/25 15:02
Soluble	Analysis	9056A		1	36852	MS	EET ATL	02/18/25 20:44

Client Sample ID: TP-03

Lab Sample ID: 705-20883-3

Date Collected: 02/16/25 12:00

Matrix: Solid

Date Received: 02/17/25 15:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	D 2216		1	37597	ASA	EET ATL	02/21/25 08:51

Client Sample ID: TP-03

Lab Sample ID: 705-20883-3

Date Collected: 02/16/25 12:00

Matrix: Solid

Date Received: 02/17/25 15:40

Percent Solids: 87.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Soluble	Leach	DI Leach			36880	MS	EET ATL	02/18/25 15:02
Soluble	Analysis	9056A		1	36852	MS	EET ATL	02/18/25 20:56

Client Sample ID: TP-04

Lab Sample ID: 705-20883-4

Date Collected: 02/16/25 12:00

Matrix: Solid

Date Received: 02/17/25 15:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	D 2216		1	37781	RS	EET ATL	02/21/25 18:36

Eurofins Atlanta

Lab Chronicle

Client: S&ME Inc
Project/Site: Lynn Bark Solar

Job ID: 705-20883-1

Client Sample ID: TP-04
Date Collected: 02/16/25 12:00
Date Received: 02/17/25 15:40

Lab Sample ID: 705-20883-4
Matrix: Solid
Percent Solids: 89.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Soluble	Leach	DI Leach			36880	MS	EET ATL	02/18/25 15:02
Soluble	Analysis	9056A		1	36852	MS	EET ATL	02/18/25 21:43

Laboratory References:
EET ATL = Eurofins Atlanta, 3080 Presidential Dr, Atlanta, GA 30340, TEL (770)457-8177

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

QC Sample Results

Client: S&ME Inc
Project/Site: Lynn Bark Solar

Job ID: 705-20883-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 705-36880/1-A

Matrix: Solid

Analysis Batch: 36852

Client Sample ID: Method Blank

Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		10	mg/Kg			02/18/25 19:16	1
Sulfate	ND		10	mg/Kg			02/18/25 19:16	1

Lab Sample ID: LCS 705-36880/2-A

Matrix: Solid

Analysis Batch: 36852

Client Sample ID: Lab Control Sample

Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	100	98.8		mg/Kg		99	90 - 110
Sulfate	250	246		mg/Kg		98	90 - 110

Lab Sample ID: 705-20271-A-2-B MS

Matrix: Solid

Analysis Batch: 36852

Client Sample ID: Matrix Spike

Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	13		99.6	101		mg/Kg		88	80 - 120
Sulfate	16		249	263		mg/Kg		99	80 - 120

Lab Sample ID: 705-20271-A-2-C MSD

Matrix: Solid

Analysis Batch: 36852

Client Sample ID: Matrix Spike Duplicate

Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Chloride	13		99.6	99.4		mg/Kg		87	80 - 120	2	15
Sulfate	16		249	248		mg/Kg		93	80 - 120	6	15

LEAST ELECTRICAL RESISTIVITY AND pH FOR CORROSION



Electrical resistivity by Wenner 4-Pin

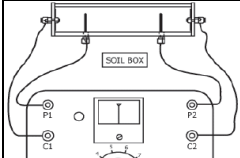
Quality Assurance

ASTM G57, AASHTO T 289

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

Project #:	24780158	Report Date:	02/20/25
Project Name:	Lynn Bark Solar	Test Date(s):	02/07/25
Client Name:	Savion, LLC		
Client Address:	4300 Market Pointe Dr. Minneapolis, MN 55435		
		Sample Date:	01/16/25

Boring/Location	Depth (ft.)	pH	Least Electrical Resistivity, Ω -cm	Water content for ER measurement
TP-01	0.0 - 5.0	7.5	8,520	24.4%
TP-02	0.0 - 5.0	7.6	4,000	23.1%
TP-03	0.0 - 5.0	7.7	4,820	21.1%
TP-04	0.0 - 5.0	8.1	4,250	27.4%

Electrical Resistivity Method	
	A voltage is impressed between the outer electrodes, and the voltage drop between the inner electrodes is measured using a voltmeter. RESISTIVITY, ρ, $\Omega \cdot \text{cm} = (R) \cdot A / a$ a, inner electrode spacing, cm : 7.2 A, cross sectional area perpendicular to flow, cm^2: 7.2

Notes / Deviations / References: **Electrical resistivity testing performed on fraction of sample passing the #4 sieve;****pH testing on fraction passing the #10 sieve.**Jacob Folsom

Technical Responsibility

Jacob Folsom

Signature

Lab Services Manager

Position

2/24/2025

Date

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Geotherm

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Cypress, TX 77433
Office: 291-985-9344
info@geothermusa.com
<http://www.geothermusa.com>

March 4, 2025

S&ME, Inc.
2020 Liberty Road, Suite 105
Lexington, KY 40505
Attn: Jacob Folsom

Thermal Resistivity Report
Lynn Bark Solar – Threeforks, Kentucky (Project No. 24780158)

The following is the report of thermal dryout characterization tests conducted on four (4) bulk samples of native soil from the referenced project sent to our laboratory.

Thermal Resistivity Tests: The samples were tested at the ‘optimum’ moisture content and at 90% of the standard Proctor dry density ***provided by S&ME***. The tests were conducted in accordance with the **IEEE standard 442-2017**. The results are tabulated below and the thermal dryout curves are presented in **Figures 1-4**.

Sample ID, Description, Thermal Resistivity, Moisture Content and Density

Sample ID	Depth (ft)	Effort (%)	Description (S&ME)	Thermal Resistivity (°C-cm/W)		Moisture Content (%)	Dry Density (lb/ft³)
				Wet	Dry		
TP-01	0 – 5	90	Silty Sand with Gravel, Brown	46	153	10	113
TP-02	0 – 5	90	Gravelly Silty Sand, Gray	58	170	10	117
TP-03	0 – 5	90	Gravelly Silty Sand, Dark Brown	63	189	10	115
TP-04	0 – 5	90	Gravelly Silty Sand, Gray	49	144	8	122

Comments: The thermal characteristic depicted in the dryout curves apply for the soils at their respective test dry density.

Please contact us if you have any questions or if we can be of further assistance.

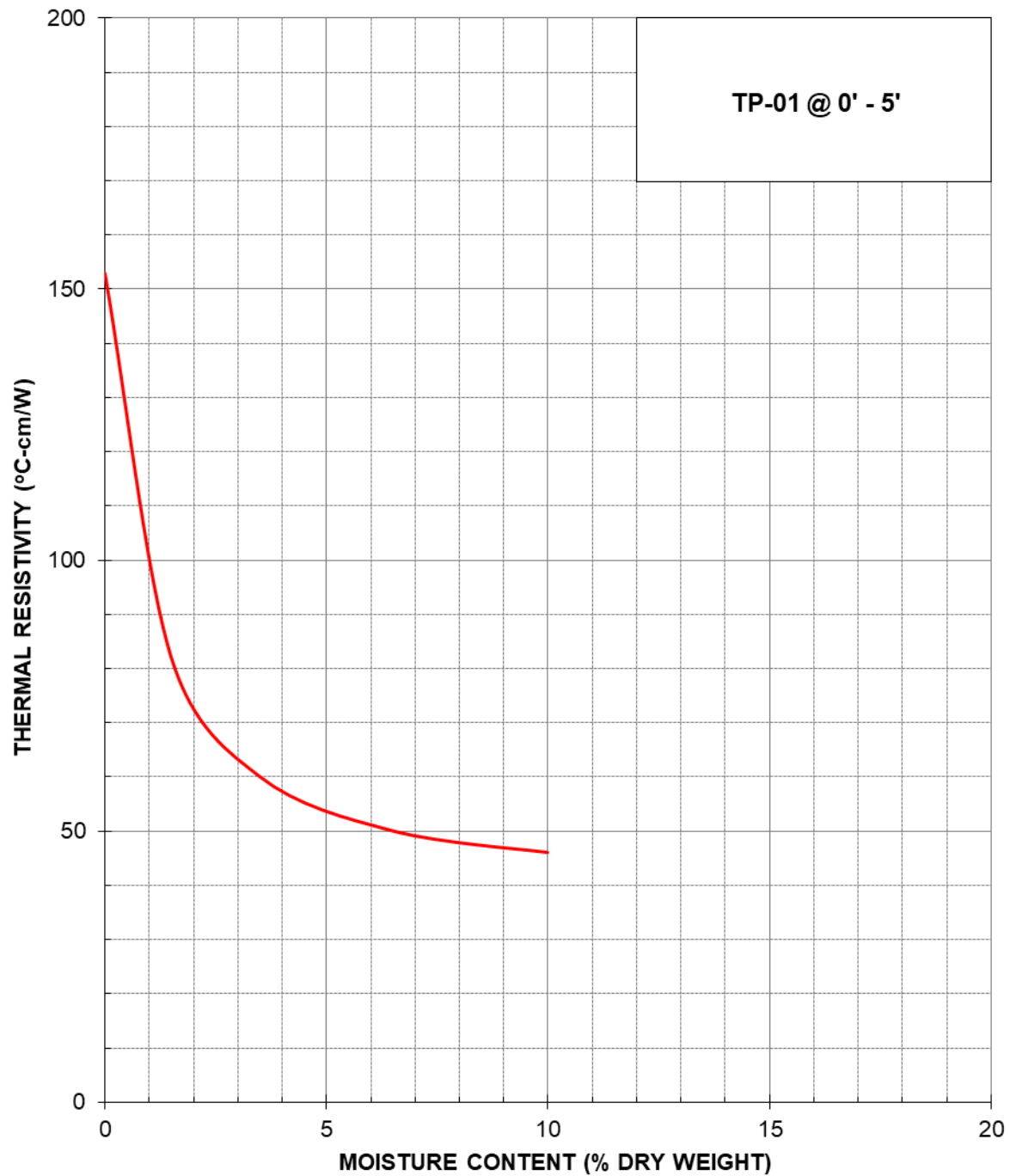
Geotherm USA, LLC

Nimesh Patel

COOL SOLUTIONS FOR UNDERGROUND POWER CABLES
THERMAL SURVEYS, CORRECTIVE BACKFILLS & INSTRUMENTATION

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THERMAL DRYOUT CURVE



S&ME, Inc. (Project No. 24780158)

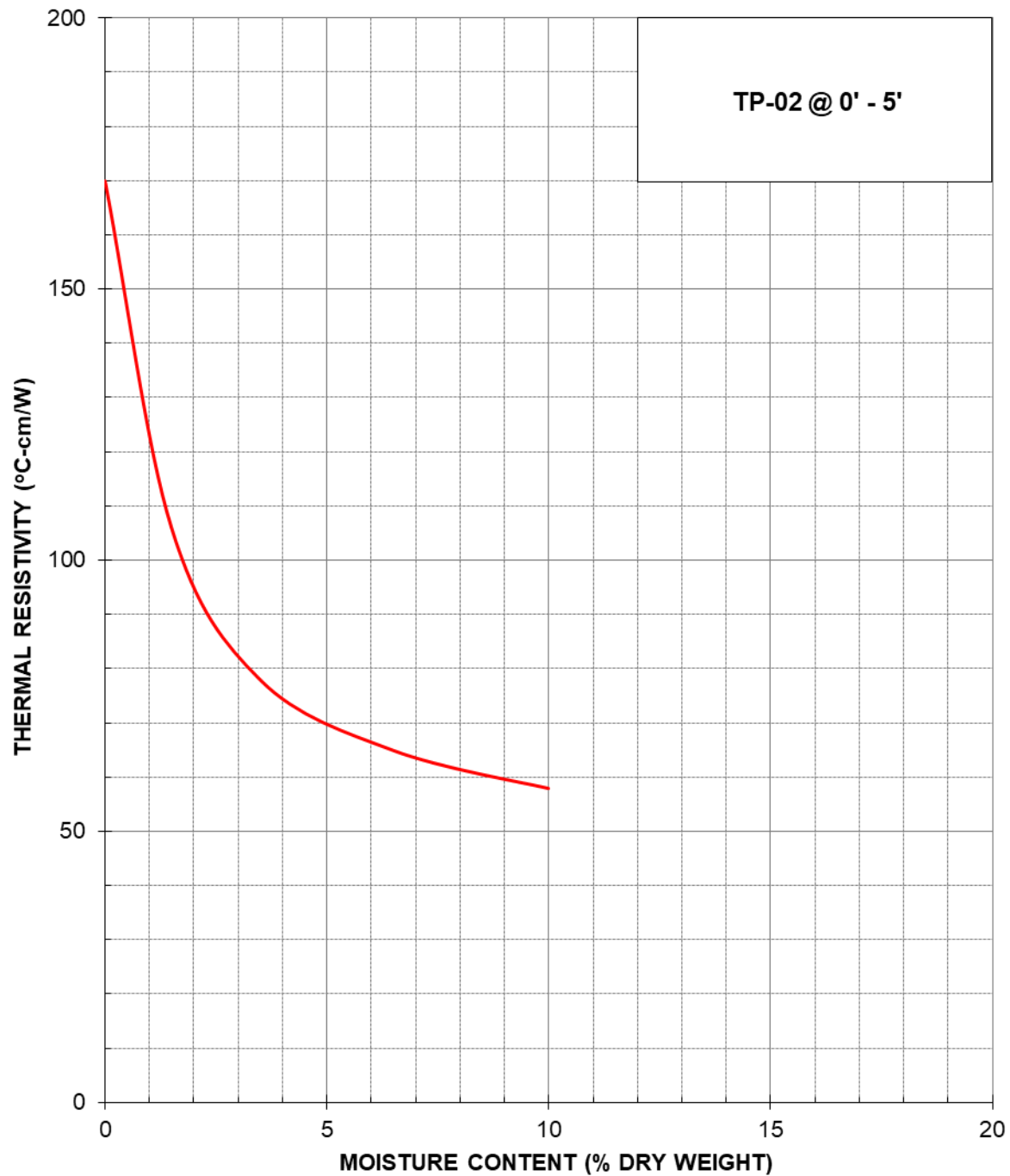
Lynn Bark Solar – Threeforks, Kentucky

Thermal Resistivity Report

March 2025

Figure 1

THERMAL DRYOUT CURVE



S&ME, Inc. (Project No. 24780158)

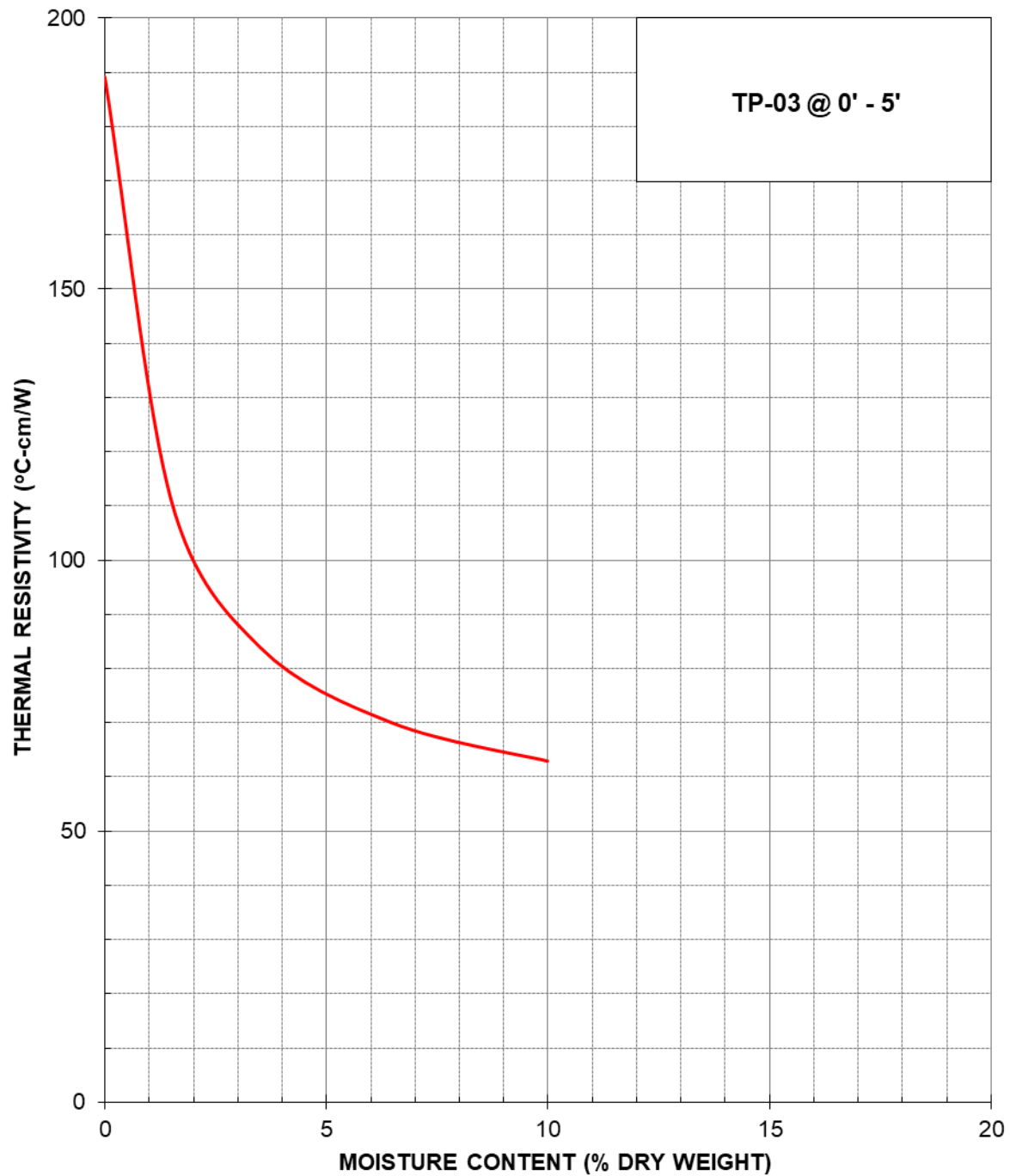
Lynn Bark Solar – Threeforks, Kentucky

Thermal Resistivity Report

March 2025

Figure 2

THERMAL DRYOUT CURVE



S&ME, Inc. (Project No. 24780158)

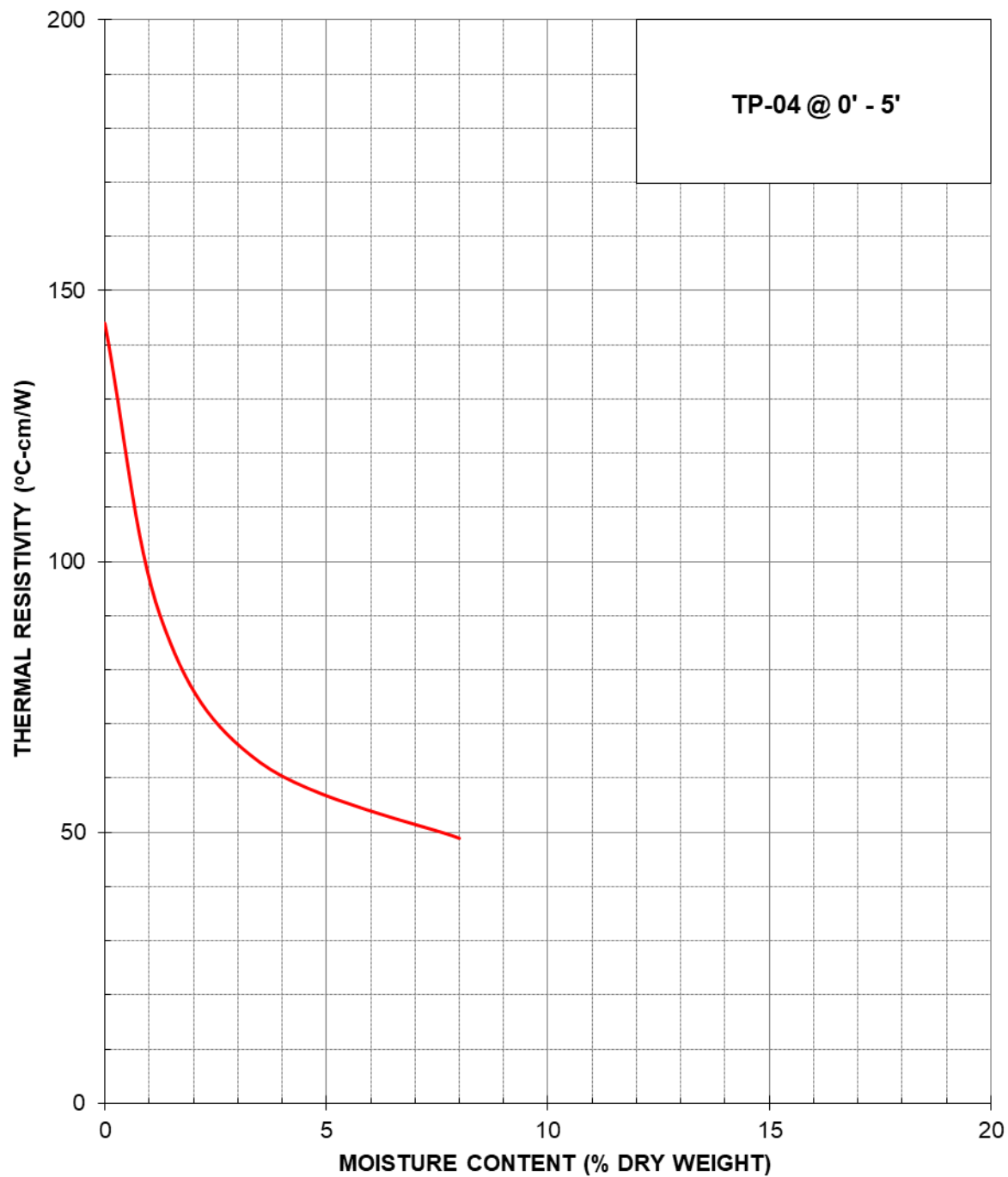
Lynn Bark Solar – Threeforks, Kentucky

Thermal Resistivity Report

March 2025

Figure 3

THERMAL DRYOUT CURVE



S&ME, Inc. (Project No. 24780158)

Lynn Bark Solar – Threeforks, Kentucky

Thermal Resistivity Report

March 2025

Figure 4



Summary of Laboratory Procedures

Recovered disturbed and undisturbed samples and the drillers' field logs were transported to the laboratory where they were examined by the geotechnical engineer. Selected samples representative of certain groups of soils were subjected to simple classification tests by hand or other simple means.

Recovered disturbed and undisturbed samples and the drillers' field logs were transported to the laboratory where they were examined by the geotechnical engineer. Selected samples representative of certain groups of soils were subjected to simple classification tests by hand or other simple means. Other samples were tested in the laboratory to determine their strength or consolidation properties.

♦ Laboratory Tests of Soil

Examination of Split Spoon Soil Samples

Soil and rock samples and field boring records were reviewed in the laboratory by the geotechnical engineer. Soils were classified in general accordance with the visual-manual method described in ASTM D 2488, *Standard Practice for Description and Identification of Soils (Visual-Manual Method)*. The geotechnical engineer also prepared the final boring records enclosed with this report.

Examination of Split Spoon Soil Samples

Soil and rock samples and field boring records were reviewed in the laboratory by the geotechnical engineer. Representative soil samples were selected for classification testing to provide grain size and plasticity data to allow classification of the samples in general accordance with the AASHTO Classification method described in ASTM D3282, *Standard Practice for Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes*. The geotechnical engineer also prepared the final boring records enclosed with this report.

Moisture Content Testing of Soil Samples by Oven Drying

Moisture content was determined in general conformance with the methods outlined in ASTM D2216, "Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil or Rock by Mass." This method is limited in scope to Group B, C, or D samples of earth materials which do not contain appreciable amounts of organic material, soluble solids such as salt or reactive solids such as cement. This method is also limited to samples which do not contain contamination.

A representative portion of the soil was divided from the sample using one of the methods described in Section 9 of ASTM D2216. The split portion was then placed in a drying oven and heated to approximately 110 degrees C overnight or until a constant mass was achieved after repetitive weighing. The moisture content of the soil was then computed as the mass of water removed from the sample by drying, divided by the mass of the sample dry, times 100 percent. No attempt was made to exclude any particular particle size from the portion split from the sample.

Liquid and Plastic Limits Testing

Atterberg limits of the soils was determined generally following the methods described by ASTM D4318, *Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils*. Albert Atterberg originally defined "limits of consistency" of fine grained soils in terms of their relative ease of deformation at various moisture contents. In current engineering usage, the liquid limit of a soil is defined as the moisture content, in percent, marking the upper limit of viscous flow and the boundary with a semi-liquid state. The plastic limit defines the lower limit of plastic behavior, above which a soil behaves plastically below which it retains its shape upon drying. The plasticity index (PI) is the range of water content over which a soil behaves plastically. Numerically, the PI is the difference between liquid limit and plastic limit values.

Representative portions of fine grained Group A, B, C, or D samples were prepared using the wet method described in Section 10.1 of ASTM D4318. The liquid limit of each sample was determined using the multipoint method (Method A) described in Section 11. The liquid limit is by definition the moisture content where 25 drops of a hand operated liquid limit device are required to close a standard width groove cut in a soil sample placed in the device. After each test, the moisture content of the sample was adjusted and the sample replaced in the device. The test was repeated to provide a minimum of three widely spaced combinations of N versus moisture content. When plotted on semilog paper, the liquid limit moisture content was determined by straight line interpolation between the data points at N equals 25 blows.

The plastic limit was determined using the procedure described in Section 17 of ASTM D4318. A selected portion of the soil used in the liquid limit test was kneaded and rolled by hand until it could no longer be rolled to a 3.2 mm thread on a glass plate. This procedure was repeated until at least 6 grams of material was accumulated, at which point the moisture content was determined using the methods described in ASTM D2216.

Grain Size Analysis of Samples

The distribution of particle sizes greater than 75 μm was determined in general accordance with the procedures described by ASTM D421, *Standard Practice for Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants*, and D422, *Standard Test Method for Particle Size Analysis of Soils*. During preparation samples were divided into two portions. The material coarser than the No. 30 U.S. sieve size fraction was dry sieved through a nest of standard sieves as described in Article 6. Material passing the No. 30 sieve was independently passed through a nest of sieves down to the No. 200 size.

Grain Size Analysis of Samples with Hydrometer

The distribution of particle sizes was determined in general accordance with the procedures described by ASTM D421, *Standard Practice for Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants*, and D422, *Standard Test Method for Particle Size Analysis of Soils*. During preparation samples were divided into two portions. The material coarser than the No. 10 U.S. sieve size fraction was dry sieved through a nest of standard sieves as described in Article 6. Material passing the No. 10 sieve was soaked in demineralized water and a dispersing agent, then the soil-water slurry placed in a glass sedimentation chamber and the specific gravity of the slurry recorded at various time intervals. The grain size distribution was calculated from the time rate of sedimentation of the various size particles. After the final hydrometer reading was obtained, the suspension was washed through the No. 200 sieve. The remaining material retained on the No. 200 sieve was oven dried, and then passed through a standard nest of sieves.

samples were divided into two portions. The material coarser than the No. 10 U.S. sieve size fraction was dry sieved through a nest of standard sieves as described in Article 6. Material passing the No. 10 sieve was soaked in demineralized water and a dispersing agent, then the soil-water slurry placed in a glass sedimentation chamber and the specific gravity of the slurry recorded at various time intervals. The grain size distribution was calculated from the time rate of sedimentation of the various size particles. After the final hydrometer reading was obtained, the suspension was washed through the No. 200 sieve. The remaining material retained on the No. 200 sieve was oven dried, and then passed through a standard nest of sieves.

Percent Fines Determination of Samples

A selected specimen of soils was washed over a No. 200 sieve after being thoroughly mixed and dried. This test was conducted in general accordance with ASTM D1140, *Standard Test Method for Amount of Material Finer Than the No. 200 Sieve*. Method A, using water to wash the sample through the sieve without soaking the sample for a prescribed period of time, was used and the percentage by weight of material washing through the sieve was deemed the "percent fines" or percent clay and silt fraction.

Compaction Tests of Soils Using Standard Effort

Soil placed as engineering fill is compacted to a dense state to obtain satisfactory engineering properties. Laboratory compaction tests provide the basis for determining the percent compaction and water content needed to achieve the required engineering properties, and for controlling construction to assure the required compaction and water contents are achieved. Test procedures generally followed those described by ASTM D698, *Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 lbf/ft³)*.

The relationship between water content and the dry unit weight is determined for soils compacted in either 4 or 6 inch diameter molds with a 5.5 lbf rammer dropped from a height of 12 inches, producing a compactive effort of 12,400 lbf/ft³. ASTM D 698 provides three alternative procedures depending on material gradation:

Method A (Shall be used if 20 percent or less by weight is retained on No. 4 sieve)

- ◆ All material passes No. 4 sieve size
- ◆ 4 inch diameter mold
- ◆ Soil in 3 layers with 25 blows per layer

Method B (Shall be used if 20 percent by weight is retained on the No. 4 sieve and 20 percent or less by weight is retained on the 3/8-inch sieve)

- ◆ All material passes 3/8 inch sieve
- ◆ 4 inch diameter mold
- ◆ Soil in 3 layers with 25 blows per layer

Method C (Shall be used if more than 20 percent by weight is retained on the 3/8-inch sieve and less than 30 percent is retained on the 3/4-inch sieve)

- ◆ All material passes 3/4 inch sieve
- ◆ 6-inch diameter mold
- ◆ Soil in 3 layers with 56 blows per layer

Soil was compacted in the mold in three layers of approximately equal thickness, each compacted with either 25 or 56 blows of the rammer. After compaction of the sample in the mold, the resulting dry density and moisture content was determined and the procedure repeated. Separate soils were used for each sample point, adjusting the moisture content of the soil as described in Section 10.2 (Moist Preparation Method). The procedure was repeated for a sufficient number of water content values to allow the dry density vs. water

content values to be plotted and the maximum dry density and optimum moisture content to be determined from the resulting curvilinear relationship.

Laboratory California Bearing Ratio Tests of Compacted Samples

This method is used to evaluate the potential strength of subgrade, subbase, and base course material, including recycled materials, for use in road and airfield pavements. Laboratory CBR tests were run in general accordance with the procedures laid out in ASTM D1883, *Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils*. Specimens were prepared in standard molds using three different levels of compactive effort within plus or minus 0.5 percent of the optimum moisture content value. While embedded in the compaction mold, each sample was inundated for a minimum period of 96 hours to achieve saturation. During inundation the specimen was surcharged by a weight approximating the anticipated weight of the pavement and base course layers. After removing the sample from the soaking bath, the soil was then sheared by jacking a piston having a cross sectional area of 3 square inches into the end surface of the specimen. The piston was jacked 0.5 inches into the specimen at a constant rate of 0.05 inches per minute.

The CBR is defined as the load required to penetrate a material to a predetermined depth, compared to the load required to penetrate a standard sample of crushed stone to the same depth. The CBR value was usually based on the load ratio for a penetration of 0.10 inches, after correcting the load-deflection curves for surface irregularities or upward concavity. However, where the calculated CBR for a penetration of 0.20 inches was greater than the result obtained for a penetration of 0.01 inches, the test was repeated by reversing the specimen and shearing the opposite end surface. Where the second test indicated a greater CBR at 0.20 inches penetration, the CBR for 0.20 inches penetration was used.

Soil pH Testing

Soil pH measures the activity of hydrogen ions in a water solution. The pH scale ranges from 0 (very acidic) to 14 (very alkaline or basic). Test methods follow those given by AASHTO T-289-91(2004), *Determining pH for Soil for Use in Corrosion Testing*.

Moist samples are sieved and pulverized as described in Section 6.2. A 30 mg sample is then suspended in distilled water for one hour. A pH meter is first standardized against a buffer solution of known pH, then the probe immersed in the suspended solution and the pH reading recorded. If the pH of the soil is below 4.5 the soil is reported as aggressive.

Soil Resistivity of Samples

This method is used to evaluate soil resistivity for the control of corrosion of buried structures, both for the estimation of expected corrosion rates and for the design of cathodic protection systems. Laboratory soil resistivity tests were run in general accordance with the procedure laid out in ASTM G57, *Standard Test Method for Field Measurement of Soil Resistivity using the Wenner Four-Electrode Method*. Laboratory tests were performed using Section 7.2.

A soil sample representative of the area of interest was mixed thoroughly and brought to saturation by adding only a sufficient amount of distilled water to produce a slight amount of surface water. The sample was condition overnight allowing excess surface water to evaporate. The saturated stiff slurry sample was placed

in the soil box in layers, eliminating air spaces as far as practicable. A voltage was impressed across the outer electrodes. The voltage drop across the inner electrodes was measured with both the current and voltage drop recorded, if a separate ammeter and voltmeter were used. Where a resistivity meter was used, the resistance was read directly. The saturated measurement will provide an approaching minimum resistivity.

Laboratory Sulfate Ion Content Test

External sulfate can occur when concrete is in contact with sulfate containing water e.g. seawater, swamp water, ground water or sewage water. The often massive formation of gypsum and ettringite formed during the external sulfate attack may cause concrete to crack and scale.

Water soluble sulfate ion content is determined using either Method A or B as described by AASHTO T-290-95(2003), *Determining Water-Soluble Sulfate Ion Content in Soil*. Soil specimens were first prepared by splitting and quartering representative portions from recovered samples as described in Section 7.2.

Method A, the Gravimetric Method, determines sulfate content by precipitation of barium sulfate from a heated solution of the soil and chemical reagents. Method B, the Turbidimetric Method, relies on a photoelectric colorimeter to determine the turbidity of a barium sulfate suspension after chemical reagents are added. Laboratory test data sheets will indicate the method used.

Laboratory Chloride Ion Content Test

Water soluble chloride ion content is determined using either Method A or B as described by AASHTO T-291-94(2004), *Determining Water-Soluble chloride Ion Content in Soil*. Soil specimens were first prepared by splitting and quartering representative portions from recovered samples as described in Section 7.2.

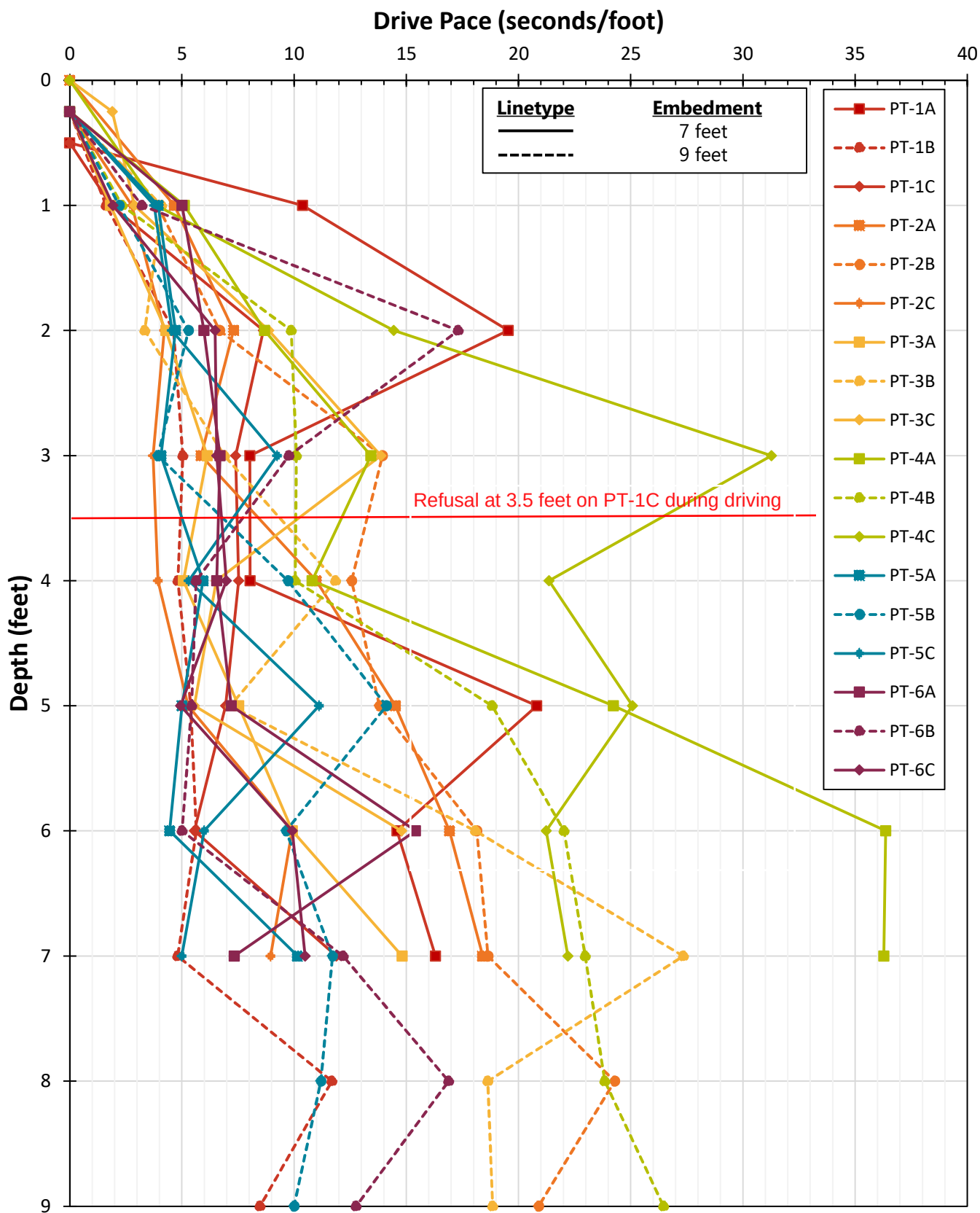
Method A, the Mohr Titration Method, determines chloride ion content using silver nitrate in a suspended solution of the soil and distilled water. A reaction between a potassium chromate indicator solution and the silver nitrate produces a red-silver chromate precipitate.

Method B utilizes a pH/mV meter with chloride ion selective electrodes. When inserted into the suspension the meter records the activity of the chloride ions. These readings are compared to a set of calibration curves to determine the ion content in mg/kg.



Appendix IV– Pile Load Testing

Pile Load Test Figures
Combined Pile Load Test Data
Deflection vs Depth 5 ft Embed
Deflection vs Depth 6 ft Embed
Deflection vs Depth 7 ft Embed
Deflection vs Depth 9 ft Embed (with Adfreeze Stress)
LPile Output File
ASCE-7-10 Design Hazards Report
ASCE-7-16 Design Hazards Report



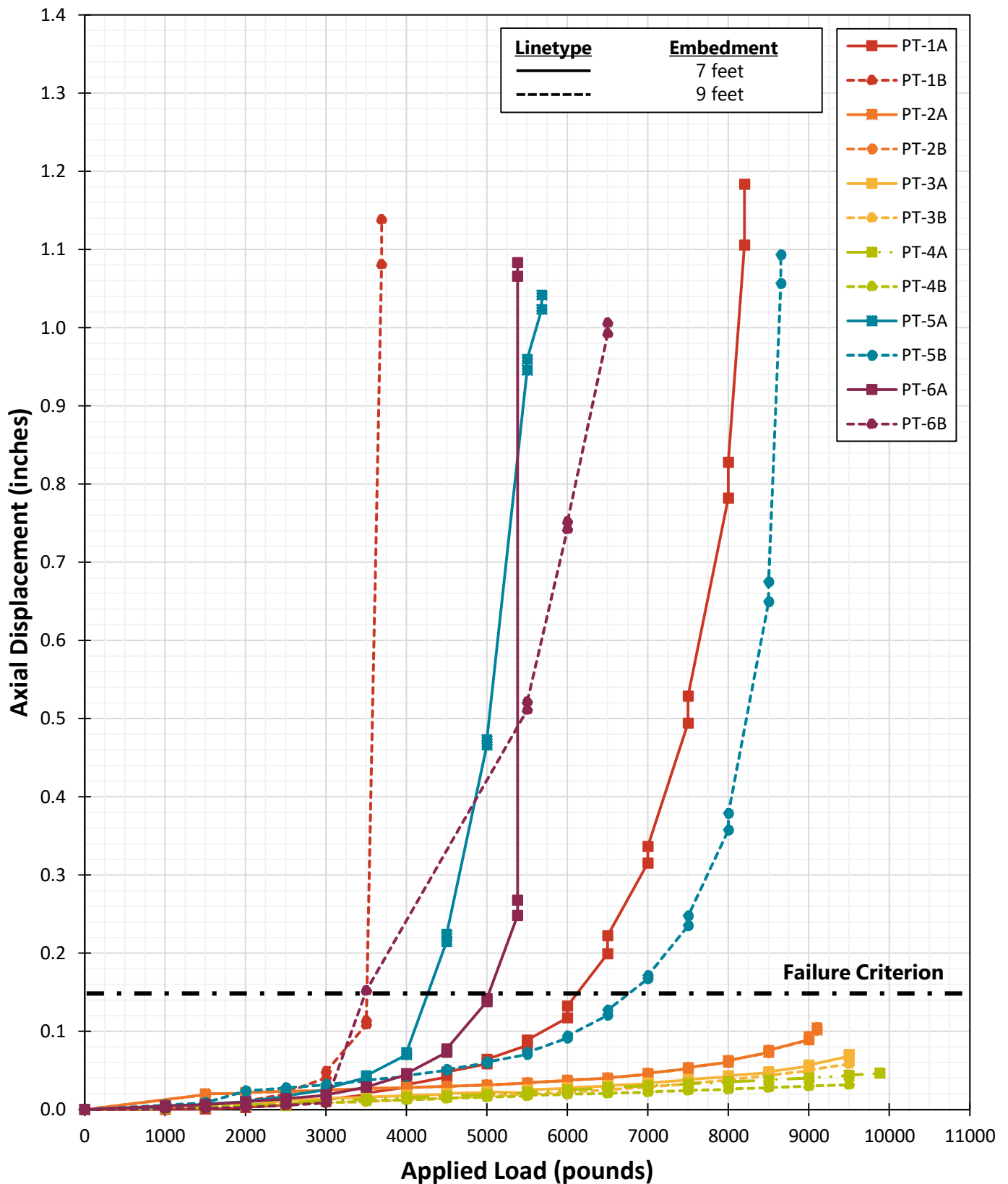
AXIAL INSTALLATION DATA

LYNN BARK SOLAR PROJECT
MARTIN COUNTY, KENTUCKY

SCALE:
NOT TO SCALE
DATE:
March 2025
PROJECT NUMBER
24780158

FIGURE NO.

