CONSULTING GROUP

Report of Geotechnical Investigation

Proposed Frontier Solar Power Plant
East Side of State Highway 429 (KY-429)
Marion and Washington Counties, Kentucky

Latitude 37.61876° N
Longitude 85.27050° W

DRAFT

Prepared for:

BrightNight Power
13123 East Emerald Coast Parkway, Suite B #158
Inlet Beach, Florida 32461

G2 Project No. 223429
January 18, 2024

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CONSULTING GROUP

January 18, 2024

Mr. Praneeth Chiguluri, P.E.
BrightNight Power
13123 East Emerald Coast Parkway, Suite B #158
Inlet Beach, Florida 32461

Re: **DRAFT** Report of Geotechnical Investigation
Proposed Frontier Solar Power Plant
East Side of State Highway 429 (KY-429)
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Dear Mr. Chiguluri:

We have completed the Geotechnical Investigation for the proposed Frontier Solar Power Plant to be constructed in Marion and Washington Counties, Kentucky. This report presents the results of our observations, on-site testing and analyses, and our recommendations for foundation design and construction considerations as they relate to the geotechnical conditions beneath the site.

We appreciate the opportunity to be of service to BrightNight Power and look forward to discussing the recommendations presented. In the meantime, if you have any questions regarding the report or any other matter pertaining to the project, please call us.

Sincerely,

G2 Consulting Group, LLC

Jeffrey D. Crow
Project Engineer

David L. Wanlass
Project Manager

Bruce J. Wilberding, P.E.
Project Consultant

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ATTACHMENTS

1.0 PROJECT DESCRIPTION

The project site is shown in relation to surrounding roads on the Geotechnical Test Location Plans, Plate Nos. 1 and 2. The overall project site is approximately 886 acres in area, of which approximately 601 acres is designated for the construction of photovoltaic (PV) solar panel arrays. The proposed substation area and gen-tie alignment will be constructed within the southern portion of the site.

The PV panel frames will likely be supported on either steel piles driven into pre-drilled holes that extend into the existing bedrock or steel anchor screws drilled into the existing bedrock. The power transmission monopoles will be supported on drilled cast-in-place concrete pier foundations. The power conversion enclosures, transformers and other auxiliary systems and structures have not yet been identified or laid out. Most of the other structures are typically supported on shallow spread footing foundations or mat foundations. The development is also anticipated to include underground utilities, site surface drainage features and gravel-surfaced roadways.

Final design grades were not available at the time of this report; however, proposed site grades are expected to be similar to existing grades ranging from Elevation 716 feet to 866 feet. Based on the existing topography, we anticipate earthwork will include minor to moderate grade cuts and fill placement to correct grade disparities and to prepare structure pads, pavement subgrades and site drainage excavations. At the time of this report, no other specific project or structural information regarding the proposed development was available for review.

2.0 SCOPE OF SERVICES

The field operations, laboratory testing, and engineering report preparation were performed under the direction and supervision of a licensed professional engineer. Our services were performed according to generally accepted standards and procedures in the practice of geotechnical engineering.

G2 previously performed a preliminary geotechnical investigation and presented the results in a report dated December 19, 2022. The prior services performed within or near the currently proposed project boundary include twenty-seven (27) test pits (T-01 through T-25, T-28 and T-29), two (2) in-situ electrical resistivity testing test locations (T-08 and T-25) and laboratory electrical resistivity, soil chemical, Standard Proctor compaction and California Bearing Ratio (CBR) testing of bulk samples obtained from one (1) location (T-25). The results from the preliminary geotechnical investigation are incorporated into this geotechnical investigation report.

Our scope of services for the current geotechnical investigation was as follows:

1. We drilled a total of thirteen (13) soil borings. Borings B-01 through B-03 were performed along the proposed gen-tie alignment. Borings B-05 and B-06 were performed within the proposed substation area. Borings B-04 and B-07 through B-13 were performed within the proposed solar array areas. Each boring was extended until drilling refusal was encountered on the limestone bedrock or boulders. Two (2) sequential 5-foot core run samples of the underlying limestone bedrock were obtained within borings B-01 through B-03, B-05 and B-06. The final depths of borings B-01 through B-13 ranged between 3-1/4 and 18 feet below the ground surface.

2. We drilled a total of eighteen (18) relief holes at select pile load test locations. Each hole extended to a depth of 9 feet below the ground surface using air-rotary hammer drilling methods. Eight (8) holes (PD-01 and PD-12 through PD-18) were drilled to approximately 4 inches in diameter. The remaining ten (10) holes (PD-02 through PD-11) were drilled to approximately 6 inches in diameter. The relief holes were backfilled prior to pile installation in a loose manner using the drill cuttings and topped with a compacted soil mixture.

3. We installed a total of twenty-six (26) non-galvanized steel W6x9 test piles to embedment depths ranging between 5 and 7 feet .One (1) test pile was installed at pre-drilled locations PD-01 through PD-18. Two (2) test piles were installed into undisturbed native soils at four (4) test locations PLT-01 through PLT-04. Each installed pile was load tested in tension and laterally.

4. We excavated a total of twenty-three (23) test pits. Test pits PD-01 through PD-18 and PLT-01 through PLT-04 were performed at the pile load test locations and extended to depths ranging between 3-1/2 and 10 feet. Test pit T-SUB was performed within the proposed substation area and extended to an excavation refusal depth of 3 feet below the ground surface.

5. We performed in-situ thermal resistivity testing at a total of nine (9) test pit locations. Additionally, we obtained bulk soil samples at each of these locations for laboratory thermal resistivity testing. The laboratory testing was performed on our behalf by Geotherm USA, TX.

6. We performed in-situ electrical resistivity testing at a total of twenty (20) locations. Additionally, we obtained bulk soil samples at each of these locations for laboratory soil electrical resistivity and chemical testing. The laboratory testing was performed on our behalf by Essential Corrosion Protection, MD.

7. We performed laboratory geotechnical testing, including organic matter content, natural moisture content, grain-size distribution (sieve analyses), Atterberg limits, expansion index, unconfined compressive strength determination, Standard Proctor compaction, California Bearing Ratio (CBR), and visual engineering classification on representative samples obtained from the soil borings and test pits.

8. We prepared this geotechnical engineering report. This report includes recommendations based on the encountered and tested geotechnical conditions at the site.

2.1 Field Test Locations

BrightNight Power (BrightNight) and G2 Consulting Group, LLC (G2) selected the number, depths and proposed locations of the soil borings, relief holes, test piles and test pits based on the features of the proposed development and site access conflicts. At the time of field operations, soil borings B-04, B-07, B-09, B-11 and B-12 and pile load test locations PD-03, PD-04, PD-08, PD-09, PD-12 and PD-13 were offset to their corresponding proposed alternative locations due to site access conflicts. G2 field personnel identified the final test locations by using a hand-held mobile GPS device. The approximate GPS coordinates of each exploration location are identified below:

Soil Borings	Latitude, Longitude (deg)	
B-01	37.60489 N	85.25190 W
B-02	37.61027 N	85.25491 W
B-03	37.60968 N	85.26271 W
B-04	37.62544 N	85.26794 W
B-05	37.61767 N	85.26914 W
B-06	37.61876 N	85.27050 W
B-07	37.63201 N	85.26979 W
B-08	37.64206 N	85.26717 W
B-09	37.64395 N	85.27915 W
B-10	37.65394 N	85.26074 W
B-11	37.65481 N	85.25555 W
B-12	37.65193 N	85.26782 W
B-13	37.65385 N	85.27238 W

Test Pits at the PLT Locations	Latitude, Longitude (deg)	
PD-01 (1 pile)	37.62693 N	85.27826 W
PD-02 (1 pile)	37.65219 N	85.25635 W
PD-03 (1 pile)	37.65641 N	85.26495 W
PD-04 (1 pile)	37.63909 N	85.27471 W
PD-05 (1 pile)	37.65601 N	85.25869 W
PD-06 (1 pile)	37.65394 N	85.26513 W
PD-07 (1 pile)	37.65041 N	85.27135 W
PD-08 (1 pile)	37.65312 N	85.27526 W
PD-09 (1 pile)	37.64657 N	85.27458 W
PD-10 (1 pile)	37.64298 N	85.27405 W
PD-11 (1 pile)	37.64040 N	85.27739 W
PD-12 (1 pile)	37.63507 N	85.26615 W
PD-13 (1 pile)	37.63444 N	85.26320 W
PD-14 (1 pile)	37.63102 N	85.27242 W
PD-15 (1 pile)	37.62855 N	85.26711 W
PD-16 (1 pile)	37.62629 N	85.27311 W
PD-17 (1 pile)	37.62369 N	85.27693 W
PD-18 (1 pile)	37.61847 N	85.27125 W
PLT-01 (2 piles)	37.65533 N	85.27485 W
PLT-02 (2 piles)	37.64782 N	85.27938 W
PLT-03 (2 piles)	37.63917 N	85.27029 W
PLT-04 (2 piles)	37.62208 N	85.26932 W

Test Pits (No PLT)	Latitude, Longitude (deg)	
T-01	37.65597 N	85.27128 W
T-02	37.65598 N	85.26174 W
T-03	37.65429 N	85.25509 W
T-04	37.65305 N	85.27546 W
T-05	37.65156 N	85.26811 W
T-06	37.65167 N	85.25968 W
T-07	37.64745 N	85.27901 W
T-08	37.64670 N	85.27325 W
T-09	37.64347 N	85.27646 W
T-10	37.64338 N	85.26938 W
T-11	37.64013 N	85.27959 W
T-12	37.63963 N	85.27313 W
T-13	37.63989 N	85.26799 W
T-14	37.62536 N	85.28632 W
T-15	37.62228 N	85.28931 W
T-16	37.62181 N	85.28484 W
T-17	37.63118 N	85.26917 W
T-18	37.62850 N	85.27282 W
T-19	37.62705 N	85.27980 W
T-20	37.62516 N	85.27481 W
T-21	37.62579 N	85.26833 W
T-22	37.62177 N	85.27988 W
T-23	37.62212 N	85.27391 W
T-24	37.62203 N	85.26842 W
T-25	37.61982 N	85.27121 W
T-28	37.64163 N	85.27238 W
T-29	37.62452 N	85.27171 W
T-SUB	37.61831 N	85.26993 W

2.2 Soil Borings

Borings B-01 through B-03 were performed along the proposed gen-tie alignment. Borings B-05 and B-06 were performed within the proposed substation area. Borings B-04 and B-07 through B-13 were performed within the proposed solar array areas. The soil borings were drilled by Strata Group, LLC using a truck-mounted rotary drilling rig under the guidance and direction of G2 personnel.

Continuous-flight, 4-inch diameter, solid-stem augers were used to advance each boring until drilling refusal was encountered. Beginning at the drilling refusal depth within borings B-01, B-02, B-03, B-05 and B-06, a 2-inch diameter, diamond-tipped core-barrel was used to advance into the underlying limestone bedrock to their final explored depths. Photographic documentation of each rock core run is presented in Appendix B.

The soil samples were obtained at intervals of 2-1/2 feet. The samples were obtained by the Standard Penetration Test method ASTM D1586, which involves driving a 2-inch diameter split-spoon sampler into the soil with a 140-pound weight falling 30 inches. The sampler is generally driven three successive 6-inch increments, with the number of blows for each increment recorded. The number of blows required to advance the sampler the last 12 inches is termed the Standard Penetration Resistance (N). The blow counts for each 6-inch increment and the resulting N-values are presented on the individual soil boring logs.

The soil samples were placed in sealed containers in the field and brought to our laboratory for testing and classification. During the field operations, G2 maintained a log of the encountered subsurface conditions, including changes in stratigraphy and observed groundwater levels. The boreholes were backfilled with auger cuttings upon completion. The final soil boring logs are based on the field boring logs and laboratory soil classification and test results. The soil boring logs are presented in Appendix A.

2.3 Pile Load Testing

2.3.1 Test Pile Installation

A total of twenty-two (22) test pile locations were evaluated. At eighteen (18) of these locations, a single relief hole was predrilled by the soil boring crew to a depth of 9 feet using air-rotary hammer drilling methods prior to test pile installation. After drilling, the relief holes were backfilled in a loose manner with the drill cuttings minus gravel, topped with a soil mixture, and manually tamped at the ground surface to a firm condition. At the remaining four (4) test pile locations, no predrilling was performed.

G2 obtained twenty-six (26) non-galvanized steel W6x9 piles. At test locations PD-01 and PD-12 through PD-18, one (1) test pile was installed into a 4-inch diameter relief hole. At test locations PD-02 through PD-11, one (1) test pile was installed into a 6-inch diameter relief hole. At test locations PLT-01 through PLT-04, two (2) test piles were installed into the undisturbed native ground.

A JCB backhoe fitted with an FRD Furukawa F6 hydraulic impact hammer (energy class of 1,000 foot-pounds) was used to drive each test pile to the final embedment depths. A proprietary drive head was used with the impact hammer to maintain pile head seating and alignment. The plumbness was monitored and adjusted as needed.

The test pile installed at PLT location PD-03 was pushed to the final test embedment depth using the weight of the hammer. After the maximum push depths were observed for the remaining test piles, the operator activated the maximum impact rate of 1,500 bpm to reach the final embedment depth.

During installation, the relative drivability per location was recorded as a function of the continuous drive time versus depth of penetration. The test piles at locations PD-12, PD-15 and PD-16 encountered driving refusal in limestone bedrock pre-drilled to approximately 4 inches in diameter. Actual continuous drive times for the remaining test piles ranged from 7 to 30 seconds.

The observed push depths and driving rates after activating the impact hammer are presented below.

Test Location	Observed Driving Rate per Depth (seconds per foot of penetration)													Test Pit Excavation Refusal Depth (feet)
	½'	1'	1-½'	2'	2-½'	3'	3-½'	4'	4-½'	5'	5-½'	6'	6-½'	7'	
PD-01 (4 in. hole)	Pushed to 4'								3 to 4						5-1/2
PD-02 (6 in. hole)	Pushed to 2'				3				5		10				3-1/2
PD-03 (6 in. hole)	Pushed to 7'														7-1/2
PD-04 (6 in. hole)	Pushed to 4'								3 to 4				8 to 10		4
PD-05 (6 in. hole)	Pushed to 2'				4				6						9
PD-06 (6 in. hole)	Pushed to 5'										3 to 4				> 9
PD-07 (6 in. hole)	Pushed to 5'										3 to 4				8
PD-08 (6 in. hole)	Pushed to 2'				3 to 4				6		12				6
PD-09 (6 in. hole)	Pushed to 3'							4			7		12		4
PD-10 (6 in. hole)	Pushed to 4'								4						5
PD-11 (6 in. hole)	Pushed to 4'								6		10				4-1/2
PD-12 (4 in. hole)	Push to 1		2				4 to 6				20				3-1/2
PD-13 (4 in. hole)	Push to 1		3 to 5				6								3-1/2
PD-14 (4 in. hole)	Pushed to 2'				3 to 4				8 to 10						3-1/2
PD-15 (4 in. hole)	Pushed to 3'						2 to 3			10 to 12		30			5-1/2
PD-16 (4 in. hole)	Pushed to 4-1/2'									30					5
PD-17 (4 in. hole)	Pushed to 2'			4			6			12					4
PD-18 (4 in. hole)	Pushed to 3-1/2'							4 to 5			12				5-1/2
PLT-01	Pushed to 2'				3 to 4				6 to 10						8
PLT-02	Pushed to 2'				3 to 5					10 to 12					8
PLT-03	Pushed to 3-1/2'							4 to 6					12		9
PLT-04	Pushed to 2'				3 to 4				3 to 4						> 10

Photographs of the web and flanges of each pile after installation are presented in Appendix B. The damage to the pile tops is attributed to the adjustments made to the alignment of the driving helmet during driving operations. The pile at test location PD-11 was not extractable and was, therefore, cut near the corresponding excavation refusal depth between 4 and 4-1/2 feet below the ground surface. The damage to the bottom flange of the piles at test locations PD-02, PD-05, PD-08, PD-10 and PD-12 through PD-17, PLT-02 and PLT-03 can be attributed to damage occurring during pile driving within the hard clay soils or limestone cobbles, boulders and bedrock.

2.3.2 Tension Pile Load Test Procedure

Axial uplift (tension) pile load tests were performed on each pile in general conformance with the procedures described in the ASTM D3689 method of testing for Deep Foundations under Static Axial Tensile Load. The test piles were load tested approximately 1 to 3 hours after installation.

A JCB backhoe with an operating weight of approximately 18,000 pounds was used as an axial reaction against the test pile load. The hydraulic impact hammer was placed on the ground to prevent movement during high test loading conditions. An Enerpac hydraulic load jack fitted with a Yellow Lifting vertical plate lifting clamp, each with a 20-ton rated capacity, was used to apply the tensile load to the top of the test pile.

A Crosby Bluelink Dynamometer wireless pressure-to-load transducer, with a 6-1/2 ton rated capacity and an accuracy of 0.2 percent, was fitted between the test pile and load jack. The resulting jack loads during the load test were transmitted wirelessly to a hand-held computer.

Two (2) digital or manual dial gauges, with a resolution of 0.001 inches, were mounted to opposing sides of the pile web using magnetic bases. Two (2) 8-foot-long L-channel reference beams were supported above grade and adjacent to opposing sides of the test pile. The dial gauges were extended to a vertical position over and in contact with the reference beams.

Tension Load Test Setup

The proposed load sequence was recommended by G2. Each pile was incrementally loaded at 500 pound increments to 4,000 pounds and then at 1,000 pound increments to 12,000 pounds, or until 0.25 inches of deflection was observed. If 0.25 inch of deflection was observed, the piles were then unloaded and loaded until 1 inch deflection was observed.

The complete results are presented in Appendix C. A summary of the as-tested tension loads at 0.25-inch of deflection is presented below.

Relief Hole Dia.	Pile Length below Excavation Refusal Depth (feet)	As-Tested Tension Load at 0.25-inch Deflection (lbs)					
		PLT Location	Embedment Depth				
			5 feet	5-½ feet	6 feet	6-½ feet	7 feet
No Relief Hole	No observable limestone layer	PLT-01	5,260	-	-	-	9,490
		PLT-02	4,630	-	-	-	6,420
		PLT-03	6,090	-	-	-	7,800
		PLT-04	8,240	-	-	-	12,000 (0.05 in.)
4 inches	No observable limestone layer	PD-01	-	3,880	-	-	-
		PD-16	2,750	-	-	-	-
		PD-18	-	4,420	-	-	-
	1 foot	PD-15	-	-	12,000 (0.05 in.)	-	-
		PD-17	12,000 (0.07 in.)	-	-	-	-
	1-½ feet	PD-13	8,320	-	-	-	-
	2-½ feet	PD-12	-	-	7,700	-	-
		PD-14	-	-	12,000 (0.13 in.)	-	-
6 inches	No observable limestone layer	PD-03	-	-	-	-	1,440
		PD-04	-	-	-	-	10,590
		PD-05	-	-	1,290	-	
		PD-06	-	-	-	-	2,990
		PD-07	-	-	2,160	-	-
		PD-10	1,440	-	-	-	-
	½ foot	PD-08	-	-	-	7,430	-
	1-½ feet	PD-11	-	-	6,240	-	-
	2-½ feet	PD-02	-	-	4,210	-	-
	3 feet	PD-09	-	-	-	-	12,000 (0.02 in.)

2.3.3 Lateral Pile Load Test Procedure

Lateral pile load tests were performed in general conformance with the procedures described in the ASTM D3966 method of testing for Deep Foundations under Lateral Load. The test piles were load tested approximately 1 to 3 hours after installation.

A JCB backhoe with an operating weight of approximately 18,000 pounds was used as a lateral reaction against the test pile load. An Enerpac hydraulic load jack with a rated capacity of 20 tons was used to apply the lateral load to the side of the test pile.

A Crosby Bluelink Dynamometer wireless pressure to load transducer, with a 6-1/2 ton rated capacity and an accuracy of 0.2 percent, was fitted between the test pile and load jack. The beam clamp connecting the load transducer to the test pile was centered approximately 30 inches above grade. The resulting jack loads during testing were transmitted wirelessly to a hand-held computer.

Two (2) digital or manual dial gauges, with a resolution of 0.001 inches, were mounted to opposing sides of the pile web using magnetic bases to the opposite side of the pile approximately 6 inches above the ground surface. An 8-foot long L-channel reference beam was supported above grade and perpendicular to the load direction. The dial gauges were extended to a horizontal position parallel to the load jack and in contact with the reference beam.

Lateral Load Test Setup

The proposed load sequence was recommended by G2. Each pile was incrementally loaded at a height of 30 inches above grade in 500-pound increments and cyclically loaded in 1,500-pound increments until 0.50 inches of deflection was observed from a height of 6 inches above grade. The piles were then unloaded and reloaded until 1 inch of deflection was observed. The complete results are presented in Appendix C. The corresponding observed lateral loads at 0.50-inch of deflection is presented below.

Relief Hole Dia.	Pile Length below Excavation Refusal Depth (feet)	As-Tested Lateral Load at 0.50-inch Deflection (lbs)					
		PLT Location	Embedment Depth				
			5 feet	5-½ feet	6 feet	6-½ feet	7 feet
No Relief Hole	No observable limestone layer	PLT-01	2,840	-	-	-	3,190
		PLT-02	2,990	-	-	-	3,610
		PLT-03	2,990	-	-	-	3,260
		PLT-04	3,390	-	-	-	5,110

Relief Hole Dia.	Pile Length below Excavation Refusal Depth (feet)	As-Tested Lateral Load at 0.50-inch Deflection (lbs)					
		PLT Location	Embedment Depth				
			5 feet	5-½ feet	6 feet	6-½ feet	7 feet
4 inches	No observable limestone layer	PD-01	-	2,460	-	-	-
		PD-16	2,360	-	-	-	-
		PD-18	-	3,410	-	-	-
	1 foot	PD-15	-	-	2,810	-	-
		PD-17	3,480	-	-	-	-
	1-½ feet	PD-13	2,950	-	-	-	-
	2-½ feet	PD-12	-	-	2,470	-	-
		PD-14	-	-	3,080	-	-
6 inches	No observable limestone layer	PD-03	-	-	-	-	1,450
		PD-04	-	-	-	-	2,500
		PD-05	-	-	2,990	-	
		PD-06	-	-	-	-	2,290
		PD-07	-	-	2,590	-	-
		PD-10	1,080	-	-	-	-
	½ foot	PD-08	-	-	-	2,980	-
	1-½ feet	PD-11	-	-	2,440	-	-
	2-½ feet	PD-02	-	-	2,580	-	-
	3 feet	PD-09	-	-	-	-	2,970

(1) Lateral load applied at 30 inches above grade. Lateral deflection measured from 6 inches above grade.

2.4 Test Pits

Test pits PD-01 through PD-18 and PLT-01 through PLT-04 were excavated at the pile load test locations. Test pits T-01 through T-25, T-28, T-29 and T-SUB were excavated within the proposed array and substation areas. The test pits were performed using a JCB backhoe equipped with a 24-inch wide bucket. Each test pit was extended to a maximum depth of 10 feet unless excavation refusal was encountered at shallower depths due to the underlying hard clay or limestone boulders or bedrock.

Bulk samples of the excavated soils from each test pit were obtained and placed in sealed containers in the field for laboratory testing and further classification. During excavation operations, a log of the encountered subsurface conditions was maintained for each location, including changes in stratigraphy and observed groundwater levels. The test pits were backfilled with excavated soil. No controlled compaction of the backfill was performed during backfilling operations. The final test pit logs are based on the field logs and laboratory soil classification and test results. The test pit logs are presented in Appendix A.

2.5 Soil Thermal Resistivity Testing

For the preliminary geotechnical investigation, G2 performed laboratory thermal resistivity on one (1) bulk sample obtained from test pit T-25 between the depths of 2 and 4 feet. For specimen preparation, one (1) set of five (5) remolded specimens was prepared to 85 percent of the density value and near the as-received moisture content. The thermal resistivity was determined on one (1) remolded specimen near the as-received moisture content. The remaining four (4) remolded specimens were placed in an oven to achieve incrementally drier moisture contents prior to thermal resistivity testing. The testing was performed using a TEMPOS Thermal Properties Analyzer in general conformance with the procedures described in the ASTM D5334 method of testing. The one (1) “85 percent compaction” dryout curve performed by G2 is presented in Appendix A.

In-situ thermal resistivity (Rho) testing was performed within test pits PD-01, PD-03, PD-06, PD-11, PD-15, PLT-01, PLT-02, PLT-03 and T-SUB on undisturbed soils exposed on the test pit walls at depths between 2 and 4 feet. The testing was performed using a TEMPOS Thermal Properties Analyzer in general conformance with the procedures described in the ASTM D5334 method of testing. The complete results are presented in Appendix A.

Laboratory thermal resistivity testing of remolded soil specimens was performed on bulk soil samples obtained at the same depths from the aforenoted nine (9) test pit locations. For each bulk sample, G2 performed laboratory testing to determine the maximum density value when prepared to the as-received moisture content and compacted using ASTM D698 Standard Proctor effort. The bulk soil samples were placed in sealed containers and transported to Geotherm USA (Cypress, TX) for laboratory remolded thermal resistivity testing of soil specimens prepared to 90 percent of the maximum density values. The nine (9) "90 percent compaction" dryout curves performed by Geotherm are presented in Appendix E.

The following table presents a summary of the in-situ and laboratory thermal resistivity test results.

	In-Situ Thermal Resistivity (°C-cm/W) (9 test locations)	Laboratory Remolded Thermal Resistivity near 0% Moisture Content (°C-cm/W)	
		85 percent compaction (G2 performed 1 dryout curve)	90 percent compaction (Geotherm performed 9 dryout curves)
Minimum	51.6	300	-
Maximum	121.0	300	-
Average	75.6	300	-

2.6 Soil Chemical and Electrical Resistivity Testing

In-situ soil electrical resistivity testing was performed in the vicinity of test pits PD-01 through PD-03, PD-05 through PD-11, PD-13, PD-14, PD-15, PD-17, PD-18, PLT-01 through PLT-04, T-SUB, T-08 and T-25. At each test location, two (2) perpendicular test runs were performed along north to south and east to west directions using a Nilsson Model 400 resistivity meter in general conformance with the procedures described in the ASTM G57 method of testing. The testing was performed using electrode rod spacings of 0.5, 1, 1.5, 2, 3, 5, 7, 10, 15, 20, 30 and 45 feet at seventeen (17) locations, electrode rod spacings of 0.5, 1, 1.5, 2, 3, 5, 7, 10, 15, 20, 30, 45, 70, 100, 150 and 200 feet at three (3) locations, and electrode rod spacings of 2, 5, 10, 25 and 50 feet at two (2) locations. The following table presents a summary of the in-situ electrical resistivity test results.

	In-Situ Soil Electrical Resistivity Measured at 'a' Spacings of up to 200 feet (1,000 x ohm-cm)																	
	0.5'	1.0'	1.5'	2.0'	3.0'	5.0'	7.0'	10'	15'	20'	25'	30'	45'	50'	70'	100'	150'	200'
Minimum	2.6	2.2	2.3	2.7	3.3	4.6	5.6	6.3	8.3	7.6	12.0	8.0	8.6	15.3	26.8	34.4	45.9	42.1
Maximum	7.6	10.1	6.8	13.0	6.8	17.2	11.6	18.6	21.5	26.0	19.6	33.8	42.2	22.0	44.2	53.6	68.9	80.4
Average	4.7	4.8	4.2	4.5	4.8	7.3	8.1	10.4	13.4	15.3	14.3	19.6	23.6	18.4	34.1	41.7	55.0	59.3

Laboratory soil electrical resistivity and chemical testing was performed on bulk soil samples obtained from test pit locations at depths between 2 to 3 feet below the ground surface. The testing was performed on our behalf by Essential Corrosion Protection (Columbia, MD). The complete results are presented in Appendix E. The following table presents a summary of the thermal resistivity test results.

	Electrical Resistivity (1,000 x ohm-cm)		Soil Chemical Test Summary			
	As-Received Moisture Content	Saturated Moisture Content	Redox Potential (mV)	pH	Soluble Chloride (ppm)	Soluble Sulfate (ppm)
Minimum	2.5	1.6	296	5.1	20	< 5
Maximum	34.0	14.0	622	7.4	45	10
Average	9.7	5.3	460	6.1	39	5

2.7 Geotechnical Laboratory Testing

Representative soil samples were placed in sealed containers in the field for laboratory testing and further classification in general conformance with the Unified Soil Classification System (USCS). Laboratory testing included determinations based on the standards presented below.

Laboratory Test Procedure	ASTM	Test Quantity	Sample Depth	Figure No.
Organic Matter Content	D2974	27	Upper 9 inches	01 – 63
Natural Moisture Content	D2216	83	2 to 18 feet	01 – 63
Sieve Analysis	D6913	10	2 to 7-½ feet	64 – 65
Atterberg Limits	D4318	17	2 to 7-½ feet	66
Expansion Index	D4829	2	5 to 6 feet	67
Unconfined Compressive Strength	D2166	14	2 to 7-½ feet	68 – 70
Standard Proctor	D698	3	1 to 4 feet	71 – 73
California Bearing Ratio (CBR)	D1883	3	1 to 4 feet	74 – 76

3.0 SUBSURFACE CONDITIONS

3.1 Site Geology and Karst Topography

According to the United States Geological Survey (USGS), the project site is within two geological regions having karst topography. The first geologic region is known as the Drakes formation consisting of dolostone, shale and limestone. The second geologic region is known as the Ashlock formation, Grant Lake and Calloway Creek Limestones, and Fairview formation consisting of limestone, shale and siltstone. The project site is identified on Plate No. 4, Geotechnical Test Location Plan USGS Topographic Imagery, in relation to the 7.5-minute quadrangle maps for Saint Catharine and Lebanon West, Kentucky.

