PRELIMINARY GEOTECHNICAL REPORT

BALANCED ROCK POWER

Ebba Solar Project
Lincoln County, Colorado

April 5, 2024

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1 Executive Summary

ANS Geo, Inc. is pleased to provide this Preliminary Geotechnical Report (Report) to Balanced Rock Power (BRP) to summarize the results of our geotechnical investigation program in support of the proposed Ebba Solar project located in Lincoln County, Colorado. ANS Geo has summarized, at a very high level, some of the critical geotechnical items and observations which may impact project design and construction within this Section from our observations during the completion of our preliminary geotechnical investigation at the project site.

1. ANS Geo advanced a total of 12 soil borings; three (3) borings were located within the BESS and substation area, and nine (9) within the array area. An investigation location plan is provided as **Attachment A-2**, and soil boring logs are presented as **Attachment C**. 15 test pits were excavated to approximately 15 feet below grade. Test pit logs are presented as **Attachment D**.
2. The encountered soils observed were predominantly medium stiff to stiff, low to moderate plasticity clay and very low plasticity to non-plastic silts, underlain by loose to dense silty, clayey sand with intermittent clay layers. At locations within the substation footprint, dark gray very stiff to hard clayshale was observed from approximately 22 feet below ground surface (BGS) until boring termination. Encountered subsurface conditions and laboratory test results are summarized in **Section 4**, and **Section 5**, respectively.
3. No groundwater was encountered during our investigation.
4. At select test pit locations, auger cuttings were collected between zero (0) and five (5) feet below grade with the purpose of obtaining bulk soil samples for laboratory corrosivity testing, thermal resistivity testing, and California Bearing Ratio (CBR) testing. Laboratory testing results are summarized in **Section 5** and as-received laboratory test results are included within **Attachment E.**
5. Pile load testing was completed at 15 test locations across the proposed project area. A total of 15 piles (one (1) pile at each test location) were directly embedded to between 7 and 10 feet below grade and tested for both uplift and lateral capacities. No pile refusals were encountered during installation. Detailed pile load testing logs have been provided as **Attachment G** and a summary of results have been provided in **Table 9**.
6. ANS Geo performed nine (9) field Electrical Resistivity Tests (ERTs) using the Wenner 4-point Method. Results of in-situ electrical resistivity testing yielded results as low as 225 ohm-cm and as high as 20,565 ohm-cm. The electrical designer should review the detailed data for the purpose of their design. Detailed ERT logs have been provided as **Attachment F**.
7. Based on corrosivity lab testing and field soil resistivity measurements, the in-situ soil conditions generally indicate that soils are “moderately corrosive”. Refer to **Section 8** for discussion of site-specific corrosion as well as **Attachment F** for additional details**.**
8. Ad-freeze influence should be considered within the upper 30 inches for array area post foundations across this site for a 100-year return period. All other shallow foundations should consider a frost depth of 40 inches below grade. Refer to **Section 8** and **9** for specific foundation design considerations.
9. ANS Geo has provided Substation Recommendations in **Table A** directly preceding our provided Attachments.
10. Based on California Bearing Ratio testing results and the assumptions outlines in **Section 9**, unreinforced aggregate access roads should be designed for pos-construction traffic conditions to include at least 14 to 18 inches of compacted crushed stone with a 2-inch rutting allowance. Refer to **Section 9** for detailed access road recommendations and for reduced aggregate thickness techniques.

2 Project Description

ANS Geo, Inc. (ANS Geo) is pleased to provide this Preliminary Geotechnical Report to Balanced Rock Power (BRP) to summarize the results of our geotechnical investigation program in support of the proposed Ebba Solar project located in Lincoln County, Colorado.

ANS Geo, in collaboration with BRP, developed a geotechnical investigation program, implemented by ANS Geo intended to provide information to support the design and construction of the proposed Ebba Solar facility. Our understanding of project details comes from meetings and email communications with Jesse Cohen, Manager of Development for BRP, and Emmett Turner, Associate of Development Engineering for BRP. The field investigations for this report were conducted as described in "Proposal for Geotechnical Investigation and Engineering Services – Ebba Solar", dated February 20, 2024 (Rev.1); authorization to proceed was received by Eric Hafner, Chief Operating Officer for BRP, on February 21, 2024.

The Ebba Solar project is a planned photovoltaic (PV) facility expected to encompass roughly 2,310 parcel acres. This site is located approximately six (6) miles south of the town of Limon, Colorado. Site vicinity is shown shown in **Figure 1**, below, and **Attachment A-1**, Site Proximity Map.

ANS Geo previously completed a geotechnical desktop study for BRP, entitled *Geotechnical Desktop Study – Ebba Solar*, dated February 2, 2024, which provided a high-level summary of anticipated subsurface conditions across the project area using publicly available geological maps, historical geotechnical reports within the vicinity of the study area, other publicly available information, and our knowledge of the area geology.

The geotechnical investigation herein presented includes evaluation of local geologic conditions, logs of soil borings, pile load testing, test pits, and in-situ electrical resistivity testing conducted at the site, results of laboratory soil index testing, thermal resistivity, corrosion testing, and California Bearing Ratio (CBR) testing, as well as recommended geotechnical design parameters and discussion of construction considerations for the Ebba Solar facility. A location plan showing all field investigation locations is provided as **Attachment A-2**. FEMA flood hazard mapping and seismic hazard mapping are provided in **Attachments A-3** and **A-4**, respectively. Soil boring logs (**Attachment C**), test pit logs (**Attachment D**), as-received laboratory test results (**Attachment E**), field-determined electrical resistivity test data (**Attachment F**), pile-load test results (**Attachment G**), recommended seismic design parameters (**Attachment H**), and National Resource Conservation Services soil mapping (**Attachment I)** are also presented in the Attachments appended to this report.

Figure 1: Project Vicinity Map

Area overview with site project limits shown in blue. Source: Google Earth, imagery date June 2017. Graphical scale.

2.1 Reference Files

Prior to commencing field investigations, ANS Geo was provided the location plan "Ebba Solar Project Area.kmz", dated 01/10/2024, which outlined planned development at the site. In addition to this location plan, BRP provided details for site coordination, land access, and other project details via e-mail and phone conversations.

2.2 Project Assumptions

ANS Geo understands that the proposed solar development will include a solar photovoltaic (PV) system, an underground cable collection system, and supporting structures and equipment. We understand the project footprint spans across multiple parcels; some contiguous, some separated by county and state roads; and will include the development of unpaved, aggregate access roadways within the project parcels. ANS Geo assumes the project design life to be 35 years.

The recommendations presented herein are site-specific. Geotechnical design recommendations and construction considerations are based on our understanding of project details as outlined in this report and our experience with similar developments in this region. Should the configuration of the system differ from our stated understanding, it is imperative that ANS Geo is contacted to review, confirm, and/or update our recommendations to reflect the planned development. For example, recommendations such as pile design parameters will change if alternate pile installation techniques are considered, such as screw piles, helical piles, compaction-and-backfilling, or other method, and these changes may cause a material change in the design of foundations. Similarly, should the location of access roadways and expected traffic volumes and loading, assumed facility design life, or other site condition change, our recommendations will need to be updated.

3 Methodology

3.1 Soil Boring Explorations

ANS Geo advanced 12 soil borings completed at select locations across the project area from March 5th, 2024, to March 7th, 2024. Ten (10) borings (B-01 through B-10) were advanced to 20 feet below ground surface (BGS), with one (1) located within the BESS/substation area and nine (9) within the array areas. Additionally, two (2) borings (SS-B-01 and SS-B-02) were advanced to 50 feet BGS within the BESS/substation area. The soil boring locations are depicted in the Investigation Location Plan, provided as **Attachment A-2**.

A Diedrich D-50 track drill rig was used to collect soil samples using the Standard Penetration Test (SPT) Method through hollow-stem augers in accordance with ASTM Standard D1586. Soil samples were collected continuously within the upper 10 feet in each boring, then in five-foot intervals thereafter to the termination depth. Soil boring locations, proposed by ANS Geo and confirmed by BRP review, were located at relatively evenly spread locations throughout the project's array area(s). All soil borings were overseen and logged by an ANS Geo representative under the direction of a Professional Engineer licensed in the State of Colorado. Typed soil boring logs are presented as **Attachment C**. Upon completion, each borehole was backfilled to its existing grade with soil cuttings.

3.2 Test Pit Excavations

ANS Geo advanced a total of 15 test pit excavations to a depth of 15 feet below grade across the project area to evaluate the subsurface conditions. Test pit locations were located at relatively evenly spread locations throughout the project's array area(s) at each pile location to profile the investigation location. All test pits were overseen and documented by an ANS Geo geotechnical representative under the direction of a Professional Engineer licensed in the State of Colorado. Soil strata changes, soil classification, and excavation depths were documented during each test pit excavation and are presented within the test pit logs provided as **Attachment D**.

At select test pit locations, auger cuttings were collected between one (1) and five (5) feet below grade with the purpose of obtaining bulk soil samples for laboratory thermal resistivity testing (TRT), California Bearing Ratio (CBR) testing, and corrosivity testing. Upon completion, each test pit excavation was backfilled with native soils, bucket-tamped, and driven over several times with the excavator to minimize any post-excavation settlement.

3.3 Electrical Resistivity Testing

As part of the field investigation program, ANS Geo performed field Electrical Resistivity Testing (ERT) at nine (9) locations across the project site; eight (8) locations within the proposed array area(s) and one (1) location within the substation footprint. In-situ soil resistivity measurements were obtained by utilizing the Wenner 4-Pin Method in accordance with ASTM G57 and IEEE Standard 81. Two (2) mutually perpendicular traverses were collected at each array area location utilizing electrode "a"-spacings of 2, 5, 10, 25 and 50 feet. Two (2) mutually perpendicular traverses were collected at the substation location utilizing "a"-spacings of 2, 5, 10, 25, 50, 100, 150 and 200 feet. Test results are presented as **Attachment F**.

3.4 Pile Load Testing

3.4.1 Pre-Drilling

During our investigation at the project site, ANS Geo anticipated that pre-drilling of pile load test (PLT) installation locations may be necessary; however, the lithology encountered during soil borings indicated that pre-drilling would not be necessary due to the amendable soil hardness and density. During pile installation, refusal prior to target embedment depth was not encountered.

3.4.2 Test Pile Installation

ANS Geo conducted pile load testing at 15 accessible locations (PT-01 through PT-15) across the proposed solar array area(s). Each pile location included one (1) test pile embedded at various depths ranging between seven (7) and 10 feet below grade. No piles encountered refusal prior to achieving their target embedment depth. The non-galvanized W6x9 steel sections ("piles") were installed via direct push to significant resistance, then driven to their final depths using a GAYK HRE 4000 Pile Driver. Piles underwent a 72 hour wait time ("soak period") prior to testing. All piles were tested for both uplift and lateral capacities.

Table 9 in **Section 6** summarizes the target embedment depth, final embedment depth, and a summary of vertical and lateral load testing results for each pile.

3.4.3 Uplift Load Testing

Once driven to the final embedment depth (varying between seven (7) and 10 feet below grade), uplift load testing was performed on each test pile in general accordance with the ASTM D3689 – Standard Test Methods for Deep Foundation Elements under Static Axial Tensile Load (referred to throughout this report as "uplift testing"). The tension load was generally applied through the arm of a Yanmar ViO Excavator which aligned the load concentrically to the pile using a chain attached to a dynamometer, as well as a "pacman" clamp attachment to secure the assembly to the pile. Uplift loads were applied in one-minute, 1,000-pound increments up to 12,000 pounds or 1.5-inch of vertical displacement, whichever occurred first. More than half of test locations encountered maximum uplift of 12,000 lbs prior to reaching either 1.0 or 1.5 inches of deflection. In all cases where the pile started mobilizing prior to the 12,000 lb load, the pile had fully mobilized by 1.0 inch of vertical deflection. As a result, we recommend that uplift mobilization failure be limited to 1.0 inch, rather than 1.5 inches. Uplift testing data is presented in our summary of PLT results, **Table 9**. See additional discussion in **Section 8.4.1** and **Section 9.5**.

Once achieved, the load was released, and final displacement was recorded.

3.4.4 Lateral Load Testing

A lateral load test was performed on piles at each location following each uplift load test, in accordance with ASTM D3966 (lateral) test method. Horizontal loads were applied at approximately four (4) feet above grade on each pile with the pulling force of a hydraulic ram fixed to the excavator. Each test load was applied in one-minute, 500-pound increments up to 5,500 pounds, or until a deflection of one-inch (measured at six inches above grade) was observed. Once achieved, the load was immediately released, and residual deflection was recorded.

3.4.5 Removal of Piles

Upon completion of the pile load testing program, test piles were removed and disposed off-site. Pile locations were backfilled with native soils and compacted with excavator bucket.

4 Geology, Surface, and Subsurface Conditions

Prior to site mobilization, ANS Geo conducted a desktop review of publicly available geologic maps and reports made available by the United States Geological Survey (USGS), the Colorado Geological Survey (CGS), and other public sources. Our desktop review of anticipated geologic conditions is summarized herein, along with our observed, site-specific conditions as identified through our investigation.

4.1 Observed Site Conditions

The project area is divided by state highway 71 (CO-71) with boundaries extending to the east and west. The fields are not bound by fences and are generally accessible by varying unpaved County Roads which run perpendicular to CO-71. Access to parcels that are bounded by CO-71 is limited due to roadside ditches.

The project site is covered by winter wheat crops over silty topsoil. Fencing runs throughout the project area, dividing the land into smaller parcels of land containing crops at varying maturity.

4.2 Historic & Topographic Setting

The site of the planned Ebba Solar is located in Lincoln County, Colorado. The site consists of multiple parcels located six (6) to nine (9) miles south of the town of Limon, and approximately 65 miles northeast of Colorado Springs along US Highway 24. Parcels are generally arrayed on either side of Colorado State Highway 71.

During our site visits, the parcels appeared to be in use as pasture and other agricultural capacity. Historical satellite imagery shows that the site appears to have been used in a pastoral and grazing capacity since 1969 (the year of earliest available imagery from our review). The site does not appear from satellite imagery, or our site visit, to have hosted or currently host permanent structures.

The project site is relatively flat, with elevation estimated to be approximately 5,550 feet above mean sea-level (AMSL) across the site and is generally gently sloping from the west to east. Available area topographic maps indicate that slopes are on the order of approximately 1% to the east.

4.3 Surficial Geology

ANS Geo reviewed geological mapping made available by the Colorado Geological Survey (CGS) and the United States Geological Survey (USGS) which indicated the project area is located in High Plains region of the United States. This area is a semi-arid climate, which is characterized by a gentle-sloping, high altitude landscape that is dominated by Quaternary Eolian deposits and older gravels and alluviums.

ANS Geo additionally reviewed surficial soil mapping available from the Natural Resource Conservation Service (NRCS) Web Soil Survey application. The NRCS survey was initially created for agricultural purposes and is generally limited to the upper five (5) to six (6) feet BGS; however, the resource provides generalized information pertaining to the soil chemistry and properties. The NRCS mapping identifies the project area to be primarily comprised of the Ascalon Sandy Loam, Platner Loam, Wages Loam, and Weld Silt Loam soil units.

4.4 Bedrock Geology

ANS Geo reviewed geologic maps made available by the Colorado Geological Survey (CGS) and the United States Geological Survey (USGS), which indicated that the project site is located west of the Big Sandy Creek Valley. This valley characteristically has observed bedrock between 20 and 46 feet below ground surface (BGS). The project site is located at a higher elevation than the valley, where the top of the bedrock is likely to be deeper than excavations for development at this site. Bedrock was not encountered during our investigation and is not anticipated to be encountered during construction.

4.5 Observed Subsurface Conditions

ANS Geo has provided the generalized subsurface conditions within **Table 1** and **Table 2** based observations recorded within our geotechnical investigation program. Soil boring logs and test pit photo logs have been provided as **Attachment C** and **Attachment D**, respectively, and should be reviewed for specific soil condition observations.

In general, soil lithology throughout the project site consists of brown silt, sand, and clay mixtures which grade with depth into clay, silt, and sand soils with higher silt/clay (fine-grained) fraction and increased hardness/relative density. Groundwater was not encountered in soil borings or test pits.

Table 1: Generalized Array Area Subsurface Profile

Stratum	Avg. Depth (ft)	Material (USGS Classification)	Avg. Consistency/ Relative Density	Description
I	0 ~ 4	Silt (ML), Silty Sand (SM), Silty Clay (CL-ML)	Medium Stiff to Very Stiff, Loose to Medium dense	This stratum generally consists of a layer of brown, medium stiff to very stiff silt (ML) and loose silty sand (SM). Pocket penetrometer values of the silty soils in this layer ranged between 3.0 and >4.5 tsf. SPT N-values ranging from 7 to 21 blows per foot (BPF) were observed in this stratum, with an average N-value of 11. Fat clay was observed in the upper two (2) feet at location B-07.
II	4 ~ 20	Silty Sand (SM), Clayey Sand (SC), Silty, Clayey Sand (SP-SM), Sand (SP), Sandy Lean Clay (CL)	Loose to Medium Dense, Very Stiff to Hard	Stratum II generally consists of a layer of light brown to light gray, loose to medium dense silty sand (SM), clayey sand (SC) and poorly sorted sand (SP). Very stiff lean clay (CL) was also observed within this layer. Varying amounts of coarse to fine gravel were encountered in these sand layers. Pocket penetrometer values of lean clay ranged between 2.5 and >4.5 tsf within this layer. SPT N-values ranged between 8 and 41 BPF with an average N-value of 20 in this layer.

Table 2: Generalized Substation and BESS Area Subsurface Profile

Stratum	Avg. Depth (ft)	Material (USGS Classification)	Avg. Consistency/ Density	Description
I	0 ~ 2	Silt (ML)	Very Stiff	This stratum generally consists of a layer of brown, very stiff non-plastic silt (ML) with varying amounts of fine sand. SPT N-values ranging from 12 to 19 blows per foot (BPF) were observed in this stratum, with an average N-value of 16.
II	2 ~ 13	Silty Sand (SM), Clayey Sand (SC), Sand (SP), Sandy Lean Clay (CL)	Very Loose to Dense, Stiff	Stratum II generally consists of a layer of light brown, very loose to dense silty sand (SM), clayey sand (SC) and poorly sorted sand (SP), all varying in amounts of coarse and fine grains. Stiff lean clay (CL) was also observed at 2 to 4 feet BGS at SS-B-02. Varying amounts of fine gravel were encountered in layer. SPT N-values ranged between 8 and 41 BPF with an average N-value of 20 in this layer.
III	13 ~ 20	Gravel (GP), Sand (SP)	Medium Dense to Dense	Stratum III generally consists of light brown to light gray, medium dense to dense poorly sorted sand (SP) and poorly sorted gravel (GP), with varying amounts of coarse to fine grained material. SPT N-values ranged between 14 and 28 BPF with an average N-value of 22 in this layer.
IV	20 ~ 50	Fat Clay (CH, clayshale)	Very Stiff to Hard	Stratum IV generally consists of brownish yellow to dark gray, very stiff to hard high plasticity fat clay (CH), with little to trace sand. Pocket penetrometer values were all >4.5 tsf and SPT N-values ranged between 24 and >50 BPF within this layer.

4.6 Groundwater

ANS Geo did not encounter static groundwater during the geotechnical investigation. ANS Geo notes that groundwater conditions are ephemeral and fluctuate due to seasonal and climate influences. Therefore, some fluctuation should be considered.

4.7 Summary of Geohazards

ANS Geo assessed publicly available information, results of the geotechnical investigation and the site conditions during the investigation to evaluate any potential geotechnical or geological hazards. Most common geohazards for solar project sites and site-specific assessments of these hazards are summarized in **Table 3**.

Table 3: Risk of Geohazards to Site Development

Hazard	Relative Risk to Site	Comment
Corrosive Soil	Moderate	Laboratory corrosion testing and field electrical resistivity testing show that the project site soils are moderately corrosive to steel and negligibly corrosive to concrete. NRCS maps indicate that the project site is generally considered to have moderate risk of corrosion to concrete and a moderate to high risk of corrosion to steel.
Frost Action	Moderate	The frost depth in Lincoln County, Colorado is mapped at approximately 30 inches below grade. Foundations should be constructed considering the frost related forces or with proper remediation against frost. A detailed discussion is provided in **Section** Error! Reference source not found..
Collapsible Soil	Moderate to Low	Loose, dry loess soil deposits can experience soil collapse. Loess soils are mapped at the project site; however, results of soil borings and test pits indicate that risk of collapsing soils are relatively low.
Expansive Soils	Low	Generally, the near-surface soils encountered during soil borings and test pits did not show properties associated with swelling soil. However, fat clay was observed in the upper two (2) feet at a single boring (B-07). Additionally, the Swelling Clays Map of the Conterminous Unites States published by the USGS was reviewed for risk of expansive clays on site. Based on this map, it appears that the project site is mapped within material either potentially containing abundant clay having high swelling potential or containing clay which has slight to moderate swelling potential. Although mapped in this region, near-surface swelling soils were encountered in only a single boring and in no test pits; we do not anticipate that swelling soils will be significantly or extensively encountered during construction.
Earthquake – Seismicity	Low	The project area is mapped within a low hazard zone based on the USGS “2018 Long-term National Seismic Hazard Map.” ANS Geo does not anticipate any impact to the proposed facility. See **Attachment A-4** for a Seismic Hazard Map.
Flooding	Low	According to the Colorado Water Conservation Board, there are no flood zones contained within the project boundaries. North of the project site in and around Limon, Colorado, there are areas of minor to moderate risk of flooding. See **Attachment A-3** for surrounding flood hazards. This site may be relatively prone to flash flooding, especially in “monsoon” season (usually from June to September).
Liquefaction	Low to Negligible	Given the lack of groundwater encountered during our investigation and the low probability that a seismic event will occur while the site is flooded at the ground surface, the site can be considered low-risk for liquefaction.
Slope Failure	Negligible	The site has a relatively flat topography. ANS Geo does not anticipate any slope stability concerns for the proposed solar facility for

		development within plus or minus two (2) feet of existing ground surface.
Subsidence – Pumping	Negligible	There is no known oil and gas development or installation equipment in the area. ANS Geo does not anticipate any impact to the proposed facility.
Subsidence – Mining	Negligible	Based on online mining databases, there are no known mines within the project boundary. ANS Geo does not anticipate any impact due to mining activity to the proposed facility.
Subsidence – Caves/Karst/Gypsum	Negligible	Based on the USGS Mineral Resources On-Line Spatial Database, no karst feature, or formations are mapped near the area. Moreover, no bedrock was encountered at any of the boreholes, and is not expected to be encountered during construction at this site.
Quick Clay	Negligible	Quick clay is a type of clay that when disturbed can suddenly liquefy without warning leading to potential landslides and other hazards. There is no known quick clay within the project area.

5 Laboratory Results

Representative soil samples were collected during our investigation and submitted to ANS's accredited materials testing laboratory. Soil samples will be retained for a period of three (3) months following the initial submission of this Report.

5.1 Soil Index Testing

A summary of the index laboratory test results has been provided within **Table 4** and **Table 5**. As-received laboratory test results are included within **Attachment E**.

Table 4: Soil Index Testing Summary (Sieve Analysis, ASTM D6913)

Location ID	Sample ID	Depth (ft)	% Gravel	% Sand	% Fines	% Moisture
B-01	S-4	6-8	0.0	52.0	48.0	12.3
B-04	S-6	13-15	7.5	86.6	5.9	4.8
B-06	S-3	4-6	1.1	68.9	30.0	6.9
B-08	S-2	2-4	0.0	76.6	23.4	5.7
B-1	S-4	6-8	0.0	62.7	37.3	10.2
B-09	S-4	6-8	1.8	86.5	11.7	5.2
B-10	S-5	8-10	2.4	80.7	16.9	4.9
	U-1	2-4	0.0	25.6	74.4	14.4
SS-B-01	S-7	18-20	4.6	84.9	10.5	3.1
SS-B-02	S-6	13-15	7.0	88.8	4.2	2.1

Table 5: Soil Index Testing Summary (Atterberg Limits, ASTM D4318)

Boring ID	Sample ID	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	% Moisture	USCS
B-02	S-3	4-6	27	21	6	13.9	CL-ML
	S-5	8-10	34	22	12	11.8	CL
B-03	S-6	13-15	26	20	6	8.6	CL-ML
B-05	S-2	2-4	37	22	15	16.2	CL

Boring ID	Sample ID	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	% Moisture	USCS
B-07	S-1	0-2	51	26	25	20.5	CH
B-10	U-1	2-4	38	21	17	14.4	CL
SS-B-01	S-9	28-30	77	34	43	28.2	CH
SS-B-02	S-10	33-35	83	34	49	25.0	CH

5.2 Thermal Resistivity Testing

ANS Geo collected bulk samples from five (5) locations within the project area from three (3) to five (5) feet below grade for laboratory testing of Thermal Resistivity. Soil was collected in a five-gallon bucket and delivered to ANS's accredited laboratory for testing. The soil was compacted to 90 percent of its Standard Proctor Density in accordance with ASTM D698, and Thermal Resistivity Testing was conducted in accordance with IEEE Standard 442-2017 and ASTM D5334. Results of the thermal testing summarized within **Table 6**. Complete, as-received results are provided within **Attachment E**.

Table 6: Thermal Resistivity Testing Summary (ASTM D5334)

Location ID	Material Type	Thermal Resistivity Values at Various Moisture Contents						Received Moisture Content (%)	Re-Molded Dry Density (lb/ft³)
		% water	% water	% water	% water	% water	% water		
		(°C-cm/W)	(°C-cm/W)	(°C-cm/W)	(°C-cm/W)	(°C-cm/W)	(°C-cm/W)		
TP-04	CL-ML	0.0	4.3	8.6	12.9	17.2	--	12.1	95.7
		220.9	147.4	72.3	62.2	57.8	--		
TP-06	CL-ML	0.0	5.3	10.5	15.8	21.0	--	17.2	85.1
		241.9	181.5	98.0	77.4	70.2	--		
TP-09	CL-ML	0.0	3.9	7.7	11.6	15.4	--	11.0	97.3
		242.4	163.5	69.2	56.8	52.9	--		
TP-14	SM-SC	0.0	2.6	5.3	7.9	10.5	--	5.5	107.5
		191.6	62.1	43.8	41.8	40.3	--		
TP-15	CL-ML	0.0	4.3	8.6	12.9	17.2	--	17.0	94.2
		236.1	172.6	84.7	67.4	61.7	--		

5.3 Corrosivity Testing

ANS Geo collected bulk samples from two (2) to four (4) feet below grade at six (6) locations for corrosivity testing. The results of the testing, completed by ANS, are summarized within **Table 7** and detailed within **Attachment E**.

Table 7: Corrosivity Testing Summary

Location ID	pH	Sulfate (mg/kg)	Chloride (mg/kg)	Redox Potential (average) (mV)	Soil Box (Calculated Resistivity) (Ω-cm)
TP-01	7.8	<15	36	110	2850
TP-04	7.5	240	177	141	1960
TP-07	7.7	<15	48	159	2420
TP-10	8.0	30	45	170	6630
TP-12	8.0	<15	18	176	3590
TP-13	7.7	<15	<10	201	7310

5.4 California Bearing Ratio

ANS Geo collected bulk samples from one (1) to two (2) feet below grade at three (3) locations for testing of California Bearing Ratio (CBR) in accordance with ASTM D1883 at approximately 95 percent of its Standard Proctor Density (ASTM D698). The results of the testing have been summarized within **Table 8** and are detailed within **Attachment E**.

Table 8: California Bearing Ratio Results Summary

Sample ID	Test Pit	CBR Ratio (%)
CBR-01	TP-01	1.9
CBR-02	TP-06	9.2
CBR-03	TP-15	2.1

6 Pile Load Testing Results

Table 9 presents the summarized results of the pile load testing program at each test location. Complete load testing logs are provided as **Attachment G** and should be referenced for detailed information. Additional discussion of preliminary array-area pile design is provided in **Section 8.4.1 to Section 8.4.2.** Discussion of pile construction and pile drivability are found in **Section 9.5.**

Table 9: Pile Load Testing Summary

Pile Test ID	Pushed-to Depth (ft)	Target Pile Embedment Depth (ft)	Final Embedment Depth (ft)	Average Drive Time Rate* (sec/ft)	Approx. Uplift Load at 1-inch Displacement (lbs.)	Approx. Lateral Load at 1-inch Deflection (lbs.)
PLT-01	0.0	7.0	7.0	3.4	8,100	4,300
PLT-02	0.0	8.0	8.0	7.6	> 12,000	4,900
PLT-03	1.0	9.0	9.0	2.5	4,400	3,600
PLT-04	1.0	10.0	10.0	7.8	> 12,000	> 5,500
PLT-05	1.0	7.0	7.0	7.7	9,700	4,000
PLT-06	1.0	8.0	8.0	9.9	> 12,000	3,600
PLT-07	1.0	9.0	9.0	11.2	> 12,000	4,900
PLT-08	0.0	10.0	10.0	4.3	> 12,000	5,300
PLT-09	0.0	7.0	7.0	2.8	2,700	5,200
PLT-10	0.0	8.0	8.0	11.6	6,500	5,300
PLT-11	1.0	9.0	9.0	3.3	5,600	5,300
PLT-12	0.0	10.0	10.0	20.7	> 12,000	5,400
PLT-13	0.0	7.0	7.0	8.0	> 12,000	5,300
PLT-14	0.0	8.0	8.0	23.4	> 12,000	> 5,500
PLT-15	0.0	9.0	9.0	8.4	> 12,000	5,300

*Time per ft to advance pile via vibration from pushed-to depth to final embedment depth

7 Seismic Considerations

7.1 Site Classification

Based on the observations recorded within our subsurface investigation program and our familiarity with the project area, Site Class D is assumed as the average condition across the project site for Risk Category II.

The seismic ground motion values for this this were obtained from the USGS Seismic Hazard Maps, referenced in ASCE 7-16 Standard and provided as **Attachment H,** and are as follows:

- 0.2 second spectral response acceleration, S_S = 0.129 g
- 1 second spectral response acceleration, S_1 = 0.045 g
- Maximum spectral acceleration for short periods, S_{MS} = 0.206 g
- Maximum spectral acceleration for a 1-second period, S_{M1} = 0.109 g
- 5% damped design spectral acceleration at short periods, S_{DS} = 0.137 g
- 5% damped design spectral acceleration at 1-second period, S_{D1} = 0.072 g

7.2 Historic Seismic Events & Liquefaction

According to the United States Geological Survey (USGS) earthquake catalog, the closest earthquakes to the project are over 50 miles away in Denver and Colorado Springs. These earthquakes range in magnitude up to 5.3. This magnitude 5.3 earthquake is considered a “moderate” event that occurred on November 27, 1967, in Denver, which is approximately 77 miles from the project site. While layers of sand where observed within the soil borings, liquefaction is of low concern due to the general medium to dense material stiffness and the lack of groundwater present at the site.

7.3 Preliminary Seismic Evaluation

The designated seismic site class is anticipated based on results from our investigation program and using select areas of the site which have been investigated by ANS Geo. Based on our observation of subsurface conditions, estimated Site Class ratings, and review of USGS’s 2018 National Seismic Hazard Map and publicly available information, ANS Geo concludes that the area is generally considered to be a relatively low seismic hazard zone.

8 Foundation Design Considerations

ANS Geo anticipates that, as typical with solar farm construction, embedded posts, such as W6x9 H-piles, will be used to support the proposed solar panels. Conventional shallow foundations such as sonotubes, spread footings, or systems may also be utilized for equipment pads and associated support structures.

8.1 Corrosion Considerations

8.1.1 Buried Steel

Given the available testing results measuring the soil pH level, sulfate and chloride concentrations, resistivity, and redox potential summarized in in **Section 5.3**, in consideration with the soil and moisture conditions observed, the in-situ soil conditions generally indicate soils that are generally “moderately corrosive” to ferrous materials. It is anticipated that hot dipped galvanized steel with a minimum zinc coating thickness in accordance with ASTM A123 may be able to provide some protection prior to the increased rate of expected bare-steel corrosion loss over the project design life. However, we recommend evaluating

the need for increased sacrificial steel thickness or an increased zinc coating thickness of 5-mil to meet the corrosion allowance for steel. For structural steel shapes, a minimum zinc coating thickness typically ranges from 3-mil to 4-mil depending on the steel section size as specified by ASTM A123. For example, a W6x9 shall contain a minimum zinc coating grade of 75 micrometers, or a 3-mil thick coating.

Steel section loss in piles decreases the structural load carrying capacity of the member as well as increases the member deflections. Therefore, it is recommended that the final structural design considers the useful life of galvanized (zinc) coating, followed by the anticipated loss of steel due to corrosion to ensure the structural integrity is maintained throughout the service life. Thicker pile sections, increased zinc coating thickness, or other corrosion protection measures may be necessary to accommodate any reduction in structural capacity. For example, it is possible that a W6x12 pile with a standard zinc coating thickness could corrode to W6x9-equivalent section throughout the service life depending on the corrosion-related soil properties.

Soil Corrosion:

- **Soil corrosion loss of zinc (per side):**
    - **3 mil coating:** 0.371 mil/year (depletion of zinc occurs within ~8 years)
    - **5 mil coating:** 0.140 mil/year (depletion of zinc occurs within ~35.7 years)
- **Soil corrosion loss of bare steel *after* zinc loss (per side)**: 1.37 mil/year
    - **With 0 mil coating:** 43.10 mil (by the end of 35 years of design life)
    - **With 3 mil coating:** 33.15 mil (by the end of 35 years of design life)
    - **With 5 mil coating:** 0 mil (by the end of 35 years of design life)

Atmospheric Corrosion:

- **Atmospheric corrosion loss of zinc**: 0.002 to 0.016 mil/year (Category C2 - Zinc will last over 30 years)

Based on the limited corrosivity and resistivity testing results, it is our professional opinion that a 75-micrometer (3-mil) zinc coating would maintain an approximate lifespan of approximately eight (8) years prior to full depletion. Upon depletion of the zinc coating, bare steel loss would occur at an estimated rate of 1.23 mils (~0.0012 inches) per year. For context, under these assumed conditions, a 3-mil zinc-coated W6x9 steel pile would experience approximately 33.15 mils (0.0332 inches) of steel loss (per side) within a 35-year lifespan, while a 5-mil zinc-coated steel pile would experience approximately 0 mils within a 35-year lifespan.

If desired, a detailed corrosion evaluation report can be developed by ANS Geo, or others, to interpret the soil corrosivity test results and estimate the rate of corrosion for zinc and bare steel resulting from exposure to the surrounding environment. This detailed corrosion evaluation may be provided to the Owner and/or foundation engineer to incorporate the test results into the design and selection of pile foundations, or other buried steel across the site.

8.1.2 Buried Concrete

Corrosive soils can have a significant impact on below-grade concrete foundations by potentially damaging or weakening the concrete. One of the primary forms of concrete deterioration due to exposure to corrosive soils is sulfate attack. Sulfate attack is a common form of concrete deterioration which occurs when concrete comes in contact with water or soil containing sulfates. Sulfates are typically found in some soils, in seawater, and in wastewater treatment plants. The principal factors which affect the rate and severity of sulfate attack are permeability of concrete, concentration of sulfates, tricalcium aluminate (C_3A) content, and calcium hydroxide content. When sulfates react with C_3A, it will form ettringite which will expand and create internal tension within the concrete that eventually leads to cracking. Therefore, a low C_3A content is one of the main considerations when selecting cement for sulfate resistance.