4



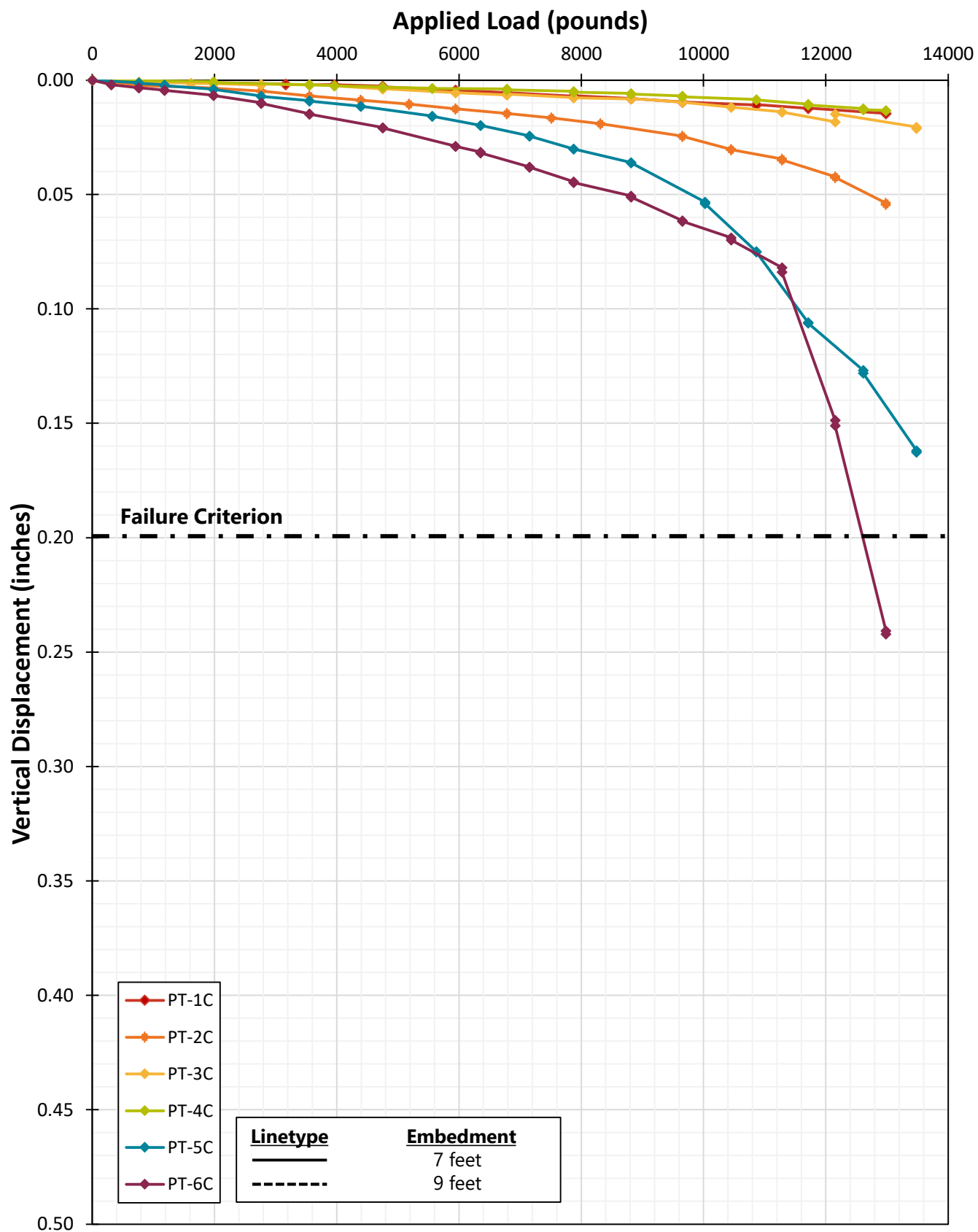
AXIAL TENSION LOAD TEST DATA

LYNN BARK SOLAR PROJECT
MARTIN COUNTY, KENTUCKY

SCALE:
NOT TO SCALE
DATE:
March 2025
PROJECT NUMBER
24780158

FIGURE NO.

5



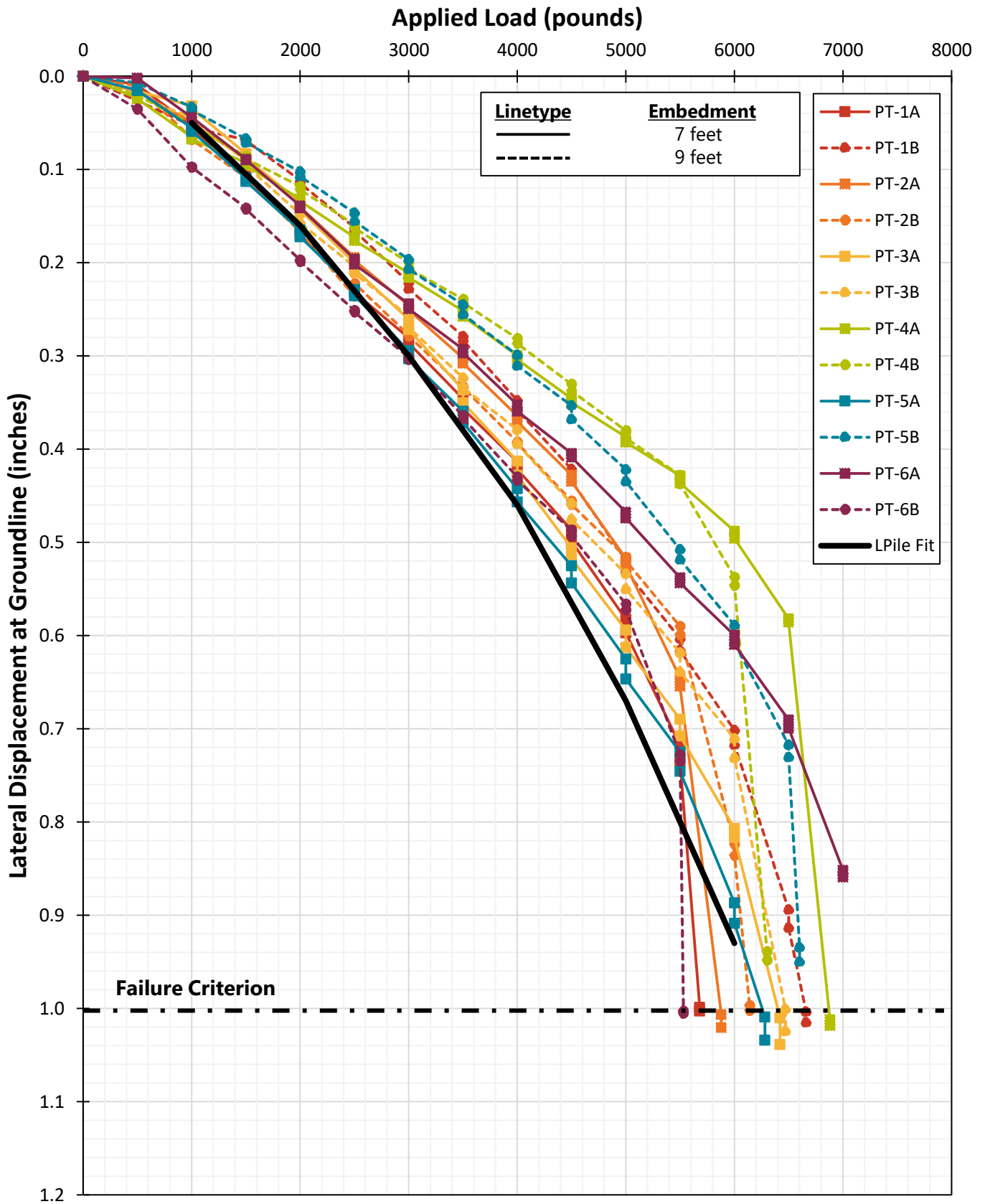
AXIAL COMPRESSION LOAD TEST DATA

LYNN BARK SOLAR PROJECT
MARTIN COUNTY, KENTUCKY

SCALE:
NOT TO SCALE
DATE:
March 2025
PROJECT NUMBER
24780158

FIGURE NO.

6



LATERAL LOAD TEST DATA

LYNN BARK SOLAR PROJECT
MARTIN COUNTY, KENTUCKY

SCALE:
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DATE:
March 2025
PROJECT NUMBER
24780158

FIGURE NO.

7

Pile Load Test Results

Lynn Bark Solar
Martin County, Kentucky
S&ME Project No. 24780158



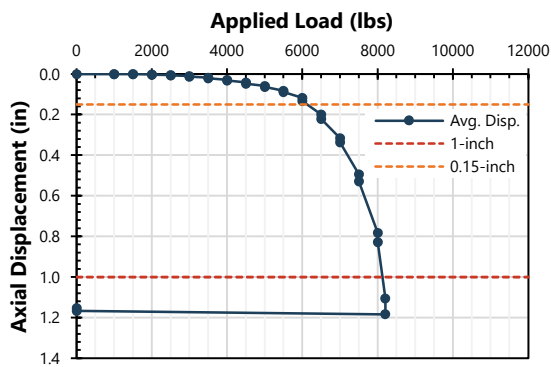
Axial Tensile Load

Test Information

Pile ID: PT-1A
Test Date: 1/22/2025
Pile Section: W6x9
Pile Embedment (ft): 7
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Cell ID: DEDR2505512
Displacement Gauge #1 ID: 18325126
Displacement Gauge #2 ID: 20026088
Personnel: K. Ackers

Test Termination

Test terminated at approximately 8,200 lbs
after exceeding 1" displacement



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
1000	Start	0.0005	0.0003	0.0004
1000	End	0.0005	0.0003	0.0004
1500	Start	0.0000	0.0016	0.0008
1500	End	0.0000	0.0016	0.0008
2000	Start	0.0025	0.0026	0.0025
2000	End	0.0030	0.0033	0.0031
2500	Start	0.0060	0.0053	0.0057
2500	End	0.0070	0.0067	0.0068
3000	Start	0.0110	0.0101	0.0106
3000	End	0.0130	0.0124	0.0127
3500	Start	0.0195	0.0180	0.0187
3500	End	0.0220	0.0199	0.0210
4000	Start	0.0300	0.0272	0.0286
4000	End	0.0340	0.0294	0.0317
4500	Start	0.0435	0.0394	0.0415
4500	End	0.0510	0.0449	0.0480
5000	Start	0.0620	0.0549	0.0584
5000	End	0.0683	0.0600	0.0641
5500	Start	0.0860	0.0781	0.0820
5500	End	0.0930	0.0845	0.0888
6000	Start	0.1205	0.1139	0.1172
6000	End	0.1365	0.1283	0.1324
6500	Start	0.2015	0.1970	0.1992
6500	End	0.2255	0.2188	0.2222
7000	Start	0.3170	0.3134	0.3152
7000	End	0.3390	0.3336	0.3363
7500	Start	0.4920	0.4962	0.4941
7500	End	0.5305	0.5270	0.5288
8000	Start	0.7820	0.7817	0.7819
8000	End	0.8257	0.8300	0.8278
8200	Start	1.0955	1.1154	1.1055
8200	End	1.1790	1.1878	1.1834
0	Start	1.1750	1.1587	1.1668
0	End	1.1470	1.1584	1.1527

Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
1000	Start	0.0020	0.0027	0.0024
1000	End	0.0020	0.0028	0.0024
1500	Start	0.0045	0.0051	0.0048
1500	End	0.0050	0.0060	0.0055
2000	Start	0.0090	0.0100	0.0095
2000	End	0.0105	0.0115	0.0110
2500	Start	0.0185	0.0207	0.0196
2500	End	0.0210	0.0229	0.0219
3000	Start	0.0385	0.0429	0.0407
3000	End	0.0480	0.0501	0.0491
3500	Start	0.1040	0.1135	0.1087
3500	End	0.1134	0.1146	0.1140
3700	Start	1.0845	1.0776	1.0811
3700	End	1.1375	1.1396	1.1385
0	Start	1.1245	1.1270	1.1258
0	End	1.1240	1.1270	1.1255

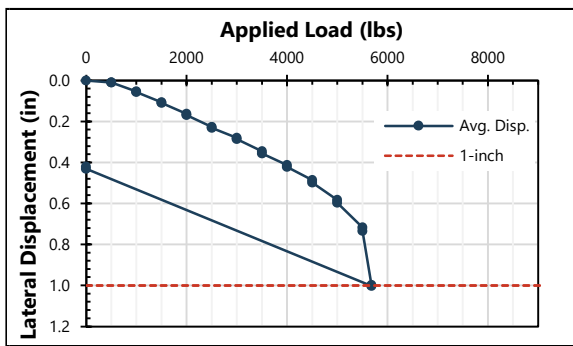
Lynn Bark Solar
Martin County, Kentucky
S&ME Project No. 24780158



Lateral Load

Test Information	
Pile ID:	PT-1A
Test Date:	1/22/2025
Pile Section:	W6x9
Pile Embedment (ft):	7
Time Increment (sec):	60
Pile Installation Date:	1/14/2025
Load Application Height (in):	48
Disp. Measurement Height (in):	6
Load Cell ID:	DEDR2505512
Displacement Gauge IDs:	18325126
	20026088
Personnel:	K. Ackers

Test Termination
Test terminated at approximately 5,700 lbs after exceeding 1" displacement



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
500	Start	0.0149	0.0030	0.0090
500	End	0.0156	0.0030	0.0093
1000	Start	0.0605	0.0455	0.0530
1000	End	0.0633	0.0490	0.0561
1500	Start	0.1155	0.0990	0.1072
1500	End	0.1188	0.1015	0.1102
2000	Start	0.1722	0.1535	0.1629
2000	End	0.1802	0.1590	0.1696
2500	Start	0.2367	0.2165	0.2266
2500	End	0.2440	0.2200	0.2320
3000	Start	0.2917	0.2695	0.2806
3000	End	0.2996	0.2730	0.2863
3500	Start	0.3586	0.3335	0.3461
3500	End	0.3714	0.3425	0.3570
4000	Start	0.4285	0.3980	0.4132
4000	End	0.4390	0.4045	0.4217
4500	Start	0.5085	0.4650	0.4867
4500	End	0.5196	0.4780	0.4988
5000	Start	0.6074	0.5575	0.5824
5000	End	0.6258	0.5685	0.5971
5500	Start	0.7515	0.6835	0.7175
5500	End	0.7774	0.6920	0.7347
5700	Start	1.0935	0.9040	0.9988
5700	End	1.1176	0.8880	1.0028
0	Start	0.5015	0.3605	0.4310
0	End	0.4872	0.3530	0.4201

Pile Load Test Results

Lynn Bark Solar
Martin County, Kentucky
S&ME Project No. 24780158



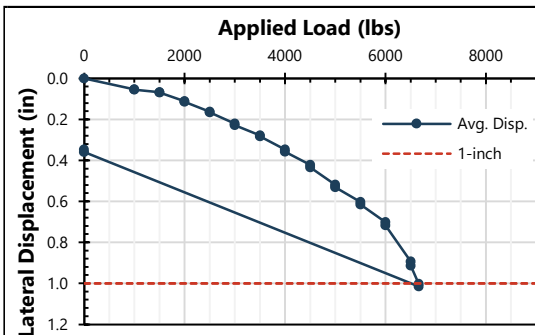
Lateral Load

Test Information

Pile ID: PT-1B
Test Date: 1/22/2025
Pile Section: W6x9
Pile Embedment (ft): 9
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Application Height (in): 48
Disp. Measurement Height (in): 6
Load Cell ID: DEDR2505512
Displacement Gauge IDs: 18325126
20026088
Personnel: K. Ackers

Test Termination

Test terminated at approximately 6,700 lbs
after exceeding 1" displacement



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
	End			
1000	Start	0.0595	0.0460	0.0528
1000	End	0.0623	0.0485	0.0554
1500	Start	0.0747	0.0615	0.0681
1500	End	0.0758	0.0620	0.0689
2000	Start	0.1175	0.1055	0.1115
2000	End	0.1211	0.1085	0.1148
2500	Start	0.1687	0.1560	0.1624
2500	End	0.1725	0.1590	0.1658
3000	Start	0.2271	0.2155	0.2213
3000	End	0.2346	0.2215	0.2281
3500	Start	0.2855	0.2725	0.2790
3500	End	0.2904	0.2765	0.2835
4000	Start	0.3542	0.3415	0.3478
4000	End	0.3654	0.3510	0.3582
4500	Start	0.4285	0.4146	0.4216
4500	End	0.4422	0.4260	0.4341
5000	Start	0.5277	0.5105	0.5191
5000	End	0.5386	0.5235	0.5310
5500	Start	0.6118	0.5945	0.6031
5500	End	0.6255	0.6065	0.6160
6000	Start	0.7105	0.6925	0.7015
6000	End	0.7280	0.7065	0.7172
6500	Start	0.9074	0.8810	0.8942
6500	End	0.9302	0.8970	0.9136
6700	Start	1.0225	0.9850	1.0037
6700	End	1.0350	0.9950	1.0150
0	Start	0.3719	0.3480	0.3600
0	End	0.3575	0.3375	0.3475

Pile Load Test Results

Lynn Bark Solar
Martin County, Kentucky
S&ME Project No. 24780158



Axial Compressive Load

Test Information

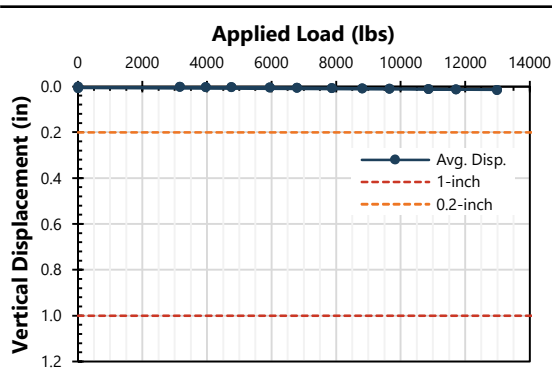
Pile ID: PT-1C
Test Date: 1/22/2025
Pile Section: W6x9
Pile Embedment (ft): 7
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Cell ID: DEDR2505512
Displacement Gauge IDs: 18325126
20026088
Personnel: K. Ackers

Note on Test Loads

Reported load in pounds is calibrated to an approximately 100 psi gauge increment

Test Termination

Test terminated at approximately 12,980 lbs



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
310	Start			
310	End			
760	Start			
760	End			
1180	Start			
1180	End			
1610	Start			
1610	End			
1980	Start			
1980	End			
2400	Start			
2400	End			
2760	Start			
2760	End			
3160	Start	0.0025	0.0010	0.0017
3160	End	0.0028	0.0010	0.0019
3550	Start			
3550	End			
3960	Start	0.0030	0.0010	0.0020
3960	End	0.0031	0.0010	0.0021
4390	Start			
4390	End			
4750	Start	0.0038	0.0015	0.0027
4750	End	0.0039	0.0020	0.0030
5180	Start			
5180	End			
5560	Start			
5560	End			
5940	Start	0.0052	0.0035	0.0044
5940	End	0.0053	0.0035	0.0044
6350	Start			
6350	End			
6780	Start	0.0060	0.0050	0.0055
6780	End	0.0060	0.0050	0.0055
7150	Start			
7150	End			
7510	Start			
7510	End			
7870	Start	0.0070	0.0070	0.0070
7870	End	0.0067	0.0070	0.0069
8310	Start			
8310	End			
8810	Start	0.0077	0.0085	0.0081
8810	End	0.0075	0.0085	0.0080
9220	Start			
9220	End			
9650	Start	0.0082	0.0110	0.0096
9650	End	0.0077	0.0115	0.0096
10020	Start			
10020	End			
10450	Start			
10450	End			
10860	Start	0.0079	0.0140	0.0109
10860	End	0.0073	0.0140	0.0107
11280	Start			
11280	End			
11710	Start	0.0077	0.0170	0.0124
11710	End	0.0074	0.0170	0.0122
12150	Start			
12150	End			
12610	Start			
12610	End			
12980	Start	0.0087	0.0205	0.0146
12980	End	0.0082	0.0210	0.0146
13480	Start			
13480	End			
0	Start	0.0060	0.0085	0.0073
0	End	0.0041	0.0090	0.0065

Pile Load Test Results

Lynn Bark Solar
Martin County, Kentucky
S&ME Project No. 24780158



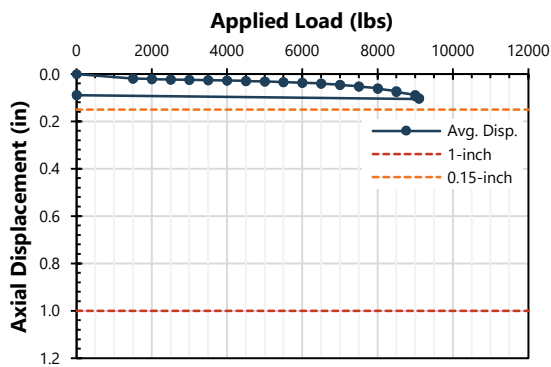
Axial Tensile Load

Test Information

Pile ID: PT-2A
Test Date: 1/24/2025
Pile Section: W6x9
Pile Embedment (ft): 7
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Cell ID: DEDR2505512
Displacement Gauge #1 ID: 18325126
Displacement Gauge #2 ID: 20026088
Personnel: K. Ackers

Test Termination

Test terminated at approximately 9,100 lbs



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
1500	Start	0.0199	0.0180	0.0189
1500	End	0.0208	0.0195	0.0202
2000	Start	0.0212	0.0200	0.0206
2000	End	0.0230	0.0210	0.0220
2500	Start	0.0245	0.0220	0.0233
2500	End	0.0246	0.0220	0.0233
3000	Start	0.0260	0.0230	0.0245
3000	End	0.0266	0.0235	0.0250
3500	Start	0.0286	0.0250	0.0268
3500	End	0.0289	0.0250	0.0270
4000	Start	0.0301	0.0255	0.0278
4000	End	0.0308	0.0255	0.0281
4500	Start	0.0322	0.0270	0.0296
4500	End	0.0326	0.0270	0.0298
5000	Start	0.0342	0.0285	0.0313
5000	End	0.0347	0.0285	0.0316
5500	Start	0.0377	0.0300	0.0338
5500	End	0.0385	0.0305	0.0345
6000	Start	0.0419	0.0325	0.0372
6000	End	0.0424	0.0330	0.0377
6500	Start	0.0455	0.0345	0.0400
6500	End	0.0464	0.0350	0.0407
7000	Start	0.0512	0.0390	0.0451
7000	End	0.0528	0.0400	0.0464
7500	Start	0.0586	0.0460	0.0523
7500	End	0.0601	0.0475	0.0538
8000	Start	0.0671	0.0535	0.0603
8000	End	0.0699	0.0555	0.0627
8500	Start	0.0803	0.0655	0.0729
8500	End	0.0840	0.0675	0.0758
9000	Start	0.0975	0.0805	0.0890
9000	End	0.1023	0.0845	0.0934
9100	Start	0.1109	0.0920	0.1014
9100	End	0.1149	0.0950	0.1049
0	Start	0.0915	0.0880	0.0898
0	End	0.0911	0.0870	0.0891

Pile Load Test Results

Lynn Bark Solar
Martin County, Kentucky
S&ME Project No. 24780158



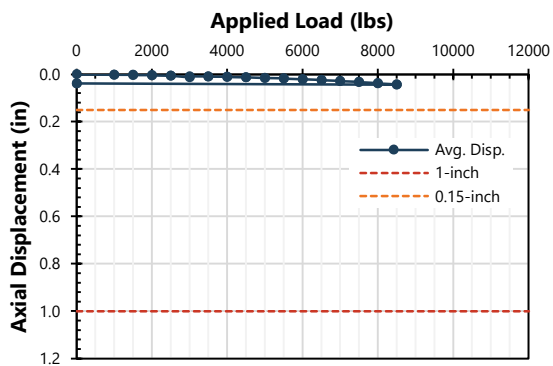
Axial Tensile Load

Test Information

Pile ID: PT-2B
Test Date: 1/24/2025
Pile Section: W6x9
Pile Embedment (ft): 9
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Cell ID: DEDR2505512
Displacement Gauge #1 ID: 18325126
Displacement Gauge #2 ID: 20026088
Personnel: K. Ackers

Test Termination

Test terminated at approximately 8,700 lbs
after jack ran out of stroke



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
1000	Start	0.0043	0.0000	0.0021
1000	End	0.0044	0.0000	0.0022
1500	Start	0.0054	0.0005	0.0029
1500	End	0.0060	0.0010	0.0035
2000	Start	0.0074	0.0015	0.0044
2000	End	0.0091	0.0020	0.0056
2500	Start	0.0100	0.0030	0.0065
2500	End	0.0104	0.0030	0.0067
3000	Start	0.0121	0.0140	0.0130
3000	End	0.0129	0.0045	0.0087
3500	Start	0.0138	0.0055	0.0097
3500	End	0.0145	0.0060	0.0103
4000	Start	0.0160	0.0065	0.0113
4000	End	0.0164	0.0065	0.0115
4500	Start	0.0182	0.0080	0.0131
4500	End	0.0191	0.0085	0.0138
5000	Start	0.0208	0.0100	0.0154
5000	End	0.0216	0.0105	0.0161
5500	Start	0.0236	0.0120	0.0178
5500	End	0.0244	0.0135	0.0190
6000	Start	0.0265	0.0155	0.0210
6000	End	0.0272	0.0160	0.0216
6500	Start	0.0306	0.0180	0.0243
6500	End	0.0313	0.0190	0.0251
7000	Start	0.0346	0.0210	0.0278
7000	End	0.0361	0.0220	0.0291
7500	Start	0.0404	0.0250	0.0327
7500	End	0.0410	0.0255	0.0332
8000	Start	0.0449	0.0290	0.0370
8000	End	0.0473	0.0305	0.0389
8700	Start	0.0522	0.0345	0.0433
8700	End	0.0532	0.0355	0.0443
0	Start	0.0402	0.0365	0.0384
0	End	0.0403	0.0365	0.0384

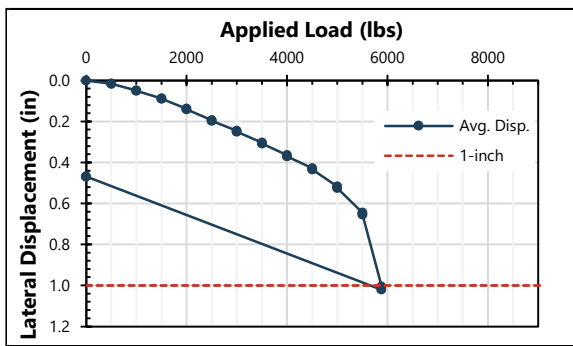
Lynn Bark Solar
Martin County, Kentucky
S&ME Project No. 24780158



Lateral Load

Test Information	
Pile ID:	PT-2A
Test Date:	1/24/2025
Pile Section:	W6x9
Pile Embedment (ft):	7
Time Increment (sec):	60
Pile Installation Date:	1/14/2025
Load Application Height (in):	48
Disp. Measurement Height (in):	6
Load Cell ID:	DEDR2505512
Displacement Gauge IDs:	18325126
	20026088
Personnel:	K. Ackers

Test Termination
Test terminated at approximately 5,900 lbs after exceeding 1" displacement



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
500	Start	0.0180	0.0155	0.0167
500	End	0.0180	0.0153	0.0166
1000	Start	0.0512	0.0475	0.0494
1000	End	0.0521	0.0485	0.0503
1500	Start	0.0903	0.0865	0.0884
1500	End	0.0922	0.0880	0.0901
2000	Start	0.1404	0.1355	0.1379
2000	End	0.1430	0.1375	0.1402
2500	Start	0.1967	0.1920	0.1944
2500	End	0.2005	0.1945	0.1975
3000	Start	0.2483	0.2435	0.2459
3000	End	0.2539	0.2475	0.2507
3500	Start	0.3036	0.3015	0.3026
3500	End	0.3095	0.3065	0.3080
4000	Start	0.3640	0.3645	0.3642
4000	End	0.3714	0.3695	0.3705
4500	Start	0.4268	0.4290	0.4279
4500	End	0.4343	0.4350	0.4346
5000	Start	0.5113	0.5235	0.5174
5000	End	0.5184	0.5305	0.5244
5500	Start	0.6266	0.6640	0.6453
5500	End	0.6378	0.6710	0.6544
5900	Start	0.9956	1.0180	1.0068
5900	End	1.0125	1.0285	1.0205
0	Start	0.4586	0.4796	0.4691
0	End	0.4615	0.4755	0.4685

Pile Load Test Results

Lynn Bark Solar
Martin County, Kentucky
S&ME Project No. 24780158



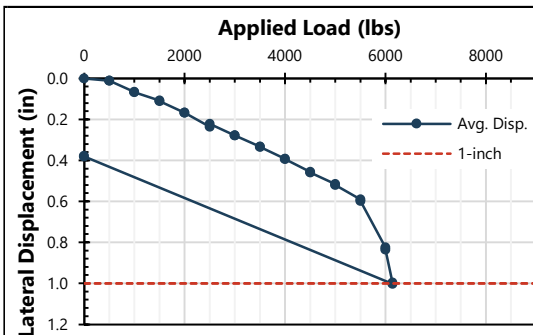
Lateral Load

Test Information

Pile ID: PT-2B
Test Date: 1/24/2025
Pile Section: W6x9
Pile Embedment (ft): 9
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Application Height (in): 48
Disp. Measurement Height (in): 6
Load Cell ID: DEDR2505512
Displacement Gauge IDs: 18325126
20026088
Personnel: K. Ackers

Test Termination

Test terminated at approximately 6,100 lbs
after exceeding 1" displacement



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
500	Start	0.0103	0.0110	0.0107
500	End	0.0109	0.0120	0.0114
1000	Start	0.0660	0.0670	0.0665
1000	End	0.0675	0.0685	0.0680
1500	Start	0.1072	0.1095	0.1084
1500	End	0.1095	0.1115	0.1105
2000	Start	0.1640	0.1695	0.1668
2000	End	0.1651	0.1700	0.1675
2500	Start	0.2168	0.2550	0.2359
2500	End	0.2183	0.2260	0.2221
3000	Start	0.2727	0.2825	0.2776
3000	End	0.2742	0.2835	0.2788
3500	Start	0.3269	0.3395	0.3332
3500	End	0.3286	0.3395	0.3340
4000	Start	0.3857	0.3990	0.3924
4000	End	0.3873	0.4000	0.3937
4500	Start	0.4483	0.4630	0.4556
4500	End	0.4527	0.4660	0.4594
5000	Start	0.5090	0.5232	0.5161
5000	End	0.5126	0.5270	0.5198
5500	Start	0.5809	0.5995	0.5902
5500	End	0.5895	0.6090	0.5993
6000	Start	0.7964	0.8520	0.8242
6000	End	0.8064	0.8655	0.8359
6100	Start	0.9438	1.0500	0.9969
6100	End	0.9451	1.0595	1.0023
0	Start	0.3568	0.4050	0.3809
0	End	0.3541	0.4020	0.3781

Pile Load Test Results

Lynn Bark Solar
Martin County, Kentucky
S&ME Project No. 24780158



Axial Compressive Load

Test Information

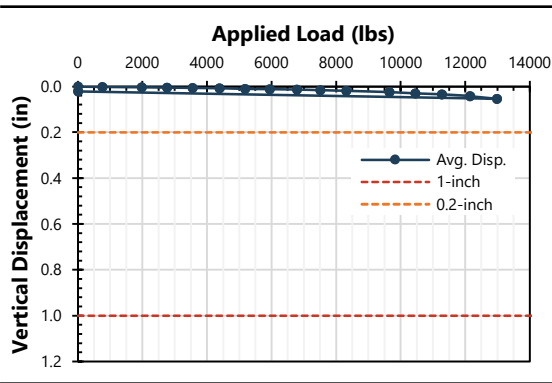
Pile ID: PT-2C
Test Date: 1/24/2025
Pile Section: W6x9
Pile Embedment (ft): 7
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Cell ID: DEDR2505512
Displacement Gauge IDs: 18325126
20026088
Personnel: K. Ackers

Note on Test Loads

Reported load in pounds is calibrated to an approximately 100 psi gauge increment

Test Termination

Test terminated at approximately 12,980 lbs after exceeding 1" displacement



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
310	Start			
310	End			
760	Start	0.0032	0.0010	0.0021
760	End	0.0032	0.0015	0.0024
1180	Start			
1180	End			
1610	Start			
1610	End			
1980	Start	0.0065	0.0005	0.0035
1980	End	0.0066	0.0005	0.0035
2400	Start			
2400	End			
2760	Start	0.0092	0.0005	0.0048
2760	End	0.0092	0.0005	0.0048
3160	Start			
3160	End			
3550	Start	0.0128	0.0010	0.0069
3550	End	0.0128	0.0010	0.0069
3960	Start			
3960	End			
4390	Start	0.0161	0.0015	0.0088
4390	End	0.0161	0.0015	0.0088
4750	Start			
4750	End			
5180	Start	0.0189	0.0020	0.0105
5180	End	0.0189	0.0020	0.0105
5560	Start			
5560	End			
5940	Start	0.0217	0.0035	0.0126
5940	End	0.0217	0.0035	0.0126
6350	Start			
6350	End			
6780	Start	0.0246	0.0045	0.0145
6780	End	0.0246	0.0045	0.0145
7150	Start			
7150	End			
7510	Start	0.0281	0.0050	0.0165
7510	End	0.0281	0.0050	0.0166
7870	Start			
7870	End			
8310	Start	0.0316	0.0065	0.0190
8310	End	0.0316	0.0065	0.0191
8810	Start			
8810	End			
9220	Start			
9220	End			
9650	Start	0.0384	0.0105	0.0245
9650	End	0.0386	0.0105	0.0246
10020	Start			
10020	End			
10450	Start	0.0452	0.0155	0.0303
10450	End	0.0452	0.0155	0.0304
10860	Start			
10860	End			
11280	Start	0.0505	0.0185	0.0345
11280	End	0.0507	0.0190	0.0348
11710	Start			
11710	End			
12150	Start	0.0594	0.0250	0.0422
12150	End	0.0601	0.0250	0.0426
12610	Start			
12610	End			
12980	Start	0.0720	0.0355	0.0537
12980	End	0.0725	0.0360	0.0543
13480	Start			
13480	End			
0	Start	0.0228	0.0230	0.0229
0	End	0.0210	0.0220	0.0215

Pile Load Test Results

Lynn Bark Solar
Martin County, Kentucky
S&ME Project No. 24780158



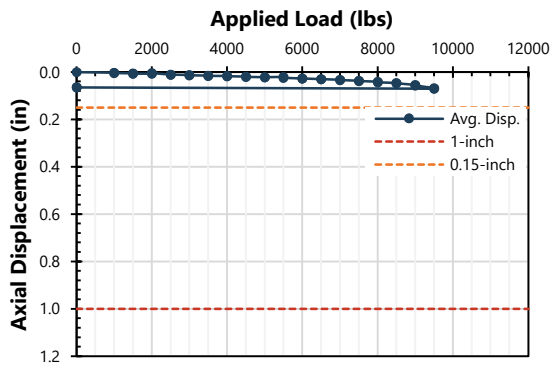
Axial Tensile Load

Test Information

Pile ID: PT-3A
Test Date: 1/22/2025
Pile Section: W6x9
Pile Embedment (ft): 7
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Cell ID: DEDR2505512
Displacement Gauge #1 ID: 18325126
Displacement Gauge #2 ID: 20026088
Personnel: K. Ackers

Test Termination

Test terminated at approximately 9,700 lbs
after jack ran out of stroke



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
1000	Start	0.0029	0.0030	0.0029
1000	End	0.0043	0.0045	0.0044
1500	Start	0.0066	0.0060	0.0063
1500	End	0.0072	0.0065	0.0068
2000	Start	0.0086	0.0070	0.0078
2000	End	0.0010	0.0085	0.0048
2500	Start	0.0122	0.0105	0.0113
2500	End	0.0128	0.0110	0.0119
3000	Start	0.0147	0.0120	0.0134
3000	End	0.0155	0.0130	0.0143
3500	Start	0.0170	0.0140	0.0155
3500	End	0.0179	0.0145	0.0162
4000	Start	0.0197	0.0153	0.0175
4000	End	0.0209	0.0160	0.0184
4500	Start	0.0223	0.0165	0.0194
4500	End	0.0233	0.0175	0.0204
5000	Start	0.0253	0.0185	0.0219
5000	End	0.0261	0.0195	0.0228
5500	Start	0.0205	0.0215	0.0210
5500	End	0.0292	0.0215	0.0253
6000	Start	0.0313	0.0230	0.0271
6000	End	0.0321	0.0235	0.0278
6500	Start	0.0347	0.0250	0.0299
6500	End	0.0360	0.0260	0.0310
7000	Start	0.0389	0.0270	0.0329
7000	End	0.0400	0.0285	0.0342
7500	Start	0.0441	0.0315	0.0378
7500	End	0.0447	0.0325	0.0386
8000	Start	0.0492	0.0345	0.0418
8000	End	0.0504	0.0360	0.0432
8500	Start	0.0552	0.0390	0.0471
8500	End	0.0564	0.0400	0.0482
9000	Start	0.0642	0.0465	0.0553
9000	End	0.0657	0.0480	0.0568
9500	Start	0.0779	0.0585	0.0682
9500	End	0.0803	0.0605	0.0704
0	Start	0.0675	0.0635	0.0655
0	End	0.0665	0.0625	0.0645

Pile Load Test Results

Lynn Bark Solar
Martin County, Kentucky
S&ME Project No. 24780158



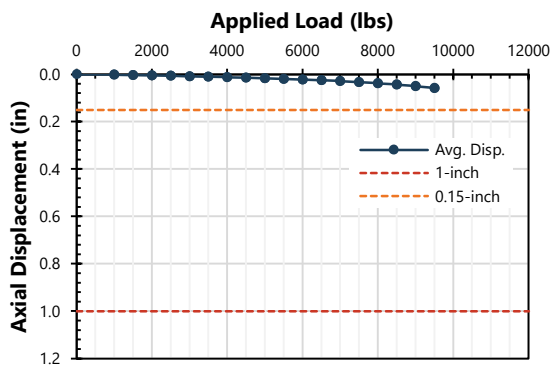
Axial Tensile Load

Test Information

Pile ID: PT-3B
Test Date: 1/22/2025
Pile Section: W6x9
Pile Embedment (ft): 9
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Cell ID: DEDR2505512
Displacement Gauge #1 ID: 18325126
Displacement Gauge #2 ID: 20026088
Personnel: K. Ackers