According to the United States Department of Agriculture (USDA) soil survey, the surficial soil and rock consists predominately of clayey residuum weathered from limestone, shale and siltstone. The surficial soils are identified to contain as much as 21 percent calcium carbonate and have very low to high permeability rates between 0.02 and 1.98 inches per hour. The limestone, shale and siltstone bedrock are considered impermeable. Surface slopes generally range between 0 and 20 percent.

When traversing to each test pit location, G2 field engineers performed cursory visual identification of observable topographic depressions indicative of possible karst topography, sinkholes, drainage channels or cattle-induced erosion features. A total of eleven (11) depressions were encountered on the project site adjacent to the access pathways to each test location. Photographic documentation of each observed depression is presented in Appendix B. The approximate locations of the depressions are identified on Plate No. 2, Geotechnical Test Location Plan, in relation to the surrounding area.

We understand that since the time of our preliminary geotechnical investigation, a karst survey was performed by others and they prepared a report dated August 2, 2023. In combined consideration of the site geology, regional karst topography, the observed depressions and prior karst report, it is very likely that sinkholes or developing sinkholes are present within the project site. We recommend the contractor prepare a karst management plan for review by the owner prior to commencement of earthwork operations.

3.2 Site Seismicity

Based on our familiarity with the subsurface conditions in the area and our engineering judgement, structures may be designed for seismic loading conditions on the basis of the following seismic coefficients and classifications. If additional information is obtained from deeper soil borings or other geotechnical investigations, the assumed Site Class C shall be confirmed.

ASCE 7-16 Seismic Coefficients for All Risk Categories [1]		
Maximum Considered Earthquake Spectral Response Acceleration	at short periods (S_S)	0.170 g
	at one second period (S_1)	0.094 g
Maximum Considered Earthquake Spectral Response Acceleration (adjusted for site class C)	at short periods (S_{MS})	0.221 g
	at one second period (S_{M1})	0.141 g
Five Percent Damped Design Spectral Response Acceleration	at short periods (S_{DS})	0.147 g
	at one second period (S_{D1})	0.094 g

(1) Based on the Applied Technology Council (ATC) hazards tool (https://hazards.atcouncil.org/)

The clay soils and underlying limestone encountered beneath the site are generally not susceptible to liquefaction or seismic-induced settlement. Groundwater seepage was encountered within test pit PD-18 at a depth of 5-1/4 feet below the ground surface. No measurable groundwater was encountered during or upon completion within the remaining soil borings and test pits.

Given the observed general lack of groundwater to the depths explored and the low relative magnitude of the maximum considered earthquake that could produce ground accelerations of up to 0.221g, there is a very low probability of soil liquefaction and a low risk of minor seismic-induced settlement occurring beneath the site. No foundation design or site grading mitigation is recommended.

3.3 Soil and Rock Conditions

Approximately 1 to 9 inches, with an average of 6 inches, of sandy clay tilled earth is present at the ground surface of each soil boring location (B-01 through B-13) and test pit location (PD-01 through PD-18, PLT-01 through PLT-04, T-SUB, T-01 through T-25, T-28 and T-29). The tilled earth has organic matter contents ranging from 2.0 to 12.7 percent.

Native predominantly fat clay soils, and to a lesser degree lean to fat silty, sandy and gravelly clay soils, underlie the tilled earth at each boring and test pit location. The native clay soils extend to depths ranging from 1 to 9-1/4 feet within each soil boring and within test pits PD-01 through PD-05, PD-07 through PD-18, PLT-01 through PLT-03, T-SUB, T-02 through T-04, T-06 through T-18, T-17 through T-23, T-25, T-28 and T-29. The native soils extend to the explored depths within the remaining test pits PD-06, PLT-04, T-01, T-05, T-16 and T-24.

The native clay soils are generally stiff to hard in consistency with unconfined compressive strengths ranging from 2,000 to 9,000 pounds per square foot (psf). However, the native clay soils are medium in consistency within boring B-11 at depths between 4-1/2 and 5-1/2 feet with a correlated Standard Penetration Test (SPT) N-value of 8 blows per foot of penetration (bpf), and extending to depths of 2 and 4 feet within test pits PD-11 and PD-15, respectively, with an unconfined compressive strength of 1,500 psf. The native clay soils have moisture contents ranging from 11 to 35 percent, dry densities from 93 to 115 pounds per cubic foot (pcf), liquid limits from 26 to 84, and plasticity indexes from 8 to 52. The native fat clay soils within test pits PLT-01 and PLT-03 have expansion indexes of 47 and 41, respectively.

Native clayey gravel soils are present at depths between 3-3/4 to 6-1/2 feet within boring B-8 and between 5-1/2 to 8 feet within B-11. The intermittent clayey gravel soils are medium compact to compact is relative density with SPT N-values of 25 and 36 bpf.

Occasional cobble to boulder sized limestone fragments are present within the clay and clayey gravel soils at test pits PD-01, PD-03, PD-07, PD-11, PD-15, PD-16, PLT-01, PLT-03, PLT-04, T-SUB, T-02, T-05, T-15 and T-20.

Moderately to slightly weathered limestone underlies the native clay soils within borings B-01 through B-13 and T-02 through T-04 T-06 through T-11, T-14, T-15, T-17, T-19 and T-21 through T-23, and extends to the explored depths. In addition, excavation refusal on weathered limestone was encountered within test pits PD-01 through PD-05, PD-07 through PD-18, PLT-01 through PLT-03, T-SUB, T-12, T-13, T-18, T-20, T-25, T-26, T-28 and T-29.

The soil boring and test pit logs are presented in Appendix A. The stratification depths shown on the logs represent the soil conditions at the exploration locations. Variations may occur between exploration locations. Additionally, the stratigraphic lines represent the approximate boundary between soil types. The transition may be more gradual than what is shown. The general notes and terminology defining the nomenclature used within this report are presented in Appendix E.

3.4 Groundwater Conditions

Groundwater seepage was encountered within test pit PD-18 at a depth of 5-1/4 feet below the ground surface. No measurable groundwater was encountered during or upon completion within any soil borings (B-01 through B-13) or the remaining test pits (PD-01 through PD-17, PLT-01 through PLT-04, T-SUB, T-01 through T-25, T-28 and T-29).

Fluctuations in groundwater levels should be anticipated due to seasonal variations and following periods of prolonged precipitation. It should be noted that groundwater observations made during drilling operations in predominantly cohesive soils are not necessarily indicative of the static groundwater level. This is due to the low permeability of such soils and the tendency of drilling operations to seal off the natural paths of groundwater flow.

3.5 Soil Corrosivity

Based on the laboratory soil chemical test results, no special type of Portland cement will be required for structural concrete elements (i.e., foundations, walls, etc.) due to soil chemical corrosivity.

Based on the laboratory electrical resistivity test results, the steel foundations will require a corrosion allowance, consisting of zinc galvanization and sacrificial steel, to maintain the integrity of the nominal steel section needed to resist the applied load for the design service life. The steel will begin to corrode upon depletion of the zinc coating. The total sacrificial steel is the steel consumed by corrosion and the residual steel that has been chemically altered by corrosion.

For estimated corrosion rates of zinc, we considered the test data within the National Bureau of Standards (NBS) zinc loss measurements for galvanized pipes buried at 47 test sites nationally from 1910 to 1955. Figure No. 21 within the “Reinforced Earth: Application of Theory to Practice, McKittrick, 1979” presents this test data as it relates to soil electrical resistivity. For estimated corrosion rates of steel, we considered the corrosion rates recommended by Eurocode 3. Table 4-1 within Part 5 of the “Eurocode 3: Design of steel structures, 1993” is intended to show a relationship between steel loss and soil type and compactness. Based on the aforenoted publications, we estimate a zinc corrosion rate of 0.52 mils per year (mpy) and steel corrosion rate of 0.55 mpy may occur to both sides of the pile or screw anchor due to soil corrosivity.

The estimated zinc and steel corrosion rates are considered preliminary and based on indirect correlations of metal loss data from other sites. Corrosion allowance for pile or anchor design should incorporate additional corrosion testing and/or analyses performed by a certified corrosion professional.

4.0 EARTHWORK RECOMMENDATIONS

4.1 Site and Subgrade Preparation

The existing tilled earth (1 to 9 inches, with an average of 6 inches in thickness) is disturbed soil that has been blended with residual crop organics. Where site grades need to be raised within the influence of structures or roadways, any existing topsoil or tilled earth soils should be removed and disposed of in non-structural areas of the site. The existing topsoil or tilled earth soils within the PV array areas should be removed where the amount of engineered fill to be placed will exceed 1 foot. Otherwise, the existing topsoil or tilled earth soils can remain in-place within the PV array areas.

Earthwork operations are expected to consist of removing the existing vegetation and topsoil where required, cutting existing soils or placing engineered fill to achieve proposed site design grades and minimize any severe surface undulations within proposed solar panel areas, excavating for foundations and underground utilities, and preparing the subgrade for support of gravel roads. G2 recommends all earthwork operations be performed in accordance with specifications that have been prepared by a Kentucky licensed professional engineer and be properly monitored in the field by a geotechnical engineer or soils technician under the direction of a licensed engineer.

Limestone bedrock may be encountered where grade cuts, trenches or foundation excavations are required. The upper 6 inches of limestone should generally be rippable using a rock ripper fitted to a dozer or excavator; however, breaking or blasting equipment could be required for deeper excavations.

Once the proposed subgrade has been exposed after grubbing operations and topsoil or tilled earth removal where required, and prior to placement of engineered fill and/or construction of pavement sections, the exposed subgrade in proposed pavement and auxiliary structure areas should be thoroughly proof-rolled using a heavy rubber-tired vehicle, such as a fully loaded dump truck or front-end loader, and should be visually evaluated for instability and/or unsuitable conditions. Any unstable or unsuitable areas should be undercut and replaced with engineered fill.

4.2 Fill Soils and Placement

Engineered fill below structures or roadways should extend a distance laterally beyond the structure, road perimeter, or PV array pile foundation at least equal to twice the depth of the fill. Engineered fill should consist of pre-approved environmentally clean soils, and should be free of organic matter, frozen soil clods, or other harmful material. Engineered fill should have a liquid limit less than 40 percent and a plasticity index of less than 20 percent. Where imported granular engineered fill is used within 3 feet below and 2 feet laterally from the edge of shallow foundations, supplemental drainage must be provided to prevent pooling of water within the granular fill.

The generally acceptable lean clay soils are overlain by unsuitable fat clay soils that would be difficult to visually identify and isolate from each other. We recommend restricting the placement of engineered fill prepared from on-site clay soils to depths greater than 3 feet below the bottoms of shallow spread footing and mat foundations and a lateral distance of at least 2 feet beyond the edges of shallow foundations. Along proposed roadways, the on-site clay soils should be restricted to placement at depths greater than 2 feet below the proposed finish grade. The native clay soils may also be used to raise grades in PV array areas and non-structural fill areas of the site.

If necessary, the clay soils can be chemically treated with hydrated lime to improve stability and reduce the soil's swell potential. This treatment method consists of thoroughly blending proportioned additives to chemically alter their plasticity properties. Additional testing and evaluation would need to be performed to identify the appropriate quantity of the different additives. Chemically treated soils may be used as engineered fill without restrictions; however, it should be noted that the strength, corrosivity and thermal resistivity properties of these soils will be different compared to the untreated soils.

Engineered fill should be placed in uniform horizontal layers, not more than 9 inches in loose thickness for heavy-duty compaction equipment (sheep-foot roller for clayey soil or steel drum roller for imported granular material) and 6 inches in loose thickness for light-duty compaction equipment (tamping rammer for clayey soil or vibratory plate compactor for imported granular material). We recommend a qualified field technician be on site to observe the placement of engineered fill in compliance with the recommended specifications presented below.

Engineered Fill Minimum Compaction Recommendations [1]		Test Frequency
Structural engineered fill	95% of Standard	1 per lift or every 300 sq. yds. per lift
Non-structural engineered fill (general fill)	90% of Standard	Every 2,000 sq. yds per lift
Cable trench backfill in non-structural areas [2]	90% of Standard	Every 1,000 linear feet
Cable trench backfill crossing structures and roads	95% of Standard	1 per lift per crossing
Road gravel	95% of Modified	Every 500 linear feet

(1) Minimum percent compaction based on ASTM D698 (Standard Proctor) or ASTM D1557 (Modified Proctor).
(2) Compaction testing for the cable trench backfill should be performed at a depth of 18 inches above the cables and using a nuclear-density gauge probe setting of 12 inches.

Earthwork factors ranging between -0.10 (shrinkage) and +0.20 (bulkage) may be used for estimating the earthwork quantities for the non-organic native clay soils below the tilled earth and extending to a depth of 5 feet. This estimate is based on a comparison of the existing dry density values (93 to 109 pcf) and the "95 percent of the maximum dry density" values (91 to 103 pcf) from the Standard Proctor tests performed for the clay soils encountered at test pits PLT-01, PLT-03 and T-25.

Moisture conditioning (disking and drying) of the cohesive soils will likely be necessary to facilitate compaction. If the native clay soils or lime-treated clay soils are used as engineered fill, the fill should be compacted at moisture contents that are within 3 percent above the optimum moisture content. Sheep-foot roller compaction equipment should be used for all compaction operations using clay soils. If imported granular soils are used as engineered fill or aggregate base material for roadways, the granular fill should be compacted at moisture contents that are within 2 percent above or below the optimum moisture content.

Upon completion of engineered fill placement, the topsoil placed to restore vegetation should be lightly compacted to a firm condition to provide reasonable surface stability and erosion resistance. No more than 6 inches of new topsoil may be placed within a 5-foot radius of individual PV array pile foundations to provide reasonable lateral load resistance.

4.3 Permanent and Temporary Slopes and Support

Provided the recommendations for site and subgrade preparation are adhered to, permanent fill slopes, consisting of properly compacted engineered fill, may be designed at inclinations as steep as 2H:1V. Permanent fill slopes, consisting of general fill, may be designed at inclinations as steep as 3H:1V. Any fill soils placed on existing slopes should be continuously keyed into the existing slopes. We recommend key dimensions of at least 4 feet wide and no more than 1-1/2 feet deep. Further analyses may be required on a case-by-case basis for unique challenges at specific locations.

To achieve a uniformly compact surface on the face of the new fill slopes, the slopes should be overfilled and trimmed back. Fill slopes should be protected against erosion as soon as practical after construction. Erosion protection may consist of vegetation, composite erosion mats, top-of-slope swales and/or other drainage methods that direct water away from the top and toe of the slope.

For open cut temporary excavations where space is available and where personnel will enter the excavations, temporary unsurcharged slopes may be sloped back to a maximum depth of 5 feet without shoring at 1 units horizontal to 1 unit vertical (1H:1V) within the native medium clay soils and medium compact to compact clayey gravel soils, and 3/4H:1V within the native stiff to hard clay soils and

weathered limestone above the groundwater table. Where groundwater seepage from excavation cuts is observed, the slopes will need to be flattened sufficiently to achieve stability, but in no case left steeper than 3H:1V at and below the seepage level. The tops of the slopes should be barricaded to prevent vehicles and storage loads within 5 feet of the tops of the slopes. If materials are stored or equipment is operated near an excavation, shoring and slopes must be designed to resist the additional lateral pressure due to the surcharge loads. Berms are recommended along the tops of slopes to prevent runoff water from entering the excavations and eroding the slope faces.

Where sloped excavations are not possible, shoring may be required to support vertical cuts that extend below a depth of 5 feet and where personnel will enter the excavations. For design of multi-level braced or tied-back shoring, we recommend the use of a rectangular distribution of lateral earth pressure. It may be assumed that the retained soils with a level surface behind the braced shoring will exert a lateral pressure equal to 24H in pounds per square foot, where H is the height of the shoring in feet. For design of single-level braced or tied back shoring and cantilevered shoring, a trapezoidal distribution of lateral earth pressure may be used. It may be assumed that the retained soils with a level surface behind cantilevered shoring will exert a lateral pressure equal to that developed by a fluid with a density of 30 pounds per cubic foot (pcf) for soils above the water level. If construction traffic or material storage is allowed within 10 feet of the vertical excavation, a uniform vertical pressure of 360 pounds per square foot should be added at the ground surface when determining the design lateral loads.

All excavations should be safely sheeted, shored, sloped, or braced in accordance with local or federal OSHA requirements. If material is stored or equipment is operated near an excavation, stronger shoring must be used to resist the extra pressure due to the superimposed loads and should be evaluated by an experienced professional engineer registered in the State of Kentucky. Care should always be exercised when excavating near existing roadways or utilities to avoid undermining them. In no case should excavations extend below the level of adjacent existing structures unless underpinning is planned.

5.0 GRAVEL ROAD RECOMMENDATIONS

5.1 Temporary Construction Roads

If feasible, construction traffic should be limited to light-duty equipment and vehicles during and for a few days following precipitation events to minimize disturbance of the native subgrade soils. Where subgrade disturbance or rutting is experienced and continued construction traffic is expected, we recommend subgrade stabilization be performed to provide improved support for construction traffic.

Where ruts develop that are less than 2 inches deep, we recommend subgrade stabilization consist of placing a minimum 6-inch thick layer of 1-inch by 3-inch (1x3) crushed concrete or gravel over the exposed subgrade. Where ruts develop that are between 2 and 4 inches deep, we recommend subgrade stabilization consist of placing a minimum 9-inch thick layer of 1x3 crushed concrete or gravel over the exposed subgrade. Where ruts develop that are greater than 4 inches deep, we recommend subgrade stabilization consist of placing a layer of triaxial geogrid over the exposed subgrade, plus placing a minimum 9-inch thick layer of 1x3 crushed concrete or gravel over the geogrid. The geogrid may consist of Tensar TriAx TRX160, or approved equal. For all cases, the crushed 1x3 should be compacted to a stable and unyielding condition using a minimum 15-ton roller compactor.

If rutting continues after subgrade stabilization, any resulting ruts should be infilled with additional 1x3 crushed concrete or aggregate base as needed until rutting ceases. We recommend stockpiles of 1x3 crushed concrete, aggregate base and triaxial geogrid be maintained on site during construction to allow for rapid response and repair of any developing instability.

The native clay subgrade soils may alternatively be chemically treated with hydrated lime to improve stability and rut resistance along primary construction routes. Additional testing and evaluation would need to be performed to identify the appropriate quantity of the hydrated lime additive.

5.2 Permanent Gravel Roads

The final construction of all permanent roads should be delayed until after construction of all other development features. We anticipate the proposed access roads will need to support emergency fire apparatuses weighing up to 75,000 lbs.

We performed our analysis in accordance with AASHTO pavement design criteria for low volume aggregate-surfaced roads. We have assumed an Allowable Serviceability Loss of 2.5 (ΔPSI), an allowable rut depth of 2 inches, and an Elastic Modulus of Aggregate Base (E_{BS}) of 30,000 psi. The allowable rutting and serviceability design charts (AASHTO 1993, II-74 and II-75) are presented in Appendix E.

Roadways on Properly Prepared Subgrade

The tested California Bearing Ratio (CBR) values of the near-surface clay soils at test pit locations PLT-01, PLT-03 and T-25 range from 1.55 to 2.60 at 95 percent compaction. Based on these results, we recommend an effective CBR value of 1.55 for use in design of pavements on properly prepared subgrade soils. A CBR value of 1.55 is approximately equivalent to a Resilient Modulus (M_R) of 2,325 psi [M_R (psi) = 1,500 $*$ CBR].

To support emergency fire apparatuses weighing up to 75,000 lbs, the proposed access roadways will require a heavy-duty dense-graded aggregate section consisting of 11 inches of dense-graded aggregate on properly prepared subgrade soils. Roadways not intended for emergency vehicles may be supported on 6 to 10 inches of dense-graded aggregate based on the allowable 18-kip ESALs presented below.

Permanent Road Aggregate [(1)] Thickness (inches)	Allowable 18-kip ESALs	75-kip Emergency Vehicle Support
6	2,500	No
7	3,500	No
8	5,500	No
9	7,500	No
10	10,000	No
11	16,000	Yes

(1) KTC Dense Graded Aggregate (DGA) or Crushed Stone Base (CSB).
(2) Support for emergency vehicles based on prepared subgrade ultimate bearing pressure (not the allowable 18-kip ESALs based on AASHTO 1993, II-74 and II-75 rutting and serviceability design charts).

Roadways on Lime-Treated Subgrade

The native clay soils may be lime-treated for support of permanent access and internal maintenance roads. The optimum lime content for producing stabilized subgrade soil shall be determined by performing a mix design in accordance with the associated ASTM test procedures.

The existing tilled earth and topsoil are not suitable for blending with the treated soils due to the presence of organic matter and must be completely undercut. We recommend an initial estimated optimum lime content of 5 percent be used for evaluation of the clay subgrade soils.

To achieve optimal results for stabilization, the optimum lime content should be mixed homogeneously with the upper 12 inches of the subgrade soil and achieve a moisture content near optimum moisture content. The treated soil should be compacted to achieve a density of at least 95 percent of the maximum dry density as determined by the Standard Proctor compaction test (ASTM D698). An equivalent M_R value of 10,000 psi may be used in pavement design for lime-treated subgrade soil.

To support emergency fire apparatuses weighing up to 75,000 lbs, the proposed access roadways will require a heavy-duty dense-graded aggregate section consisting of 6 inches of KTC Dense Graded Aggregate (DGA) or Crushed Stone Base (CSB) placed on properly prepared subgrade. We estimate the proposed 6-inch gravel road section supported on lime-treated subgrade soil may support up to 17,000 allowable 18-kip ESALs.

6.0 SHALLOW CONCRETE FOUNDATIONS RECOMMENDATIONS

Structure foundations should not bear on or within the existing tilled earth or topsoil, and engineered fill should not be placed over existing tilled earth or topsoil.

Based on the assumed soil and climate conditions, the undisturbed non-organic native soils are generally conducive to support of shallow foundation types, such as shallow spread footing or mat foundations for auxiliary systems and structures; however, some minor loss of capacity should be expected if the surrounding native soil is allowed to shrink or swell during moisture fluctuations. The likelihood of significant soil moisture fluctuations occurring is considered relatively low in this region.

6.1 Mat Foundation Capacity

Mat foundations bearing on undisturbed non-organic clay or clayey gravel soils, limestone bedrock or engineered fill can be designed based on the average modulus of subgrade reaction values (k_1) presented below.

Mat Foundation Bearing Soil Type	Average Modulus of Subgrade Reaction Values, k_1 (pci)
Undisturbed Medium to Stiff Clay Soils	55
Undisturbed Very Stiff to Hard Clay Soils, Medium Compact to Compact Clayey Gravel Soils	90
Undisturbed Limestone Bedrock	180
Imported Granular Engineered Fill, Lime-Treated Cohesive Soils	100

The allowable subgrade modulus values (k_s) for actual mat foundation dimensions can be determined by using the relationships presented below, where B equals the least mat foundation width.

Relationships for Allowable Subgrade Modulus	
For Mats Bearing Directly on Undisturbed Clay Soils or Lime-Treated Clay Soils	k_s (pci) = $k_1[1/B]$
For Mats Bearing Directly on Imported Granular Material	k_s (pci) = $k_1[(B+1)/2B]^2$

6.2 Spread Footing Foundation Capacity

Spread footing foundations bearing on undisturbed non-organic clay or clayey gravel soils, limestone bedrock or engineered fill may be designed based on the net allowable soil bearing pressures presented below.

Spread Footing Foundation Bearing Soil Type	Allowable Soil Bearing Pressures, q_{all} (psf)
Undisturbed Medium to Stiff Clay Soils	1,500
Undisturbed Very Stiff to Hard Clay Soils, Medium Compact to Compact Clayey Gravel Soils	3,000
Undisturbed Limestone Bedrock	5,000
Imported Granular Engineered Fill, Lime-Treated Cohesive Soils	3,000

6.3 Foundation Dimensions

All spread footing and mat foundations should bear within the recommended soils described above, but should also bear at a minimum depth of 2 feet below finished grade for frost protection. All foundation undercuts should extend laterally beyond the foundation perimeter a minimum distance equal to at least half of the undercut depth.

Continuous wall or strip footing foundations should be at least 12 inches in width and isolated column spread footing or mat foundations should be at least 30 inches in their least dimension. We recommend all foundations be suitably reinforced to minimize the effects of differential settlements associated with local variations in subgrade conditions.

6.4 Settlement

If the recommendations outlined in this report are adhered to, total and differential settlement of mat foundations bearing on undisturbed non-organic clay or clayey gravel soils, limestone bedrock or engineered fill should be less than 1-1/2 inches and 3/4 inch, respectively. If the recommendations outlined in this report are adhered to, total settlements of individual spread footing foundations and differential settlement between adjacent foundations bearing on the recommended soil types should be less than 1 inch and 1/2 inch, respectively.

6.5 Lateral Earth Pressures

Lateral loads on mat or shallow spread footing foundations may be resisted by the combined passive resistance of the adjacent soils and the soil frictional resistance beneath the foundations. The allowable passive resistance of undisturbed native non-organic soils, lime-treated soils, limestone bedrock or imported granular engineered fill may be modeled as a triangular load distribution equal to the pressure developed by a fluid with a density and maximum pressure as follows:

Mat or Spread Footing Foundation Bearing Soil Type	Equivalent Fluid Density (pcf)	Maximum Bearing Pressure (psf)
Undisturbed Medium to Stiff Clay Soils	150	1,500
Undisturbed Very Stiff Clay Soils, Medium Compact to Compact Clayey Gravel Soils	300	3,000
Hard Clay Soils, Undisturbed Limestone Bedrock	500	5,000
Imported Granular Engineered Fill, Lime-Treated Clay Soils	300	3,000

An allowable frictional resistance factor of 0.4 may be used along the bottoms of shallow spread footing or mat foundations. A one-third increase in the passive resistance values may be used for temporary wind or seismic loads. Tension loads on spread footing foundations may be resisted by the foundation concrete weight plus the weight of the soil backfill placed over the spread footing foundation.

7.0 DRILLED CONCRETE PIER FOUNDATION RECOMMENDATIONS

We recommend any proposed power distribution monopoles be supported on drilled cast-in-place concrete pier foundations bearing on or socketed into the underlying limestone bedrock. The minimum socket embedment should be evaluated by the structural engineer.

We anticipate the drilled concrete piers may be augured neat within the clay soils. The contractor should be prepared to use a rock auger and/or core barrel to excavate through the limestone bedrock. Once the drilled pier excavations extend through the native clay soils and to the design bearing depth, any standing water at the bottom of the excavation should be pumped dry, reinforcing steel should be set, and concrete placed.

We recommend using a concrete mix design with a slump of 5 to 7 inches for free fall placement to reduce the potential for concrete arching and provide a workable material. We recommend using a temporary form, such as a Sonotube®, to form the top portion of the drilled pier. The use of this top form is a beneficial aid to the correct placement and orientation of the anchor bolts.

Drilled pier foundations should be at least 18 inches in diameter. Adjacent piers should be spaced at least 3 pier diameters on center to prevent group interaction and bearing capacity reduction. Adjacent piers at different levels should be designed and constructed so the least lateral distance between them is equivalent to or more than the difference in their bearing levels.

7.1 Soil Parameters for Axial Capacity

Drilled pier foundations bearing on undisturbed competent limestone bedrock may be designed in compression based on an ultimate end bearing pressure of 90,000 psf as applied to the surface area of the pier bottom. We anticipate an 18-inch, 36-inch and 60-inch drilled pier may provide approximately 159 kips, 636 kips and 1,767 kips of ultimate downward capacity, respectively.

The upper 2 feet of soil below the ground surface should be ignored in determining pier axial uplift capacities to account for the effects of seasonal moisture fluctuation, disturbance during construction and cyclic lateral loading. We recommend using the following sets of parameters for determining the ultimate (nominal unfactored) upward capacities of drilled concrete pier foundations.

Boring No.	Elevation Below Existing Grade (feet)	Depth Below Existing Grade (feet)	Soil Type	Drilled Concrete Pier Ultimate Upward Skin Friction (psf)
B-01 (Gen-Tie)	762.0 to 760.0	0.0 to 2	Disturbed Clay	0
	760.0 to 758.0	2.0 to 4.0	Stiff Clay	850
	758.0 to 746.2	4.0 to 15.8	Weathered Limestone	2,000
B-02 (Gen-Tie)	753.0 to 751.0	0.0 to 2.0	Disturbed Clay	0
	751.0 to 747.5	2.0 to 5.5	Stiff Clay	850
	747.5 to 737.0	5.5 to 16.0	Weathered Limestone	2,000
B-03 (Gen-Tie)	840.0 to 838.0	0.0 to 2.0	Disturbed Clay	0
	838.0 to 833.0	2.0 to 7.0	Stiff Clay	900
	833.0 to 822.0	7.0 to 18.0	Weathered Limestone	2,000
B-05 (Substation/Gen-Tie)	804.0 to 802.0	0.0 to 2.0	Disturbed Clay	0
	802.0 to 798.5	2.0 to 5.5	Stiff Clay	900
	798.5 to 788.2	5.5 to 15.8	Weathered Limestone	2,000
B-06 (Substation)	826.0 to 824.0	0.0 to 2.0	Disturbed Clay	0
	824.0 to 821.7	2.0 to 4.3	Very Stiff Clay	1,000
	821.7 to 811.5	4.3 to 14.5	Weathered Limestone	2,000

Tensile axial loads of drilled piers are resisted by the skin friction along the pier and the weight of the pier. The ultimate axial capacities of 18-inch, 36-inch and 60-inch drilled concrete piers with embedment depths ranging between 4 and 15 feet below the existing grade are presented in the following table.