Recommended concrete properties, including cement type, to resist sulfate attack are based on the site-specific sulfate exposure class, as per ACI 318-19, Table 19.3.1.1. The severity of the exposure of concrete to sulfate is divided into four classes (S0 through S3) depending on the water-soluble sulfate in soil (percent by mass) or dissolved sulfates in water (ppm).

Results of ANS Geo's laboratory testing indicate that water-soluble concentration within soil at two and four feet were equal to or lower than 240 mg/kg. A sulfate exposure classes of **S0** (***Water-Soluble Sulfate (SO_4^2) in soil, percent by mass < 0.1%)*** is expected to be appropriate for concrete in contact with soil similar to those assayed for this investigation. For sulfate exposure class **S0**, external sulfate attack is not likely to be of concern, and there are no recommended restrictions on cement type.

ANS Geo recommends that concrete adheres to the requirements of ACI 318-19, Table 19.3.2.1 for concrete properties including maximum water-cement ratio, minimum compressive strength (psi), and cement type for the site-specific sulfate exposure class. These recommendations do not consider acidic or basic soils, which should additionally be considered during cement design. For as-received results of corrosivity testing, see **Attachment E**.

8.2 Frost Considerations

8.2.1 Frost Depth

According to the Department Services of Colorado the local frost depth within Lincoln County, Colorado, is mapped to exist at approximately 30 inches below grade. ANS Geo recommends that all shallow (non-pile) foundations should be embedded at least to this depth. Shallower foundation depths may also be accommodated, provided they are appropriately frost-protected by way of appropriately designed haunched edges, foam insulation, and/or free-draining structural fill extending to the frost depth.

For shallow foundations which are not load-bearing or sensitive to movement, such foundations may be able to be founded at shallower depths. ANS Geo may be contacted to provide recommendations for minimum embedment depth in this scenario.

8.2.2 Ad-freeze Influence

We recognize that fluctuations in air temperature, snow cover and insulation, and historic freezing indices have shown empirical correlations of shallower frost depth. For design of array and support structure pile foundations, shallower depths of frost influence may be considered, hereby referred to as "ad-freeze depth".

Given the location of the project and soils encountered, the potential for frost heave against post foundations should be considered. Fine-grained soils, or granular soils with greater than 10 percent fine-grained content are frost-susceptible due to the inability of entrapped moisture from infiltrating or evaporating prior to freezing. Trapped moisture will begin to create ice lenses, which will grip the steel posts or embedded structures, followed by ice-jacking due to frost heave. The phenomenon is more commonly referred to as "ad-freeze stress", which can be considered as an external, upward force applied to the post. The magnitude of the upward force will depend on the depth/thickness of the frost zone, the interface bond stress between embedded structure/material and the surrounding area, and the surface area of the structure/material in contact with this bond stress.

Several methods exist to evaluate frost susceptibility of soils, including determination of fine-grained content of near-surface soils, evaluation of air freezing index. Frost penetration depth may be calculated in multiple ways, including local, County, or State building code frost depths, the US Army Corps of Engineers method using the modified Berggren Equation, and empirical data.

Additionally, using the modified Berggren Equation, frost penetration depth can also be calculated based on assumed values for soil density, moisture content, thermal conductivity, air freezing index, and volumetric latent heat of soil. Using site-specific values and assumptions, input into the modified Berggren Equation, and our professional opinion and experience, the calculated frost penetration depth for a 100-year return period, for ad-freeze stress consideration purposes, is roughly 28 inches.

Based on our evaluation, since conditions may exist where snow cover is not present during low temperature extremes, and using a calculated depth of frost penetration, ANS Geo recommends that piles may be designed considering an “ad-freeze depth” of 30 inches (2.5 feet) below grade with the presence of sod/vegetative cover. As predominantly silt (ML) and silty sand (SM) soils were observed near grade, ANS Geo recommends that an unfactored ad-freeze (uplift) stress of 2,088 pounds per square foot (14.5 psi) be considered within the 30-inch ad-freeze depth of posts for panel foundation sizing and design.

8.3 Soil Shrink & Swell Potential

Shrinkage and swelling of soils refer to the volumetric change (decrease and increase) exhibited in primarily fine-grained soils due to a change in moisture conditions. The extent of shrinking and swelling is largely influenced by the type and amount of clay present in the native near-surface soils. Higher-risk soils generally include fine-grained material with a high clay content, greater than 50 percent by weight, and liquid limits of 50 percent or higher (fat clays).

Based on laboratory results and onsite observations, the vast majority of the project site did not show properties associated with swelling/shrinking soils.

In Boring B-07, a two (2) foot layer of fat clay (CH) soil was encountered from ground surface to a depth of two (2) feet BGS. The calculated potential vertical rise at this boring location is less than one (1) inch, and is expected to be less than one-half (1/2) inch throughout the majority of the project site.

8.4 Recommended Parameters for PV Array Pile Design

In this section, the results of PLT investigations should be considered preliminary. Section 8.4.1 below, discuss some of the assumptions and decisions which influenced the recommendations of this section, and notes on considerations for pile array designers and constructors to consider ahead of and during construction. Additional notes on construction considerations of pile installation.

8.4.1 Discussion of Uplift (Tensile) Pile Testing Results

The test termination criteria for uplift (tensile) pile testing were set so that testing halted once either an uplift load of 12,000 lbs or a deflection of 1.5 inches was achieved, whichever came first. Most piles reached the 12,000-pound load limit prior to the 1.5-inch deflection limit was reached. At six (6) locations (PLT-01, PLT-03, PLT-05, PLT-09, PLT-10 and PLT-11) the pile had mobilized suddenly prior to the 12,000 lb load limit. In these cases, the deflection to achieve 1.0 inches was recorded, as uplift failure has already occurred, and measurements of additional deflection may not accurately reflect the soil failure envelope beyond this. As such, we recommend that uplift failure be considered to have been effectively reached for a deflection of 1.0 inch, rather than 1.5 inches.

As pre-drilling was not conducted during testing, and is not expected to be necessary for pile installations at this site, the recommendations in **Table 10** are appropriate only for piles installed via direct push and vibration into undisturbed native subgrade.

8.4.2 Discussion of Lateral Pile Testing Results

Based on our interpretation of the subsurface conditions observed within our limited investigation program, and the laboratory testing results, ANS Geo recommends that the preliminary soil parameters in **Table 10** be considered within array areas only. LPILE parameters presented are calibrated so that 95% or greater of field experimental data is within the simulated lateral deflections.

Table 10: Recommended LPILE Parameters for Array-Area Driven Pile Design

Depth (ft)	Material Model	Total Unit Weight (pcf)	Internal Friction Angle	Cohesion (psf)	Soil Modulus, k_{static} (psi/in.)	Soil Strain (E_{50})	Allowable End Bearing[1,2] (psf)	Allowable Side Resistance[1,2] (psf)
0 to 0.5	Stiff Clay w/o Free Water	100	--	--	--	--	--	--
0.5 to 1	Stiff Clay w/o Free Water	100	--	1,250	--	Default	--	--
1 to 2.5	Stiff Clay w/o Free Water	105	--	1,500	--	Default	--	--
2.5 to 4	Stiff Clay w/o Free Water	110	--	1,750	--	Default	--	300
4 to 8	Sand (Reese, et al.)	115	33°	--	Default	--	2,500	400
8 to 10+	Sand (Reese, et al.)	120	35°	--	Default	--	3,500	450

1. These recommendations consider a minimum factor of safety of 2.5 for end-bearing and 1.5 for skin friction conditions.
2. Equivalent box perimeter area approach was utilized for axial capacities.
3. Allowable end bearing values are recommended based on strain compatibility with mobilized allowable side resistances.
4. The upper 2.5 feet are neglected in axial pile capacity due to ad-freeze.

ANS Geo recommends that allowable side resistance within the upper 30 inches be neglected due to potential erosion, frost impact, or surficial disturbance. For lateral design considerations, ANS Geo additionally recommends that lateral resistance within the upper six (6) inches be neglected to account for potential erosion; this depth should be confirmed in the Civil Engineer of Record's hydrological study. Pile load testing results and subsurface observations were evaluated by ANS Geo using LPILE software to provide these refined soil parameters. ANS Geo notes that the soil parameters depicted within **Table 10** represent values calibrated to curve-fit our lateral load test data; these parameters should not be relied upon for other site foundation designs. It is our recommendation that a verification load testing program and detailed structural calculations, using the intended pile sections and design loads, be performed prior to construction to confirm these recommendations.

ANS Geo notes that these recommendations are based on typical criteria we have observed through our professional experience; once a racking vendor has been selected, the racking vendor's specific criteria should govern over our recommendations.

8.5 Recommended Soil Parameters – Shallow Foundations

ANS Geo anticipates that shallow foundations such as concrete footings, housekeeping pads, inverter pads, or sonotubes will be used to support non-critical and lightly loaded structures. As such, we recommend the soil parameters depicted within **Table 11** be considered for such foundation designs, assuming a maximum post-construction vertical movement of one-inch. Load-bearing foundations should be installed atop properly prepared subgrade as described in **Section 9.3**.

Table 11: Recommended Soil Parameters for Shallow Foundations

Depth (ft)	Material (Stratum No.)	Max. Allowable Bearing Pressure (psf)		Vertical Subgrade Modulus	Soil / Concrete Friction Factor
		Strip Footings / Grade Beams	Isolated Square / Circular Footings		
1 to 2	Silt, Clay, Clayey Sand (Stratum I)	1,500	1,750	20	0.35
2 to 3	Silt, Clay, Clayey Sand (Stratum II)	2,000	2,250	30	0.40
3 +	Silt/Sand (Stratum III)	2,250	2.500	90	0.4

ANS Geo notes that **Table 11** includes bearing capacities for layers which may be impacted by frost. For foundations which are founded within the frost zone (as noted in **Section 8.2**), these foundations should be frost-protected by way of appropriately designed haunched edges, foam insulation, and/or free-draining structural fill extending to the frost depth. Should the maximum allowable bearing capacity be lower than required, ANS Geo recommends over-excavating below the recommended excavation depth and replacement of native material using additional structural fill placed and prepared as noted in **Section 9.3**. For each additional 12-inches of over-excavation and replacement of structural fill beyond the recommended minimum, allowable bearing capacity may be increased by 250 psf, up to a maximum of 500 psf allowable bearing capacity increase from values presented in **Table 11**.

Shallow foundations should not be directly placed or constructed on the dry, loose, and poorly-graded sand. If the native subgrade material is unsuitable, ANS Geo recommends over-excavation to a minimum depth of at least twelve (12) inches beneath the foundation depth, the placement of a geotextile separation fabric, and the controlled placement of lifts of compacted stone or structural fill (as specified in Table 11). Crushed stone or select fill should be placed in loose lifts not exceeding 12-inches, and should be compacted using three, round-trip passes of a minimum 5-ton static drum roller.

The capacities and parameters noted in **Table 11** are based on foundation considerations and assumptions detailed in **Section 9.3**. The above recommendations in **Table 11** are based on strip footings and isolated spread footings with dimensions producing less than 100 square feet.

The above recommendations are intended for isolated square or circular spread footings with dimensions producing less than 100 square feet.

8.5.1 Mat Foundations

Mat foundations (100 square feet or larger, such as larger substation slabs) should be founded at a depth of at least one (1) feet or greater on at least 18 inches of properly compacted structural fill as indicated in **Section 9.3**.

Table 12: Recommended Soil Parameters for Mat Foundations

Depth (ft)	Material	Max. Allowable Bearing Pressure (psf)		Vertical Subgrade Modulus	Soil / Concrete Friction Factor
		100 to 500 sq. ft foundation	> 500 sq. ft foundation		
2 to 4	Silt (ML), Clay (CL, CH), Silty/Clayey Sand (Stratum I)	750	500	30	0.35

Rigid mat foundations placed on at least 24 inches of properly compacted fill may be designed for an increased maximum allowable bearing capacity of 250 psf on top of the allowable bearing pressures presented in **Table 12** and may be designed for an increased maximum settlement of 2 inches. The mat foundation should be constructed on the compacted structural fill layer. Use of a vapor retarder such as

polyethylene sheeting may be considered by the designer directly beneath the foundation to limit the potential for water to wet the underlying fine-grained soils. Adequate construction joints and reinforcement should be provided to reduce the potential for cracking of the floor slab due to differential movement.

Lastly, sliding resistance of any shallow foundations will be largely provided by the friction between the concrete foundation and the underlying subgrade soils. Although the concrete foundation will be separated from the native soil by a compacted structural fill layer, we have conservatively considered direct contact on native fine-grained soils for purposes of obtaining a design value. The base friction coefficient for the foundation on native soils are provided in the above tables. The strains required to mobilize base friction are not compatible with the strains required to mobilize passive resistance. Therefore, we recommend that passive earth pressure be ignored.

8.6 Recommended Soil Parameters – Deep Foundations

If critical substation structures or transmission poles are subjected to heavy compressive and/or overturning loads, it is recommended that drilled pier foundations be used. Geotechnical design values have been created for use in Ensoft LPILE, Fad Tool's MFAD, or CAISSON software. These parameters have been provided in **Table A** immediately preceding the attachments.

8.6.1 Deep Foundation Capacities

Design capacities can be calculated using the diameter of the shaft, depth of the shaft, installation method, and various geotechnical parameters, provided in **Table A**, that define how the soil will behave under load. A summary of the recommended ultimate skin friction and end bearing values for drilled shaft design is provided in **Table A**. Piers should extend a minimum of 1.5 pier diameters into a given soil stratum to fully develop the recommended design end bearing strengths. A minimum factor of safety of two (2) must be applied to the skin friction values and three (3) to the end bearing capacities for design purposes.

Post-construction settlement for drilled piers designed for end bearing should be limited to one (1) inch or less, based on the recommended capacities provided herein. Foundation loads and dimensions would be required to calculate an explicit anticipated settlement. ANS Geo should be consulted with the final dimensions and loading of the proposed foundations to allow calculation of the anticipated settlement of each structure and confirm the settlement remains within a serviceable limit.

8.6.2 Deep Foundation Construction

Based on the presence of non-cohesive and sandy soils throughout the project area, temporary casing may be required, depending on the design embedment depth of the piers, to maintain borehole integrity prior to placement of reinforcing steel and concrete. Contractors should be required to provide bid prices for varying sizes and lengths of temporary casing based on the design depths and diameters of deep foundation elements. Piers should be poured the same day they are drilled and must not be left open overnight. If a pier cannot be poured on the same day as drilling, they may be loosely backfilled and re-drilled the following day for installation. To the extent possible, cast-in-place concrete should be placed "in the dry"; pumps or casing may be necessary to remove or prevent infiltration of groundwater into open excavations prior to placement of concrete.

Pier holes should be inspected for verticality (plumbness), proper depth of drilling, proper bearing strata, and cleanliness of the bottom of the excavation prior to introduction of reinforcing steel or concrete. ANS Geo encourages that concrete should be placed via tremie method to avoid consolidation or segregation of the aggregates in the concrete.

9 Construction Recommendations

9.1 Excavation

Depending on proposed foundation configurations, degree of earthwork, and depth of utilities, some excavations may extend deeper than four (4) feet below grade. Temporary excavations deeper than four (4) feet should be shored or sloped and benched, in accordance with OSHA regulations, to ensure safe working conditions within the excavations. For benching purposes, overburden clays may be considered as "Type A" material and should be sloped no steeper than 3/4H:1V (horizontal to vertical). Clayey sands, "Type B", should be limited to 1H:1V or flatter. "Type C", flowing (non-cohesive) sands, should utilize 1-1/2H:1V or shallower. All OSHA soil classifications should be field-determined by the contractor's "competent person" prior to excavation. Any proposed shoring systems should be designed by the contractor's "competent person", be certified by a Professional Engineer licensed in the State of Colorado and should be submitted to the engineer for review.

9.2 Dewatering

At the time of our geotechnical investigation, perched water and/or groundwater was not encountered within any investigation location. As such, dewatering is not anticipated for shallow excavations. Notwithstanding, the contractor should be prepared to manage groundwater, perched water, and/or infiltrated stormwater as needed using localized sump-and-pump, wellpoint, or similar techniques to allow for concrete foundation construction in-the-dry. Water discharge should be managed in compliance with applicable state and local regulations. The contractor should be sure to grade the surface as necessary to divert stormwater away from open excavation to the extent possible.

In addition, ANS Geo notes that the presence of standing water or shallow water may exist across the site during construction and development. The presence of this shallow water or standing water may make the native soil subgrade softer, and it may require additional site preparation to allow vehicles and equipment to pass. Furthermore, based on the season and time of construction, precipitation may cause wetter soil conditions which need to be considered and managed. The Contractor should take these conditions into consideration, including the need for additional access stone and/or cement or lime for the stabilization of these conditions.

9.3 Subgrade Preparation and Compaction

Prior to the installation of shallow concrete foundations, ANS Geo recommends over-excavating the subgrade by at least 12 inches, taking into account frost considerations as discussed in **Section 8.2**, proof-rolling the subgrade, lining the exposed material with a geotextile separation fabric, and bringing the subgrade back up to the design foundation elevation with compacted structural fill as specified within **Table 13**. If geotextile fabric is not desired, an additional two (2) inches of stone should be provided to account for some impregnation of the stone into native soil, to maintain a capillary break, and maintain drainage.

Native material beneath the separation fabric should be inspected for unsatisfactory conditions such as standing water, frozen soil, unsuitable soil, organics, protruding cobbles or boulders, or deleterious materials. Should any unsatisfactory conditions exist within the native subgrade, the excavation should be undercut an additional six (6) inches (18 total inches beneath proposed foundation depth) prior to placement of the geotextile separation fabric.

Table 13: Recommended Specification of Structural Fill

Sieve Size	Percent Passing
2-inch	100
No. 4	30 – 100
No. 50	10 – 60
No. 200	5 – 20
Max. Liquid Limit	Max. Plasticity Index
30	10

Should structural fill material not be available, in accordance with the specifications highlighted in **Table 13**, ANS Geo should be contacted to evaluate alternate materials. Structural fill should be placed in loose lifts not exceeding 12-inches if using large equipment, or 8-inches if using hand-operated tools such as jumping jacks, tamping plates, or similar equipment. Structural fill should be placed within two (2) percent of its optimum moisture content and be compacted to at least 95 percent of its Modified Proctor Density (ASTM D1557). The subgrade preparation (over-excavation, fabric, and structural fill) should horizontally extend at least two (2) times the compacted vertical structural fill thickness beyond each edge of the foundation. For example, a six (6)-inch over-excavation and compacted structural fill thickness should extend at least 12 inches laterally beyond each foundation edge.

9.3.1 Re-Use of Native Soils

ANS Geo notes that any native soils with considerable fine-grained content (more than 20 percent) may be difficult to handle, place, and compact without proper moisture conditioning and protection. ANS Geo recommends the following measures be considered to reduce the adverse impacts of moisture-sensitive soils:

- Positive measures should be implemented and maintained to intercept and direct surface water away from moisture-sensitive subgrade surfaces.
- Subgrade surfaces should be sloped and, as appropriate, seal-rolled to facilitate proper drainage. Surfaces should be properly prepared in anticipation of inclement weather. Moisture should not be allowed to collect on subgrade surfaces.
- To the extent practical, the limits of exposed subgrade soils should be minimized.
- Construction traffic should be limited to properly constructed haul roads.
- Disturbed soils should be removed and replaced with compacted controlled fill material.
- In place moisture contents should be maintained with two percent wet/dry of the optimum moisture content as determined by the Modified Proctor Test (ASTM D1557).

These soils may be re-used across the project area for fill in landscaped areas; however, it should not be used under or above foundations or load-bearing structures where typically imported structural fill or general backfill are used, respectively. Native material used as backfill for cable trenches should be handled and placed at a moisture content at or above its optimum value to ensure representative thermal properties are maintained. Native soils may also be used in required “fill” areas within the PV array footprint(s), provided that the material is placed and compacted consistent with the “general backfill” recommendations described herein.

9.3.2 General Backfill

In areas around and above installed foundations, large utilities, and other buried site features, ANS Geo recommends well-graded granular soils with less than 20 percent fine-grained content may be used as general backfill. Native soils meeting these criteria, if and where present, may also be used. General backfill material should be screened of any cobbles, boulders, and any particles larger than 3 inches in diameter, and should not be used beneath any load-bearing structures. General backfill should be placed in loose lift thicknesses not exceeding 12 inches and be compacted to at least 95 percent of its Modified Proctor Density (ASTM D1557). Soil used as backfill should not be handled when frozen and should be free of excessive moisture, organics, and deleterious material.

In fill areas beneath foundations and load-bearing structures, ANS Geo recommends structural fill as described in **Section 9.3** and **Table 13.** Flexible base for gravel access roads is specified in **Section 9.4**.

9.3.3 Compaction Testing

Compaction testing should be performed at each discrete equipment foundation location for each compacted lift at a minimum of one test per 2,500 square feet. For linear sections such as trenches, the contractor and/or the owner’s representative should perform a visual trench bottom inspection along the length of the trench to confirm no angular, sharp, deleterious, frozen, trash, organic material, or standing

water exists at the bottom of trench. For backfilling and compaction of trenches, a minimum of one compaction test per 500 linear feet and minimum one per lift, should be performed. In all cases, the subgrade should be maintained, covered, or protected if concrete is not immediately placed. Excessively wet or dry material should be removed or improved prior to the placement of foundations.

9.4 Access Roads

ANS Geo understands that, as part of the work, access roads will be constructed to provide access for heavy equipment such as a main power transformer, poles, and other ancillary structures, as well as long-term access for site maintenance purposes. It is expected that new, unpaved paths will be constructed of aggregate material placed on native, compacted and proof-rolled subgrade stripped of topsoil and other organic material.

During construction, the delivery and movement of heavier loads such as transformers, inverters, delivery of steel and concrete, and transportation of cabling is expected. Construction loads and vehicles are larger and heavier than the expected vehicles during long-term operation; however, the duration of these activities will be much shorter considering the access road life. Designing for short-duration, construction-phase access road would require increased thickness of aggregate, the use of geogrid, or other soil improvement, but these increased roads would be over-designed for long-term operation including routine light-duty trucks, maintenance vehicles, and infrequent accessibility to emergency personnel including fire-fighting rigs. Therefore, it is typical for access road design to be completed considering the thickness of road base required for long-term use since it is expected that the site subcontractor will be able to maintain serviceable access roads throughout construction and at turn-over of the facility by backfilling ruts greater than two-inches, back-blading and re-compacting loose and rutted areas, re-shaping roads to promote drainage and safe passage of traffic, and other improvements.

Considering the above, ANS Geo has performed an evaluation of the required access road thickness based on infrequent emergency access for firefighting vehicles as well as occasional light vehicular traffic. Our preliminary road evaluation for a post-construction access road assumed the following:

Table 14: Access Road Design Considerations

Design Consideration	Design Assumption
Equivalent Single-Axle Loads (ESALs)	2,500
Allowable Rut Depth	2 inches, 3 inches
Service Life	35 years
Subgrade Soil	Silt (ML), Clay (CL, CH), Silty Sand (SM), Clayey Sand (SC)
Assumed Min. Design Subgrade CBR	2.0% (following proof-roll and compaction)

ANS Geo recommends that access road granular base material (flexible base) consists of clean, crushed stone or roadbase material with particle size distribution as presented in **Table 13**.

Table 15: Recommended Gradation of Crushed Stone for Access Roads

Sieve Size	Percent Passing
3 in.	100
1-½ in.	90 – 100
3/4 in.	50 – 90
No. 4	30 – 50
No. 200	3 – 12

Alternatively, access road flexible base/aggregate stone gradation and maximum plasticity index requirements may conform to the requirements for Aggregate Class 4, 5, or 6 of Table 703-2 within Section 703.01 of the Colorado Department of Transportation (CDOT) *Standard Specifications for Road and Bridge Construction, 2023*.

ANS Geo has provided a number of access road configurations in **Table 16** based on the assumptions listed in **Table 14**. The use of a non-woven geotextile fabric (such as Mirafi HP270) is recommended and presented within our evaluation. In addition, it is possible and likely that certain areas will require stabilization or additional access stone thickness where weaker soils are present. The overall cross-sectional thickness may be reduced by the use of a Class II geogrid (such as Tensar BX1200 or TX7). Cement or lime stabilization can also be utilized to reduce the access road thickness, as long as the stabilized base has a soaked CBR of greater than 35 percent. This access road thickness can also be reduced if a greater rut depth is allowed to minimize the access road thickness as long as maintenance is performed to restore the roadway to a serviceable condition as damage occurs. A comparison of various options and configurations has been provided in **Table 16**.

Table 16: Recommended Aggregate Thickness for Permanent Site Access Roads

Aggregate Construction Option	Access Road Cross Section	
	2 in. Rut Depth	3 in. Rut Depth
Aggregate on prepared native soil	18 inches of Crushed Stone on properly prepared native subgrade	14 inches of Crushed Stone on properly prepared native subgrade
Aggregate with geotextile fabric	11 inches of Crushed Stone over non-woven geotextile	9 inches of Crushed Stone over non-woven geotextile
Aggregate with Class II geogrid and geotextile fabric	7 inches of Crushed Stone over Class II geogrid atop non-woven geotextile	6 inches of Crushed Stone over Class II geogrid atop non-woven geotextile

When using geogrid, it is recommended that a nonwoven geotextile fabric be placed between the fine-grained subgrade and the geogrid to provide separation and avoid the stone aggregate to be blinded with fines. If geotextile fabric is not desired, an additional two (2) inches of stone should be provided to account for some impregnation of the stone into native soil. When geogrid is used, it should be placed in accordance with manufacturer's recommendations such as three (3) foot overlap, fastening overlapping areas, and material storage and handling.

Prior to access road construction, the subgrade should be stripped of vegetation and topsoil, and should be confirmed to maintain a minimum CBR value assumed in **Table 14** (CBR value of 2.0) and compaction to 95 percent of its Proctor Density (ASTM D698) to be in conformance with ANS Geo's above recommendations. Should the desired CBR and/or target compaction not be achieved, ANS Geo first recommends that the upper 12-inches be scarified, moisture-conditioned (dried or wetted to within +/- 2% of optimum moisture content), and re-placed and re-compacted. Should this not produce the desired minimum CBR and subgrade performance, soil improvement such as additional stone, and/or additional stabilization may be required to meet ANS Geo's minimum design recommendations. Crushed stone should be placed in loose lifts not exceeding eight (8) inches in height and be compacted to ensure a minimum CBR of 35 percent is achieved.

Field conditions should be verified at the time of construction. Subgrade conditions could vary based on excavation depths, weather, drainage, and construction practices that disturb the subgrade. Dynamic cone penetrometer (DCP) testing should be completed on the prepared subgrade per ASTM D6951 and in a consistent manner by trained personnel to obtain useful and reliable data. ANS Geo recommends that, at minimum, DCP testing should be completed at a frequency of one test per each 500-linear feet of access roadway. Should conditions vary, this frequency may be increased or decreased based on observations from the site, or at the discretion of the Geotechnical Engineer of Record, Civil/Structural Engineer of Record or Owners Engineer. The tests should be staggered across the width of the road at outer wheel-tracks (left and right) and the centerline. However, the variability of the road subgrade strength will only become fully apparent when the tests have been carried out. In order to ensure statistical reliability, at least ten tests should be taken in each uniform section. The use of DCP testing may also be used to decrease the thickness of access road stone, if the prepared subgrade is stiffer (is confirmed to have a higher CBR) than ANS Geo's design assumption and no visible surface water or pumping is observed in the section of roadway being tested. ANS Geo can be contacted to provide a table of access road stone thickness compared to field-confirmed CBR.

ANS Geo notes that the presence of standing water may exist across the site around times of precipitation, during construction and development. The presence of water may make the native soil subgrade softer, and it may require additional site preparation to allow vehicles and equipment to pass. The Contractor should take these conditions into consideration, including the need for additional access stone and/or cement or lime for the stabilization of these conditions.

If chemical stabilization of subgrade is desired, we may be contacted to provide recommendations for various chemical treatment options. The contractor should perform any necessary due diligence to confirm their design, means, and methods. The subgrade should be verified below the treatment depth to evaluate the CBR value of the subgrade prior to treatment. In addition, any recommended chemical stabilization application rate should be taken as an assumed average. The actual application rate should be determined by the contractor and may vary based on the tested and desired subgrade CBR along the proposed roadway, the treatment depth required, and the moisture content. The application rate and treatment depth should be evaluated by performing several test strips at the project site prior to the start of construction and testing the test strips in the field using a dynamic cone penetrometer or plate load test to confirm the CBR. Then, once the application rate and depth are evaluated, verification and calibration testing should be performed using the dynamic cone penetrometer at intervals of no less than 500-linear feet along the access roadway.

9.5 Pile Construction and Drivability

ANS Geo anticipates that, as typical with solar farm construction, solar panels may be supported by driven steel wide-flanged piles or screw-type piles torqued to their final embedment depths. Wide-flanged piles are typically installed via direct-push, vibration, and/or percussive hammer methods. ANS Geo notes that no installation locations encountered shallow refusal during installations. This refusal rate is not an estimation of frequency during installation of production piles, but rather a factual representation of the refusals encountered within our limited load testing program.

Although shallow refusals are not anticipated for localized area and remediation, ANS Geo recommends that the contractor be prepared to pre-drill at proposed post locations to clear obstructions, as needed. We recommend that pre-drilled holes be completed to a diameter slightly smaller than the diagonal dimension of the proposed pile section to ensure a tight fit once the pile is driven to its targeted depth. For example, an under-sized, four-inch diameter hole may be drilled and utilized for W6x9 section (approx. 7.1-inch diagonal measurement). The contractor should be aware, however, that heavier sections (ie. W6x12 or W6x15) may have limiting “bending” capacity in its flanges, and therefore require a hole of a slightly larger proportion.

10 Limitations

ANS Geo notes that the findings and recommendations presented within this Geotechnical Report are based on our investigation programs conducted in March 2024, and our engineering judgment. In addition, the current level of investigation does not represent the level of investigation to support a final design, and it is expected that a final, detailed-level geotechnical investigation will be completed at the site prior to final design and start of construction by an EPC to confirm and further define the recommendations provided herein. If ANS Geo's limited and preliminary investigation is used for final design, our recommendations shall only be valid for the exact and specific locations at which field investigations or laboratory testing was completed. All other areas and regions of the site which are not investigated under a final investigation to confirm if our preliminary and limited investigation is valid for the entire project site will be at the risk of the individual or entity using this Report.

If actual site subsurface conditions differ from the inferred conditions on which ANS Geo has based our confirmation-dependent recommendations, ANS Geo will need to modify our confirmation-dependent recommendations to develop final recommendations.

Table A

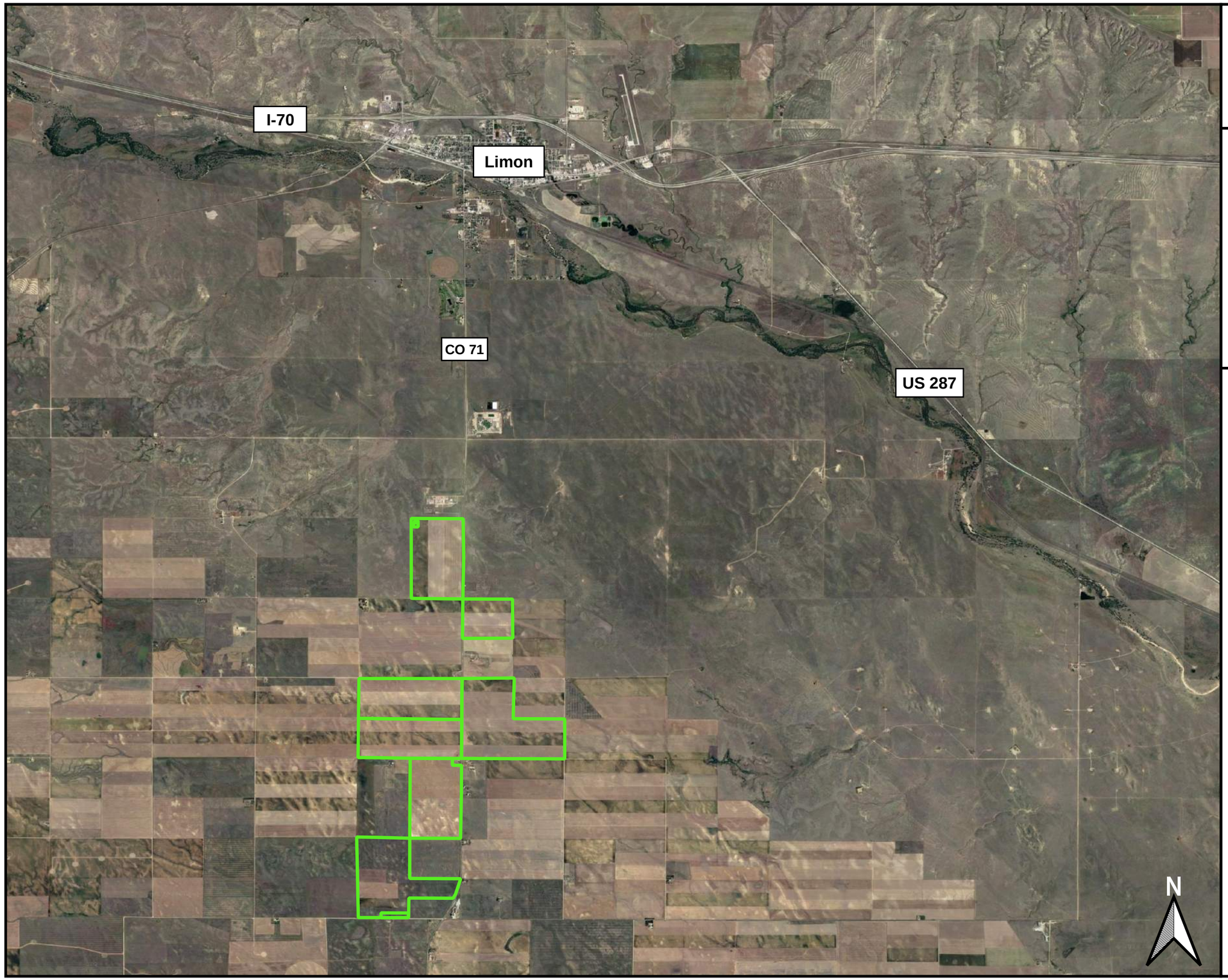
Recommended Substation Foundation Parameters

Table A - Recommended Geotechnical Parameters (Substation)														
Appr. Depth to Top of Layer [ft]	Appr. Depth to Bottom of Layer [ft]	Material Property	Design N-Value	LPile / MFAD			MFAD	Drilled Shafts (Lpile)			Active Earth Pressure Coefficient, K_a	Passive Earth Pressure Coefficient, K_p	Drilled Shafts	
				Effective Unit Weight [pcf]	Friction Angle soil or rock [°]	Cohesion of soil [psf]	Deformation Modulus, Ed [ksi]	p-y Modulus, k (Static Loading) [lb/in^3]	p-y Modulus, k (Cyclic Loading) [lb/in^3]	Strain Factor, e50			Ultimate Skin Friction [ksf]	Ultimate End Bearing [ksf]
0	2.5	Stiff Clay w/o Free Water [Reese]	17	110	--	1,500	1.30	--	--	0.009	1.00	1.00	--	--
2.5	6	Sand [Reese]	12	110	30	--	0.70	70	--	--	0.33	3.00	0.24	--
6	8	Sand [Reese]	4	95	28	--	0.25	25	--	--	0.36	2.77	0.41	7.8
8	16.5	Sand [Reese]	20	115	33	--	1.40	130	--	--	0.29	3.39	1.24	16.9
16.5	22.5	Sand [Reese]	15	113	31	--	1.00	90	--	--	0.32	3.12	1.29	12.4
22.5	42.5	Stiff Clay w/o Free Water [Reese]	26	120	--	3,000	2.10	--	--	0.005	1.00	1.00	1.70	18.4
42.5	50	Stiff Clay w/o Free Water [Reese]	50	125	--	5,000	4.30	--	--	0.004	1.00	1.00	3.68	25.7

1. Parameters assume groundwater was not encountered.
2. Upper two and a half feet do not account for skin friction due to anticipated surfical erosion,surface disturbance and ad freeze reccomendations.
3. ANS Geo recommends that a safety factor of 2.0 be applied to passive earth pressure coefficients and Ultimate Side Resistance values presented herein.
4. ANS Geo recommends that a safety factor of 3.0 be applied to the Ultimate End Bearing values presented herein.