Test Termination

Test terminated at approximately 9,600 lbs
after jack ran out of stroke



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
1000	Start	0.0012	0.0020	0.0016
1000	End	0.0019	0.0020	0.0020
1500	Start	0.0041	0.0040	0.0040
1500	End	0.0041	0.0040	0.0040
2000	Start	0.0053	0.0050	0.0051
2000	End	0.0053	0.0050	0.0051
2500	Start	0.0070	0.0065	0.0067
2500	End	0.0070	0.0065	0.0068
3000	Start	0.0092	0.0085	0.0088
3000	End	0.0092	0.0085	0.0088
3500	Start	0.0110	0.0095	0.0103
3500	End	0.0110	0.0095	0.0103
4000	Start	0.0134	0.0115	0.0124
4000	End	0.0135	0.0120	0.0127
4500	Start	0.0158	0.0135	0.0146
4500	End	0.0159	0.0135	0.0147
5000	Start	0.0189	0.0155	0.0172
5000	End	0.0190	0.0160	0.0175
5500	Start	0.0213	0.0175	0.0194
5500	End	0.0214	0.0175	0.0194
6000	Start	0.0244	0.0200	0.0222
6000	End	0.0244	0.0200	0.0222
6500	Start	0.0277	0.0230	0.0253
6500	End	0.0279	0.0230	0.0254
7000	Start	0.0314	0.0260	0.0287
7000	End	0.0318	0.0265	0.0291
7500	Start	0.0357	0.0305	0.0331
7500	End	0.0363	0.0305	0.0334
8000	Start	0.0408	0.0345	0.0376
8000	End	0.0413	0.0355	0.0384
8500	Start	0.0471	0.0400	0.0436
8500	End	0.0475	0.0405	0.0440
9000	Start	0.0531	0.0465	0.0498
9000	End	0.0541	0.0475	0.0508
9500	Start	0.0620	0.0545	0.0583
9500	End	0.0633	0.0555	0.0594

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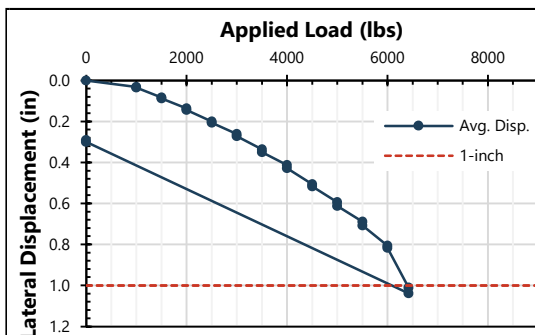
Lateral Load

Test Information

Pile ID:	PT-3A
Test Date:	1/22/2025
Pile Section:	W6x9
Pile Embedment (ft):	7
Time Increment (sec):	60
Pile Installation Date:	1/14/2025
Load Application Height (in):	48
Disp. Measurement Height (in):	6
Load Cell ID:	DEDR2505512
Displacement Gauge IDs:	18325126
	20026088
Personnel:	K. Ackers

Test Termination

Test terminated at approximately 6,400 lbs
after exceeding 1" displacement



Field Note

Preloaded to 1000 lbs

Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
1000	Start	0.0315	0.0323	0.0319
1000	End	0.0345	0.0350	0.0347
1500	Start	0.0825	0.0835	0.0830
1500	End	0.0870	0.0878	0.0874
2000	Start	0.1340	0.1372	0.1356
2000	End	0.1420	0.1451	0.1435
2500	Start	0.1985	0.2023	0.2004
2500	End	0.2050	0.2083	0.2066
3000	Start	0.2585	0.2632	0.2608
3000	End	0.2705	0.2731	0.2718
3500	Start	0.3345	0.3385	0.3365
3500	End	0.3490	0.3513	0.3502
4000	Start	0.4111	0.4148	0.4129
4000	End	0.4280	0.4283	0.4281
4500	Start	0.5065	0.5052	0.5058
4500	End	0.5185	0.5162	0.5174
5000	Start	0.5940	0.5942	0.5941
5000	End	0.6145	0.6109	0.6127
5500	Start	0.6925	0.6870	0.6897
5500	End	0.7115	0.7038	0.7076
6000	Start	0.8105	0.8035	0.8070
6000	End	0.8200	0.8133	0.8166
6400	Start	1.0140	1.0065	1.0102
6400	End	1.0445	1.0330	1.0387
0	Start	0.2960	0.3042	0.3001
0	End	0.2875	0.2957	0.2916

Pile Load Test Results

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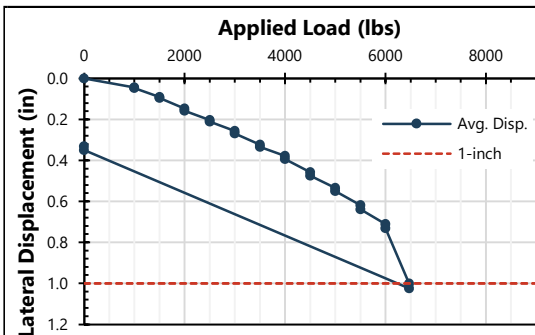
Lateral Load

Test Information

Pile ID: PT-3B
Test Date: 1/22/2025
Pile Section: W6x9
Pile Embedment (ft): 9
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Application Height (in): 48
Disp. Measurement Height (in): 6
Load Cell ID: DEDR2505512
Displacement Gauge IDs: 18325126
20026088
Personnel: K. Ackers

Test Termination

Test terminated at approximately 6,500 lbs
after exceeding 1" displacement



Field Note

Preloaded to 1000 lbs

Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
	End			
1000	Start	0.0450	0.0433	0.0441
1000	End	0.0485	0.0471	0.0478
1500	Start	0.0900	0.0908	0.0904
1500	End	0.0960	0.0959	0.0959
2000	Start	0.1470	0.1486	0.1478
2000	End	0.1575	0.1574	0.1575
2500	Start	0.2025	0.2053	0.2039
2500	End	0.2105	0.2126	0.2116
3000	Start	0.2540	0.2604	0.2572
3000	End	0.2665	0.2725	0.2695
3500	Start	0.3180	0.3288	0.3234
3500	End	0.3290	0.3392	0.3341
4000	Start	0.3715	0.3866	0.3790
4000	End	0.3880	0.4009	0.3944
4500	Start	0.4500	0.4667	0.4584
4500	End	0.4670	0.4843	0.4757
5000	Start	0.5230	0.5445	0.5338
5000	End	0.5400	0.5612	0.5506
5500	Start	0.6040	0.6330	0.6185
5500	End	0.6255	0.6527	0.6391
6000	Start	0.6945	0.7270	0.7107
6000	End	0.7160	0.7470	0.7315
6500	Start	0.9710	1.0313	1.0011
6500	End	0.9920	1.0572	1.0246
0	Start	0.3510	0.3503	0.3507
0	End	0.3325	0.3308	0.3316

Pile Load Test Results

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Axial Compressive Load

Test Information

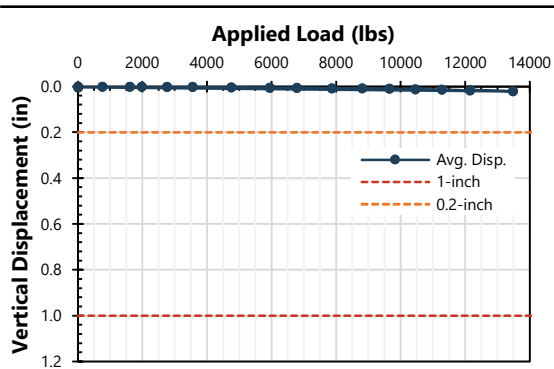
Pile ID: PT-3C
Test Date: 1/22/2025
Pile Section: W6x9
Pile Embedment (ft): 7
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Cell ID: DEDR2505512
Displacement Gauge IDs: 18325126
20026088
Personnel: K. Ackers

Note on Test Loads

Reported load in pounds is calibrated to an approximately 100 psi gauge increment

Test Termination

Test terminated at approximately 13,480 lbs



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
310	Start			
310	End			
760	Start	0.0007	0.0010	0.0008
760	End	0.0007	0.0010	0.0008
1180	Start			
1180	End			
1610	Start	0.0016	0.0010	0.0013
1610	End	0.0018	0.0010	0.0014
1980	Start	0.0020	0.0010	0.0015
1980	End	0.0020	0.0010	0.0015
2400	Start			
2400	End			
2760	Start	0.0033	0.0010	0.0022
2760	End	0.0030	0.0005	0.0018
3160	Start			
3160	End			
3550	Start	0.0044	0.0000	0.0022
3550	End	0.0032	0.0005	0.0018
3960	Start			
3960	End			
4390	Start			
4390	End			
4750	Start	0.0057	0.0020	0.0038
4750	End	0.0050	0.0025	0.0037
5180	Start			
5180	End			
5560	Start			
5560	End			
5940	Start	0.0075	0.0035	0.0055
5940	End	0.0064	0.0045	0.0055
6350	Start			
6350	End			
6780	Start	0.0086	0.0045	0.0066
6780	End	0.0077	0.0045	0.0061
7150	Start			
7150	End			
7510	Start			
7510	End			
7870	Start	0.0117	0.0035	0.0076
7870	End	0.0120	0.0035	0.0077
8310	Start			
8310	End			
8810	Start	0.0146	0.0020	0.0083
8810	End	0.0146	0.0015	0.0080
9220	Start			
9220	End			
9650	Start	0.0169	0.0025	0.0097
9650	End	0.0170	0.0025	0.0097
10020	Start			
10020	End			
10450	Start	0.0196	0.0040	0.0118
10450	End	0.0197	0.0040	0.0118
10860	Start			
10860	End			
11280	Start	0.0227	0.0050	0.0138
11280	End	0.0229	0.0050	0.0139
11710	Start			
11710	End			
12150	Start	0.0290	0.0075	0.0182
12150	End	0.0220	0.0075	0.0148
12610	Start			
12610	End			
12980	Start			
12980	End			
13480	Start	0.0305	0.0105	0.0205
13480	End	0.0317	0.0105	0.0211
0	Start	0.0005	0.0085	0.0045
0	End	0.0014	0.0095	0.0055

Pile Load Test Results

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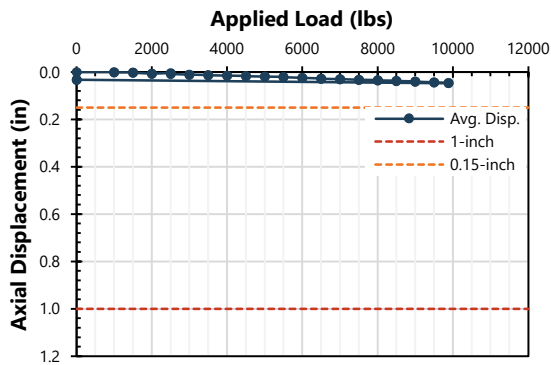
Axial Tensile Load

Test Information

Pile ID: PT-4A
Test Date: 1/23/2025
Pile Section: W6x9
Pile Embedment (ft): 7
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Cell ID: DEDR2505512
Displacement Gauge #1 ID: 18325126
Displacement Gauge #2 ID: 20026088
Personnel: K. Ackers

Test Termination

Test terminated at approximately 9,900 lbs
after jack ran out of stroke



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
1000	Start	0.0000	0.0024	0.0012
1000	End	0.0005	0.0025	0.0015
1500	Start	0.0015	0.0037	0.0026
1500	End	0.0020	0.0045	0.0032
2000	Start	0.0050	0.0086	0.0068
2000	End	0.0055	0.0089	0.0072
2500	Start	0.0065	0.0030	0.0048
2500	End	0.0070	0.0108	0.0089
3000	Start	0.0095	0.0129	0.0112
3000	End	0.0100	0.0136	0.0118
3500	Start	0.0110	0.0155	0.0132
3500	End	0.0115	0.0160	0.0138
4000	Start	0.0125	0.0173	0.0149
4000	End	0.0135	0.0181	0.0158
4500	Start	0.0145	0.0197	0.0171
4500	End	0.0150	0.0201	0.0176
5000	Start	0.0165	0.0220	0.0192
5000	End	0.0170	0.0225	0.0198
5500	Start	0.0185	0.0245	0.0215
5500	End	0.0195	0.0253	0.0224
6000	Start	0.0215	0.0278	0.0246
6000	End	0.0220	0.0286	0.0253
6500	Start	0.0245	0.0310	0.0278
6500	End	0.0250	0.0317	0.0284
7000	Start	0.0270	0.0339	0.0305
7000	End	0.0270	0.0344	0.0307
7500	Start	0.0290	0.0363	0.0327
7500	End	0.0295	0.0369	0.0332
8000	Start	0.0310	0.0386	0.0348
8000	End	0.0320	0.0394	0.0357
8500	Start	0.0335	0.0416	0.0376
8500	End	0.0345	0.0420	0.0382
9000	Start	0.0360	0.0446	0.0403
9000	End	0.0365	0.0449	0.0407
9500	Start	0.0395	0.0479	0.0437
9500	End	0.0400	0.0486	0.0443
9900	Start	0.0420	0.0505	0.0462
9900	End	0.0425	0.0510	0.0468
0	Start	0.0310	0.0362	0.0336
0	End	0.0310	0.0362	0.0336

Pile Load Test Results

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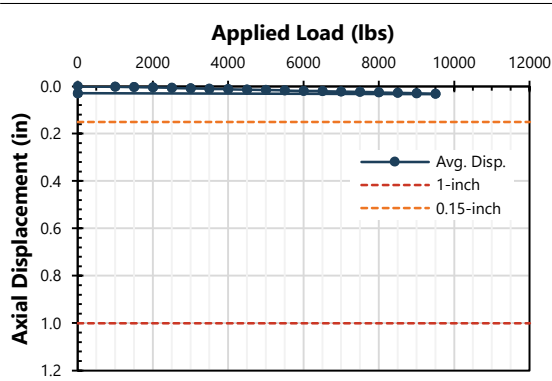
Axial Tensile Load

Test Information

Pile ID: PT-4B
Test Date: 1/23/2025
Pile Section: W6x9
Pile Embedment (ft): 9
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Cell ID: DEDR2505512
Displacement Gauge #1 ID: 18325126
Displacement Gauge #2 ID: 20026088
Personnel: K. Ackers

Test Termination

Test terminated at approximately 9,600 lbs
after jack ran out of stroke



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
1000	Start	0.0020	0.0023	0.0022
1000	End	0.0020	0.0025	0.0023
1500	Start	0.0030	0.0039	0.0034
1500	End	0.0040	0.0043	0.0042
2000	Start	0.0045	0.0053	0.0049
2000	End	0.0055	0.0060	0.0057
2500	Start	0.0065	0.0072	0.0068
2500	End	0.0070	0.0080	0.0075
3000	Start	0.0085	0.0091	0.0088
3000	End	0.0085	0.0097	0.0091
3500	Start	0.0100	0.0111	0.0106
3500	End	0.0110	0.0120	0.0115
4000	Start	0.0120	0.0131	0.0125
4000	End	0.0120	0.0137	0.0128
4500	Start	0.0135	0.0147	0.0141
4500	End	0.0140	0.0152	0.0146
5000	Start	0.0150	0.0164	0.0157
5000	End	0.0155	0.0169	0.0162
5500	Start	0.0160	0.0185	0.0172
5500	End	0.0175	0.0195	0.0185
6000	Start	0.0185	0.0204	0.0195
6000	End	0.0190	0.0207	0.0198
6500	Start	0.0195	0.0217	0.0206
6500	End	0.0200	0.0220	0.0210
7000	Start	0.0215	0.0233	0.0224
7000	End	0.0220	0.0240	0.0230
7500	Start	0.0235	0.0252	0.0243
7500	End	0.0235	0.0257	0.0246
8000	Start	0.0250	0.0270	0.0260
8000	End	0.0255	0.0276	0.0266
8500	Start	0.0270	0.0290	0.0280
8500	End	0.0270	0.0296	0.0283
9000	Start	0.0290	0.0309	0.0299
9000	End	0.0290	0.0314	0.0302
9600	Start	0.0305	0.0333	0.0319
9600	End	0.0315	0.0341	0.0328
0	Start	0.0300	0.0297	0.0298
0	End	0.0305	0.0307	0.0306

Pile Load Test Results

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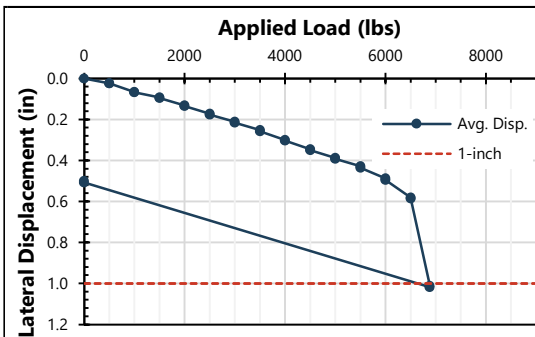
Lateral Load

Test Information

Pile ID: PT-4A
Test Date: 1/23/2025
Pile Section: W6x9
Pile Embedment (ft): 7
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Application Height (in): 48
Disp. Measurement Height (in): 6
Load Cell ID: DEDR2505512
Displacement Gauge IDs: 18325126
20026088
Personnel: K. Ackers

Test Termination

Test terminated at approximately 6,900 lbs
after exceeding 1" displacement



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
500	Start	0.0240	0.0229	0.0234
500	End	0.0250	0.0235	0.0243
1000	Start	0.0665	0.0640	0.0653
1000	End	0.0690	0.0660	0.0675
1500	Start	0.0945	0.0913	0.0929
1500	End	0.0975	0.0937	0.0956
2000	Start	0.1340	0.1295	0.1317
2000	End	0.1365	0.1317	0.1341
2500	Start	0.1750	0.1702	0.1726
2500	End	0.1790	0.1736	0.1763
3000	Start	0.2140	0.2081	0.2110
3000	End	0.2190	0.2128	0.2159
3500	Start	0.2545	0.2490	0.2518
3500	End	0.2610	0.2542	0.2576
4000	Start	0.3030	0.2959	0.2994
4000	End	0.3075	0.3004	0.3039
4500	Start	0.3490	0.3422	0.3456
4500	End	0.3535	0.3463	0.3499
5000	Start	0.3905	0.3836	0.3871
5000	End	0.3965	0.3887	0.3926
5500	Start	0.4315	0.4255	0.4285
5500	End	0.4405	0.4327	0.4366
6000	Start	0.4920	0.4840	0.4880
6000	End	0.5005	0.4912	0.4959
6500	Start	0.5870	0.5769	0.5819
6500	End	0.5905	0.5803	0.5854
6900	Start	1.0085	1.0151	1.0118
6900	End	1.0150	1.0217	1.0183
0	Start	0.5060	0.5111	0.5086
0	End	0.4975	0.5033	0.5004

Pile Load Test Results

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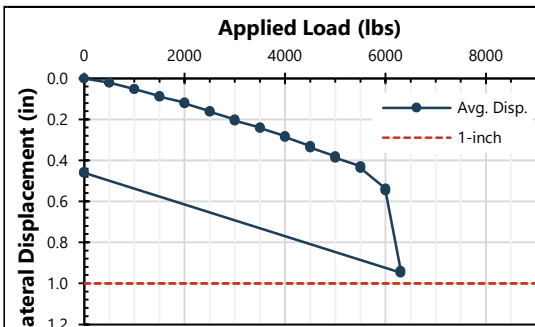
Lateral Load

Test Information

Pile ID: PT-4B
Test Date: 1/23/2025
Pile Section: W6x9
Pile Embedment (ft): 9
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Application Height (in): 48
Disp. Measurement Height (in): 6
Load Cell ID: DEDR2505512
Displacement Gauge IDs: 18325126
20026088
Personnel: K. Ackers

Test Termination

Test terminated at approximately 6,300 lbs
prior to exceeding 1" displacement.



Test Note

Gauge 1 lost connection after the final load.

Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
500	Start	0.0205	0.0211	0.0208
500	End	0.0200	0.0199	0.0200
1000	Start	0.0510	0.0529	0.0519
1000	End	0.0515	0.0534	0.0524
1500	Start	0.0865	0.0855	0.0860
1500	End	0.0890	0.0884	0.0887
2000	Start	0.1175	0.1186	0.1181
2000	End	0.1215	0.1218	0.1216
2500	Start	0.1595	0.1586	0.1591
2500	End	0.1640	0.1617	0.1629
3000	Start	0.2010	0.1988	0.1999
3000	End	0.2085	0.2044	0.2064
3500	Start	0.2405	0.2378	0.2391
3500	End	0.2445	0.2416	0.2430
4000	Start	0.2825	0.2800	0.2812
4000	End	0.2885	0.2849	0.2867
4500	Start	0.3325	0.3283	0.3304
4500	End	0.3400	0.3354	0.3377
5000	Start	0.3820	0.3781	0.3800
5000	End	0.3915	0.3850	0.3882
5500	Start	0.4315	0.4245	0.4280
5500	End	0.4415	0.4330	0.4373
6000	Start	0.5360	0.5388	0.5374
6000	End	0.5440	0.5485	0.5462
6300	Start	-	0.9390	0.9390
6300	End	-	0.9483	0.9483
0	Start	-	0.4618	0.4618
0	End	-	0.4572	0.4572

Pile Load Test Results

Lynn Bark Solar
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Axial Compressive Load

Test Information

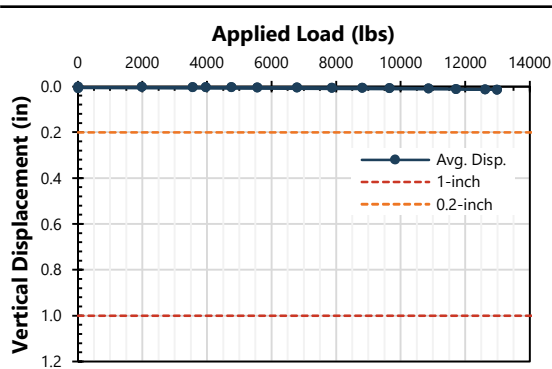
Pile ID: PT-4C
Test Date: 1/23/2025
Pile Section: W6x9
Pile Embedment (ft): 7
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Cell ID: DEDR2505512
Displacement Gauge IDs: 18325126
20026088
Personnel: K. Ackers

Note on Test Loads

Reported load in pounds is calibrated to an approximately 100 psi gauge increment

Test Termination

Test terminated at approximately 12,980 lbs



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
310	Start			
310	End			
760	Start			
760	End			
1180	Start			
1180	End			
1610	Start			
1610	End			
1980	Start	0.0000	0.0013	0.0006
1980	End	0.0005	0.0018	0.0011
2400	Start			
2400	End			
2760	Start			
2760	End			
3160	Start			
3160	End			
3550	Start	0.0010	0.0031	0.0020
3550	End	0.0010	0.0034	0.0022
3960	Start	0.0010	0.0036	0.0023
3960	End	0.0010	0.0040	0.0025
4390	Start			
4390	End			
4750	Start	0.0015	0.0044	0.0029
4750	End	0.0015	0.0048	0.0032
5180	Start			
5180	End			
5560	Start	0.0020	0.0051	0.0036
5560	End	0.0020	0.0053	0.0037
5940	Start			
5940	End			
6350	Start			
6350	End			
6780	Start	0.0020	0.0058	0.0039
6780	End	0.0025	0.0060	0.0043
7150	Start			
7150	End			
7510	Start			
7510	End			
7870	Start	0.0025	0.0073	0.0049
7870	End	0.0030	0.0075	0.0053
8310	Start			
8310	End			
8810	Start	0.0030	0.0086	0.0058
8810	End	0.0030	0.0092	0.0061
9220	Start			
9220	End			
9650	Start	0.0035	0.0103	0.0069
9650	End	0.0040	0.0106	0.0073
10020	Start			
10020	End			
10450	Start			
10450	End			
10860	Start	0.0045	0.0125	0.0085
10860	End	0.0045	0.0128	0.0087
11280	Start			
11280	End			
11710	Start	0.0065	0.0145	0.0105
11710	End	0.0070	0.0149	0.0110
12150	Start			
12150	End			
12610	Start	0.0080	0.0170	0.0125
12610	End	0.0085	0.0174	0.0130
12980	Start	0.0085	0.0180	0.0132
12980	End	0.0085	0.0183	0.0134
13480	Start			
13480	End			
0	Start	0.0110	0.0035	0.0072
0	End	0.0105	0.0029	0.0067

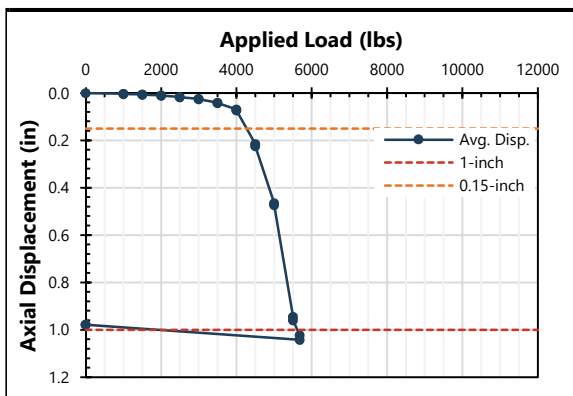
Lynn Bark Solar
Martin County, Kentucky
S&ME Project No. 24780158



Axial Tensile Load

Test Information	
Pile ID:	PT-5A
Test Date:	1/21/2025
Pile Section:	W6x9
Pile Embedment (ft):	7
Time Increment (sec):	60
Pile Installation Date:	1/14/2025
Load Cell ID:	DEDR2505512
Displacement Gauge #1 ID:	18325126
Displacement Gauge #2 ID:	20026088
Personnel:	K. Ackers

Test Termination
Test terminated at approximately 5,700 lbs after exceeding 1" displacement



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
1000	Start	0.0040	0.0032	0.0036
1000	End	0.0045	0.0049	0.0047
1500	Start	0.0060	0.0065	0.0063
1500	End	0.0070	0.0076	0.0073
2000	Start	0.0090	0.0107	0.0099
2000	End	0.0105	0.0111	0.0108
2500	Start	0.0160	0.0170	0.0165
2500	End	0.0175	0.0178	0.0176
3000	Start	0.0245	0.0257	0.0251
3000	End	0.0265	0.0268	0.0267
3500	Start	0.0400	0.0420	0.0410
3500	End	0.0425	0.0439	0.0432
4000	Start	0.0685	0.0713	0.0699
4000	End	0.0720	0.0740	0.0730
4500	Start	0.2135	0.2162	0.2149
4500	End	0.2240	0.2249	0.2245
5000	Start	0.4630	0.4691	0.4661
5000	End	0.4715	0.4750	0.4732
5500	Start	0.9435	0.9478	0.9457
5500	End	0.9590	0.9601	0.9595
5700	Start	1.0200	1.0269	1.0234
5700	End	1.0420	1.0414	1.0417
0	Start	0.9810	0.9765	0.9788
0	End	0.9790	0.9752	0.9771

Pile Load Test Results

Lynn Bark Solar
Martin County, Kentucky
S&ME Project No. 24780158



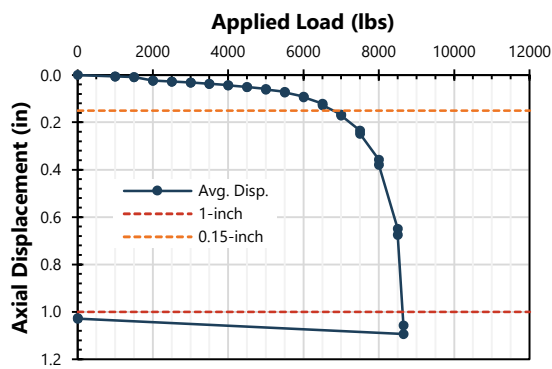
Axial Tensile Load

Test Information

Pile ID: PT-5B
Test Date: 1/21/2025
Pile Section: W6x9
Pile Embedment (ft): 9
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Cell ID: DEDR2505512
Displacement Gauge #1 ID: 18325126
Displacement Gauge #2 ID: 20026088
Personnel: K. Ackers

Test Termination

Test terminated at approximately 8,700 lbs
after exceeding 1" displacement



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
1000	Start	0.0030	0.0083	0.0056
1000	End	0.0035	0.0085	0.0060
1500	Start	0.0060	0.0112	0.0086
1500	End	0.0065	0.0112	0.0089
2000	Start	0.0230	0.0244	0.0237
2000	End	0.0235	0.0244	0.0240
2500	Start	0.0265	0.0286	0.0276
2500	End	0.0270	0.0287	0.0279
3000	Start	0.0305	0.0332	0.0318
3000	End	0.0315	0.0335	0.0325
3500	Start	0.0355	0.0383	0.0369
3500	End	0.0365	0.0388	0.0377
4000	Start	0.0410	0.0436	0.0423
4000	End	0.0425	0.0449	0.0437
4500	Start	0.0490	0.0518	0.0504
4500	End	0.0500	0.0527	0.0514
5000	Start	0.0575	0.0614	0.0595
5000	End	0.0595	0.0626	0.0610
5500	Start	0.0685	0.0727	0.0706
5500	End	0.0715	0.0749	0.0732
6000	Start	0.0890	0.0940	0.0915
6000	End	0.0920	0.0964	0.0942
6500	Start	0.1175	0.1242	0.1209
6500	End	0.1250	0.1298	0.1274
7000	Start	0.1640	0.1708	0.1674
7000	End	0.1690	0.1737	0.1714
7500	Start	0.2305	0.2398	0.2351
7500	End	0.2445	0.2512	0.2478
8000	Start	0.3510	0.3636	0.3573
8000	End	0.3750	0.3825	0.3788
8500	Start	0.6420	0.6568	0.6494
8500	End	0.6705	0.6792	0.6748
8700	Start	1.0475	1.0657	1.0566
8700	End	1.0880	1.0985	1.0932
0	Start	1.0265	1.0300	1.0283
0	End	1.0235	1.0278	1.0257

Pile Load Test Results

Lynn Bark Solar
Martin County, Kentucky
S&ME Project No. 24780158



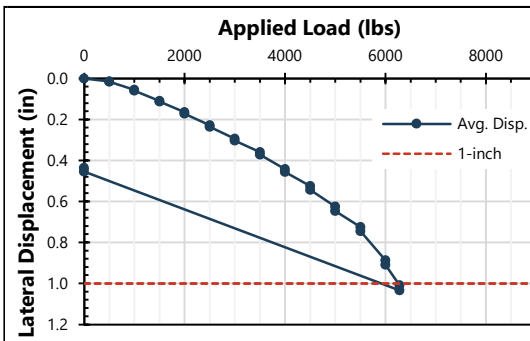
Lateral Load

Test Information

Pile ID: PT-5A
Test Date: 1/21/2025
Pile Section: W6x9
Pile Embedment (ft): 7
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Application Height (in): 48
Disp. Measurement Height (in): 6
Load Cell ID: DEDR2505512
Displacement Gauge IDs: 18325126
20026088
Personnel: K. Ackers

Test Termination

Test terminated at approximately 6,300 lbs
after exceeding 1" displacement



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
500	Start	0.0150	0.0151	0.0151
500	End	0.0155	0.0153	0.0154
1000	Start	0.0550	0.0561	0.0556
1000	End	0.0590	0.0591	0.0591
1500	Start	0.1100	0.1082	0.1091
1500	End	0.1140	0.1117	0.1129
2000	Start	0.1675	0.1625	0.1650
2000	End	0.1755	0.1691	0.1723
2500	Start	0.2325	0.2251	0.2288
2500	End	0.2400	0.2309	0.2354
3000	Start	0.3000	0.2889	0.2945
3000	End	0.3095	0.2966	0.3030
3500	Start	0.3660	0.3526	0.3593
3500	End	0.3800	0.3634	0.3717
4000	Start	0.4500	0.4348	0.4424
4000	End	0.4660	0.4472	0.4566
4500	Start	0.5340	0.5165	0.5253
4500	End	0.5560	0.5311	0.5436
5000	Start	0.6365	0.6139	0.6252
5000	End	0.6590	0.6340	0.6465
5500	Start	0.7355	0.7150	0.7252
5500	End	0.7615	0.7297	0.7456
6000	Start	0.8970	0.8765	0.8868
6000	End	0.9195	0.8979	0.9087
6300	Start	1.0160	1.0023	1.0092
6300	End	1.0405	1.0275	1.0340
0	Start	0.4605	0.4485	0.4545
0	End	0.4400	0.4315	0.4357

Pile Load Test Results

Lynn Bark Solar
Martin County, Kentucky
S&ME Project No. 24780158



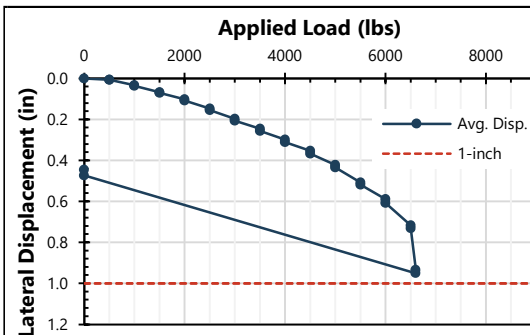
Lateral Load

Test Information

Pile ID: PT-5B
Test Date: 1/21/2025
Pile Section: W6x9
Pile Embedment (ft): 9
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Application Height (in): 48
Disp. Measurement Height (in): 6
Load Cell ID: DEDR2505512
Displacement Gauge IDs: 18325126
20026088
Personnel: K. Ackers

Test Termination

Test terminated at approximately 6,600 lbs
at almost 1" displacement



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
500	Start	0.0100	0.0040	0.0070
500	End	0.0100	0.0041	0.0071
1000	Start	0.0360	0.0302	0.0331
1000	End	0.0395	0.0334	0.0365
1500	Start	0.0705	0.0636	0.0671
1500	End	0.0750	0.0677	0.0713
2000	Start	0.1060	0.0986	0.1023
2000	End	0.1115	0.1034	0.1075
2500	Start	0.1495	0.1438	0.1467
2500	End	0.1590	0.1521	0.1555
3000	Start	0.1990	0.1940	0.1965
3000	End	0.2105	0.2034	0.2070
3500	Start	0.2475	0.2425	0.2450
3500	End	0.2595	0.2520	0.2558
4000	Start	0.3010	0.2973	0.2992
4000	End	0.3125	0.3088	0.3107
4500	Start	0.3545	0.3522	0.3533
4500	End	0.3695	0.3664	0.3680
5000	Start	0.4235	0.4205	0.4220
5000	End	0.4380	0.4317	0.4349
5500	Start	0.5120	0.5035	0.5077
5500	End	0.5235	0.5136	0.5185
6000	Start	0.5965	0.5814	0.5890
6000	End	0.6175	0.5990	0.6082
6500	Start	0.7305	0.7038	0.7172
6500	End	0.7450	0.7162	0.7306
6600	Start	0.9545	0.9147	0.9346
6600	End	0.9735	0.9267	0.9501
0	Start	0.5030	0.4431	0.4730
0	End	0.4735	0.4168	0.4451

Pile Load Test Results

Lynn Bark Solar
Martin County, Kentucky
S&ME Project No. 24780158



Axial Compressive Load

Test Information

Pile ID: PT-5C
Test Date: 1/21/2025
Pile Section: W6x9
Pile Embedment (ft): 7
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Cell ID: DEDR2505512
Displacement Gauge IDs: 18325126
20026088
Personnel: K. Ackers

Note on Test Loads

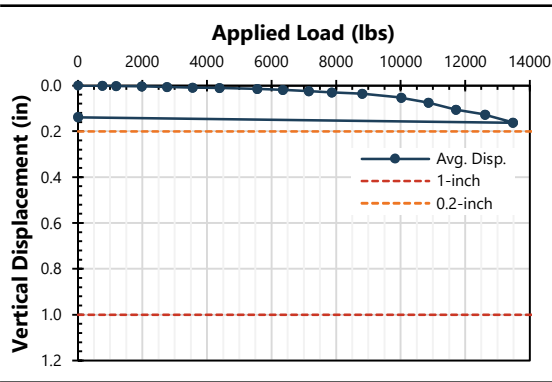
Reported load in pounds is calibrated to an approximately 100 psi gauge increment

Field Note

Gauge 2 malfunctioned and did not produce readings presumably due to temperature in the field

Test Termination

Test terminated at approximately 13,480 lbs



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	End	0.0000	#N/A	0.0000
310	Start			
310	End			
760	Start	0.0012	#N/A	0.0012
760	End	0.0014	#N/A	0.0014
1180	Start	0.0021	#N/A	0.0021
1180	End	0.0025	#N/A	0.0025
1610	Start			
1610	End			
1980	Start	0.0040	#N/A	0.0040
1980	End	0.0041	#N/A	0.0041
2400	Start			
2400	End			
2760	Start	0.0070	#N/A	0.0070
2760	End	0.0072	#N/A	0.0072
3160	Start			
3160	End			
3550	Start	0.0090	#N/A	0.0090
3550	End	0.0092	#N/A	0.0092
3960	Start			
3960	End			
4390	Start	0.0115	#N/A	0.0115
4390	End	0.0114	#N/A	0.0114
4750	Start			
4750	End			
5180	Start			
5180	End			
5560	Start	0.0157	#N/A	0.0157
5560	End	0.0158	#N/A	0.0158
5940	Start			
5940	End			
6350	Start	0.0198	#N/A	0.0198
6350	End	0.0198	#N/A	0.0198
6780	Start			
6780	End			
7150	Start	0.0244	#N/A	0.0244
7150	End	0.0245	#N/A	0.0245
7510	Start			
7510	End			
7870	Start	0.0301	#N/A	0.0301
7870	End	0.0301	#N/A	0.0301
8310	Start			
8310	End			
8810	Start	0.0360	#N/A	0.0360
8810	End	0.0362	#N/A	0.0362
9220	Start			
9220	End			
9650	Start			
9650	End			
10020	Start	0.0533	#N/A	0.0533
10020	End	0.0540	#N/A	0.0540
10450	Start			
10450	End			
10860	Start	0.0749	#N/A	0.0749
10860	End	0.0751	#N/A	0.0751
11280	Start			
11280	End			
11710	Start	0.1059	#N/A	0.1059
11710	End	0.1062	#N/A	0.1062
12150	Start			
12150	End			
12610	Start	0.1268	#N/A	0.1268
12610	End	0.1281	#N/A	0.1281
12980	Start			
12980	End			
13480	Start	0.1619	#N/A	0.1619
13480	End	0.1627	#N/A	0.1627
0	Start	0.1389	#N/A	0.1389
0	End	0.1364	#N/A	0.1364

Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
1000	Start	0.0045	0.0044	0.0044
1000	End	0.0045	0.0044	0.0044
1500	Start	0.0060	0.0059	0.0059
1500	End	0.0065	0.0060	0.0063
2000	Start	0.0095	0.0096	0.0095
2000	End	0.0100	0.0097	0.0099
2500	Start	0.0135	0.0135	0.0135
2500	End	0.0140	0.0138	0.0139
3000	Start	0.0180	0.0183	0.0182
3000	End	0.0190	0.0185	0.0187
3500	Start	0.0285	0.0282	0.0284
3500	End	0.0290	0.0284	0.0287
4000	Start	0.0445	0.0447	0.0446
4000	End	0.0465	0.0457	0.0461
4500	Start	0.0730	0.0736	0.0733
4500	End	0.0780	0.0772	0.0776
5000	Start	0.1375	0.1382	0.1378
5000	End	0.1420	0.1415	0.1418
5500	Start	0.2465	0.2500	0.2482
5500	End	0.2680	0.2674	0.2677
5400	Start	1.0625	1.0688	1.0657
5400	End	1.0840	1.0819	1.0830
0	Start	1.0690	1.0588	1.0639
0	End	1.0680	1.0583	1.0631

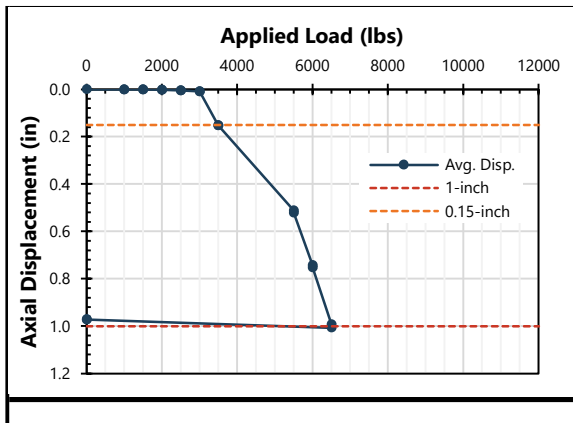
Lynn Bark Solar
Martin County, Kentucky
S&ME Project No. 24780158