Boring No.	Depth Below Existing Grade (feet)	Limestone Socket Depth (feet)	Drilled Concrete Pier Preliminary Ultimate Upward Capacity (kips)		
			18-in. Dia.	36-in. Dia.	60-in. Dia.
B-01 (Gen-Tie)	4.0 (top of limestone)	0.0	9	20	38
	6.0	2.0	28	60	107
	10.0	6.0	67	140	245
	15.0	11.0	116	239	416
B-02 (Gen-Tie)	5.5 (top of limestone)	0.0	11	26	50
	7.5	2.0	31	66	118
	10.0	4.5	55	115	204
	15.0	9.5	104	215	376
B-03 (Gen-Tie)	7.0 (top of limestone)	0.0	23	50	91
	9.0	2.0	42	90	160
	10.0	3.0	52	110	194
	15.0	8.0	101	209	366

Boring No.	Depth Below Existing Grade (feet)	Limestone Socket Depth (feet)	Drilled Concrete Pier Preliminary Ultimate Upward Capacity (kips)		
			18-in. Dia.	36-in. Dia.	60-in. Dia.
B-05 (Substation/Gen-Tie)	5.5 (top of limestone)	0.0	12	27	52
	7.5	2.0	31	67	120
	10.0	4.5	56	117	206
	15.0	9.5	104	216	378
B-06 (Substation)	4.3 (top of limestone)	0.0	12	26	79
	6.3	2.0	31	66	148
	10.0	5.7	67	139	275
	15.0	10.7	115	239	447

Given the ultimate skin friction resistance and end bearing parameters are based on indirect field tests, a factor of safety of 3.0 may be used for determination of allowable skin friction and end bearing capacity. The pier weight for upward capacity does not require a factor of safety. The recommended capacities may be increased by a factor of 1/3 when considering temporary wind and seismic load conditions.

Total settlement of structures supported on drilled concrete pier foundations bearing on limestone bedrock will be less than 3/4 inch. Differential settlement will be less than 1/2 inch.

7.2 LPILE Parameters for Lateral Capacity

Lateral loads on drilled pier foundations may be resisted by the adjacent soils and by the section properties of the drilled pier. The upper 2 feet of soil below the ground surface should be ignored when determining lateral capacities to account for the effects of seasonal moisture fluctuation, disturbance during construction and cyclic lateral loading. We recommend using the following sets of LPILE soil parameters (undrained condition) in lateral capacity design of drilled pier foundations.

Boring No.	Depth (feet)	Drilled Concrete Pier LPILE Parameters						
		Soil Type	Effective Unit Weight (pcf)	Cohesion (psf)	Uniaxial Compressive Strength (psi)	Strain Factor (E_{50} or k_{rm})	Initial Modulus of Rock Mass (psi)	RQD (%)
B-01 (Gen-Tie)	0.0 to 2.0	Disturbed Clay	130	-	-	-	-	-
	2.0 to 4.0	Stiff Clay w/o F.W.	130	1,500	-	0.0080	-	-
	4.0 to 15.8	Weak Rock (Reese)	165	-	6,280	0.0004	300,000	67
B-02 (Gen-Tie)	0.0 to 2.0	Disturbed Clay	130	-	-	-	-	-
	2.0 to 5.5	Stiff Clay w/o F.W.	130	1,500	-	0.0080	-	-
	5.5 to 16.0	Weak Rock (Reese)	161	-	7,610	0.0004	300,000	39
B-03 (Gen-Tie)	0.0 to 2.0	Disturbed Clay	130	-	-	-	-	-
	2.0 to 7.0	Stiff Clay w/o F.W.	130	1,800	-	0.0073	-	-
	7.0 to 18.0	Weak Rock (Reese)	163	-	6,710	0.0005	150,000	29
B-05 (Substation/ Gen-Tie)	0.0 to 2.0	Disturbed Clay	130	-	-	-	-	-
	2.0 to 5.5	Stiff Clay w/o F.W.	130	1,800	-	0.0073	-	-
	5.5 to 15.8	Weak Rock (Reese)	166	-	4,570	0.0004	300,000	83
B-06 (Substation)	0.0 to 2.0	Disturbed Clay	130	-	-	-	-	-
	2.0 to 4.3	Stiff Clay w/o F.W.	130	2,400	-	0.0068	-	-
	4.3 to 14.5	Weak Rock (Reese)	162	-	7,300	0.0004	300,000	83

8.0 SOLAR ARRAY FOUNDATION RECOMMENDATIONS

8.1 Feasible Foundation Types

Steel piles are typically driven into the ground for support of solar array PV panels; however, the observed subsurface conditions beneath the site are not consistently conducive to standard driven pile foundations across a large portion of the site. Some of the alternative feasible pile foundation installation methods that could be considered for the site are presented below.

Feasible Pile Installation Option		Hole Diameter for W6x9 Piles		Relief Hole Backfill Option
A	Drive pile to design depth without pre-drilling	No relief hole		No relief hole
B	Pre-drill undersized diameter hole to design depth	B1	4 inches	Place auger cuttings in hole and drive pile
		B2	5 inches	
		B3	6 inches	
C	Pre-drill oversized diameter hole to design depth	9 inches or minimum steel cover per ACI 318, whichever is greater		Place pile in hole and backfill with grout

For Pile Installation Options B1, B2 and B3, pre-drilling undersized relief holes at each foundation will reduce the risk of subsequent pile driving refusal; however, it will not eliminate the risk. The greatest risk of refusal will occur with the 4-inch diameter predrill option. Pre-drilled relief holes in weathered limestone are typically drilled to an approximate diameter between 60 percent (for soft carbonate rock) and 100 percent (for hard carbonate rock) of the pile section's largest dimension. For example, a W6x9 steel pile would require 4 to 6-inch diameter relief holes. To remediate this foundation system after the facility is closed, the driven piles will need to be excavated or removed using a heavy-duty vibratory pile extractor.

Augur drills will generally be able to penetrate the existing overburden soils and pass through zones of minor cobble content; however, percussion rock drilling methods (air-rotary or similar) may be required where more significant cobble and boulder quantities and bedrock are encountered. Prior to pile driving operations, the relief holes should be backfilled with the drill cuttings, minus any rock fragments larger than 3/4 inch.

The pile foundation should then be driven into the relief hole. It is expected that a pile driver with an energy rating of between 1,000 and 1,500 ft-lbs will be required to install piling. It is expected that the pile flanges will be deformed within the undersized relief hole below the competent limestone contact and where cobbles and boulders project into the hole sidewalls. The desired effect is to wedge the pile into the hole down to the approximate embedment depth. It should be expected that some piles will fail to achieve their design embedment depth, and, therefore, more frequent load testing of short piles and cutting of the tops of excessively tall piles will be required.

If the risk of pile driving refusal cannot be tolerated, the contractor could drill oversized holes to the required embedment depth (Pile Installation Option C). The drilled holes should be at least 9 inches in diameter and extend at least 12 inches below the Kentucky building code frost depth of 24 inches for Marion County (minimum embedment depth of 3 feet). Temporary casing may be required if caving soils are present. For this approach, the steel piles can be placed into the hole and backfilled with controlled low-strength material (CLSM) such as cement grout. If present, any groundwater seepage should be removed prior to grout placement operations.

Rock anchor screws (Option D) may also be feasible foundation option for support of PV array foundations. Due to the slenderness of screw anchor sections, some method of increasing the lateral capacity may be required. To remediate this foundation system, the screw anchors can be reverse screwed for removal.

For all options (A, B1, B2, B3, C and D), we recommend further delineation of the bedrock interface be performed prior to final design of foundations. This can be achieved by performing a geophysical survey of the proposed solar array areas.

Based on the observed subsurface conditions at each exploration location, we preliminarily grouped the locations into "Capacity Areas" relative to the surrounding subsurface conditions. Plate No. 3, Capacity Area Plan, provides a pictorial that delineates the approximate limits of the feasible foundation options. The transition between the delineated areas will be more gradual than is shown.

Capacity Area No. (See Plate No. 3)	Feasible Foundation Option	Test Locations
1	B3, C and D	T-02, T-06, T-10 and T-11
2	B2, B3, C and D	B-05, B-06, B-10, PD-01, PD-02, PD-04, PD-09, PD-10, PD-11, PD-12, PD-13, PD-14, PD-15, PD-16, PD-17, PD-18, T-04, T-08, T-19, T-23, T-25 and T-SUB
3	B1, B2, B3, C and D	B-04, B-07, B-08, B-09, B-12, B-13, PD-03, PD-07, PD-08, PLT-01, PLT-02, PLT-03, T-03, T-07, T-09, T-12, T-13, T-17, T-18, T-20, T-21, T-28 and T-29
4	A, B1, B2, B3, C and D	B-11, PD-05, PD-06, PLT-04, T-01, T-05 and T-24

1. Soil borings B-01 through B-03 and test pits T-14, T-15, T-16 and T-22 are outside of the proposed fenced area and not categorized into a Capacity Area.

8.2 Axial Capacity

8.2.1 Effects of Adfreeze

The project site experiences occasional to frequent below-freezing temperatures from November through March. Climate data obtained from the nearby cities of Bradfordville and Bardstown, Kentucky (NOAA Stations USC-150940 and USC-150397) suggests that the project site can be assigned a 50-year air-freezing index of 478˚F-Days and a mean annual temperature of 57.1˚F. Based on an evaluation using the Modified Berggren method, the upper 20 inches is considered susceptible to the effects of frost penetration. Therefore, we recommend an effective frost depth of 20 inches be used in pile foundation design. The effective frost zone is not the same as the 24-inch codified frost depth required for shallow concrete foundations.

The near-surface clay soils have liquidity indexes ranging from -0.50 to 0.32 with an average liquidity index of 0.00. Groundwater seepage was encountered within test pit PD-18 at a depth of 5-1/4 feet below the ground surface. Publication from Nidowicz and Shur (1998) suggests a tangential shear force of 56 kPa (1,170 psf) will occur for steel (and 1,670 psf for concrete) within a regional frost depth zone of approximately 1 meter and in contact with clay soils having liquidity indexes less than 0.25.

In combined consideration of the average soil conditions for the site and the observed groundwater seepage within test pit PD-18, we recommend an ultimate adfreeze (negative) force of 1,170 psf for steel and 1,670 psf for concrete be assumed to a depth of 20 inches as applied to the boxed perimeter of the pile section or circumference of the screw anchor or concrete pier.

The recommended ultimate adfreeze tension forces do not need to be evaluated as an additional tension load when evaluating transient wind or earthquake loads, but should be considered independently as a static load to be overcome by additional pile embedment. No multiplier or factor of safety should be applied to the ultimate adfreeze forces.

8.2.2 Effects of Shrink/Swell Potential

An average of 6 inches of sandy clay tilled earth with organic matter contents ranging from 2.0 to 12.7 percent is generally present at the ground surface of each soil boring and test pit location. The tilled earth is underlain by native low to high plasticity clay soils with a moderate to high potential for shrinkage or swelling with decreases or increases in moisture content (Liquid Limit = 26 to 84; Plasticity Index = 8 to 52, Expansion Index = 41 to 47, CBR Swell = 0.7 to 3.3 percent).

The regional climate for this site is considered to be humid with an approximate Thornthwaite Moisture Index (TMI) of 60. Based on an evaluation using the Foundation Performance Association (FPA) method for estimating the depth of the moisture active zone, the upper 6 feet of the subsurface soils are considered susceptible to periodic expanding and shrinking fluctuations. We recommend pile, screw anchor or drilled pier foundations that are entirely supported within native clay soils (not bearing in limestone bedrock) to extend below the moisture active zone.

Based on an evaluation using the Texas Department of Transportation method (TxDOT Designation Tx-124-E) for estimating Potential Vertical Rise (PVR), an unloaded surface structure has a PVR of approximately 1-1/2 inches if the native undisturbed clay soils to a depth of 6 feet were allowed to transition from a “dry” condition to a “wet” condition. The estimated PVR value indicates the possible vertical movement of the ground surface relative to existing grade over time.

In combined consideration of the climatic conditions and estimated soil impermeability, soil consistency, moisture content, observed depth of root growth, and groundwater depth, the effects of seasonal fluctuations in soil moisture are anticipated to be low. Based on these conditions, we estimate an effective active zone of moisture fluctuation extending to an approximate depth of 24 inches for use in foundation analyses. The effective active zone represents the depth to which the moisture content of the near-surface soils is reasonably expected to fluctuate seasonally.

During periods of seasonal drying, it is expected that the upper tilled earth and native clay may shrink away from contact with the sides of the foundations. Since any gaps that might develop adjacent to a foundation could result in loss of frictional skin resistance on the sides of the foundation, any axial capacity within the upper 24 inches of embedment should not be included in the axial capacity design.

During periods of seasonal wetting, it is expected that the upper clay may swell. Any swelling within the clay will manifest as ground surface rise. The rising ground will, in turn, impose frictional tension forces on the sides of the foundation. For tension capacity design of foundations, we recommend an ultimate adfreeze (negative) force of 750 psf for steel and 750 psf for concrete be assumed to a depth of 24 inches as applied to the boxed perimeter of the pile section or circumference of the screw anchor or concrete pier.

8.2.3 Ultimate Skin Friction Capacity

We recommend grouping the test data into four (4) sets of ultimate axial skin friction parameters to simplify the axial design of steel piles installed at existing grade. The “Capacity Areas” presented are based on the field test results that were performed in a relatively short timeframe. The ultimate capacity of engineered fill placed over existing grade should be determined by performing additional pile load testing upon completion of rough subgrade elevation earthwork.

Capacity Area No. (See Plate No. 3)	Depth Below Grade (feet)	Ultimate Skin Friction Parameters (psf) [1]				
		Driven Piles in Undisturbed Soil (Option A)	Undersized Hole Diameter for Driven W6x9 Piles [2]			Drilled Concrete Pier or Screw Anchor (Options C and D)
			4-inch Dia. (Option B1)	5-inch Dia. (Option B2)	6-inch Dia. (Option B3)	
1	0 to 2	-	-	-	0	0
	2 to 3	-	-	-	130	350
	3 to 15	-	-	-	1,500	2,000
2	0 to 2	-	-	0	0	0
	2 to 6	-	-	240	130	350
	6 to 15	-	-	1,700	1,500	2,000
3	0 to 2	-	0	0	0	0
	2 to 9	-	350	240	130	350
	9 to 15	-	2,000	1,700	1,500	2,000
4	0 to 2	0	0	0	0	0
	2 to 15	565	350	240	130	350

(1) Skin friction applied to the boxed perimeter of the pile section, circumference of the screw anchor, or the circumference of the drilled concrete pier.
(2) For tension capacity of different pile sections, the 4-, 5- and 6-inch diameter relief holes for W6x9 piles correspond to approximately 67, 85 and 100 percent of the pile section's largest dimension.

8.2.4 Ultimate Bearing Capacity

PV array foundations bearing on native clay soils at depths greater than 6 feet or on limestone bedrock may be designed based on an ultimate soil bearing pressure of 9,000 psf based on the boxed area of the W-section pile tip, the cross-sectional base area of the screw anchor, or the cross-sectional base area of the drilled concrete pier.

8.2.5 Factor of Safety

Given the higher confidence in the data obtained by direct pile tension load tests, a relatively low factor of safety of 1.5 may be used in determining allowable design skin friction values. Given the ultimate end bearing parameters were based on indirect field and laboratory tests, a factor of safety of 3.0 should be used for determination of allowable end bearing.

8.3 Lateral Capacity

8.3.1 LPILE Analyses (version 2022.12.10)

The assumed properties of the non-galvanized W6x9 test piles are presented below.

LPILE Pile Input Parameters for Non-Galvanized W6x9 Steel Piles	
Section Type	Elastic Section (Non-Yielding)
Structural Shape	H-Pile Strong Axis
HP Flange Width (in.)	3.940
H-Pile Depth (in.)	5.900
Flange Thickness (in.)	0.215
Web Thickness (in.)	0.170
Area (in^2)	2.680
Mom. Of Inertia (in^4)	16.40
Elastic Modulus (psi)	29,000,000

For efficiency, the test data was grouped and LPILE analyses were performed on the test data obtained from locations selected as representative of the groups. The "Stiff Clay without Free Water (Reese)" soil model was assigned for all final LPILE layers based on the observed soil conditions. The load was applied at a height of 2-1/2 feet above grade. The LPILE analyses were performed using a cyclic loading frequency of 2 cycles. The deflection models are based on field test results that were performed in a relatively short timeframe.

The cohesion and strain factor values were modified until the calculated 0.50-inch of deflection at a height of 6 inches above grade was approximated at the observed 0.50-inch of deflection at a height of 6 inches above grade. The model parameters were then iteratively refined until the calculated 0.25-inch and 1.00-inch deflections were approximated at the actual test loads.

The calculated models and the relative model concurrence ratings to the observed 0.25-inch and 1.00-inch deflections are presented in the following table.

Location Pile ID	Depth Below Grade (feet)	0.50-inch Deflection LPILE Model					
		Stiff Clay without Free Water			(1) (in.)	(2) (in.)	Concurrence Rating
		Unit Wt. (pcf)	Cohesion (psf)	Strain Factor			
PD-01 (4 in.)	0 to ½	110	500	0.0200	0.17	1.84	Fair
	½ to 5-½	125	2,000	0.0071			
PD-03 (6 in.)	0 to ½	110	500	0.0200	0.14	8.26	Poor
	½ to 7	125	800	0.0150			
PD-10 (6 in.)	0 to ½	110	500	0.0200	0.09	1.64	Fair
	½ to 5	125	970	0.0100			
PD-11 (6 in.)	0 to ½	110	500	0.0200	0.20	2.49	Fair
	½ to 4-½	125	1,400	0.0087			
	4-½ to 6	160	6,300	0.0040			
PD-12 (4 in.)	0 to ½	110	500	0.0200	0.21	1.71	Fair
	½ to 3-½	125	1,000	0.0100			
	3-½ to 6	160	3,600	0.0048			
PD-16 (4 in.)	0 to ½	110	500	0.0050	0.17	1.72	Fair
	½ to 5	125	2,250	0.0068			
PLT-01A	0 to ½	110	500	0.0200	0.17	1.38	Good
	½ to 5	125	2,750	0.0063			
PLT-01B	0 to ½	110	500	0.0200	0.17	1.29	Good
	½ to 7	125	2,100	0.0069			

(1) Calculated deflection of the actual test load observed at 0.25 in. deflection
(2) Calculated deflection of the actual test load observed at 1.00 in. deflection

8.3.2 LPILE Parameters

Based on the results of our LPILE analyses, we recommend grouping the LPILE soil parameters into six (6) sets of parameters to simplify the lateral design of steel piles installed at the existing grade. The LPILE soil parameters presented are based on the field test results that were performed in a relatively short timeframe. The LPILE soil parameters of engineered fill placed over existing grade should be determined by performing additional pile load testing upon completion of rough subgrade elevation earthwork.

Layer ID	Layer ID Soil Type	LPILE Parameters for Layer ID Groupings			
		LPILE Soil Type	Cohesion (psf)	Strain Factor	Eff. Unit Wt. (pcf)
L1	Topsoil	Stiff Clay w/o Free Water	500	0.0200	110
L2	Clay (6-inch hole)	Stiff Clay w/o Free Water	800	0.0150	125
L3	Clay (5-inch hole)	Stiff Clay w/o Free Water	900	0.0125	125
L4	Clay (4-inch hole)	Stiff Clay w/o Free Water	1,000	0.0100	125
L5	Clay (Undisturbed)	Stiff Clay w/o Free Water	2,100	0.0060	125
L6	Limestone (4- to 6-inch hole)	Stiff Clay w/o Free Water	3,600	0.0048	160

We recommend grouping the test data into four (4) "Capacity Areas" relative to the surrounding subsurface conditions to further simplify the lateral design of steel piles installed at the existing grade.

Capacity Area No. (See Plate No. 3)	Depth Below Grade (feet)	LPILE Layer Depths for Lateral Capacity				
		Driven Piles in Undisturbed Soil (Option A)	Undersized Hole Diameter for Driven W6x9 Piles			Drilled Concrete Pier or Screw Anchor (Options C and D)
			4-inch Dia. (Option B1)	5-inch Dia. (Option B2)	6-inch Dia. (Option B3)	
1	0 to ½	-	-	-	L1	L1
	½ to 3	-	-	-	L2	L5
	3+	-	-	-	L6	L6
2	0 to ½	-	-	L1	L1	L1
	½ to 6	-	-	L3	L2	L5
	6+	-	-	L6	L6	L6
3	0 to ½	-	L1	L1	L1	L1
	½ to 9	-	L4	L3	L2	L5
	9+	-	L6	L6	L6	L6
4	0 to ½	L1	L1	L1	L1	L1
	½+	L5	L4	L3	L2	L5

LPILE analyses were again performed by applying lateral loads of 500, 1,000, 2,000, 3,000 and 4,000 lbs to W6x9 piles at 6 inches, 48 inches, and 72 inches above the ground surface. For Capacity Area No. 1, we evaluated a W6x9 pile installed in a 6-inch diameter relief hole (Option B3). For Capacity Area No. 2, we evaluated a W6x9 pile installed in a 5-inch diameter relief hole (Option B2). For Capacity Area No. 3, we evaluated a W6x9 pile installed in a 4-inch diameter relief hole (Option B1). For Capacity Area No. 4, we evaluated a W6x9 pile installed into undisturbed native soil (Option A).

The analyses was performed using embedment depths of 6, 8 and 10 feet. No axial load was applied when performing the analyses. The analyses were performed with an assumed cyclic loading frequency of 10 cycles. The computed LPILE load vs. deflection curves are presented in Appendix D. The corresponding computed LPILE lateral capacities are presented in the following table.

Capacity Area No.	Evaluated Foundation Option	Load Height above Grade	Embedment Depth (ft.)	Lateral Deflection at Load Height Above Grade (in.)					Figure No.
				500 lbs.	1,000 lbs.	2,000 lbs.	3,000 lbs.	4,000 lbs.	
1	B3	6 inches	6	0.02	0.07	0.26	0.77	2.05	262
			8	0.02	0.07	0.23	0.44	0.70	
			10	0.02	0.07	0.23	0.44	0.70	
		48 inches	6	0.23	0.59	2.44	8.87	-	263
			8	0.23	0.58	1.46	2.51	3.86	
			10	0.23	0.58	1.46	2.51	3.70	
		72 inches	6	0.50	1.27	6.11	-	-	264
			8	0.50	1.20	2.88	4.92	7.82	
			10	0.50	1.20	2.87	4.81	6.97	

Capacity Area No.	Evaluated Foundation Option	Load Height above Grade	Embedment Depth (ft.)	Lateral Deflection at Load Height Above Grade (in.)					Figure No.
				500 lbs.	1,000 lbs.	2,000 lbs.	3,000 lbs.	4,000 lbs.	
2	B2	6 inches	6	0.02	0.09	0.93	4.45	-	265
			8	0.02	0.08	0.28	0.62	1.30	
			10	0.02	0.08	0.28	0.60	1.01	
		48 inches	6	0.24	0.22	27.9	-	-	266
			8	0.23	0.61	1.70	3.87	8.87	
			10	0.23	0.61	1.68	3.06	4.68	
		72 inches	6	0.57	3.42	-	-	-	267
			8	0.51	1.26	3.44	8.34	-	
			10	0.51	1.26	3.28	5.75	8.66	
3	B1	6 inches	6	0.02	0.07	0.56	2.57	-	268
			8	0.02	0.07	0.24	0.65	1.60	
			10	0.02	0.07	0.24	0.52	0.89	
		48 inches	6	0.22	0.86	8.97	-	-	269
			8	0.22	0.57	1.87	5.67	-	
			10	0.22	0.57	1.56	2.83	4.39	
		72 inches	6	0.50	2.26	-	-	-	270
			8	0.48	1.21	4.29	19.3	-	
			10	0.48	1.20	3.09	5.42	8.35	
4	A	6 inches	6	0.01	0.03	0.11	0.24	0.51	271
			8	0.01	0.03	0.11	0.22	0.37	
			10	0.01	0.03	0.11	0.22	0.37	
		48 inches	6	0.16	0.39	1.10	2.83	7.76	272
			8	0.16	0.39	1.01	1.79	2.72	
			10	0.16	0.39	1.01	1.78	2.69	
		72 inches	6	0.38	0.90	2.67	7.75	-	273
			8	0.38	0.90	2.19	3.74	5.78	
			10	0.38	0.90	2.18	3.73	5.49	

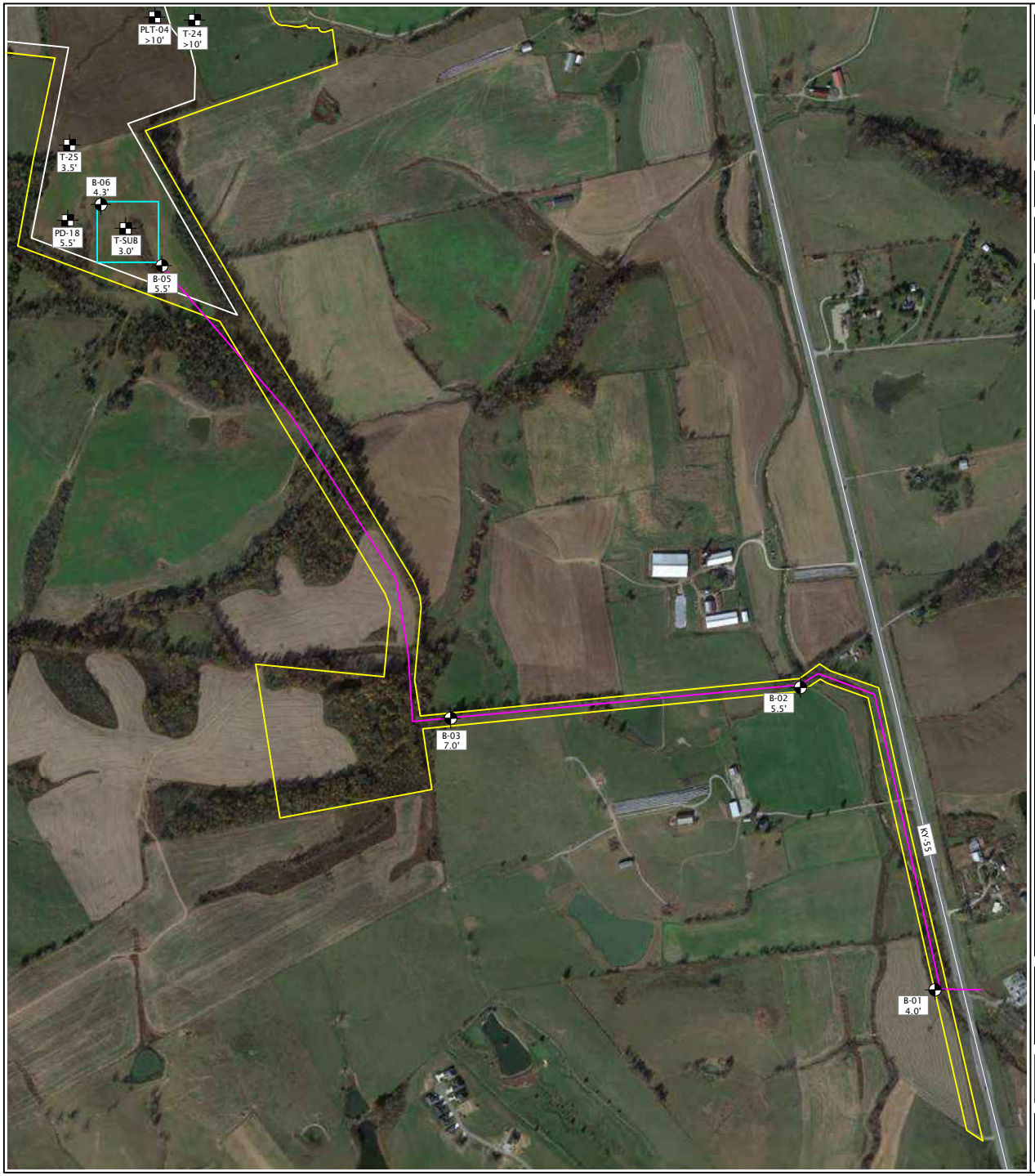
The load-deflection curves of the computed LPILE lateral capacities presented are based on the use of W6x9 steel piles that do not include any calculated factor of safety reduction. Since the capacities were derived from direct static load tests and are limited by the indicated deflection criteria, no additional factor of safety needs to be applied in determining the design lateral capacities of the piles.

9.0 GENERAL COMMENTS

G2 has formulated the evaluations and recommendations presented in this report relative to site preparation and foundations on the basis of data provided to them relating to the location, type, and grade for the proposed site. Any significant change in this data should be brought to G2's attention for review and evaluation with respect to the prevailing subsurface conditions.