Attachment A

Site Investigation Mapping



ANS GEO

ATTACHMENT A-1
SITE VICINITY MAP

BALANCED ROCK POWER

BALANCED ROCK POWER
EBBA SOLAR PROJECT
LIMON, COLORADO

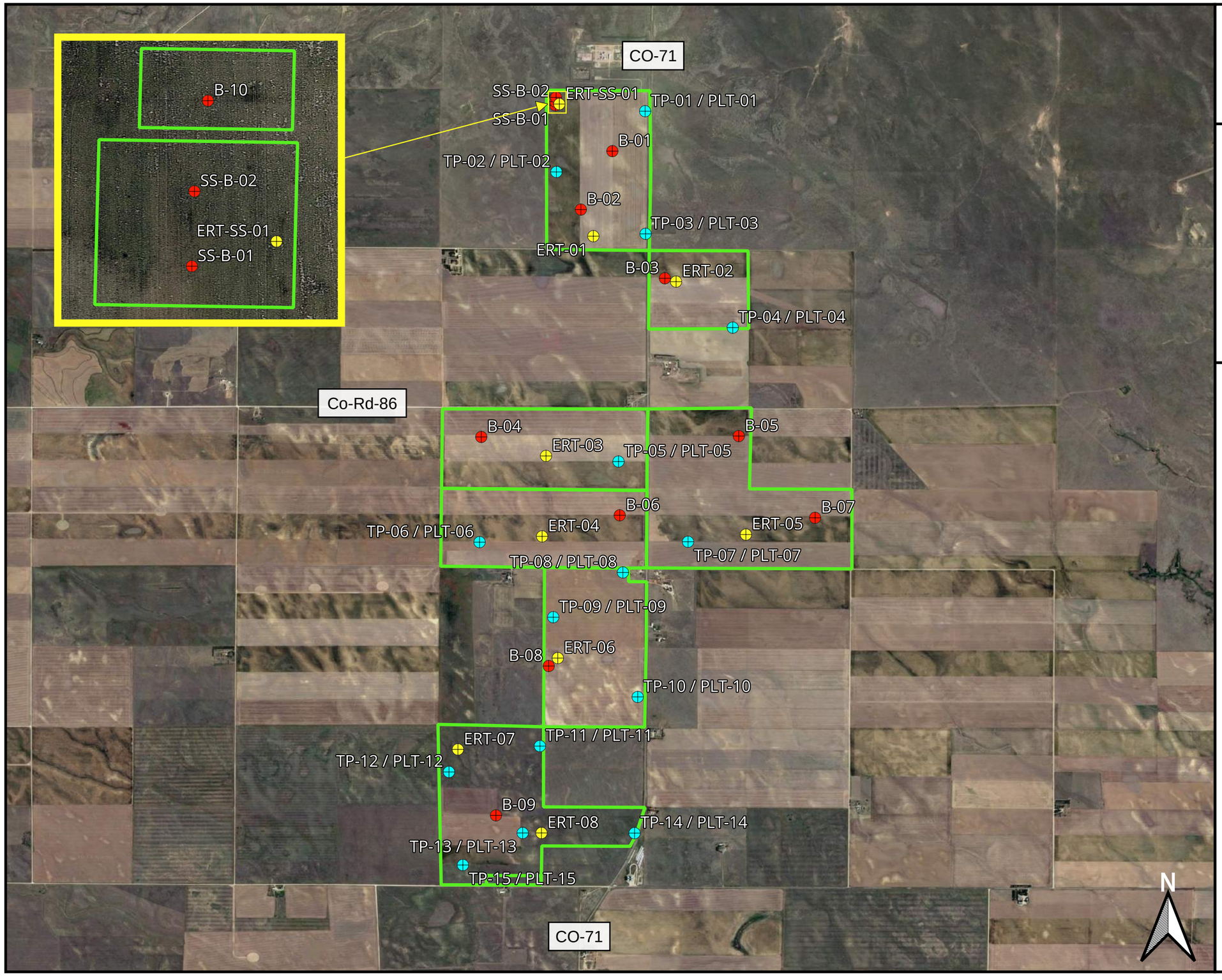
Legend

Ebba Solar Project Boundary

0 2,500 5,000 ft

Absolute Scale: 1 inch = 5000 feet
Scale at 11" x 17" AS SHOWN

Prepared by: Noelle Cheshire
Date: March 12, 2024
Drawing Number: ILP-1 Rev.0



ANS GEO

ATTACHMENT A-2
INVESTIGATION LOCATION PLAN

BALANCED ROCK POWER

BALANCED ROCK POWER
EBBA SOLAR PROJECT
LIMON, COLORADO

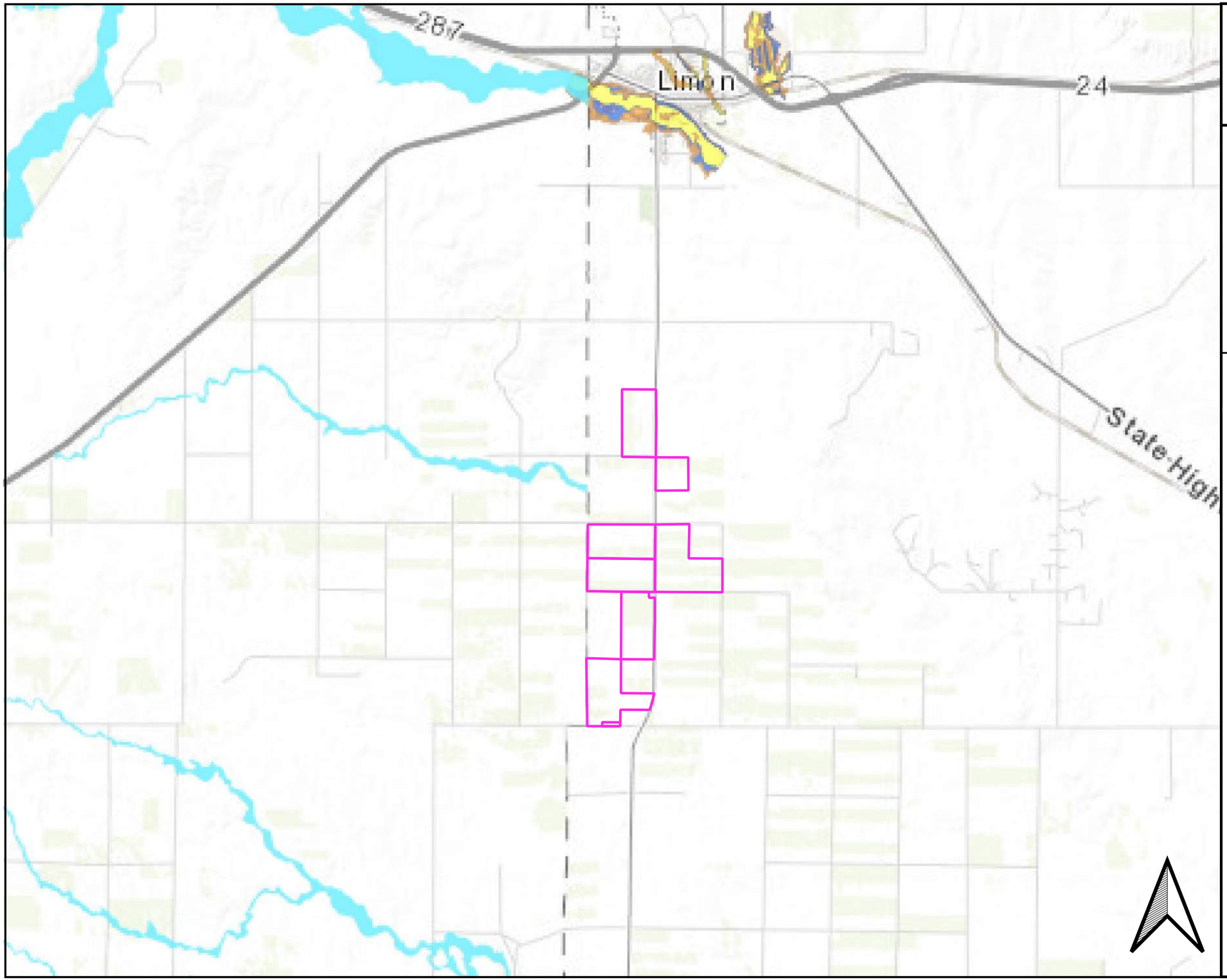
Legend

- Electrical Resistivity Test Location
- Pile Load Test and Test Pit Location
- Soil Boring Location
- Ebba Solar Project Boundary

0 1,250 2,500 ft

Absolute Scale: 1 inch = 2500 feet
Scale at 11" x 17" AS SHOWN

Prepared by: Noelle Cheshire
Date: March 12, 2024
Drawing Number: ILP-1 Rev.1



ANS GEO

ATTACHMENT A-3
FLOOD HAZARD MAP

BALANCED ROCK POWER

BALANCED ROCK POWER
EBBA SOLAR PROJECT
LIMON, COLORADO

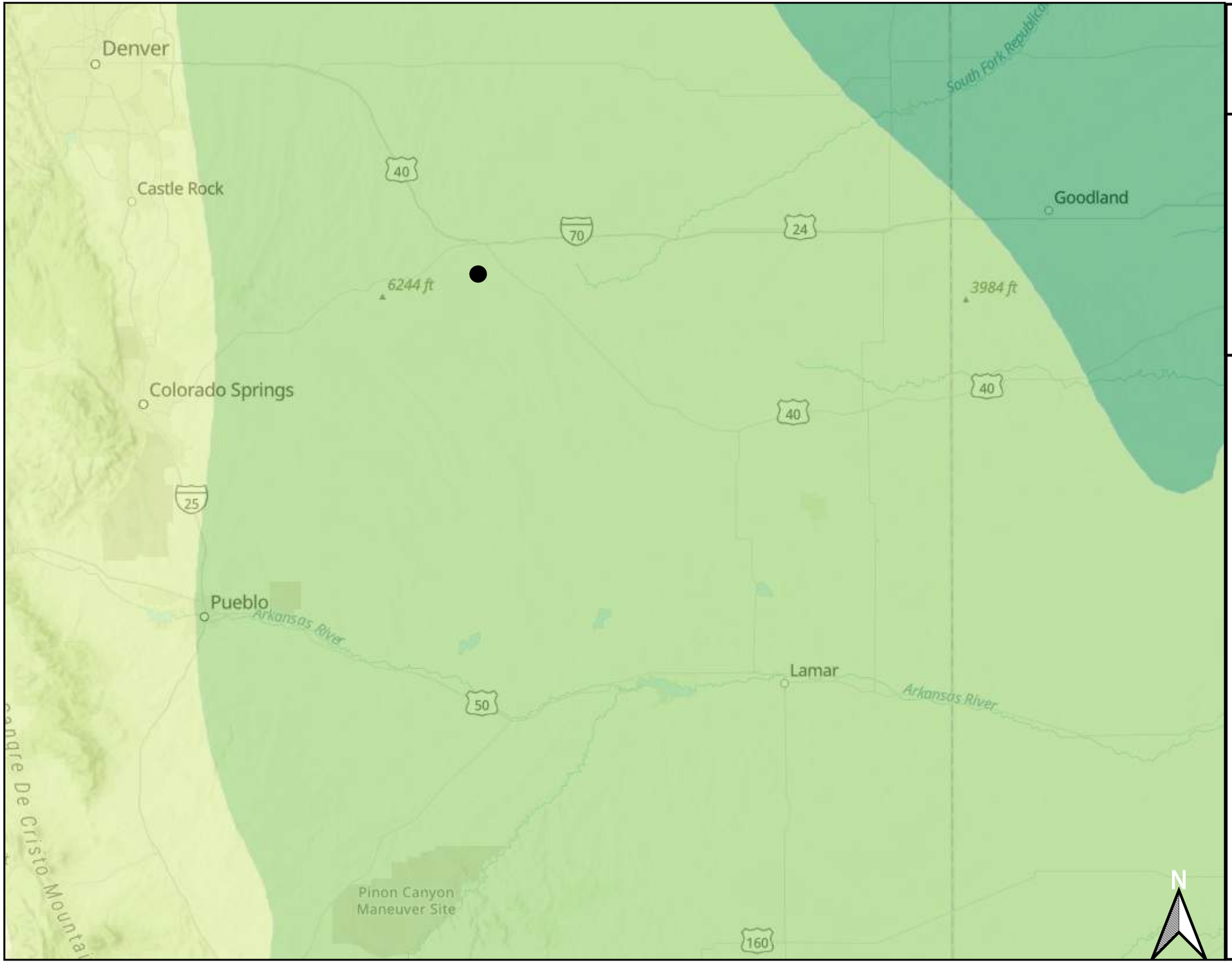
Legend

- Project Boundary
- Preliminary Floodplains
  - Regulatory Floodway
  - Administrative Floodway
  - A (1% Annual Chance)
  - AE (1% Annual Chance)
  - AO (1% Annual Chance)
  - AH (1% Annual Chance)
  - 1% Depth < 1 ft
  - X (0.2% Annual Chance)
  - Reduced Risk Due to Levee
- NFHL Flood Hazard Zones
  - 1% Annual Chance

0 10,000 20,000 ft

Absolute Scale: 1 inch = 10,000 feet
Scale at 11" x 17" AS SHOWN

Prepared by: Zachary Agnew
Date: January 19, 2024
Source: Colorado Hazard Mapping Portal
Drawing Number: NFHL-ILP-Rev.1



ANS GEO

ATTACHMENT A-4
SEISMIC HAZARD MAP

BALANCED ROCK POWER

BALANCED ROCK POWER
EBBA SOLAR PROJECT
LIMON, COLORADO

Legend

USGS - Simplified 2018 National Hazard Map (2% PGA, 50 years)

Risk Level

- Highest
- Very High
- High
- Moderate
- Low
- Very Low
- Lowest

● Project Location

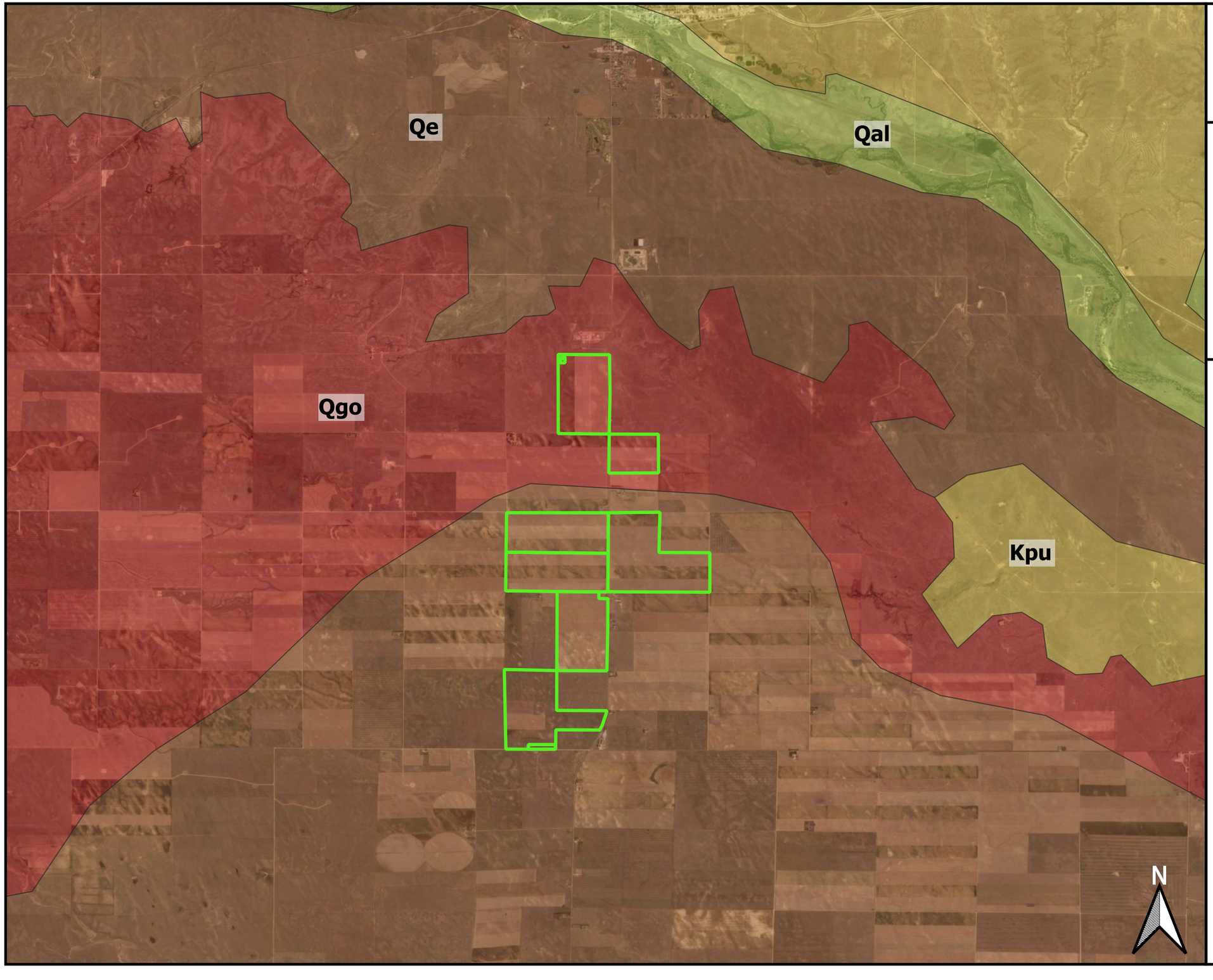
0 8 15 mi

Absolute Scale: 1 inch = 15 miles
Scale at 11" x 17" AS SHOWN

Prepared by: Catherine Schmidt
Date: March 21, 2024
Drawing Number: Seismic Hazard Rev.1

Attachment B

Geologic Mapping



ANS GEO

ATTACHMENT B
GEOLOGICAL MAP

BALANCED ROCK POWER

BALANCED ROCK POWER
EBBA SOLAR PROJECT
LIMON, COLORADO

Legend

Ebba Solar Project Boundary

Geologic units of Colorado

Pierre Shale (Kpu):
- Sand, clay and silt found in the upper unit of the undivided Pierre Shale formation

Eolian Deposits (Qe):
- Dune sand, silt and Peoria Loess

Modern Alluvium (Qal):
-Piney Creek Alluvium and younger deposits

Older Gravel and Alluvium (Qgo):
- Older gravels and alluviums (Slocum, Verdos, Rocky Flats, and Nussbaum) deposited pre Bull Lake Era

0 2,500 5,000 ft

Absolute Scale: 1 inch = 5000 feet
Scale at 11" x 17" AS SHOWN

Prepared by: Noelle Cheshire
Date: March 12, 2024
Drawing Number: ILP-1 Rev.0
Source: NGMDB MapView

Attachment C

Soil Boring Logs

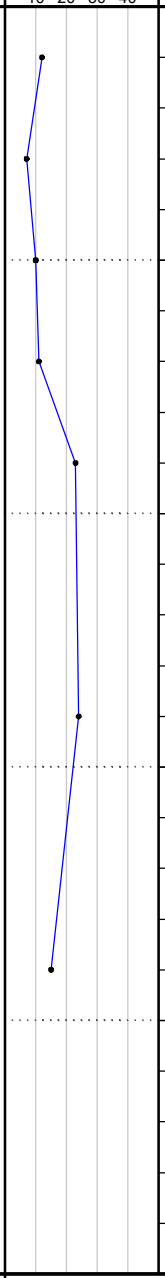
Soil Boring Log

B-01

Client:	Balanced Rock Power	**Drilling Firm:**	Core Co. USA	**Coordinates:**	39.195157 N, -103.699617 E
Project:	Ebba Solar	**Drill Crew:**	Chris Tillery / Giovanni Rosas	**Horiz. Datum:**	NAD83
Location:	Lincoln County, Colorado	**Boring Start:**	03/06/24 12:00 AM	**Elevation:**	Grade
Inspector:	Noelle Cheshire	**Boring End:**	03/06/24 12:00 AM	**Vert. Datum:**	Grade

Rig Model:	Diedrich D-50	**Sampler Type:**	Split Spoon	**Casing Type:**	N/A
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	N/A
Drill Method:	Hollow Stem Auger	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	N/A
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	N/A
Drilling Fluid:	None	**Hammer Fall:**	30 inches	**Hammer Fall:**	N/A

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)
0	S-1	12	3 5 7 8	12	ML	Stiff, medium brown SILT, some fine Sand, moist (ML)	M	L	3.0	
	S-2	7	3 3 4 4	7		Medium stiff, medium brown SILT, some fine Sand, moist (ML)	M	L	3.5	
5	S-3	10	4 4 6 6	10		Stiff, medium brown SILT, some fine Sand, moist, with calcareous deposits (ML)	M	L	2.5	
	S-4	11	4 5 6 7	11	SM	Medium dense, brown Silty medium to fine SAND, moist, with ferrous staining (SM)				
	S-5	23	6 11 12 14	23		Medium dense, light brown medium to fine SAND, some Silt, moist, with ferrous staining and calcareous deposits (SM)				
10										
	S-6	24	9 11 13 15	24	SP	Medium dense, light gray coarse to fine SAND, some fine Gravel, moist (SP)				
15										
	S-7	15	7 7 8 10	15	SM	Medium dense, light gray coarse to fine SAND, some Silt, little fine Gravel, moist (SM)				
20						End of soil boring at 20 feet BGS. Borehole backfilled with soil cuttings.				



Drilling & Strata Notes

Moisture content 6'-8': 12.3%

In-Borehole Water Levels

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

General Notes

BGS = Below Ground Surface
No Groundwater encountered.

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

▽ = ATD Water Level (At Time of Drilling)
▼ = AD Water Level (After Drilling - Short Term)
▼ = EOD Water Level (End of Drilling - Long Term)

Soil Boring Log

B-02

Client:	Balanced Rock Power	**Drilling Firm:**	Core Co. USA	**Coordinates:**	39.189833 N, -103.702487 E
Project:	Ebba Solar	**Drill Crew:**	Chris Tillery / Giovanni Rosas	**Horiz. Datum:**	NAD83
Location:	Lincoln County, Colorado	**Boring Start:**	03/06/24 12:00 AM	**Elevation:**	Grade
Inspector:	Noelle Cheshire	**Boring End:**	03/06/24 12:00 AM	**Vert. Datum:**	Grade

Rig Model:	Diedrich D-50	**Sampler Type:**	Split Spoon	**Casing Type:**	N/A
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	N/A
Drill Method:	Hollow Stem Auger	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	N/A
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	N/A
Drilling Fluid:	None	**Hammer Fall:**	30 inches	**Hammer Fall:**	N/A

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)	Drilling & Strata Notes
	S-1	13	6 5 7 9	12	ML	Stiff, medium brown SILT, some fine Sand, moist, with organics (ML)	L	L			
	S-2	12	4 4 3 4	7		Medium stiff, brown SILT, some fine Sand, moist, with organics snd calcareous deposits (ML)	L	L	4.0		
5	S-3	21	4 4 4 4	8	CL-ML	Stiff, brown Silty Lean CLAY, some coarse to fine Sand, moist, with organics (CL-ML)	L	L			Moisture content 4'-6': 13.9%
	S-4	20	7 8 7 7	15	CL	Very stiff, brown Sandy Lean CLAY, moist, with organics and ferrous staining (CL)	L	M	2.5		
	S-5	21	6 8 10 8	18		Very stiff, brown Lean CLAY, some coarse to fine, moist, with ferrous staining and calcareous deposits (CL)	L	M			Moisture content 8'-10': 11.8%
10											
	S-6	24	6 5 7 8	12	SC	Medium dense, brown Clayey medium to fine SAND, moist, with ferrous staining and calcareous deposits (SC)					
15											
	S-7	24	8 12 16 18	28		Medium dense, light brown Clayey fine SAND, moist, with ferrous staining and calcareous deposits (SC)					
20						End of soil boring at 20 feet BGS. Borehole backfilled with soil cuttings.					

N-Value: 10 20 30 40

In-Borehole Water Levels

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

General Notes

BGS = Below Ground Surface
No Groundwater encountered.

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

▽ = ATD Water Level (At Time of Drilling)
▼ = AD Water Level (After Drilling - Short Term)
▼ = EOD Water Level (End of Drilling - Long Term)

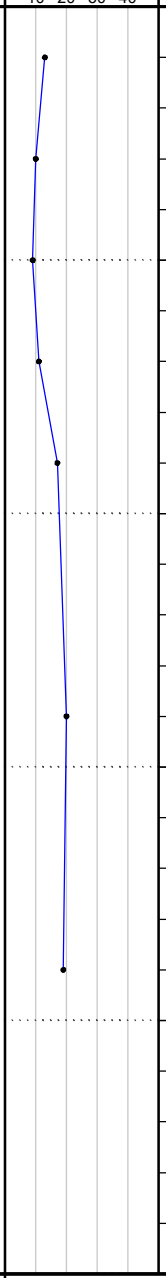
Soil Boring Log

B-03

Client:	Balanced Rock Power	**Drilling Firm:**	Core Co. USA	**Coordinates:**	39.183575 N, -103.694831 E
Project:	Ebba Solar	**Drill Crew:**	Chris Tillery / Giovanni Rosas	**Horiz. Datum:**	NAD83
Location:	Lincoln County, Colorado	**Boring Start:**	03/06/24 12:00 AM	**Elevation:**	Grade
Inspector:	Noelle Cheshire	**Boring End:**	03/06/24 12:00 AM	**Vert. Datum:**	Grade

Rig Model:	Diedrich D-50	**Sampler Type:**	Split Spoon	**Casing Type:**	N/A
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	N/A
Drill Method:	Hollow Stem Auger	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	N/A
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	N/A
Drilling Fluid:	None	**Hammer Fall:**	30 inches	**Hammer Fall:**	N/A

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)	Drilling & Strata Notes
	S-1	19	7 6 7 8	13	ML	Stiff, brown SILT, little fine Sand, moist, with organics (ML)	L	L	4.0		
	S-2	10	4 4 6 5	10		Stiff, brown SILT, trace fine Sand, moist, with organics (ML)	L	L	4.0		
5	S-3	14	4 4 5 5	9		Stiff, brown SILT, little fine Sand, moist, with ferrous staining and calcareous deposits (ML)	M	M	2.0		
	S-4	16	4 4 7 9	11		Stiff, brown Sandy SILT, moist, with ferrous staining (ML)	L	L	1.5		
	S-5	13	4 8 9 12	17	CL	Top 5": Very stiff, dark brown lean CLAY, trace fine Sand, moist (CL) Bottom 8": Medium dense, light brown Silty Lean CLAY, some medium to fine SAND, moist (CL-ML)	M	M	2.5		
10					CL-ML						
	S-6	24	8 8 12 15	20		Medium dense, brown Silty Lean CLAY, little coarse to fine Sand, moist, with ferrous staining and calcareous deposits (CL-ML)					Moisture content 13'-15': 8.6%
15											
	S-7	24	8 9 10 12	19	CL	Very stiff, light brown Sandy Lean CLAY, moist, with ferrous staining and calcareous deposits (CL)	M	M	>4.5		
20						End of soil boring at 20 feet BGS. Borehole backfilled with soil cuttings.					



In-Borehole Water Levels

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

General Notes

BGS = Below Ground Surface
No Groundwater encountered.

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

▽ = ATD Water Level (At Time of Drilling)
▼ = AD Water Level (After Drilling - Short Term)
▼ = EOD Water Level (End of Drilling - Long Term)

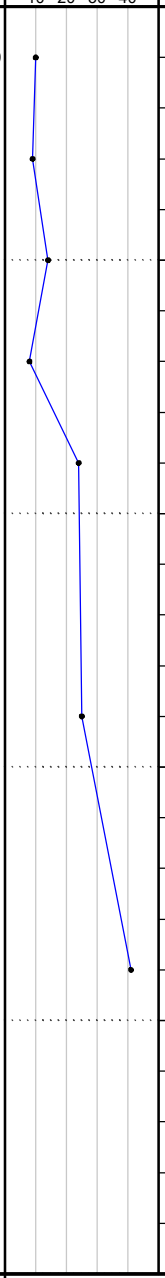
Soil Boring Log

B-04

Client:	Balanced Rock Power	**Drilling Firm:**	Core Co. USA	**Coordinates:**	39.169126 N, -103.711557 E
Project:	Ebba Solar	**Drill Crew:**	Chris Tillery / Giovanni Rosas	**Horiz. Datum:**	NAD83
Location:	Lincoln County, Colorado	**Boring Start:**	03/06/24 12:00 AM	**Elevation:**	Grade
Inspector:	Noelle Cheshire	**Boring End:**	03/06/24 12:00 AM	**Vert. Datum:**	Grade

Rig Model:	Diedrich D-50	**Sampler Type:**	Split Spoon	**Casing Type:**	N/A
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	N/A
Drill Method:	Hollow Stem Auger	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	N/A
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	N/A
Drilling Fluid:	None	**Hammer Fall:**	30 inches	**Hammer Fall:**	N/A

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)	Drilling & Strata Notes
	S-1	16	3 4 6 6	10	ML	Very stiff, brown SILT, trace fine Sand, moist, with organics (ML)	L	L	3.75	1.69	
	S-2	18	4 4 5 4	9	SM	Loose, light brown medium to fine SAND, some Silt, moist (SM)					
5	S-3	24	4 6 8 9	14	ML	Stiff, brown SILT, little fine Sand, moist, with ferrous staining (ML)	L	L	1.25		
	S-4	19	6 3 5 9	8	SM	Loose, light gray to light brown coarse to fine SAND, little Silt, trace fine Gravel, moist (SM)					
	S-5	23	9 11 13 15	24	SW-SM*	Medium dense, light gray coarse to fine SAND, trace fine Gravel, trace Silt, moist (SW-SM)					
10											
	S-6	24	6 13 12 20	25		Medium dense, light gray coarse to fine SAND, trace fine Gravel, trace Silt, moist (SW-SM)					Moisture content 13'-15': 4.8%
15											
	S-7	24	11 20 21 24	41	SP	Dense, light gray coarse to fine SAND, some coarse to fine Gravel, moist (SP)					
20						End of soil boring at 20 feet BGS. Borehole backfilled with soil cuttings.					



In-Borehole Water Levels

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

General Notes

BGS = Below Ground Surface
No Groundwater encountered.

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

▽ = ATD Water Level (At Time of Drilling)
▼ = AD Water Level (After Drilling - Short Term)
▼ = EOD Water Level (End of Drilling - Long Term)

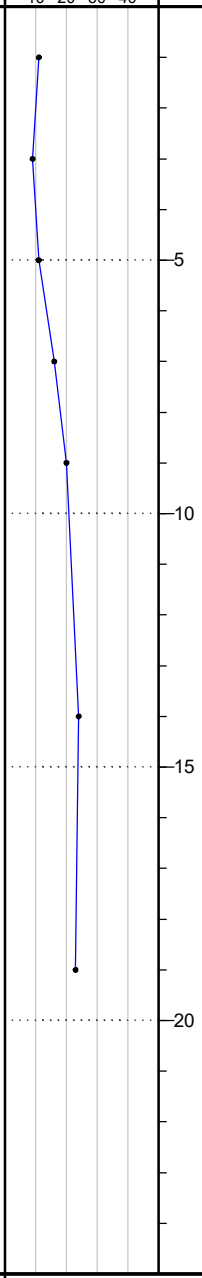
Soil Boring Log

B-05

Client:	Balanced Rock Power	**Drilling Firm:**	Core Co. USA	**Coordinates:**	39.169205 N, -103.688101 E
Project:	Ebba Solar	**Drill Crew:**	Chris Tillery / Giovanni Rosas	**Horiz. Datum:**	NAD83
Location:	Lincoln County, Colorado	**Boring Start:**	03/06/24 12:00 AM	**Elevation:**	Grade
Inspector:	Noelle Cheshire	**Boring End:**	03/06/24 12:00 AM	**Vert. Datum:**	Grade

Rig Model:	Diedrich D-50	**Sampler Type:**	Split Spoon	**Casing Type:**	N/A
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	N/A
Drill Method:	Hollow Stem Auger	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	N/A
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	N/A
Drilling Fluid:	None	**Hammer Fall:**	30 inches	**Hammer Fall:**	N/A

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)	Drilling & Strata Notes
	S-1	11	4 4 7 7	11	ML	Stiff, dark brown SILT, trace fine Sand, moist, with organics (ML)	L	L	>4.5		
	S-2	11	5 4 5 3	9	CL	Stiff, brown Lean CLAY, trace fine Sand, moist (CL)	L	L	>4.5		Moisture content 2'-4': 16.2%
5	S-3	15	4 5 6 8	11	ML	Stiff, brown SILT, some fine Sand, moist (ML)	L	L	>4.5		
	S-4	21	6 8 8 10	16	SM	Medium dense, brown Silty fine SAND, moist, with ferrous staining (SM)					
	S-5	22	8 9 11 14	20		Medium dense, light brown Silty medium to fine SAND, moist, with calcareous deposits (SM)					
10											
	S-6	24	9 10 14 16	24		Medium dense, light brown coarse to fine SAND, little fine Gravel, little Silt, moist (SM)					
15											
	S-7	20	10 12 11 9	23	SP	Medium dense, light gray coarse to fine SAND, some coarse to fine Gravel, trace Silt, moist (SP)					
20						End of soil boring at 20 feet BGS. Borehole backfilled with soil cuttings.					



In-Borehole Water Levels

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

General Notes

BGS = Below Ground Surface
No Groundwater encountered.