Axial Tensile Load

Test Information	
Pile ID:	PT-6B
Test Date:	1/21/2025
Pile Section:	W6x9
Pile Embedment (ft):	9
Time Increment (sec):	60
Pile Installation Date:	1/14/2025
Load Cell ID:	DEDR2505512
Displacement Gauge #1 ID:	18325126
Displacement Gauge #2 ID:	20026088
Personnel:	K. Ackers

Test Termination
Test terminated at approximately 6,500 lbs after exceeding 1" displacement



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
1000	Start	0.0010	0.0013	0.0011
1000	End	0.0010	0.0014	0.0012
1500	Start	0.0005	0.0029	0.0017
1500	End	0.0005	0.0029	0.0017
2000	Start	0.0005	0.0050	0.0028
2000	End	0.0010	0.0050	0.0030
2500	Start	0.0035	0.0074	0.0055
2500	End	0.0035	0.0074	0.0055
3000	Start	0.0065	0.0109	0.0087
3000	End	0.0070	0.0109	0.0089
3500	Start	0.1345	0.1698	0.1521
3500	End	0.1345	0.1698	0.1521
5500	Start	0.4855	0.5371	0.5113
5500	End	0.4980	0.5455	0.5217
6000	Start	0.7140	0.7707	0.7423
6000	End	0.7255	0.7784	0.7520
6500	Start	0.9640	1.0212	0.9926
6500	End	0.9795	1.0329	1.0062
0	Start	0.9660	0.9776	0.9718
0	End	0.9650	0.9775	0.9712

Pile Load Test Results

Lynn Bark Solar
Martin County, Kentucky
S&ME Project No. 24780158



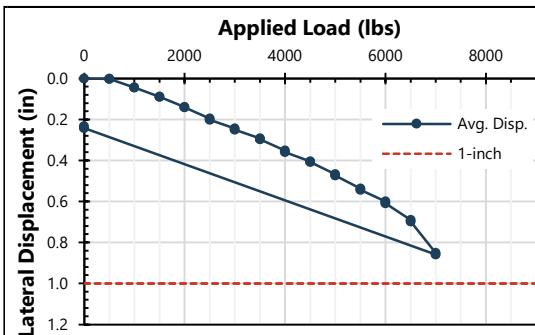
Lateral Load

Test Information

Pile ID: PT-6A
Test Date: 1/21/2025
Pile Section: W6x9
Pile Embedment (ft): 7
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Application Height (in): 48
Disp. Measurement Height (in): 6
Load Cell ID: DEDR2505512
Displacement Gauge IDs: 18325126
20026088
Personnel: K. Ackers

Test Termination

Test terminated at approximately 7,000 lbs



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
500	Start	0.0026	0.0015	0.0021
500	End	0.0026	0.0015	0.0021
1000	Start	0.0444	0.0440	0.0442
1000	End	0.0444	0.0440	0.0442
1500	Start	0.0882	0.0895	0.0888
1500	End	0.0895	0.0900	0.0897
2000	Start	0.1376	0.1405	0.1390
2000	End	0.1404	0.1420	0.1412
2500	Start	0.1946	0.1975	0.1960
2500	End	0.2009	0.2025	0.2017
3000	Start	0.2427	0.2455	0.2441
3000	End	0.2480	0.2510	0.2495
3500	Start	0.2918	0.2940	0.2929
3500	End	0.2959	0.2980	0.2969
4000	Start	0.3507	0.3540	0.3524
4000	End	0.3578	0.3610	0.3594
4500	Start	0.4032	0.4060	0.4046
4500	End	0.4070	0.4105	0.4087
5000	Start	0.4659	0.4690	0.4675
5000	End	0.4725	0.4755	0.4740
5500	Start	0.5358	0.5400	0.5379
5500	End	0.5416	0.5455	0.5436
6000	Start	0.5967	0.6030	0.5999
6000	End	0.6071	0.6120	0.6096
6500	Start	0.6875	0.6935	0.6905
6500	End	0.6964	0.7020	0.6992
7000	Start	0.8349	0.8685	0.8517
7000	End	0.8408	0.8775	0.8591
0	Start	0.2349	0.2505	0.2427
0	End	0.2236	0.2420	0.2328

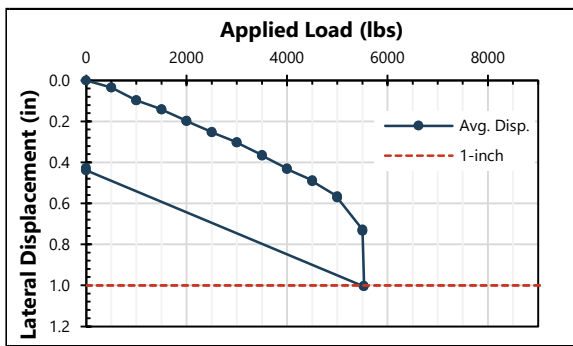
Lynn Bark Solar
Martin County, Kentucky
S&ME Project No. 24780158



Lateral Load

Test Information	
Pile ID:	PT-6B
Test Date:	1/21/2025
Pile Section:	W6x9
Pile Embedment (ft):	9
Time Increment (sec):	60
Pile Installation Date:	1/14/2025
Load Application Height (in):	48
Disp. Measurement Height (in):	6
Load Cell ID:	DEDR2505512
Displacement Gauge IDs:	18325126
	20026088
Personnel:	K. Ackers

Test Termination
Test terminated at approximately 5,500 lbs after exceeding 1" displacement



Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
500	Start	0.0412	0.0295	0.0354
500	End	0.0412	0.0295	0.0354
1000	Start	0.1091	0.0860	0.0975
1000	End	0.1094	0.0860	0.0977
1500	Start	0.1567	0.1260	0.1413
1500	End	0.1584	0.1270	0.1427
2000	Start	0.2151	0.1790	0.1971
2000	End	0.2173	0.1805	0.1989
2500	Start	0.2723	0.2305	0.2514
2500	End	0.2744	0.2315	0.2529
3000	Start	0.3249	0.2785	0.3017
3000	End	0.3273	0.2805	0.3039
3500	Start	0.3885	0.3400	0.3642
3500	End	0.3914	0.3425	0.3669
4000	Start	0.4551	0.4045	0.4298
4000	End	0.4597	0.4075	0.4336
4500	Start	0.5141	0.4600	0.4871
4500	End	0.5203	0.4655	0.4929
5000	Start	0.5902	0.5425	0.5663
5000	End	0.5970	0.5480	0.5725
5500	Start	0.7392	0.7165	0.7278
5500	End	0.7446	0.7250	0.7348
5500	Start	0.9644	1.0410	1.0027
5500	End	0.9649	1.0455	1.0052
0	Start	0.4185	0.4585	0.4385
0	End	0.4007	0.4525	0.4266

Pile Load Test Results

Lynn Bark Solar
Martin County, Kentucky
S&ME Project No. 24780158



Axial Compressive Load

Test Information

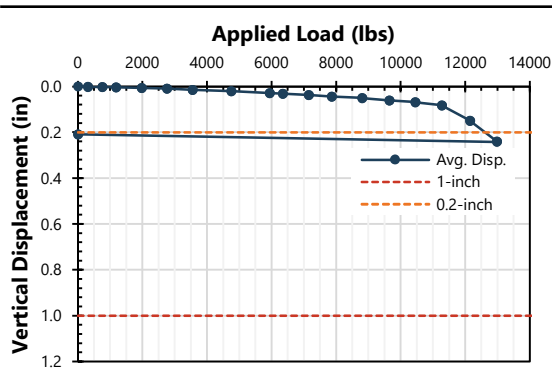
Pile ID: PT-6C
Test Date: 1/21/2025
Pile Section: W6x9
Pile Embedment (ft): 7
Time Increment (sec): 60
Pile Installation Date: 1/14/2025
Load Cell ID: DEDR2505512
Displacement Gauge IDs: 18325126
20026088
Personnel: K. Ackers

Note on Test Loads

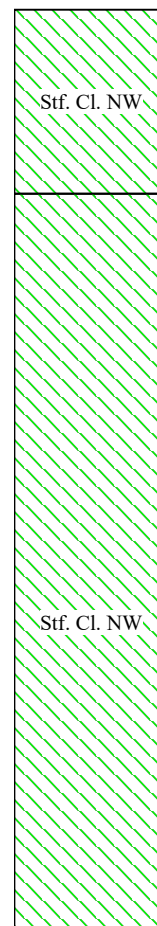
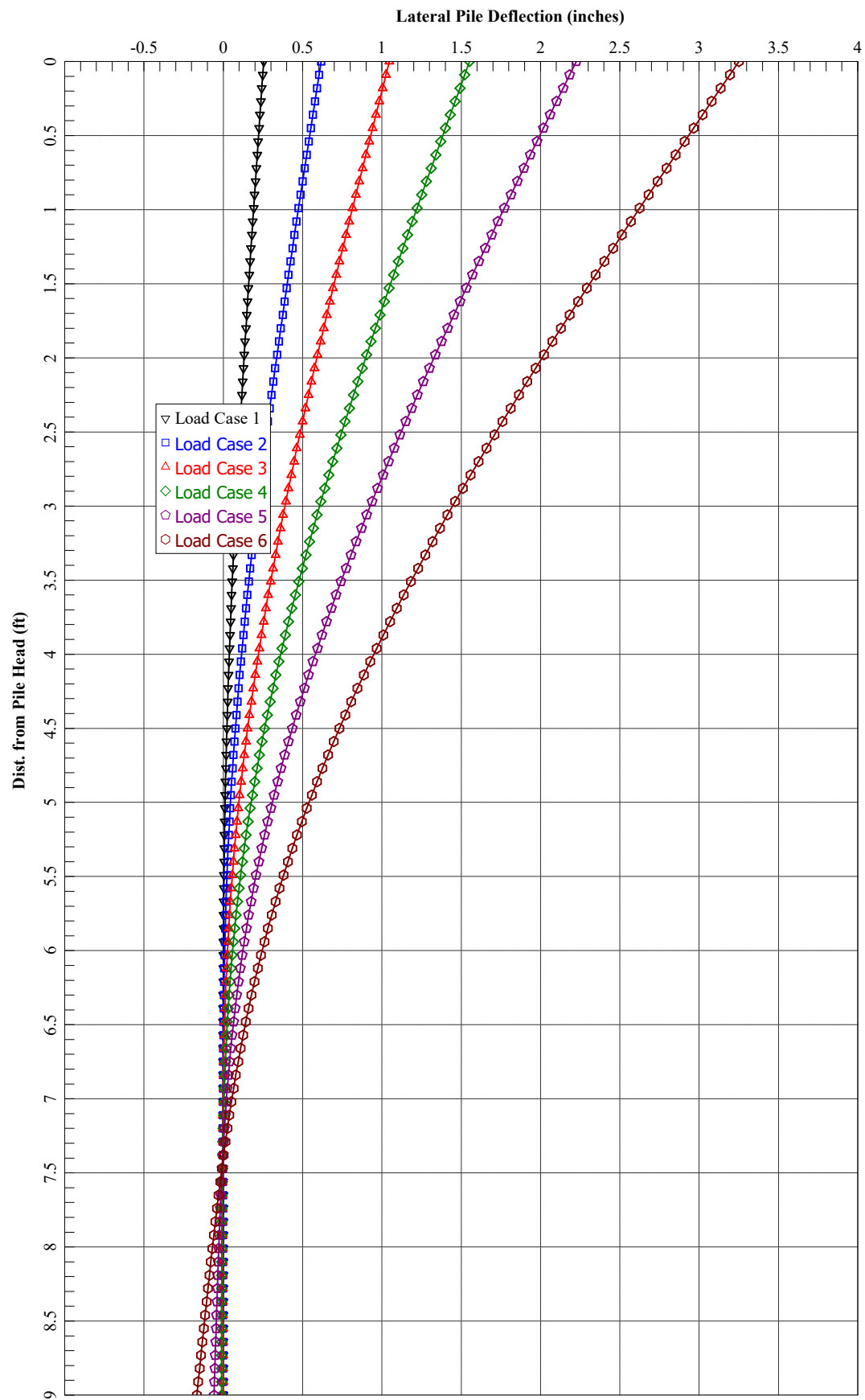
Reported load in pounds is calibrated to an approximately 100 psi gauge increment

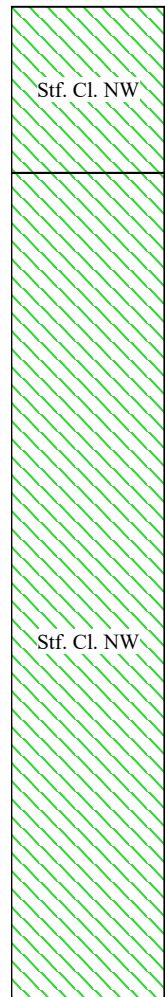
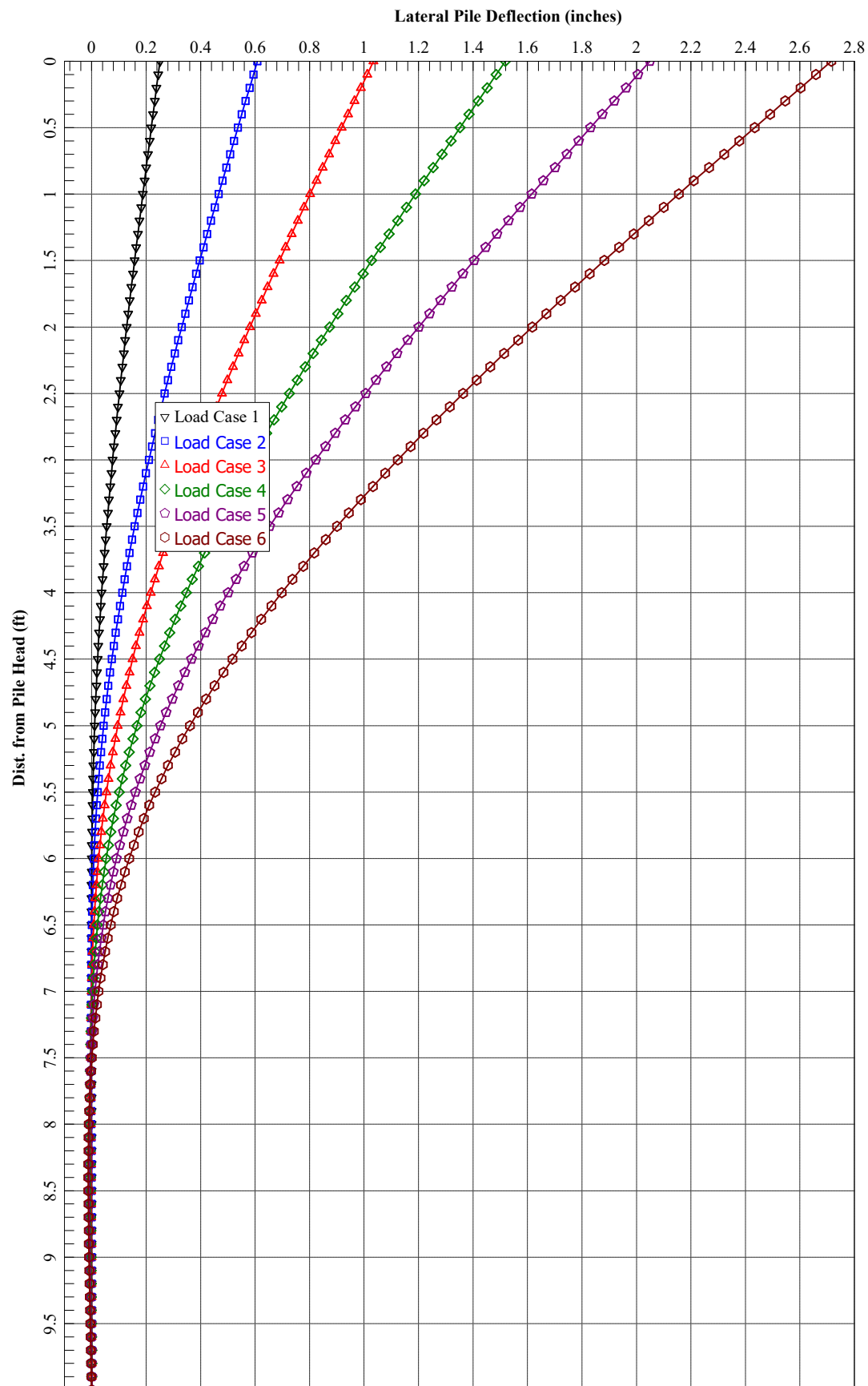
Test Termination

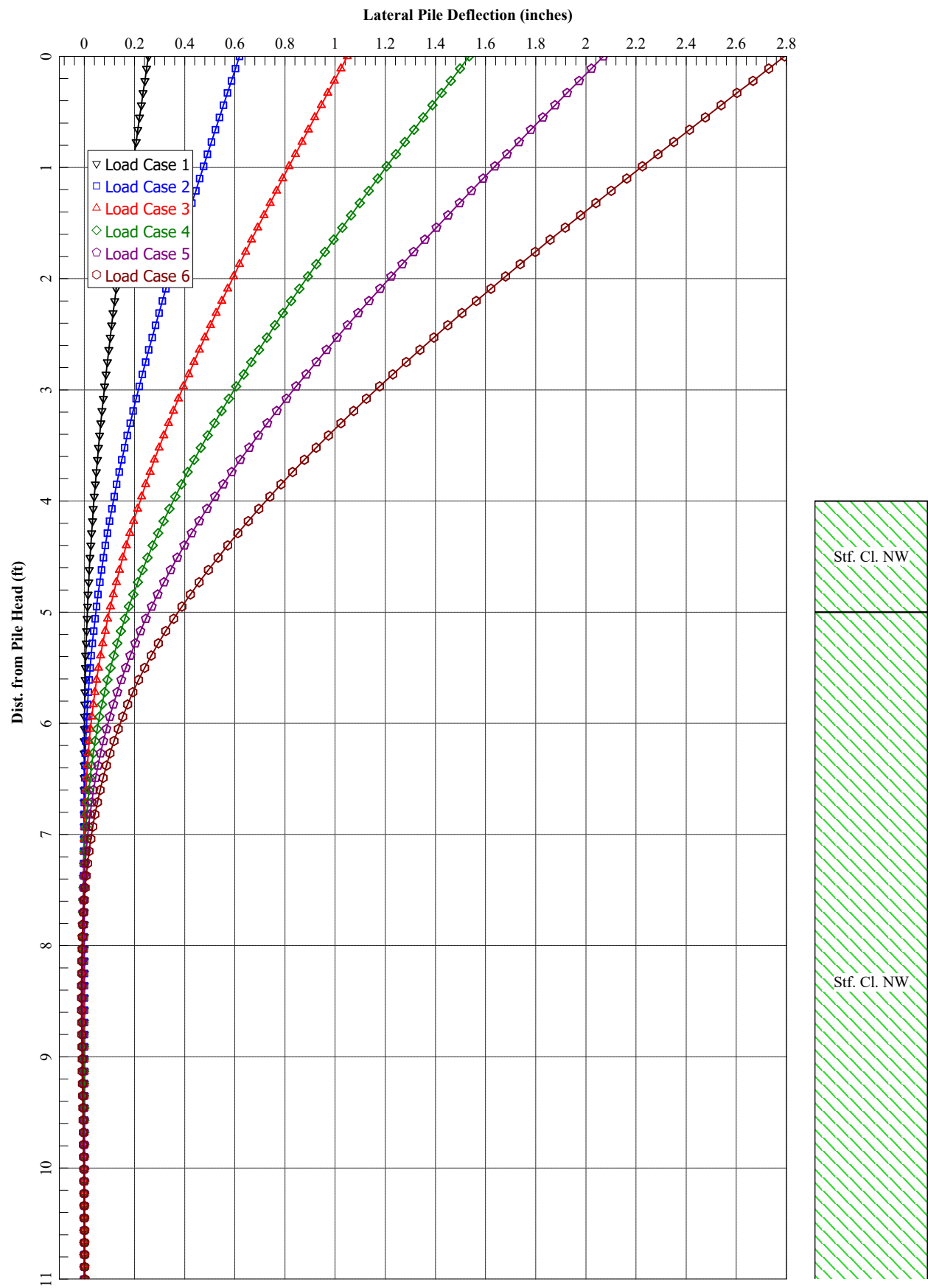
Test terminated at approximately 12980 lbs



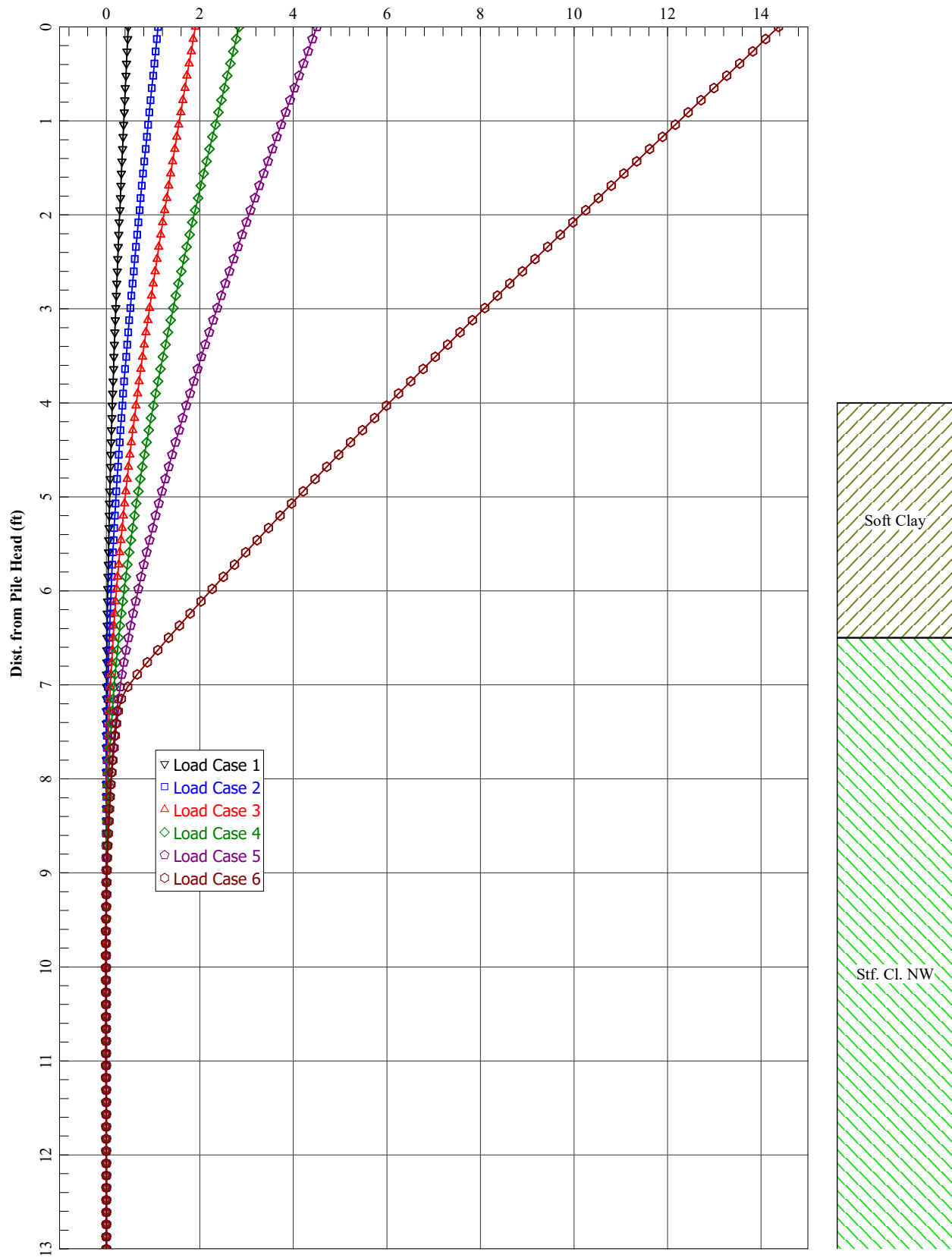
Applied Load (lbs)	Time Interval	Displacement (in)		
		Gauge 1	Gauge 2	Avg.
0	Start	0.0000	0.0000	0.0000
310	Start	0.0020	0.0019	0.0019
310	End	0.0020	0.0021	0.0020
760	Start	0.0035	0.0032	0.0033
760	End	0.0035	0.0032	0.0033
1180	Start	0.0045	0.0042	0.0043
1180	End	0.0045	0.0045	0.0045
1610	Start			
1610	End			
1980	Start	0.0065	0.0067	0.0066
1980	End	0.0065	0.0070	0.0067
2400	Start			
2400	End			
2760	Start	0.0105	0.0093	0.0099
2760	End	0.0105	0.0098	0.0102
3160	Start			
3160	End			
3550	Start	0.0160	0.0133	0.0147
3550	End	0.0160	0.0138	0.0149
3960	Start			
3960	End			
4390	Start			
4390	End			
4750	Start	0.0225	0.0190	0.0207
4750	End	0.0225	0.0193	0.0209
5180	Start			
5180	End			
5560	Start			
5560	End			
5940	Start	0.0310	0.0267	0.0288
5940	End	0.0310	0.0269	0.0290
6350	Start	0.0335	0.0294	0.0314
6350	End	0.0340	0.0296	0.0318
6780	Start			
6780	End			
7150	Start	0.0405	0.0355	0.0380
7150	End	0.0405	0.0357	0.0381
7510	Start			
7510	End			
7870	Start	0.0475	0.0412	0.0444
7870	End	0.0480	0.0416	0.0448
8310	Start			
8310	End			
8810	Start	0.0540	0.0472	0.0506
8810	End	0.0545	0.0476	0.0511
9220	Start			
9220	End			
9650	Start	0.0660	0.0569	0.0614
9650	End	0.0660	0.0574	0.0617
10020	Start			
10020	End			
10450	Start	0.0740	0.0638	0.0689
10450	End	0.0750	0.0647	0.0699
10860	Start			
10860	End			
11280	Start	0.0880	0.0758	0.0819
11280	End	0.0900	0.0778	0.0839
11710	Start			
11710	End			
12150	Start	0.1565	0.1408	0.1487
12150	End	0.1585	0.1435	0.1510
12610	Start			
12610	End			
12980	Start	0.2480	0.2333	0.2406
12980	End	0.2495	0.2346	0.2420
13480	Start			
13480	End			
0	Start	0.2105	0.2091	0.2098
0	End	0.2100	0.2083	0.2092







Deflection vs Depth (with Adfreeze Strees)
Lateral Pile Deflection (inches)



=====

LPIle for Version 2022-12.012

License ID : 166863175
License Type : (Single User License)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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S&ME, Inc.
Orlando, FL

=====

This model was prepared by:
Mark Tilashalski

Files Used for Analysis

Path to file locations:
\Shared\SME\Ops\Cincinnati-1178\Projects\2024\24780158_Savion_Lynn Bark
Solar_Threeforks KY\GEO\Project Docs\Calcs\Driven Piles\

Name of input data file:
New LPIle (SI units).lp12d

Name of output report file:
New LPIle (SI units).lp12o

Name of plot output file:
New LPIle (SI units).lp12p

Name of runtime message file:
New LPIle (SI units).lp12r

Date and Time of Analysis

Date: March 25, 2025

Time: 14:12:25

Problem Title

Project Name: Tift Mullis Solar

Job Number: 24800083

Client: Inman Solar

Engineer: Eddie Polanco

Description:

Program Options and Settings

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- | | | |
|--|---|---------------|
| - Maximum number of iterations allowed | = | 500 |
| - Deflection tolerance for convergence | = | 1.0000E-05 in |
| - Maximum allowable deflection | = | 100.0000 in |
| - Number of pile increments | = | 100 |

Loading Type and Number of Cycles of Loading:

- | | | |
|-------------------------------|---|------------|
| - Cyclic loading specified | | |
| - Number of cycles of loading | = | 100 cycles |

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Pile Structural Properties and Geometry

Number of pile sections defined	=	1
Total length of pile	=	11.000 ft
Depth of ground surface below top of pile	=	4.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	3.9400
2	11.000	3.9400

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a AISC strong axis steel pile	
Length of section	= 11.000000 ft
AISC Section Type	= W

AISC Section Name = W6X9

Pile width = 3.940000 in

Soil and Rock Layering Information

The soil profile is modelled using 2 layers

Layer 1 is stiff clay without free water

Distance from top of pile to top of layer	=	4.000000 ft
Distance from top of pile to bottom of layer	=	5.000000 ft
Effective unit weight at top of layer	=	115.000000 pcf
Effective unit weight at bottom of layer	=	115.000000 pcf
Undrained cohesion at top of layer	=	1500. psf
Undrained cohesion at bottom of layer	=	1500. psf
Epsilon-50 at top of layer	=	0.008000
Epsilon-50 at bottom of layer	=	0.008000

Layer 2 is stiff clay without free water

Distance from top of pile to top of layer	=	5.000000 ft
Distance from top of pile to bottom of layer	=	15.000000 ft
Effective unit weight at top of layer	=	115.000000 pcf
Effective unit weight at bottom of layer	=	115.000000 pcf
Undrained cohesion at top of layer	=	3000. psf
Undrained cohesion at bottom of layer	=	3000. psf
Epsilon-50 at top of layer	=	0.006000
Epsilon-50 at bottom of layer	=	0.006000

(Depth of the lowest soil layer extends 4.000 ft below the pile tip)

Summary of Input Soil Properties

Layer	Soil Type	Layer	Effective	Cohesion	E50
-------	-----------	-------	-----------	----------	-----

Num.	Name (p-y Curve Type)	Depth ft	Unit Wt. pcf	psf	or krm
1	Stiff Clay	4.0000	115.0000	1500.	0.00800
	w/o Free Water	5.0000	115.0000	1500.	0.00800
2	Stiff Clay	5.0000	115.0000	3000.	0.00600
	w/o Free Water	15.0000	115.0000	3000.	0.00600

Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	4.000	2.5000	1.0000
2	15.000	2.5000	1.0000

Cyclic Loading Type

Cyclic loading criteria were used for computation of p-y curves for all analyses.

Number of cycles of loading = 100

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 6

Load Compute No.	Load Top y Type	Condition Run Analysis 1	Condition 2	Axial Thrust Force, lbs
1	1	V = 1000.000000 lbs	M = 0.0000 in-lbs	0.0000000
No		Yes		
2	1	V = 2000. lbs	M = 0.0000 in-lbs	0.0000000
No		Yes		
3	1	V = 3000. lbs	M = 0.0000 in-lbs	0.0000000

No		Yes				
4	1	V =	4000. lbs	M =	0.0000 in-lbs	0.0000000
No		Yes				
5	1	V =	5000. lbs	M =	0.0000 in-lbs	0.0000000
No		Yes				
6	1	V =	6000. lbs	M =	0.0000 in-lbs	0.0000000
No		Yes				

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

----- Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness -----

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Dimensions and Properties of Steel AISC Strong Axis:

Length of Section	=	11.000000 ft
Flange Width	=	3.940000 in
Section Depth	=	5.900000 in
Flange Thickness	=	0.215000 in
Web Thickness	=	0.170000 in
Yield Stress of Pipe	=	60.000000 ksi
Elastic Modulus	=	29000. ksi
Cross-sectional Area	=	2.680000 sq. in.
Moment of Inertia	=	16.400000 in^4
Elastic Bending Stiffness	=	475600. kip-in^2
Plastic Modulus, Z	=	6.230000in^3
Plastic Moment Capacity = Fy Z	=	373.800000in-kip

Axial Structural Capacities:

Nom. Axial Structural Capacity = Fy As = 160.800 kips

Nominal Axial Tensile Capacity = -160.800 kips

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 1

Number	Axial Thrust Force kips
-----	-----
1	0.000

Definition of Run Messages:

Y = part of pipe section has yielded.

Axial Thrust Force = 0.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Total Stress ksi	Run Msg
-----	-----	-----	-----	-----	---
0.00002232	10.3531960	463904.	2.9500000	1.8901714	
0.00004464	20.7063919	463904.	2.9500000	3.7803428	
0.00006695	31.0595879	463904.	2.9500000	5.6705142	
0.00008927	41.4127838	463904.	2.9500000	7.5606855	
0.0001116	51.7659798	463904.	2.9500000	9.4508569	
0.0001339	62.1191758	463904.	2.9500000	11.3410283	
0.0001562	72.4723717	463904.	2.9500000	13.2311997	
0.0001785	82.8255677	463904.	2.9500000	15.1213711	
0.0002009	93.1787636	463904.	2.9500000	17.0115425	
0.0002232	103.5319596	463904.	2.9500000	18.9017138	
0.0002455	113.8851556	463904.	2.9500000	20.7918852	
0.0002678	124.2383515	463904.	2.9500000	22.6820566	
0.0002901	134.5915475	463904.	2.9500000	24.5722280	
0.0003124	144.9447434	463904.	2.9500000	26.4623994	
0.0003348	155.2979394	463904.	2.9500000	28.3525708	
0.0003571	165.6511354	463904.	2.9500000	30.2427422	
0.0003794	176.0043313	463904.	2.9500000	32.1329135	
0.0004017	186.3575273	463904.	2.9500000	34.0230849	
0.0004240	196.7107232	463904.	2.9500000	35.9132563	
0.0004464	207.0639192	463904.	2.9500000	37.8034277	
0.0004687	217.4171152	463904.	2.9500000	39.6935991	
0.0004910	227.7703111	463904.	2.9500000	41.5837705	
0.0005133	238.1235071	463904.	2.9500000	43.4739418	
0.0005356	248.4767030	463904.	2.9500000	45.3641132	
0.0005579	258.8298990	463904.	2.9500000	47.2542846	
0.0005803	269.1830950	463904.	2.9500000	49.1444560	
0.0006026	279.5362909	463904.	2.9500000	51.0346274	

0.0006249	289.8894869	463904.	2.9500000	52.9247988	
0.0006472	300.2426828	463904.	2.9500000	54.8149702	
0.0006695	310.5958788	463904.	2.9500000	56.7051415	
0.0006918	320.9490748	463904.	2.9500000	58.5953129	
0.0007142	330.6430835	462981.	2.9500000	60.0000000	Y
0.0007365	336.9457285	457509.	2.9500000	60.0000000	Y
0.0007588	339.7817426	447791.	2.9500000	60.0000000	Y
0.0007811	341.2042750	436818.	2.9500000	60.0000000	Y
0.0008034	342.5150980	426316.	2.9500000	60.0000000	Y
0.0008257	343.7207380	416254.	2.9500000	60.0000000	Y
0.0008481	344.8259695	406603.	2.9500000	60.0000000	Y
0.0008704	345.8490482	397353.	2.9500000	60.0000000	Y
0.0009150	347.6783949	379969.	2.9500000	60.0000000	Y
0.0009597	349.2615104	363945.	2.9500000	60.0000000	Y
0.0010043	350.6278368	349131.	2.9500000	60.0000000	Y
0.0010489	351.8362042	335426.	2.9500000	60.0000000	Y
0.0010936	352.8875500	322697.	2.9500000	60.0000000	Y
0.0011382	353.8244520	310865.	2.9500000	60.0000000	Y
0.0011828	354.6594744	299840.	2.9500000	60.0000000	Y
0.0012275	355.4044577	289544.	2.9500000	60.0000000	Y
0.0012721	356.0705197	279908.	2.9500000	60.0000000	Y
0.0013167	356.6680550	270873.	2.9500000	60.0000000	Y
0.0013614	357.2067350	262388.	2.9500000	60.0000000	Y
0.0014060	357.6955081	254406.	2.9500000	60.0000000	Y
0.0014506	358.1425996	246886.	2.9500000	60.0000000	Y
0.0014953	358.5555116	239793.	2.9500000	60.0000000	Y
0.0015399	358.9219204	233080.	2.9500000	60.0000000	Y
0.0015845	359.2616733	226729.	2.9500000	60.0000000	Y
0.0016292	359.5823234	220714.	2.9500000	60.0000000	Y
0.0016738	359.8629273	214996.	2.9500000	60.0000000	Y
0.0017184	360.1351122	209570.	2.9500000	60.0000000	Y
0.0017631	360.3759952	204401.	2.9500000	60.0000000	Y
0.0018077	360.6096395	199483.	2.9500000	60.0000000	Y
0.0018524	360.8161526	194788.	2.9500000	60.0000000	Y
0.0018970	361.0216508	190313.	2.9500000	60.0000000	Y
0.0019416	361.1972287	186028.	2.9500000	60.0000000	Y
0.0019863	361.3728066	181936.	2.9500000	60.0000000	Y
0.0020309	361.5316067	178016.	2.9500000	60.0000000	Y
0.0020755	361.6795034	174259.	2.9500000	60.0000000	Y
0.0021202	361.8274002	170660.	2.9500000	60.0000000	Y
0.0021648	361.9535122	167200.	2.9500000	60.0000000	Y
0.0022094	362.0768009	163878.	2.9500000	60.0000000	Y
0.0022541	362.2000896	160687.	2.9500000	60.0000000	Y
0.0022987	362.3057159	157613.	2.9500000	60.0000000	Y
0.0023433	362.4072890	154654.	2.9500000	60.0000000	Y
0.0023880	362.5088620	151806.	2.9500000	60.0000000	Y
0.0024326	362.6043972	149060.	2.9500000	60.0000000	Y
0.0024772	362.6869663	146407.	2.9500000	60.0000000	Y
0.0025219	362.7695354	143849.	2.9500000	60.0000000	Y
0.0025665	362.8521044	141379.	2.9500000	60.0000000	Y

0.0026112	362.9296621	138992.	2.9500000	60.0000000	Y
0.0026558	362.9957580	136681.	2.9500000	60.0000000	Y
0.0028343	363.2509822	128161.	2.9500000	60.0000000	Y
0.0030129	363.4588737	120636.	2.9500000	60.0000000	Y
0.0031914	363.6287139	113940.	2.9500000	60.0000000	Y
0.0033699	363.7820454	107949.	2.9500000	60.0000000	Y
0.0035485	363.9022609	102551.	2.9500000	60.0000000	Y

Summary of Results for Nominal Moment Capacity for Section 1

Load No.	Axial Thrust kips	Nominal Moment Capacity in-kips
1	0.00000000	363.9022609033

Note that the values in the above table are not factored by a strength reduction factor for LRFD.

The value of the strength reduction factor depends on the provisions of the LRFD code being followed.

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to the LRFD structural design standard being followed.