The scope of the present investigation was limited to evaluation of subsurface conditions for the support of the proposed structures and other related aspects of the development. No environmental or hydrogeological testing or analyses were included in the scope of this investigation. If changes occur in the design, location, or concept of the project, the conclusions and recommendations contained in this report are not valid unless G2 Consulting Group, LLC reviews the changes. G2 Consulting Group, LLC will then confirm the recommendations presented herein or make changes in writing.

G2 has based the analyses and recommendations submitted in this report upon the data obtained at the approximate locations shown on the Geotechnical Test Location Plan, Plate No. 2. This report does not reflect variations that may occur between the actual test locations and the actual structure locations. The nature and extent of any such variations may not become clear until the time of construction. If significant variations then become evident, it may be necessary for G2 to re-evaluate the report recommendations.



CONSULTING GROUP

G2 Project No. 223429

Name: Proposed Frontier Solar Power Plant

Location: Marion and Washington Counties, Kentucky

Date: January 10, 2024

TEST LOCATION LEGEND

B-01 through B-13	Soil borings performed by Strata Group, LLC on December 11 through 18, 2023
PD-01 through PD-13 PLT-01 through PLT-04	Pile load testing and test pits performed by G2 Consulting Group, LLC (G2) on December 16 through 20, 2023
T-01 through T-25, T-28, T-29 and T-SUB	Test pits performed by G2 on November 15 through 19, 2022 and December 16, 2023

BOUNDARY LEGEND

- Project Boundary
- Fenced Area
- Substation Area
- Gen-Tie Alignment

Note 1: The depth indicated on test location ID's B-01, B-02, B-03, B-05 and B-06 represents the estimated top of limestone bedrock. For the remaining exploration locations, the depths indicated are the exploration refusal depths, which may have resulted from limestone boulders or layers overlying the actual top of limestone bedrock we are intending to present.

Note 2: Cobble or boulders (limestone fragments) are present above the excavation refusal depths indicated on test location ID's PD-01, PD-03, PD-07, PD-11, PD-15, PD-16, PLT-01, PLT-03, PLT-04, T-SUB, T-02, T-05, T-15 and T-20.

SCALE

1,000 Feet

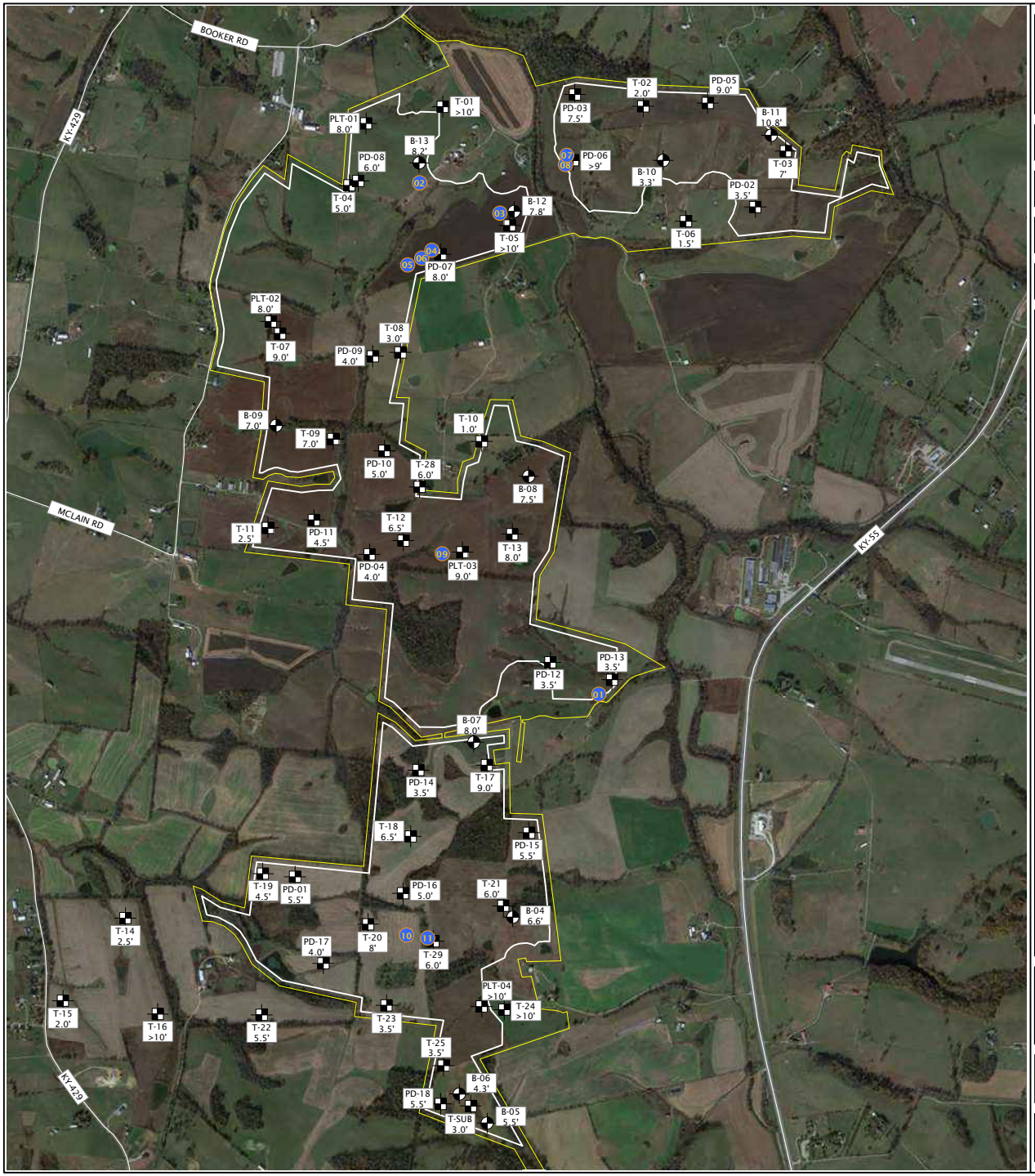
N

SHEET TITLE

Geotechnical Test Location Plan (Gen-Tie Alignment)

SHEET NO.

Plate No. 1



CONSULTING GROUP

G2 Project No. 223429

Name: Proposed Frontier Solar Power Plant

Location: Marion and Washington Counties, Kentucky

Date: January 10, 2024

TEST LOCATION LEGEND

B-01 through B-13	Soil borings performed by Strata Group, LLC on December 11 through 18, 2023
PD-01 through PD-13 PLT-01 through PLT-04	Pile load testing and test pits performed by G2 Consulting Group, LLC (G2) on December 16 through 20, 2023
T-01 through T-25, T-28, T-29 and T-SUB	Test pits performed by G2 on November 15 through 19, 2022 and December 16, 2023

BOUNDARY LEGEND

Project Boundary

Fenced Area

FIELD NOTES LEGEND

01 through 11	G2 Observed Surface Depressions

Note 1: The depth indicated on test location ID's B-01, B-02, B-03, B-05 and B-06 represents the estimated top of limestone bedrock. For the remaining exploration locations, the depths indicated are the exploration refusal depths, which may have resulted from limestone boulders or layers overlying the actual top of limestone bedrock we are intending to present.

Note 2: Cobble or boulders (limestone fragments) are present above the excavation refusal depths indicated on test location ID's PD-01, PD-03, PD-07, PD-11, PD-15, PD-16, PLT-01, PLT-03, PLT-04, T-SUB, T-02, T-05, T-15 and T-20.

SCALE

4,000 Feet

1 Mile

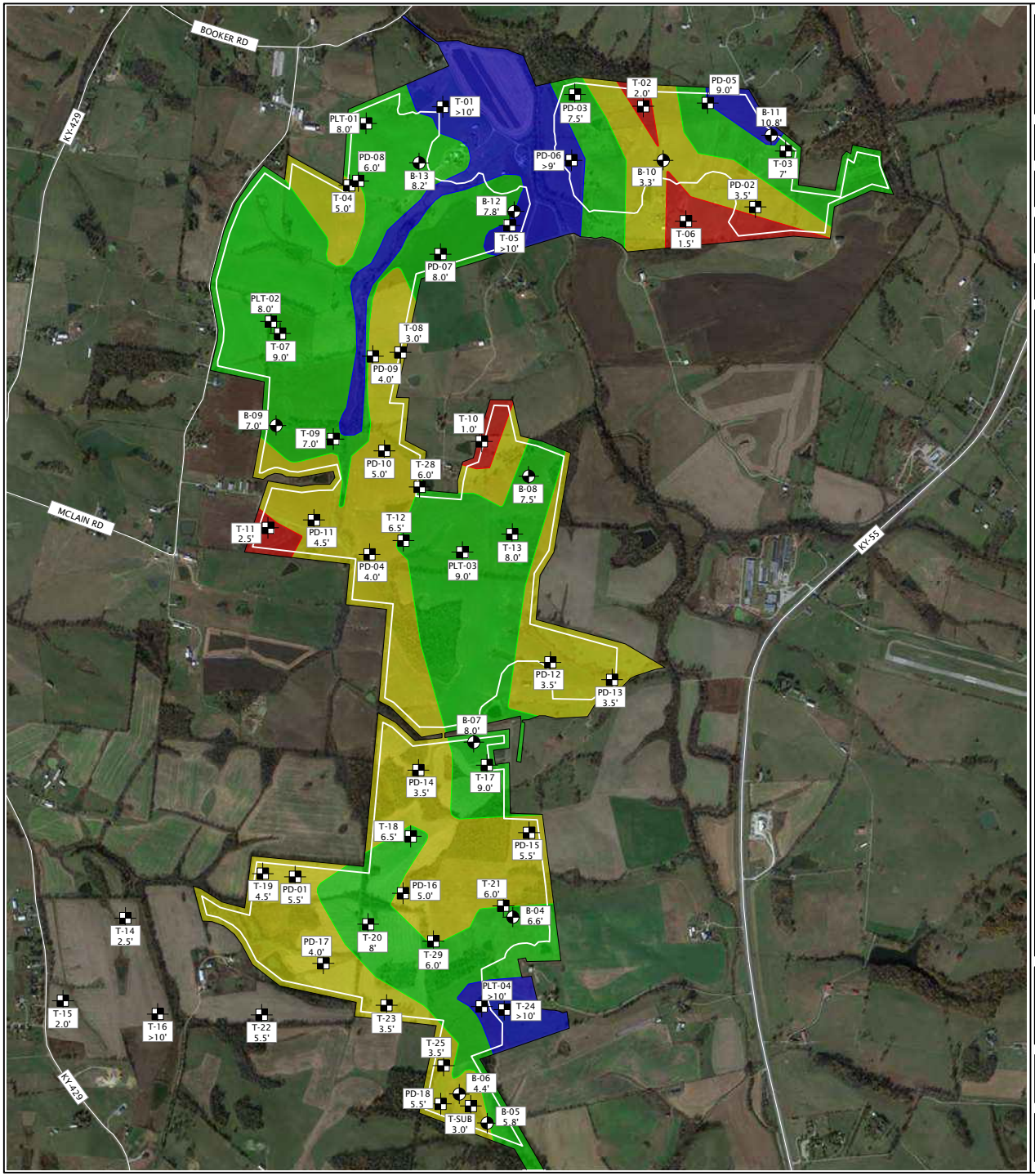
N

SHEET TITLE

Geotechnical Test Location Plan (PV Array Area)

SHEET NO.

Plate No. 2



CONSULTING GROUP

G2 Project No. 223429

Name: Proposed Frontier Solar Power Plant

Location: Washington and Marion Counties, Kentucky

Date: January 10, 2024

TEST LOCATION LEGEND

B-01 through B-13	Soil borings performed by Strata Group, LLC on December 11 through 18, 2023
PD-01 through PD-13 PLT-01 through PLT-04	Pile load testing and test pits performed by G2 Consulting Group, LLC (G2) on December 16 through 20, 2023
T-01 through T-25, T-28, T-29 and T-SUB	Test pits performed by G2 on November 15 through 19, 2022 and December 16, 2023

BOUNDARY LEGEND

- Project Boundary
- PV Array Fenced Area

CAPACITY AREAS 1 THROUGH 4

1. Presence of limestone bedrock is estimated to be shallower than 3 feet
2. Presence of limestone bedrock is estimated to be present at depths between 3 and 6 feet
3. Presence of limestone bedrock is estimated to be present at depths between 6 and 9 feet
4. Presence of limestone bedrock is estimated to be deeper than 9 feet

Note 1: The depth indicated on test location ID's B-01, B-02, B-03, B-05 and B-06 represents the estimated top of limestone bedrock. For the remaining test location ID's, the depths indicated are the drilling or excavation refusal depths, which may have resulted from limestone boulders or layers overlying the actual top of limestone bedrock we are intending to present.

Note 2: Cobbles or boulders (limestone fragments) are present above the excavation refusal depths indicated on test location ID's PD-01, PD-03, PD-07, PD-11, PD-15, PD-16, PLT-01, PLT-03, PLT-04, T-SUB, T-02, T-05, T-15 and T-20.

Note 3: The "capacity areas" represent the estimated ranges of limestone bedrock based on linearly interpolating the depths indicated on each test location ID. The capacity areas were refined based on information presented within the Karst Occurrence in Kentucky Map (KGS, 2001). The transition between each capacity area will be more gradual than what is shown.

SCALE

4,000 Feet

1 Mile

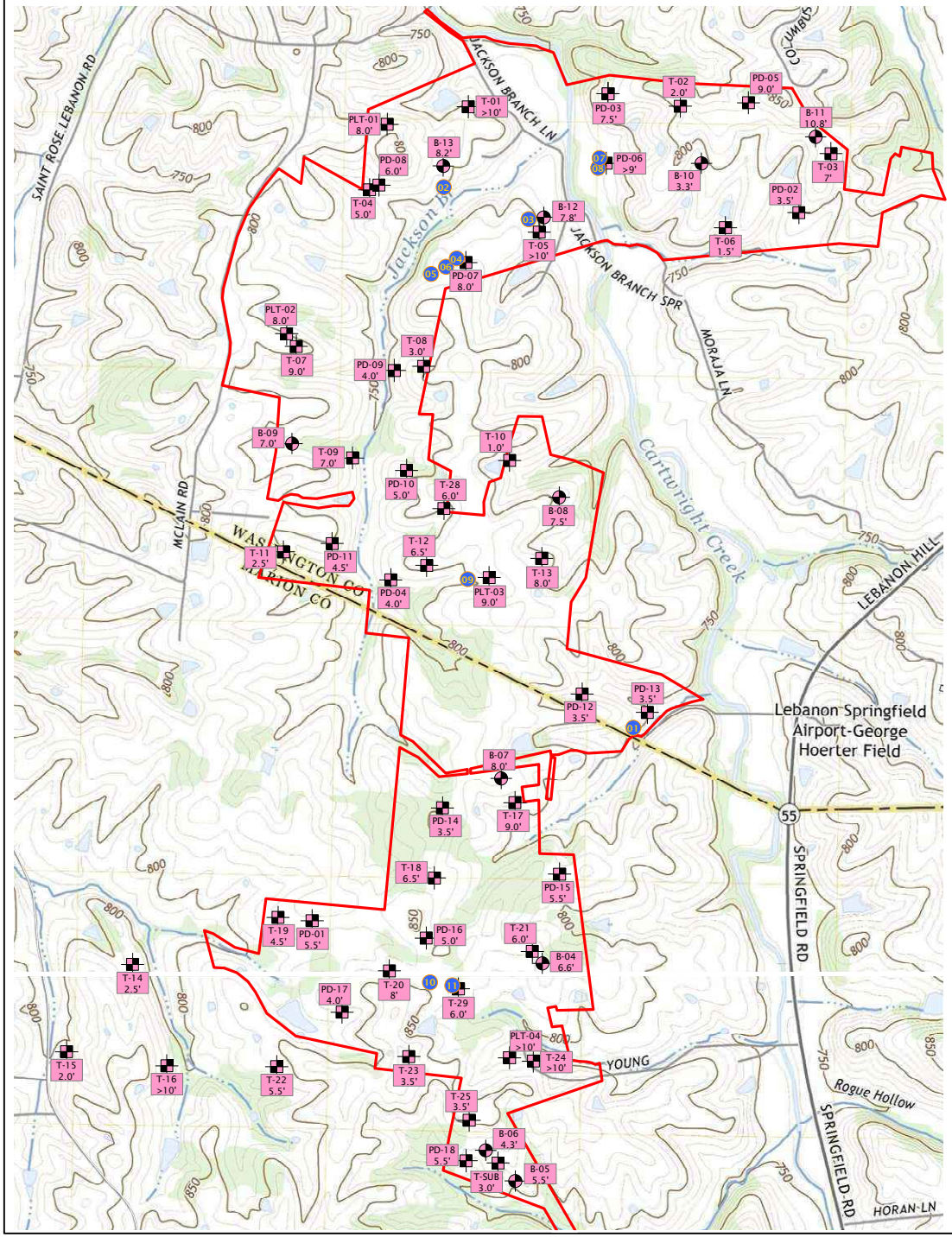
N

SHEET TITLE

Capacity Area Plan

SHEET NO.

Plate No. 3



CONSULTING GROUP

G2 Project No. 223429

Name: Proposed Frontier Solar Power Plant

Location: Marion and Washington Counties, Kentucky

Date: January 10, 2024

TEST LOCATION LEGEND

B-01 through B-13	Soil borings performed by Strata Group, LLC on December 11 through 18, 2023
PD-01 through PD-13 PLT-01 through PLT-04	Pile load testing and test pits performed by G2 Consulting Group, LLC (G2) on December 16 through 20, 2023
T-01 through T-25, T-28, T-29 and T-SUB	Test pits performed by G2 on November 15 through 19, 2022 and December 16, 2023

BOUNDARY LEGEND

Project Boundary

FIELD NOTES LEGEND

01 through 11	G2 Observed Surface Depressions

Note 1: The depth indicated on test location ID's B-01, B-02, B-03, B-05 and B-06 represents the estimated top of limestone bedrock. For the remaining exploration locations, the depths indicated are the exploration refusal depths, which may have resulted from limestone boulders or layers overlying the actual top of limestone bedrock we are intending to present.

Note 2: Cobble or boulders (limestone fragments) are present above the excavation refusal depths indicated on test location ID's PD-01, PD-03, PD-07, PD-11, PD-15, PD-16, PLT-01, PLT-03, PLT-04, T-SUB, T-02, T-05, T-15 and T-20.

Note 3: USGS 7.5-minute Quadrangle Maps for Saint Catharine and Lebanon West, Kentucky (2022)

SCALE

4,000 Feet

1 Mile

N

SHEET TITLE

Geotechnical Test Location Plan (PV Array) with Topographic Imagery (USGS, 2022)

SHEET NO.

Plate No. 4

APPENDIX A

Geotechnical Test Data

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.60489° Longitude: -85.25190°

Soil Boring No. B-01

G2 CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 762.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (8 inches) 0.7							
		Stiff Brown Fat Clay with trace sand and gravel		S-01	3 4 6	10	18.7		3000*
		4.0		S-2	4 50/1"	---	21.0		3000*
757.0			5						
		Moderately Weak Gray Slightly Weathered Limestone (Rate = 150 sec/ft to 240 sec/ft) (Recovery = 97%) (RQD = 67% to 77%)							
752.0			10	RC-3				165	6630 psi
747.0			15	RC-4				167	6280 psi
		15.8							
		End of Boring @ 15.8 ft							
742.0			20						

Total Depth: 15.8 ft
Drilling Date: December 11, 2023
Inspector: M. Majed
Contractor: Strata Group, LLC
Driller: Daniel

Drilling Method:
4-inch diameter solid stem augers to 5.8 feet;
2-inch diameter core barrels to 15.8 feet

Water Level Observation:
Dry during drilling operations;
not recorded upon completion due to coring method

Notes:
RQD = Rock Quality Designation
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 1

SOIL / PAVEMENT BORING 223429.GPJ 20150116.G2 CONSULTING DATA TEMPLATE.GDT 1/16/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.61027° Longitude: -85.25491°

Soil Boring No. B-02

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 753.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (7 inches) 0.8							
				S-1	WOH 2 2	4	29.9		2000*
		Stiff Brown Sandy Lean to Fat Clay with trace sand and gravel (LL = 43, PI = 22)							
748.0			5	S-2	4 2 2	4	23.9		3000*
		5.5							
743.0		Moderately Weak Gray Slightly Weathered Limestone (Rate = 240 sec/ft to 300 sec/ft) (Recovery = 97% to 98%) (RQD = 39% to 78%)	10	RC-3				166	7610 psi
738.0			15	RC-4				161	8670 psi
		16.0							
		End of Boring @ 16 ft							
733.0			20						

Total Depth: 16 ft
Drilling Date: December 11, 2023
Inspector: M. Majed
Contractor: Strata Group, LLC
Driller: Daniel

Drilling Method:
4-inch diameter solid stem augers to 6 feet;
2-inch diameter core barrels to 16 feet

Water Level Observation:
Dry during drilling operations;
not recorded upon completion due to coring method

Notes:
WOH = weight of hammer
RQD = Rock Quality Designation
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 2

SOIL / PAVEMENT BORING 223429.GPJ 20150116.G2 CONSULTING DATA TEMPLATE.GDT 1/16/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.60968° Longitude: -85.26271°

Soil Boring No. B-03

G2 CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 840.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (8 inches) 0.7							
		Very Stiff Brown Fat Clay with trace gravel 2.0		S-1A	5 12		20.8		6000*
				S-1B	12	24			
835.0		Very Stiff Brown Gravelly Clay with little sand (Finer than No. 200 Sieve = 43.5%)	5	S-2	12 30 32	62			
		7.0		S-3	42 50/1"	---			
830.0			10						
		Moderately Weak Gray Moderately Weathered Limestone (Rate = 300 sec/ft to 420 sec/ft) (Recovery = 90% to 92%) (RQD = 29% to 39%)		RC-4				163	6710 psi
825.0			15						
		18.0		RC-5				165	8200 psi
		End of Boring @ 18 ft							
820.0			20						

Total Depth: 18 ft
Drilling Date: December 12, 2023
Inspector: M. Majed
Contractor: Strata Group, LLC
Driller: Daniel

Drilling Method:
4-inch diameter solid stem augers to 8 feet;
2-inch diameter core barrels to 18 feet

Water Level Observation:
Dry during drilling operations;
not recorded upon completion due to coring method

Notes:
RQD = Rock Quality Designation
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 3

SOIL / PAVEMENT BORING 223429.GPJ 20150116.G2 CONSULTING DATA TEMPLATE.GDT 1/16/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.62544° Longitude: -85.26794°

Soil Boring No. B-04

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 840.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (8 inches) 0.7		S-1	3 5 4	9	26.9	93	4500
		Stiff to Very Stiff Brown Fat Clay with trace sand							
835.0			5	S-2	3 6 5	11	30.7		3000*
		6.5 Gray Weathered Limestone 6.8		S-3	32 50/1"	---			
		End of Boring @ 6.8 ft, Auger Refusal							
830.0			10						
825.0			15						
820.0			20						

Total Depth: 6.8 ft
Drilling Date: December 18, 2023
Inspector: M. Majed
Contractor: Strata Group, LLC
Driller: Daniel

Drilling Method:
4-inch diameter solid stem augers

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 4

SOIL / PAVEMENT BORING 223429.GPJ 20150116.G2 CONSULTING DATA TEMPLATE.GDT 1/16/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.61767° Longitude: -85.26914°

Soil Boring No. B-05

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 804.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (8 inches) 0.7							
				S-1	2 3 6	9	25.4	100	4330
		Stiff to Very Stiff Brown Fat Clay with trace gravel							
799.0			5	S-2	7 8 12	20	23.5	102	3590
		5.5							
794.0		Moderately Weak Gray Slightly Weathered Limestone (Rate = 360 sec/ft to 420 sec/ft) (Recovery = 92% to 100%) (RQD = 83% to 98%)	10	RC-3				167	7370 psi
789.0			15	RC-4				166	4570 psi
		15.8							
		End of Boring @ 15.8 ft							
784.0			20						

Total Depth: 15.8 ft
Drilling Date: December 14, 2023
Inspector: M. Majed
Contractor: Strata Group, LLC
Driller: Daniel

Drilling Method:
4-inch diameter solid stem augers to 5.8 feet;
2-inch diameter core barrels to 15.8 feet

Water Level Observation:
Dry during drilling operations;
not recorded upon completion due to coring method

Notes:
RQD = Rock Quality Designation
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 5

SOIL / PAVEMENT BORING 223429.GPJ 20150116.G2 CONSULTING DATA TEMPLATE.GDT 1/16/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.61876° Longitude: -85.27050°

Soil Boring No. B-06

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 826.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) 0.5							
		Very Stiff Brown Fat Clay (Finer than No. 200 Sieve = 99.3%)		S-1	3 4 5	9	24.2	102	4990
		4.3		S-2	13 50/5"	---			
821.0		Moderately Weak Gray Slightly Weathered Limestone (Rate = 240 sec/ft to 300 sec/ft) (Recovery = 97%) (RQD = 83% to 86%)	5	RC-3				162	7300 psi
816.0			10	RC-4				170	14740 psi
		14.5							
811.0		End of Boring @ 14.5 ft	15						
806.0			20						

Total Depth: 14.5 ft
Drilling Date: December 13, 2023
Inspector: M. Majed
Contractor: Strata Group, LLC
Driller: Daniel

Drilling Method:
4-inch diameter solid stem augers to 4.5 feet;
2-inch diameter core barrels to 14.5 feet

Water Level Observation:
Dry during drilling operations;
not recorded upon completion due to coring method

Notes:
RQD = Rock Quality Designation
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 6

SOIL / PAVEMENT BORING 223429.GPJ 20150116.G2 CONSULTING DATA TEMPLATE.GDT 1/16/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.63201° Longitude: -85.26979°

Soil Boring No. B-07

G2 CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 829.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (8 inches) 0.7							
		Stiff to Very Stiff Brown Fat Clay with trace sand (Finer than No. 200 Sieve = 94.1%)		S-1	4 2 5	7	22.5		3000*
824.0			5	S-2	3 4 7	11	22.8		4000*
		5.5							
		Very Stiff Mottled Brown and Gray Silty Clay with trace sand and gravel (LL = 26, PI = 8)		S-3	8 10 20	30	19.9		4000*
		8.0							
		Gray Weathered Limestone 8.1							
		End of Boring @ 8 ft, Auger Refusal							
819.0			10						
814.0			15						
809.0			20						

Total Depth: 8 ft
Drilling Date: December 13, 2023
Inspector: M. Majed
Contractor: Strata Group, LLC
Driller: Daniel

Drilling Method:
4-inch diameter solid stem augers

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 7

SOIL / PAVEMENT BORING 223429.GPJ 20150116.G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.64206° Longitude: -85.26717°

Soil Boring No. B-08

G2 CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 796.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (8 inches) 0.7							
		Very Stiff Brown Fat Clay with trace sand and gravel (LL = 81, PI = 51) 3.8		S-1	5 6 6	12	30.3	95	5620
791.0		Compact Brown Clayey Gravel with little sand (Finer than No. 200 Sieve = 29.3%) 6.5	5	S-2	10 15 21	36			
				S-3	50/3"	---			
		Gray Weathered Limestone 7.5							
		End of Boring @ 7.5 ft, Auger Refusal							
786.0			10						
781.0			15						
776.0			20						

Total Depth: 7.5 ft
Drilling Date: December 15, 2023
Inspector: M. Majed
Contractor: Strata Group, LLC
Driller: Daniel

Drilling Method:
4-inch diameter solid stem augers

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 8

SOIL / PAVEMENT BORING 223429.GPJ 20150116.G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.64395° Longitude: -85.27915°

Soil Boring No. B-09

G2 CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 782.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) 0.5							
		Stiff Brown Sandy Fat Clay with trace gravel		S-1	3 5 7	12	19.8	109	2610
		3.0							
777.0		Very Stiff Mottled Brown and Gray Fat Clay with trace sand	5	S-2	9 8 8	16	21.1	106	6130
		7.0		S-3A	11 50		16.2	115	5570
		Gray Weathered Limestone 7.5		S-3B	50/2"	---			
		End of Boring @ 7.5 ft, Auger Refusal							
772.0			10						
767.0			15						
762.0			20						

Total Depth: 7.5 ft
Drilling Date: December 14, 2023
Inspector: M. Majed
Contractor: Strata Group, LLC
Driller: Daniel

Drilling Method:
4-inch diameter solid stem augers

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 9

SOIL / PAVEMENT BORING 223429.GPJ 20150116.G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.65394° Longitude: -85.26074°

Soil Boring No. B-10

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 783.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) 0.5							
		Hard Brown Fat Clay with trace gravel		S-1	4 3 5	8	28.1		9000*
		3.2 Gray Weathered Limestone 3.3							
		End of Boring @ 3.3 ft, Auger Refusal							
778.0			5						
773.0			10						
768.0			15						
763.0			20						

Total Depth: 3.3 ft
Drilling Date: December 18, 2023
Inspector: M. Majed
Contractor: Strata Group, LLC
Driller: Daniel

Drilling Method:
4-inch diameter solid stem augers

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 10

SOIL / PAVEMENT BORING 223429.GPJ 20150116.G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.65481° Longitude: -85.25555°