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

▽ = ATD Water Level (At Time of Drilling)
▼ = AD Water Level (After Drilling - Short Term)
▼ = EOD Water Level (End of Drilling - Long Term)

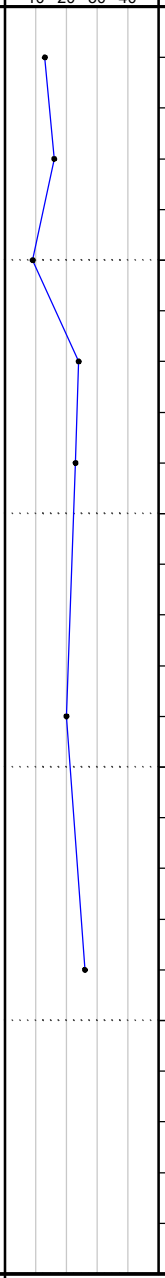
Soil Boring Log

B-06

Client:	Balanced Rock Power	**Drilling Firm:**	Core Co. USA	**Coordinates:**	39.161991 N, -103.698947 E
Project:	Ebba Solar	**Drill Crew:**	Chris Tillery / Giovanni Rosas	**Horiz. Datum:**	NAD83
Location:	Lincoln County, Colorado	**Boring Start:**	03/07/24 12:00 AM	**Elevation:**	Grade
Inspector:	Noelle Cheshire	**Boring End:**	03/07/24 12:00 AM	**Vert. Datum:**	Grade

Rig Model:	Diedrich D-50	**Sampler Type:**	Split Spoon	**Casing Type:**	N/A
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	N/A
Drill Method:	Hollow Stem Auger	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	N/A
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	N/A
Drilling Fluid:	None	**Hammer Fall:**	30 inches	**Hammer Fall:**	N/A

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)	Drilling & Strata Notes
	S-1	13	3 5 8 9	13	ML	Stiff, dark brown SILT, trace fine Sand, moist, with organics (ML)	L	L	3.25	1.5	
	S-2	21	6 7 9 9	16		Very stiff, light brown SILT, trace fine Sand, moist (ML)	L	L			
5	S-3	14	7 5 4 4	9	SM	Loose, light brown medium to fine Silty SAND, trace fine Gravel, moist (SM)					Moisture content 4'-6': 6.9%
	S-4	17	8 11 13 14	24		Medium dense, light brown coarse to fine Silty SAND, trace fine Gravel, moist (SM)					
	S-5	15	11 8 15 16	23	SP	Medium dense, light brown coarse to fine SAND, little fine Gravel, trace Silt, moist (SM)					
10											
	S-6	18	11 8 12 12	20	SC	Medium dense, light brown Clayey coarse to fine SAND, trace coarse to fine Gravel, moist, with ferrous staining and calcareous deposits (SC)					
15											
	S-7	24	9 13 13 14	26	SP	Medium dense, light gray coarse to fine SAND, little coarse to fine Gravel, trace Clay, moist (SP)					
20						End of soil boring at 20 feet BGS. Borehole backfilled with soil cuttings.					



In-Borehole Water Levels

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

General Notes

BGS = Below Ground Surface
No Groundwater encountered.

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

▽ = ATD Water Level (At Time of Drilling)
▼ = AD Water Level (After Drilling - Short Term)
▼ = EOD Water Level (End of Drilling - Long Term)

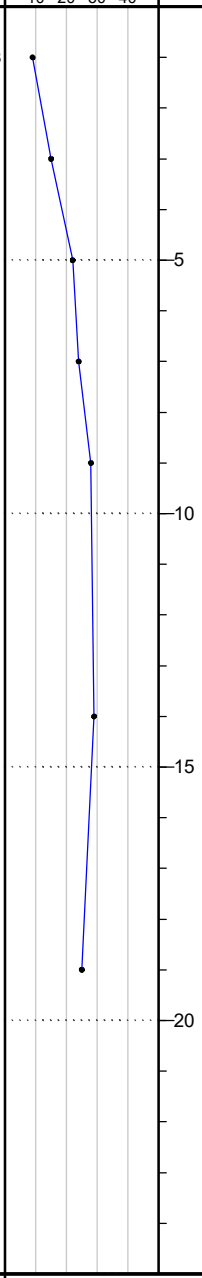
Soil Boring Log

B-07

Client:	Balanced Rock Power	**Drilling Firm:**	Core Co. USA	**Coordinates:**	39.161763 N, -103.681151 E
Project:	Ebba Solar	**Drill Crew:**	Chris Tillery / Giovanni Rosas	**Horiz. Datum:**	NAD83
Location:	Lincoln County, Colorado	**Boring Start:**	03/07/24 12:00 AM	**Elevation:**	Grade
Inspector:	Noelle Cheshire	**Boring End:**	03/07/24 12:00 AM	**Vert. Datum:**	Grade

Rig Model:	Diedrich D-50	**Sampler Type:**	Split Spoon	**Casing Type:**	N/A
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	N/A
Drill Method:	Hollow Stem Auger	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	N/A
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	N/A
Drilling Fluid:	None	**Hammer Fall:**	30 inches	**Hammer Fall:**	N/A

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Graphic Log	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)	Drilling & Strata Notes
	S-1	24	4 4 5 8	9	CH		Stiff, brown Fat CLAY, little fine Sand, moist, with organics (CH)	L	L	3.25	1.38	Moisture content 0'-2': 20.5%
	S-2	14	3 6 9 9	15	CL		Very stiff, brown lean CLAY, little fine Sand, moist (CL)	M	M	>4.5		
5	S-3	20	7 9 13 14	22	SC		Medium dense, light gray Clayey fine SAND, moist (SC)					
	S-4	20	9 11 13 13	24			Medium dense, light gray Clayey medium to fine SAND, moist (SC)					
	S-5	24	9 13 15 16	28	SP		Medium dense, light gray coarse to fine SAND, trace coarse to fine Gravel, trace Clay, moist (SP)					
10												
	S-6	24	3 15 14 16	29			Medium dense, light brown coarse to fine SAND, little coarse to fine Gravel, trace Clay, moist (SP)					
15												
	S-7	20	13 11 14 9	25			Medium dense, light gray coarse to fine SAND, little coarse to fine Gravel, moist (SP)					
20							End of soil boring at 20 feet BGS. Borehole backfilled with soil cuttings.					



In-Borehole Water Levels

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

General Notes

BGS = Below Ground Surface
No Groundwater encountered.

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

▽ = ATD Water Level (At Time of Drilling)
▼ = AD Water Level (After Drilling - Short Term)
▼ = EOD Water Level (End of Drilling - Long Term)

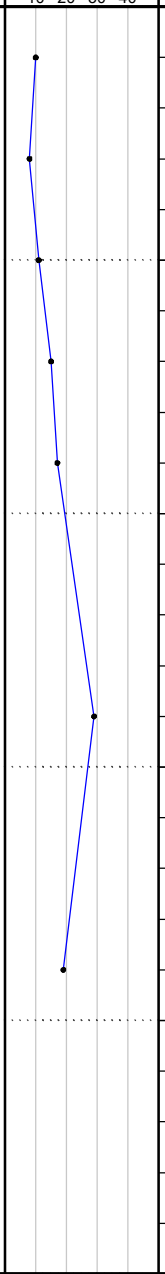
Soil Boring Log

B-08

Client:	Balanced Rock Power	**Drilling Firm:**	Core Co. USA	**Coordinates:**	39.148265 N, -103.705413 E
Project:	Ebba Solar	**Drill Crew:**	Chris Tillery / Giovanni Rosas	**Horiz. Datum:**	NAD83
Location:	Lincoln County, Colorado	**Boring Start:**	03/07/24 12:00 AM	**Elevation:**	Grade
Inspector:	Noelle Cheshire	**Boring End:**	03/07/24 12:00 AM	**Vert. Datum:**	Grade

Rig Model:	Diedrich D-50	**Sampler Type:**	Split Spoon	**Casing Type:**	N/A
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	N/A
Drill Method:	Hollow Stem Auger	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	N/A
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	N/A
Drilling Fluid:	None	**Hammer Fall:**	30 inches	**Hammer Fall:**	N/A

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)	Drilling & Strata Notes
0	S-1	24	2 4 6 7	10	ML	Medium dense, brown Sandy SILT, moist, with organics (ML)	L	L	2.0		
	S-2	16	5 3 5 5	8	SM	Loose, brown coarse to fine SAND, some Silt, moist, with calcareous deposits (SM)					Moisture content 2'-4': 5.7%
5	S-3	20	4 4 7 7	11		Medium dense, light brown coarse to fine Silty SAND, moist (SM)					
	S-4	18	7 7 8 8	15		Medium dense, light brown Silty medium to fine SAND, moist (SM)					Moisture content 6'-8': 10.2%
	S-5	20	5 6 11 10	17	SC	Very stiff, brown Sandy CLAY, moist (SC)					
10											
	S-6	24	9 12 17 17	29	CL	Very stiff, light gray Sandy Lean CLAY, moist, with calcareous deposits (CL)	M	M	>4.5		
15											
	S-7	24	9 8 11 15	19		Very stiff, brown lean CLAY, little medium to fine Sand, moist, with ferrous staining and calcareous deposits (CL)	M	M	>4.5		
20						End of soil boring at 20 feet BGS. Borehole backfilled with soil cuttings.					



In-Borehole Water Levels

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

General Notes

BGS = Below Ground Surface
No Groundwater encountered.

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

▽ = ATD Water Level (At Time of Drilling)
▼ = AD Water Level (After Drilling - Short Term)
▼ = EOD Water Level (End of Drilling - Long Term)

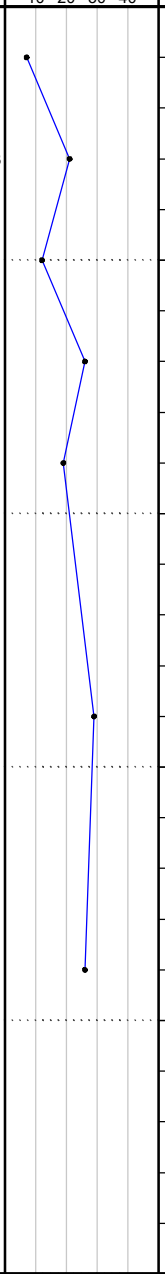
Soil Boring Log

B-09

Client:	Balanced Rock Power	**Drilling Firm:**	Core Co. USA	**Coordinates:**	39.134659 N, -103.710222 E
Project:	Ebba Solar	**Drill Crew:**	Chris Tillery / Giovanni Rosas	**Horiz. Datum:**	NAD83
Location:	Lincoln County, Colorado	**Boring Start:**	03/07/24 12:00 AM	**Elevation:**	Grade
Inspector:	Noelle Cheshire	**Boring End:**	03/07/24 12:00 AM	**Vert. Datum:**	Grade

Rig Model:	Diedrich D-50	**Sampler Type:**	Split Spoon	**Casing Type:**	N/A
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	N/A
Drill Method:	Hollow Stem Auger	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	N/A
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	N/A
Drilling Fluid:	None	**Hammer Fall:**	30 inches	**Hammer Fall:**	N/A

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)
0	S-1	24	3 3 4 4	7	ML	Medium stiff, dark brown Sandy SILT, trace fine Gravel, moist, with organics (ML)	L	L	2.75	
	S-2	24	4 8 13 13	21		Very stiff, brown Sandy SILT, trace fine Gravel, moist, with calcareous deposits (ML)	L	L	4.0	1.63
5	S-3	24	4 4 8 8	12	SP-SM	Medium dense, light brown coarse to fine SAND, little to fine Gravel, little Silt, moist (SP-SM)				
	S-4	24	9 13 13 12	26		Medium dense, light brown coarse to fine SAND, little Silt, trace fine Gravel, moist (SP-SM)				
	S-5	14	9 9 10 10	19		Medium dense, light brown coarse to fine SAND, little Silt, trace fine Gravel, moist (SP-SM)				
10										
	S-6	24	12 14 15 16	29	SC	Medium dense, brown coarse to fine SAND, some Clay, little coarse to fine Gravel, moist, with calcareous deposits (SC)				
15										
	S-7	24	10 13 13 15	26	SP	Medium dense, light brown coarse to fine SAND, some coarse to fine Gravel, moist, with calcareous deposits (SP)				
20						End of soil boring at 20 feet BGS. Borehole backfilled with soil cuttings.				



Drilling & Strata Notes

Moisture content 6'-8': 5.2%

In-Borehole Water Levels

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

General Notes

BGS = Below Ground Surface
No Groundwater encountered.

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

▽ = ATD Water Level (At Time of Drilling)
▼ = AD Water Level (After Drilling - Short Term)
▼ = EOD Water Level (End of Drilling - Long Term)

Soil Boring Log

B-10

Client:	Balanced Rock Power	**Drilling Firm:**	Core Co. USA	**Coordinates:**	39.20005 N, -103.70474 E
Project:	Ebba Solar	**Drill Crew:**	Chris Tillery / Giovanni Rosas	**Horiz. Datum:**	NAD83
Location:	Lincoln County, Colorado	**Boring Start:**	03/05/24 12:00 AM	**Elevation:**	Grade
Inspector:	Noelle Cheshire	**Boring End:**	03/05/24 12:00 AM	**Vert. Datum:**	Grade

Rig Model:	Diedrich D-50	**Sampler Type:**	Split Spoon	**Casing Type:**	N/A
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	N/A
Drill Method:	Hollow Stem Auger	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	N/A
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	N/A
Drilling Fluid:	None	**Hammer Fall:**	30 inches	**Hammer Fall:**	N/A

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)	Drilling & Strata Notes
	S-1	17	4 5 7 8	12	CL	Very stiff, brown Lean CLAY, some fine Sand, moist, with organics, ferrous staining (CL)	L	NP			
	U-1	20	PUSH			Brown Sandy Lean CLAY, moist (CL)	L				Moisture content 2'-4': 14.4%
5	S-3	21	5 7 6 9	13	SM	Medium dense, light brown Silty medium to fine SAND, moist (SM)					
	S-4	24	3 4 3 6	7		Loose, light brown coarse to fine SAND, some Silt, moist, with calcareous deposits (SM)					
	S-5	24	17 19 13 16	32		Dense, light gray coarse to fine SAND, litlle Silt, trace fine Gravel, moist (SM)					Moisture content 8'-10': 4.9%
10											
	S-6	24	11 13 14 17	27	SP	Medium dense, light gray coarse to fine SAND, little fine Gravel, moist (SP)					
15											
	S-7	24	9 11 13 15	24	GP	Medium dense, light gray Sandy fine GRAVEL, moist (GP)					
20						End of soil boring at 20 feet BGS. Borehole backfilled with soil cuttings.					

N-Value: 10 20 30 40

In-Borehole Water Levels

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

General Notes

BGS = Below Ground Surface
No Groundwater encountered.

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

▽ = ATD Water Level (At Time of Drilling)
▼ = AD Water Level (After Drilling - Short Term)
▼ = EOD Water Level (End of Drilling - Long Term)

Soil Boring Log

B-SS-01

Client:	Balanced Rock Power	**Drilling Firm:**	Core Co. USA	**Coordinates:**	39.199337 N, -103.704809 E
Project:	Ebba Solar	**Drill Crew:**	Chris Tillery / Giovanni Rosas	**Horiz. Datum:**	NAD83
Location:	Lincoln County, Colorado	**Boring Start:**	03/05/24 12:00 AM	**Elevation:**	Grade
Inspector:	Noelle Cheshire	**Boring End:**	03/05/24 12:00 AM	**Vert. Datum:**	Grade

Rig Model:	Diedrich D-50	**Sampler Type:**	Split Spoon	**Casing Type:**	N/A
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	N/A
Drill Method:	Hollow Stem Auger	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	N/A
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	N/A
Drilling Fluid:	None	**Hammer Fall:**	30 inches	**Hammer Fall:**	N/A

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)	Drilling & Strata Notes
	S-1	10	3 9 10 13	19	ML	Very stiff, brown Sandy SILT, dry, with organics and calcareous deposits (ML)	L	L	-	-	Sample too dry for PP/TV measurement
	S-2	24	8 9 11 13	20	SP	Medium dense, brown coarse to fine SAND, trace fine Gravel, trace Silt, moist (SP)					
5	S-3	24	7 4 6 6	10		Loose to medium dense, brown coarse to fine SAND, little fine Gravel, trace Silt, moist (SP)					
	S-4	17	4 4 3 4	7		Loose, light brown coarse to fine SAND, trace fine Gravel, trace Silt, moist, with calcareous deposits (SP)					
	S-5	23	6 7 10 12	17	SP / CL	Top 6": Brown coarse to fine SAND, trace coarse to fine Gravel, moist (SP) Bottom 17": Light gray Sandy Lean CLAY, moist, with calcareous deposits (CL)	M	M	>4.5	1.63	
10											
	S-6	18	8 11 11 13	22	SP	Dense, light gray to light brown SAND, some coarse to fine Gravel, moist (SP)					
15											
	S-7	24	6 9 14 18	23	SP-SM	Medium dense, light gray to light brown coarse to fine SAND, little Silt, trace fine Gravel, dry (SP-SM)					Moisture content 18'-20': 3.1%
20											
	S-8	24	15 17 18 9	35	GP / CH	Top 14": Light gray fine GRAVEL, some coarse to fine Sand, moist (GP) Bottom 10": Brown to olive gray Fat CLAY, trace coarse to fine Sand, moist, with ferrous	H	H	>4.5	1.75	

N-Value: 10 20 30 40

In-Borehole Water Levels

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

General Notes

BGS = Below Ground Surface
No Groundwater encountered.

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

▽ = ATD Water Level (At Time of Drilling)
▼ = AD Water Level (After Drilling - Short Term)
▼ = EOD Water Level (End of Drilling - Long Term)

Soil Boring Log

B-SS-01
(Continued)

Client:	Balanced Rock Power	**Drilling Firm:**	Core Co. USA	**Coordinates:**	39.199337 N, -103.704809 E
Project:	Ebba Solar	**Drill Crew:**	Chris Tillery / Giovanni Rosas	**Horiz. Datum:**	NAD83
Location:	Lincoln County, Colorado	**Boring Start:**	03/05/24 12:00 AM	**Elevation:**	Grade
Inspector:	Noelle Cheshire	**Boring End:**	03/05/24 12:00 AM	**Vert. Datum:**	Grade

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Graphic Log	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)	N-Value (10 20 30 40)	Drilling & Strata Notes
							staining and deposits and gray streaks (CH)						
	S-9	24	11 13 13 15	26			Very stiff, brownish yellow to olive gray Fat CLAY, trace coarse to fine Sand, moist, with ferrous staining and deposits and gray streaks (CH)	H	H	>4.5	1.75		Moisture content 28'-30': 28.2%
30												30	
	S-10	24	10 13 15 18	28			Very stiff, olive to dark gray Fat CLAY, trace fine Sand, moist, with ferrous staining (CH)	H	H	>4.5	2.13		
35												35	
	S-11	24	15 18 21 25	39	CH		Hard, olive to dark gray Fat CLAY, moist, with ferrous staining and brownish yellow streaks (CH)	H	H	>4.5	>2.25		
40												40	
	S-12	16	16 23 30 34	> 50			Hard, dark gray Fat CLAY, some fine Sand, moist, with ferrous staining and brownish yellow streaks (CH)	H	H	>4.5	>2.25	>>	
45												45	
	S-13	18	16 25 32 30	> 50			Hard, dark gray Fat CLAY, some fine Sand, moist, with ferrous staining and brownish yellow streaks (CH)	H	H	>4.5	>2.25	>>	
50							End of soil boring at 50 feet BGS. Borehole backfilled with soil cuttings.					50	

In-Borehole Water Levels

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

General Notes

BGS = Below Ground Surface
No Groundwater encountered.

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

▽ = ATD Water Level (At Time of Drilling)
▼ = AD Water Level (After Drilling - Short Term)
▼ = EOD Water Level (End of Drilling - Long Term)

Soil Boring Log

B-SS-02

Client:	Balanced Rock Power	**Drilling Firm:**	Core Co. USA	**Coordinates:**	39.19966 N, -103.704798 E
Project:	Ebba Solar	**Drill Crew:**	Chris Tillery / Giovanni Rosas	**Horiz. Datum:**	NAD83
Location:	Lincoln County, Colorado	**Boring Start:**	03/05/24 12:00 AM	**Elevation:**	Grade
Inspector:	Noelle Cheshire	**Boring End:**	03/05/24 12:00 AM	**Vert. Datum:**	Grade

Rig Model:	Diedrich D-50	**Sampler Type:**	Split Spoon	**Casing Type:**	N/A
Rig Type:	Track	**Sampler Length:**	24 inches	**Casing Length:**	N/A
Drill Method:	Hollow Stem Auger	**Sampler I.D.:**	1.375 inches	**Casing I.D.:**	N/A
Hammer Type:	Automatic	**Hammer Wt.:**	140 pounds	**Hammer Wt.:**	N/A
Drilling Fluid:	None	**Hammer Fall:**	30 inches	**Hammer Fall:**	N/A

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)
0	S-1	24	5 9 8 9	17	ML	Very stiff, light brown Sandy SILT, moist, with organics and calcareous deposits (ML)	L	M	-	-
	S-2	10	6 6 7 9	13	CL	Stiff, light brown Sandy Lean CLAY, trace fine Gravel, moist, with organics and ferrous staining (CL)	M	M	-	-
5	S-3	24	5 8 6 8	14	SC	Medium dense, brown medium to fine SAND, some Clay, moist, with organics and ferrous staining (SC)	-		-	-
	S-4	24	3 2 2 5	4		Very loose, medium brown medium to fine SAND, little Clay, moist, with calcareous deposits (SC)	-		-	-
	S-5	24	8 10 11 13	21		Medium dense, light brown medium to fine SAND, little Clay, moist, with ferrous staining and calcareous deposits (SC)	-		-	-
10	S-6	16	11 13 15 16	28	SW	Medium dense, light gray to light brown coarse to fine SAND, trace fine Gravel, trace Clay, dry (SW)	-		-	-
15	S-7	24	4 6 8 14	14	GP	Medium dense, light gray to light brown Sandy coarse to fine GRAVEL, moist (GP)	-		-	-
20	S-8	24	9 11 13 16	24	CH	Very stiff, brown Fat CLAY, trace fine Sand, moist, with ferrous staining and calcareous deposits and brownish yellow staining (CH)	H	H	>4.5	-

N-Value: 10 20 30 40

Drilling & Strata Notes

Moisture content 13'-15': 2.1%

In-Borehole Water Levels

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

General Notes

BGS = Below Ground Surface
No Groundwater encountered.

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

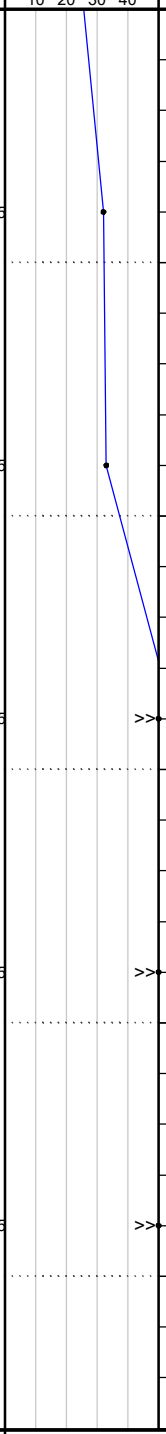
▽ = ATD Water Level (At Time of Drilling)
▼ = AD Water Level (After Drilling - Short Term)
▼ = EOD Water Level (End of Drilling - Long Term)

Soil Boring Log

B-SS-02
(Continued)

Client:	Balanced Rock Power	**Drilling Firm:**	Core Co. USA	**Coordinates:**	39.19966 N, -103.704798 E
Project:	Ebba Solar	**Drill Crew:**	Chris Tillery / Giovanni Rosas	**Horiz. Datum:**	NAD83
Location:	Lincoln County, Colorado	**Boring Start:**	03/05/24 12:00 AM	**Elevation:**	Grade
Inspector:	Noelle Cheshire	**Boring End:**	03/05/24 12:00 AM	**Vert. Datum:**	Grade

Depth (ft)	Sample No.	Rec. (in)	Blows per 6"	N-Value	USCS Symbol	Visual Classification	Toughness	Plasticity	PP (tsf)	TV (tsf)	Drilling & Strata Notes
30	S-9	24	12 15 17 18	32	CH	Hard, mottled dark gray to brownish yellow Fat CLAY, trace coarse Sand, moist, with ferrous staining (CH)	H	H	>4.5	>2.25	
35	S-10	24	14 12 21 26	33		Hard, mottled dark gray to brownish yellow Fat CLAY, trace coarse Sand, moist, with ferrous staining (CH)	H	H	>4.5	>2.25	Moisture content 33'-35': 25.0%
40	S-11	22	18 21 31 40	> 50		Hard, dark gray Fat CLAY, moist, with ferrous staining (CH)	H	H	>4.5	>2.25	
45	S-12	18	15 27 38 50/4"	> 50		Hard, dark gray Fat CLAY, moist, with ferrous staining, clayshale (CH)	H	H	>4.5	>2.25	
50	S-13	16	17 29 32 50/5"	> 50		Hard, dark gray Fat CLAY, moist, with ferrous staining and brownish yellow streaks clayshale (CH)	H	H	>4.5	>2.25	
						End of soil boring at 50 feet BGS. Borehole backfilled with soil cuttings.					



In-Borehole Water Levels

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

General Notes

BGS = Below Ground Surface
No Groundwater encountered.

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

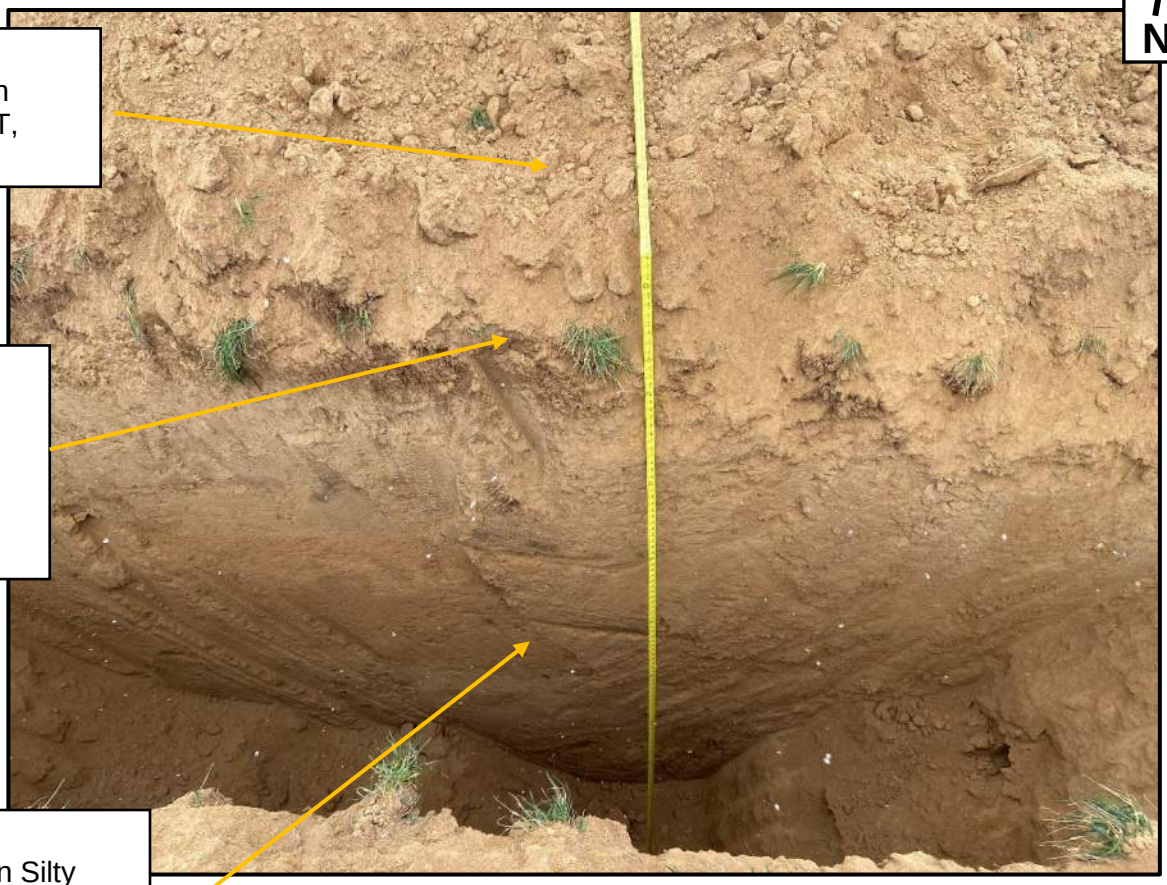
▽ = ATD Water Level (At Time of Drilling)
▼ = AD Water Level (After Drilling - Short Term)
▼ = EOD Water Level (End of Drilling - Long Term)

Attachment D

Test Pit Logs

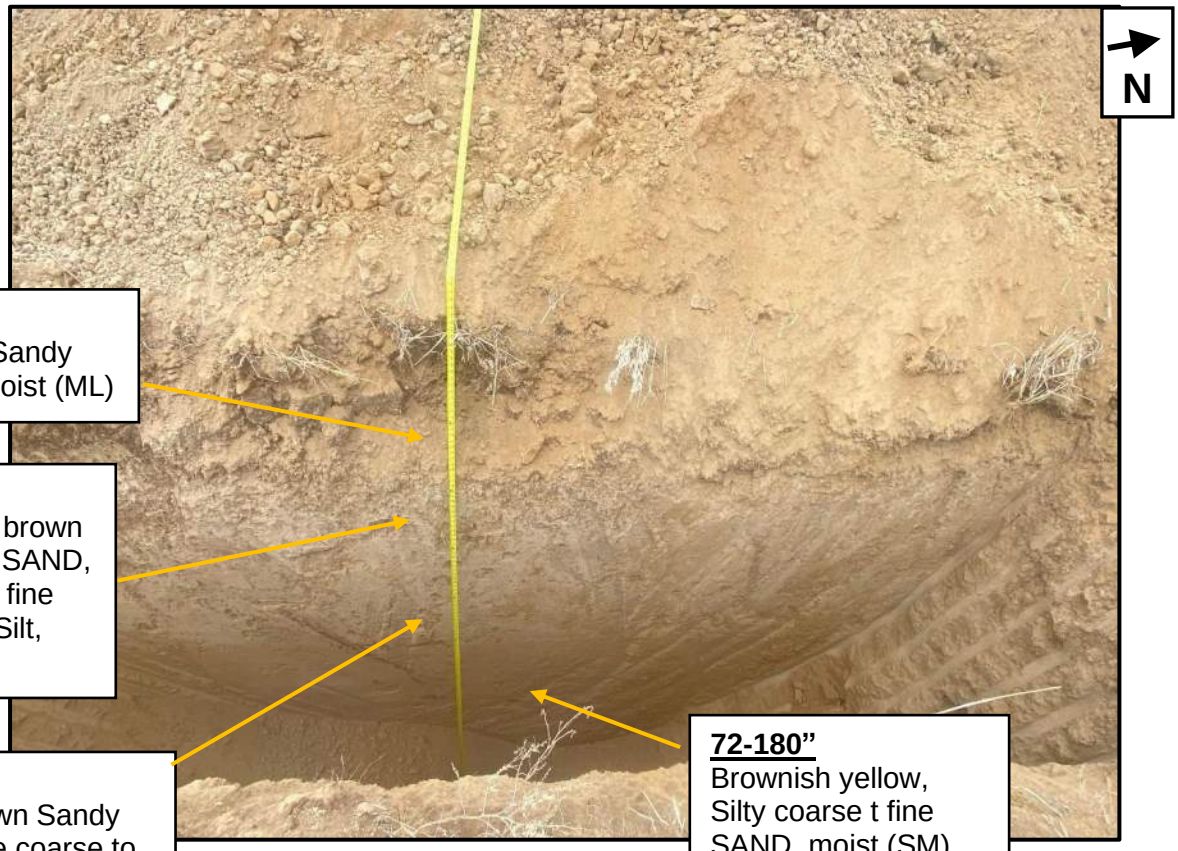
TEST PIT PHOTO LOG

Project Name	**Ebba Solar**	**Test Pit ID**	TP-01
Site Location	Lincoln County, Colorado	**Date**	03/08/2024
Test Pit Contractor	Alta Energy	**ANS Geo Representative**	Caleb Ross
Equipment Used	Yanmar SV100 Excavator	**Weather/Temp**	Partly Cloudy/34°F
Final Test Pit Depth (feet)	15 ft (180 inches)	**Time Opened**	9:35 AM
Groundwater Depth (feet)	N/A	**Time Closed**	10:20 AM



TEST PIT PHOTO LOG

Project Name	**Ebba Solar**	**Test Pit ID**	TP-02
Site Location	Lincoln County, Colorado	**Date**	03/08/2024
Test Pit Contractor	Alta Energy	**ANS Geo Representative**	Caleb Ross
Equipment Used	Yanmar SV100 Excavator	**Weather/Temp**	Partly Cloudy/25°F
Final Test Pit Depth (feet)	15 ft (180 inches)	**Time Opened**	12:08 PM
Groundwater Depth (feet)	N/A	**Time Closed**	12:50 PM



0-24”
Brown Sandy SILT, moist (ML)

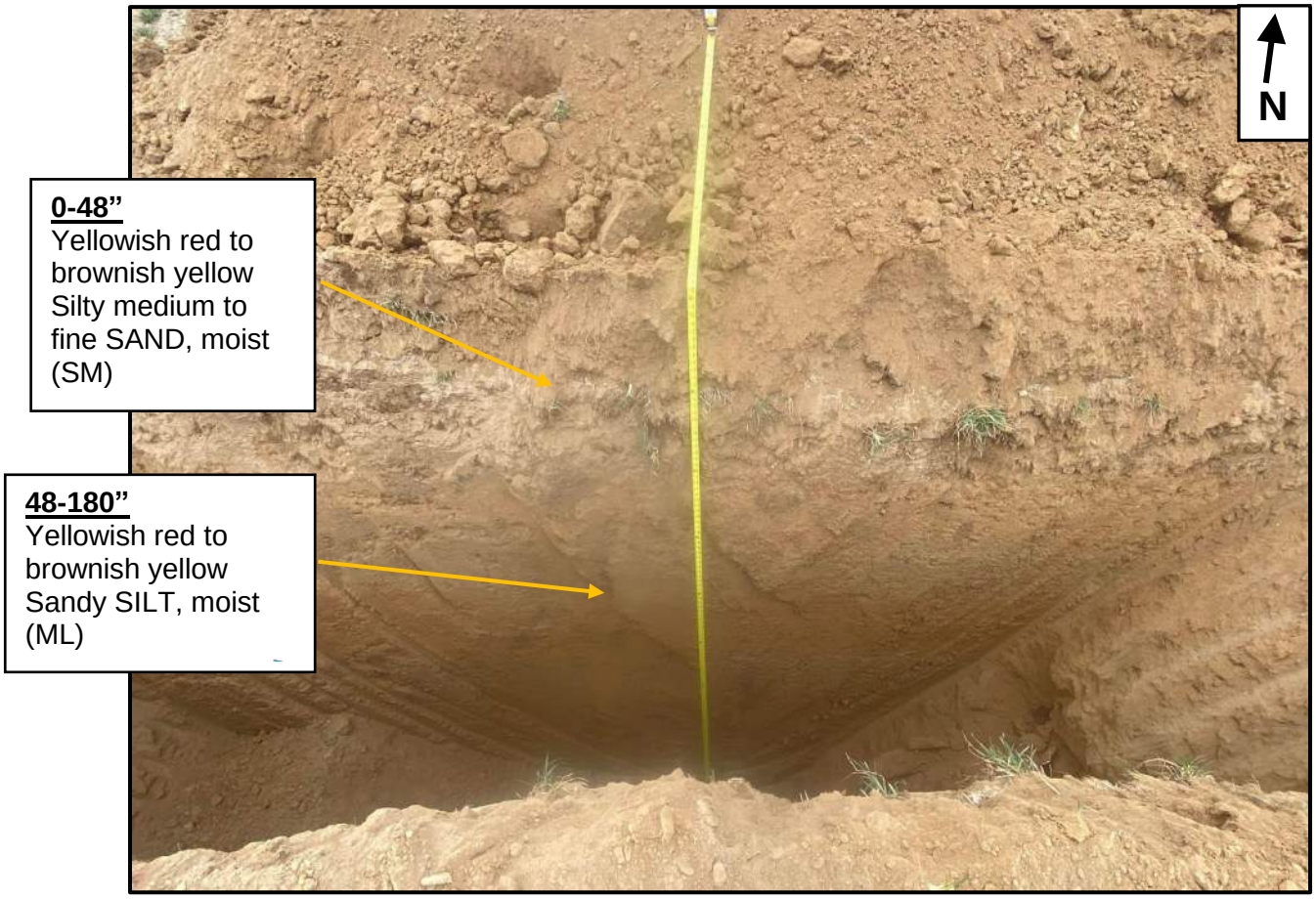
24-48”
Brown to light brown coarse to fine SAND, little coarse to fine Gravel, trace Silt, moist (SP)