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	4.0000	0.00	N.A.	No	0.00	1875.
2	5.0000	0.5545	Yes	No	1875.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for

peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 1000.0 lbs
 Applied moment at pile head = 0.0 in-lbs
 Axial thrust load on pile head = 0.0 lbs

Depth Res.	Soil X	Deflect. Spr.	Bending Distrib. Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil p
	Es*H	y						
feet		Lat. Load	in-lbs	lbs	radians	psi*	lb-in^2	
lb/inch		lb/inch	lb/inch					
0.00	0.00	0.2554	7.39E-08	1000.	-0.00535	8.88E-09	4.64E+08	
0.00	0.00	0.00	0.00					
0.1100	0.00	0.2483	1320.	1000.0000	-0.00535	158.5610	4.64E+08	
0.00	0.00	0.00	0.00					
0.2200	0.00	0.2413	2640.	1000.0000	-0.00534	317.1220	4.64E+08	
0.00	0.00	0.00	0.00					
0.3300	0.00	0.2342	3960.	1000.	-0.00533	475.6829	4.64E+08	
0.00	0.00	0.00	0.00					
0.4400	0.00	0.2272	5280.	1000.	-0.00532	634.2439	4.64E+08	
0.00	0.00	0.00	0.00					
0.5500	0.00	0.2202	6600.	1000.0000	-0.00530	792.8049	4.64E+08	
0.00	0.00	0.00	0.00					
0.6600	0.00	0.2132	7920.	1000.0000	-0.00528	951.3659	4.64E+08	
0.00	0.00	0.00	0.00					
0.7700	0.00	0.2062	9240.	1000.0000	-0.00526	1110.	4.64E+08	
0.00	0.00	0.00	0.00					
0.8800	0.00	0.1993	10560.	1000.0000	-0.00523	1268.	4.64E+08	
0.00	0.00	0.00	0.00					
0.9900	0.00	0.1924	11880.	1000.0000	-0.00520	1427.	4.64E+08	
0.00	0.00	0.00	0.00					
1.1000	0.00	0.1856	13200.	1000.	-0.00516	1586.	4.64E+08	
0.00	0.00	0.00	0.00					
1.2100	0.00	0.1788	14520.	1000.0000	-0.00512	1744.	4.64E+08	
0.00	0.00	0.00	0.00					
1.3200	0.00	0.1720	15840.	1000.0000	-0.00508	1903.	4.64E+08	

0.00	0.00	0.00					
1.4300	0.1654	17160.	1000.0000	-0.00503	2061.	4.64E+08	
0.00	0.00	0.00					
1.5400	0.1587	18480.	1000.0000	-0.00498	2220.	4.64E+08	
0.00	0.00	0.00					
1.6500	0.1522	19800.	1000.0000	-0.00493	2378.	4.64E+08	
0.00	0.00	0.00					
1.7600	0.1457	21120.	1000.0000	-0.00487	2537.	4.64E+08	
0.00	0.00	0.00					
1.8700	0.1393	22440.	1000.0000	-0.00481	2696.	4.64E+08	
0.00	0.00	0.00					
1.9800	0.1330	23760.	1000.0000	-0.00474	2854.	4.64E+08	
0.00	0.00	0.00					
2.0900	0.1268	25080.	1000.0000	-0.00467	3013.	4.64E+08	
0.00	0.00	0.00					
2.2000	0.1207	26400.	1000.0000	-0.00460	3171.	4.64E+08	
0.00	0.00	0.00					
2.3100	0.1147	27720.	1000.0000	-0.00452	3330.	4.64E+08	
0.00	0.00	0.00					
2.4200	0.1088	29040.	1000.0000	-0.00444	3488.	4.64E+08	
0.00	0.00	0.00					
2.5300	0.1029	30360.	1000.0000	-0.00436	3647.	4.64E+08	
0.00	0.00	0.00					
2.6400	0.09724	31680.	1000.0000	-0.00427	3805.	4.64E+08	
0.00	0.00	0.00					
2.7500	0.09167	33000.	1000.0000	-0.00418	3964.	4.64E+08	
0.00	0.00	0.00					
2.8600	0.08621	34320.	1000.0000	-0.00408	4123.	4.64E+08	
0.00	0.00	0.00					
2.9700	0.08089	35640.	1000.0000	-0.00398	4281.	4.64E+08	
0.00	0.00	0.00					
3.0800	0.07570	36960.	1000.0000	-0.00388	4440.	4.64E+08	
0.00	0.00	0.00					
3.1900	0.07065	38280.	1000.0000	-0.00377	4598.	4.64E+08	
0.00	0.00	0.00					
3.3000	0.06574	39600.	1000.0000	-0.00366	4757.	4.64E+08	
0.00	0.00	0.00					
3.4100	0.06098	40920.	1000.0000	-0.00355	4915.	4.64E+08	
0.00	0.00	0.00					
3.5200	0.05638	42240.	1000.0000	-0.00343	5074.	4.64E+08	
0.00	0.00	0.00					
3.6300	0.05193	43560.	1000.0000	-0.00331	5233.	4.64E+08	
0.00	0.00	0.00					
3.7400	0.04765	44880.	1000.0000	-0.00318	5391.	4.64E+08	
0.00	0.00	0.00					
3.8500	0.04353	46200.	1000.0000	-0.00305	5550.	4.64E+08	
0.00	0.00	0.00					
3.9600	0.03959	47520.	1000.0000	-0.00292	5708.	4.64E+08	
0.00	0.00	0.00					
4.0700	0.03583	48840.	928.9524	-0.00278	5867.	4.64E+08	

-107.648	3966.	0.00				
4.1800	0.03225	49972.	784.7895	-0.00264	6003.	4.64E+08
-110.781	4534.	0.00				
4.2900	0.02886	50912.	636.7563	-0.00250	6116.	4.64E+08
-113.512	5192.	0.00				
4.4000	0.02566	51653.	485.3945	-0.00235	6205.	4.64E+08
-115.824	5959.	0.00				
4.5100	0.02265	52193.	331.2694	-0.00220	6270.	4.64E+08
-117.699	6859.	0.00				
4.6200	0.01984	52528.	174.9718	-0.00205	6310.	4.64E+08
-119.116	7925.	0.00				
4.7300	0.01723	52655.	17.1203	-0.00190	6325.	4.64E+08
-120.053	9198.	0.00				
4.8400	0.01481	52573.	-141.635	-0.00175	6315.	4.64E+08
-120.486	10737.	0.00				
4.9500	0.01260	52281.	-300.610	-0.00161	6280.	4.64E+08
-120.386	12616.	0.00				
5.0600	0.01057	51780.	-523.260	-0.00146	6220.	4.64E+08
-216.962	27084.	0.00				
5.1700	0.00875	50900.	-808.943	-0.00131	6114.	4.64E+08
-215.891	32578.	0.00				
5.2800	0.00711	49644.	-1092.	-0.00117	5963.	4.64E+08
-213.528	39632.	0.00				
5.3900	0.00566	48016.	-1372.	-0.00103	5768.	4.64E+08
-209.757	48895.	0.00				
5.5000	0.00439	46023.	-1645.	-8.96E-04	5528.	4.64E+08
-204.427	61412.	0.00				
5.6100	0.00330	43673.	-1910.	-7.68E-04	5246.	4.64E+08
-197.315	78972.	0.00				
5.7200	0.00237	40980.	-2165.	-6.48E-04	4923.	4.64E+08
-188.076	104919.	0.00				
5.8300	0.00159	37958.	-2405.	-5.35E-04	4560.	4.64E+08
-176.104	146360.	0.00				
5.9400	9.53E-04	34631.	-2627.	-4.32E-04	4160.	4.64E+08
-160.160	221871.	0.00				
6.0500	4.48E-04	31023.	-2823.	-3.39E-04	3727.	4.64E+08
-136.894	403770.	0.00				
6.1600	5.87E-05	27178.	-2968.	-2.56E-04	3265.	4.64E+08
-82.956	1864406.	0.00				
6.2700	-2.28E-04	23188.	-2942.	-1.84E-04	2785.	4.64E+08
122.6908	710349.	0.00				
6.3800	-4.28E-04	19412.	-2763.	-1.24E-04	2332.	4.64E+08
147.8663	456443.	0.00				
6.4900	-5.54E-04	15893.	-2559.	-7.34E-05	1909.	4.64E+08
162.3017	386475.	0.00				
6.6000	-6.21E-04	12657.	-2338.	-3.28E-05	1520.	4.64E+08
171.6426	364629.	0.00				
6.7100	-6.41E-04	9720.	-2108.	-9.35E-07	1168.	4.64E+08
177.6474	365908.	0.00				
6.8200	-6.24E-04	7093.	-1871.	2.30E-05	852.0132	4.64E+08

181.0972	383191.	0.00				
6.9300	-5.80E-04	4781.	-1631.	3.99E-05	574.3234	4.64E+08
182.3985	414988.	0.00				
7.0400	-5.19E-04	2787.	-1391.	5.06E-05	334.8097	4.64E+08
181.7797	462723.	0.00				
7.1500	-4.46E-04	1110.	-1152.	5.62E-05	133.3426	4.64E+08
179.3702	530310.	0.00				
7.2600	-3.70E-04	-254.593	-918.172	5.74E-05	30.5822	4.64E+08
175.2367	624804.	0.00				
7.3700	-2.95E-04	-1314.	-690.713	5.52E-05	157.8300	4.64E+08
169.3989	758203.	0.00				
7.4800	-2.25E-04	-2078.	-472.100	5.04E-05	249.6224	4.64E+08
161.8325	951313.	0.00				
7.5900	-1.62E-04	-2560.	-264.669	4.38E-05	307.5433	4.64E+08
152.4570	1242302.	0.00				
7.7000	-1.09E-04	-2777.	-70.924	3.62E-05	333.5548	4.64E+08
141.0952	1707912.	0.00				
7.8100	-6.65E-05	-2747.	112.3675	2.83E-05	330.0350	4.64E+08
136.6199	2710431.	0.00				
7.9200	-3.43E-05	-2480.	250.0438	2.09E-05	297.9206	4.64E+08
71.9806	2766832.	0.00				
8.0300	-1.15E-05	-2087.	313.7302	1.44E-05	250.7406	4.64E+08
24.5139	2823234.	0.00				
8.1400	3.58E-06	-1652.	324.7583	9.04E-06	198.4298	4.64E+08
-7.805	2879636.	0.00				
8.2500	1.24E-05	-1230.	301.3861	4.94E-06	147.7526	4.64E+08
-27.608	2936037.	0.00				
8.3600	1.66E-05	-856.244	258.5915	1.97E-06	102.8537	4.64E+08
-37.233	2955901.	0.00				
8.4700	1.76E-05	-547.340	207.9686	-2.22E-08	65.7476	4.64E+08
-39.469	2955901.	0.00				
8.5800	1.66E-05	-307.207	157.4323	-1.24E-06	36.9023	4.64E+08
-37.101	2955901.	0.00				
8.6900	1.44E-05	-131.719	111.7262	-1.86E-06	15.8223	4.64E+08
-32.150	2955901.	0.00				
8.8000	1.17E-05	-12.249	73.2868	-2.07E-06	1.4714	4.64E+08
-26.091	2955901.	0.00				
8.9100	8.90E-06	61.7584	42.9132	-2.00E-06	7.4185	4.64E+08
-19.929	2955901.	0.00				
9.0200	6.38E-06	101.0415	20.3308	-1.77E-06	12.1373	4.64E+08
-14.287	2955901.	0.00				
9.1300	4.24E-06	115.4316	4.6357	-1.46E-06	13.8659	4.64E+08
-9.494	2955901.	0.00				
9.2400	2.53E-06	113.2796	-5.374	-1.13E-06	13.6074	4.64E+08
-5.672	2955901.	0.00				
9.3500	1.25E-06	101.2448	-10.967	-8.27E-07	12.1617	4.64E+08
-2.803	2955901.	0.00				
9.4600	3.51E-07	84.3263	-13.335	-5.63E-07	10.1294	4.64E+08
-0.785	2955901.	0.00				
9.5700	-2.34E-07	66.0396	-13.508	-3.49E-07	7.9328	4.64E+08

0.5231	2955901.	0.00					
9.6800	-5.70E-07	48.6643	-12.321	-1.85E-07	5.8457	4.64E+08	
1.2760	2955901.	0.00					
9.7900	-7.23E-07	33.5123	-10.410	-6.86E-08	4.0256	4.64E+08	
1.6196	2955901.	0.00					
9.9000	-7.51E-07	21.1822	-8.231	9.25E-09	2.5444	4.64E+08	
1.6813	2955901.	0.00					
10.0100	-6.99E-07	11.7816	-6.089	5.62E-08	1.4152	4.64E+08	
1.5648	2955901.	0.00					
10.1200	-6.03E-07	5.1075	-4.166	8.02E-08	0.6135	4.64E+08	
1.3493	2955901.	0.00					
10.2300	-4.87E-07	0.7845	-2.555	8.86E-08	0.09424	4.64E+08	
1.0908	2955901.	0.00					
10.3400	-3.69E-07	-1.638	-1.290	8.73E-08	0.1967	4.64E+08	
0.8258	2955901.	0.00					
10.4500	-2.57E-07	-2.621	-0.366	8.13E-08	0.3149	4.64E+08	
0.5744	2955901.	0.00					
10.5600	-1.54E-07	-2.604	0.2410	7.39E-08	0.3128	4.64E+08	
0.3452	2955901.	0.00					
10.6700	-6.15E-08	-1.985	0.5598	6.73E-08	0.2384	4.64E+08	
0.1378	2955901.	0.00					
10.7800	2.36E-08	-1.126	0.6159	6.29E-08	0.1353	4.64E+08	
-0.05284	2955901.	0.00					
10.8900	1.05E-07	-0.359	0.4265	6.08E-08	0.04314	4.64E+08	
-0.234	2955901.	0.00					
11.0000	1.84E-07	0.00	0.00	6.03E-08	0.00	4.64E+08	
-0.412	1477951.	0.00					

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection	=	0.25538834 inches
Computed slope at pile head	=	-0.0053519 radians
Maximum bending moment	=	52655. inch-lbs
Maximum shear force	=	-2968. lbs
Depth of maximum bending moment	=	4.73000000 feet below pile head
Depth of maximum shear force	=	6.16000000 feet below pile head
Number of iterations	=	19
Number of zero deflection points	=	4
Pile deflection at ground	=	0.03822226 inches

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 2000.0 lbs
 Applied moment at pile head = 0.0 in-lbs
 Axial thrust load on pile head = 0.0 lbs

Depth Res.	Soil X Es*H feet lb/inch	Deflect. Spr. y Lat. inches lb/inch	Bending Distrib. Moment in-lbs lb/inch	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil p
0.00	0.00	0.6182	4.14E-07	2000.	-0.01212	4.97E-08	4.64E+08	
0.00	0.00	0.00	0.00					
0.1100	0.00	0.6022	2640.	2000.	-0.01212	317.1220	4.64E+08	
0.00	0.00	0.00	0.00					
0.2200	0.00	0.5862	5280.	2000.	-0.01211	634.2439	4.64E+08	
0.00	0.00	0.00	0.00					
0.3300	0.00	0.5702	7920.	2000.	-0.01209	951.3659	4.64E+08	
0.00	0.00	0.00	0.00					
0.4400	0.00	0.5543	10560.	2000.	-0.01206	1268.	4.64E+08	
0.00	0.00	0.00	0.00					
0.5500	0.00	0.5384	13200.	2000.	-0.01203	1586.	4.64E+08	
0.00	0.00	0.00	0.00					
0.6600	0.00	0.5225	15840.	2000.	-0.01199	1903.	4.64E+08	
0.00	0.00	0.00	0.00					
0.7700	0.00	0.5067	18480.	2000.	-0.01194	2220.	4.64E+08	
0.00	0.00	0.00	0.00					
0.8800	0.00	0.4910	21120.	2000.	-0.01188	2537.	4.64E+08	
0.00	0.00	0.00	0.00					
0.9900	0.00	0.4754	23760.	2000.	-0.01182	2854.	4.64E+08	
0.00	0.00	0.00	0.00					
1.1000	0.00	0.4598	26400.	2000.	-0.01175	3171.	4.64E+08	
0.00	0.00	0.00	0.00					
1.2100	0.00	0.4444	29040.	2000.	-0.01167	3488.	4.64E+08	
0.00	0.00	0.00	0.00					
1.3200	0.00	0.4290	31680.	2000.	-0.01158	3805.	4.64E+08	
0.00	0.00	0.00	0.00					
1.4300	0.00	0.4138	34320.	2000.	-0.01149	4123.	4.64E+08	
0.00	0.00	0.00	0.00					
1.5400	0.00	0.3987	36960.	2000.	-0.01139	4440.	4.64E+08	
0.00	0.00	0.00	0.00					
1.6500	0.00	0.3837	39600.	2000.	-0.01128	4757.	4.64E+08	

0.00	0.00	0.00				
1.7600	0.3689	42240.	2000.	-0.01116	5074.	4.64E+08
0.00	0.00	0.00				
1.8700	0.3543	44880.	2000.	-0.01104	5391.	4.64E+08
0.00	0.00	0.00				
1.9800	0.3398	47520.	2000.	-0.01091	5708.	4.64E+08
0.00	0.00	0.00				
2.0900	0.3255	50160.	2000.	-0.01077	6025.	4.64E+08
0.00	0.00	0.00				
2.2000	0.3113	52800.	2000.	-0.01062	6342.	4.64E+08
0.00	0.00	0.00				
2.3100	0.2974	55440.	2000.	-0.01047	6660.	4.64E+08
0.00	0.00	0.00				
2.4200	0.2837	58080.	2000.	-0.01031	6977.	4.64E+08
0.00	0.00	0.00				
2.5300	0.2702	60720.	2000.	-0.01014	7294.	4.64E+08
0.00	0.00	0.00				
2.6400	0.2569	63360.	2000.	-0.00996	7611.	4.64E+08
0.00	0.00	0.00				
2.7500	0.2439	66000.	2000.	-0.00978	7928.	4.64E+08
0.00	0.00	0.00				
2.8600	0.2311	68640.	2000.	-0.00958	8245.	4.64E+08
0.00	0.00	0.00				
2.9700	0.2186	71280.	2000.	-0.00939	8562.	4.64E+08
0.00	0.00	0.00				
3.0800	0.2064	73920.	2000.	-0.00918	8879.	4.64E+08
0.00	0.00	0.00				
3.1900	0.1944	76560.	2000.	-0.00896	9197.	4.64E+08
0.00	0.00	0.00				
3.3000	0.1827	79200.	2000.	-0.00874	9514.	4.64E+08
0.00	0.00	0.00				
3.4100	0.1713	81840.	2000.	-0.00851	9831.	4.64E+08
0.00	0.00	0.00				
3.5200	0.1602	84480.	2000.	-0.00828	10148.	4.64E+08
0.00	0.00	0.00				
3.6300	0.1495	87120.	2000.	-0.00803	10465.	4.64E+08
0.00	0.00	0.00				
3.7400	0.1390	89760.	2000.	-0.00778	10782.	4.64E+08
0.00	0.00	0.00				
3.8500	0.1289	92400.	2000.	-0.00752	11099.	4.64E+08
0.00	0.00	0.00				
3.9600	0.1192	95040.	2000.	-0.00726	11416.	4.64E+08
0.00	0.00	0.00				
4.0700	0.1098	97680.	1906.	-0.00698	11734.	4.64E+08
-142.413	1713.	0.00				
4.1800	0.1007	100072.	1715.	-0.00670	12021.	4.64E+08
-147.269	1930.	0.00				
4.2900	0.09207	102207.	1517.	-0.00641	12277.	4.64E+08
-151.703	2175.	0.00				
4.4000	0.08379	104078.	1315.	-0.00612	12502.	4.64E+08

-155.701	2453.	0.00				
4.5100	0.07591	105678.	1107.	-0.00582	12694.	4.64E+08
-159.247	2769.	0.00				
4.6200	0.06843	107000.	894.5071	-0.00552	12853.	4.64E+08
-162.323	3131.	0.00				
4.7300	0.06135	108039.	678.5329	-0.00521	12978.	4.64E+08
-164.911	3548.	0.00				
4.8400	0.05467	108791.	459.4762	-0.00490	13068.	4.64E+08
-166.993	4032.	0.00				
4.9500	0.04840	109252.	238.0194	-0.00459	13124.	4.64E+08
-168.548	4597.	0.00				
5.0600	0.04254	109420.	-76.018	-0.00428	13144.	4.64E+08
-307.266	9534.	0.00				
5.1700	0.03709	109052.	-483.281	-0.00397	13099.	4.64E+08
-309.800	11024.	0.00				
5.2800	0.03206	108144.	-893.087	-0.00366	12990.	4.64E+08
-311.119	12811.	0.00				
5.3900	0.02743	106694.	-1304.	-0.00336	12816.	4.64E+08
-311.161	14976.	0.00				
5.5000	0.02320	104702.	-1714.	-0.00306	12577.	4.64E+08
-309.853	17633.	0.00				
5.6100	0.01936	102170.	-2121.	-0.00276	12273.	4.64E+08
-307.107	20940.	0.00				
5.7200	0.01591	99103.	-2523.	-0.00248	11904.	4.64E+08
-302.812	25131.	0.00				
5.8300	0.01282	95508.	-2919.	-0.00220	11473.	4.64E+08
-296.823	30552.	0.00				
5.9400	0.01010	91396.	-3306.	-0.00193	10979.	4.64E+08
-288.945	37757.	0.00				
6.0500	0.00772	86781.	-3681.	-0.00168	10424.	4.64E+08
-278.891	47672.	0.00				
6.1600	0.00567	81679.	-4040.	-0.00144	9811.	4.64E+08
-266.220	61987.	0.00				
6.2700	0.00392	76114.	-4381.	-0.00121	9143.	4.64E+08
-250.172	84186.	0.00				
6.3800	0.00246	70113.	-4698.	-0.00101	8422.	4.64E+08
-229.250	122914.	0.00				
6.4900	0.00126	63713.	-4981.	-8.16E-04	7653.	4.64E+08
-199.702	208438.	0.00				
6.6000	3.07E-04	56964.	-5208.	-6.45E-04	6843.	4.64E+08
-144.415	621542.	0.00				
6.7100	-4.37E-04	49964.	-5197.	-4.93E-04	6002.	4.64E+08
161.1031	486273.	0.00				
6.8200	-9.94E-04	43245.	-4956.	-3.60E-04	5195.	4.64E+08
203.2754	270031.	0.00				
6.9300	-0.00139	36880.	-4672.	-2.46E-04	4430.	4.64E+08
226.7052	215660.	0.00				
7.0400	-0.00164	30909.	-4363.	-1.50E-04	3713.	4.64E+08
242.4245	194763.	0.00				
7.1500	-0.00178	25362.	-4036.	-6.95E-05	3046.	4.64E+08

253.4535	187708.	0.00				
7.2600	-0.00183	20256.	-3696.	-4.56E-06	2433.	4.64E+08
261.0814	188692.	0.00				
7.3700	-0.00179	15604.	-3348.	4.65E-05	1874.	4.64E+08
265.9746	195658.	0.00				
7.4800	-0.00170	11416.	-2995.	8.49E-05	1371.	4.64E+08
268.5154	208034.	0.00				
7.5900	-0.00157	7697.	-2641.	1.12E-04	924.5209	4.64E+08
268.9355	226074.	0.00				
7.7000	-0.00141	4445.	-2287.	1.29E-04	533.9612	4.64E+08
267.3777	250694.	0.00				
7.8100	-0.00123	1660.	-1936.	1.38E-04	199.3638	4.64E+08
263.9271	283530.	0.00				
7.9200	-0.00104	-665.936	-1591.	1.39E-04	79.9936	4.64E+08
258.6272	327190.	0.00				
8.0300	-8.61E-04	-2541.	-1254.	1.35E-04	305.2201	4.64E+08
251.4878	385757.	0.00				
8.1400	-6.87E-04	-3978.	-928.436	1.26E-04	477.8101	4.64E+08
242.4861	465739.	0.00				
8.2500	-5.29E-04	-4992.	-615.565	1.13E-04	599.6477	4.64E+08
231.5613	577920.	0.00				
8.3600	-3.89E-04	-5603.	-320.223	9.78E-05	673.0194	4.64E+08
215.9275	732163.	0.00				
8.4700	-2.71E-04	-5837.	-47.574	8.15E-05	701.1973	4.64E+08
197.1767	961386.	0.00				
8.5800	-1.74E-04	-5728.	199.0916	6.51E-05	688.1061	4.64E+08
176.5589	1338733.	0.00				
8.6900	-9.90E-05	-5312.	416.7942	4.94E-05	638.0610	4.64E+08
153.2935	2044636.	0.00				
8.8000	-4.38E-05	-4628.	582.6911	3.52E-05	555.9315	4.64E+08
98.0654	2955901.	0.00				
8.9100	-6.00E-06	-3773.	656.2860	2.33E-05	453.2768	4.64E+08
13.4420	2955901.	0.00				
9.0200	1.76E-05	-2895.	639.1250	1.38E-05	347.8088	4.64E+08
-39.444	2955901.	0.00				
9.1300	3.04E-05	-2086.	568.2279	6.68E-06	250.5963	4.64E+08
-67.976	2955901.	0.00				
9.2400	3.53E-05	-1395.	471.2486	1.73E-06	167.6112	4.64E+08
-78.962	2955901.	0.00				
9.3500	3.49E-05	-842.086	367.5132	-1.45E-06	101.1530	4.64E+08
-78.213	2955901.	0.00				
9.4600	3.14E-05	-425.107	269.4419	-3.25E-06	51.0647	4.64E+08
-70.380	2955901.	0.00				
9.5700	2.63E-05	-130.759	184.0692	-4.05E-06	15.7071	4.64E+08
-58.972	2955901.	0.00				
9.6800	2.07E-05	60.8352	114.4805	-4.14E-06	7.3076	4.64E+08
-46.465	2955901.	0.00				
9.7900	1.54E-05	171.4693	61.0642	-3.81E-06	20.5972	4.64E+08
-34.469	2955901.	0.00				
9.9000	1.07E-05	222.0447	22.5306	-3.25E-06	26.6724	4.64E+08

-23.915	2955901.	0.00					
10.0100	6.80E-06	230.9502	-3.305	-2.61E-06	27.7422	4.64E+08	
-15.229	2955901.	0.00					
10.1200	3.79E-06	213.3206	-18.956	-1.98E-06	25.6245	4.64E+08	
-8.485	2955901.	0.00					
10.2300	1.58E-06	180.9060	-26.890	-1.42E-06	21.7308	4.64E+08	
-3.536	2955901.	0.00					
10.3400	4.82E-08	142.3305	-29.295	-9.57E-07	17.0970	4.64E+08	
-0.108	2955901.	0.00					
10.4500	-9.48E-07	103.5669	-27.965	-6.07E-07	12.4407	4.64E+08	
2.1229	2955901.	0.00					
10.5600	-1.56E-06	68.5022	-24.266	-3.63E-07	8.2286	4.64E+08	
3.4827	2955901.	0.00					
10.6700	-1.91E-06	39.5057	-19.151	-2.09E-07	4.7455	4.64E+08	
4.2663	2955901.	0.00					
10.7800	-2.11E-06	17.9428	-13.222	-1.27E-07	2.1553	4.64E+08	
4.7176	2955901.	0.00					
10.8900	-2.24E-06	4.5997	-6.797	-9.51E-08	0.5525	4.64E+08	
5.0180	2955901.	0.00					
11.0000	-2.36E-06	0.00	0.00	-8.85E-08	0.00	4.64E+08	
5.2797	1477951.	0.00					

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection	=	0.61821243 inches
Computed slope at pile head	=	-0.0121234 radians
Maximum bending moment	=	109420. inch-lbs
Maximum shear force	=	-5208. lbs
Depth of maximum bending moment	=	5.06000000 feet below pile head
Depth of maximum shear force	=	6.60000000 feet below pile head
Number of iterations	=	26
Number of zero deflection points	=	3
Pile deflection at ground	=	0.11573578 inches

Computed Values of Pile Loading and Deflection for Lateral Loading for Load Case Number 3

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head	=	3000.0 lbs
Applied moment at pile head	=	0.0 in-lbs
Axial thrust load on pile head	=	0.0 lbs

Depth Res.	Soil X Es*H feet lb/inch	Deflect. Spr. y Lat. inches lb/inch	Bending Distrib. Moment Load in-lbs lb/inch	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil p

0.00	0.00	1.0487	9.46E-07	3000.	-0.01970	1.14E-07	4.64E+08	
0.00	0.00	0.00	0.00					
0.1100	0.00	1.0227	3960.	3000.	-0.01970	475.6829	4.64E+08	
0.00	0.00	0.00	0.00					
0.2200	0.00	0.9967	7920.	3000.	-0.01968	951.3659	4.64E+08	
0.00	0.00	0.00	0.00					
0.3300	0.00	0.9708	11880.	3000.	-0.01965	1427.	4.64E+08	
0.00	0.00	0.00	0.00					
0.4400	0.00	0.9448	15840.	3000.	-0.01961	1903.	4.64E+08	
0.00	0.00	0.00	0.00					
0.5500	0.00	0.9190	19800.	3000.	-0.01956	2378.	4.64E+08	
0.00	0.00	0.00	0.00					
0.6600	0.00	0.8932	23760.	3000.	-0.01950	2854.	4.64E+08	
0.00	0.00	0.00	0.00					
0.7700	0.00	0.8675	27720.	3000.	-0.01943	3330.	4.64E+08	
0.00	0.00	0.00	0.00					
0.8800	0.00	0.8419	31680.	3000.	-0.01934	3805.	4.64E+08	
0.00	0.00	0.00	0.00					
0.9900	0.00	0.8164	35640.	3000.	-0.01925	4281.	4.64E+08	
0.00	0.00	0.00	0.00					
1.1000	0.00	0.7911	39600.	3000.	-0.01914	4757.	4.64E+08	
0.00	0.00	0.00	0.00					
1.2100	0.00	0.7659	43560.	3000.	-0.01902	5233.	4.64E+08	
0.00	0.00	0.00	0.00					
1.3200	0.00	0.7409	47520.	3000.	-0.01889	5708.	4.64E+08	
0.00	0.00	0.00	0.00					
1.4300	0.00	0.7160	51480.	3000.	-0.01875	6184.	4.64E+08	
0.00	0.00	0.00	0.00					
1.5400	0.00	0.6914	55440.	3000.	-0.01860	6660.	4.64E+08	
0.00	0.00	0.00	0.00					
1.6500	0.00	0.6669	59400.	3000.	-0.01844	7135.	4.64E+08	
0.00	0.00	0.00	0.00					
1.7600	0.00	0.6427	63360.	3000.	-0.01826	7611.	4.64E+08	
0.00	0.00	0.00	0.00					
1.8700	0.00	0.6187	67320.	3000.	-0.01808	8087.	4.64E+08	
0.00	0.00	0.00	0.00					
1.9800	0.00	0.5950	71280.	3000.	-0.01788	8562.	4.64E+08	

0.00	0.00	0.00				
2.0900	0.5715	75240.	3000.	-0.01767	9038.	4.64E+08
0.00	0.00	0.00				
2.2000	0.5483	79200.	3000.	-0.01745	9514.	4.64E+08
0.00	0.00	0.00				
2.3100	0.5255	83160.	3000.	-0.01722	9989.	4.64E+08
0.00	0.00	0.00				
2.4200	0.5029	87120.	3000.	-0.01698	10465.	4.64E+08
0.00	0.00	0.00				
2.5300	0.4806	91080.	3000.	-0.01672	10941.	4.64E+08
0.00	0.00	0.00				
2.6400	0.4587	95040.	3000.	-0.01646	11416.	4.64E+08
0.00	0.00	0.00				
2.7500	0.4372	99000.	3000.	-0.01618	11892.	4.64E+08
0.00	0.00	0.00				
2.8600	0.4160	102960.	3000.	-0.01589	12368.	4.64E+08
0.00	0.00	0.00				
2.9700	0.3952	106920.	3000.	-0.01560	12843.	4.64E+08
0.00	0.00	0.00				
3.0800	0.3748	110880.	3000.	-0.01529	13319.	4.64E+08
0.00	0.00	0.00				
3.1900	0.3549	114840.	3000.	-0.01497	13795.	4.64E+08
0.00	0.00	0.00				
3.3000	0.3353	118800.	3000.	-0.01463	14270.	4.64E+08
0.00	0.00	0.00				
3.4100	0.3162	122760.	3000.	-0.01429	14746.	4.64E+08
0.00	0.00	0.00				
3.5200	0.2976	126720.	3000.	-0.01393	15222.	4.64E+08
0.00	0.00	0.00				
3.6300	0.2795	130680.	3000.	-0.01357	15698.	4.64E+08
0.00	0.00	0.00				
3.7400	0.2618	134640.	3000.	-0.01319	16173.	4.64E+08
0.00	0.00	0.00				
3.8500	0.2446	138600.	3000.	-0.01280	16649.	4.64E+08
0.00	0.00	0.00				
3.9600	0.2280	142560.	3000.	-0.01240	17125.	4.64E+08
0.00	0.00	0.00				
4.0700	0.2119	146520.	2889.	-0.01199	17600.	4.64E+08
-167.868	1046.	0.00				
4.1800	0.1963	150188.	2664.	-0.01157	18041.	4.64E+08
-174.011	1170.	0.00				
4.2900	0.1814	153552.	2430.	-0.01114	18445.	4.64E+08
-179.720	1308.	0.00				
4.4000	0.1669	156603.	2189.	-0.01069	18811.	4.64E+08
-184.980	1463.	0.00				
4.5100	0.1531	159332.	1942.	-0.01025	19139.	4.64E+08
-189.777	1636.	0.00				
4.6200	0.1399	161730.	1689.	-0.00979	19427.	4.64E+08
-194.095	1831.	0.00				
4.7300	0.1273	163790.	1430.	-0.00933	19675.	4.64E+08

-197.918	2053.	0.00				
4.8400	0.1153	165505.	1167.	-0.00886	19881.	4.64E+08
-201.229	2304.	0.00				
4.9500	0.1039	166870.	899.0847	-0.00838	20045.	4.64E+08
-204.009	2592.	0.00				
5.0600	0.09314	167879.	517.7614	-0.00791	20166.	4.64E+08
-373.753	5297.	0.00				
5.1700	0.08302	168237.	21.0053	-0.00743	20209.	4.64E+08
-378.907	6025.	0.00				
5.2800	0.07353	167934.	-481.762	-0.00695	20173.	4.64E+08
-382.861	6873.	0.00				
5.3900	0.06467	166965.	-988.922	-0.00647	20056.	4.64E+08
-385.564	7870.	0.00				
5.5000	0.05643	165323.	-1499.	-0.00600	19859.	4.64E+08
-386.961	9051.	0.00				
5.6100	0.04882	163008.	-2010.	-0.00554	19581.	4.64E+08
-386.989	10464.	0.00				
5.7200	0.04182	160018.	-2519.	-0.00508	19222.	4.64E+08
-385.574	12170.	0.00				
5.8300	0.03542	156356.	-3026.	-0.00463	18782.	4.64E+08
-382.626	14259.	0.00				
5.9400	0.02961	152028.	-3529.	-0.00419	18262.	4.64E+08
-378.036	16854.	0.00				
6.0500	0.02437	147041.	-4023.	-0.00376	17663.	4.64E+08
-371.665	20133.	0.00				
6.1600	0.01968	141407.	-4508.	-0.00335	16986.	4.64E+08
-363.326	24371.	0.00				
6.2700	0.01552	135139.	-4981.	-0.00296	16233.	4.64E+08
-352.761	30000.	0.00				
6.3800	0.01187	128257.	-5438.	-0.00258	15406.	4.64E+08
-339.590	37759.	0.00				
6.4900	0.00870	120783.	-5875.	-0.00223	14509.	4.64E+08
-323.209	49020.	0.00				
6.6000	0.00599	112745.	-6288.	-0.00190	13543.	4.64E+08
-302.558	66687.	0.00				
6.7100	0.00370	104181.	-6670.	-0.00159	12514.	4.64E+08
-275.474	98336.	0.00				
6.8200	0.00180	95137.	-7008.	-0.00130	11428.	4.64E+08
-236.165	173376.	0.00				
6.9300	2.56E-04	85681.	-7262.	-0.00105	10292.	4.64E+08
-149.353	771236.	0.00				
7.0400	-9.65E-04	75965.	-7221.	-8.17E-04	9125.	4.64E+08
212.0722	290092.	0.00				
7.1500	-0.00190	66618.	-6911.	-6.14E-04	8002.	4.64E+08
257.5059	178872.	0.00				
7.2600	-0.00259	57720.	-6553.	-4.37E-04	6933.	4.64E+08
284.7725	145395.	0.00				
7.3700	-0.00305	49319.	-6164.	-2.85E-04	5924.	4.64E+08
303.7952	131322.	0.00				
7.4800	-0.00334	41446.	-5754.	-1.55E-04	4979.	4.64E+08

317.6683	125670.	0.00				
7.5900	-0.00346	34128.	-5328.	-4.79E-05	4099.	4.64E+08
327.7844	124904.	0.00				
7.7000	-0.00346	27380.	-4891.	3.96E-05	3289.	4.64E+08
334.8888	127641.	0.00				
7.8100	-0.00336	21216.	-4446.	1.09E-04	2548.	4.64E+08
339.4224	133360.	0.00				
7.9200	-0.00318	15643.	-3996.	1.61E-04	1879.	4.64E+08
341.6620	141988.	0.00				
8.0300	-0.00293	10665.	-3545.	1.99E-04	1281.	4.64E+08
341.7874	153758.	0.00				
8.1400	-0.00265	6283.	-3095.	2.23E-04	754.7696	4.64E+08
339.9161	169185.	0.00				
8.2500	-0.00235	2494.	-2649.	2.35E-04	299.5457	4.64E+08
336.1223	189096.	0.00				
8.3600	-0.00203	-710.342	-2212.	2.38E-04	85.3277	4.64E+08
326.4131	212121.	0.00				
8.4700	-0.00172	-3346.	-1790.	2.32E-04	401.8826	4.64E+08
313.0635	240428.	0.00				
8.5800	-0.00142	-5435.	-1386.	2.19E-04	652.9132	4.64E+08
298.4105	277608.	0.00				
8.6900	-0.00114	-7005.	-1003.	2.02E-04	841.4863	4.64E+08
282.4858	327244.	0.00				
8.8000	-8.86E-04	-8083.	-641.308	1.80E-04	970.9350	4.64E+08
265.2862	395094.	0.00				
8.9100	-6.64E-04	-8698.	-303.357	1.56E-04	1045.	4.64E+08
246.7611	490898.	0.00				
9.0200	-4.73E-04	-8884.	9.1833	1.31E-04	1067.	4.64E+08
226.7847	632336.	0.00				
9.1300	-3.17E-04	-8674.	294.2198	1.06E-04	1042.	4.64E+08
205.0887	854903.	0.00				
9.2400	-1.92E-04	-8107.	549.0932	8.25E-05	973.8326	4.64E+08
181.0831	1241744.	0.00				
9.3500	-9.88E-05	-7224.	769.7522	6.07E-05	867.8175	4.64E+08
153.2487	2047959.	0.00				
9.4600	-3.22E-05	-6075.	918.4726	4.18E-05	729.7273	4.64E+08
72.0853	2955901.	0.00				
9.5700	1.16E-05	-4800.	948.9384	2.63E-05	576.5496	4.64E+08
-25.925	2955901.	0.00				
9.6800	3.73E-05	-3570.	876.6743	1.44E-05	428.7981	4.64E+08
-83.566	2955901.	0.00				
9.7900	4.97E-05	-2485.	748.1395	5.81E-06	298.5370	4.64E+08
-111.183	2955901.	0.00				
9.9000	5.26E-05	-1595.	596.9459	2.81E-09	191.5466	4.64E+08
-117.898	2955901.	0.00				
10.0100	4.97E-05	-909.345	445.7414	-3.56E-06	109.2323	4.64E+08
-111.200	2955901.	0.00				
10.1200	4.33E-05	-417.844	308.4255	-5.45E-06	50.1922	4.64E+08
-96.854	2955901.	0.00				
10.2300	3.53E-05	-95.102	192.3658	-6.18E-06	11.4238	4.64E+08

-78.994	2955901.	0.00					
10.3400	2.69E-05	90.0016	100.4094	-6.18E-06	10.8112	4.64E+08	
-60.334	2955901.	0.00					
10.4500	1.89E-05	169.9792	32.5849	-5.81E-06	20.4182	4.64E+08	
-42.431	2955901.	0.00					
10.5600	1.16E-05	176.0258	-12.551	-5.32E-06	21.1446	4.64E+08	
-25.957	2955901.	0.00					
10.6700	4.90E-06	136.8446	-36.919	-4.88E-06	16.4380	4.64E+08	
-10.964	2955901.	0.00					
10.7800	-1.29E-06	78.5596	-42.256	-4.57E-06	9.4367	4.64E+08	
2.8779	2955901.	0.00					
10.8900	-7.17E-06	25.2890	-29.757	-4.42E-06	3.0378	4.64E+08	
16.0592	2955901.	0.00					
11.0000	-1.30E-05	0.00	0.00	-4.39E-06	0.00	4.64E+08	
29.0278	1477951.	0.00					

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 3:

Pile-head deflection	=	1.04872400 inches
Computed slope at pile head	=	-0.0197032 radians
Maximum bending moment	=	168237. inch-lbs
Maximum shear force	=	-7262. lbs
Depth of maximum bending moment	=	5.17000000 feet below pile head
Depth of maximum shear force	=	6.93000000 feet below pile head
Number of iterations	=	26
Number of zero deflection points	=	3
Pile deflection at ground	=	0.22213963 inches

Computed Values of Pile Loading and Deflection for Lateral Loading for Load Case Number 4

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head	=	4000.0 lbs
Applied moment at pile head	=	0.0 in-lbs
Axial thrust load on pile head	=	0.0 lbs

Depth	Deflect.	Bending	Shear	Slope	Total	Bending	Soil
-------	----------	---------	-------	-------	-------	---------	------