Soil Boring No. B-11

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 829.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) 0.5							
		Very Stiff Brown Fat Clay with trace sand and gravel (LL = 77, PI = 48)		S-1	2 3 5	8	29.1	93	4410
		4.5		S-2A	6		29.7		5000*
824.0		Medium Tan Silty Clay	5	S-2B	4 4	8			
		5.5							
		Medium Compact Tan Clayey Gravel with some sand (Finer than No. 200 Sieve = 30.8%)		S-3	22 15 10	25			
		8.0							
		Tan Silty Clay							
		9.3							
819.0		Gray Weathered Limestone	10	S-4	12 50/4"	---			
		10.8							
		End of Boring @ 10.8 ft, Auger Refusal							
814.0			15						
809.0			20						

Total Depth: 10.8 ft
Drilling Date: December 18, 2023
Inspector: M. Majed
Contractor: Strata Group, LLC
Driller: Daniel

Drilling Method:
4-inch diameter solid stem augers

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 11

SOIL / PAVEMENT BORING 223429.GPJ 20150116.G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.65193° Longitude: -85.26782°

Soil Boring No. B-12

G2 CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 776.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (9 inches) 0.8							
		Hard Brown Fat Clay with trace sand and gravel		S-1	5 5 6	11	27.6		8000*
		3.0							
771.0		Stiff to Very Stiff Brown Fat Clay with trace sand and gravel (LL = 75, PI = 50)	5	S-2	8 10 8	18	25.5	100	7900
		7.0		S-3A	4 10		22.7	106	3750
		Gray Weathered Limestone 7.8		S-3B	12	22			
		End of Boring @ 7.8 ft, Auger Refusal							
766.0			10						
761.0			15						
756.0			20						

Total Depth: 7.8 ft
Drilling Date: December 15, 2023
Inspector: M. Majed
Contractor: Strata Group, LLC
Driller: Daniel

Drilling Method:
4-inch diameter solid stem augers

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 12

SOIL / PAVEMENT BORING 223429.GPJ 20150116.G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.65385° Longitude: -85.27238°

Soil Boring No. B-13

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 768.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) 0.5							
				S-1	3 5 6	11	26.3	98	6140
		Very Stiff to Hard Brown Fat Clay with trace sand and gravel							
763.0			5	S-2	6 8 9	17	26.4	102	6170
				S-3	6 10 10	20	23.6	104	8140
		Gray Weathered Limestone 8.0 8.2							
		End of Boring @ 8.2 ft, Auger Refusal							
758.0			10						
753.0			15						
748.0			20						

Total Depth: 8.2 ft
Drilling Date: December 15, 2023
Inspector: M. Majed
Contractor: Strata Group, LLC
Driller: Daniel

Drilling Method:
4-inch diameter solid stem augers

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 13

SOIL / PAVEMENT BORING 223429.GPJ 20150116.G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.62693° Longitude: -85.27826°

Test Pit No. PD-01

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 842.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 5.8%) 0.5		BS-1				
		Stiff Brown Fat Clay with trace sand and gravel (LL = 60, PI = 32) 4.0		BS-2		26.8		3000*
837.0		Stiff Tan Fat Clay with trace sand and gravel, frequent boulders 5.5	5	BS-3		23.9		3500*
		End of Test Pit @ 5 ft, Refusal						
832.0			10					
827.0			15					
822.0			20					

Total Depth: 5 ft
Excavation Date: December 16, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 14

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.65219° Longitude: -85.25635°

Test Pit No. PD-02

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 796.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 3.6%)	0.5	BS-1				
		Very Stiff Brown Sandy Fat Clay with trace gravel	3.5	BS-2		26.9		5000*
		End of Test Pit @ 3.5 ft, Refusal						
791.0			5					
786.0			10					
781.0			15					
776.0			20					

Total Depth: 3.5 ft
Excavation Date: December 20, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 15

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.65641° Longitude: -85.26495°

Test Pit No. PD-03

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 772.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 8.6%)	0.5	BS-01				
		Stiff Brown Sandy Fat Clay with trace gravel, occasional cobbles and boulders						
767.0			5					
			7.5	BS-02		23.4		2000*
		End of Test Pit @ 7.5 ft, Refusal						
762.0			10					
757.0			15					
752.0			20					

Total Depth: 7.5 ft
Excavation Date: December 20, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 16

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.63909° Longitude: -85.27471°

Test Pit No. PD-04

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 781.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 6.0%) 0.5		BS-1				
		Very Stiff Brown Sandy Lean to Fat Clay with trace gravel (LL = 49, PI = 25)		BS-2		31.5		5000*
		3.0 Very Stiff Tan Gravelly Clay with trace sand (Finer than No.200 Sieve = 49.3%) 4.0		BS-3		27.4		4000*
776.0		End of Test Pit @ 4 ft, Refusal	5					
771.0			10					
766.0			15					
761.0			20					

Total Depth: 4 ft
Excavation Date: December 19, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 17

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.65610° Longitude: -85.25869°

Test Pit No. PD-05

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 821.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 5.9%) 0.5		BS-1				
816.0		Very Stiff Brown Sandy Fat Clay with trace gravel	5					
		9.0		BS-2		34.6		6000*
811.0		End of Test Pit @ 9 ft, Refusal	10					
806.0			15					
801.0			20					

Total Depth: 9 ft
Excavation Date: December 20, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 18

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.65394° Longitude: -85.26513°

Test Pit No. PD-06

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 718.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 6.9%) 0.5		BS-1				
		Stiff Brown Fat Clay with trace sand (Finer than No. 200 Sieve = 95.6%)						
713.0		5.0	5	BS-2		21.1		2000*
		Very Stiff Mottled Brown and Gray Sandy Fat Clay with trace gravel 9.0		BS-3		24.6		6000*
708.0		End of Test Pit @ 9 ft, Refusal	10					
703.0			15					
698.0			20					

Total Depth: 9 ft
Excavation Date: December 20, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 19

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.65041° Longitude: -85.27135°

Test Pit No. PD-07

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 777.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 5.3%)	0.5	BS-1				
772.0		Very Stiff Brown Sandy Fat Clay with trace gravel, occasional cobbles and boulders	5					
			8.0	BS-2		27.3		6000*
767.0		End of Test Pit @ 8 ft, Refusal	10					
762.0			15					
757.0			20					

Total Depth: 8 ft
Excavation Date: December 20, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 20

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.65312° Longitude: -85.27526°

Test Pit No. PD-08

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 768.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 5.5%)	0.5	BS-1				
		Very Stiff Brown Sandy Fat Clay with trace gravel						
763.0			5					
			6.0	BS-2		24.1		5000*
		End of Test Pit @ 6 ft, Refusal						
758.0			10					
753.0			15					
748.0			20					

Total Depth: 6 ft
Excavation Date: December 20, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 21

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.64657° Longitude: -85.27458°

Test Pit No. PD-09

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 756.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 4.8%) 0.5		BS-1				
		Very Stiff Brown Sandy Lean to Fat Clay with trace gravel (LL = 41, PI = 19)		BS-2		21.0		5000*
		4.0 End of Test Pit @ 4 ft, Refusal						
751.0			5					
746.0			10					
741.0			15					
736.0			20					

Total Depth: 4 ft
Excavation Date: December 20, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 22

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.64298° Longitude: -85.27405°

Test Pit No. PD-10

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 792.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 3.8%) 0.5		BS-1				
		Very Stiff Tan Fat Clay with trace sand 3.5		BS-2		32.4		6000*
787.0		Hard Mottled Gray and Tan Fat Clay with trace sand and gravel 5.0	5	BS-3		20.4		8000*
782.0		End of Test Pit @ 5 ft, Refusal	10					
777.0			15					
772.0			20					

Total Depth: 5 ft
Excavation Date: December 19, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 23

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.64040° Longitude: -85.27739°

Test Pit No. PD-11

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 796.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 6.4%)	0.5	BS-1				
		Medium Tan Sandy Lean to Fat Clay with trace gravel	2.0	BS-2		26.3		1500*
		Hard Mottled Gray and Brown Sandy Fat Clay with trace gravel	4.2	BS-3		24.2		9000*
		Hard Gray Silty Clay with trace sand and gravel, occasional cobbles	4.5	BS-4		13.7		9000*
791.0			5					
		End of Test Pit @ 4.5 ft, Refusal						
786.0			10					
781.0			15					
776.0			20					

Total Depth: 4.5 ft
Excavation Date: December 19, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 24

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.63507° Longitude: -85.26615°

Test Pit No. PD-12

G2 CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 776.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 9.0%)	0.5	BS-01				
		Very Stiff Brown Sandy Fat Clay with trace gravel	3.5	BS-02		24.5		6000*
		End of Test Pit @ 3.5 ft, Refusal						
771.0			5					
766.0			10					
761.0			15					
756.0			20					

Total Depth: 3.5 ft
Excavation Date: December 19, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 25

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.63444° Longitude: -85.26320°

Test Pit No. PD-13

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 757.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 4.8%)	0.5	BS-1				
		Very Stiff Brown Sandy Lean to Fat Clay with trace gravel (LL = 48, PI = 26)						
			3.5	BS-2		24.5		5000*
		End of Test Pit @ 3.5 ft, Refusal						
752.0			5					
747.0			10					
742.0			15					
737.0			20					

Total Depth: 3.5 ft
Excavation Date: December 19, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 26

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.63102° Longitude: -85.27242°

Test Pit No. PD-14

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 843.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 5.2%)	0.5	BS-1				
		Stiff Brown Fat Clay with trace sand and gravel	2.0	BS-2		32.4		2000*
		Very Stiff Mottled Brown and Gray Sandy Fat Clay with trace gravel	3.5	BS-3		28.8		5000*
		End of Test Pit @ 3.5 ft, Refusal						
838.0			5					
833.0			10					
828.0			15					
823.0			20					

Total Depth: 3.5 ft
Excavation Date: December 18, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 27

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.62855° Longitude: -85.26711°

Test Pit No. PD-15

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 830.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 4.4%) 0.5		BS-1				
		Medium Mottled Brown Sandy Lean to Fat Clay with trace gravel 4.0		BS-2		25.7		1500*
825.0		Hard Gray Silty Clay with trace sand and gravel, occasional boulders 5.5	5	BS-3		20.6		9000*
		End of Test Pit @ 5.5 ft, Refusal						
820.0			10					
815.0			15					
810.0			20					

Total Depth: 5.5 ft
Excavation Date: December 16, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 28

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.62629° Longitude: -85.27311°

Test Pit No. PD-16

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 848.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 10.2%) 0.5		BS-1				
		Stiff Brown Sandy Fat Clay with trace gravel 4.0		BS-2		25.2		2000*
843.0		Stiff Mottled Gray and Brown Sandy Fat Clay with trace gravel, occasional boulders 5.0	5	BS-3		22.6		3000*
		End of Test Pit @ 5 ft, Refusal						
838.0			10					
833.0			15					
828.0			20					

Total Depth: 5 ft
Excavation Date: December 16, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 29

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.62369° Longitude: -85.27693°

Test Pit No. PD-17

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 834.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 12.7%)	0.5	BS-1				
		Very Stiff Brown Sandy Fat Clay with trace gravel						
			3.5	BS-2		27.8		6000*
		Very Stiff Tan Sandy Fat Clay with trace gravel	4.0	BS-3		24.2		4000*
829.0		End of Test Pit @ 4 ft, Refusal	5					
824.0			10					
819.0			15					
814.0			20					

Total Depth: 4 ft
Excavation Date: December 16, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 30

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.61847° Longitude: -85.27125°

Test Pit No. PD-18

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 819.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 9.8%)	0.5	BS-1				
		Stiff Brown Sandy Lean to Fat Clay with trace gravel (LL = 40, PI = 19)	3.0	BS-2		23.6		3000*
814.0		Hard Gray Silty Clay with trace gravel	5					
			5.5	BS-3		17.4		9000*
		End of Test Pit @ 5.5 ft, Refusal						
809.0			10					
804.0			15					
799.0			20					

Total Depth: 5.5 ft
Excavation Date: December 16, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Groundwater seepage at 5-1/4 feet upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 31

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.65533° Longitude: -85.27485°

Test Pit No. PLT-01

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 786.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 2.1%)	0.5	BS-1				
		Stiff Brown Sandy Lean to Fat Clay (LL = 42, PI = 20)	3.0	BS-2		23.5		2500*
781.0		Very Stiff Tan Sandy Fat Clay	5	BS-3		25.0		5000*
		Very Stiff Gray Silty Clay with trace sand and gravel, occasional boulders	8.0	BS-4		19.0		6000*
		End of Test Pit @ 8 ft, Refusal						
776.0			10					
771.0			15					
766.0			20					

Total Depth: 8 ft
Excavation Date: December 19, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 32

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.64782° Longitude: -85.27938°

Test Pit No. PLT-02

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 799.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 2.0%)	0.5	BS-1				
794.0		Very Stiff Brown Sandy Fat Clay (Finer than No. 200 Sieve = 87.0%)	5					
			8.0	BS-2		28.1		5000*
789.0		End of Test Pit @ 8 ft, Refusal	10					
784.0			15					
779.0			20					

Total Depth: 8 ft
Excavation Date: December 19, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 33

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.63917° Longitude: -85.27029°

Test Pit No. PLT-03

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 812.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 2.9%)	0.5	BS-1				
		Very Stiff Brown Sandy Fat Clay	3.0	BS-2		22.9		6000*
807.0		Very Stiff Mottled Brown and Gray Sandy Fat Clay	5					
			7.0	BS-3		23.7		5000*
		Stiff Gray Silty Clay with trace sand and gravel	8.0	BS-4		30.2		2000*
		Hard Gray Silty Clay with trace sand and gravel, occasional boulders	9.0	BS-5		26.1		9000*
802.0		End of Test Pit @ 9 ft, Refusal	10					
797.0			15					
792.0			20					

Total Depth: 9 ft
Excavation Date: December 19, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 34

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.62208° Longitude: -85.26932°

Test Pit No. PLT-04

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 810.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 7.2%)	0.5	BS-1				
805.0		Stiff to Very Stiff Brown Fat Clay with trace sand (LL = 54, PI = 30)	5	BS-2		22.9		6000*
			8.0	BS-3		23.3		3500*
800.0		Very Stiff Gray Silty Clay with trace sand and gravel, occasional boulders	10.0 10	BS-4		22.4		7000*
		End of Test Pit @ 10 ft						
795.0			15					
790.0			20					

Total Depth: 10 ft
Excavation Date: December 16, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 35

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.61831° Longitude: -85.26993°

Test Pit No. T-SUB

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 818.0 ft	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 5.9%)	0.5	BS-1				
		Very Stiff Brown Sandy Fat Clay with trace gravel	2.0	BS-2		24.5		6000*
		Hard Gray Silty Clay with trace sand and gracel, occasional boulders	3.0	BS-3				9000*
		End of Test Pit @ 3 ft, Refusal						
813.0			5					
808.0			10					
803.0			15					
798.0			20					

Total Depth: 3 ft
Excavation Date: December 16, 2023
Inspector: M. Majed
Contractor: G2 Consulting Group, LLC
Operator: T. Dehayes

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 36

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.65597° Longitude: -85.27129°

Test Pit No. T-01

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA				
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 757.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay (6 inches) 0.5		BS-1				
752.0			5	BS-2				9000*
		Hard Brown Sandy Fat Clay						
747.0		10.0	10					
		End of Test Pit @ 10 ft						
742.0			15					
737.0			20					

Total Depth: 10 ft
Excavation Date: November 15, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 37

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.65598° Longitude: -85.26175°

Test Pit No. T-02

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 798.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (6 inches) (Organic Content = 10.3%)	0.5	BS-1				
		Hard Brown Sandy Fat Clay, occasional cobbles	2.0	BS-2		32.2		9000*
		Gray Weathered Limestone	3.0					
		End of Test Pit @ 3 ft, Refusal						
793.0			5					
788.0			10					
783.0			15					
778.0			20					

Total Depth: 3 ft
Excavation Date: November 15, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 38

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.65430° Longitude: -85.25509°

Test Pit No. T-03

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 831.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay (6 inches) 0.5		BS-1				
		Hard Mottled Gray and Brown Fat Clay with trace sand (LL = 59, PI = 35)						
826.0			5	BS-2		23.7		9000*
		7.0						
		Gray Weathered Limestone 9.0						
821.0		End of Test Pit @ 9 ft, Refusal	10					
816.0			15					
811.0			20					

Total Depth: 9 ft
Excavation Date: November 15, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 39

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.65306° Longitude: -85.27546°

Test Pit No. T-04

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 764.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay (4 inches) 0.3		BS-1				
		Hard Brown Sandy Fat Clay with trace gravel						
759.0		5.0	5	BS-2				9000*
		Gray Weathered Limestone 7.0						
		End of Test Pit @ 7 ft, Refusal						
754.0			10					
749.0			15					
744.0			20					

Total Depth: 7 ft
Excavation Date: November 15, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 40

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.65156° Longitude: -85.26811°

Test Pit No. T-05

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA				
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 750.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay (4 inches) 0.3		BS-1				
		Very Stiff Brown Sandy Fat Clay 2.0						
		Very Stiff Brown Sandy Fat Clay, occasional boulders 3.0						
745.0			5	BS-2		27.4		5000*
		Very Stiff Brown Sandy Fat Clay with trace gravel						
740.0		10.0	10	BS-3				
		End of Test Pit @ 10 ft						
735.0			15					
730.0			20					

Total Depth: 10 ft
Excavation Date: November 15, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 41

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.65168° Longitude: -85.25968°

Test Pit No. T-06

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 760.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Topsoil: Dark Brown Sandy Clay (3 inches) 0.3		BS-1				
		Hard Brown Sandy Fat Clay with trace gravel 1.5		BS-2				9000*
		Gray Weathered Limestone 2.0						
		End of Test Pit @ 2 ft, Refusal						
755.0			5					
750.0			10					
745.0			15					
740.0			20					

Total Depth: 2 ft
Excavation Date: November 15, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 42

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.64745° Longitude: -85.27902°

Test Pit No. T-07

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 796.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay (4 inches) 0.3		BS-1				
791.0		Hard Brown Sandy Fat Clay	5	BS-2				9000*
		7.0						
		Very Stiff Mottled Brown and Gray Fat Clay with trace sand (LL = 62, PI = 39)		BS-3		26.1		7000*
		9.0						
786.0		Gray Weathered Limestone 10.0	10					
		End of Test Pit @ 10 ft						
781.0			15					
776.0			20					

Total Depth: 10 ft
Excavation Date: November 16, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 43

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.64671° Longitude: -85.27325°

Test Pit No. T-08

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 788.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Topsoil: Dark Brown Sandy Clay (2 inches) 0.2		BS-1				
		Hard Brown Sandy Fat Clay with trace gravel						
		3.0		BS-2				9000*
		Gray Weathered Limestone						
		4.0						
		End of Test Pit @ 4 ft, Refusal						
783.0			5					
778.0			10					
773.0			15					
768.0			20					

Total Depth: 4 ft
Excavation Date: November 16, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 44

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.64347° Longitude: -85.27646°

Test Pit No. T-09

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 770.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay (1 inch) 0.1		BS-1				
				BS-2		17.4		7000*
		Very Stiff Brown Sandy Fat Clay (Finer than No. 200 Sieve = 86.4%)						
765.0			5					
		7.0						
		Gray Weathered Limestone						
760.0		10.0	10					
		End of Test Pit @ 10 ft, Refusal						
755.0			15					
750.0			20					

Total Depth: 10 ft
Excavation Date: November 16, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 45

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.64338° Longitude: -85.26939°

Test Pit No. T-10

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 782.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Topsoil: Dark Brown Clayey Sand with trace gravel (8 inches) (Organic Content = 10.4%) 0.7		BS-1				
		Brown Sandy Lean to Fat Clay with trace gravel 1.0		BS-2				
		Gray Weathered Limestone, frequent sand layers and clay seams						
		4.5						
777.0		End of Test Pit @ 4.5 ft, Refusal	5					
772.0			10					
767.0			15					
762.0			20					

Total Depth: 4.5 ft
Excavation Date: November 15, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Excavation Backfilling Procedure:
Excavated soil

Figure No. 46

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.64013° Longitude: -85.27960°

Test Pit No. T-11

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 799.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay (1 inch) 0.1		BS-1				
		Hard Brown Sandy Fat Clay		BS-2				9000*
		2.5						
		Gray Weathered Limestone						
794.0		5.0	5	BS-3				
		End of Test Pit @ 5 ft, Refusal						
789.0			10					
784.0			15					
779.0			20					

Total Depth: 5 ft
Excavation Date: November 16, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 47

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.63963° Longitude: -85.27313°

Test Pit No. T-12

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 805.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay (4 inches) 0.3		BS-1				
		Very Stiff Mottled Brown and Gray Fat Clay with trace sand						
800.0			5	BS-2				7000*
		6.0 Hard Gray Lean to Fat Clay with trace sand 6.5		BS-3		11.4		9000*
		End of Test Pit @ 6.5 ft, Refusal						
795.0			10					
790.0			15					
785.0			20					

Total Depth: 6.5 ft
Excavation Date: November 16, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 48

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.63990° Longitude: -85.26800°

Test Pit No. T-13

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 809.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay (6 inches) 0.5		BS-1				
		Hard Brown Sandy Fat Clay						
804.0			5	BS-2				9000*
		7.5						
		Hard Gray Fat Clay with trace sand 8.0		BS-3				9000*
		End of Test Pit @ 8 ft, Refusal						
799.0			10					
794.0			15					
789.0			20					

Total Depth: 8 ft
Excavation Date: November 16, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 49

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.62536° Longitude: -85.28633°

Test Pit No. T-14

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 813.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay (3 inches) 0.3		BS-1				
		Hard Brown Sandy Fat Clay		BS-2		16.7		9000*
		2.5						
		Gray Weathered Limestone						
		4.0						
		End of Test Pit @ 4 ft, Refusal						
808.0			5					
803.0			10					
798.0			15					
793.0			20					

Total Depth: 4 ft
Excavation Date: November 16, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 50

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.62228° Longitude: -85.28932°

Test Pit No. T-15

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 805.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay with trace gravel (3 inches) (Organic Content = 4.5%)	0.3	BS-1				
		Very Stiff Brown Sandy Fat Clay, occasional cobbles	2.0	BS-2				7000*
		Gray Weathered Limestone	4.0					
800.0		End of Test Pit @ 4 ft, Refusal	5					
795.0			10					
790.0			15					
785.0			20					

Total Depth: 4 ft
Excavation Date: November 17, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 51

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.62182° Longitude: -85.28484°

Test Pit No. T-16

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 830.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay (6 inches) 0.5		BS-1				
825.0		Hard Brown Fat Clay with trace sand (LL = 84, PI = 52)	5	BS-2		27.9		9000*
		9.0						
820.0		Stiff Mottled Dark Brown and Brown Sandy Fat Clay 10.0	10	BS-3				3000*
		End of Test Pit @ 10 ft						
815.0			15					
810.0			20					

Total Depth: 10 ft
Excavation Date: November 16, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 52

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.63118° Longitude: -85.26918°

Test Pit No. T-17

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 815.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay (2 inches) 0.2		BS-1				
		Hard Gray Fat Clay with trace sand		BS-2				9000*
810.0			5					
		6.0						
		Very Stiff Mottled Brown and Gray Fat Clay with trace sand		BS-3				6000*
		8.5						
		Gray Weathered Limestone 9.0						
		End of Test Pit @ 9 ft, Refusal						
805.0			10					
800.0			15					
795.0			20					

Total Depth: 9 ft
Excavation Date: November 17, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 53

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.62850° Longitude: -85.27283°

Test Pit No. T-18

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 836.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay (2 inches) 0.2		BS-1				
		Hard Brown Sandy Fat Clay		BS-2				9000*
831.0			5					
		5.5 Hard Tan Silty Clay with trace sand 6.5		BS-3				9000*
		End of Test Pit @ 6.5 ft, Refusal						
826.0			10					
821.0			15					
816.0			20					

Total Depth: 6.5 ft
Excavation Date: November 17, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 54

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.62705° Longitude: -85.27981°

Test Pit No. T-19

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 835.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay (2 inches) 0.2		BS-1				
		Very Stiff Brown Sandy Fat Clay		BS-2		22.1		7000*
		3.8		BS-3				6000*
		Very Stiff Tan Silty Clay with trace sand 4.5						
830.0		Gray Weathered Limestone 5.0	5					
		End of Test Pit @ 5 ft, Refusal						
825.0			10					
820.0			15					
815.0			20					

Total Depth: 5 ft
Excavation Date: November 17, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 55

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.62516° Longitude: -85.27481°

Test Pit No. T-20

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 838.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay (3 inches) 0.3		BS-1				
833.0		Hard Brown Sandy Fat Clay 5.0	5	BS-2		20.0		9000*
		Hard Brown Sandy Fat Clay, occasional cobbles 7.0						
		Stiff Gray Fat Clay with trace sand, occasional cobbles 8.0		BS-3				2000*
		End of Test Pit @ 8 ft, Refusal						
828.0			10					
823.0			15					
818.0			20					

Total Depth: 8 ft
Excavation Date: November 17, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 56

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.62579° Longitude: -85.26834°

Test Pit No. T-21

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 839.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay (4 inches) (Organic Content = 6.4%) 0.3		BS-1				
		Hard Brown Sandy Lean Clay with trace gravel (LL = 34, PI = 14)		BS-2		12.6		9000*
		4.0						
834.0		Very Stiff Gray Sandy Lean to Fat Clay	5	BS-3		11.4		7000*
		6.0						
		Gray Weathered Limestone 7.0						
		End of Test Pit @ 7 ft, Refusal						
829.0			10					
824.0			15					
819.0			20					

Total Depth: 7 ft
Excavation Date: November 17, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 57

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.62178° Longitude: -85.27989°

Test Pit No. T-22

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 833.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay (3 inches) 0.3		BS-1				
		Very Stiff Brown Sandy Fat Clay 3.0						
		Very Stiff Brown Fat Clay with trace sand (Finer than No. 200 Sieve = 93.4%)		BS-2				4000*
828.0			5					
		Gray Weathered Limestone 5.5 – 6.5		BS-3				
		End of Test Pit @ 6.5 ft, Refusal						
823.0			10					
818.0			15					
813.0			20					

Total Depth: 6.5 ft
Excavation Date: November 17, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 58

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.62213° Longitude: -85.27391°

Test Pit No. T-23

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 863.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay (3 inches) 0.3		BS-1				
		Very Stiff Brown Sandy Fat Clay		BS-2				7000*
		3.5 Gray Weathered Limestone 4.0						
858.0		End of Test Pit @ 4 ft, Refusal	5					
853.0			10					
848.0			15					
843.0			20					

Total Depth: 4 ft
Excavation Date: November 17, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 59

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.62203° Longitude: -85.26842°

Test Pit No. T-24

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 814.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Topsoil: Dark Brown Sandy Clay (3 inches) 0.3		BS-1				
809.0		Hard Brown Sandy Fat Clay with trace gravel	5	BS-2				8000*
		7.0						
		Very Stiff Mottled Brown and Gray Fat Clay with trace sand		BS-3				7000*
		9.0						
804.0		Hard Gray Sandy Lean to Fat Clay with trace sand 10.0	10	BS-4		15.9		9000*
		End of Test Pit @ 10 ft						
799.0			15					
794.0			20					

Total Depth: 10 ft
Excavation Date: November 17, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 60

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.61982° Longitude: -85.27122°

Test Pit No. T-25

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 849.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay (3 inches) 0.3		BS-1				
		Hard Brown Sandy Lean to Fat Clay (LL = 44, PI = 24)		BS-2		16.5		8000*
		2.0						
		Hard Tan Silty Clay with trace sand		BS-3		15.0		9000*
		3.5						
		End of Test Pit @ 3.5 ft, Refusal						
844.0			5					
839.0			10					
834.0			15					
829.0			20					

Total Depth: 3.5 ft
Excavation Date: November 17, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 61

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.64163° Longitude: -85.27238°

Test Pit No. T-28

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 798.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay (4 inches) 0.3		BS-1				
		Very Stiff Mottled Gray and Brown Fat Clay with trace sand		BS-2				5000*
793.0		5.0	5					
		Hard Gray Fat Clay with trace sand 6.0		BS-3				9000*
		End of Test Pit @ 6 ft, Refusal						
788.0			10					
783.0			15					
778.0			20					

Total Depth: 6 ft
Excavation Date: November 16, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 62

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No. 223429

Latitude: 37.62452° Longitude: -85.27171°

Test Pit No. T-29

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 830.0 ft ±	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Dark Brown Sandy Clay (3 inches) 0.3		BS-1				
		Very Stiff Brown Sandy Fat Clay		BS-2				6000*
825.0			5					
		5.5 Hard Mottled Brown and Gray Fat Clay with trace sand 6.0		BS-3		25.6		9000*
		End of Test Pit @ 6 ft, Refusal						
820.0			10					
815.0			15					
810.0			20					

Total Depth: 6 ft
Excavation Date: November 17, 2022
Inspector: S. Misze
Contractor: G2 Consulting Group, LLC
Operator: Z. Lilly