48-72”
Light brown Sandy SILT, little coarse to fine Gravel, moist (ML)

72-180”
Brownish yellow, Silty coarse t fine SAND, moist (SM)

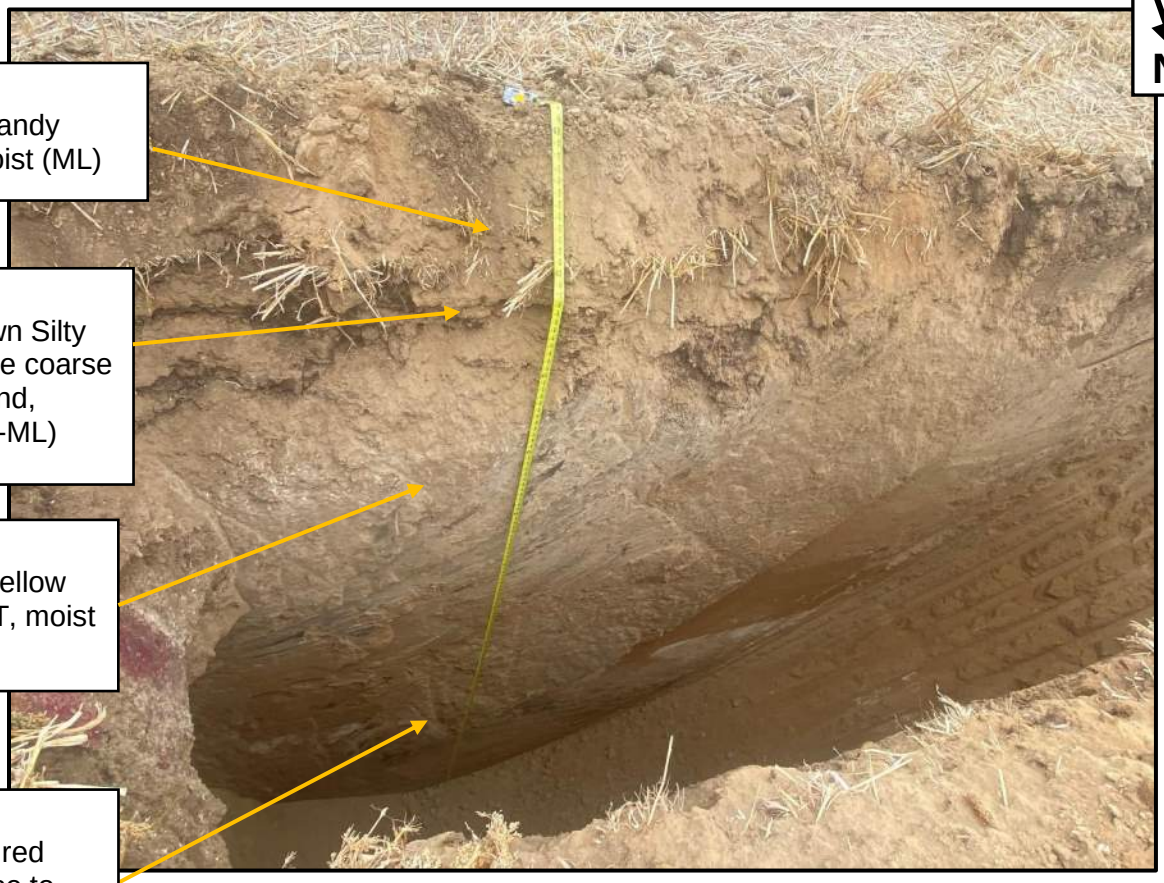
TEST PIT PHOTO LOG

Project Name	**Ebba Solar**	**Test Pit ID**	TP-03
Site Location	Lincoln County, Colorado	**Date**	03/08/2024
Test Pit Contractor	Alta Energy	**ANS Geo Representative**	Caleb Ross
Equipment Used	Yanmar SV100 Excavator	**Weather/Temp**	Partly Cloudy/25°F
Final Test Pit Depth (feet)	15 ft (180 inches)	**Time Opened**	10:50 AM
Groundwater Depth (feet)	N/A	**Time Closed**	11:50 PM



TEST PIT PHOTO LOG

Project Name	**Ebba Solar**	**Test Pit ID**	TP-04
Site Location	Lincoln County, Colorado	**Date**	03/08/2024
Test Pit Contractor	Alta Energy	**ANS Geo Representative**	Caleb Ross
Equipment Used	Yanmar SV100 Excavator	**Weather/Temp**	Partly Cloudy/25°F
Final Test Pit Depth (feet)	15 ft (180 inches)	**Time Opened**	1:40 PM
Groundwater Depth (feet)	N/A	**Time Closed**	2:30 PM



0-36”
Brown Sandy SILT, moist (ML)

36-60”
Light brown Silty CLAY, little coarse to fine Sand, moist (CL-ML)

60-96”
Brownish yellow Sandy SILT, moist (ML)

96-180”
Yellowish red Silty coarse to fine SAND, moist (SM)

TEST PIT PHOTO LOG

Project Name	**Ebba Solar**	**Test Pit ID**	TP-05
Site Location	Lincoln County, Colorado	**Date**	03/08/2024
Test Pit Contractor	Alta Energy	**ANS Geo Representative**	Caleb Ross
Equipment Used	Yanmar SV100 Excavator	**Weather/Temp**	Partly Cloudy/25°F
Final Test Pit Depth (feet)	15 ft (180 inches)	**Time Opened**	3:10 PM
Groundwater Depth (feet)	N/A	**Time Closed**	3:53 PM

0-36”
Brown SILT, moist (ML)

36-156”
Yellowish red Sandy SILT, moist (ML)

156-180”
Light brown Silty coarse to fine SAND, moist (SM)

TEST PIT PHOTO LOG

Project Name	**Ebba Solar**	**Test Pit ID**	TP-06
Site Location	Lincoln County, Colorado	**Date**	03/09/2024
Test Pit Contractor	Alta Energy	**ANS Geo Representative**	Caleb Ross
Equipment Used	Yanmar SV100 Excavator	**Weather/Temp**	Sunny/25°F
Final Test Pit Depth (feet)	15 ft (180 inches)	**Time Opened**	9:05 AM
Groundwater Depth (feet)	N/A	**Time Closed**	9:52 AM

0-12”
Brown to dark brown SILT, moist (ML)

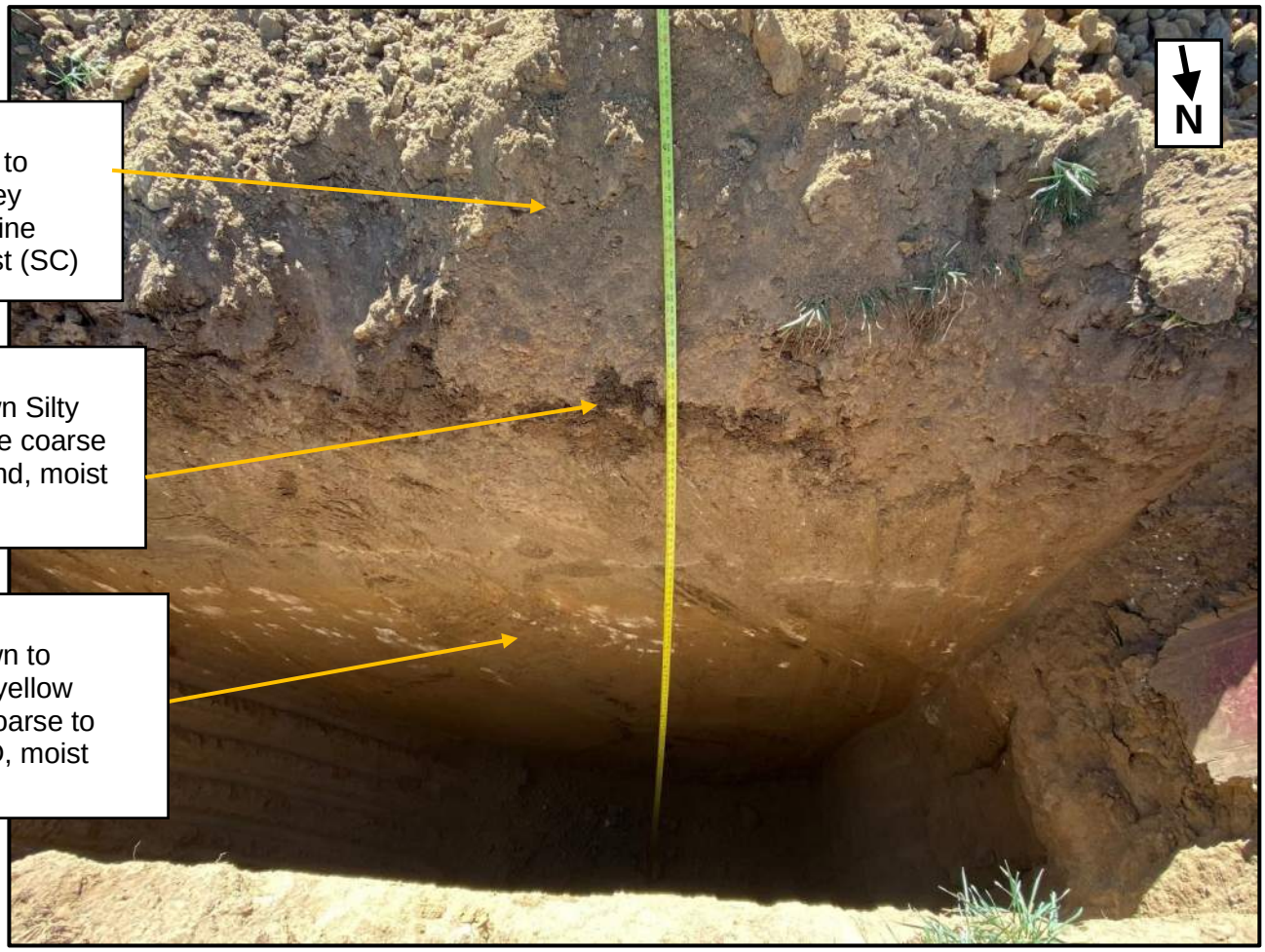
12-30”
Dark brown coarse to fine SAND, some Clay, some Silt, moist (SC-SM)

30-60”
Dark brown Silty CLAY, trace coarse to fine Sand, moist (CL-ML)

60-180”
Brown, Silty coarse to fine SAND, moist (SM)

TEST PIT PHOTO LOG

Project Name	**Ebba Solar**	**Test Pit ID**	TP-07
Site Location	Lincoln County, Colorado	**Date**	03/09/2024
Test Pit Contractor	Alta Energy	**ANS Geo Representative**	Caleb Ross
Equipment Used	Yanmar SV100 Excavator	**Weather/Temp**	Sunny/40°F
Final Test Pit Depth (feet)	15 ft (180 inches)	**Time Opened**	12:21 PM
Groundwater Depth (feet)	N/A	**Time Closed**	12:53 PM



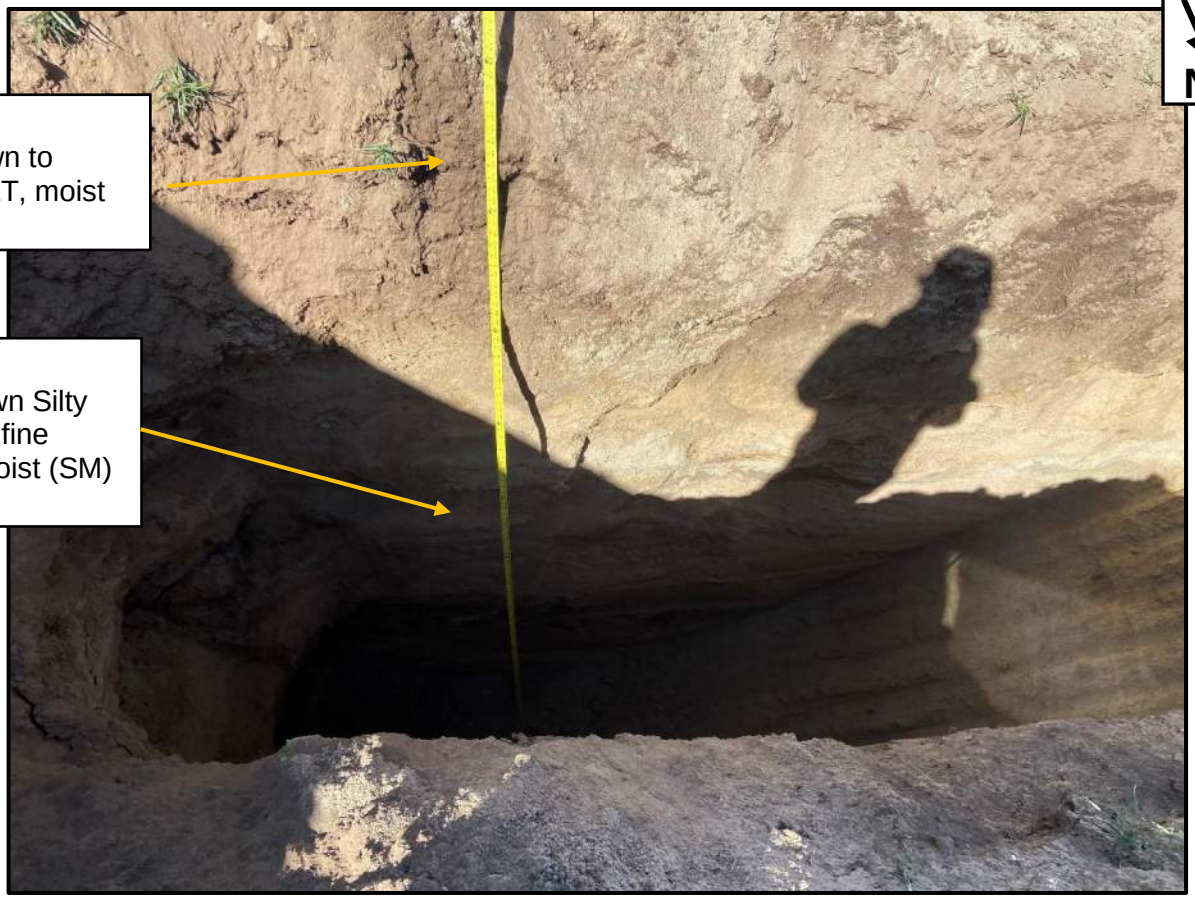
0-24”
Light brown to brown Clayey medium to fine SAND, moist (SC)

24-48”
Dark brown Silty CLAY, little coarse to fine Sand, moist (CL-ML)

48-180”
Light brown to brownish yellow Gravely coarse to fine SAND, moist (SP)

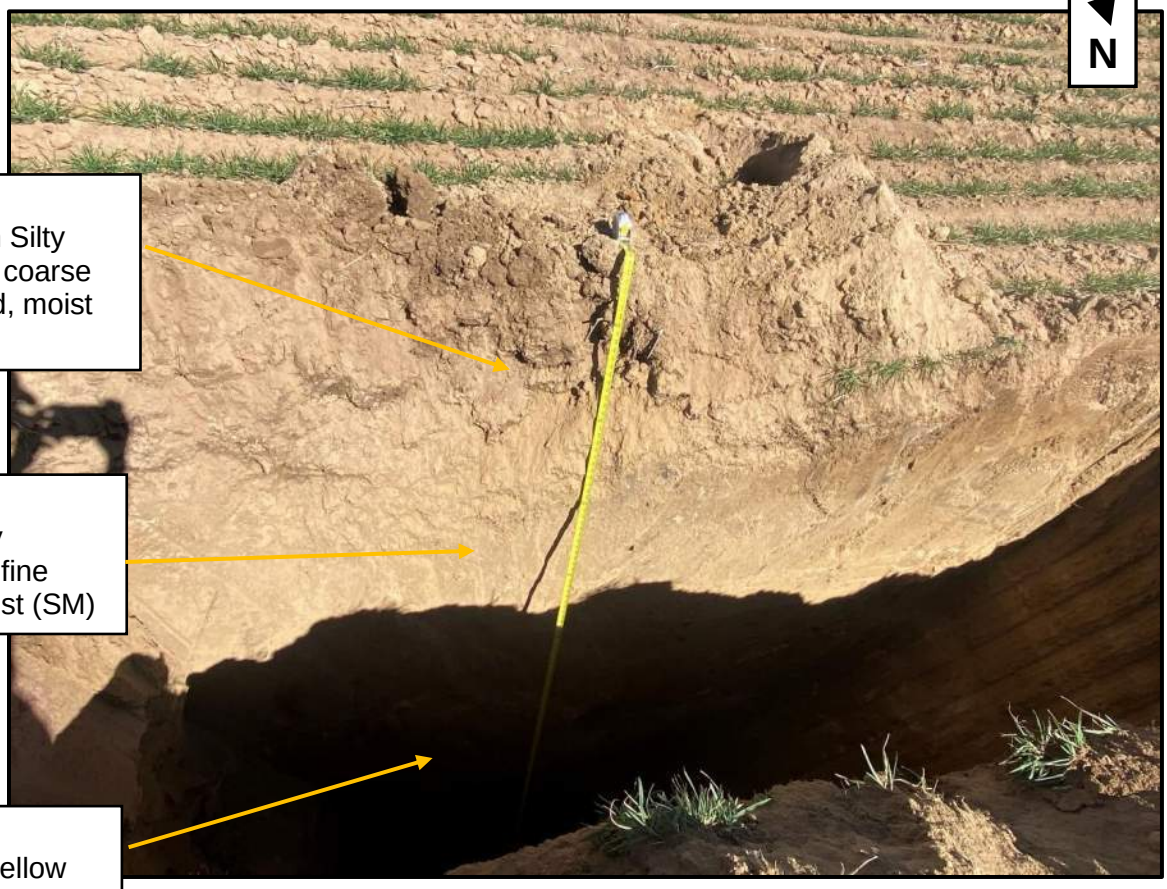
TEST PIT PHOTO LOG

Project Name	**Ebba Solar**	**Test Pit ID**	TP-08
Site Location	Lincoln County, Colorado	**Date**	03/09/2024
Test Pit Contractor	Alta Energy	**ANS Geo Representative**	Caleb Ross
Equipment Used	Yanmar SV100 Excavator	**Weather/Temp**	Partly Cloudy/25°F
Final Test Pit Depth (feet)	15 ft (180 inches)	**Time Opened**	11:30 AM
Groundwater Depth (feet)	N/A	**Time Closed**	11:58 AM



TEST PIT PHOTO LOG

Project Name	**Ebba Solar**	**Test Pit ID**	TP-09
Site Location	Lincoln County, Colorado	**Date**	03/09/2024
Test Pit Contractor	Alta Energy	**ANS Geo Representative**	Caleb Ross
Equipment Used	Yanmar SV100 Excavator	**Weather/Temp**	Sunny/35°F
Final Test Pit Depth (feet)	15 ft (180 inches)	**Time Opened**	10:30 AM
Groundwater Depth (feet)	N/A	**Time Closed**	11:20 AM



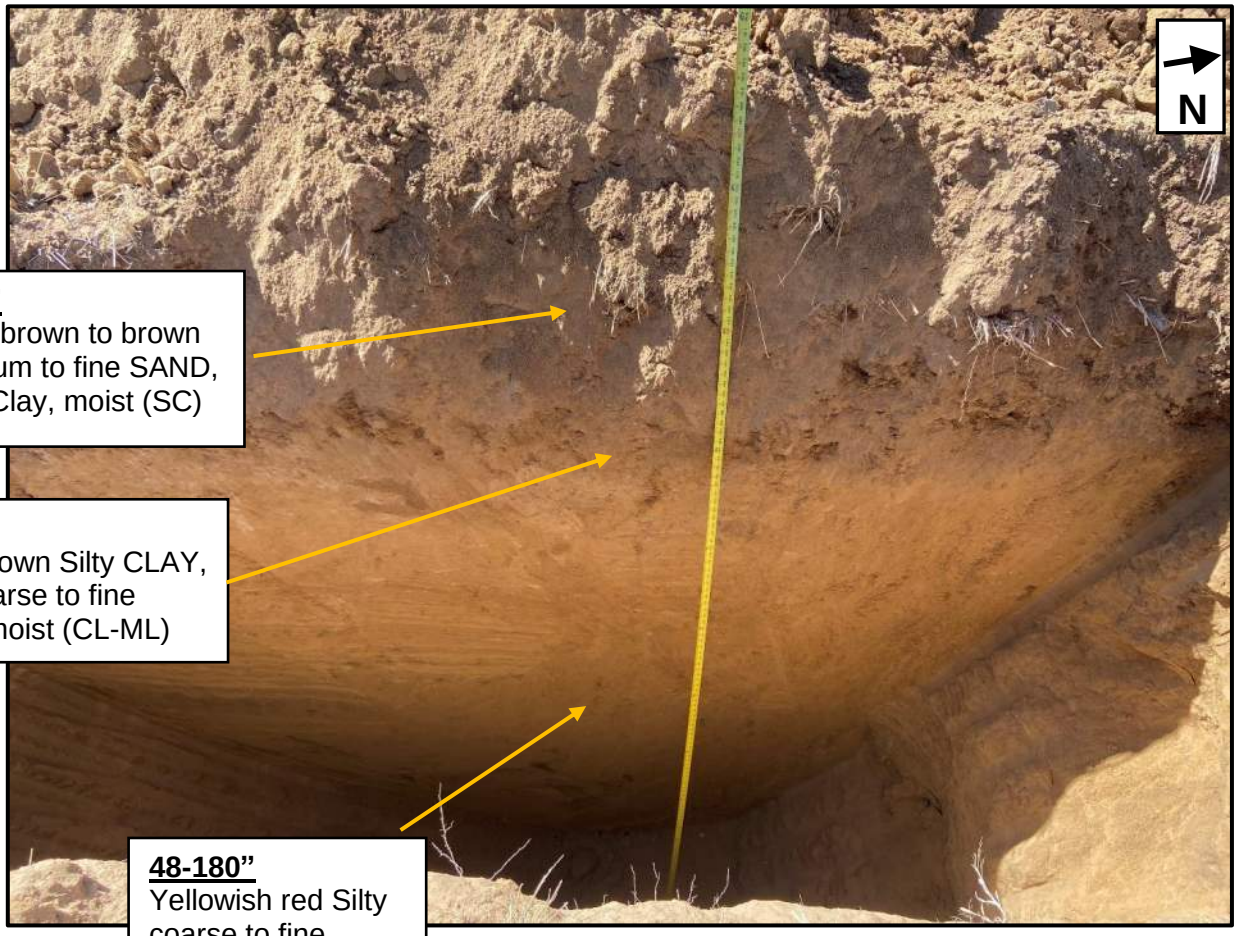
0-60”
Light brown Silty CLAY, little coarse to fine Sand, moist (CL-ML)

60-120”
Brown Silty medium to fine SAND, moist (SM)

120-180”
Brownish yellow coarse to fine SAND, some Clay, moist (SC)

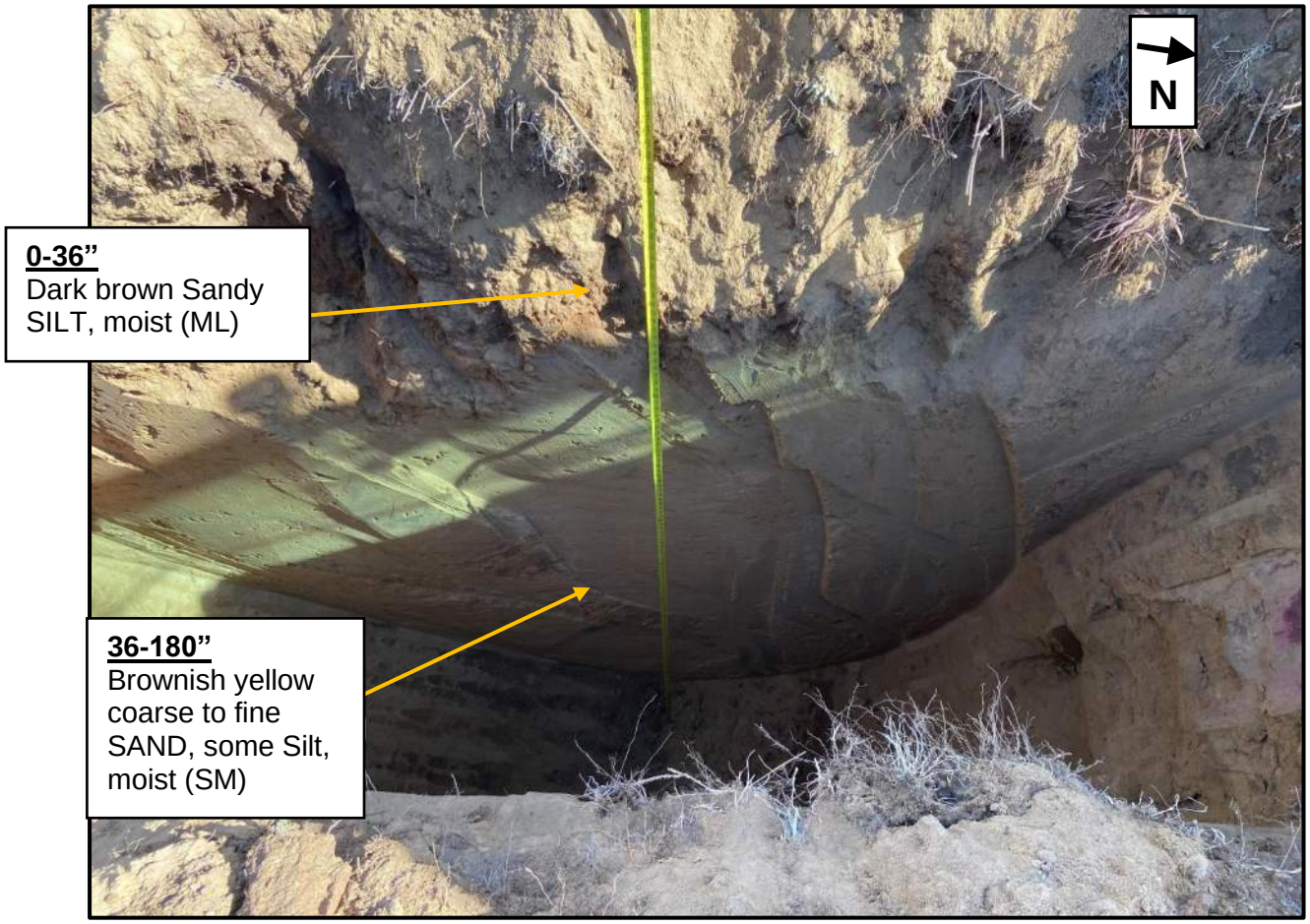
TEST PIT PHOTO LOG

Project Name	**Ebba Solar**	**Test Pit ID**	TP-10
Site Location	Lincoln County, Colorado	**Date**	03/09/2024
Test Pit Contractor	Alta Energy	**ANS Geo Representative**	Caleb Ross
Equipment Used	Yanmar SV100 Excavator	**Weather/Temp**	Sunny/35°F
Final Test Pit Depth (feet)	15 ft (180 inches)	**Time Opened**	1:26 PM
Groundwater Depth (feet)	N/A	**Time Closed**	1:57 PM



TEST PIT PHOTO LOG

Project Name	**Ebba Solar**	**Test Pit ID**	TP-11
Site Location	Lincoln County, Colorado	**Date**	03/09/2024
Test Pit Contractor	Alta Energy	**ANS Geo Representative**	Caleb Ross
Equipment Used	Yanmar SV100 Excavator	**Weather/Temp**	Sunny/35°F
Final Test Pit Depth (feet)	15 ft (180 inches)	**Time Opened**	2:15 PM
Groundwater Depth (feet)	N/A	**Time Closed**	2:45 PM



TEST PIT PHOTO LOG

Project Name	**Ebba Solar**	**Test Pit ID**	TP-12
Site Location	Lincoln County, Colorado	**Date**	03/09/2024
Test Pit Contractor	Alta Energy	**ANS Geo Representative**	Caleb Ross
Equipment Used	Yanmar SV100 Excavator	**Weather/Temp**	Sunny/35°F
Final Test Pit Depth (feet)	15 ft (180 inches)	**Time Opened**	2:57 PM
Groundwater Depth (feet)	N/A	**Time Closed**	3:31 PM

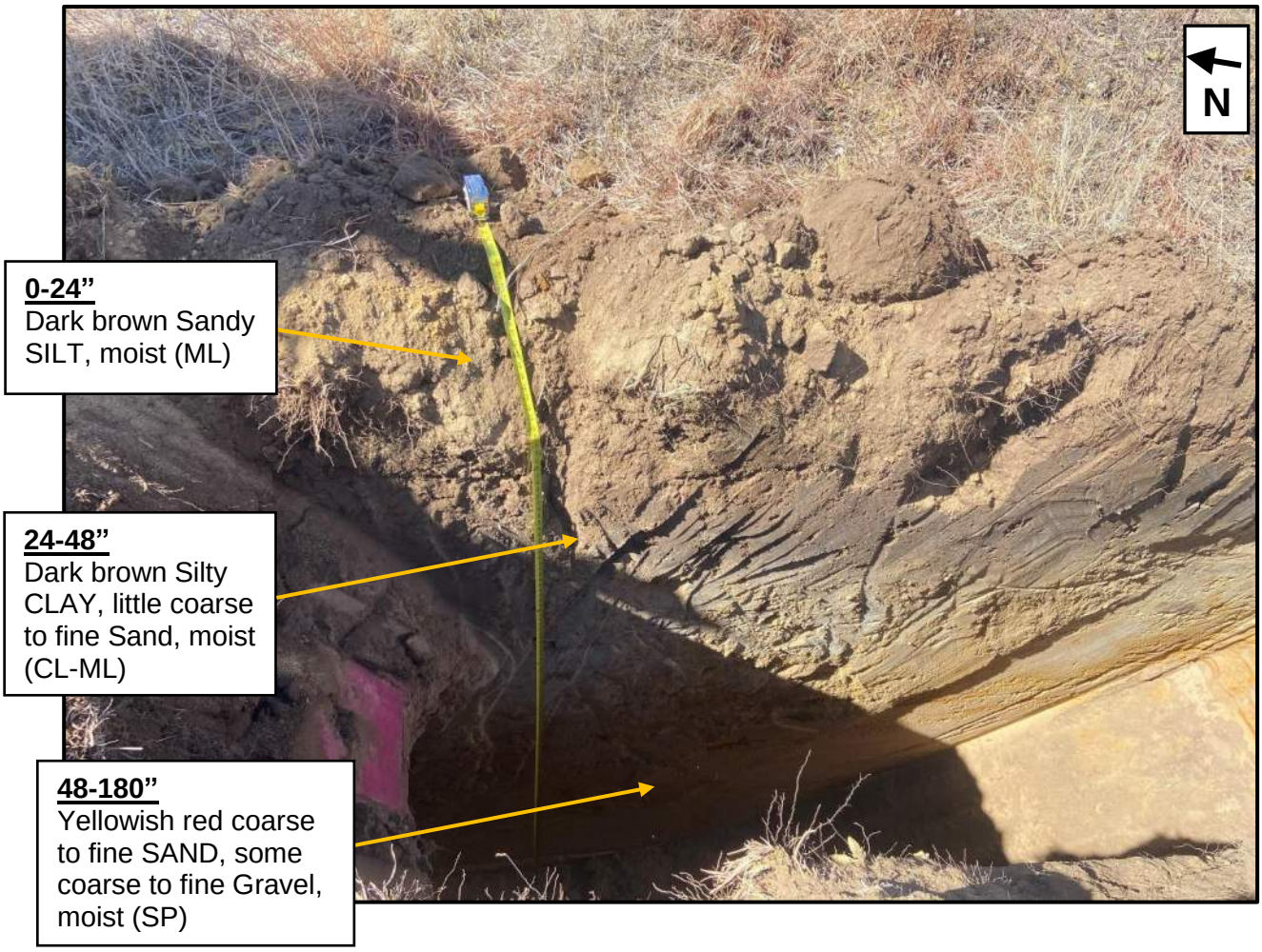
0-24”
Dark brown to gray Sandy SILT, moist (ML)

24-48”
Dark gray Silty CLAY, little coarse to fine Sand, moist (CL-ML)

48-180”
Dark brown to gray Silty coarse to fine SAND, moist (SM)