Res.	Soil	Spr.	Distrib.					p
X	y		Moment	Force	S	Stress	Stiffness	
Es*H	Lat.	Load						
feet	inches	in-lbs						
lb/inch	lb/inch	lb/inch		lbs	radians	psi*	lb-in^2	
-----	-----	-----	-----	-----	-----	-----	-----	
0.00	1.5352	-1.18E-06		4000.	-0.02791	1.42E-07	4.64E+08	
0.00	0.00	0.00						
0.1100	1.4983	5280.		4000.	-0.02791	634.2439	4.64E+08	
0.00	0.00	0.00						
0.2200	1.4615	10560.		4000.	-0.02788	1268.	4.64E+08	
0.00	0.00	0.00						
0.3300	1.4247	15840.		4000.	-0.02785	1903.	4.64E+08	
0.00	0.00	0.00						
0.4400	1.3880	21120.		4000.	-0.02779	2537.	4.64E+08	
0.00	0.00	0.00						
0.5500	1.3514	26400.		4000.	-0.02773	3171.	4.64E+08	
0.00	0.00	0.00						
0.6600	1.3148	31680.		4000.	-0.02764	3805.	4.64E+08	
0.00	0.00	0.00						
0.7700	1.2784	36960.		4000.	-0.02755	4440.	4.64E+08	
0.00	0.00	0.00						
0.8800	1.2421	42240.		4000.	-0.02743	5074.	4.64E+08	
0.00	0.00	0.00						
0.9900	1.2059	47520.		4000.	-0.02731	5708.	4.64E+08	
0.00	0.00	0.00						
1.1000	1.1700	52800.		4000.	-0.02716	6342.	4.64E+08	
0.00	0.00	0.00						
1.2100	1.1342	58080.		4000.	-0.02701	6977.	4.64E+08	
0.00	0.00	0.00						
1.3200	1.0987	63360.		4000.	-0.02683	7611.	4.64E+08	
0.00	0.00	0.00						
1.4300	1.0634	68640.		4000.	-0.02665	8245.	4.64E+08	
0.00	0.00	0.00						
1.5400	1.0284	73920.		4000.	-0.02644	8879.	4.64E+08	
0.00	0.00	0.00						
1.6500	0.9936	79200.		4000.	-0.02622	9514.	4.64E+08	
0.00	0.00	0.00						
1.7600	0.9591	84480.		4000.	-0.02599	10148.	4.64E+08	
0.00	0.00	0.00						
1.8700	0.9250	89760.		4000.	-0.02574	10782.	4.64E+08	
0.00	0.00	0.00						
1.9800	0.8912	95040.		4000.	-0.02548	11416.	4.64E+08	
0.00	0.00	0.00						
2.0900	0.8577	100320.		4000.	-0.02520	12051.	4.64E+08	
0.00	0.00	0.00						
2.2000	0.8246	105600.		4000.	-0.02491	12685.	4.64E+08	
0.00	0.00	0.00						
2.3100	0.7919	110880.		4000.	-0.02460	13319.	4.64E+08	

0.00	0.00	0.00				
2.4200	0.7597	116160.	4000.	-0.02428	13953.	4.64E+08
0.00	0.00	0.00				
2.5300	0.7278	121440.	4000.	-0.02394	14588.	4.64E+08
0.00	0.00	0.00				
2.6400	0.6965	126720.	4000.	-0.02359	15222.	4.64E+08
0.00	0.00	0.00				
2.7500	0.6656	132000.	4000.	-0.02322	15856.	4.64E+08
0.00	0.00	0.00				
2.8600	0.6352	137280.	4000.	-0.02284	16490.	4.64E+08
0.00	0.00	0.00				
2.9700	0.6053	142560.	4000.	-0.02244	17125.	4.64E+08
0.00	0.00	0.00				
3.0800	0.5759	147840.	4000.	-0.02203	17759.	4.64E+08
0.00	0.00	0.00				
3.1900	0.5471	153120.	4000.	-0.02160	18393.	4.64E+08
0.00	0.00	0.00				
3.3000	0.5189	158400.	4000.	-0.02115	19027.	4.64E+08
0.00	0.00	0.00				
3.4100	0.4913	163680.	4000.	-0.02070	19662.	4.64E+08
0.00	0.00	0.00				
3.5200	0.4643	168960.	4000.	-0.02022	20296.	4.64E+08
0.00	0.00	0.00				
3.6300	0.4379	174240.	4000.	-0.01973	20930.	4.64E+08
0.00	0.00	0.00				
3.7400	0.4122	179520.	4000.	-0.01923	21564.	4.64E+08
0.00	0.00	0.00				
3.8500	0.3871	184800.	4000.	-0.01871	22199.	4.64E+08
0.00	0.00	0.00				
3.9600	0.3628	190080.	4000.	-0.01818	22833.	4.64E+08
0.00	0.00	0.00				
4.0700	0.3391	195360.	3875.	-0.01763	23467.	4.64E+08
-188.813	734.9041	0.00				
4.1800	0.3162	200311.	3621.	-0.01707	24062.	4.64E+08
-196.031	818.2656	0.00				
4.2900	0.2941	204920.	3358.	-0.01649	24615.	4.64E+08
-202.805	910.3149	0.00				
4.4000	0.2727	209177.	3086.	-0.01590	25127.	4.64E+08
-209.122	1012.	0.00				
4.5100	0.2521	213068.	2806.	-0.01530	25594.	4.64E+08
-214.968	1126.	0.00				
4.6200	0.2323	216585.	2519.	-0.01469	26017.	4.64E+08
-220.329	1252.	0.00				
4.7300	0.2133	219719.	2225.	-0.01407	26393.	4.64E+08
-225.190	1394.	0.00				
4.8400	0.1952	222460.	1925.	-0.01344	26722.	4.64E+08
-229.534	1553.	0.00				
4.9500	0.1778	224800.	1619.	-0.01280	27003.	4.64E+08
-233.346	1732.	0.00				
5.0600	0.1613	226735.	1182.	-0.01216	27236.	4.64E+08

-428.784	3508.	0.00				
5.1700	0.1457	227922.	611.5764	-0.01151	27378.	4.64E+08
-436.132	3951.	0.00				
5.2800	0.1309	228349.	31.8211	-0.01087	27430.	4.64E+08
-442.285	4458.	0.00				
5.3900	0.1170	228006.	-555.240	-0.01022	27389.	4.64E+08
-447.201	5044.	0.00				
5.5000	0.1040	226884.	-1148.	-0.00957	27254.	4.64E+08
-450.833	5723.	0.00				
5.6100	0.09177	224975.	-1745.	-0.00893	27024.	4.64E+08
-453.129	6518.	0.00				
5.7200	0.08041	222278.	-2343.	-0.00829	26700.	4.64E+08
-454.030	7453.	0.00				
5.8300	0.06989	218789.	-2942.	-0.00766	26281.	4.64E+08
-453.471	8565.	0.00				
5.9400	0.06018	214510.	-3539.	-0.00705	25767.	4.64E+08
-451.373	9900.	0.00				
6.0500	0.05128	209445.	-4133.	-0.00644	25159.	4.64E+08
-447.641	11522.	0.00				
6.1600	0.04317	203600.	-4720.	-0.00586	24457.	4.64E+08
-442.161	13519.	0.00				
6.2700	0.03583	196984.	-5299.	-0.00529	23662.	4.64E+08
-434.784	16020.	0.00				
6.3800	0.02922	189611.	-5866.	-0.00474	22776.	4.64E+08
-425.318	19214.	0.00				
6.4900	0.02332	181497.	-6420.	-0.00421	21802.	4.64E+08
-413.495	23401.	0.00				
6.6000	0.01811	172662.	-6956.	-0.00370	20740.	4.64E+08
-398.928	29076.	0.00				
6.7100	0.01355	163132.	-7471.	-0.00323	19596.	4.64E+08
-381.014	37128.	0.00				
6.8200	0.00959	152938.	-7959.	-0.00278	18371.	4.64E+08
-358.736	49356.	0.00				
6.9300	0.00622	142119.	-8414.	-0.00236	17072.	4.64E+08
-330.127	70095.	0.00				
7.0400	0.00337	130725.	-8824.	-0.00197	15703.	4.64E+08
-290.465	113668.	0.00				
7.1500	0.00102	118825.	-9161.	-0.00161	14274.	4.64E+08
-220.885	285741.	0.00				
7.2600	-8.86E-04	106540.	-9163.	-0.00129	12798.	4.64E+08
217.6208	324221.	0.00				
7.3700	-0.00239	94634.	-8831.	-0.00101	11368.	4.64E+08
285.7378	157666.	0.00				
7.4800	-0.00354	83226.	-8430.	-7.53E-04	9997.	4.64E+08
322.4385	120129.	0.00				
7.5900	-0.00438	72380.	-7987.	-5.32E-04	8694.	4.64E+08
347.5948	104725.	0.00				
7.7000	-0.00495	62140.	-7516.	-3.41E-04	7464.	4.64E+08
366.1182	97680.	0.00				
7.8100	-0.00528	52537.	-7024.	-1.77E-04	6311.	4.64E+08

380.0472	95003.	0.00				
7.9200	-0.00542	43597.	-6515.	-4.07E-05	5237.	4.64E+08
390.4303	95154.	0.00				
8.0300	-0.00539	35337.	-5995.	7.16E-05	4245.	4.64E+08
397.8760	97475.	0.00				
8.1400	-0.00523	27770.	-5467.	1.61E-04	3336.	4.64E+08
402.7648	101709.	0.00				
8.2500	-0.00496	20905.	-4933.	2.31E-04	2511.	4.64E+08
405.3461	107831.	0.00				
8.3600	-0.00462	14746.	-4401.	2.81E-04	1771.	4.64E+08
400.8325	114565.	0.00				
8.4700	-0.00422	9286.	-3878.	3.16E-04	1115.	4.64E+08
391.8789	122599.	0.00				
8.5800	-0.00379	4508.	-3368.	3.35E-04	541.5237	4.64E+08
381.3897	132996.	0.00				
8.6900	-0.00333	395.0902	-2872.	3.42E-04	47.4590	4.64E+08
369.4869	146267.	0.00				
8.8000	-0.00288	-3074.	-2393.	3.38E-04	369.2719	4.64E+08
356.2619	163166.	0.00				
8.9100	-0.00244	-5923.	-1932.	3.26E-04	711.4370	4.64E+08
341.7793	184797.	0.00				
9.0200	-0.00202	-8176.	-1492.	3.05E-04	982.0676	4.64E+08
326.0795	212790.	0.00				
9.1300	-0.00163	-9860.	-1072.	2.80E-04	1184.	4.64E+08
309.1775	249624.	0.00				
9.2400	-0.00128	-11006.	-676.154	2.50E-04	1322.	4.64E+08
291.0581	299195.	0.00				
9.3500	-9.75E-04	-11645.	-304.757	2.18E-04	1399.	4.64E+08
271.6653	367933.	0.00				
9.4600	-7.09E-04	-11811.	40.1219	1.85E-04	1419.	4.64E+08
250.8779	467149.	0.00				
9.5700	-4.88E-04	-11540.	356.4833	1.51E-04	1386.	4.64E+08
228.4575	618566.	0.00				
9.6800	-3.09E-04	-10870.	641.8504	1.19E-04	1306.	4.64E+08
203.9170	869725.	0.00				
9.7900	-1.72E-04	-9845.	892.6797	8.99E-05	1183.	4.64E+08
176.1273	1349442.	0.00				
9.9000	-7.21E-05	-8513.	1115.	6.38E-05	1023.	4.64E+08
161.3595	2955901.	0.00				
10.0100	-3.81E-06	-6900.	1228.	4.19E-05	828.8799	4.64E+08
8.5218	2955901.	0.00				
10.1200	3.85E-05	-5273.	1176.	2.46E-05	633.3477	4.64E+08
-86.279	2955901.	0.00				
10.2300	6.11E-05	-3795.	1029.	1.17E-05	455.8738	4.64E+08
-136.734	2955901.	0.00				
10.3400	6.93E-05	-2556.	836.3128	2.63E-06	307.0183	4.64E+08
-155.269	2955901.	0.00				
10.4500	6.80E-05	-1587.	633.3130	-3.26E-06	190.6607	4.64E+08
-152.307	2955901.	0.00				
10.5600	6.07E-05	-883.942	443.0336	-6.78E-06	106.1809	4.64E+08

-135.995	2955901.	0.00					
10.6700	5.01E-05	-417.617	279.1926	-8.63E-06	50.1650	4.64E+08	
-112.249	2955901.	0.00					
10.7800	3.80E-05	-146.874	149.0149	-9.43E-06	17.6428	4.64E+08	
-84.990	2955901.	0.00					
10.8900	2.52E-05	-24.218	55.6341	-9.67E-06	2.9091	4.64E+08	
-56.496	2955901.	0.00					
11.0000	1.24E-05	0.00	0.00	-9.71E-06	0.00	4.64E+08	
-27.798	1477951.	0.00					

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 4:

Pile-head deflection	=	1.53519491 inches
Computed slope at pile head	=	-0.0279147 radians
Maximum bending moment	=	228349. inch-lbs
Maximum shear force	=	-9163. lbs
Depth of maximum bending moment	=	5.28000000 feet below pile head
Depth of maximum shear force	=	7.26000000 feet below pile head
Number of iterations	=	29
Number of zero deflection points	=	3
Pile deflection at ground	=	0.35417987 inches

Computed Values of Pile Loading and Deflection for Lateral Loading for Load Case Number 5

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head	=	5000.0 lbs
Applied moment at pile head	=	0.0 in-lbs
Axial thrust load on pile head	=	0.0 lbs

Depth Res.	Deflect. Soil Spr.	Bending Distrib.	Shear	Slope	Total	Bending	Soil
X	y	Moment	Force	S	Stress	Stiffness	p
Es*H	Lat. Load						
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	
lb/inch	lb/inch	lb/inch					

0.00	2.0702	1.77E-06	5000.	-0.03666	2.13E-07	4.64E+08
0.00	0.00	0.00				
0.1100	2.0218	6600.	5000.	-0.03665	792.8049	4.64E+08
0.00	0.00	0.00				
0.2200	1.9735	13200.	5000.	-0.03662	1586.	4.64E+08
0.00	0.00	0.00				
0.3300	1.9251	19800.	5000.	-0.03658	2378.	4.64E+08
0.00	0.00	0.00				
0.4400	1.8769	26400.	5000.	-0.03651	3171.	4.64E+08
0.00	0.00	0.00				
0.5500	1.8288	33000.	5000.	-0.03643	3964.	4.64E+08
0.00	0.00	0.00				
0.6600	1.7807	39600.	5000.	-0.03632	4757.	4.64E+08
0.00	0.00	0.00				
0.7700	1.7329	46200.	5000.	-0.03620	5550.	4.64E+08
0.00	0.00	0.00				
0.8800	1.6852	52800.	5000.	-0.03606	6342.	4.64E+08
0.00	0.00	0.00				
0.9900	1.6377	59400.	5000.	-0.03590	7135.	4.64E+08
0.00	0.00	0.00				
1.1000	1.5904	66000.	5000.	-0.03572	7928.	4.64E+08
0.00	0.00	0.00				
1.2100	1.5434	72600.	5000.	-0.03552	8721.	4.64E+08
0.00	0.00	0.00				
1.3200	1.4966	79200.	5000.	-0.03531	9514.	4.64E+08
0.00	0.00	0.00				
1.4300	1.4502	85800.	5000.	-0.03507	10306.	4.64E+08
0.00	0.00	0.00				
1.5400	1.4040	92400.	5000.	-0.03482	11099.	4.64E+08
0.00	0.00	0.00				
1.6500	1.3582	99000.	5000.	-0.03455	11892.	4.64E+08
0.00	0.00	0.00				
1.7600	1.3128	105600.	5000.	-0.03426	12685.	4.64E+08
0.00	0.00	0.00				
1.8700	1.2678	112200.	5000.	-0.03395	13478.	4.64E+08
0.00	0.00	0.00				
1.9800	1.2232	118800.	5000.	-0.03362	14270.	4.64E+08
0.00	0.00	0.00				
2.0900	1.1790	125400.	5000.	-0.03327	15063.	4.64E+08
0.00	0.00	0.00				
2.2000	1.1354	132000.	5000.	-0.03290	15856.	4.64E+08
0.00	0.00	0.00				
2.3100	1.0922	138600.	5000.	-0.03252	16649.	4.64E+08
0.00	0.00	0.00				
2.4200	1.0495	145200.	5000.	-0.03212	17442.	4.64E+08
0.00	0.00	0.00				
2.5300	1.0074	151800.	5000.	-0.03169	18235.	4.64E+08
0.00	0.00	0.00				
2.6400	0.9658	158400.	5000.	-0.03125	19027.	4.64E+08

0.00	0.00	0.00				
2.7500	0.9249	165000.	5000.	-0.03079	19820.	4.64E+08
0.00	0.00	0.00				
2.8600	0.8845	171600.	5000.	-0.03031	20613.	4.64E+08
0.00	0.00	0.00				
2.9700	0.8449	178200.	5000.	-0.02982	21406.	4.64E+08
0.00	0.00	0.00				
3.0800	0.8058	184800.	5000.	-0.02930	22199.	4.64E+08
0.00	0.00	0.00				
3.1900	0.7675	191400.	5000.	-0.02876	22991.	4.64E+08
0.00	0.00	0.00				
3.3000	0.7299	198000.	5000.	-0.02821	23784.	4.64E+08
0.00	0.00	0.00				
3.4100	0.6930	204600.	5000.	-0.02764	24577.	4.64E+08
0.00	0.00	0.00				
3.5200	0.6569	211200.	5000.	-0.02705	25370.	4.64E+08
0.00	0.00	0.00				
3.6300	0.6216	217800.	5000.	-0.02643	26163.	4.64E+08
0.00	0.00	0.00				
3.7400	0.5871	224400.	5000.	-0.02581	26955.	4.64E+08
0.00	0.00	0.00				
3.8500	0.5535	231000.	5000.	-0.02516	27748.	4.64E+08
0.00	0.00	0.00				
3.9600	0.5207	237600.	5000.	-0.02449	28541.	4.64E+08
0.00	0.00	0.00				
4.0700	0.4888	244200.	4863.	-0.02381	29334.	4.64E+08
-206.885	558.6383	0.00				
4.1800	0.4579	250440.	4585.	-0.02310	30083.	4.64E+08
-215.035	619.9131	0.00				
4.2900	0.4279	256304.	4296.	-0.02238	30788.	4.64E+08
-222.733	687.1660	0.00				
4.4000	0.3988	261781.	3997.	-0.02164	31446.	4.64E+08
-229.967	761.1868	0.00				
4.5100	0.3707	266857.	3689.	-0.02089	32055.	4.64E+08
-236.724	842.8964	0.00				
4.6200	0.3436	271521.	3373.	-0.02013	32616.	4.64E+08
-242.988	933.3732	0.00				
4.7300	0.3176	275761.	3048.	-0.01935	33125.	4.64E+08
-248.746	1034.	0.00				
4.8400	0.2926	279568.	2716.	-0.01856	33582.	4.64E+08
-253.983	1146.	0.00				
4.9500	0.2686	282932.	2378.	-0.01776	33986.	4.64E+08
-258.684	1271.	0.00				
5.0600	0.2457	285846.	1893.	-0.01695	34336.	4.64E+08
-476.307	2559.	0.00				
5.1700	0.2238	287929.	1258.	-0.01613	34587.	4.64E+08
-485.537	2863.	0.00				
5.2800	0.2031	289167.	611.8267	-0.01531	34735.	4.64E+08
-493.569	3208.	0.00				
5.3900	0.1834	289544.	-44.169	-0.01449	34781.	4.64E+08

-500.364	3601.	0.00				
5.5000	0.1649	289050.	-708.290	-0.01366	34721.	4.64E+08
-505.880	4051.	0.00				
5.6100	0.1474	287675.	-1379.	-0.01284	34556.	4.64E+08
-510.071	4569.	0.00				
5.7200	0.1309	285410.	-2054.	-0.01203	34284.	4.64E+08
-512.885	5170.	0.00				
5.8300	0.1156	282252.	-2732.	-0.01122	33905.	4.64E+08
-514.265	5872.	0.00				
5.9400	0.1013	278198.	-3411.	-0.01042	33418.	4.64E+08
-514.145	6698.	0.00				
6.0500	0.08809	273248.	-4088.	-0.00964	32823.	4.64E+08
-512.450	7679.	0.00				
6.1600	0.07588	267405.	-4762.	-0.00887	32121.	4.64E+08
-509.089	8856.	0.00				
6.2700	0.06467	260675.	-5431.	-0.00812	31313.	4.64E+08
-503.952	10286.	0.00				
6.3800	0.05444	253067.	-6092.	-0.00739	30399.	4.64E+08
-496.902	12047.	0.00				
6.4900	0.04517	244593.	-6741.	-0.00668	29381.	4.64E+08
-487.764	14254.	0.00				
6.6000	0.03681	235270.	-7378.	-0.00600	28261.	4.64E+08
-476.300	17079.	0.00				
6.7100	0.02934	225116.	-7997.	-0.00534	27041.	4.64E+08
-462.180	20794.	0.00				
6.8200	0.02271	214157.	-8596.	-0.00472	25725.	4.64E+08
-444.916	25860.	0.00				
6.9300	0.01689	202423.	-9169.	-0.00412	24315.	4.64E+08
-423.738	33122.	0.00				
7.0400	0.01182	189951.	-9711.	-0.00357	22817.	4.64E+08
-397.301	44355.	0.00				
7.1500	0.00747	176786.	-10213.	-0.00304	21236.	4.64E+08
-362.905	64095.	0.00				
7.2600	0.00379	162989.	-10659.	-0.00256	19579.	4.64E+08
-313.530	109256.	0.00				
7.3700	7.14E-04	148646.	-11006.	-0.00212	17856.	4.64E+08
-211.676	391164.	0.00				
7.4800	-0.00180	133934.	-10966.	-0.00172	16088.	4.64E+08
272.1970	199494.	0.00				
7.5900	-0.00381	119696.	-10565.	-0.00135	14378.	4.64E+08
335.7417	116217.	0.00				
7.7000	-0.00538	106043.	-10096.	-0.00103	12738.	4.64E+08
373.8198	91784.	0.00				
7.8100	-0.00654	93042.	-9585.	-7.50E-04	11176.	4.64E+08
400.9583	80920.	0.00				
7.9200	-0.00736	80739.	-9042.	-5.03E-04	9698.	4.64E+08
421.5062	75642.	0.00				
8.0300	-0.00787	69170.	-8475.	-2.89E-04	8309.	4.64E+08
437.3981	73388.	0.00				
8.1400	-0.00812	58364.	-7890.	-1.08E-04	7011.	4.64E+08

449.6705	73106.	0.00				
8.2500	-0.00815	48341.	-7290.	4.40E-05	5807.	4.64E+08
458.9426	74314.	0.00				
8.3600	-0.00800	39118.	-6684.	1.68E-04	4699.	4.64E+08
459.9265	75858.	0.00				
8.4700	-0.00771	30696.	-6079.	2.68E-04	3687.	4.64E+08
455.6189	78031.	0.00				
8.5800	-0.00730	23068.	-5482.	3.44E-04	2771.	4.64E+08
449.4199	81306.	0.00				
8.6900	-0.00680	16224.	-4894.	4.00E-04	1949.	4.64E+08
441.5527	85730.	0.00				
8.8000	-0.00624	10148.	-4317.	4.38E-04	1219.	4.64E+08
432.1893	91424.	0.00				
8.9100	-0.00564	4826.	-3754.	4.59E-04	579.6720	4.64E+08
421.4642	98583.	0.00				
9.0200	-0.00503	237.6358	-3206.	4.66E-04	28.5453	4.64E+08
409.4827	107493.	0.00				
9.1300	-0.00441	-3637.	-2674.	4.61E-04	436.8765	4.64E+08
396.3260	118557.	0.00				
9.2400	-0.00381	-6821.	-2160.	4.46E-04	819.3471	4.64E+08
382.0536	132347.	0.00				
9.3500	-0.00323	-9339.	-1666.	4.23E-04	1122.	4.64E+08
366.7027	149673.	0.00				
9.4600	-0.00269	-11219.	-1193.	3.94E-04	1348.	4.64E+08
350.2850	171719.	0.00				
9.5700	-0.00219	-12488.	-741.768	3.60E-04	1500.	4.64E+08
332.7776	200271.	0.00				
9.6800	-0.00174	-13177.	-314.825	3.24E-04	1583.	4.64E+08
314.1051	238151.	0.00				
9.7900	-0.00134	-13319.	86.5915	2.86E-04	1600.	4.64E+08
294.1022	290121.	0.00				
9.9000	-9.85E-04	-12948.	460.5057	2.49E-04	1555.	4.64E+08
272.4344	364992.	0.00				
10.0100	-6.81E-04	-12103.	804.2621	2.13E-04	1454.	4.64E+08
248.4087	481464.	0.00				
10.1200	-4.22E-04	-10825.	1114.	1.81E-04	1300.	4.64E+08
220.4314	689033.	0.00				
10.2300	-2.04E-04	-9163.	1380.	1.52E-04	1101.	4.64E+08
183.8139	1188302.	0.00				
10.3400	-2.05E-05	-7181.	1532.	1.29E-04	862.5444	4.64E+08
45.9067	2955901.	0.00				
10.4500	1.36E-04	-5118.	1453.	1.11E-04	614.8068	4.64E+08
-166.117	1609768.	0.00				
10.5600	2.74E-04	-3345.	1213.	9.94E-05	401.8376	4.64E+08
-197.780	953826.	0.00				
10.6700	3.99E-04	-1917.	938.6691	9.19E-05	230.2637	4.64E+08
-217.272	719453.	0.00				
10.7800	5.16E-04	-867.160	642.2873	8.80E-05	104.1650	4.64E+08
-231.792	592539.	0.00				
10.8900	6.31E-04	-221.278	328.4698	8.64E-05	26.5803	4.64E+08

-243.690	509914.	0.00				
11.0000	7.44E-04	0.00	0.00	8.61E-05	0.00	4.64E+08
-253.992	225173.	0.00				

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 5:

Pile-head deflection	=	2.07022209 inches
Computed slope at pile head	=	-0.0366605 radians
Maximum bending moment	=	289544. inch-lbs
Maximum shear force	=	-11006. lbs
Depth of maximum bending moment	=	5.39000000 feet below pile head
Depth of maximum shear force	=	7.37000000 feet below pile head
Number of iterations	=	29
Number of zero deflection points	=	2
Pile deflection at ground	=	0.50913415 inches

----- Computed Values of Pile Loading and Deflection for Lateral Loading for Load Case Number 6 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head	=	6000.0 lbs
Applied moment at pile head	=	0.0 in-lbs
Axial thrust load on pile head	=	0.0 lbs

Depth Res.	Soil X	Deflect. Spr. y	Bending Distrib. Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil p
	Es*H	Lat. Load						
feet	inches	lb/inch	in-lbs	lbs	radians	psi*	lb-in^2	
lb/inch	lb/inch	lb/inch	lb/inch					
0.00	2.7929	4.73E-07	6000.	-0.04807	5.68E-08	4.64E+08		
0.00	0.00	0.00						
0.1100	2.7294	7920.	6000.	-0.04806	951.3659	4.64E+08		
0.00	0.00	0.00						
0.2200	2.6660	15840.	6000.	-0.04803	1903.	4.64E+08		

0.00	0.00	0.00				
0.3300	2.6026	23760.	6000.	-0.04797	2854.	4.64E+08
0.00	0.00	0.00				
0.4400	2.5393	31680.	6000.	-0.04789	3805.	4.64E+08
0.00	0.00	0.00				
0.5500	2.4762	39600.	6000.	-0.04779	4757.	4.64E+08
0.00	0.00	0.00				
0.6600	2.4132	47520.	6000.	-0.04767	5708.	4.64E+08
0.00	0.00	0.00				
0.7700	2.3503	55440.	6000.	-0.04752	6660.	4.64E+08
0.00	0.00	0.00				
0.8800	2.2877	63360.	6000.	-0.04735	7611.	4.64E+08
0.00	0.00	0.00				
0.9900	2.2253	71280.	6000.	-0.04716	8562.	4.64E+08
0.00	0.00	0.00				
1.1000	2.1632	79200.	6000.	-0.04694	9514.	4.64E+08
0.00	0.00	0.00				
1.2100	2.1014	87120.	6000.	-0.04671	10465.	4.64E+08
0.00	0.00	0.00				
1.3200	2.0399	95040.	6000.	-0.04645	11416.	4.64E+08
0.00	0.00	0.00				
1.4300	1.9788	102960.	6000.	-0.04617	12368.	4.64E+08
0.00	0.00	0.00				
1.5400	1.9180	110880.	6000.	-0.04586	13319.	4.64E+08
0.00	0.00	0.00				
1.6500	1.8577	118800.	6000.	-0.04554	14270.	4.64E+08
0.00	0.00	0.00				
1.7600	1.7978	126720.	6000.	-0.04519	15222.	4.64E+08
0.00	0.00	0.00				
1.8700	1.7384	134640.	6000.	-0.04481	16173.	4.64E+08
0.00	0.00	0.00				
1.9800	1.6795	142560.	6000.	-0.04442	17125.	4.64E+08
0.00	0.00	0.00				
2.0900	1.6211	150480.	6000.	-0.04400	18076.	4.64E+08
0.00	0.00	0.00				
2.2000	1.5633	158400.	6000.	-0.04356	19027.	4.64E+08
0.00	0.00	0.00				
2.3100	1.5061	166320.	6000.	-0.04310	19979.	4.64E+08
0.00	0.00	0.00				
2.4200	1.4495	174240.	6000.	-0.04262	20930.	4.64E+08
0.00	0.00	0.00				
2.5300	1.3936	182160.	6000.	-0.04211	21881.	4.64E+08
0.00	0.00	0.00				
2.6400	1.3384	190080.	6000.	-0.04158	22833.	4.64E+08
0.00	0.00	0.00				
2.7500	1.2838	198000.	6000.	-0.04103	23784.	4.64E+08
0.00	0.00	0.00				
2.8600	1.2301	205920.	6000.	-0.04045	24736.	4.64E+08
0.00	0.00	0.00				
2.9700	1.1770	213840.	6000.	-0.03986	25687.	4.64E+08

0.00	0.00	0.00				
3.0800	1.1248	221760.	6000.	-0.03924	26638.	4.64E+08
0.00	0.00	0.00				
3.1900	1.0735	229680.	6000.	-0.03860	27590.	4.64E+08
0.00	0.00	0.00				
3.3000	1.0229	237600.	6000.	-0.03793	28541.	4.64E+08
0.00	0.00	0.00				
3.4100	0.9733	245520.	6000.	-0.03724	29492.	4.64E+08
0.00	0.00	0.00				
3.5200	0.9246	253440.	6000.	-0.03653	30444.	4.64E+08
0.00	0.00	0.00				
3.6300	0.8769	261360.	6000.	-0.03580	31395.	4.64E+08
0.00	0.00	0.00				
3.7400	0.8301	269280.	6000.	-0.03505	32346.	4.64E+08
0.00	0.00	0.00				
3.8500	0.7844	277200.	6000.	-0.03427	33298.	4.64E+08
0.00	0.00	0.00				
3.9600	0.7396	285120.	6000.	-0.03347	34249.	4.64E+08
0.00	0.00	0.00				
4.0700	0.6960	293040.	5851.	-0.03265	35201.	4.64E+08
-225.988	428.5997	0.00				
4.1800	0.6535	300566.	5547.	-0.03180	36105.	4.64E+08
-235.030	474.7674	0.00				
4.2900	0.6120	307683.	5231.	-0.03094	36959.	4.64E+08
-243.587	525.3474	0.00				
4.4000	0.5718	314375.	4904.	-0.03005	37763.	4.64E+08
-251.643	580.9330	0.00				
4.5100	0.5327	320629.	4567.	-0.02915	38515.	4.64E+08
-259.180	642.2223	0.00				
4.6200	0.4948	326431.	4220.	-0.02823	39212.	4.63E+08
-266.178	710.0420	0.00				
4.7300	0.4582	331770.	3864.	-0.02729	39853.	4.62E+08
-272.616	785.3764	0.00				
4.8400	0.4228	336633.	3501.	-0.02633	40437.	4.58E+08
-278.471	869.4041	0.00				
4.9500	0.3887	341011.	3130.	-0.02533	40963.	4.38E+08
-283.721	963.5348	0.00				
5.0600	0.3559	344895.	2597.	-0.02425	41430.	4.06E+08
-522.552	1938.	0.00				
5.1700	0.3247	347869.	1901.	-0.02309	41787.	3.78E+08
-532.823	2166.	0.00				
5.2800	0.2950	349914.	1192.	-0.02183	42032.	3.57E+08
-541.832	2425.	0.00				
5.3900	0.2670	351015.	471.2844	-0.02051	42165.	3.45E+08
-549.600	2717.	0.00				
5.5000	0.2408	351158.	-258.513	-0.01917	42182.	3.43E+08
-556.153	3048.	0.00				
5.6100	0.2164	350332.	-996.168	-0.01783	42083.	3.52E+08
-561.507	3425.	0.00				
5.7200	0.1937	348528.	-1740.	-0.01656	41866.	3.71E+08

-565.652	3854.	0.00				
5.8300	0.1727	345738.	-2489.	-0.01536	41531.	3.98E+08
-568.545	4345.	0.00				
5.9400	0.1532	341958.	-3240.	-0.01427	41077.	4.31E+08
-570.103	4913.	0.00				
6.0500	0.1350	337184.	-3993.	-0.01326	40503.	4.57E+08
-570.205	5574.	0.00				
6.1600	0.1182	331417.	-4744.	-0.01230	39810.	4.62E+08
-568.717	6352.	0.00				
6.2700	0.1026	324659.	-5493.	-0.01136	38999.	4.64E+08
-565.540	7277.	0.00				
6.3800	0.08819	316915.	-6236.	-0.01045	38068.	4.64E+08
-560.565	8390.	0.00				
6.4900	0.07500	308195.	-6972.	-0.00956	37021.	4.64E+08
-553.661	9745.	0.00				
6.6000	0.06296	298510.	-7697.	-0.00870	35858.	4.64E+08
-544.664	11419.	0.00				
6.7100	0.05204	287876.	-8408.	-0.00786	34580.	4.64E+08
-533.356	13528.	0.00				
6.8200	0.04221	276313.	-9103.	-0.00706	33191.	4.64E+08
-519.443	16245.	0.00				
6.9300	0.03341	263844.	-9777.	-0.00629	31693.	4.64E+08
-502.501	19854.	0.00				
7.0400	0.02560	250500.	-10427.	-0.00556	30091.	4.64E+08
-481.891	24846.	0.00				
7.1500	0.01874	236317.	-11046.	-0.00487	28387.	4.64E+08
-456.562	32167.	0.00				
7.2600	0.01276	221338.	-11628.	-0.00421	26588.	4.64E+08
-424.597	43934.	0.00				
7.3700	0.00761	205619.	-12160.	-0.00361	24699.	4.64E+08
-381.817	66229.	0.00				
7.4800	0.00324	189235.	-12620.	-0.00305	22731.	4.64E+08
-315.304	128651.	0.00				
7.5900	-4.29E-04	172301.	-12700.	-0.00253	20697.	4.64E+08
194.4963	598475.	0.00				
7.7000	-0.00345	155706.	-12351.	-0.00206	18704.	4.64E+08
334.5400	128149.	0.00				
7.8100	-0.00588	139694.	-11872.	-0.00164	16780.	4.64E+08
390.4469	87681.	0.00				
7.9200	-0.00779	124363.	-11333.	-0.00127	14939.	4.64E+08
427.5820	72495.	0.00				
8.0300	-0.00923	109776.	-10750.	-9.35E-04	13187.	4.64E+08
455.2114	65130.	0.00				
8.1400	-0.01025	95983.	-10135.	-6.42E-04	11530.	4.64E+08
476.7318	61371.	0.00				
8.2500	-0.01092	83020.	-9494.	-3.88E-04	9973.	4.64E+08
493.7937	59682.	0.00				
8.3600	-0.01128	70918.	-8838.	-1.69E-04	8519.	4.64E+08
501.1336	58659.	0.00				
8.4700	-0.01137	59689.	-8175.	1.73E-05	7170.	4.64E+08

502.1230	58313.	0.00				
8.5800	-0.01123	49335.	-7514.	1.72E-04	5926.	4.64E+08
500.6268	58837.	0.00				
8.6900	-0.01091	39853.	-6855.	2.99E-04	4787.	4.64E+08
497.0203	60127.	0.00				
8.8000	-0.01044	31237.	-6203.	4.00E-04	3752.	4.64E+08
491.5811	62145.	0.00				
8.9100	-0.00985	23478.	-5559.	4.78E-04	2820.	4.64E+08
484.5193	64902.	0.00				
9.0200	-0.00918	16563.	-4925.	5.35E-04	1990.	4.64E+08
475.9954	68452.	0.00				
9.1300	-0.00844	10477.	-4303.	5.74E-04	1258.	4.64E+08
466.1309	72890.	0.00				
9.2400	-0.00766	5203.	-3695.	5.96E-04	625.0264	4.64E+08
455.0142	78364.	0.00				
9.3500	-0.00687	722.5049	-3102.	6.04E-04	86.7887	4.64E+08
442.7026	85086.	0.00				
9.4600	-0.00607	-2987.	-2527.	6.01E-04	358.7911	4.64E+08
429.2207	93358.	0.00				
9.5700	-0.00528	-5948.	-1970.	5.88E-04	714.5348	4.64E+08
414.5537	103622.	0.00				
9.6800	-0.00452	-8188.	-1433.	5.68E-04	983.5122	4.64E+08
398.6346	116538.	0.00				
9.7900	-0.00378	-9732.	-918.497	5.43E-04	1169.	4.64E+08
381.3192	133146.	0.00				
9.9000	-0.00308	-10612.	-427.683	5.14E-04	1275.	4.64E+08
362.3394	155184.	0.00				
10.0100	-0.00242	-10861.	36.6596	4.83E-04	1305.	4.64E+08
341.2096	185836.	0.00				
10.1200	-0.00181	-10516.	471.0892	4.53E-04	1263.	4.64E+08
317.0171	231710.	0.00				
10.2300	-0.00123	-9618.	870.3111	4.24E-04	1155.	4.64E+08
287.8646	309476.	0.00				
10.3400	-6.86E-04	-8218.	1225.	3.99E-04	987.1675	4.64E+08
248.8582	478999.	0.00				
10.4500	-1.75E-04	-6385.	1505.	3.78E-04	766.9589	4.64E+08
176.7781	1336273.	0.00				
10.5600	3.13E-04	-4244.	1487.	3.63E-04	509.7505	4.64E+08
-204.475	863538.	0.00				
10.6700	7.84E-04	-2459.	1182.	3.54E-04	295.3388	4.64E+08
-257.310	433335.	0.00				
10.7800	0.00125	-1122.	821.9020	3.48E-04	134.7823	4.64E+08
-288.914	306118.	0.00				
10.8900	0.00170	-288.837	425.0173	3.46E-04	34.6956	4.64E+08
-312.426	242076.	0.00				
11.0000	0.00216	0.00	0.00	3.46E-04	0.00	4.64E+08
-331.539	101288.	0.00				

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses

are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 6:

```

Pile-head deflection           =      2.79285532 inches
Computed slope at pile head    =     -0.0480713 radians
Maximum bending moment         =       351158. inch-lbs
Maximum shear force            =       -12700. lbs
Depth of maximum bending moment =     5.50000000 feet below pile head
Depth of maximum shear force   =     7.59000000 feet below pile head
Number of iterations           =              81
Number of zero deflection points =            2
Pile deflection at ground      =     0.72377012 inches
  
```

Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

```

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians
  
```

Load Case	Load Type	Load 1	Load 2	Axial Loading	Pile-head Deflection	Pile-head Rotation	Max in lbs
No.		Load 1	Load 2	lbs	inches	radians	lbs

1	V, lb	1000.0000	M, in-lb	0.00	0.00	0.2554	-0.00535
-2968.		52655.					
2	V, lb	2000.	M, in-lb	0.00	0.00	0.6182	-0.01212
-5208.		109420.					
3	V, lb	3000.	M, in-lb	0.00	0.00	1.0487	-0.01970
-7262.		168237.					
4	V, lb	4000.	M, in-lb	0.00	0.00	1.5352	-0.02791
-9163.		228349.					
5	V, lb	5000.	M, in-lb	0.00	0.00	2.0702	-0.03666
-11006.		289544.					

6 V, lb	6000.	M, in-lb	0.00	0.00	2.7929	-0.04807
-12700.	351158.					

Maximum pile-head deflection = 2.7928553185 inches

Maximum pile-head rotation = -0.0480713404 radians = -2.754285 deg.

The analysis ended normally.