Excavation Equipment:
JCB Backhoe;
24-inch toothed bucket

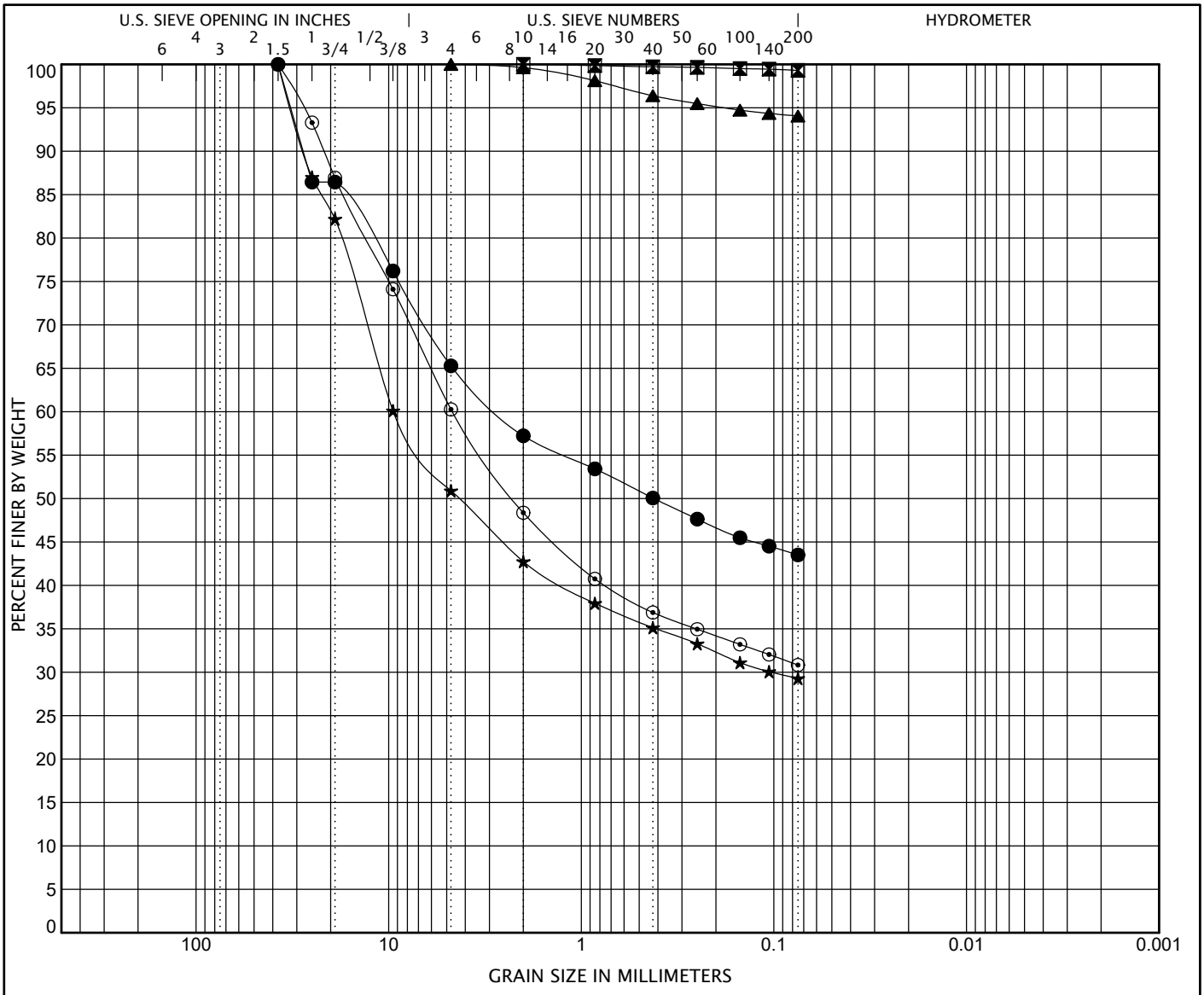
Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated soil

Figure No. 63

TEST PIT 223429.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen ID			Description	LL	PL	PI	Cc	Cu
●	B-03	S-2	Brown Gravelly Clay with little sand					
⊠	B-06	S-1	Brown Fat Clay					
▲	B-07	S-2	Brown Fat Clay with trace sand					
★	B-08	S-2	Brown Clayey Gravel with little sand					
⊙	B-11	S-3	Tan Clayey Gravel with some sand					

Specimen ID			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-03	S-2	37.5	2.695			34.7	21.8	43.5	
⊠	B-06	S-1	2				0.0	0.7	99.3	
▲	B-07	S-2	4.75				0.0	5.9	94.1	
★	B-08	S-2	37.5	9.421	0.103		49.1	21.6	29.3	
⊙	B-11	S-3	37.5	4.66			39.7	29.4	30.8	

CONSULTING GROUP

GRAIN SIZE DISTRIBUTION

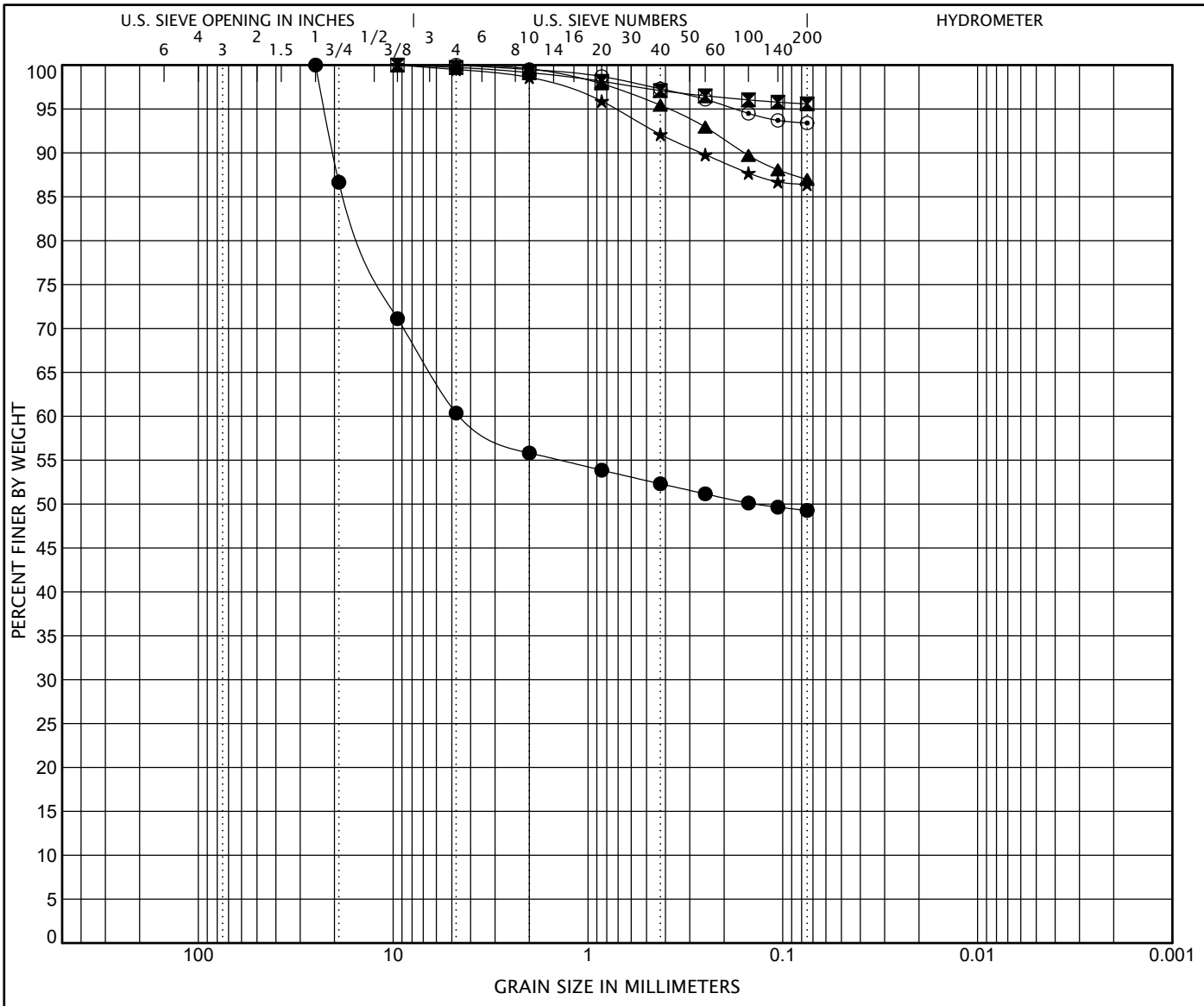
Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No.: 223429

Figure No. 64

US_GRAIN_SIZE 223429.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen ID	Description	LL	PL	PI	Cc	Cu
●	PD-04 BS-3	Tan Gravelly Clay with trace sand					
⊠	PD-06 BS-2	Brown Fat Clay with trace sand					
▲	PLT-02BS-2	Brown Sandy Fat Clay					
★	TP-09 BS-2	Brown Sandy Fat Clay					
⊙	TP-22 BS-2	Brown Fat Clay with trace sand					

	Specimen ID	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	PD-04 BS-3	25	4.432			39.6	11.1	49.3	
⊠	PD-06 BS-2	9.5				0.3	4.2	95.6	
▲	PLT-02BS-2	4.75				0.0	13.0	87.0	
★	T-09 BS-2	9.5				0.5	13.1	86.4	
⊙	T-22 BS-2	4.75				0.0	6.6	93.4	

CONSULTING GROUP

GRAIN SIZE DISTRIBUTION

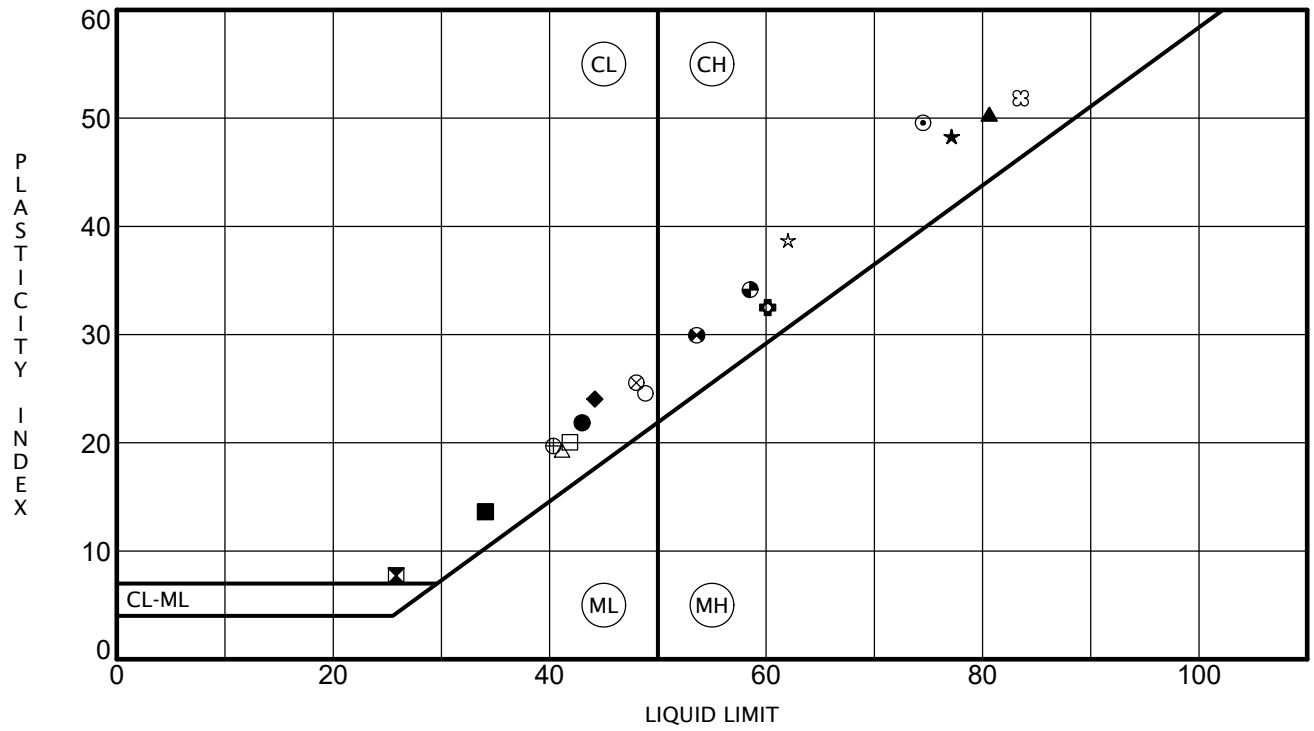
Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No.: 223429

Figure No. 65

US_GRAIN_SIZE 223429.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24



	Specimen Identification		LL	PL	PI	Fines	M %	Classification
●	B-02	S-2	43	21	22		24	Brown Sandy Lean to Fat Clay
⊠	B-07	S-3	26	18	8		20	Mottled Brown and Gray Silty Clay
▲	B-08	S-1	81	30	51		30	Brown Fat Clay
★	B-11	S-1	77	29	48		29	Brown Fat Clay
⊙	B-12	S-2	75	25	50		25	Brown Fat Clay
✿	PD-01	BS-2	60	28	32		27	Brown Fat Clay
○	PD-04	BS-2	49	24	25		32	Brown Sandy Lean to Fat Clay
△	PD-09	BS-2	41	22	19		21	Brown Sandy Lean to Fat Clay
⊗	PD-13	BS-2	48	22	26		25	Brown Sandy Lean to Fat Clay
⊕	PD-18	BS-2	40	21	19		24	Brown Sandy Lean to Fat Clay
□	PLT-01	BS-2	42	22	20		24	Brown Sandy Lean to Fat Clay
⊠	PLT-04	BS-2	54	24	30		23	Brown Fat Clay
◕	T-03	BS-2	59	24	35		24	Mottled Gray and Brown Fat Clay
☆	T-07	BS-3	62	23	39		26	Mottled Brown and Gray Fat Clay
⊠	T-16	BS-2	84	32	52		28	Brown Fat Clay
■	T-21	BS-2	34	20	14		13	Brown Sandy Lean Clay
◆	T-25	BS-2	44	20	24		17	Brown Sandy Lean to Fat Clay

CONSULTING GROUP

ATTERBERG LIMITS RESULTS

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No.: 223429

Figure No. 66

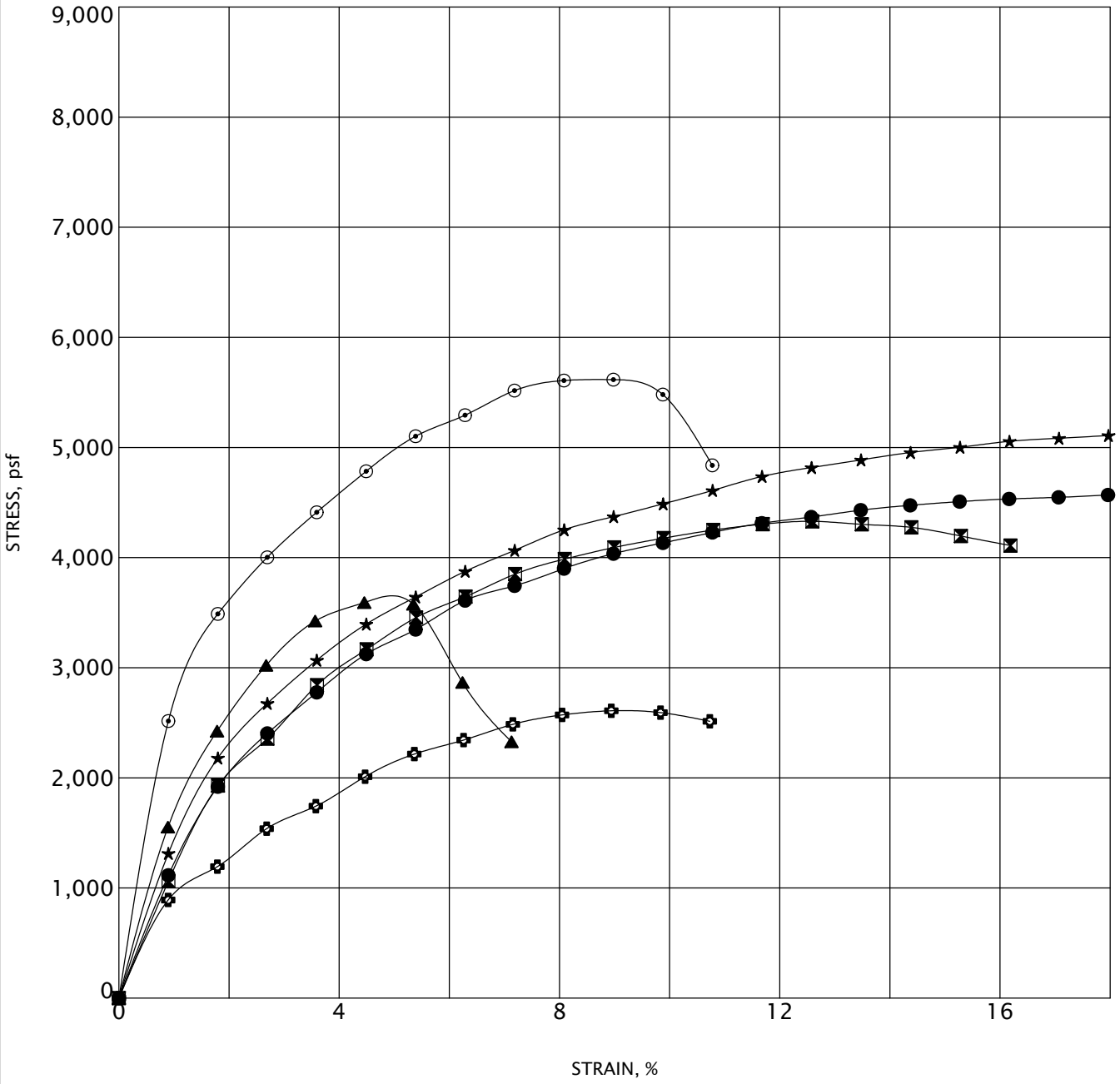
US_ATTERBERG_LIMITS 223429.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

G2 Consulting Group, LLC

ASTM D4829 - Standard Test Method for Expansion Index of Soils

Job No. 223429
Project Proposed Frontier Solar Power Plant
Location Kentucky
Tested By O. Rama
Date of Testing 1/5/2024
Checked By J. Crow

Test Pit No.	PLT-01	PLT-04
Depth	5 to 6 feet	5 to 6 feet
Soil Description	Tan Sandy Fat Clay	Brown Fat Clay
Initial Moisture Content (%)	13.0	10.0
Initial Degree of Saturation (%)	50.0	49.9
Initial Dry Density (pcf)	96.6	106.6
Initial Height of Speciment (in)	1.000	1.000
Consolidation Pressure (psf)	144	144
Initial Dial Reading (in)	0.442	0.313
Final Dial Reading (in)	0.489	0.354
Final Moisture Content (%)	35.1	30.4
Expansion Index	47	41



Specimen			Classification	MC%	γ_d	UC (psf)
●	B-04	S-1	Brown Fat Clay	27	93	4500
⊠	B-05	S-1	Brown Fat Clay	25	100	4330
▲	B-05	S-2	Brown Fat Clay	23	102	3590
★	B-06	S-1	Brown Fat Clay	24	102	4990
⊙	B-08	S-1	Brown Fat Clay	30	95	5620
✿	B-09	S-1	Brown Sandy Fat Clay	20	109	2610

US_UNCONFINED 223429.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

G2 CONSULTING GROUP

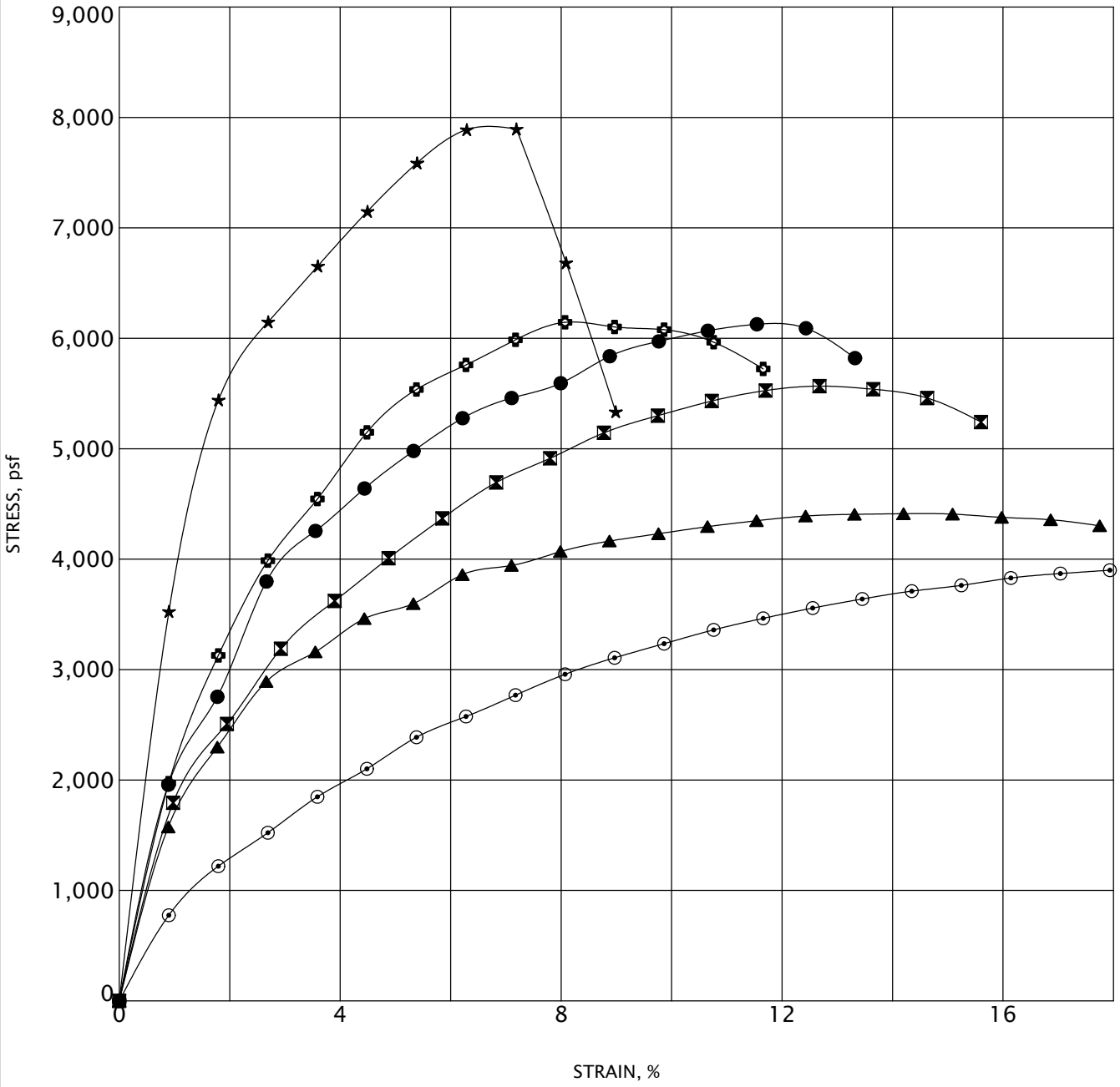
UNCONFINED COMPRESSIVE STRENGTH TEST

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No.: 223429

Figure No. 68



Specimen			Classification	MC%	γ_d	UC (psf)
●	B-09	S-2	Mottled Brown and Gray Fat Clay	21	106	6130
⊠	B-09	S-3A	Mottled Brown and Gray Fat Clay	16	115	5570
▲	B-11	S-1	Brown Fat Clay	29	93	4410
★	B-12	S-2	Brown Fat Clay	25	100	7900
⊙	B-12	S-3A	Brown Fat Clay	23	106	3750
✿	B-13	S-1	Brown Fat Clay	26	98	6140

G2 CONSULTING GROUP

UNCONFINED COMPRESSIVE STRENGTH TEST

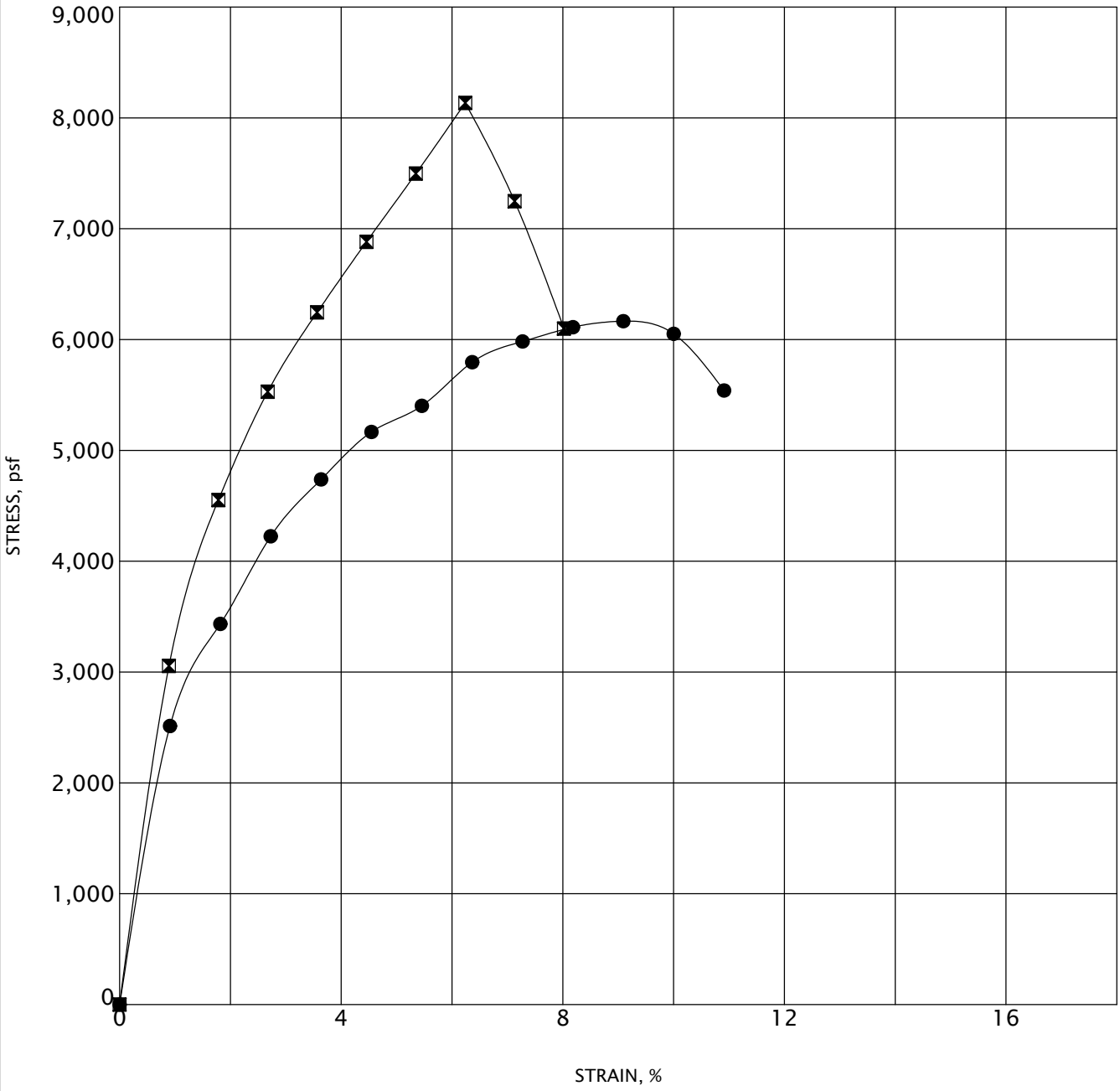
Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No.: 223429

Figure No. 69

US_UNCONFINED 223429.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24



Specimen		Classification	MC%	γ_d	UC (psf)
● B-13	S-2	Brown Fat Clay	26	102	6170
⊠ B-13	S-3	Brown Fat Clay	24	104	8140

CONSULTING GROUP

UNCONFINED COMPRESSIVE STRENGTH TEST

Project Name: Proposed Frontier Solar Power Plant

Project Location: East side of State Highway 429 (KY-429)
South from interection with Booker Road
Marion and Washington Counties, Kentucky

G2 Project No.: 223429

Figure No. 70

US_UNCONFINED 223429.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 1/14/24

G2 Consulting Group, LLC **Moisture Density Curve**

Project Name:	**Frontier Solar**	Date:	**1/4/2024**
Job Number:	**223429**	Method used:	**A**
Project Location:	**KY**	As-received water content:	**Not determined**
Test Pit No.	**PLT-01**	Rammer type:	**Mechanical**
Sample No.:	**Composite**	Percent retained on No. 4 sieve	**0**
Depth of Sample	**1 to 4 feet**	Percent passing No. 4 sieve	**100**
Soil Description:	**Brown Sandy Lean to Fat Clay & Tan Sandy Fat Clay**	Oversize correction used?	**No**
Technician:	**O. Rama**	Specific gravity (estimated)	**2.7**