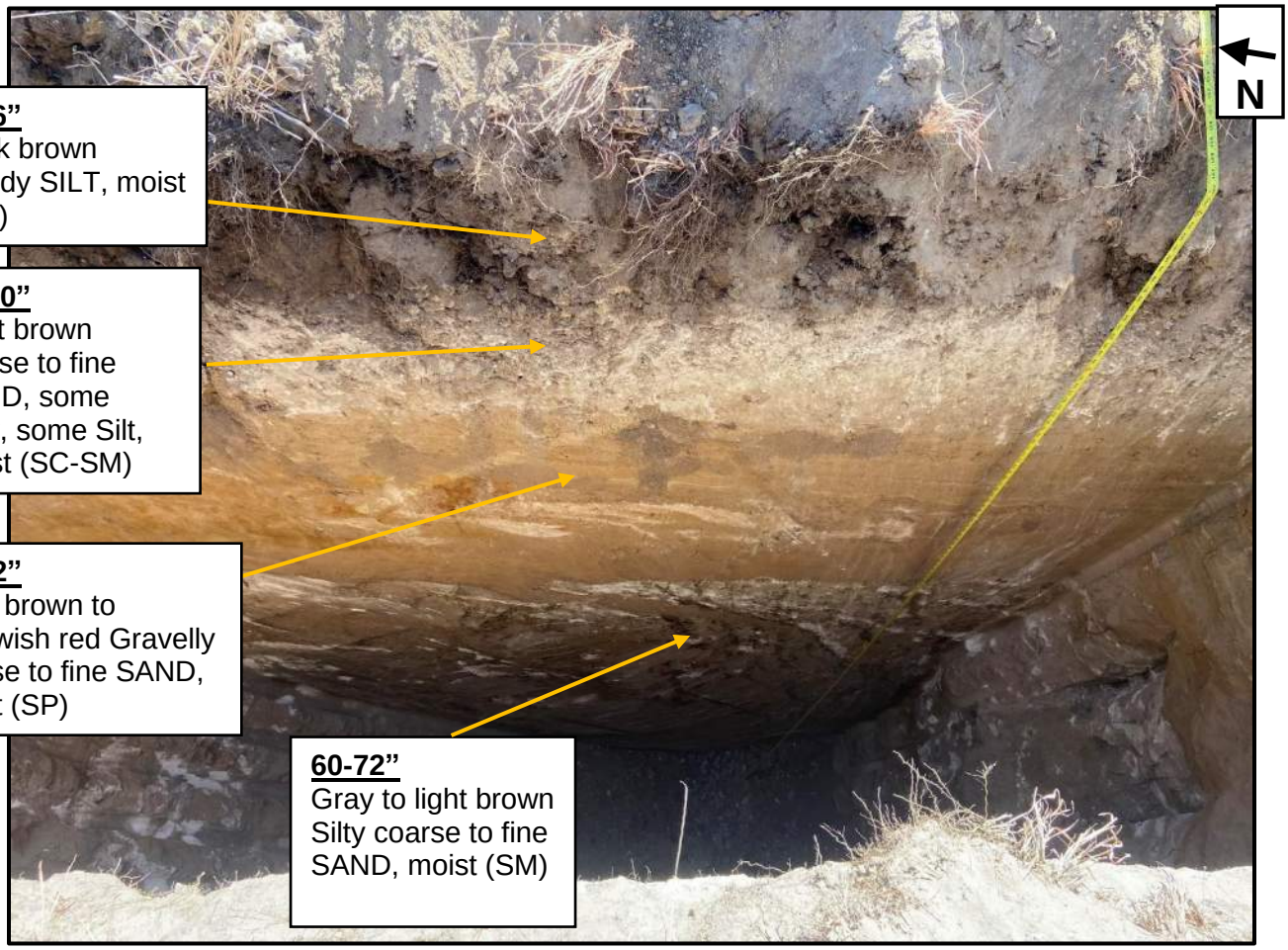
TEST PIT PHOTO LOG

Project Name	**Ebba Solar**	**Test Pit ID**	TP-13
Site Location	Lincoln County, Colorado	**Date**	03/10/2024
Test Pit Contractor	Alta Energy	**ANS Geo Representative**	Caleb Ross
Equipment Used	Yanmar SV100 Excavator	**Weather/Temp**	Sunny/30°F
Final Test Pit Depth (feet)	15 ft (180 inches)	**Time Opened**	11:36 AM
Groundwater Depth (feet)	N/A	**Time Closed**	12:06 PM



TEST PIT PHOTO LOG

Project Name	**Ebba Solar**	**Test Pit ID**	TP-14
Site Location	Lincoln County, Colorado	**Date**	03/10/2024
Test Pit Contractor	Alta Energy	**ANS Geo Representative**	Caleb Ross
Equipment Used	Yanmar SV100 Excavator	**Weather/Temp**	Sunny/35°F
Final Test Pit Depth (feet)	15 ft (180 inches)	**Time Opened**	12:20 PM
Groundwater Depth (feet)	N/A	**Time Closed**	12:53 PM



0-36”
Dark brown Sandy SILT, moist (ML)

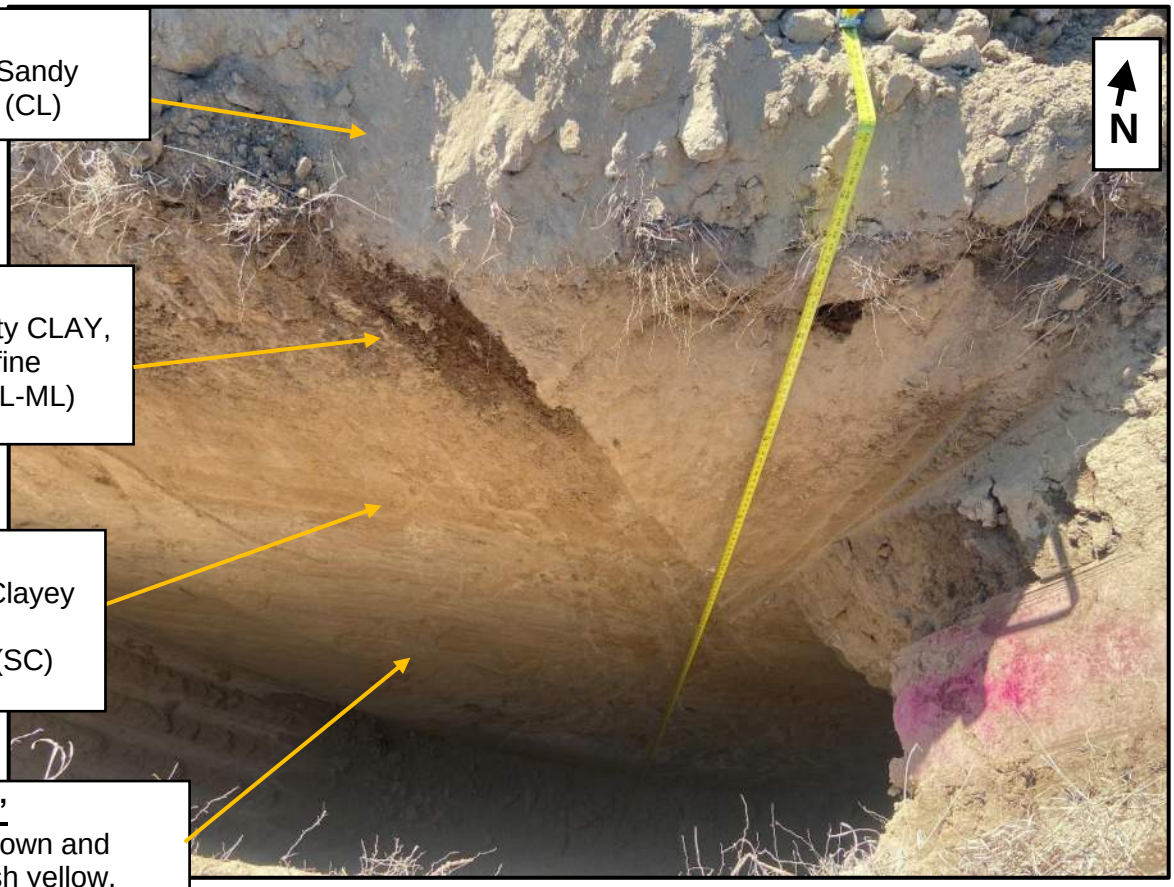
36-60”
Light brown coarse to fine SAND, some Clay, some Silt, moist (SC-SM)

60-72”
Light brown to yellowish red Gravelly coarse to fine SAND, moist (SP)

60-72”
Gray to light brown Silty coarse to fine SAND, moist (SM)

TEST PIT PHOTO LOG

Project Name	**Ebba Solar**	**Test Pit ID**	TP-15
Site Location	Lincoln County, Colorado	**Date**	03/10/2024
Test Pit Contractor	Alta Energy	**ANS Geo Representative**	Caleb Ross
Equipment Used	Yanmar SV100 Excavator	**Weather/Temp**	Sunny/35°F
Final Test Pit Depth (feet)	15 ft (180 inches)	**Time Opened**	10:37 AM
Groundwater Depth (feet)	N/A	**Time Closed**	11:15 AM



0-12”
Dark Brown Sandy CLAY, moist (CL)

12-60”
Dark brown Silty CLAY, little coarse to fine Sand, moist (CL-ML)

60-96”
Light brown, Clayey coarse to fine SAND, moist (SC)

96-180”
Light brown and brownish yellow, Silty coarse to fine SAND, moist (SM)

Attachment E

Lab Test Results

MOISTURE CONTENT ANALYSIS RESULTS

ANS CONSULTANTS, INC.
4405 South Clinton Avenue
South Plainfield, NJ 07080
Tel: (800) 585-ATUL
(908) 754-8383
Fax: (908) 754-8633
NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified
www.ANSConsultants.net

Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-Proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

Laboratory Determination of Water (Moisture) Content of Soil and Rock (ASTM D2216)

Client Name: Balanced Rock Power
Project Name: Ebba Solar, Lincoln County, CO
LAB IRN: 24-T-030
Date: 3/15/2024

Sample ID	B-01, S-4	B-02, S-3	B-02, S-5	B-03, S-6	B-04, S-6
Depth	6'-8'	4'-6'	8'-10'	13'-15'	13'-15'
Wet soil + Tare (g)	991.3	218.3	238.7	233.1	911.9
Dry soil + Tare (g)	903.4	193.5	215.2	215.9	878.8
Wt. of Tare (g)	186.0	15.4	15.2	15.1	183.5
Moisture Content	**12.3%**	**13.9%**	**11.8%**	**8.6%**	**4.8%**

Sample ID	B-05, S-2	B-06, S-3	B-07, S-1	B-08, S-2	B-08, S-4
Depth	2'-4'	4'-6'	0'-2'	2'-4'	6'-8'
Wet soil + Tare (g)	230.4	686.4	242.9	736.5	889.3
Dry soil + Tare (g)	200.5	653.5	204.2	706.6	823.7
Wt. of Tare (g)	15.4	178.7	15.4	182.2	180.3
Moisture Content	**16.2%**	**6.9%**	**20.5%**	**5.7%**	**10.2%**

Sample ID	B-09, S-4	B-10, S-5	SS-B-01, S-7	SS-B-01, S-9	SS-B-02, S-6
Depth	6'-8'	8'-10'	18'-20'	28'-30'	13'-15'
Wet soil + Tare (g)	929.0	916.8	1137.5	242.3	897.1
Dry soil + Tare (g)	891.8	882.6	1108.7	192.3	882.8
Wt. of Tare (g)	180.0	189.8	187.7	15.4	186.7
Moisture Content	**5.2%**	**4.9%**	**3.1%**	**28.2%**	**2.1%**

Tested By: ES
Checked By: ANS

ANS CONSULTANTS, INC.
4405 South Clinton Avenue
South Plainfield, NJ 07080
Tel: (800) 585-ATUL
(908) 754-8383
Fax: (908) 754-8633
NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified
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Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-Proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

Laboratory Determination of Water (Moisture) Content of Soil and Rock (ASTM D2216)

Client Name: Balanced Rock Power
Project Name: Ebba Solar, Lincoln County, CO
LAB IRN: 24-T-031
Date: 3/20/2024

Sample ID	TP-01, CORR-01	TP-04, CORR-02	TP-07, CORR-03	TP-10, CORR-04	TP-12, CORR-05
Depth	2'-4'	2'-4'	2'-4'	2'-4'	2'-4'
Wet soil + Tare (g)	255.4	167.5	167.9	160.8	166.8
Dry soil + Tare (g)	216.6	145.2	145.9	150.6	147.5
Wt. of Tare (g)	15.4	15.3	15.4	15.4	15.4
Moisture Content	**19.3%**	**17.1%**	**16.9%**	**7.6%**	**14.6%**

Sample ID	TP-13, CORR-06	TP-04, TRT-01	TP-06, TRT-02	TP-09, TRT-03	TP-14, TRT-04
Depth	2'-4'	3'-5'	3'-5'	3'-5'	3'-5'
Wet soil + Tare (g)	170.8	281.9	346.0	259.2	375.0
Dry soil + Tare (g)	162.1	253.2	297.5	235.0	356.3
Wt. of Tare (g)	15.4	15.5	15.5	15.6	15.4
Moisture Content	**5.9%**	**12.1%**	**17.2%**	**11.0%**	**5.5%**

Sample ID	TP-15, TRT-05	TP-01, CBR-01	TP-06, CBR-02	TP-15, CBR-03
Depth	3'-5'	1'-2'	1'-2'	1'-2'
Wet soil + Tare (g)	277.1	165.8	192.8	207.3
Dry soil + Tare (g)	239.1	141.8	176.1	174.4
Wt. of Tare (g)	15.3	15.3	15.3	15.3
Moisture Content	**17.0%**	**19.0%**	**10.4%**	**20.7%**

Tested By: ES
Checked By: ANS

ANS CONSULTANTS, INC.
4405 South Clinton Avenue
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Tel: (800) 585-ATUL
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Fax: (908) 754-8633
NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified
www.ANSConsultants.net

Laboratory Determination of Water (Moisture) Content of Soil and Rock (ASTM D2216)

Client Name:	Balanced Rock Power	LAB IRN:	24-T-030
Project Name:	Ebba Solar, Lincoln County, CO	Date:	3/15/2024

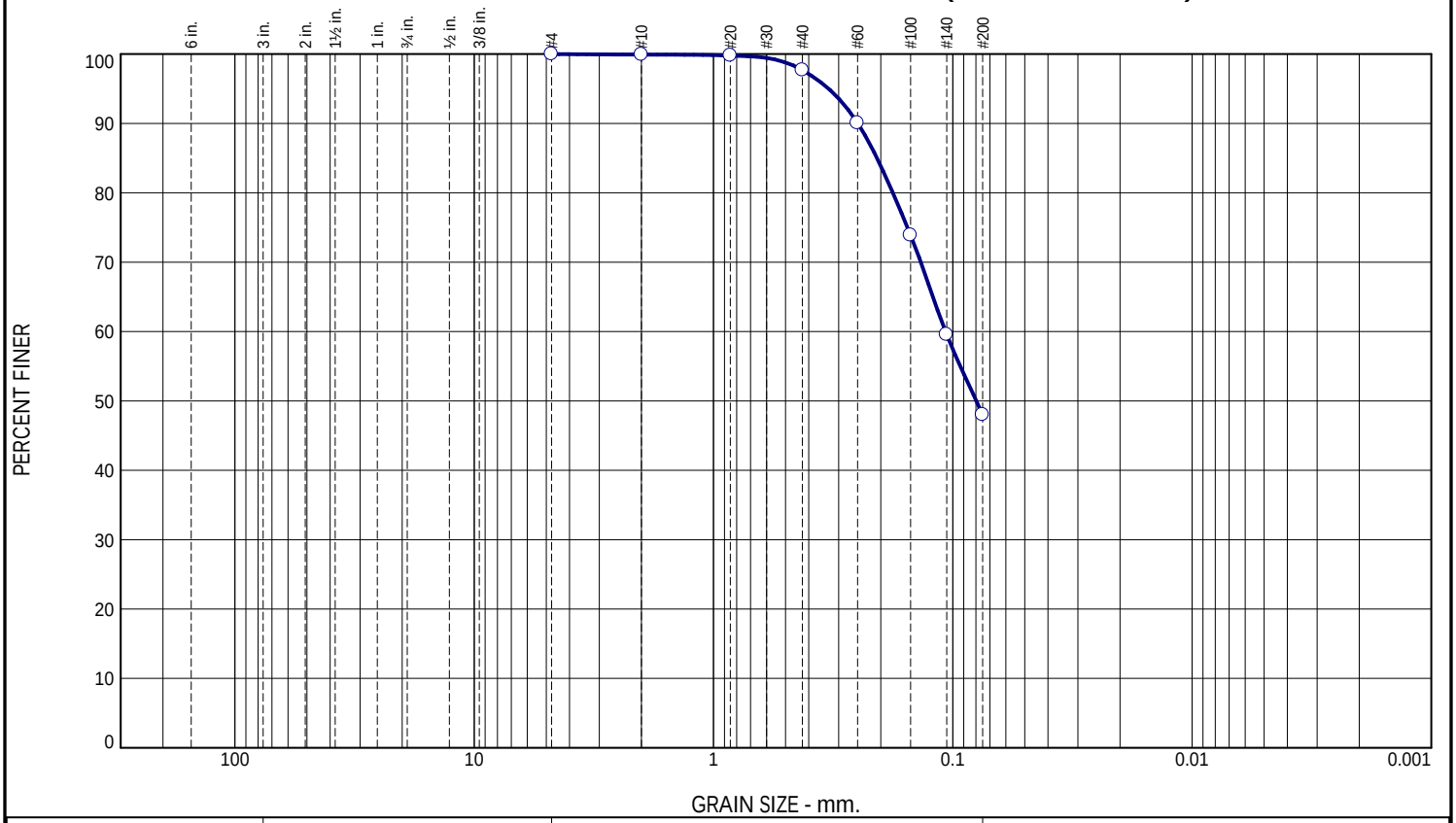
Sample ID	SS-B-02, S-10
Depth	33'-35'
Wet soil + Tare (g)	237.8
Dry soil + Tare (g)	193.3
Wt. of Tare (g)	15.4
Moisture Content	**25.0%**

Tested By: ES

Checked By: ANS

SIEVE ANALYSIS

PARTICLE SIZE DISTRIBUTION REPORT (ASTM D6913)



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	2.2	49.7	48.0	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	99.8		
#40	97.7		
#60	90.1		
#100	73.9		
#140	59.6		
#200	48.0		

* (no specification provided)

Soil Description

Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2492 D_{85}= 0.2073 D_{60}= 0.1073
D_{50}= 0.0797 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: B-01, S-4 Depth: 6'-8'

Date: 3/15/2024

ANS CONSULTANTS, INC.

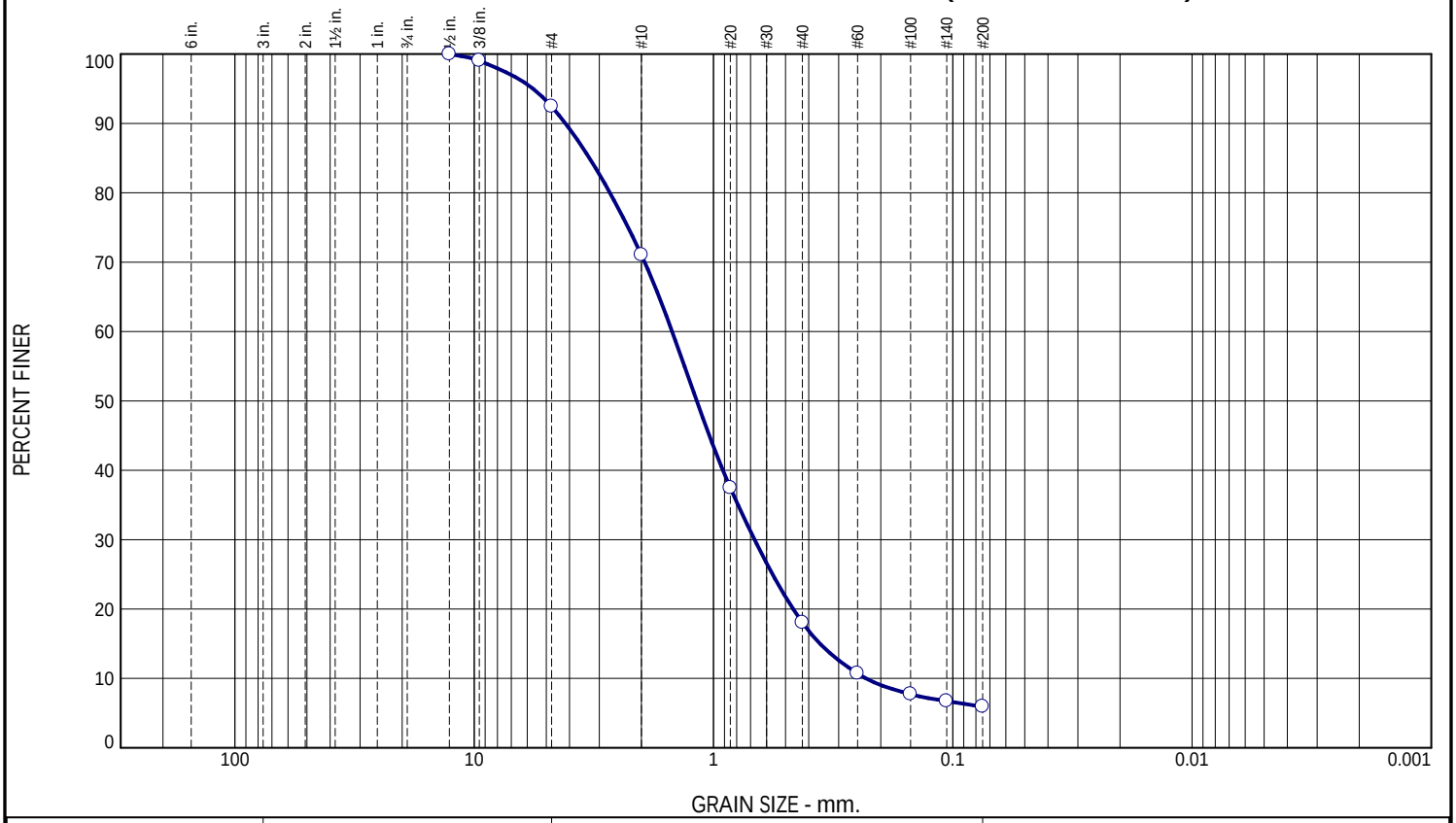
South Plainfield, New Jersey

Client: Balanced Rock Power
Project: Ebba Solar, Lincoln County, CO

Project No: IRN 24-T-030 Figure

Tested By: ES Checked By: ANS

PARTICLE SIZE DISTRIBUTION REPORT (ASTM D6913)



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.5	21.5	53.0	12.1	5.9	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.5"	100.0		
0.375"	99.0		
#4	92.5		
#10	71.0		
#20	37.5		
#40	18.0		
#60	10.7		
#100	7.7		
#140	6.7		
#200	5.9		

* (no specification provided)

Soil Description

Brown well-graded sand with silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 4.1557 D_{85}= 3.2987 D_{60}= 1.4890
D_{50}= 1.1746 D_{30}= 0.6736 D_{15}= 0.3588
D_{10}= 0.2308 C_u= 6.45 C_c= 1.32

Classification

USCS= SW-SM AASHTO= A-1-b

Remarks

Sample Number: B-04, S-6 Depth: 13'-15'

Date: 3/15/2024

ANS CONSULTANTS, INC.

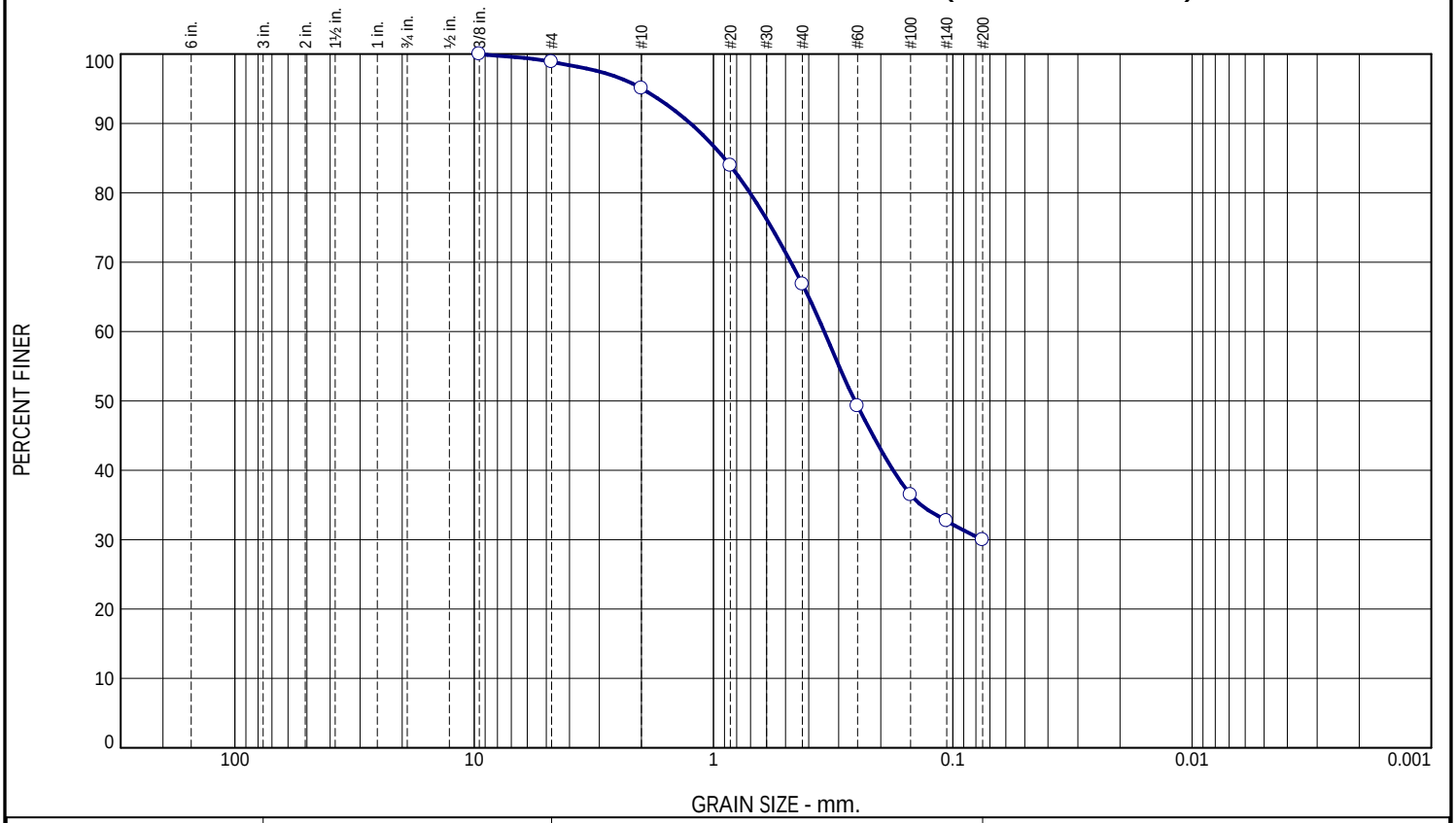
South Plainfield, New Jersey

Client: Balanced Rock Power
Project: Ebba Solar, Lincoln County, CO

Project No: IRN 24-T-030 Figure

Tested By: ES Checked By: ANS

PARTICLE SIZE DISTRIBUTION REPORT (ASTM D6913)



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.1	3.8	28.3	36.8	30.0	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375"	100.0		
#4	98.9		
#10	95.1		
#20	83.9		
#40	66.8		
#60	49.3		
#100	36.5		
#140	32.7		
#200	30.0		

* (no specification provided)

Soil Description

Brown silty sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 1.2479 D_{85}= 0.9019 D_{60}= 0.3446
D_{50}= 0.2563 D_{30}= 0.0754 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Sample Number: B-06, S-3 Depth: 4'-6'

Date: 3/15/2024

ANS CONSULTANTS, INC.

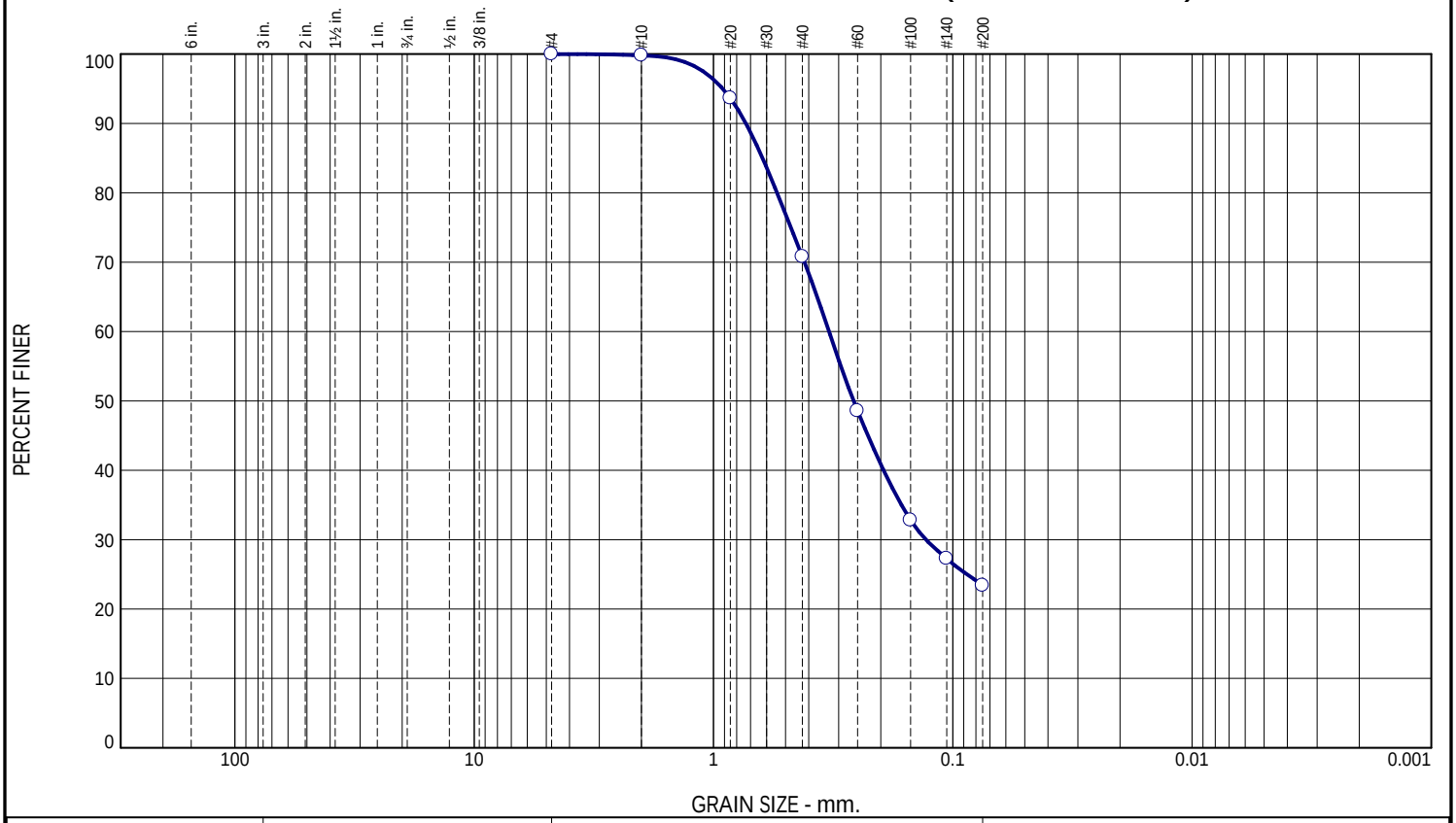
South Plainfield, New Jersey

Client: Balanced Rock Power
Project: Ebba Solar, Lincoln County, CO

Project No: IRN 24-T-030 Figure

Tested By: ES Checked By: ANS

PARTICLE SIZE DISTRIBUTION REPORT (ASTM D6913)



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	29.0	47.4	23.4	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.8		
#20	93.6		
#40	70.8		
#60	48.6		
#100	32.8		
#140	27.3		
#200	23.4		

* (no specification provided)

Soil Description

Brown silty sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.7318 D_{85}= 0.6239 D_{60}= 0.3289
D_{50}= 0.2598 D_{30}= 0.1294 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Sample Number: B-08, S-2 Depth: 2'-4'

Date: 3/15/2024

ANS CONSULTANTS, INC.

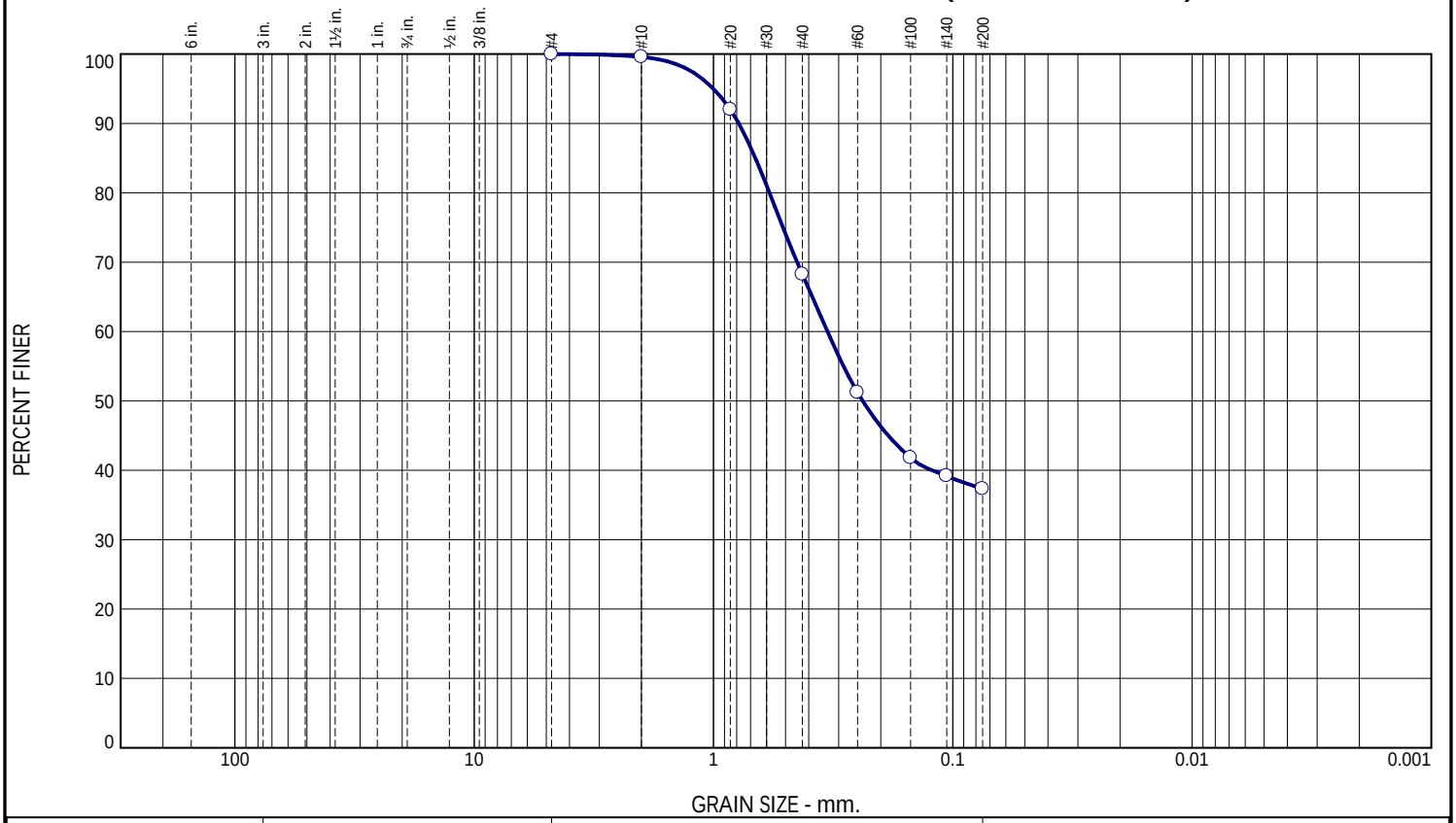
South Plainfield, New Jersey

Client: Balanced Rock Power
Project: Ebba Solar, Lincoln County, CO

Project No: IRN 24-T-030 Figure

Tested By: ES Checked By: ANS

PARTICLE SIZE DISTRIBUTION REPORT (ASTM D6913)



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.4	31.4	30.9	37.3	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.6		
#20	92.0		
#40	68.2		
#60	51.2		
#100	41.8		
#140	39.2		
#200	37.3		

* (no specification provided)

Soil Description

Pale Brown silty sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.7831 D_{85}= 0.6682 D_{60}= 0.3339
D_{50}= 0.2380 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

Sample Number: B-08, S-4 Depth: 6'-8'

Date: 3/15/2024

ANS CONSULTANTS, INC.