=====

LPILE for Version 2022-12.012

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Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Cincinnati, OH, USA

=====

This model was prepared by:
Sudip Khadka

Files Used for Analysis

Path to file locations:
\Cincinnati-1178\Projects\2024\24780158_Savion_Lynn Bark Solar_Threeforks
KY\GE0\Project Docs\Calcs\Driven Piles\

Name of input data file:
New LPILE (SI units)-SBK.lp12d

Name of output report file:
New LPILE (SI units)-SBK.lp12o

Name of plot output file:
New LPILE (SI units)-SBK.lp12p

Name of runtime message file:
New LPILE (SI units)-SBK.lp12r

Date and Time of Analysis

Date: April 4, 2025

Time: 12:20:30

Problem Title

Project Name: Tift Mullis Solar

Job Number: 24800083

Client: Inman Solar

Engineer: Eddie Polanco

Description:

Program Options and Settings

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- | | | |
|--|---|---------------|
| - Maximum number of iterations allowed | = | 500 |
| - Deflection tolerance for convergence | = | 1.0000E-05 in |
| - Maximum allowable deflection | = | 100.0000 in |
| - Number of pile increments | = | 100 |

Loading Type and Number of Cycles of Loading:

- | | | |
|-------------------------------|---|------------|
| - Cyclic loading specified | | |
| - Number of cycles of loading | = | 100 cycles |

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Pile Structural Properties and Geometry

Number of pile sections defined	=	1
Total length of pile	=	15.000 ft
Depth of ground surface below top of pile	=	4.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	3.9400
2	15.000	3.9400

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a AISC strong axis steel pile	
Length of section	= 15.000000 ft
AISC Section Type	= W

AISC Section Name = W6X9

Pile width = 3.940000 in

Soil and Rock Layering Information

The soil profile is modelled using 2 layers

Layer 1 is soft clay, p-y criteria by Matlock, 1970

Distance from top of pile to top of layer	=	4.000000 ft
Distance from top of pile to bottom of layer	=	6.500000 ft
Effective unit weight at top of layer	=	90.000000 pcf
Effective unit weight at bottom of layer	=	90.000000 pcf
Undrained cohesion at top of layer	=	250.000000 psf
Undrained cohesion at bottom of layer	=	250.000000 psf
Epsilon-50 at top of layer	=	0.010000
Epsilon-50 at bottom of layer	=	0.010000

Layer 2 is stiff clay without free water

Distance from top of pile to top of layer	=	6.500000 ft
Distance from top of pile to bottom of layer	=	20.000000 ft
Effective unit weight at top of layer	=	115.000000 pcf
Effective unit weight at bottom of layer	=	115.000000 pcf
Undrained cohesion at top of layer	=	3000. psf
Undrained cohesion at bottom of layer	=	3000. psf
Epsilon-50 at top of layer	=	0.006000
Epsilon-50 at bottom of layer	=	0.006000

(Depth of the lowest soil layer extends 5.000 ft below the pile tip)

Summary of Input Soil Properties

Layer	Soil Type	Layer	Effective	Cohesion	E50
-------	-----------	-------	-----------	----------	-----

Num.	Name (p-y Curve Type)	Depth ft	Unit Wt. pcf	psf	or krm
1	Soft Clay	4.0000	90.0000	250.0000	0.01000
2	Stiff Clay w/o Free Water	6.5000	115.0000	3000.	0.00600
		20.0000	115.0000	3000.	0.00600

Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	4.000	2.5000	1.0000
2	20.000	2.5000	1.0000

Cyclic Loading Type

Cyclic loading criteria were used for computation of p-y curves for all analyses.

Number of cycles of loading = 100

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 6

Load Compute No.	Load Top y Type vs. Pile Length	Condition Run Analysis 1	Condition 2	Axial Thrust Force, lbs
1	1	V = 1000.000000 lbs	M = 0.0000 in-lbs	-11000.
No		Yes		
2	1	V = 2000. lbs	M = 0.0000 in-lbs	-11000.
No		Yes		
3	1	V = 3000. lbs	M = 0.0000 in-lbs	-11000.

No		Yes				
4	1	V =	4000. lbs	M =	0.0000 in-lbs	-11000.
No		Yes				
5	1	V =	5000. lbs	M =	0.0000 in-lbs	-11000.
No		Yes				
6	1	V =	6000. lbs	M =	0.0000 in-lbs	-11000.
No		Yes				

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

----- Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness -----

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Dimensions and Properties of Steel AISC Strong Axis:

Length of Section	=	15.000000 ft
Flange Width	=	3.940000 in
Section Depth	=	5.900000 in
Flange Thickness	=	0.215000 in
Web Thickness	=	0.170000 in
Yield Stress of Pipe	=	50.000000 ksi
Elastic Modulus	=	29000. ksi
Cross-sectional Area	=	2.680000 sq. in.
Moment of Inertia	=	16.400000 in^4
Elastic Bending Stiffness	=	475600. kip-in^2
Plastic Modulus, Z	=	6.230000in^3
Plastic Moment Capacity = Fy Z	=	311.500000in-kip

Axial Structural Capacities:

Nom. Axial Structural Capacity = Fy As = 134.000 kips

Nominal Axial Tensile Capacity = -134.000 kips

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 1

Number	Axial Thrust Force kips
-----	-----
1	-11.000

Definition of Run Messages:

Y = part of pipe section has yielded.

Axial Thrust Force = -11.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Total Stress ksi	Run Msg
-----	-----	-----	-----	-----	---
0.00001952	9.0531506	463904.	-4.457012	-5.844737	
0.00003903	18.1063011	463904.	-0.753506	-7.497560	
0.00005855	27.1594517	463904.	0.4809961	-9.150384	
0.00007806	36.2126023	463904.	1.0982471	-10.803207	
0.00009758	45.2657528	463904.	1.4685976	-12.456031	
0.0001171	54.3189034	463904.	1.7154980	-14.108854	
0.0001366	63.3720540	463904.	1.8918555	-15.761678	
0.0001561	72.4252045	463904.	2.0241235	-17.414501	
0.0001756	81.4783551	463904.	2.1269987	-19.067324	
0.0001952	90.5315057	463904.	2.2092988	-20.720148	
0.0002147	99.5846562	463904.	2.2766353	-22.372971	
0.0002342	108.6378068	463904.	2.3327490	-24.025795	
0.0002537	117.6909574	463904.	2.3802299	-25.678618	
0.0002732	126.7441079	463904.	2.4209277	-27.331442	
0.0002927	135.7972585	463904.	2.4561992	-28.984265	
0.0003122	144.8504090	463904.	2.4870618	-30.637088	
0.0003318	153.9035596	463904.	2.5142934	-32.289912	
0.0003513	162.9567102	463904.	2.5384993	-33.942735	
0.0003708	172.0098607	463904.	2.5601573	-35.595559	
0.0003903	181.0630113	463904.	2.5796494	-37.248382	
0.0004098	190.1161619	463904.	2.5972852	-38.901206	
0.0004293	199.1693124	463904.	2.6133176	-40.554029	
0.0004488	208.2224630	463904.	2.6279560	-42.206853	
0.0004684	217.2756136	463904.	2.6413745	-43.859676	
0.0004879	226.3287641	463904.	2.6537195	-45.512499	
0.0005074	235.3819147	463904.	2.6651149	-47.165323	
0.0005269	244.4350653	463904.	2.6756662	-48.818146	

0.0005464	253.1373968	463262.	2.6825751	-50.000000	Y
0.0005659	259.3744068	458308.	2.6691032	-50.000000	Y
0.0005855	262.8696859	449002.	2.6345904	-50.000000	Y
0.0006050	265.9386171	439591.	2.5989205	-50.000000	Y
0.0006245	268.8167838	430462.	2.5639428	-50.000000	Y
0.0006440	271.5220229	421619.	2.5296903	-50.000000	Y
0.0006635	274.0689371	413057.	2.4961751	-50.000000	Y
0.0006830	276.4701018	404771.	2.4633986	-50.000000	Y
0.0007025	278.7307146	396745.	2.4313061	-50.000000	Y
0.0007221	280.8705048	388985.	2.3999697	-50.000000	Y
0.0007416	282.7949656	381344.	2.3718981	50.0000000	Y
0.0007611	284.5046253	373812.	2.3470659	50.0000000	Y
0.0008001	287.1611512	358898.	2.3124847	50.0000000	Y
0.0008392	288.6959808	344034.	2.3029314	50.0000000	Y
0.0008782	289.7369370	329929.	2.3002396	50.0000000	Y
0.0009172	290.6449010	316879.	2.3029327	50.0000000	Y
0.0009562	291.4506520	304788.	2.3029136	50.0000000	Y
0.0009953	292.1571009	293545.	2.3029654	50.0000000	Y
0.0010343	292.7847479	283075.	2.3029588	50.0000000	Y
0.0010733	293.3465392	273305.	2.3029574	50.0000000	Y
0.0011124	293.8512480	264169.	2.3029614	50.0000000	Y
0.0011514	294.3070152	255610.	2.3029707	50.0000000	Y
0.0011904	294.7185051	247575.	2.3029061	50.0000000	Y
0.0012295	295.0853969	240014.	2.3029225	50.0000000	Y
0.0012685	295.4215257	232894.	2.3029443	50.0000000	Y
0.0013075	295.7329775	226180.	2.3029720	50.0000000	Y
0.0013465	296.0133637	219832.	2.3029149	50.0000000	Y
0.0013856	296.2690568	213824.	2.3029496	50.0000000	Y
0.0014246	296.5123233	208137.	2.3029239	50.0000000	Y
0.0014636	296.7243028	202731.	2.3029379	50.0000000	Y
0.0015027	296.9318076	197604.	2.3029869	50.0000000	Y
0.0015417	297.1123890	192718.	2.3029366	50.0000000	Y
0.0015807	297.2915980	188073.	2.3029607	50.0000000	Y
0.0016198	297.4457243	183636.	2.3021990	50.0000000	Y
0.0016588	297.5992551	179408.	2.3028999	50.0000000	Y
0.0016978	297.7354531	175364.	2.3029654	50.0000000	Y
0.0017368	297.8647785	171498.	2.3029212	50.0000000	Y
0.0017759	297.9914549	167800.	2.3029964	50.0000000	Y
0.0018149	298.0992624	164250.	2.3029535	50.0000000	Y
0.0018539	298.2070698	160851.	2.3029124	50.0000000	Y
0.0018930	298.3111636	157589.	2.3029978	50.0000000	Y
0.0019320	298.3999823	154452.	2.3029574	50.0000000	Y
0.0019710	298.4888009	151438.	2.3029187	50.0000000	Y
0.0020101	298.5776195	148542.	2.3028814	50.0000000	Y
0.0020491	298.6520767	145749.	2.3029774	50.0000000	Y
0.0020881	298.7242776	143059.	2.3029404	50.0000000	Y
0.0021271	298.7964786	140468.	2.3029048	50.0000000	Y
0.0021662	298.8674120	137970.	2.3029607	50.0000000	Y
0.0022052	298.9259090	135554.	2.3029788	50.0000000	Y
0.0022442	298.9837053	133223.	2.3029443	50.0000000	Y

0.0022833	299.0415016	130971.	2.3029111	50.0000000	Y
0.0023223	299.0992979	128794.	2.3028790	50.0000000	Y
0.0024784	299.2859936	120757.	2.3029073	50.0000000	Y

Summary of Results for Nominal Moment Capacity for Section 1

Load No.	Axial Thrust kips	Nominal Moment Capacity in-kips
-----	-----	-----
1	-11.000000000	299.2859936227

Note that the values in the above table are not factored by a strength reduction factor for LRFD.

The value of the strength reduction factor depends on the provisions of the LRFD code being followed.

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to the LRFD structural design standard being followed.

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
-----	-----	-----	-----	-----	-----	-----
1	4.0000	0.00	N.A.	No	0.00	810.6907
2	6.5000	0.2572	No	No	810.6907	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 1000.0 lbs
 Applied moment at pile head = 0.0 in-lbs
 Axial thrust load on pile head = -11000.0 lbs

Depth Res.	Soil X Es*H feet lb/inch	Deflect. Spr. y Lat. inches lb/inch	Bending Distrib. Moment in-lbs lb/inch	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil p
0.00	0.00	0.4613	-1.11E-07	1000.	-0.00768	4104.	4.64E+08	
0.00	0.00	0.00	0.00					
0.1500	0.00	0.4475	1648.	1000.	-0.00768	4302.	4.64E+08	
0.00	0.00	0.00	0.00					
0.3000	0.00	0.4336	3296.	1000.	-0.00767	4500.	4.64E+08	
0.00	0.00	0.00	0.00					
0.4500	0.00	0.4198	4944.	1000.	-0.00765	4698.	4.64E+08	
0.00	0.00	0.00	0.00					
0.6000	0.00	0.4061	6593.	1000.	-0.00763	4896.	4.64E+08	
0.00	0.00	0.00	0.00					
0.7500	0.00	0.3924	8242.	1000.	-0.00760	5095.	4.64E+08	
0.00	0.00	0.00	0.00					
0.9000	0.00	0.3787	9892.	1000.	-0.00757	5293.	4.64E+08	
0.00	0.00	0.00	0.00					
1.0500	0.00	0.3651	11542.	1000.	-0.00752	5491.	4.64E+08	
0.00	0.00	0.00	0.00					
1.2000	0.00	0.3516	13194.	1000.	-0.00748	5689.	4.64E+08	
0.00	0.00	0.00	0.00					
1.3500	0.00	0.3382	14846.	1000.	-0.00742	5888.	4.64E+08	
0.00	0.00	0.00	0.00					
1.5000	0.00	0.3249	16500.	1000.	-0.00736	6086.	4.64E+08	
0.00	0.00	0.00	0.00					
1.6500	0.00	0.3117	18155.	1000.	-0.00729	6285.	4.64E+08	
0.00	0.00	0.00	0.00					
1.8000	0.00	0.2987	19811.	1000.	-0.00722	6484.	4.64E+08	
0.00	0.00	0.00	0.00					
1.9500	0.00	0.2857	21469.	1000.	-0.00714	6683.	4.64E+08	
0.00	0.00	0.00	0.00					
2.1000	0.00	0.2730	23128.	1000.	-0.00705	6883.	4.64E+08	

0.00	0.00	0.00					
2.2500	0.2603	24790.	1000.	-0.00696	7082.	4.64E+08	
0.00	0.00	0.00					
2.4000	0.2479	26453.	1000.	-0.00686	7282.	4.64E+08	
0.00	0.00	0.00					
2.5500	0.2356	28118.	1000.	-0.00676	7482.	4.64E+08	
0.00	0.00	0.00					
2.7000	0.2236	29785.	1000.	-0.00664	7682.	4.64E+08	
0.00	0.00	0.00					
2.8500	0.2117	31455.	1000.	-0.00652	7883.	4.64E+08	
0.00	0.00	0.00					
3.0000	0.2001	33127.	1000.	-0.00640	8084.	4.64E+08	
0.00	0.00	0.00					
3.1500	0.1887	34802.	1000.	-0.00627	8285.	4.64E+08	
0.00	0.00	0.00					
3.3000	0.1775	36479.	1000.	-0.00613	8486.	4.64E+08	
0.00	0.00	0.00					
3.4500	0.1666	38159.	1000.	-0.00598	8688.	4.64E+08	
0.00	0.00	0.00					
3.6000	0.1560	39842.	1000.0000	-0.00583	8890.	4.64E+08	
0.00	0.00	0.00					
3.7500	0.1456	41528.	1000.	-0.00567	9093.	4.64E+08	
0.00	0.00	0.00					
3.9000	0.1356	43217.	1000.	-0.00551	9296.	4.64E+08	
0.00	0.00	0.00					
4.0500	0.1258	44910.	974.1665	-0.00534	9499.	4.64E+08	
-28.704	410.7404	0.00					
4.2000	0.1163	46513.	920.8663	-0.00516	9692.	4.64E+08	
-30.519	472.1996	0.00					
4.3500	0.1072	48020.	864.4352	-0.00498	9873.	4.64E+08	
-32.183	540.3495	0.00					
4.5000	0.09841	49427.	805.1484	-0.00479	10042.	4.64E+08	
-33.692	616.2368	0.00					
4.6500	0.08996	50729.	743.2884	-0.00460	10198.	4.64E+08	
-35.042	701.1213	0.00					
4.8000	0.08187	51921.	679.1457	-0.00440	10341.	4.64E+08	
-36.228	796.5298	0.00					
4.9500	0.07414	53000.	613.0186	-0.00419	10471.	4.64E+08	
-37.246	904.3289	0.00					
5.1000	0.06677	53962.	545.2140	-0.00399	10587.	4.64E+08	
-38.092	1027.	0.00					
5.2500	0.05979	54805.	476.0478	-0.00377	10688.	4.64E+08	
-38.759	1167.	0.00					
5.4000	0.05319	55526.	405.8452	-0.00356	10774.	4.64E+08	
-39.243	1328.	0.00					
5.5500	0.04697	56125.	334.9415	-0.00334	10846.	4.64E+08	
-39.538	1515.	0.00					
5.7000	0.04115	56600.	263.6830	-0.00312	10903.	4.64E+08	
-39.638	1734.	0.00					
5.8500	0.03572	56951.	192.4275	-0.00290	10945.	4.64E+08	

-39.535	1992.	0.00				
6.0000	0.03069	57178.	121.5456	-0.00268	10973.	4.64E+08
-39.223	2300.	0.00				
6.1500	0.02606	57282.	51.4214	-0.00246	10985.	4.64E+08
-38.693	2672.	0.00				
6.3000	0.02183	57265.	-17.546	-0.00224	10983.	4.64E+08
-37.937	3127.	0.00				
6.4500	0.01800	57130.	-84.941	-0.00202	10967.	4.64E+08
-36.946	3694.	0.00				
6.6000	0.01457	56880.	-308.160	-0.00180	10937.	4.64E+08
-211.074	26070.	0.00				
6.7500	0.01154	55950.	-689.087	-0.00158	10825.	4.64E+08
-212.179	33095.	0.00				
6.9000	0.00890	54336.	-1070.	-0.00136	10631.	4.64E+08
-211.075	42703.	0.00				
7.0500	0.00663	52044.	-1447.	-0.00116	10356.	4.64E+08
-207.534	56313.	0.00				
7.2000	0.00473	49082.	-1815.	-9.60E-04	10000.	4.64E+08
-201.229	76518.	0.00				
7.3500	0.00318	45473.	-2168.	-7.77E-04	9567.	4.64E+08
-191.634	108589.	0.00				
7.5000	0.00194	41246.	-2501.	-6.09E-04	9059.	4.64E+08
-177.768	165192.	0.00				
7.6500	9.86E-04	36446.	-2802.	-4.58E-04	8482.	4.64E+08
-157.316	287320.	0.00				
7.8000	2.89E-04	31140.	-3053.	-3.27E-04	7845.	4.64E+08
-121.304	756515.	0.00				
7.9500	-1.91E-04	25442.	-3061.	-2.17E-04	7161.	4.64E+08
112.9105	1065074.	0.00				
8.1000	-4.93E-04	20113.	-2824.	-1.29E-04	6520.	4.64E+08
149.6201	546755.	0.00				
8.2500	-6.54E-04	15270.	-2539.	-6.00E-05	5939.	4.64E+08
167.0903	459987.	0.00				
8.4000	-7.08E-04	10969.	-2230.	-9.07E-06	5422.	4.64E+08
177.0340	449782.	0.00				
8.5500	-6.86E-04	7243.	-1906.	2.63E-05	4975.	4.64E+08
182.1296	477543.	0.00				
8.7000	-6.14E-04	4108.	-1577.	4.83E-05	4598.	4.64E+08
183.4093	537742.	0.00				
8.8500	-5.13E-04	1567.	-1249.	5.93E-05	4293.	4.64E+08
181.3415	636688.	0.00				
9.0000	-4.00E-04	-386.624	-927.313	6.16E-05	4151.	4.64E+08
176.1320	791646.	0.00				
9.1500	-2.91E-04	-1769.	-617.750	5.74E-05	4317.	4.64E+08
167.8266	1038166.	0.00				
9.3000	-1.94E-04	-2608.	-326.014	4.89E-05	4418.	4.64E+08
156.3249	1451621.	0.00				
9.4500	-1.15E-04	-2941.	-58.155	3.81E-05	4458.	4.64E+08
141.2958	2213163.	0.00				
9.6000	-5.65E-05	-2816.	173.1854	2.70E-05	4443.	4.64E+08

115.7492	3685325.	0.00				
9.7500	-1.78E-05	-2316.	311.1283	1.70E-05	4383.	4.64E+08
37.5207	3790106.	0.00				
9.9000	4.72E-06	-1695.	335.7099	9.23E-06	4308.	4.64E+08
-10.208	3894893.	0.00				
10.0500	1.54E-05	-1108.	295.6980	3.79E-06	4238.	4.64E+08
-34.250	3999684.	0.00				
10.2000	1.84E-05	-630.701	227.8411	4.21E-07	4180.	4.64E+08
-41.147	4030774.	0.00				
10.3500	1.69E-05	-287.261	156.6868	-1.36E-06	4139.	4.64E+08
-37.914	4030774.	0.00				
10.5000	1.35E-05	-66.682	95.3957	-2.05E-06	4112.	4.64E+08
-30.188	4030774.	0.00				
10.6500	9.56E-06	56.0829	48.9501	-2.07E-06	4111.	4.64E+08
-21.419	4030774.	0.00				
10.8000	6.04E-06	109.4559	17.4990	-1.75E-06	4118.	4.64E+08
-13.527	4030774.	0.00				
10.9500	3.28E-06	119.0100	-1.288	-1.30E-06	4119.	4.64E+08
-7.347	4030774.	0.00				
11.1000	1.35E-06	104.7687	-10.626	-8.68E-07	4117.	4.64E+08
-3.029	4030774.	0.00				
11.2500	1.56E-07	80.7229	-13.665	-5.08E-07	4114.	4.64E+08
-0.349	4030774.	0.00				
11.4000	-4.77E-07	55.5542	-13.017	-2.44E-07	4111.	4.64E+08
1.0690	4030774.	0.00				
11.5500	-7.22E-07	33.8534	-10.599	-7.04E-08	4109.	4.64E+08
1.6177	4030774.	0.00				
11.7000	-7.31E-07	17.3963	-7.670	2.90E-08	4107.	4.64E+08
1.6368	4030774.	0.00				
11.8500	-6.18E-07	6.2439	-4.951	7.49E-08	4105.	4.64E+08
1.3840	4030774.	0.00				
12.0000	-4.61E-07	-0.424	-2.775	8.61E-08	4105.	4.64E+08
1.0334	4030774.	0.00				
12.1500	-3.08E-07	-3.744	-1.225	7.81E-08	4105.	4.64E+08
0.6895	4030774.	0.00				
12.3000	-1.80E-07	-4.829	-0.240	6.14E-08	4105.	4.64E+08
0.4042	4030774.	0.00				
12.4500	-8.68E-08	-4.606	0.2983	4.31E-08	4105.	4.64E+08
0.1943	4030774.	0.00				
12.6000	-2.53E-08	-3.754	0.5241	2.69E-08	4105.	4.64E+08
0.05655	4030774.	0.00				
12.7500	1.01E-08	-2.718	0.5547	1.43E-08	4105.	4.64E+08
-0.02253	4030774.	0.00				
12.9000	2.64E-08	-1.756	0.4813	5.66E-09	4105.	4.64E+08
-0.05909	4030774.	0.00				
13.0500	3.05E-08	-0.986	0.3667	3.45E-10	4105.	4.64E+08
-0.06819	4030774.	0.00				
13.2000	2.76E-08	-0.436	0.2497	-2.41E-09	4105.	4.64E+08
-0.06187	4030774.	0.00				
13.3500	2.18E-08	-0.08677	0.1501	-3.43E-09	4104.	4.64E+08

-0.04874	4030774.	0.00				
13.5000	1.53E-08	0.1044	0.07545	-3.39E-09	4104.	4.64E+08
-0.03424	4030774.	0.00				
13.6500	9.55E-09	0.1847	0.02538	-2.83E-09	4104.	4.64E+08
-0.02139	4030774.	0.00				
13.8000	5.10E-09	0.1957	-0.00414	-2.09E-09	4105.	4.64E+08
-0.01142	4030774.	0.00				
13.9500	2.01E-09	0.1697	-0.01847	-1.38E-09	4104.	4.64E+08
-0.00451	4030774.	0.00				
14.1000	1.14E-10	0.1292	-0.02276	-8.05E-10	4104.	4.64E+08
-2.55E-04	4030774.	0.00				
14.2500	-8.83E-10	0.08779	-0.02121	-3.84E-10	4104.	4.64E+08
0.00198	4030774.	0.00				
14.4000	-1.27E-09	0.05282	-0.01687	-1.11E-10	4104.	4.64E+08
0.00284	4030774.	0.00				
14.5500	-1.28E-09	0.02705	-0.01173	4.40E-11	4104.	4.64E+08
0.00287	4030774.	0.00				
14.7000	-1.11E-09	0.01058	-0.00691	1.17E-10	4104.	4.64E+08
0.00248	4030774.	0.00				
14.8500	-8.61E-10	0.00217	-0.00294	1.42E-10	4104.	4.64E+08
0.00193	4030774.	0.00				
15.0000	-5.98E-10	0.00	0.00	1.46E-10	4104.	4.64E+08
0.00134	2015387.	0.00				

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection	=	0.46127998 inches
Computed slope at pile head	=	-0.0076811 radians
Maximum bending moment	=	57282. inch-lbs
Maximum shear force	=	-3061. lbs
Depth of maximum bending moment	=	6.15000000 feet below pile head
Depth of maximum shear force	=	7.95000000 feet below pile head
Number of iterations	=	23
Number of zero deflection points	=	5
Pile deflection at ground	=	0.12904576 inches

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 2000.0 lbs
 Applied moment at pile head = 0.0 in-lbs
 Axial thrust load on pile head = -11000.0 lbs

Depth Res.	Soil X Es*H feet lb/inch	Deflect. Spr. y Lat. inches lb/inch	Bending Distrib. Moment Load in-lbs lb/inch	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil p
0.00	0.00	1.0902	2.54E-07	2000.	-0.01711	4104.	4.64E+08	
0.00	0.00	0.00	0.00					
0.00	0.1500	1.0594	3261.	2000.	-0.01710	4496.	4.64E+08	
0.00	0.00	0.00	0.00					
0.00	0.3000	1.0287	6523.	2000.	-0.01708	4888.	4.64E+08	
0.00	0.00	0.00	0.00					
0.00	0.4500	0.9979	9785.	2000.	-0.01705	5280.	4.64E+08	
0.00	0.00	0.00	0.00					
0.00	0.6000	0.9673	13047.	2000.	-0.01701	5672.	4.64E+08	
0.00	0.00	0.00	0.00					
0.00	0.7500	0.9367	16311.	2000.	-0.01695	6064.	4.64E+08	
0.00	0.00	0.00	0.00					
0.00	0.9000	0.9062	19576.	2000.	-0.01688	6456.	4.64E+08	
0.00	0.00	0.00	0.00					
0.00	1.0500	0.8759	22843.	2000.	-0.01680	6848.	4.64E+08	
0.00	0.00	0.00	0.00					
0.00	1.2000	0.8458	26111.	2000.	-0.01670	7241.	4.64E+08	
0.00	0.00	0.00	0.00					
0.00	1.3500	0.8158	29381.	2000.	-0.01660	7634.	4.64E+08	
0.00	0.00	0.00	0.00					
0.00	1.5000	0.7860	32654.	2000.	-0.01648	8027.	4.64E+08	
0.00	0.00	0.00	0.00					
0.00	1.6500	0.7565	35929.	2000.	-0.01634	8420.	4.64E+08	
0.00	0.00	0.00	0.00					
0.00	1.8000	0.7272	39206.	2000.	-0.01620	8814.	4.64E+08	
0.00	0.00	0.00	0.00					
0.00	1.9500	0.6982	42487.	2000.	-0.01604	9208.	4.64E+08	
0.00	0.00	0.00	0.00					
0.00	2.1000	0.6694	45771.	2000.	-0.01587	9603.	4.64E+08	
0.00	0.00	0.00	0.00					
0.00	2.2500	0.6410	49059.	2000.	-0.01568	9998.	4.64E+08	
0.00	0.00	0.00	0.00					
0.00	2.4000	0.6130	52350.	2000.	-0.01549	10393.	4.64E+08	
0.00	0.00	0.00	0.00					
0.00	2.5500	0.5853	55646.	2000.	-0.01528	10789.	4.64E+08	

0.00	0.00	0.00					
2.7000	0.5580	58945.	2000.	-0.01506	11185.	4.64E+08	
0.00	0.00	0.00					
2.8500	0.5311	62249.	2000.	-0.01482	11582.	4.64E+08	
0.00	0.00	0.00					
3.0000	0.5046	65558.	2000.	-0.01457	11979.	4.64E+08	
0.00	0.00	0.00					
3.1500	0.4786	68872.	2000.	-0.01431	12378.	4.64E+08	
0.00	0.00	0.00					
3.3000	0.4531	72192.	2000.	-0.01404	12776.	4.64E+08	
0.00	0.00	0.00					
3.4500	0.4281	75516.	2000.	-0.01375	13176.	4.64E+08	
0.00	0.00	0.00					
3.6000	0.4036	78847.	2000.	-0.01345	13576.	4.64E+08	
0.00	0.00	0.00					
3.7500	0.3797	82184.	2000.	-0.01314	13977.	4.64E+08	
0.00	0.00	0.00					
3.9000	0.3563	85527.	2000.	-0.01281	14378.	4.64E+08	
0.00	0.00	0.00					
4.0500	0.3335	88876.	1967.	-0.01248	14780.	4.64E+08	
-36.949	199.4107	0.00					
4.2000	0.3114	92113.	1896.	-0.01212	15169.	4.64E+08	
-41.116	237.6813	0.00					
4.3500	0.2899	95223.	1819.	-0.01176	15543.	4.64E+08	
-44.834	278.4022	0.00					
4.5000	0.2690	98196.	1736.	-0.01139	15900.	4.64E+08	
-47.108	315.1832	0.00					
4.6500	0.2489	101024.	1650.	-0.01100	16240.	4.64E+08	
-49.191	355.7632	0.00					
4.8000	0.2294	103699.	1559.	-0.01060	16561.	4.64E+08	
-51.076	400.7057	0.00					
4.9500	0.2107	106218.	1466.	-0.01020	16864.	4.64E+08	
-52.759	450.6833	0.00					
5.1000	0.1927	108573.	1370.	-0.00978	17147.	4.64E+08	
-54.234	506.5032	0.00					
5.2500	0.1755	110762.	1271.	-0.00935	17409.	4.64E+08	
-55.495	569.1426	0.00					
5.4000	0.1591	112779.	1170.	-0.00892	17652.	4.64E+08	
-56.538	639.7928	0.00					
5.5500	0.1434	114621.	1068.	-0.00848	17873.	4.64E+08	
-57.355	719.9191	0.00					
5.7000	0.1285	116286.	963.8784	-0.00803	18073.	4.64E+08	
-57.940	811.3401	0.00					
5.8500	0.1145	117773.	859.2743	-0.00758	18252.	4.64E+08	
-58.287	916.3361	0.00					
6.0000	0.1013	119080.	754.2677	-0.00712	18409.	4.64E+08	
-58.387	1038.	0.00					
6.1500	0.08888	120206.	649.3077	-0.00665	18544.	4.64E+08	
-58.235	1179.	0.00					
6.3000	0.07732	121154.	544.8574	-0.00618	18658.	4.64E+08	

-57.821	1346.	0.00				
6.4500	0.06661	121923.	441.3941	-0.00571	18750.	4.64E+08
-57.138	1544.	0.00				
6.6000	0.05676	122517.	123.1377	-0.00524	18821.	4.64E+08
-296.480	9403.	0.00				
6.7500	0.04776	122159.	-416.019	-0.00476	18778.	4.64E+08
-302.583	11405.	0.00				
6.9000	0.03961	120830.	-964.235	-0.00429	18619.	4.64E+08
-306.545	13931.	0.00				
7.0500	0.03231	118518.	-1518.	-0.00383	18341.	4.64E+08
-308.225	17174.	0.00				
7.2000	0.02583	115216.	-2072.	-0.00337	17944.	4.64E+08
-307.455	21426.	0.00				
7.3500	0.02016	110926.	-2622.	-0.00294	17429.	4.64E+08
-304.019	27147.	0.00				
7.5000	0.01526	105660.	-3163.	-0.00252	16797.	4.64E+08
-297.623	35103.	0.00				
7.6500	0.01110	99438.	-3690.	-0.00212	16049.	4.64E+08
-287.837	46665.	0.00				
7.8000	0.00764	92291.	-4196.	-0.00175	15191.	4.64E+08
-273.964	64559.	0.00				
7.9500	0.00482	84264.	-4672.	-0.00140	14226.	4.64E+08
-254.709	95139.	0.00				
8.1000	0.00259	75417.	-5105.	-0.00109	13164.	4.64E+08
-227.100	157951.	0.00				
8.2500	8.84E-04	65841.	-5472.	-8.19E-04	12013.	4.64E+08
-180.636	367918.	0.00				
8.4000	-3.61E-04	55684.	-5501.	-5.83E-04	10793.	4.64E+08
149.2842	744981.	0.00				
8.5500	-0.00122	46016.	-5177.	-3.86E-04	9632.	4.64E+08
210.1646	311041.	0.00				
8.7000	-0.00175	37031.	-4773.	-2.25E-04	8553.	4.64E+08
238.4253	245185.	0.00				
8.8500	-0.00203	28823.	-4329.	-9.71E-05	7567.	4.64E+08
255.8010	227279.	0.00				
9.0000	-0.00210	21445.	-3858.	3.76E-07	6680.	4.64E+08
266.6782	228571.	0.00				
9.1500	-0.00202	14933.	-3373.	7.09E-05	5898.	4.64E+08
272.7291	242482.	0.00				
9.3000	-0.00184	9305.	-2880.	1.18E-04	5222.	4.64E+08
274.7438	268090.	0.00				
9.4500	-0.00160	4569.	-2387.	1.45E-04	4653.	4.64E+08
273.1278	307301.	0.00				
9.6000	-0.00132	717.6084	-1900.	1.55E-04	4191.	4.64E+08
268.0823	364717.	0.00				
9.7500	-0.00104	-2265.	-1425.	1.52E-04	4377.	4.64E+08
259.6795	448881.	0.00				
9.9000	-7.75E-04	-4406.	-968.163	1.39E-04	4634.	4.64E+08
247.8872	575471.	0.00				
10.0500	-5.40E-04	-5745.	-535.763	1.20E-04	4795.	4.64E+08

232.5576	774926.	0.00				
10.2000	-3.45E-04	-6330.	-137.890	9.61E-05	4865.	4.64E+08
209.5236	1092740.	0.00				
10.3500	-1.94E-04	-6237.	214.0080	7.17E-05	4854.	4.64E+08
181.4740	1681219.	0.00				
10.5000	-8.70E-05	-5557.	510.9218	4.88E-05	4772.	4.64E+08
148.4302	3070278.	0.00				
10.6500	-1.86E-05	-4396.	681.9046	2.95E-05	4633.	4.64E+08
41.5507	4030774.	0.00				
10.8000	1.92E-05	-3101.	680.5928	1.50E-05	4477.	4.64E+08
-43.008	4030774.	0.00				
10.9500	3.53E-05	-1945.	570.7240	5.17E-06	4338.	4.64E+08
-79.068	4030774.	0.00				
11.1000	3.78E-05	-1046.	423.3309	-6.32E-07	4230.	4.64E+08
-84.702	4030774.	0.00				
11.2500	3.30E-05	-421.455	280.5228	-3.48E-06	4155.	4.64E+08
-73.974	4030774.	0.00				
11.4000	2.53E-05	-36.436	162.9579	-4.37E-06	4109.	4.64E+08
-56.654	4030774.	0.00				
11.5500	1.73E-05	165.0208	77.0815	-4.12E-06	4124.	4.64E+08
-38.764	4030774.	0.00				
11.7000	1.05E-05	240.8943	21.0837	-3.33E-06	4133.	4.64E+08
-23.456	4030774.	0.00				
11.8500	5.32E-06	240.7902	-10.749	-2.40E-06	4133.	4.64E+08
-11.914	4030774.	0.00				
12.0000	1.85E-06	202.1021	-25.197	-1.54E-06	4129.	4.64E+08
-4.139	4030774.	0.00				
12.1500	-2.12E-07	150.0187	-28.495	-8.54E-07	4122.	4.64E+08
0.4753	4030774.	0.00				
12.3000	-1.23E-06	99.4868	-25.598	-3.70E-07	4116.	4.64E+08
2.7434	4030774.	0.00				
12.4500	-1.54E-06	57.8513	-20.019	-6.45E-08	4111.	4.64E+08
3.4556	4030774.	0.00				
12.6000	-1.46E-06	27.4164	-13.972	1.01E-07	4108.	4.64E+08
3.2630	4030774.	0.00				
12.7500	-1.18E-06	7.5559	-8.658	1.69E-07	4105.	4.64E+08
2.6416	4030774.	0.00				
12.9000	-8.49E-07	-3.745	-4.569	1.76E-07	4105.	4.64E+08
1.9021	4030774.	0.00				
13.0500	-5.45E-07	-8.884	-1.758	1.52E-07	4106.	4.64E+08
1.2211	4030774.	0.00				
13.2000	-3.03E-07	-10.067	-0.04760	1.15E-07	4106.	4.64E+08
0.6790	4030774.	0.00				
13.3500	-1.31E-07	-9.051	0.8285	7.79E-08	4106.	4.64E+08
0.2944	4030774.	0.00				
13.5000	-2.29E-08	-7.081	1.1398	4.66E-08	4105.	4.64E+08
0.05138	4030774.	0.00				
13.6500	3.61E-08	-4.946	1.1132	2.32E-08	4105.	4.64E+08
-0.08092	4030774.	0.00				
13.8000	6.07E-08	-3.073	0.9181	7.67E-09	4105.	4.64E+08

-0.136	4030774.	0.00				
13.9500	6.38E-08	-1.640	0.6673	-1.47E-09	4105.	4.64E+08
-0.143	4030774.	0.00				
14.1000	5.54E-08	-0.671	0.4272	-5.96E-09	4105.	4.64E+08
-0.124	4030774.	0.00				
14.2500	4.23E-08	-0.103	0.2303	-7.46E-09	4104.	4.64E+08
-0.09476	4030774.	0.00				
14.4000	2.85E-08	0.1580	0.08747	-7.35E-09	4104.	4.64E+08
-0.06391	4030774.	0.00				
14.5500	1.59E-08	0.2118	-0.00201	-6.63E-09	4105.	4.64E+08
-0.03552	4030774.	0.00				
14.7000	4.67E-09	0.1505	-0.04339	-5.93E-09	4104.	4.64E+08
-0.01045	4030774.	0.00				
14.8500	-5.48E-09	0.05538	-0.04175	-5.53E-09	4104.	4.64E+08
0.01227	4030774.	0.00				
15.0000	-1.52E-08	0.00	0.00	-5.42E-09	4104.	4.64E+08
0.03412	2015387.	0.00				

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection	=	1.09022694 inches
Computed slope at pile head	=	-0.0171097 radians
Maximum bending moment	=	122517. inch-lbs
Maximum shear force	=	-5501. lbs
Depth of maximum bending moment	=	6.60000000 feet below pile head
Depth of maximum shear force	=	8.40000000 feet below pile head
Number of iterations	=	27
Number of zero deflection points	=	5
Pile deflection at ground	=	0.34111003 inches

Computed Values of Pile Loading and Deflection for Lateral Loading for Load Case Number 3

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head	=	3000.0 lbs
Applied moment at pile head	=	0.0 in-lbs
Axial thrust load on pile head	=	-11000.0 lbs