Proctor Type: **Standard Proctor, ASTM D698**

Standard maximum dry unit weight (pcf) **104.7**

Standard optimum water content (%) **21.0**

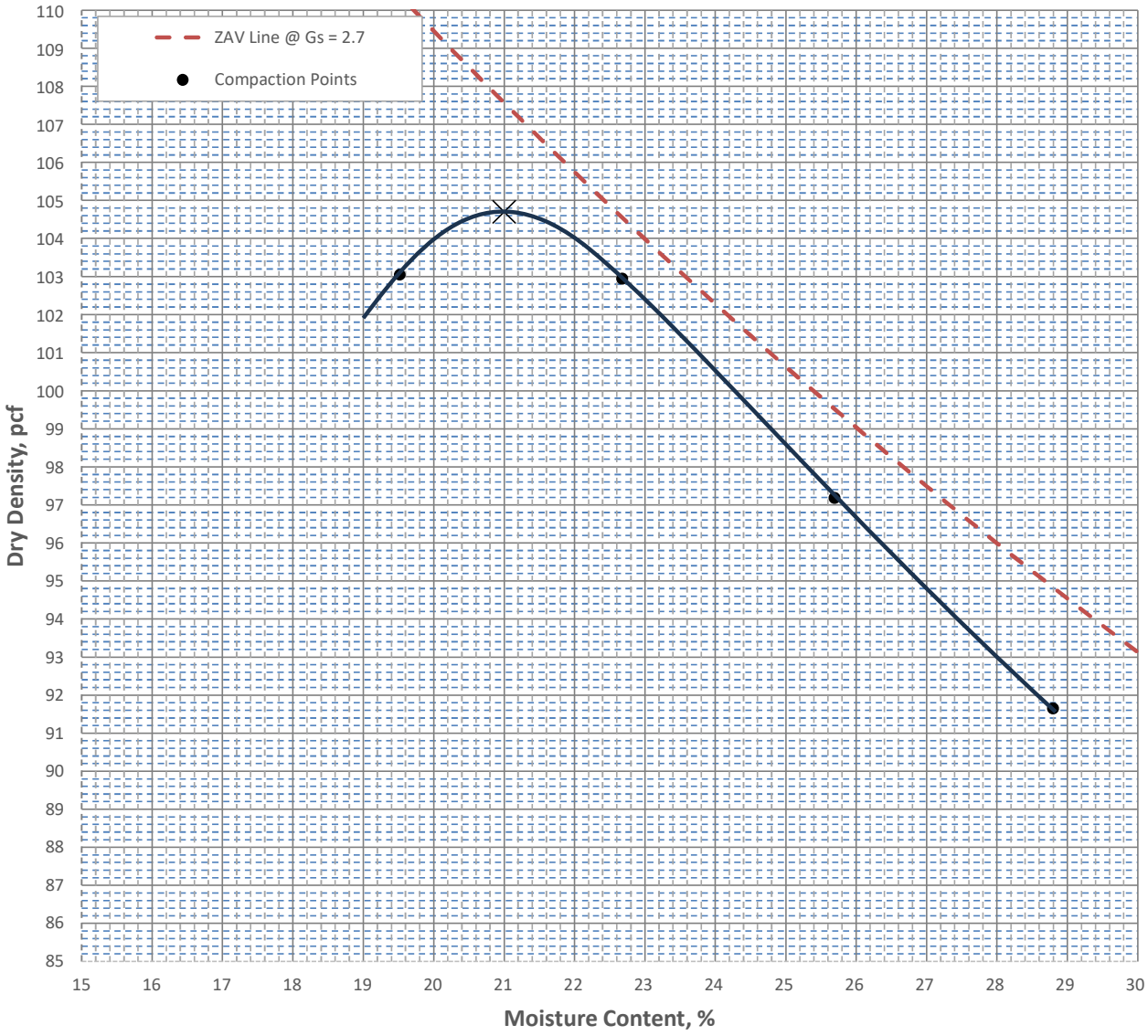


Figure No. 71

G2 Consulting Group, LLC **Moisture Density Curve**

Project Name:	Frontier Solar	Date:	1/4/2024
Job Number:	223429	Method used:	A
Project Location:	KY	As-received water content:	Not determined
Test Pit No.	PLT-03	Rammer type:	Mechanical
Sample No.:	Composite	Percent retained on No. 4 sieve	0
Depth of Sample	1 to 4 feet	Percent passing No. 4 sieve	100
Soil Description:	Brown Sandy Fat Clay & Mottled Brown and Gray Sandy Fat Clay	Oversize correction used?	No
Technician:	O. Rama	Specific gravity (estimated)	2.7

Proctor Type: **Standard Proctor, ASTM D698**

Standard maximum dry unit weight (pcf) **107.6**

Standard optimum water content (%) **18.3**

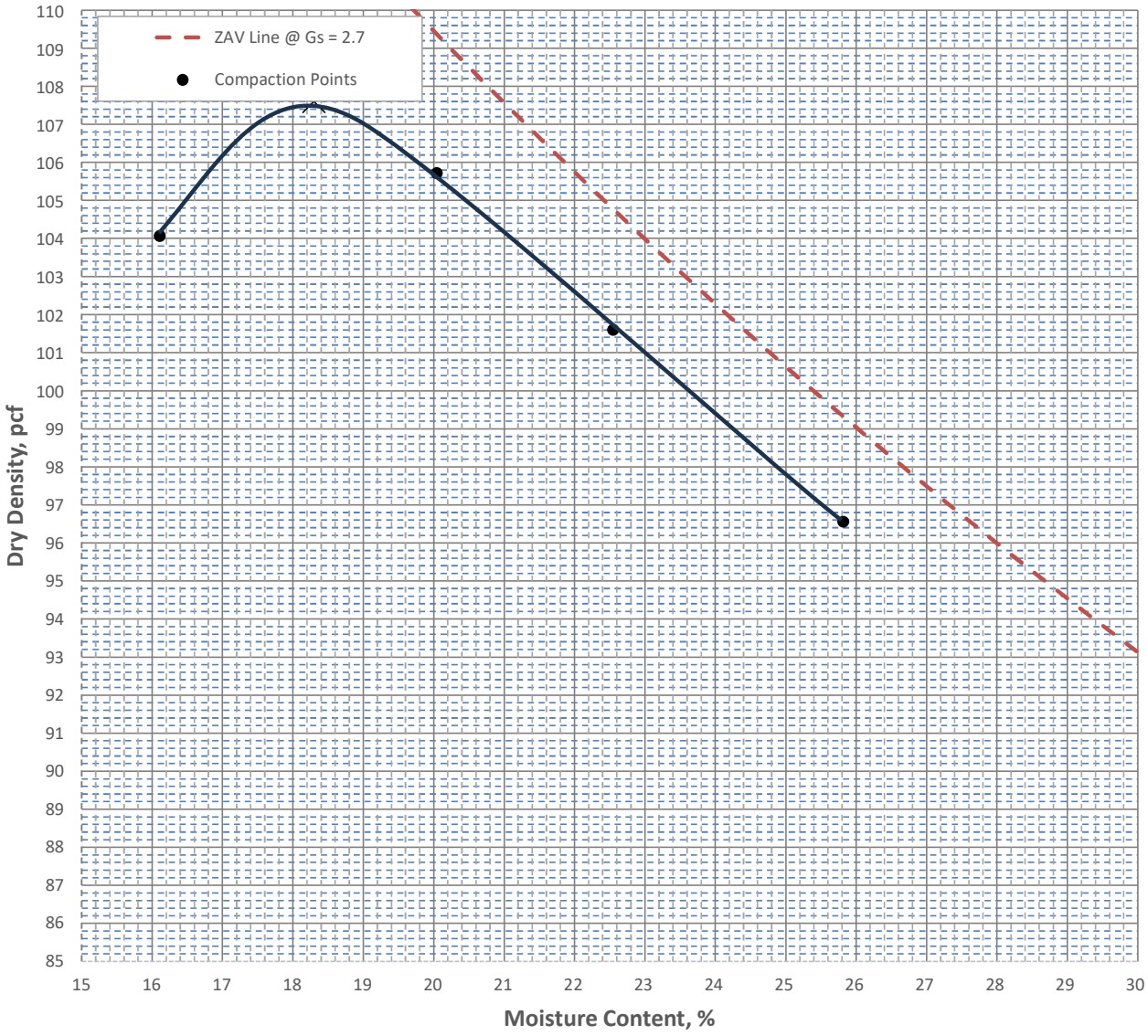


Figure No. 72

G2 Consulting Group, LLC **Moisture Density Curve**

Project Name:	Frontier Solar	Date:	12/1/2022
Job Number:	223429	Method used:	A
Project Location:	KY	As-received water content:	Not determined
Test Pit No.	T-25	Rammer type:	Mechanical
Sample No.:	Composite	Percent retained on No. 4 sieve	0
Depth of Sample	1 to 3.5 feet	Percent passing No. 4 sieve	100
Soil Description:	Brown Sandy Lean to Fat Clay & Tan Silty Clay	Oversize correction used?	No
Technician:	M. Majed	Specific gravity (estimated)	2.7

Proctor Type: **Standard Proctor, ASTM D698**

Standard maximum dry unit weight (pcf) **95.9**

Standard optimum water content (%) **24.0**

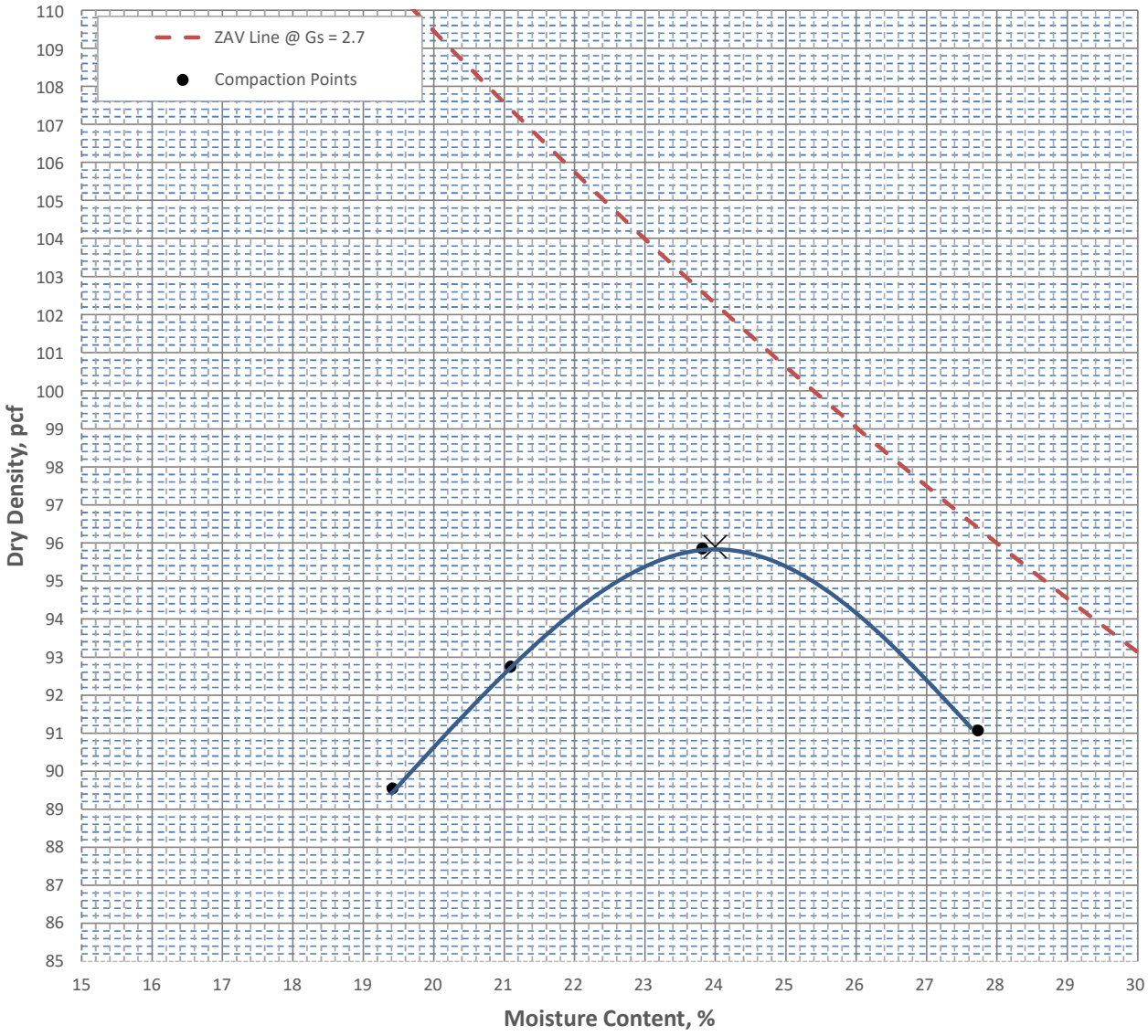
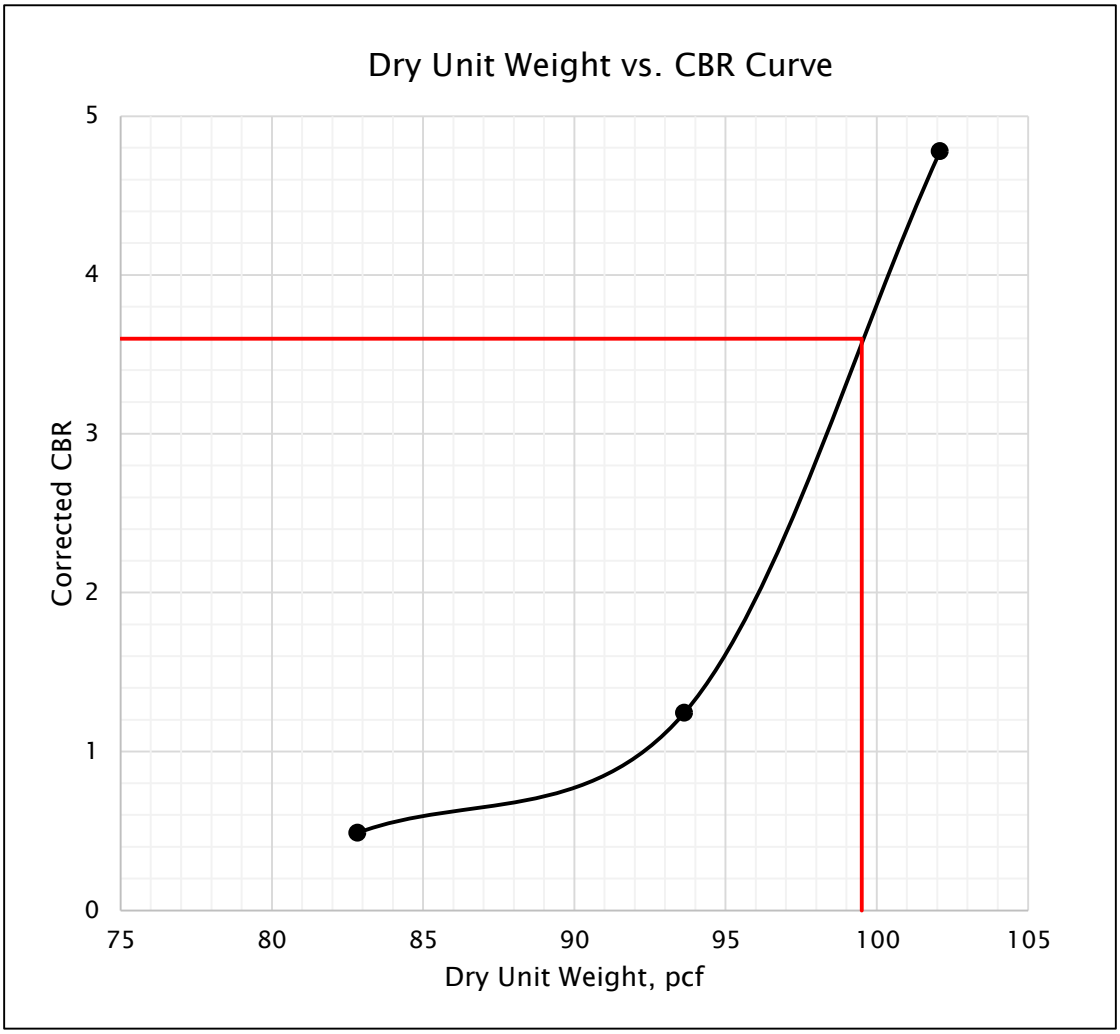


Figure No. 73

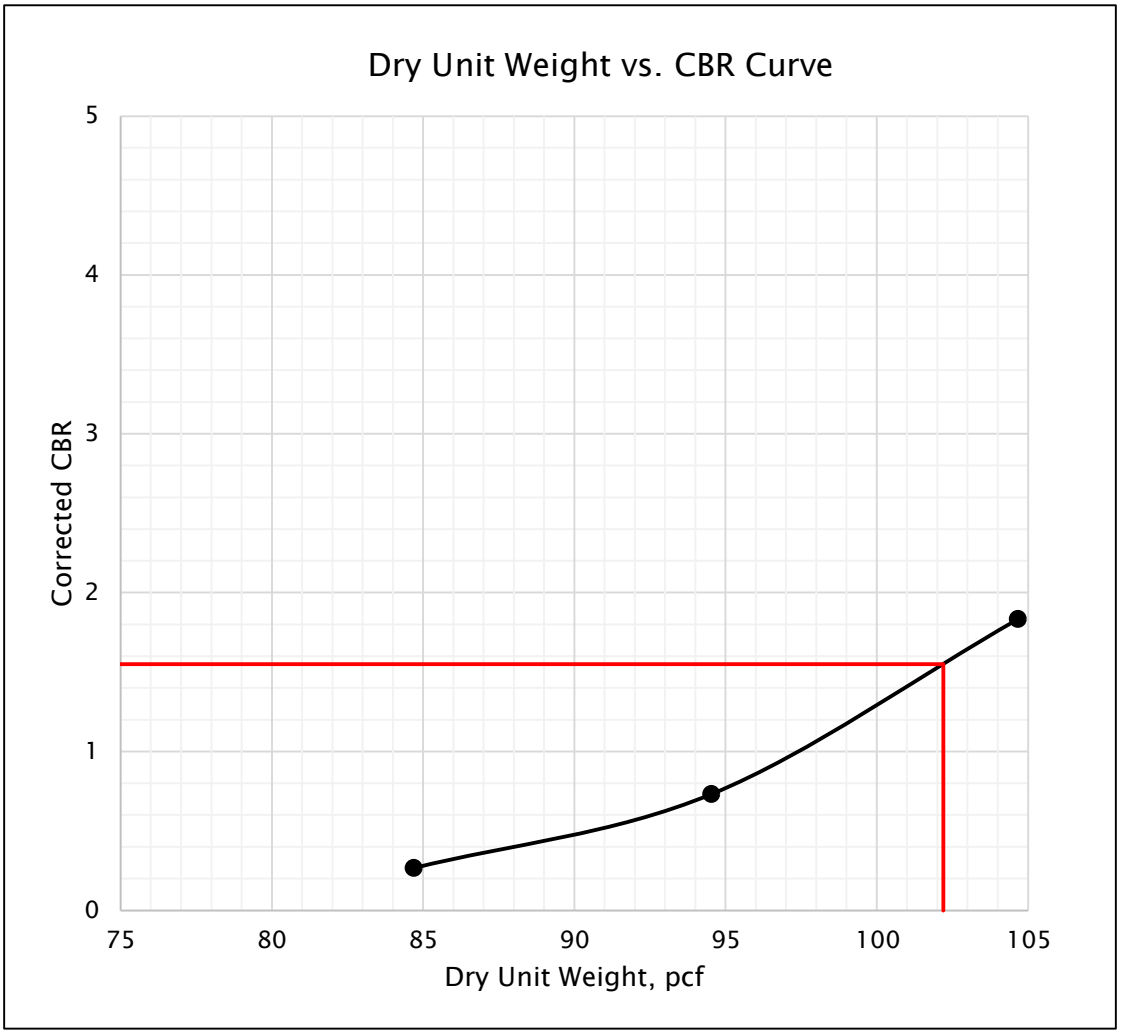
California Bearing Ratio (CBR) Test Data
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429



Composite Sample:	PLT-01
Composite Depth:	1 to 4 feet
Soil Type from 1 to 3 feet:	Brown Sandy Lean to Fat Clay
Soil Type from 3 to 4 feet:	Tan Sandy Fat Clay
Standard Proctor Maximum Dry Density:	104.7 pcf
Optimum Moisture Content:	21.0 %
Corrected CBR Value at 95 % Compaction:	2.60 %
Maximum CBR Swell:	1.4 %

Figure No. 74

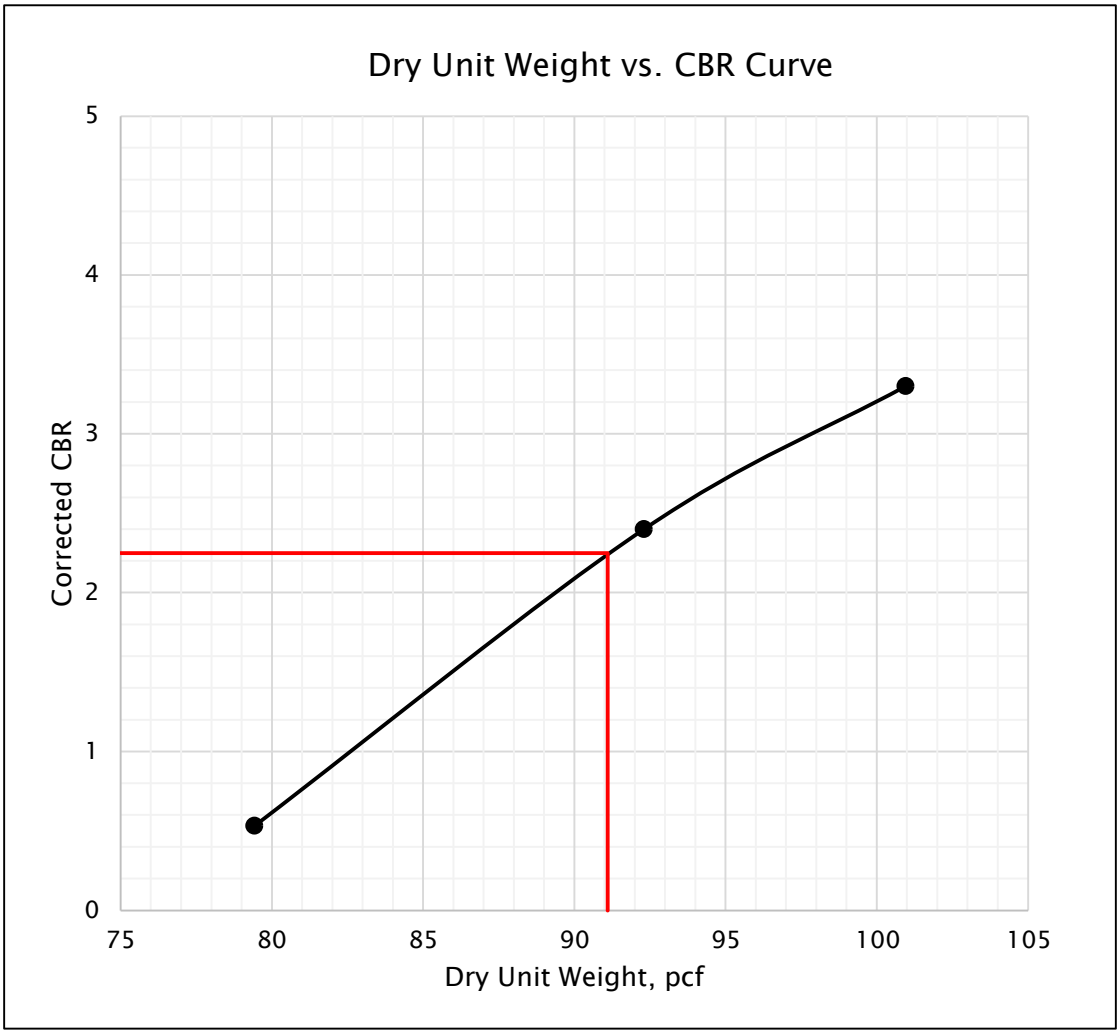
California Bearing Ratio (CBR) Test Data
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429



Composite Sample:	PLT-03
Composite Depth:	1 to 4 feet
Soil Type from 1 to 3 feet:	Brown Sandy Fat Clay
Soil Type from 3 to 4 feet:	Mottled Brown and Gray Sandy Fat Clay
Standard Proctor Maximum Dry Density:	107.6 pcf
Optimum Moisture Content:	18.3 %
Corrected CBR Value at 95 % Compaction:	1.55 %
Maximum CBR Swell:	3.3 %

Figure No. 75

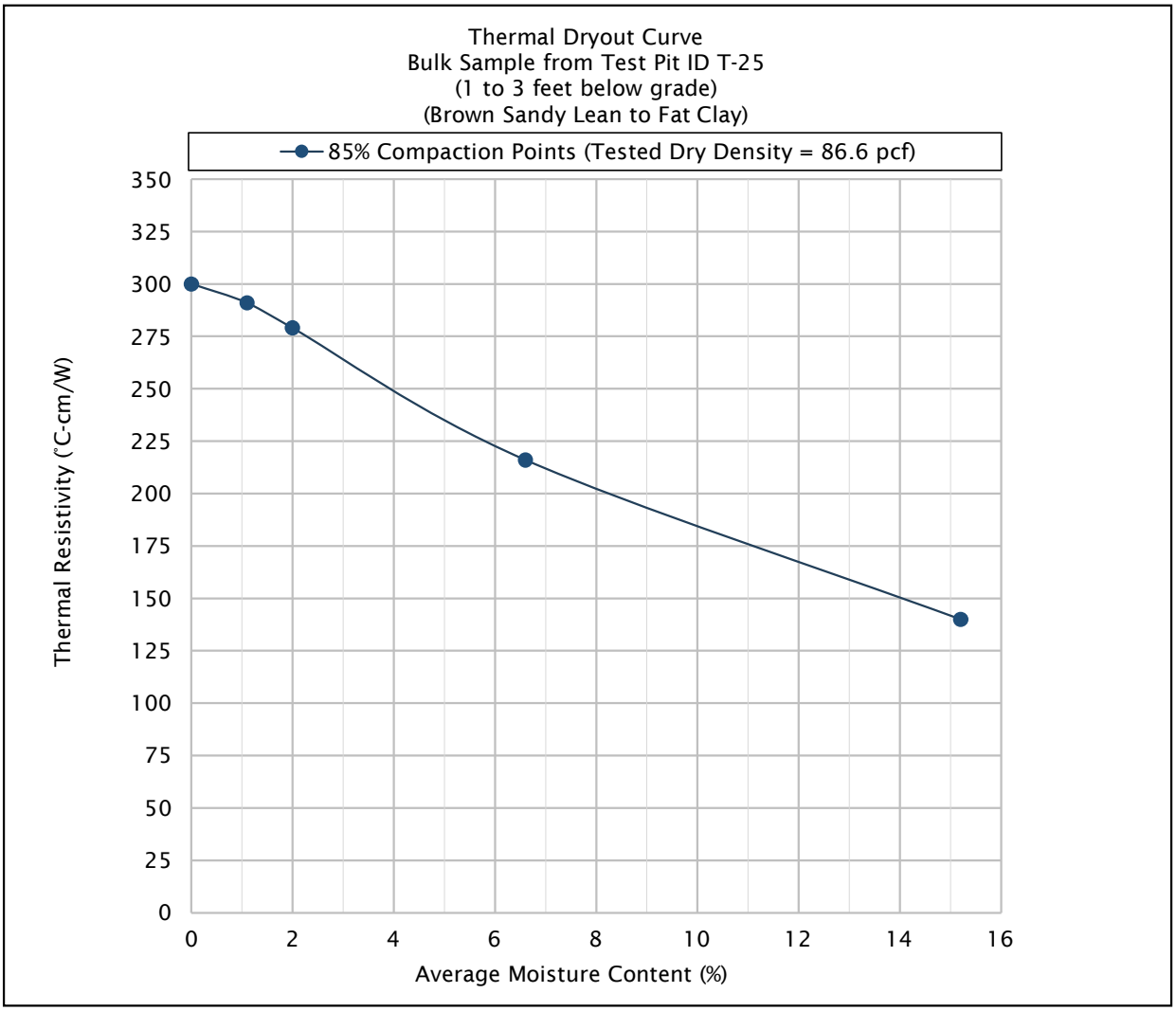
California Bearing Ratio (CBR) Test Data
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429



Composite Sample:	T-25
Composite Depth:	1 to 3.5 feet
Soil Type from 1 to 2 feet:	Brown Sandy Lean to Fat Clay
Soil Type from 2 to 3.5 feet:	Tan Silty Clay
Standard Proctor Maximum Dry Density:	95.9 pcf
Optimum Moisture Content:	24.0 %
Corrected CBR Value at 95 % Compaction:	2.25 %
Maximum CBR Swell:	0.7 %

Figure No. 76

Thermal Resistivity Dryout Curves
Proposed Sun Cactus Solar Power Plant
Ramirez, Duval County, Texas
G2 Project No. 233318



5-Point Themral Dryout Curve	Average Moisture Content (%)	Thermal Resistivity (°C-cm/W)	Temperature (°C)
85% Compaction when Dry	0.0	300	19.2
Intermediate Point	1.1	291	19.1
Intermediate Point	2.0	279	18.8
Intermediate Point	6.6	216	20.8
85% Compaction near As-Received Moisture	15.2	140	18.4

The bulk soil sample was obtained from the the excavated spoils between the depths of 1 and 3 feet below grade. The sample was air-dried, screened through the No. 4 sieve, and prepared to the as-received moisture content (15.5%) for determination of the one-point Standard Proctor maximum dry density value (101.9 pcf) The thermal resistivity dry-out curve is based on 85% of this density value (86.6 pcf).