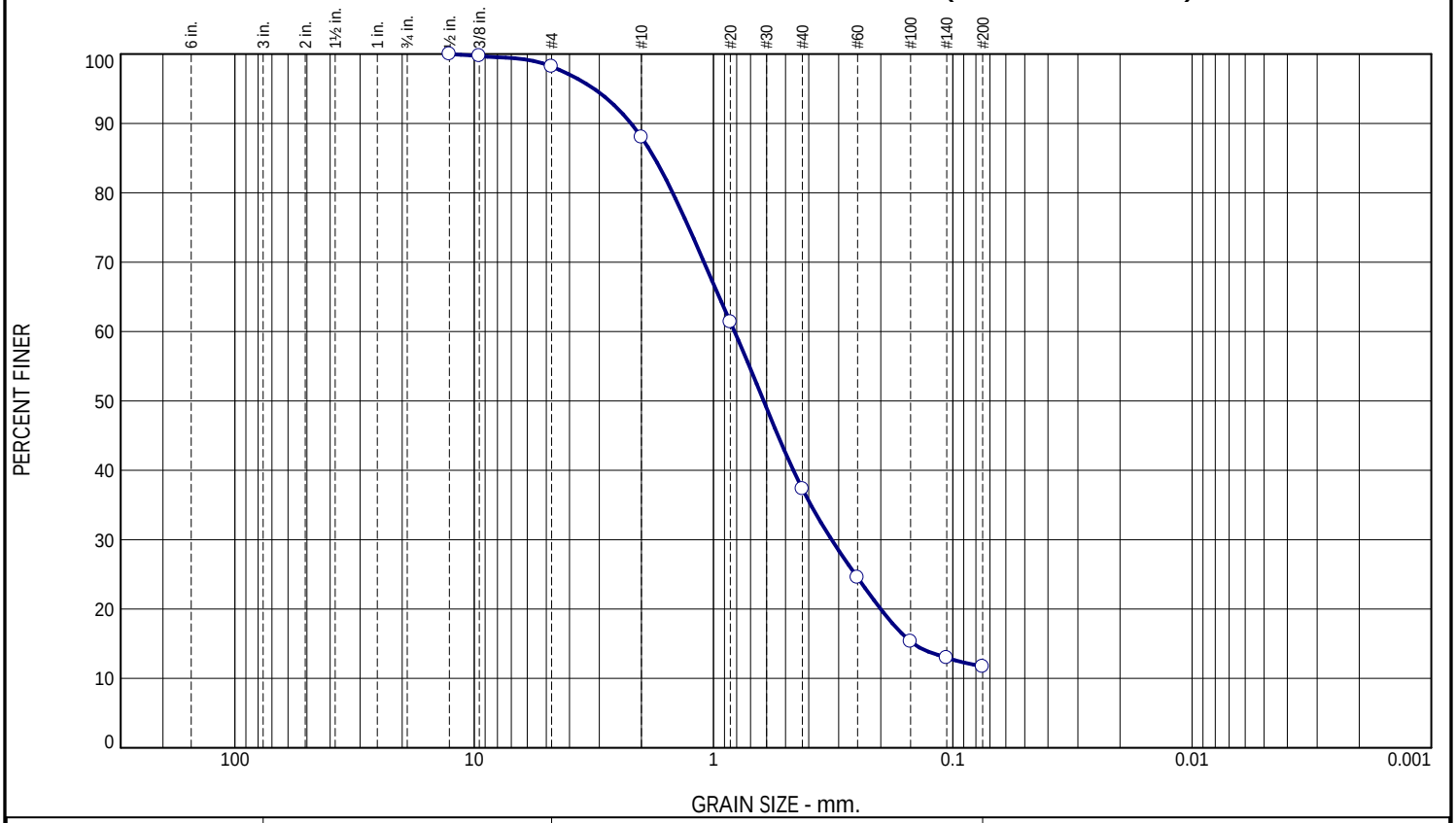
South Plainfield, New Jersey

Client: Balanced Rock Power
Project: Ebba Solar, Lincoln County, CO

Project No: IRN 24-T-030 Figure

Tested By: JS Checked By: ANS

PARTICLE SIZE DISTRIBUTION REPORT (ASTM D6913)



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.8	10.2	50.7	25.6	11.7	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.5"	100.0		
0.375"	99.7		
#4	98.2		
#10	88.0		
#20	61.4		
#40	37.3		
#60	24.5		
#100	15.3		
#140	13.0		
#200	11.7		

* (no specification provided)

Soil Description

Brown poorly graded sand with silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 2.2103 D_{85}= 1.7632 D_{60}= 0.8161
D_{50}= 0.6173 D_{30}= 0.3209 D_{15}= 0.1460
D_{10}= C_u= C_c=

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

Sample Number: B-09, S-4 Depth: 6'-8'

Date: 3/15/2024

ANS CONSULTANTS, INC.

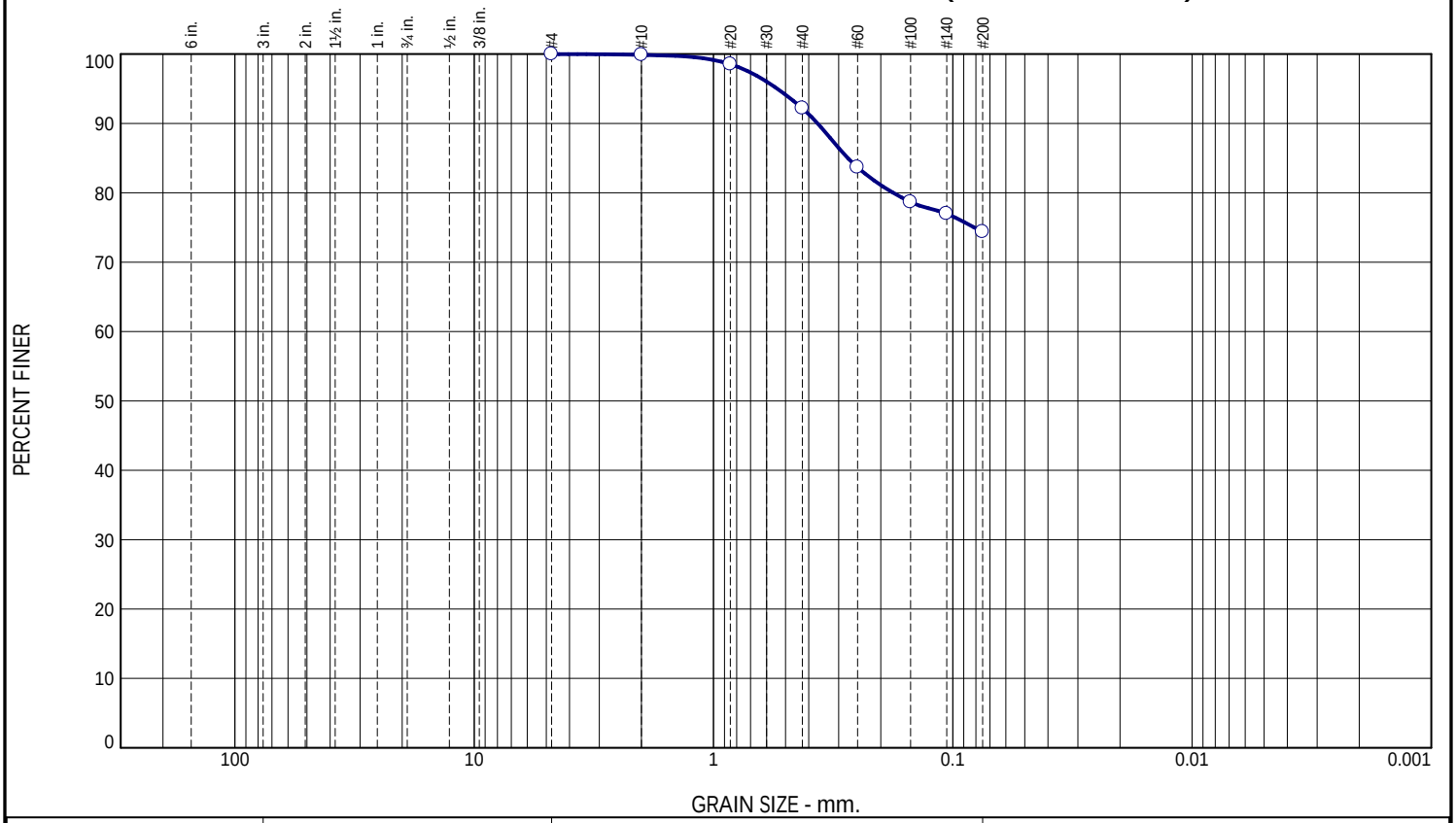
South Plainfield, New Jersey

Client: Balanced Rock Power
Project: Ebba Solar, Lincoln County, CO

Project No: IRN 24-T-030 Figure

Tested By: ES Checked By: ANS

PARTICLE SIZE DISTRIBUTION REPORT (ASTM D6913)



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	7.7	17.8	74.4	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	98.5		
#40	92.2		
#60	83.7		
#100	78.7		
#140	77.0		
#200	74.4		

* (no specification provided)

Soil Description

Brown lean clay with sand

Atterberg Limits

PL= 21 LL= 38 PI= 17

Coefficients

D_{90}= 0.3670 D_{85}= 0.2744 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(12)

Remarks

Sample Number: B-10, U-1 Depth: 2'-4'

Date: 3/16/2024

ANS CONSULTANTS, INC.

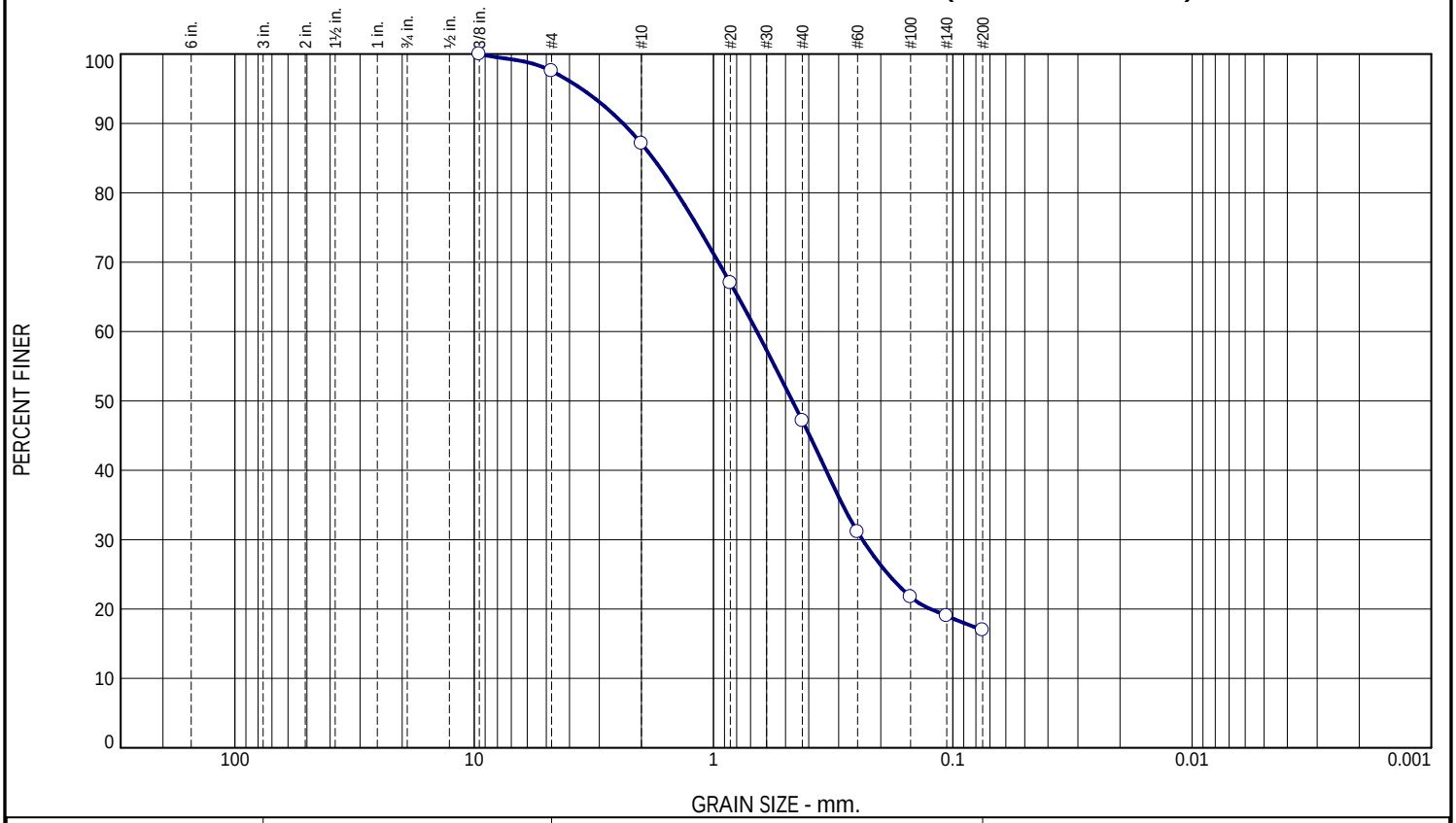
South Plainfield, New Jersey

Client: Balanced Rock Power
Project: Ebba Solar, Lincoln County, CO

Project No: IRN 24-N-087 Figure

Tested By: AS/NK Checked By: ANS

PARTICLE SIZE DISTRIBUTION REPORT (ASTM D6913)



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.4	10.5	40.0	30.2	16.9	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375"	100.0		
#4	97.6		
#10	87.1		
#20	67.0		
#40	47.1		
#60	31.1		
#100	21.7		
#140	19.0		
#200	16.9		

* (no specification provided)

Soil Description

Brown silty sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 2.3868 D_{85}= 1.7896 D_{60}= 0.6587
D_{50}= 0.4682 D_{30}= 0.2385 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

Sample Number: B-10, S-5 Depth: 8'-10'

Date: 3/15/2024

ANS CONSULTANTS, INC.

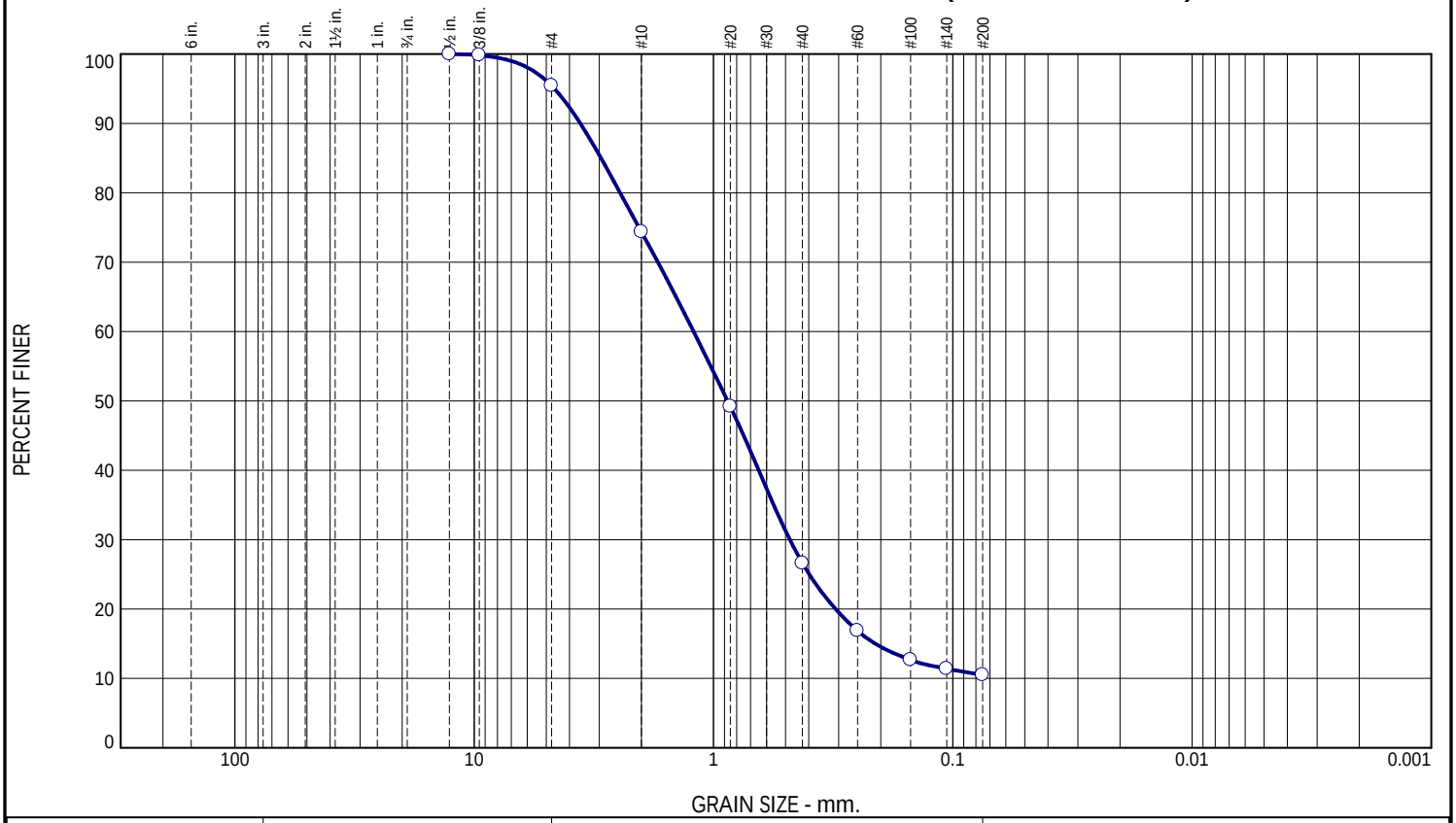
South Plainfield, New Jersey

Client: Balanced Rock Power
Project: Ebba Solar, Lincoln County, CO

Project No: IRN 24-T-030 Figure

Tested By: ES Checked By: ANS

PARTICLE SIZE DISTRIBUTION REPORT (ASTM D6913)



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.6	21.0	47.8	16.1	10.5	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.5"	100.0		
0.375"	99.8		
#4	95.4		
#10	74.4		
#20	49.2		
#40	26.6		
#60	16.9		
#100	12.7		
#140	11.4		
#200	10.5		

* (no specification provided)

Soil Description

Brown poorly graded sand with silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 3.6011 D_{85}= 2.9506 D_{60}= 1.2110
D_{50}= 0.8729 D_{30}= 0.4799 D_{15}= 0.2111
D_{10}= C_u= C_c=

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

Sample Number: SS-B-01, S-7 Depth: 18'-20'

Date: 3/15/2024

ANS CONSULTANTS, INC.

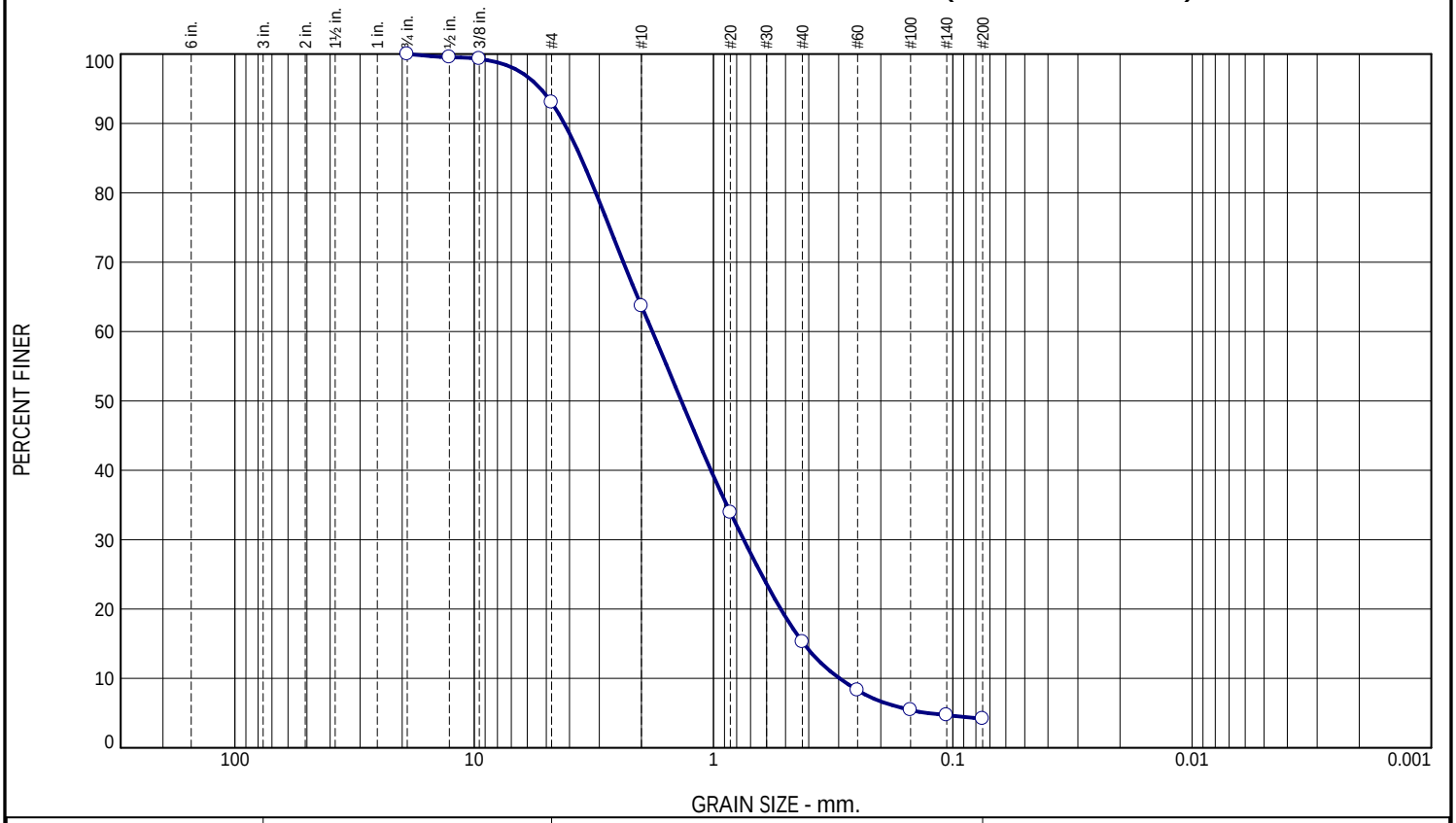
South Plainfield, New Jersey

Client: Balanced Rock Power
Project: Ebba Solar, Lincoln County, CO

Project No: IRN 24-T-030 Figure

Tested By: ES Checked By: ANS

PARTICLE SIZE DISTRIBUTION REPORT (ASTM D6913)



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.0	29.3	48.4	11.1	4.2	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.75"	100.0		
0.5"	99.5		
0.375"	99.3		
#4	93.0		
#10	63.7		
#20	33.9		
#40	15.3		
#60	8.3		
#100	5.4		
#140	4.7		
#200	4.2		

* (no specification provided)

Sample Number: SS-B-02, S-6 Depth: 13'-15'

Soil Description

Brown well-graded sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 4.2022 D_{85}= 3.5742 D_{60}= 1.7996
D_{50}= 1.3620 D_{30}= 0.7475 D_{15}= 0.4195
D_{10}= 0.2971 C_u= 6.06 C_c= 1.05

Classification

USCS= SW AASHTO= A-1-b

Remarks

Date: 3/15/2024

ANS CONSULTANTS, INC.

South Plainfield, New Jersey

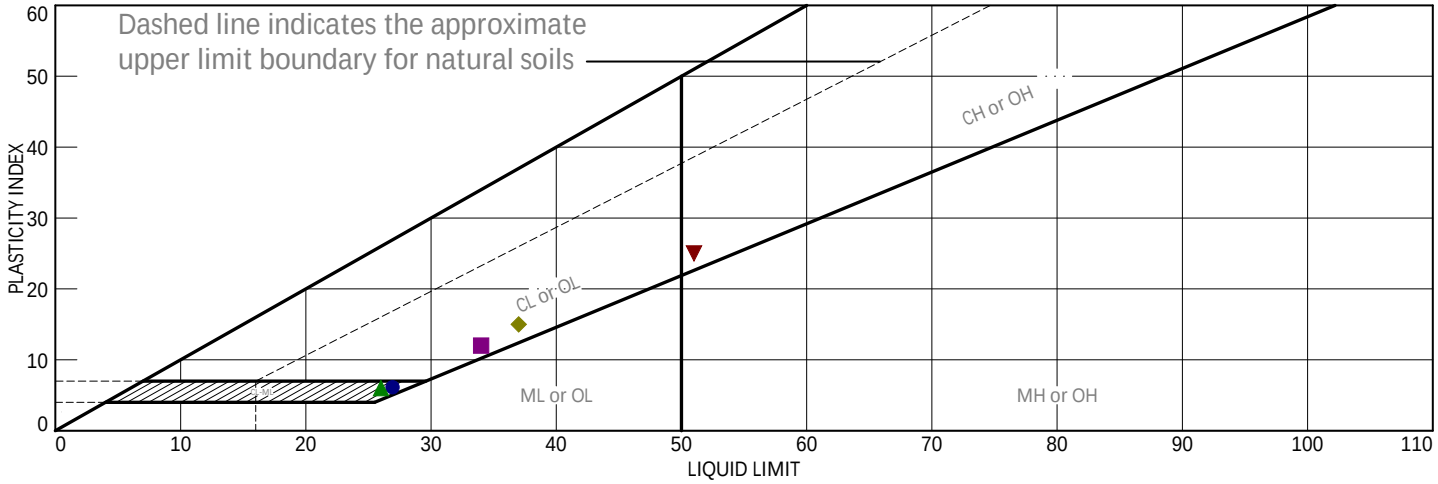
Client: Balanced Rock Power
Project: Ebba Solar, Lincoln County, CO

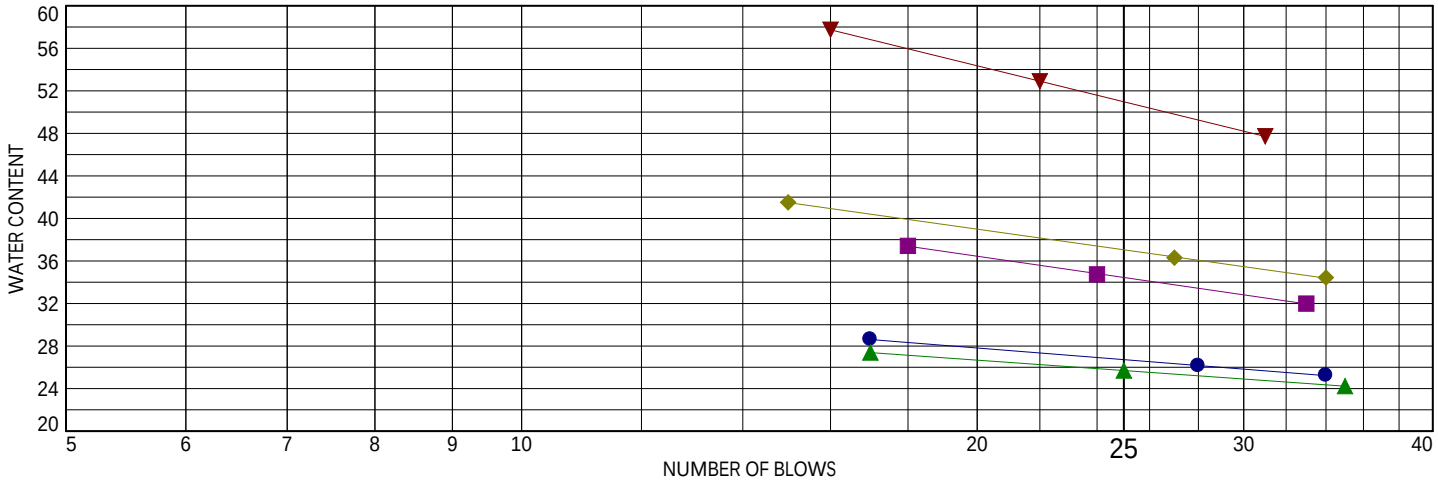
Project No: IRN 24-T-030 Figure

Tested By: ES Checked By: ANS

ATTERBERG LIMITS RESULTS

LIQUID AND PLASTIC LIMITS TEST REPORT (ASTM D4318)





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown Silt & Clay, some cmf Sand (Visual)	27	21	6			
■	Brown Silt & Clay, some cmf Sand (Visual)	34	22	12			
▲	Brown Clay & Silt, little cmf Sand (Visual)	26	20	6			
◆	Pale Brown Clay & Silt, little cmf Sand (Visual)	37	22	15			
▼	Grayish Brown Clay & Silt, littlee cmf Sand (Visual)	51	26	25			

Project No. IRN 24-T-030 Client: Balanced Rock Power

Project: Ebba Solar, Lincoln County, CO

●Depth: 4'-6' Sample Number: B-02, S-3
■Depth: 8'-10' Sample Number: B-02, S-5
▲Depth: 13'-15' Sample Number: B-03, S-6
◆Depth: 2'-4' Sample Number: B-05, S-2
▼Depth: 0'-2' Sample Number: B-07, S-1

ANS CONSULTANTS, INC.

South Plainfield, New Jersey

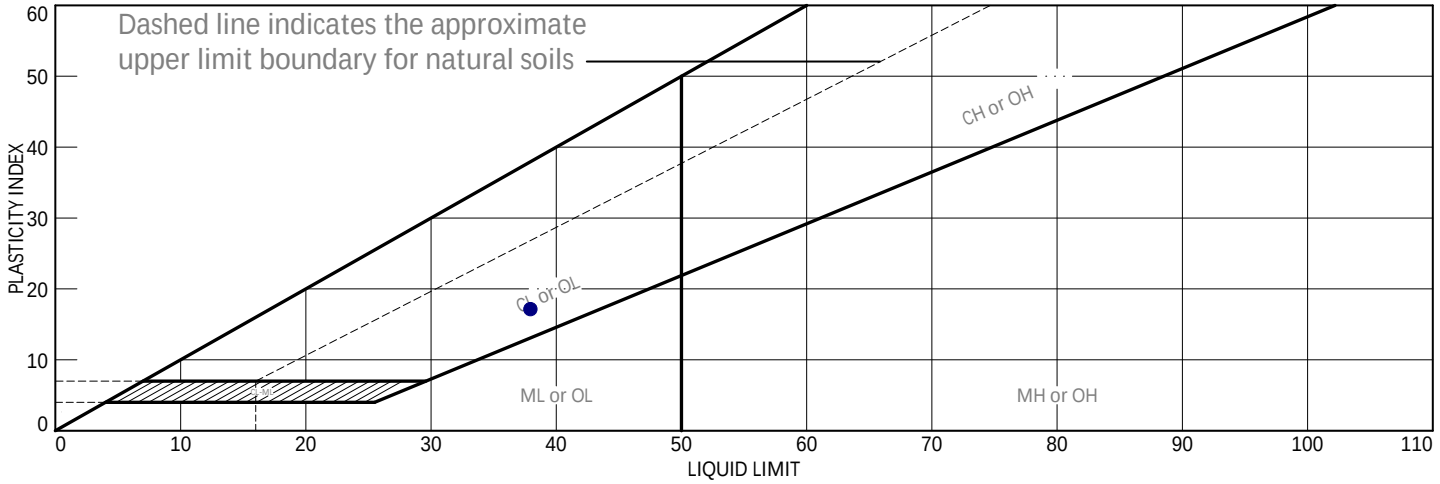
Remarks:

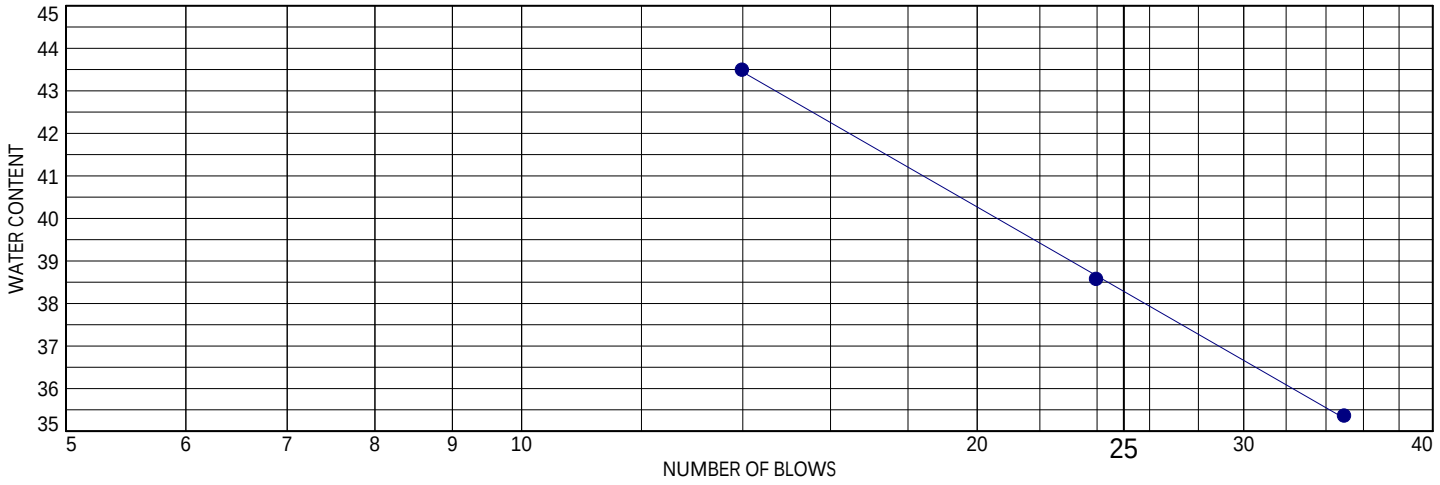
●ASTM D4318 - Sample Air-Dried, LL Device: Manual, PL Rolling Method: Hand-Rolled, Grooving Tool: Metal
3/15/2024

Figure

Tested By: ES Checked By: ANS

LIQUID AND PLASTIC LIMITS TEST REPORT (ASTM D4318)





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown lean clay with sand	38	21	17	92.2	74.4	CL

Project No. IRN 24-N-087 Client: Balanced Rock Power

Project: Ebba Solar, Lincoln County, CO

●Depth: 2'-4' Sample Number: B-10, U-1

Remarks:

●ASTM D4318 - Sample Air-Dried, LL Device: Manual, PL Rolling Method: Hand-Rolled, Grooving Tool: Metal
3/16/2024

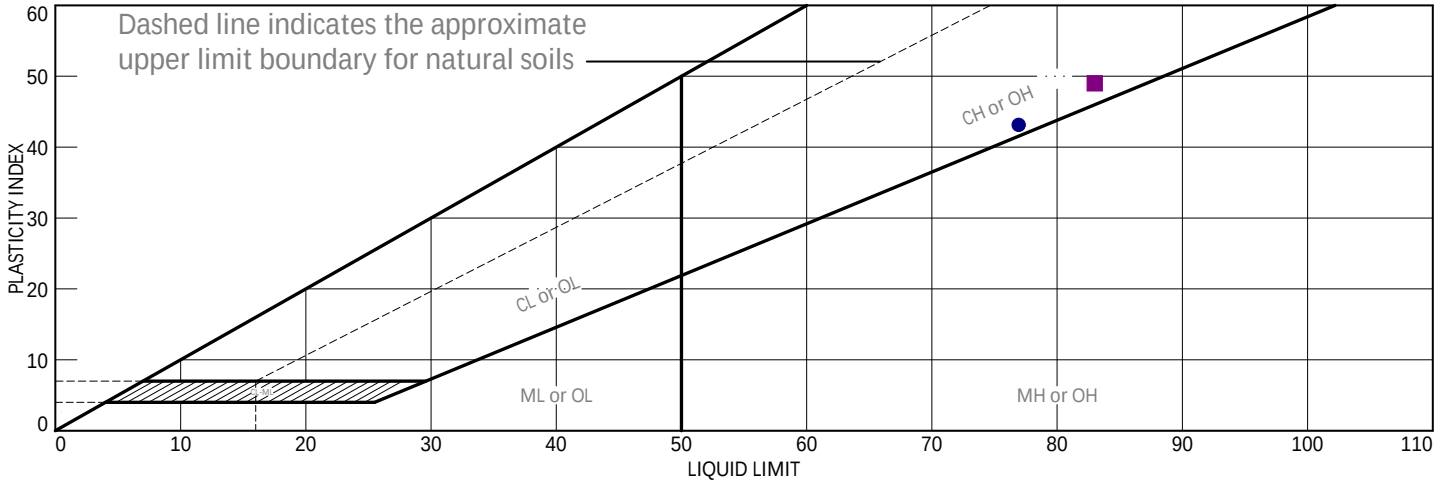
ANS CONSULTANTS, INC.