Depth Res.	Soil X Es*H feet lb/inch	Deflect. Spr. y Lat. Load inches lb/inch	Bending Distrib. Moment in-lbs lb/inch	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil p
	0.00	1.8636	9.54E-08	3000.	-0.02796	4104.	4.64E+08	
0.00	0.00	0.00	0.00					
	0.1500	1.8133	4846.	3000.	-0.02795	4687.	4.64E+08	
0.00	0.00	0.00	0.00					
	0.3000	1.7630	9693.	3000.	-0.02792	5269.	4.64E+08	
0.00	0.00	0.00	0.00					
	0.4500	1.7127	14541.	3000.	-0.02787	5851.	4.64E+08	
0.00	0.00	0.00	0.00					
	0.6000	1.6626	19389.	3000.	-0.02781	6434.	4.64E+08	
0.00	0.00	0.00	0.00					
	0.7500	1.6126	24240.	3000.	-0.02772	7016.	4.64E+08	
0.00	0.00	0.00	0.00					
	0.9000	1.5628	29092.	3000.	-0.02762	7599.	4.64E+08	
0.00	0.00	0.00	0.00					
	1.0500	1.5132	33946.	3000.	-0.02750	8182.	4.64E+08	
0.00	0.00	0.00	0.00					
	1.2000	1.4638	38803.	3000.	-0.02736	8766.	4.64E+08	
0.00	0.00	0.00	0.00					
	1.3500	1.4147	43663.	3000.	-0.02720	9349.	4.64E+08	
0.00	0.00	0.00	0.00					
	1.5000	1.3659	48526.	3000.	-0.02702	9934.	4.64E+08	
0.00	0.00	0.00	0.00					
	1.6500	1.3175	53393.	3000.	-0.02682	10518.	4.64E+08	
0.00	0.00	0.00	0.00					
	1.8000	1.2694	58264.	3000.	-0.02660	11103.	4.64E+08	
0.00	0.00	0.00	0.00					
	1.9500	1.2217	63139.	3000.	-0.02637	11689.	4.64E+08	
0.00	0.00	0.00	0.00					
	2.1000	1.1745	68020.	3000.	-0.02611	12275.	4.64E+08	
0.00	0.00	0.00	0.00					
	2.2500	1.1277	72905.	3000.	-0.02584	12862.	4.64E+08	
0.00	0.00	0.00	0.00					
	2.4000	1.0814	77797.	3000.	-0.02555	13450.	4.64E+08	
0.00	0.00	0.00	0.00					
	2.5500	1.0357	82694.	3000.	-0.02524	14038.	4.64E+08	
0.00	0.00	0.00	0.00					
	2.7000	0.9906	87597.	3000.	-0.02490	14627.	4.64E+08	
0.00	0.00	0.00	0.00					
	2.8500	0.9461	92507.	3000.	-0.02456	15217.	4.64E+08	
0.00	0.00	0.00	0.00					
	3.0000	0.9022	97425.	3000.	-0.02419	15807.	4.64E+08	

0.00	0.00	0.00				
3.1500	0.8590	102350.	3000.	-0.02380	16399.	4.64E+08
0.00	0.00	0.00				
3.3000	0.8165	107282.	3000.	-0.02339	16991.	4.64E+08
0.00	0.00	0.00				
3.4500	0.7748	112223.	3000.	-0.02297	17585.	4.64E+08
0.00	0.00	0.00				
3.6000	0.7338	117173.	3000.	-0.02252	18180.	4.64E+08
0.00	0.00	0.00				
3.7500	0.6937	122131.	3000.	-0.02206	18775.	4.64E+08
0.00	0.00	0.00				
3.9000	0.6544	127099.	3000.	-0.02157	19372.	4.64E+08
0.00	0.00	0.00				
4.0500	0.6160	132077.	2975.	-0.02107	19970.	4.64E+08
-27.971	81.7280	0.00				
4.2000	0.5786	136974.	2921.	-0.02055	20558.	4.64E+08
-32.293	100.4656	0.00				
4.3500	0.5421	141778.	2858.	-0.02001	21135.	4.64E+08
-36.743	122.0103	0.00				
4.5000	0.5065	146472.	2788.	-0.01945	21699.	4.64E+08
-41.288	146.7155	0.00				
4.6500	0.4721	151045.	2710.	-0.01887	22248.	4.64E+08
-45.895	175.0022	0.00				
4.8000	0.4386	155480.	2623.	-0.01828	22781.	4.64E+08
-50.532	207.3747	0.00				
4.9500	0.4063	159764.	2528.	-0.01767	23296.	4.64E+08
-55.170	244.4415	0.00				
5.1000	0.3750	163881.	2424.	-0.01704	23790.	4.64E+08
-59.782	286.9407	0.00				
5.2500	0.3449	167817.	2313.	-0.01639	24263.	4.64E+08
-64.342	335.7746	0.00				
5.4000	0.3160	171557.	2193.	-0.01574	24712.	4.64E+08
-68.826	392.0545	0.00				
5.5500	0.2883	175088.	2066.	-0.01506	25136.	4.64E+08
-72.385	451.9790	0.00				
5.7000	0.2618	178398.	1934.	-0.01438	25534.	4.64E+08
-73.440	504.9937	0.00				
5.8500	0.2365	181483.	1802.	-0.01368	25905.	4.64E+08
-74.231	564.9444	0.00				
6.0000	0.2125	184342.	1668.	-0.01297	26248.	4.64E+08
-74.752	633.1246	0.00				
6.1500	0.1898	186972.	1533.	-0.01225	26564.	4.64E+08
-74.994	711.1439	0.00				
6.3000	0.1684	189374.	1398.	-0.01152	26853.	4.64E+08
-74.951	801.0236	0.00				
6.4500	0.1484	191548.	1263.	-0.01078	27114.	4.64E+08
-74.615	905.3273	0.00				
6.6000	0.1296	193495.	868.0143	-0.01003	27347.	4.64E+08
-364.455	5061.	0.00				
6.7500	0.1122	194276.	202.8374	-0.00928	27441.	4.64E+08

-374.631	6008.	0.00				
6.9000	0.09621	193858.	-478.738	-0.00853	27391.	4.64E+08
-382.675	7160.	0.00				
7.0500	0.08153	192215.	-1173.	-0.00778	27194.	4.64E+08
-388.476	8576.	0.00				
7.2000	0.06820	189328.	-1875.	-0.00704	26847.	4.64E+08
-391.905	10343.	0.00				
7.3500	0.05619	185185.	-2581.	-0.00631	26349.	4.64E+08
-392.810	12582.	0.00				
7.5000	0.04548	179785.	-3287.	-0.00560	25701.	4.64E+08
-391.007	15475.	0.00				
7.6500	0.03602	173131.	-3986.	-0.00492	24901.	4.64E+08
-386.256	19302.	0.00				
7.8000	0.02777	165239.	-4674.	-0.00426	23953.	4.64E+08
-378.237	24517.	0.00				
7.9500	0.02067	156135.	-5345.	-0.00364	22860.	4.64E+08
-366.482	31908.	0.00				
8.1000	0.01467	145854.	-5990.	-0.00305	21625.	4.64E+08
-350.252	42980.	0.00				
8.2500	0.00968	134451.	-6600.	-0.00251	20255.	4.64E+08
-328.229	61024.	0.00				
8.4000	0.00563	121994.	-7164.	-0.00201	18759.	4.64E+08
-297.622	95089.	0.00				
8.5500	0.00244	108582.	-7657.	-0.00156	17148.	4.64E+08
-250.273	184771.	0.00				
8.7000	6.93E-07	94368.	-7883.	-0.00117	15440.	4.64E+08
-1.176	3056766.	0.00				
8.8500	-0.00178	80157.	-7661.	-8.32E-04	13733.	4.64E+08
247.6755	250790.	0.00				
9.0000	-0.00300	66755.	-7176.	-5.47E-04	12123.	4.64E+08
291.5556	175158.	0.00				
9.1500	-0.00375	54302.	-6627.	-3.13E-04	10627.	4.64E+08
318.2403	152820.	0.00				
9.3000	-0.00412	42885.	-6038.	-1.24E-04	9256.	4.64E+08
336.0075	146748.	0.00				
9.4500	-0.00419	32560.	-5423.	2.23E-05	8016.	4.64E+08
347.6707	149182.	0.00				
9.6000	-0.00404	23364.	-4791.	1.31E-04	6911.	4.64E+08
354.5185	157913.	0.00				
9.7500	-0.00372	15318.	-4150.	2.06E-04	5944.	4.64E+08
357.2283	172669.	0.00				
9.9000	-0.00330	8431.	-3508.	2.52E-04	5117.	4.64E+08
356.1785	194286.	0.00				
10.0500	-0.00282	2698.	-2871.	2.74E-04	4429.	4.64E+08
351.5786	224656.	0.00				
10.2000	-0.00232	-1895.	-2251.	2.75E-04	4332.	4.64E+08
337.3585	262292.	0.00				
10.3500	-0.00183	-5396.	-1661.	2.61E-04	4753.	4.64E+08
317.9546	313324.	0.00				
10.5000	-0.00138	-7866.	-1109.	2.35E-04	5049.	4.64E+08

296.2082	387556.	0.00				
10.6500	-9.80E-04	-9378.	-597.229	2.02E-04	5231.	4.64E+08
272.1203	499909.	0.00				
10.8000	-6.49E-04	-10008.	-131.337	1.64E-04	5307.	4.64E+08
245.5369	680597.	0.00				
10.9500	-3.89E-04	-9844.	284.0496	1.26E-04	5287.	4.64E+08
216.0042	999891.	0.00				
11.1000	-1.97E-04	-8981.	642.4973	8.91E-05	5183.	4.64E+08
182.2710	1664810.	0.00				
11.2500	-6.80E-05	-7528.	943.6237	5.71E-05	5009.	4.64E+08
152.3139	4030774.	0.00				
11.4000	8.46E-06	-5581.	1064.	3.17E-05	4775.	4.64E+08
-18.950	4030774.	0.00				
11.5500	4.60E-05	-3697.	953.9671	1.37E-05	4549.	4.64E+08
-102.921	4030774.	0.00				
11.7000	5.76E-05	-2147.	745.1758	2.32E-06	4362.	4.64E+08
-129.069	4030774.	0.00				
11.8500	5.43E-05	-1014.	519.5333	-3.81E-06	4226.	4.64E+08
-121.645	4030774.	0.00				
12.0000	4.39E-05	-276.449	321.5343	-6.31E-06	4138.	4.64E+08
-98.354	4030774.	0.00				
12.1500	3.16E-05	142.8430	169.3488	-6.57E-06	4122.	4.64E+08
-70.741	4030774.	0.00				
12.3000	2.03E-05	332.9466	64.8576	-5.65E-06	4144.	4.64E+08
-45.361	4030774.	0.00				
12.4500	1.12E-05	376.1067	1.3635	-4.27E-06	4150.	4.64E+08
-25.188	4030774.	0.00				
12.6000	4.87E-06	337.6858	-31.114	-2.89E-06	4145.	4.64E+08
-10.898	4030774.	0.00				
12.7500	8.44E-07	263.9815	-42.622	-1.72E-06	4136.	4.64E+08
-1.889	4030774.	0.00				
12.9000	-1.34E-06	184.1770	-41.630	-8.53E-07	4127.	4.64E+08
2.9913	4030774.	0.00				
13.0500	-2.23E-06	114.0783	-34.446	-2.75E-07	4118.	4.64E+08
4.9911	4030774.	0.00				
13.2000	-2.33E-06	60.1594	-25.268	6.32E-08	4112.	4.64E+08
5.2067	4030774.	0.00				
13.3500	-2.00E-06	23.1149	-16.549	2.25E-07	4107.	4.64E+08
4.4815	4030774.	0.00				
13.5000	-1.52E-06	0.5921	-9.460	2.71E-07	4105.	4.64E+08
3.3947	4030774.	0.00				
13.6500	-1.03E-06	-10.932	-4.336	2.51E-07	4106.	4.64E+08
2.2987	4030774.	0.00				
13.8000	-6.13E-07	-15.009	-1.031	2.00E-07	4106.	4.64E+08
1.3736	4030774.	0.00				
13.9500	-3.05E-07	-14.637	0.8199	1.43E-07	4106.	4.64E+08
0.6833	4030774.	0.00				
14.1000	-9.91E-08	-12.052	1.6346	9.11E-08	4106.	4.64E+08
0.2219	4030774.	0.00				
14.2500	2.28E-08	-8.748	1.7885	5.07E-08	4106.	4.64E+08

-0.05098	4030774.	0.00					
14.4000	8.35E-08	-5.611	1.5742	2.29E-08	4105.	4.64E+08	
-0.187	4030774.	0.00					
14.5500	1.05E-07	-3.080	1.1940	6.01E-09	4105.	4.64E+08	
-0.235	4030774.	0.00					
14.7000	1.05E-07	-1.312	0.7702	-2.51E-09	4105.	4.64E+08	
-0.236	4030774.	0.00					
14.8500	9.61E-08	-0.308	0.3646	-5.65E-09	4105.	4.64E+08	
-0.215	4030774.	0.00					
15.0000	8.48E-08	0.00	0.00	-6.25E-09	4104.	4.64E+08	
-0.190	2015387.	0.00					

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 3:

Pile-head deflection	=	1.86357817 inches
Computed slope at pile head	=	-0.0279574 radians
Maximum bending moment	=	194276. inch-lbs
Maximum shear force	=	-7883. lbs
Depth of maximum bending moment	=	6.75000000 feet below pile head
Depth of maximum shear force	=	8.70000000 feet below pile head
Number of iterations	=	24
Number of zero deflection points	=	4
Pile deflection at ground	=	0.62884252 inches

Computed Values of Pile Loading and Deflection for Lateral Loading for Load Case Number 4

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head	=	4000.0 lbs
Applied moment at pile head	=	0.0 in-lbs
Axial thrust load on pile head	=	-11000.0 lbs

Depth	Deflect.	Bending	Shear	Slope	Total	Bending	Soil
Res. Soil Spr.	Distrib.						
X	y	Moment	Force	S	Stress	Stiffness	p
Es*H	Lat. Load						
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	

lb/inch	lb/inch	lb/inch				
-----	-----	-----	-----	-----	-----	-----
0.00	2.8192	-2.54E-07	4000.	-0.04060	4104.	4.64E+08
0.00	0.00	0.00				
0.1500	2.7461	6396.	4000.	-0.04059	4873.	4.64E+08
0.00	0.00	0.00				
0.3000	2.6731	12793.	4000.	-0.04055	5641.	4.64E+08
0.00	0.00	0.00				
0.4500	2.6002	19190.	4000.	-0.04049	6410.	4.64E+08
0.00	0.00	0.00				
0.6000	2.5273	25589.	4000.	-0.04040	7178.	4.64E+08
0.00	0.00	0.00				
0.7500	2.4547	31990.	4000.	-0.04029	7947.	4.64E+08
0.00	0.00	0.00				
0.9000	2.3823	38394.	4000.	-0.04015	8716.	4.64E+08
0.00	0.00	0.00				
1.0500	2.3101	44800.	4000.	-0.03999	9486.	4.64E+08
0.00	0.00	0.00				
1.2000	2.2383	51210.	4000.	-0.03981	10256.	4.64E+08
0.00	0.00	0.00				
1.3500	2.1668	57624.	4000.	-0.03960	11026.	4.64E+08
0.00	0.00	0.00				
1.5000	2.0958	64042.	4000.	-0.03936	11797.	4.64E+08
0.00	0.00	0.00				
1.6500	2.0252	70465.	4000.	-0.03910	12569.	4.64E+08
0.00	0.00	0.00				
1.8000	1.9550	76894.	4000.	-0.03881	13341.	4.64E+08
0.00	0.00	0.00				
1.9500	1.8854	83328.	4000.	-0.03850	14114.	4.64E+08
0.00	0.00	0.00				
2.1000	1.8164	89769.	4000.	-0.03817	14888.	4.64E+08
0.00	0.00	0.00				
2.2500	1.7480	96217.	4000.	-0.03780	15662.	4.64E+08
0.00	0.00	0.00				
2.4000	1.6803	102672.	4000.	-0.03742	16438.	4.64E+08
0.00	0.00	0.00				
2.5500	1.6133	109135.	4000.	-0.03701	17214.	4.64E+08
0.00	0.00	0.00				
2.7000	1.5471	115607.	4000.	-0.03657	17991.	4.64E+08
0.00	0.00	0.00				
2.8500	1.4817	122087.	4000.	-0.03611	18770.	4.64E+08
0.00	0.00	0.00				
3.0000	1.4171	128577.	4000.	-0.03562	19549.	4.64E+08
0.00	0.00	0.00				
3.1500	1.3534	135076.	4000.	-0.03511	20330.	4.64E+08
0.00	0.00	0.00				
3.3000	1.2907	141586.	4000.	-0.03458	21112.	4.64E+08
0.00	0.00	0.00				
3.4500	1.2289	148107.	4000.	-0.03401	21895.	4.64E+08

0.00	0.00	0.00				
3.6000	1.1682	154639.	4000.	-0.03343	22680.	4.64E+08
0.00	0.00	0.00				
3.7500	1.1086	161183.	4000.	-0.03281	23466.	4.64E+08
0.00	0.00	0.00				
3.9000	1.0501	167740.	4000.	-0.03218	24254.	4.64E+08
0.00	0.00	0.00				
4.0500	0.9928	174309.	3986.	-0.03151	25043.	4.64E+08
-16.001	29.0115	0.00				
4.2000	0.9367	180840.	3953.	-0.03082	25827.	4.64E+08
-20.470	39.3386	0.00				
4.3500	0.8818	187318.	3912.	-0.03011	26606.	4.64E+08
-25.199	51.4371	0.00				
4.5000	0.8283	193730.	3862.	-0.02937	27376.	4.64E+08
-30.135	65.4895	0.00				
4.6500	0.7761	200058.	3803.	-0.02861	28136.	4.64E+08
-35.230	81.7112	0.00				
4.8000	0.7253	206288.	3735.	-0.02782	28884.	4.64E+08
-40.437	100.3577	0.00				
4.9500	0.6759	212402.	3657.	-0.02701	29619.	4.64E+08
-45.713	121.7343	0.00				
5.1000	0.6281	218385.	3570.	-0.02617	30337.	4.64E+08
-51.015	146.2072	0.00				
5.2500	0.5817	224219.	3474.	-0.02531	31038.	4.64E+08
-56.303	174.2193	0.00				
5.4000	0.5369	229888.	3368.	-0.02443	31719.	4.64E+08
-61.542	206.3096	0.00				
5.5500	0.4938	235376.	3252.	-0.02353	32378.	4.64E+08
-66.697	243.1391	0.00				
5.7000	0.4522	240665.	3128.	-0.02260	33014.	4.64E+08
-71.737	285.5252	0.00				
5.8500	0.4124	245740.	2994.	-0.02166	33623.	4.64E+08
-76.634	334.4871	0.00				
6.0000	0.3743	250586.	2852.	-0.02070	34205.	4.63E+08
-81.363	391.3083	0.00				
6.1500	0.3379	255188.	2701.	-0.01971	34758.	4.62E+08
-85.902	457.6193	0.00				
6.3000	0.3033	259531.	2543.	-0.01870	35280.	4.58E+08
-90.233	535.5059	0.00				
6.4500	0.2705	263602.	2380.	-0.01766	35769.	4.47E+08
-91.161	606.5056	0.00				
6.6000	0.2397	267398.	1915.	-0.01658	36225.	4.35E+08
-425.008	3191.	0.00				
6.7500	0.2109	269839.	1138.	-0.01546	36518.	4.27E+08
-438.602	3744.	0.00				
6.9000	0.1841	270882.	338.0610	-0.01431	36643.	4.24E+08
-450.059	4401.	0.00				
7.0500	0.1593	270490.	-480.372	-0.01316	36596.	4.25E+08
-459.311	5189.	0.00				
7.2000	0.1367	268632.	-1313.	-0.01203	36373.	4.31E+08

-466.280	6141.	0.00				
7.3500	0.1160	265285.	-2157.	-0.01093	35971.	4.42E+08
-470.863	7305.	0.00				
7.5000	0.09733	260434.	-3006.	-0.00987	35388.	4.55E+08
-472.916	8746.	0.00				
7.6500	0.08048	254071.	-3857.	-0.00886	34624.	4.62E+08
-472.233	10562.	0.00				
7.8000	0.06541	246198.	-4704.	-0.00789	33678.	4.64E+08
-468.578	12894.	0.00				
7.9500	0.05207	236826.	-5541.	-0.00696	32552.	4.64E+08
-461.669	15960.	0.00				
8.1000	0.04037	225976.	-6362.	-0.00606	31249.	4.64E+08
-451.132	20112.	0.00				
8.2500	0.03026	213682.	-7161.	-0.00520	29772.	4.64E+08
-436.414	25960.	0.00				
8.4000	0.02164	199990.	-7929.	-0.00440	28128.	4.64E+08
-416.638	34658.	0.00				
8.5500	0.01441	184963.	-8655.	-0.00366	26323.	4.64E+08
-390.237	48735.	0.00				
8.7000	0.00848	168687.	-9325.	-0.00297	24367.	4.64E+08
-353.896	75122.	0.00				
8.8500	0.00372	151277.	-9911.	-0.00235	22276.	4.64E+08
-297.974	144008.	0.00				
9.0000	2.57E-05	132912.	-10222.	-0.00180	20070.	4.64E+08
-46.708	3266257.	0.00				
9.1500	-0.00274	114407.	-9999.	-0.00132	17847.	4.64E+08
294.3756	193054.	0.00				
9.3000	-0.00472	96865.	-9421.	-9.07E-04	15740.	4.64E+08
347.5087	132634.	0.00				
9.4500	-0.00601	80455.	-8766.	-5.63E-04	13769.	4.64E+08
380.3680	113902.	0.00				
9.6000	-0.00674	65285.	-8061.	-2.81E-04	11947.	4.64E+08
402.9234	107543.	0.00				
9.7500	-0.00702	51425.	-7322.	-5.41E-05	10282.	4.64E+08
418.5705	107312.	0.00				
9.9000	-0.00694	38925.	-6559.	1.21E-04	8780.	4.64E+08
428.8791	111257.	0.00				
10.0500	-0.00658	27817.	-5782.	2.51E-04	7446.	4.64E+08
434.6899	118827.	0.00				
10.2000	-0.00604	18120.	-5005.	3.40E-04	6281.	4.64E+08
428.6504	127819.	0.00				
10.3500	-0.00536	9813.	-4244.	3.94E-04	5283.	4.64E+08
416.1325	139705.	0.00				
10.5000	-0.00462	2856.	-3509.	4.19E-04	4447.	4.64E+08
400.8914	156253.	0.00				
10.6500	-0.00385	-2803.	-2803.	4.19E-04	4441.	4.64E+08
383.1875	178927.	0.00				
10.8000	-0.00311	-7220.	-2132.	3.99E-04	4972.	4.64E+08
363.1936	210135.	0.00				
10.9500	-0.00242	-10461.	-1498.	3.65E-04	5361.	4.64E+08

341.0076	253877.	0.00				
11.1000	-0.00180	-12598.	-906.058	3.20E-04	5618.	4.64E+08
316.6493	317091.	0.00				
11.2500	-0.00127	-13711.	-360.040	2.69E-04	5751.	4.64E+08
290.0375	412631.	0.00				
11.4000	-8.29E-04	-13884.	135.8256	2.16E-04	5772.	4.64E+08
260.9238	566748.	0.00				
11.5500	-4.89E-04	-13213.	576.4921	1.63E-04	5692.	4.64E+08
228.7056	841610.	0.00				
11.7000	-2.42E-04	-11802.	954.9361	1.14E-04	5522.	4.64E+08
191.7877	1427245.	0.00				
11.8500	-7.70E-05	-9771.	1283.	7.26E-05	5278.	4.64E+08
172.5100	4030774.	0.00				
12.0000	1.96E-05	-7181.	1399.	3.97E-05	4967.	4.64E+08
-43.807	4030774.	0.00				
12.1500	6.60E-05	-4734.	1226.	1.66E-05	4673.	4.64E+08
-147.811	4030774.	0.00				
12.3000	7.94E-05	-2766.	962.5070	2.07E-06	4437.	4.64E+08
-145.159	3291250.	0.00				
12.4500	7.34E-05	-1269.	683.8357	-5.76E-06	4257.	4.64E+08
-164.476	4030774.	0.00				
12.6000	5.86E-05	-304.686	417.6113	-8.81E-06	4141.	4.64E+08
-131.329	4030774.	0.00				
12.7500	4.17E-05	234.0744	215.3392	-8.95E-06	4133.	4.64E+08
-93.417	4030774.	0.00				
12.9000	2.64E-05	470.1804	78.0135	-7.59E-06	4161.	4.64E+08
-59.167	4030774.	0.00				
13.0500	1.44E-05	514.6226	-4.279	-5.67E-06	4166.	4.64E+08
-32.269	4030774.	0.00				
13.2000	5.99E-06	454.5516	-45.400	-3.79E-06	4159.	4.64E+08
-13.421	4030774.	0.00				
13.3500	7.51E-07	351.0322	-58.992	-2.23E-06	4147.	4.64E+08
-1.681	4030774.	0.00				
13.5000	-2.04E-06	242.0928	-56.393	-1.08E-06	4134.	4.64E+08
4.5683	4030774.	0.00				
13.6500	-3.14E-06	147.9731	-45.954	-3.24E-07	4122.	4.64E+08
7.0314	4030774.	0.00				
13.8000	-3.21E-06	76.6466	-33.163	1.12E-07	4114.	4.64E+08
7.1803	4030774.	0.00				
13.9500	-2.74E-06	28.5902	-21.184	3.16E-07	4108.	4.64E+08
6.1304	4030774.	0.00				
14.1000	-2.07E-06	0.3985	-11.496	3.72E-07	4105.	4.64E+08
4.6334	4030774.	0.00				
14.2500	-1.40E-06	-12.781	-4.509	3.48E-07	4106.	4.64E+08
3.1302	4030774.	0.00				
14.4000	-8.16E-07	-15.820	-0.04753	2.93E-07	4106.	4.64E+08
1.8268	4030774.	0.00				
14.5500	-3.44E-07	-12.940	2.2904	2.37E-07	4106.	4.64E+08
0.7709	4030774.	0.00				
14.7000	3.69E-08	-7.565	2.9098	1.97E-07	4105.	4.64E+08

-0.08266	4030774.	0.00					
14.8500	3.65E-07	-2.457	2.0993	1.78E-07	4105.	4.64E+08	
-0.818	4030774.	0.00					
15.0000	6.76E-07	0.00	0.00	1.73E-07	4104.	4.64E+08	
-1.515	2015387.	0.00					

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 4:

Pile-head deflection	=	2.81921674 inches
Computed slope at pile head	=	-0.0406008 radians
Maximum bending moment	=	270882. inch-lbs
Maximum shear force	=	-10222. lbs
Depth of maximum bending moment	=	6.90000000 feet below pile head
Depth of maximum shear force	=	9.00000000 feet below pile head
Number of iterations	=	31
Number of zero deflection points	=	4
Pile deflection at ground	=	1.01187917 inches

Analysis Case 5 has failed to converge within 500 iterations.

The following lines are a few of the results from the last five iterations.

Iteration 496,	Y(top) = 9.2062E+00, dYmax = 2.1478E-05 at node 48, Delta dYmax = 1.6671E-08
Iteration 497,	Y(top) = 9.2062E+00, dYmax = 2.1465E-05 at node 48, Delta dYmax = 1.2412E-08
Iteration 498,	Y(top) = 9.2062E+00, dYmax = 2.1445E-05 at node 48, Delta dYmax = 1.9814E-08
Iteration 499,	Y(top) = 9.2062E+00, dYmax = 2.1423E-05 at node 48, Delta dYmax = 2.2023E-08
Iteration 500,	Y(top) = 9.2062E+00, dYmax = 2.1400E-05 at node 48, Delta dYmax = 2.2874E-08

Lateral Loading Analysis for Load Case Number 5

**** Runtime Error No. 10 ****

The analysis failed to converge within the limit of 500 iterations.

Maximum change in nodal deflections = 2.1400E-05 in

Maximum change in nodal deflections from prior iteration = 2.2874E-08 in

Minimum change in nodal deflections in all iterations = 1.0874E-05 in

Specified convergence tolerance on nodal deflections = 1.0000E-05 in

Analysis of Convergence Performance and Recommendations for
Modification of Iterations Limit and Convergence Tolerance

The following recommendations are made on the basis of an analysis of convergence performance for the last analysis.

The estimated number of iterations needed to obtain a solution for the current convergence tolerance value is 998 iterations.

A solution may be possible by increasing the maximum number of iterations to above this value.

The current value for convergence tolerance is less than the recommended upper limit of 0.0001 inches, so a solution is possible if the convergence tolerance is raised to a value greater than 2.1400E-05 in.

It is recommended that the convergence tolerance not be raised above 0.0001 inches.

Analysis Case 6 has failed to converge within 500 iterations.

The following lines are a few of the results from the last five iterations.

Iteration 496, Y(top) = 1.6898E+01, dYmax = 5.7790E-05 at node 48, Delta dYmax = 3.0528E-07

Iteration 497, Y(top) = 1.6898E+01, dYmax = 5.7734E-05 at node 48, Delta dYmax = 5.5999E-08

Iteration 498, Y(top) = 1.6898E+01, dYmax = 5.7585E-05 at node 48, Delta dYmax = 1.4923E-07

Iteration 499, Y(top) = 1.6898E+01, dYmax = 5.7403E-05 at node 48, Delta dYmax =

1.8132E-07
Iteration 500, Y(top) = 1.6898E+01, dYmax = 5.7209E-05 at node 48, Delta dYmax = 1.9440E-07

Lateral Loading Analysis for Load Case Number 6

**** Runtime Error No. 10 ****

The analysis failed to converge within the limit of 500 iterations.

Maximum change in nodal deflections = 5.7209E-05 in

Maximum change in nodal deflections from prior iteration = 1.9440E-07 in

Minimum change in nodal deflections in all iterations = 3.0627E-05 in

Specified convergence tolerance on nodal deflections = 1.0000E-05 in

Analysis of Convergence Performance and Recommendations for
Modification of Iterations Limit and Convergence Tolerance

The following recommendations are made on the basis of an analysis of convergence performance for the last analysis.

The estimated number of iterations needed to obtain a solution for the current convergence tolerance value is 742 iterations.

A solution may be possible by increasing the maximum number of iterations to above this value.
The current value for convergence tolerance is less than the recommended upper limit of 0.0001 inches, so a solution is possible if the convergence tolerance is raised to a value greater than 5.7209E-05 in.

It is recommended that the convergence tolerance not be raised above 0.0001 inches.

Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case	Load Type	Load 1	Load 2	Axial Loading	Pile-head Deflection	Pile-head Rotation	Max in lbs
No.		in-lbs	in-lb	lbs	inches	radians	
1	V, lb	1000.0000	M, in-lb	0.00	-11000.	0.4613	-0.00768
-3061.		57282.					
2	V, lb	2000.	M, in-lb	0.00	-11000.	1.0902	-0.01711
-5501.		122517.					
3	V, lb	3000.	M, in-lb	0.00	-11000.	1.8636	-0.02796
-7883.		194276.					
4	V, lb	4000.	M, in-lb	0.00	-11000.	2.8192	-0.04060
-10222.		270882.					

Maximum pile-head deflection = 2.8192167446 inches

Maximum pile-head rotation = -0.0406008324 radians = -2.326256 deg.

The analysis ended with one or more load cases with no solution.

ASCE Hazards Report

Address:

No Address at This Location

Standard:

ASCE/SEI 7-10

Risk Category: II

Soil Class:

D - Stiff Soil

Latitude:

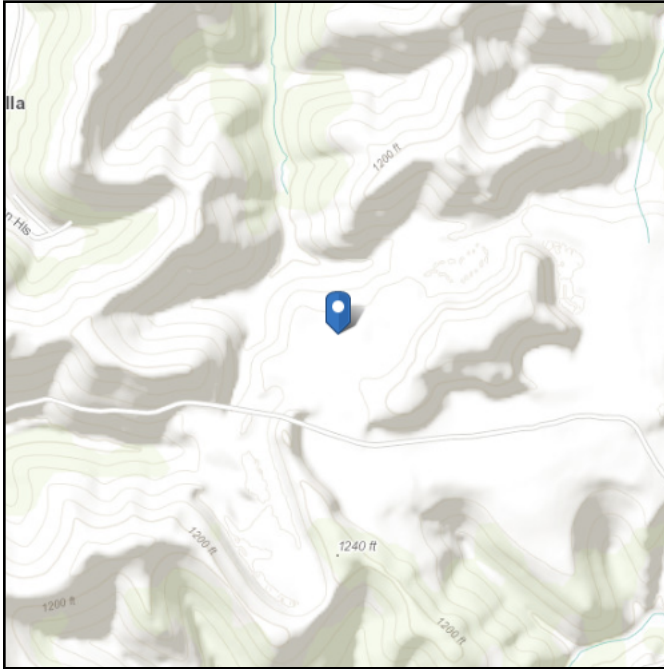
37.790253

Longitude:

-82.559285

Elevation:

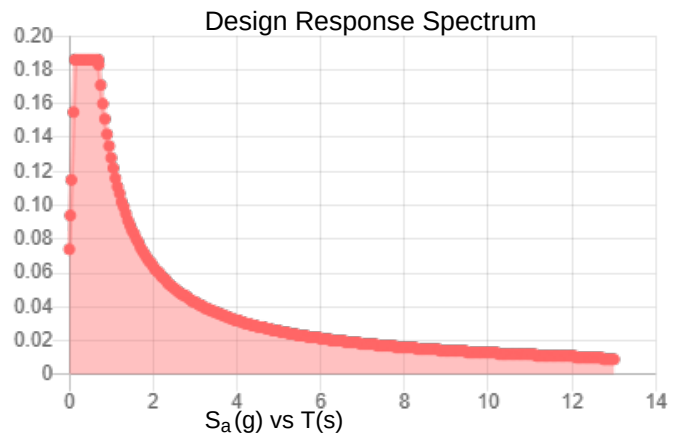
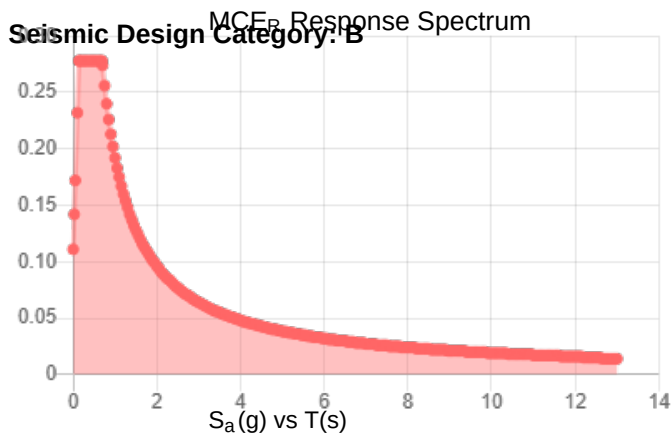
1071.1189672843361 m
(NAVD 88)



Site Soil Class: D - Stiff Soil

Results:

S_S :	0.174	S_{D1} :	0.128
S_1 :	0.08	T_L :	12
F_a :	1.6	PGA :	0.082
F_v :	2.4	PGA_M :	0.132
S_{MS} :	0.278	F_{PGA} :	1.6
S_{M1} :	0.192	I_e :	1
S_{DS} :	0.186		



Data Accessed: Thu Apr 03 2025

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

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ASCE Hazards Report

Address:

No Address at This Location

Standard:

ASCE/SEI 7-16

Risk Category: II

Soil Class:

D - Stiff Soil

Latitude:

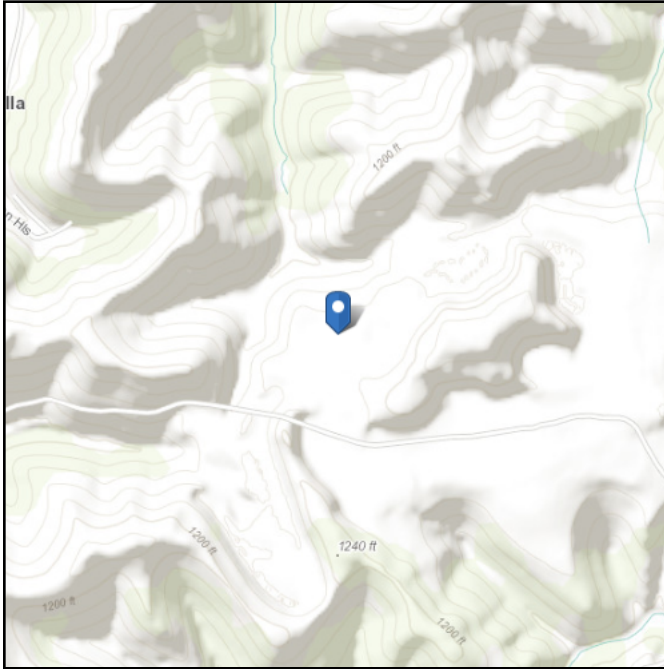
37.790253

Longitude:

-82.559285

Elevation:

1071.1189672843361 m
(NAVD 88)

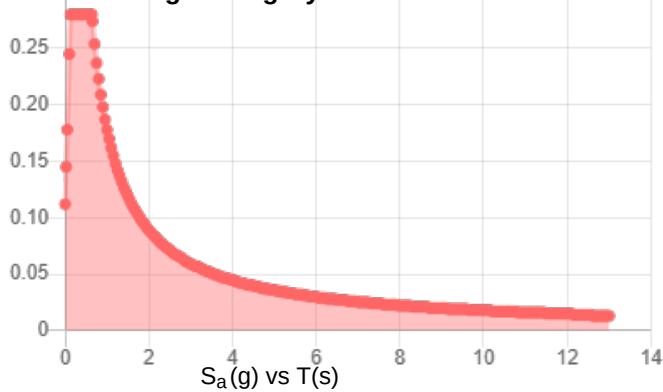


Site Soil Class: D - Stiff Soil

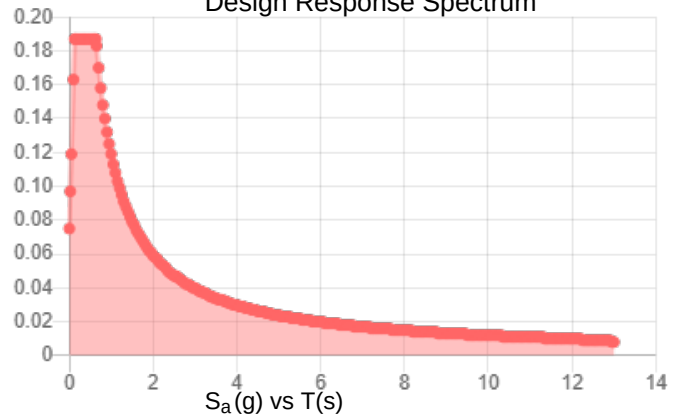
Results:

S_S :	0.175	S_{D1} :	0.119
S_1 :	0.074	T_L :	12
F_a :	1.6	PGA :	0.091
F_v :	2.4	PGA _M :	0.146
S_{MS} :	0.28	F_{PGA} :	1.6
S_{M1} :	0.178	I_e :	1
S_{DS} :	0.187	C_v :	0.7

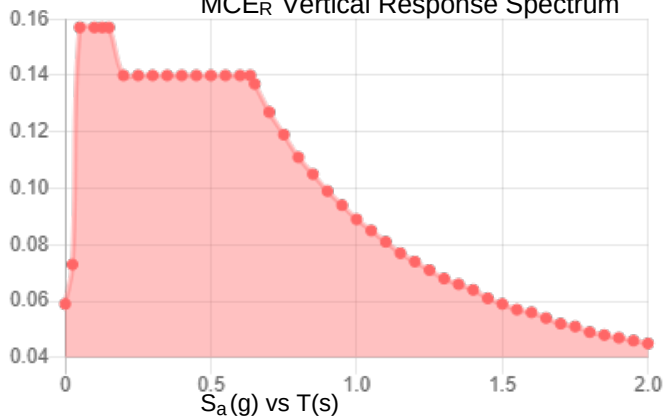
Seismic Design Category: B MCE_R Response Spectrum



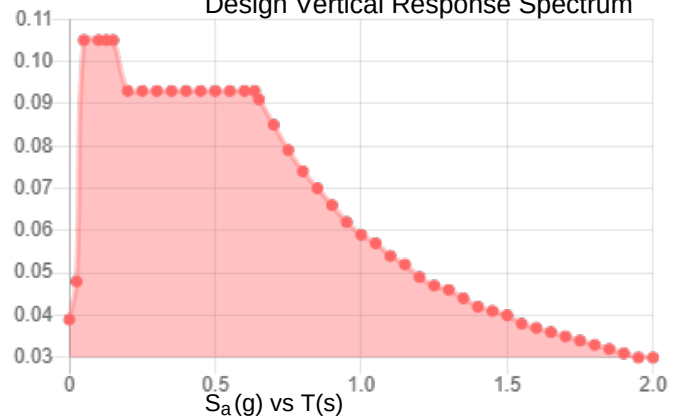
Design Response Spectrum



MCE_R Vertical Response Spectrum



Design Vertical Response Spectrum



Data Accessed: Thu Apr 03 2025

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

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