Figure No. 77

In-Situ Soil Thermal Resistivity Test Data
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit Location	Test Depth (feet)	Temperature (˚C)	In-Situ Rho (˚C-cm/W)
PD-01	2	7.6	62.5
	3	8.9	66.9
	4	10.8	88.3
PD-03	2	7.1	51.6
	3	8.7	60.2
	4	9.9	60.2
PD-06	2	7.3	93.7
	3	10.0	56.3
	4	10.6	53.6
PD-11	2	8.1	63.9
	3	9.0	98.4
	4	10.2	68.5
PD-15	2	8.4	58.7
	3	10.1	73.4
	4	11.3	76.2
PLT-01	2	7.7	107.0
	3	9.0	71.9
	4	10.2	79.6
PLT-02	2	7.3	63.5
	3	8.7	76.0
	4	9.5	74.1
PLT-03	2	7.8	86.7
	3	9.3	71.8
	4	10.6	121.0
T-SUB	2	8.1	101.0
	3	8.9	79.7
		Minimum	51.6
		Maximum	121.0
		Average	75.6

Figure No. 78

In-Situ Electrical Resistivity Test Data
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Location	Direction	'a' Spacing Electrical Resistivity (ohm-cm)																	
		0.5 ft.	1.0 ft.	1.5 ft.	2.0 ft.	3.0 ft.	5.0 ft.	7.0 ft.	10.0 ft.	15.0 ft.	20 ft.	25 ft.	30 ft.	45 ft.	50 ft.	70 ft.	100 ft.	150 ft.	200 ft.
PD-01	E/W	5,200	6,800	4,800	4,200	4,900	5,600	6,800	8,200	10,300	11,400	-	12,000	12,900	-	-	-	-	-
	N/S	4,700	6,300	5,400	4,500	5,000	5,600	6,700	8,600	9,400	11,100	-	11,400	13,700	-	-	-	-	-
PD-02	E/W	4,100	5,500	4,000	3,300	5,600	7,300	8,400	10,900	14,000	12,200	-	13,700	12,000	-	-	-	-	-
	N/S	4,200	5,300	4,800	3,500	6,300	7,600	8,100	9,900	12,600	11,800	-	14,900	12,900	-	-	-	-	-
PD-03	E/W	3,700	3,000	2,600	3,100	4,500	5,800	7,300	7,600	9,100	9,100	-	10,300	9,400	-	-	-	-	-
	N/S	3,600	2,800	2,500	3,200	4,600	5,800	7,100	7,800	9,400	9,100	-	9,700	10,300	-	-	-	-	-
PD-05	E/W	6,300	6,800	4,300	3,000	4,500	5,600	6,800	7,400	8,900	8,400	-	8,600	8,600	-	-	-	-	-
	N/S	6,700	6,500	5,100	2,800	4,400	5,400	6,500	7,000	8,300	7,600	-	8,000	9,400	-	-	-	-	-
PD-06	E/W	4,200	3,800	3,100	3,300	4,600	6,600	8,100	10,500	11,200	13,400	-	16,600	21,500	-	-	-	-	-
	N/S	4,100	3,600	2,800	3,400	4,400	6,700	8,400	10,900	13,200	16,000	-	21,200	23,200	-	-	-	-	-
PD-07	E/W	4,600	3,000	3,400	3,700	5,000	7,200	8,400	10,300	14,000	16,400	-	20,600	20,600	-	-	-	-	-
	N/S	4,500	3,200	3,400	3,800	5,200	7,500	8,800	10,500	14,000	17,200	-	21,800	21,500	-	-	-	-	-
PD-08	E/W	3,000	2,600	2,600	2,900	3,900	5,500	6,900	8,400	10,600	11,800	-	17,200	23,200	-	-	-	-	-
	N/S	3,300	2,200	2,500	2,900	3,900	5,400	6,700	8,000	10,600	12,200	-	16,600	21,500	-	-	-	-	-
PD-09	E/W	2,700	2,400	3,100	3,300	4,500	6,900	8,800	11,600	15,700	17,600	-	19,500	18,000	-	-	-	-	-
	N/S	3,000	2,200	2,800	3,400	4,700	7,100	7,900	12,000	16,000	17,200	-	20,100	15,500	-	-	-	-	-
PD-10	E/W	6,100	7,400	6,800	6,100	6,800	9,100	11,600	15,700	21,500	24,800	-	32,100	42,200	-	-	-	-	-
	N/S	6,200	7,600	6,600	6,500	6,300	8,900	11,500	15,300	21,200	26,000	-	33,800	41,300	-	-	-	-	-
PD-11	E/W	7,100	9,700	6,800	3,700	4,100	6,200	7,700	9,900	13,500	16,400	-	21,800	28,400	-	-	-	-	-
	N/S	7,600	10,100	6,300	3,700	4,100	6,100	7,700	10,300	13,700	16,800	-	21,800	27,500	-	-	-	-	-
PD-13	E/W	4,200	5,500	5,400	3,800	5,500	8,300	11,100	14,500	18,000	21,800	-	28,100	34,400	-	-	-	-	-
	N/S	4,500	5,300	4,800	3,700	5,500	8,500	10,700	13,200	17,200	21,000	-	25,800	31,800	-	-	-	-	-
PD-14	E/W	4,100	3,000	3,100	3,500	4,900	7,200	8,300	9,900	12,900	15,700	-	20,600	22,400	-	-	-	-	-
	N/S	4,000	3,000	2,800	3,400	4,700	7,300	8,700	11,100	14,300	17,200	-	21,800	24,900	-	-	-	-	-
PD-15	E/W	3,200	2,200	2,300	2,700	3,700	5,300	6,000	7,400	9,400	10,300	-	15,500	18,000	-	-	-	-	-
	N/S	3,100	2,600	2,400	2,800	3,700	5,000	6,000	6,300	8,600	9,900	-	13,200	16,300	-	-	-	-	-
PD-17	E/W	2,800	2,600	2,800	3,300	4,500	6,700	7,900	10,100	12,600	13,700	-	17,800	23,200	-	-	-	-	-
	N/S	2,600	3,000	2,700	3,300	4,600	7,100	8,300	10,300	12,300	13,700	-	17,800	20,600	-	-	-	-	-
PD-18	E/W	5,700	6,100	5,400	4,200	5,200	8,200	10,500	14,300	18,600	20,200	-	28,100	37,000	-	-	-	-	-
	N/S	6,000	6,500	5,700	4,500	5,400	8,500	10,700	14,300	18,000	21,000	-	27,500	36,100	-	-	-	-	-
PLT-01	E/W	6,200	4,500	4,300	4,500	5,100	6,700	7,300	9,500	12,300	14,500	-	18,300	23,200	-	30,800	38,300	51,700	49,700
	N/S	5,700	4,900	4,500	4,500	5,200	6,900	7,500	9,300	12,900	14,900	-	18,300	21,500	-	26,800	36,300	45,900	42,100
PLT-02	E/W	7,100	7,600	5,400	4,900	5,700	8,500	10,700	13,900	19,200	23,700	-	29,800	42,200	-	-	-	-	-
	N/S	7,600	8,600	6,300	4,500	5,400	8,400	10,400	13,400	18,900	24,500	-	31,000	39,600	-	-	-	-	-
PLT-03	E/W	4,500	4,000	3,400	3,700	4,500	6,500	8,000	10,300	14,600	18,000	-	25,200	34,400	-	42,800	51,700	68,900	76,600
	N/S	4,700	4,200	4,000	3,600	4,700	6,700	8,800	11,100	15,500	17,600	-	25,800	33,600	-	44,200	53,600	68,900	80,400
PLT-04	E/W	4,300	3,800	4,800	3,700	3,300	4,600	5,600	7,400	10,000	11,800	-	16,600	21,500	-	-	-	-	-
	N/S	4,200	3,600	4,300	4,200	3,900	5,200	6,300	7,600	10,600	13,400	-	17,200	23,200	-	-	-	-	-
T-SUB	E/W	5,200	6,700	6,300	5,700	6,300	6,600	6,700	9,100	12,000	13,400	-	17,200	22,400	-	29,400	36,300	48,800	57,400
	N/S	4,700	6,100	5,400	5,700	5,700	6,700	7,100	9,100	12,300	13,000	-	17,800	24,100	-	30,800	34,400	45,900	49,700
T-08	E/W	-	-	-	13,000	-	11,500	-	9,400	-	-	12,000	-	-	15,300	-	-	-	-
	N/S	-	-	-	11,500	-	12,400	-	9,000	-	-	12,900	-	-	18,200	-	-	-	-
T-25	E/W	-	-	-	10,700	-	17,200	-	18,600	-	-	19,600	-	-	22,000	-	-	-	-
	N/S	-	-	-	11,900	-	12,400	-	9,000	-	-	12,900	-	-	18,200	-	-	-	-
	Minimum	2,600	2,200	2,300	2,700	3,300	4,600	5,600	6,300	8,300	7,600	12,000	8,000	8,600	15,300	26,800	34,400	45,900	42,100
	Maximum	7,600	10,100	6,800	13,000	6,800	17,200	11,600	18,600	21,500	26,000	19,600	33,800	42,200	22,000	44,200	53,600	68,900	80,400
	Average	4,700	4,800	4,200	4,500	4,800	7,300	8,100	10,400	13,400	15,300	14,300	19,600	23,600	18,400	34,100	41,700	55,000	59,300

Figure No. 79

APPENDIX B

Photographic Documentation

Rock Core Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Boring No.	Sample No.	Depth (ft.)	Recovery (%)	RQD (%)	Hardness	Color	Weathering	Rock Type
B-01	RC-3	5.75 to 10.75	97	67	Moderately Weak	Gray	Slightly Weathered	Limestone
B-01	RC-4	10.75 to 15.75	97	77	Moderately Weak	Gray	Slightly Weathered	Limestone

Figure No. 80

Rock Core Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Boring No.	Sample No.	Depth (ft.)	Recovery (%)	RQD (%)	Hardness	Color	Weathering	Rock Type
B-02	RC-3	6 to 11	98	39	Moderately Weak	Gray	Slightly Weathered	Limestone
B-02	RC-4	11 to 16	97	78	Moderately Weak	Gray	Slightly Weathered	Limestone

Figure No. 81

Rock Core Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Boring No.	Sample No.	Depth (ft.)	Recovery (%)	RQD (%)	Hardness	Color	Weathering	Rock Type
B-03	RC-4	8 to 13	90	29	Moderately Weak	Gray	Moderately Weathered	Limestone
B-03	RC-5	13 to 18	92	39	Moderately Weak	Gray	Moderately Weathered	Limestone

Figure No. 82

Rock Core Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Boring No.	Sample No.	Depth (ft.)	Recovery (%)	RQD (%)	Hardness	Color	Weathering	Rock Type
B-05	RC-3	5.75 to 10.75	92	83	Moderately Weak	Gray	Slightly Weathered	Limestone
B-05	RC-4	10.75 to 15.75	100	98	Moderately Weak	Gray	Slightly Weathered	Limestone

Figure No. 83

Rock Core Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Boring No.	Sample No.	Depth (ft.)	Recovery (%)	RQD (%)	Hardness	Color	Weathering	Rock Type
B-06	RC-3	4.5 to 9.5	97	86	Moderately Weak	Gray	Slightly Weathered	Limestone
B-06	RC-4	9.5 to 14.5	97	83	Moderately Weak	Gray	Slightly Weathered	Limestone

Figure No. 84

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	PD-01
Test Pit Depth:	5-1/2 feet
Date:	December 16, 2023
Field Engineers:	Mohamad Majed
	Timothy Dehayes

Figure No. 85

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	PD-02
Test Pit Depth:	3-1/2 feet
Date:	December 20, 2023
Field Engineers:	Mohamad Majed
	Timothy Dehayes

Figure No. 86

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	PD-03
Test Pit Depth:	7-1/2 feet
Date:	December 20, 2023
Field Engineers:	Mohamad Majed
	Timothy Dehayes

Figure No. 87

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	PD-04
Test Pit Depth:	4 feet
Date:	December 19, 2023
Field Engineers:	Mohamad Majed
	Timothy Dehayes

Figure No. 88

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	PD-05
Test Pit Depth:	9 feet
Date:	December 20, 2023
Field Engineers:	Mohamad Majed Timothy Dehayes

Figure No. 89

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	PD-06
Test Pit Depth:	9 feet
Date:	December 20, 2023
Field Engineers:	Mohamad Majed
	Timothy Dehayes

Figure No. 90

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	PD-07
Test Pit Depth:	8 feet
Date:	December 20, 2023
Field Engineers:	Mohamad Majed Timothy Dehayes

Figure No. 91

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	PD-08
Test Pit Depth:	6 feet
Date:	December 20, 2023
Field Engineers:	Mohamad Majed
	Timothy Dehayes

Figure No. 92

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	PD-09
Test Pit Depth:	4 feet
Date:	December 20, 2023
Field Engineers:	Mohamad Majed
	Timothy Dehayes

Figure No. 93

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	PD-10
Test Pit Depth:	5 feet
Date:	December 19, 2023
Field Engineers:	Mohamad Majed Timothy Dehayes

Figure No. 94

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	PD-11
Test Pit Depth:	4-1/2 feet
Date:	December 19, 2023
Field Engineers:	Mohamad Majed Timothy Dehayes

Figure No. 95

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	PD-12
Test Pit Depth:	3-1/2 feet
Date:	December 19, 2023
Field Engineers:	Mohamad Majed
	Timothy Dehayes

Figure No. 96

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	PD-13
Test Pit Depth:	3-1/2 feet
Date:	December 19, 2023
Field Engineers:	Mohamad Majed
	Timothy Dehayes

Figure No. 97

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	PD-14
Test Pit Depth:	3-1/2 feet
Date:	December 18, 2023
Field Engineers:	Mohamad Majed Timothy Dehayes

Figure No. 98

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	PD-15
Test Pit Depth:	5-1/2 feet
Date:	December 16 2023
Field Engineers:	Mohamad Majed
	Timothy Dehayes

Figure No. 99

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	PD-16
Test Pit Depth:	5 feet
Date:	December 16, 2023
Field Engineers:	Mohamad Majed Timothy Dehayes

Figure No. 100

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	PD-17
Test Pit Depth:	4 feet
Date:	December 16, 2023
Field Engineers:	Mohamad Majed
	Timothy Dehayes

Figure No. 101

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	PD-18
Test Pit Depth:	5-1/2 feet
Date:	December 16, 2023
Field Engineers:	Mohamad Majed
	Timothy Dehayes

Figure No. 102

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	PLT-01
Test Pit Depth:	8 feet
Date:	December 19, 2023
Field Engineers:	Mohamad Majed Timothy Dehayes

Figure No. 103

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID: PLT-02
Test Pit Depth: 8 feet
Date: December 19, 2023
Field Engineers: Mohamad Majed
Timothy Dehayes

Figure No. 104

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	PLT-03
Test Pit Depth:	9 feet
Date:	December 19, 2023
Field Engineers:	Mohamad Majed
	Timothy Dehayes

Figure No. 105

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	PLT-04
Test Pit Depth:	10 feet
Date:	December 16, 2023
Field Engineers:	Mohamad Majed Timothy Dehayes

Figure No. 106

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	T-SUB
Test Pit Depth:	3 feet
Date:	December 16, 2023
Field Engineers:	Mohamad Majed
	Timothy Dehayes

Figure No. 107

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	T-01
Test Pit Depth:	10 feet
Date:	November 15, 2022
Field Engineer(s):	Zachery Lilly
	Steve Misze

Figure No. 108

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID: T-02
Test Pit Depth: 3 feet
Date: November 15, 2022
Field Engineer(s): Zachery Lilly
Steve Misze

Figure No. 109

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID: T-03
Test Pit Depth: 9 feet
Date: November 15, 2022
Field Engineer(s): Zachery Lilly
Steve Misze

Figure No. 110

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	T-04
Test Pit Depth:	7 feet
Date:	November 15, 2022
Field Engineer(s):	Zachery Lilly
	Steve Misze

Figure No. 111

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	T-05
Test Pit Depth:	10 feet
Date:	November 15, 2022
Field Engineer(s):	Zachery Lilly
	Steve Misze

Figure No. 112

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	T-06
Test Pit Depth:	2 feet
Date:	November 15, 2022
Field Engineer(s):	Zachery Lilly
	Steve Misze

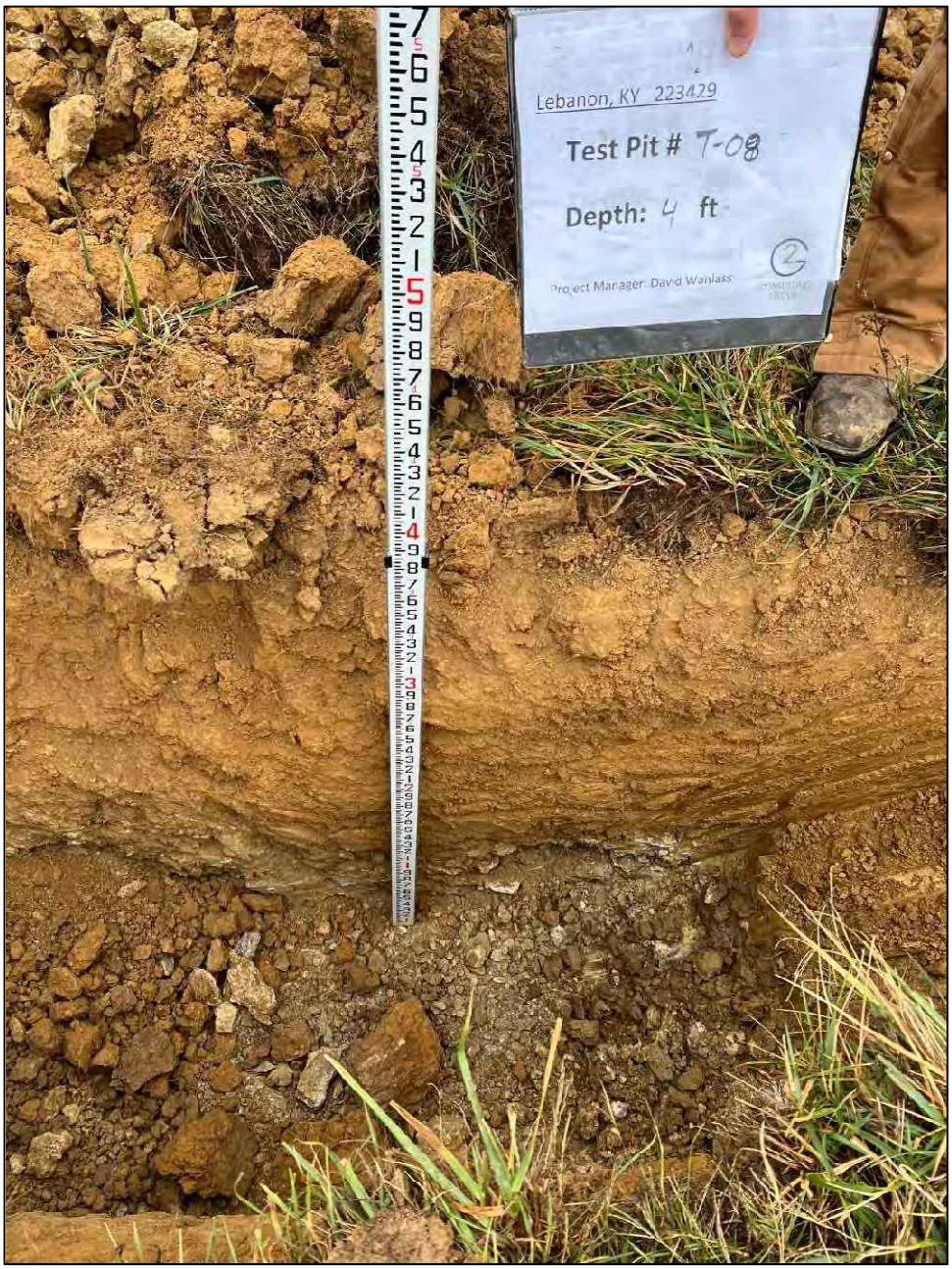
Figure No. 113

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID: T-07
Test Pit Depth: 10 feet
Date: November 16, 2022
Field Engineer(s): Zachery Lilly
Steve Misze

Figure No. 114

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429



Test Pit ID:	T-08
Test Pit Depth:	4 feet
Date:	November 16, 2022
Field Engineer(s):	Zachery Lilly
	Steve Misze

Figure No. 115

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	T-09
Test Pit Depth:	10 feet
Date:	November 16, 2022
Field Engineer(s):	Zachery Lilly
	Steve Misze

Figure No. 116

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	T-10
Test Pit Depth:	4-1/2 feet
Date:	November 15, 2022
Field Engineer(s):	Zachery Lilly
	Steve Misze

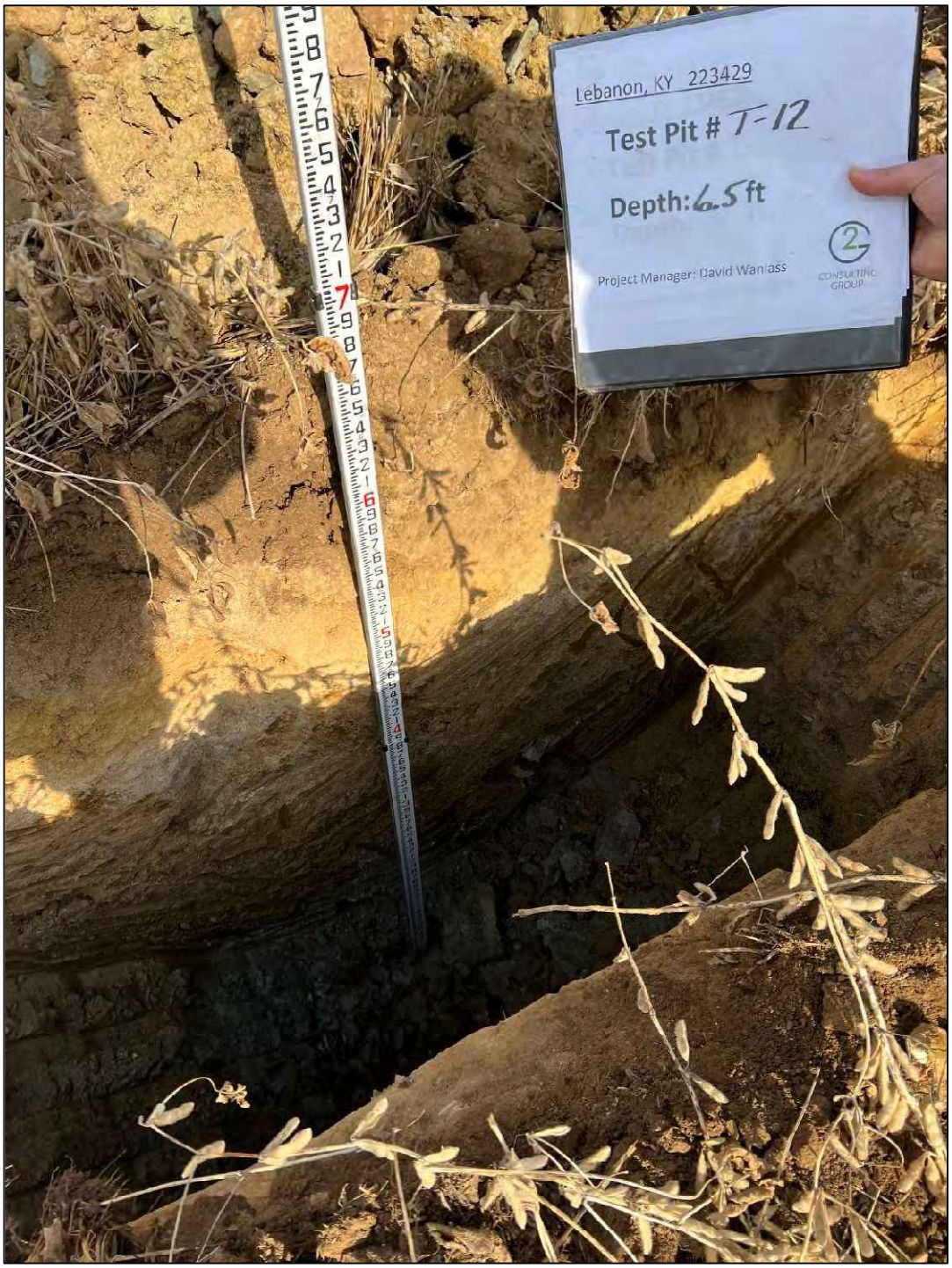
Figure No. 117

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID: T-11
Test Pit Depth: 5 feet
Date: November 16, 2022
Field Engineer(s): Zachery Lilly
Steve Misze

Figure No. 118

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429



Test Pit ID: T-12
Test Pit Depth: 6-1/2 feet
Date: November 16, 2022
Field Engineer(s): Zachery Lilly
Steve Misze

Figure No. 119

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID: T-13
Test Pit Depth: 8 feet
Date: November 16, 2022
Field Engineer(s): Zachery Lilly
Steve Misze

Figure No. 120

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID: T-14
Test Pit Depth: 4 feet
Date: November 16, 2022
Field Engineer(s): Zachery Lilly
Steve Misze

Figure No. 121

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID:	T-15
Test Pit Depth:	4 feet
Date:	November 17, 2022
Field Engineer(s):	Zachery Lilly Steve Misze

Figure No. 122

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID: T-16
Test Pit Depth: 10 feet
Date: November 16, 2022
Field Engineer(s): Zachery Lilly
Steve Misze

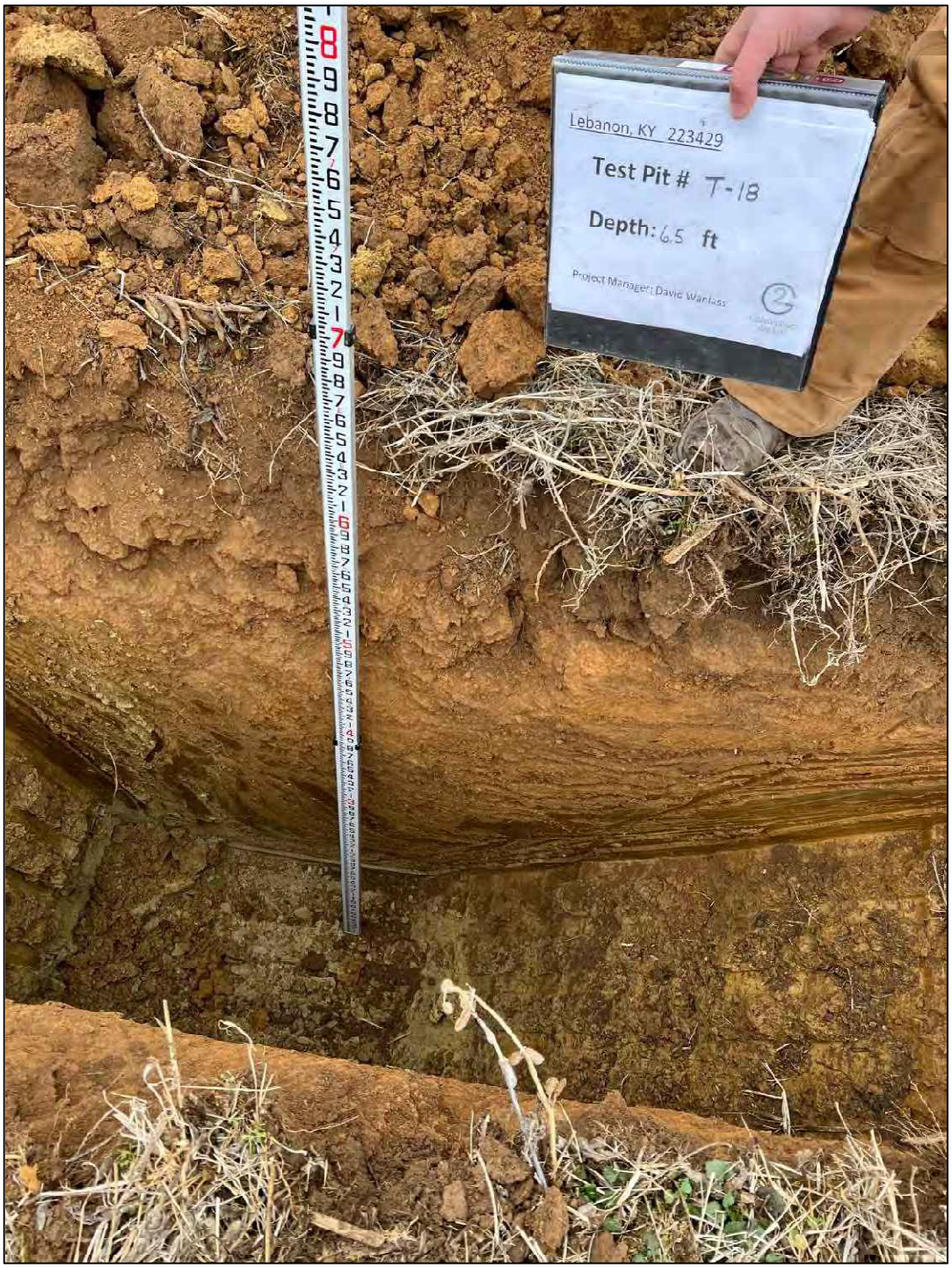
Figure No. 123

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429

Test Pit ID: T-17
Test Pit Depth: 9 feet
Date: November 17, 2022
Field Engineer(s): Zachery Lilly
Steve Misze

Figure No. 124

Test Pit Photographic Documentation
Proposed Frontier Solar Power Plant
Marion and Washington Counties, Kentucky
G2 Project No. 223429



Test Pit ID:	T-18
Test Pit Depth:	6-1/2 feet
Date:	November 17, 2022
Field Engineer(s):	Zachery Lilly
	Steve Misze

Figure No. 125