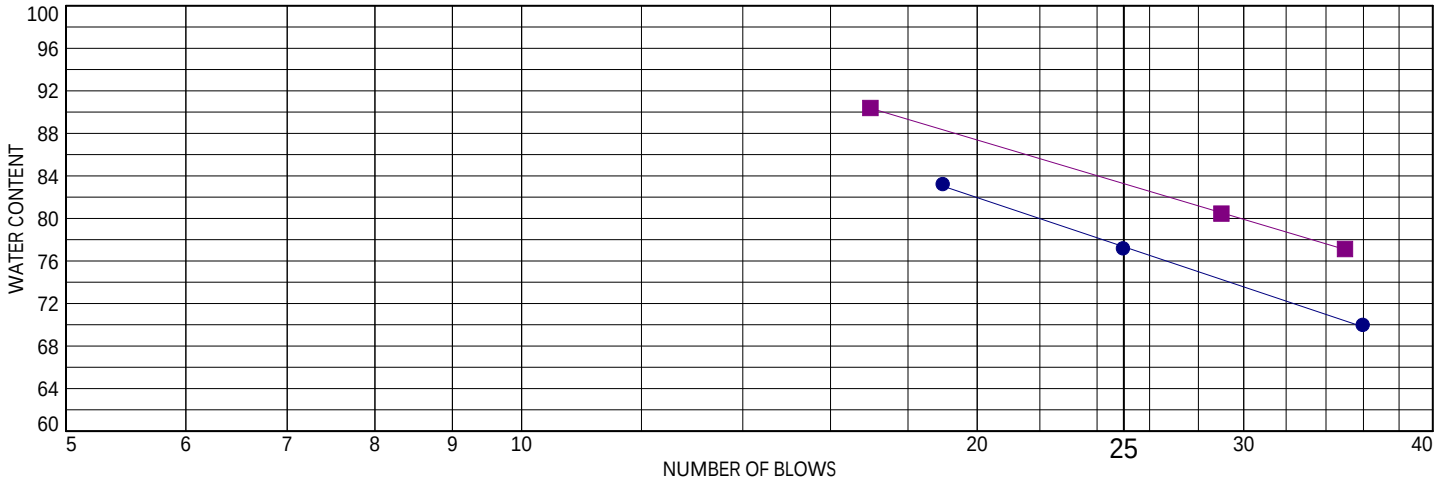
South Plainfield, New Jersey

Figure

Tested By: NK Checked By: ANS

LIQUID AND PLASTIC LIMITS TEST REPORT (ASTM D4318)





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive Brown Clay & Silt, trace cmf Sand (Visual)	77	34	43			
■	Dark Gray Clay & Silt, trace cmf Sand (Visual)	83	34	49			

Project No. IRN 24-T-030 Client: Balanced Rock Power

Project: Ebba Solar, Lincoln County, CO

●Depth: 28'-30' Sample Number: SS-B-01, S-9

■Depth: 33'-35' Sample Number: SS-B-02, S-10

Remarks:

●ASTM D4318 - Sample Air-Dried, LL Device: Manual, PL Rolling Method: Hand-Rolled, Grooving Tool: Metal
3/15/2024

ANS CONSULTANTS, INC.

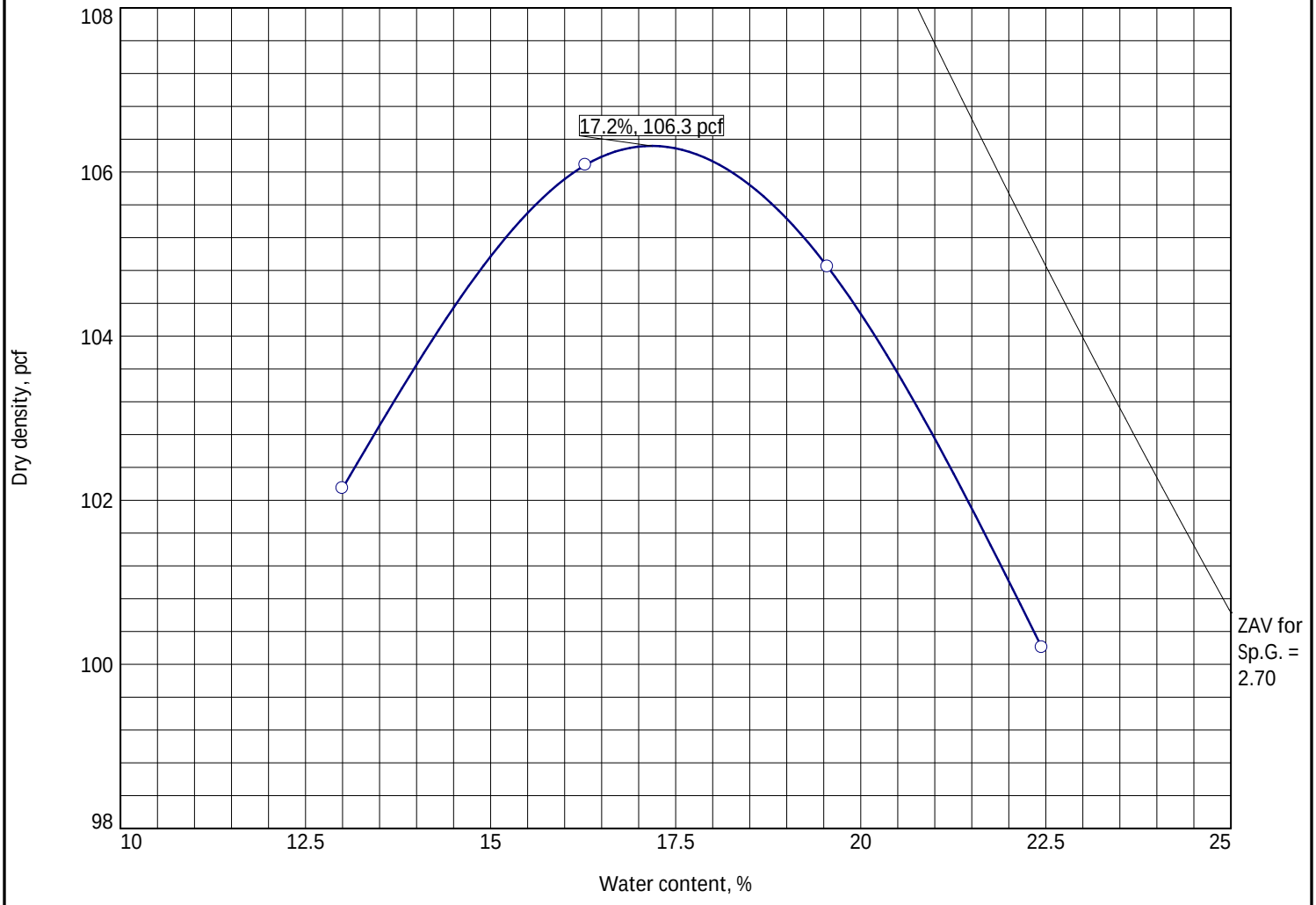
South Plainfield, New Jersey

Figure

Tested By: ES Checked By: ANS

THERMAL RESISTIVITY RESULTS

COMPACTION TEST REPORT



Test specification: ASTM D 698-12 Method B Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
3'-5'				2.7			0	

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 106.3 pcf Optimum moisture = 17.2 %	Light Brown Clay & Silt, little cmf Sand (Visual)

Project No. IRN 24-T-031 Client: Balanced Rock Power

Project: Ebba Solar, Lincoln County, CO

Date: 3/20/2024

○ Sample Number: TP-04, TRT-01

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South Plainfield, New Jersey

Remarks:
SG Assumed

Figure

Tested By: JS Checked By: ANS

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Determination of Thermal Conductivity of Soil and Rock by Thermal Needle Probe (ASTM D5334)

Client Name: Balanced Rock Power
LAB IRN: 24-T-031
Project Name: Ebba Solar, Lincoln County, CO
Date: 3/20/2024

Sample ID: TP-04, TRT-01, 3'-5'
Description: Light Brown Clay & Silt, little cmf Sand (Visual)

Specimen type: Reconstituted (90% D698)
Recompaction Dry Density: 95.7 PCF
In-Situ Moisture: 12.1 %
Optimum Moisture: 17.2 %

S.No.	Moisture (%)		Thermal Conductivity (W/m-K)	Thermal Resistivity (°C-cm/W)
1	Dry	0.0	0.4526	220.9
2	¼ OMC	4.3	0.6784	147.4
3	½ OMC	8.6	1.3830	72.3
4	¾ OMC	12.9	1.6070	62.2
5	OMC	17.2	1.7298	57.8

Remarks:

1. Needle size: 2.4 mm diameter × 100 mm length.
2. Thermal grease used: High-density polysynthetics silver thermal compound
3. Tested under controlled room temperature conditions (20°C to 22°C).

Tested By: ES
Checked By: ANS

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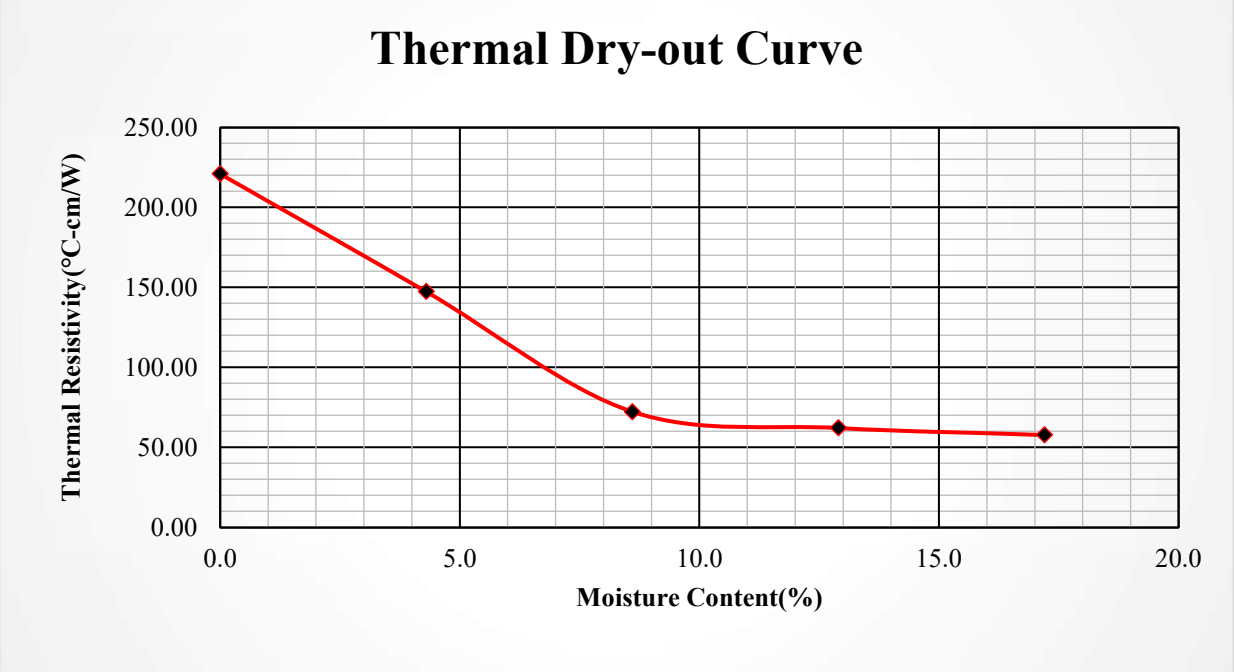
Thermal Dryout Curve (ASTM D5334)

Client Name:	Balanced Rock Power	LAB IRN:	24-T-031
Project Name:	Ebba Solar, Lincoln County, CO	Date:	3/20/2024

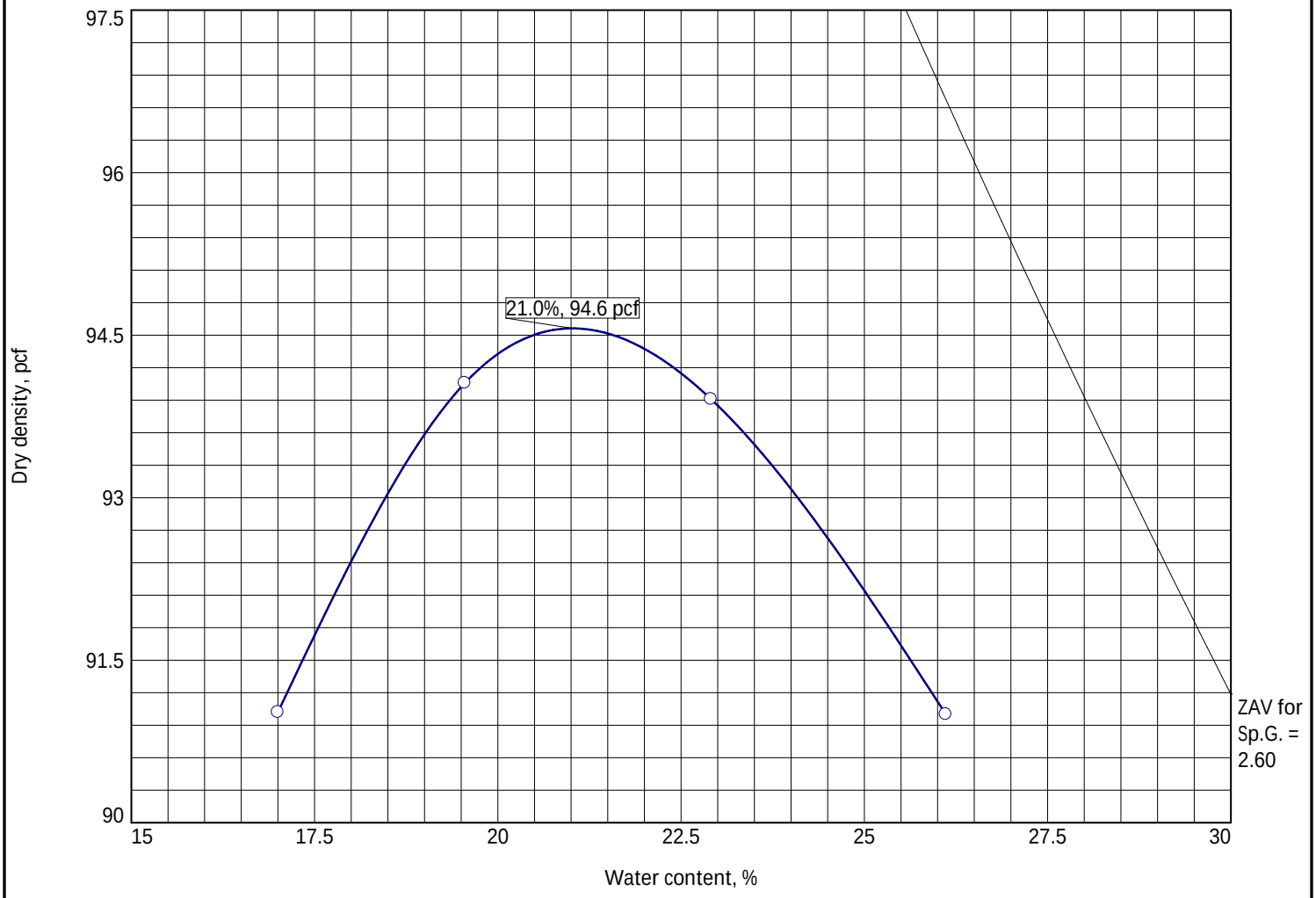
Sample ID: TP-04, TRT-01, 3'-5'

Description: Light Brown Clay & Silt, little cmf Sand (Visual)

Specimen type:	Reconstituted (90% D698)	Recompaction Dry Density:	95.7 PCF
In-Situ Moisture:	12.1 %	Optimum Moisture:	17.2 %



COMPACTION TEST REPORT



Test specification: ASTM D 698-12 Method B Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
3'-5'				2.7			0	

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 94.6 pcf Optimum moisture = 21.0 %	Dark Brown Clay & Silt, trace cmf Sand (Visual)

Project No. IRN 24-T-031 Client: Balanced Rock Power

Project: Ebba Solar, Lincoln County, CO

Date: 3/20/2024

○ Sample Number: TP-06, TRT-02

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Remarks:
SG Assumed

Figure

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Determination of Thermal Conductivity of Soil and Rock by Thermal Needle Probe (ASTM D5334)

Client Name: Balanced Rock Power
LAB IRN: 24-T-031
Project Name: Ebba Solar, Lincoln County, CO
Date: 3/20/2024

Sample ID: TP-06, TRT-02, 3'-5'
Description: Dark Brown Clay & Silt, trace cmf Sand (Visual)

Specimen type: Reconstituted (90% D698)
Recompaction Dry Density: 85.1 PCF
In-Situ Moisture: 17.2 %
Optimum Moisture: 21.0 %

S.No.	Moisture (%)		Thermal Conductivity (W/m-K)	Thermal Resistivity (°C-cm/W)
1	Dry	0.0	0.4134	241.9
2	¼ OMC	5.3	0.5511	181.5
3	½ OMC	10.5	1.0202	98.0
4	¾ OMC	15.8	1.2922	77.4
5	OMC	21.0	1.4246	70.2

Remarks:

1. Needle size: 2.4 mm diameter × 100 mm length.
2. Thermal grease used: High-density polysynthetics silver thermal compound
3. Tested under controlled room temperature conditions (20°C to 22°C).

Tested By: ES
Checked By: ANS

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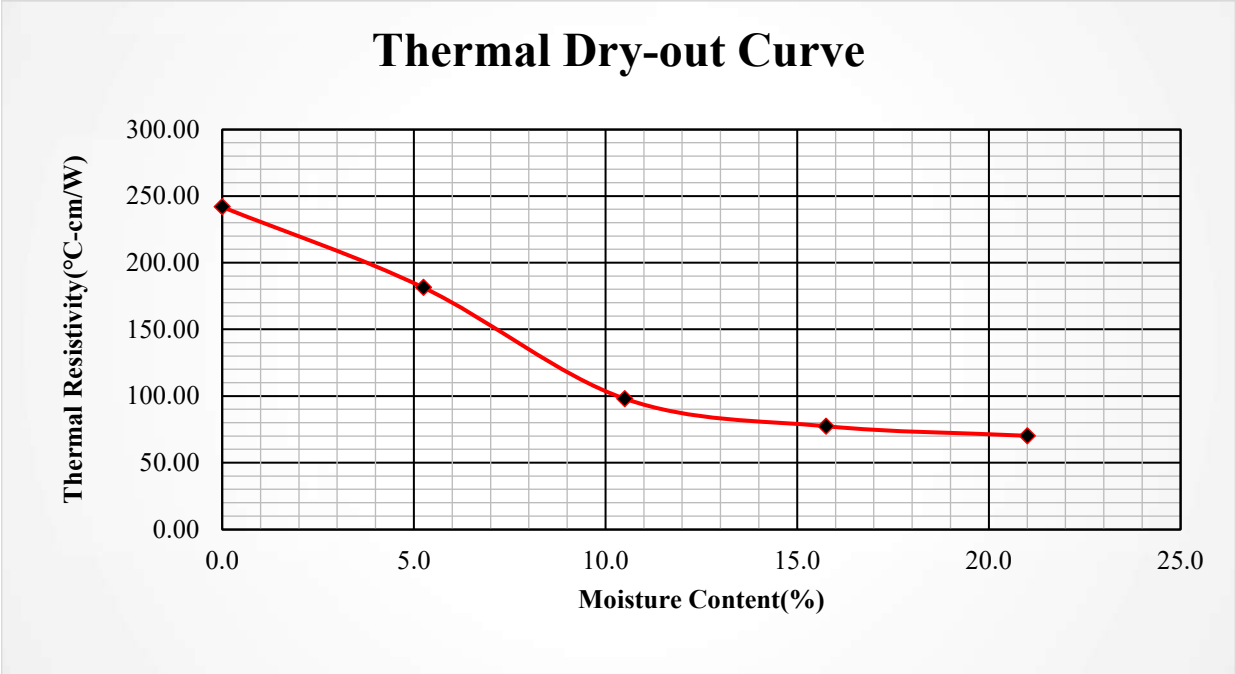
Thermal Dryout Curve (ASTM D5334)

Client Name:	Balanced Rock Power	LAB IRN:	24-T-031
Project Name:	Ebba Solar, Lincoln County, CO	Date:	3/20/2024

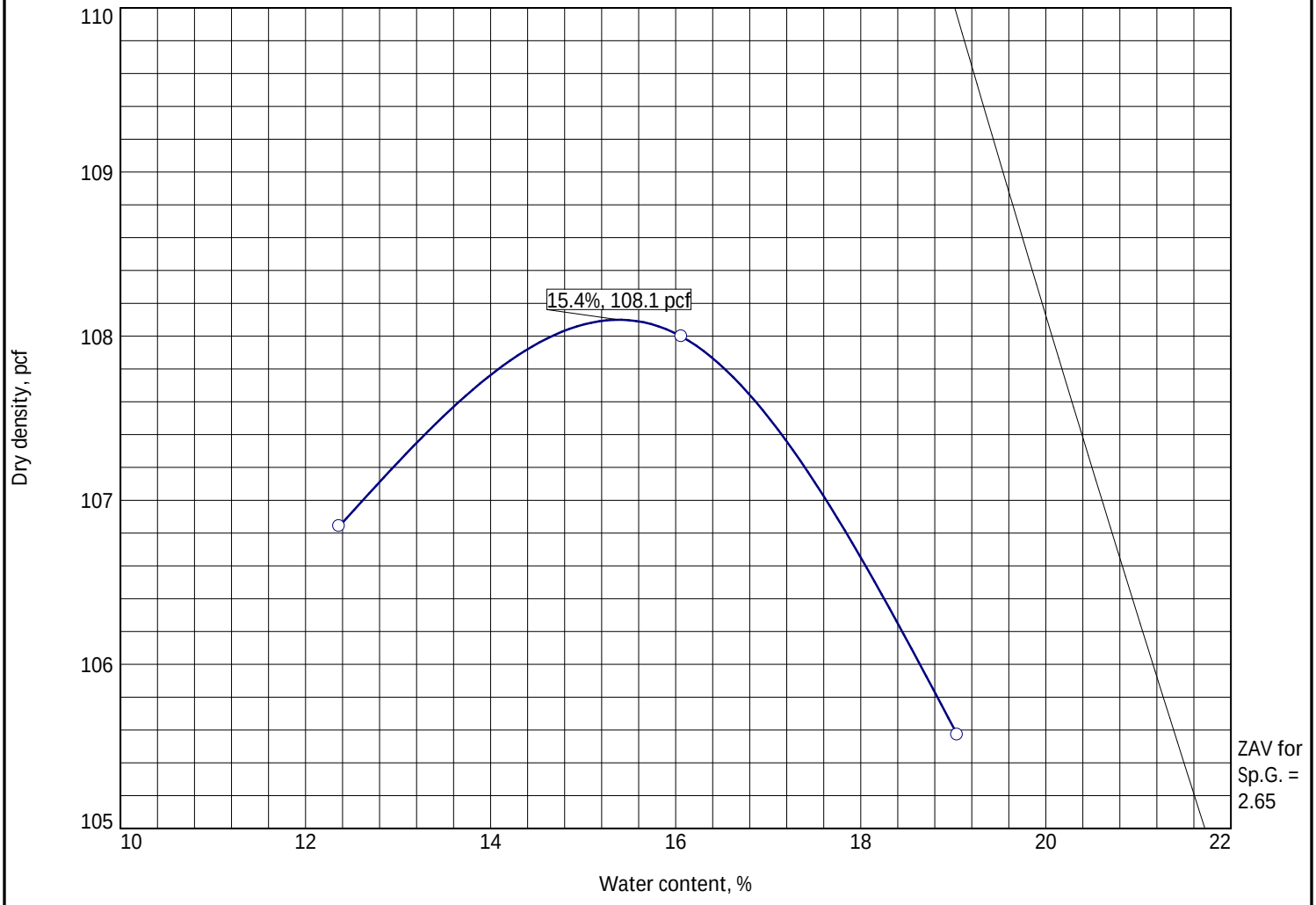
Sample ID: TP-06, TRT-02, 3'-5'

Description: Dark Brown Clay & Silt, trace cmf Sand (Visual)

Specimen type:	Reconstituted (90% D698)	Recompaction Dry Density:	85.1 PCF
In-Situ Moisture:	17.2 %	Optimum Moisture:	21.0 %



COMPACTION TEST REPORT



Test specification: ASTM D 698-12 Method B Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
3'-5'				2.7			0	

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 108.1 pcf Optimum moisture = 15.4 %	Light Brown Clay & Silt, little cmf Sand (Visual)

Project No. IRN 24-T-031 Client: Balanced Rock Power

Project: Ebba Solar, Lincoln County, CO

Date: 3/20/2024

○ Sample Number: TP-09, TRT-03

Remarks:
SG Assumed

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Determination of Thermal Conductivity of Soil and Rock by Thermal Needle Probe (ASTM D5334)

Client Name: Balanced Rock Power
LAB IRN: 24-T-031
Project Name: Ebba Solar, Lincoln County, CO
Date: 3/20/2024

Sample ID: TP-09, TRT-03, 3'-5'
Description: Light Brown Clay & Silt, little cmf Sand (Visual)

Specimen type: Reconstituted (90% D698)
Recompaction Dry Density: 97.3 PCF
In-Situ Moisture: 11.0 %
Optimum Moisture: 15.4 %

S.No.	Moisture (%)		Thermal Conductivity (W/m-K)	Thermal Resistivity (°C-cm/W)
1	Dry	0.0	0.4125	242.4
2	¼ OMC	3.9	0.6118	163.5
3	½ OMC	7.7	1.4456	69.2
4	¾ OMC	11.6	1.7596	56.8
5	OMC	15.4	1.8907	52.9

Remarks:

1. Needle size: 2.4 mm diameter × 100 mm length.
2. Thermal grease used: High-density polysynthetics silver thermal compound
3. Tested under controlled room temperature conditions (20°C to 22°C).

Tested By: ES
Checked By: ANS

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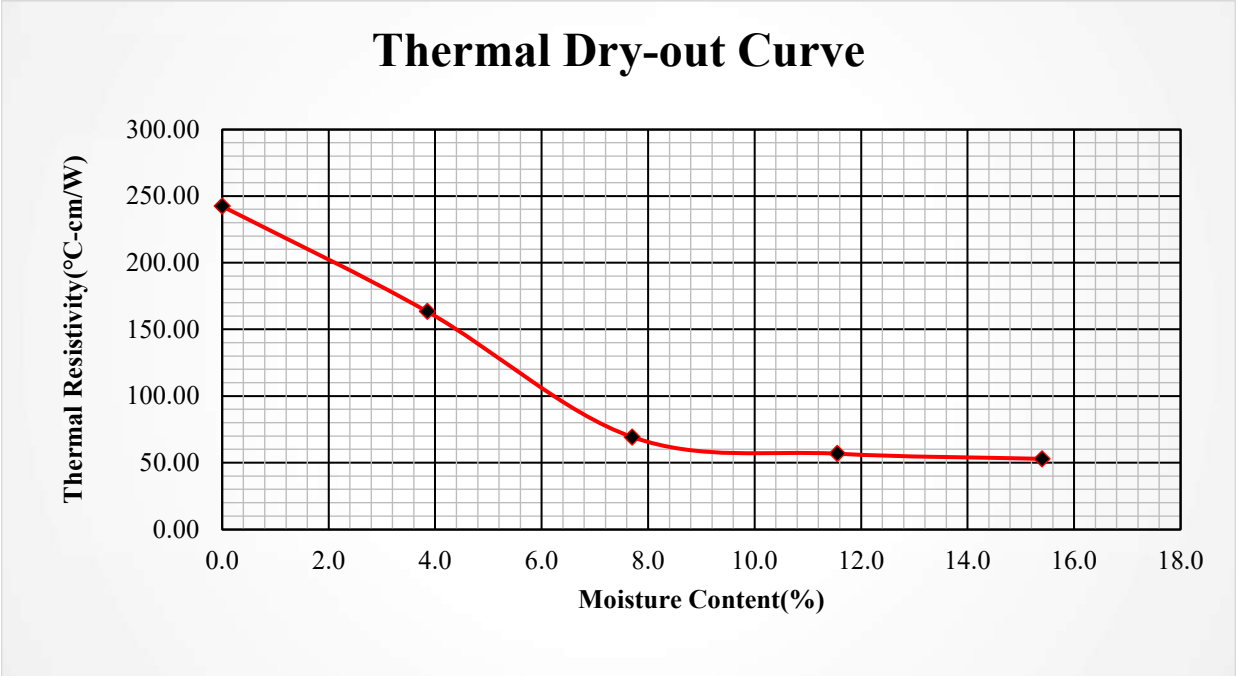
Thermal Dryout Curve (ASTM D5334)

Client Name:	Balanced Rock Power	LAB IRN:	24-T-031
Project Name:	Ebba Solar, Lincoln County, CO	Date:	3/20/2024

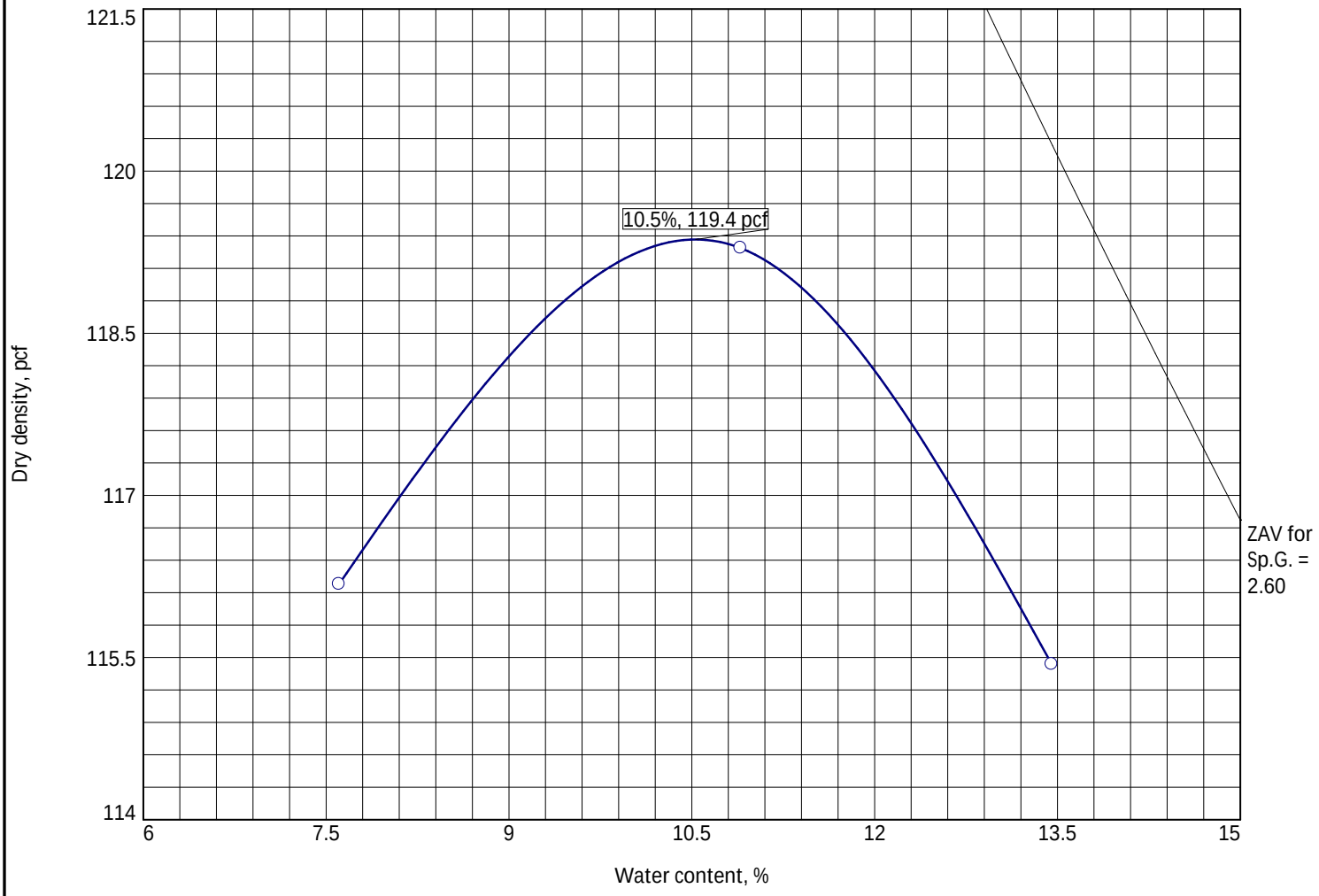
Sample ID: TP-09, TRT-03, 3'-5'

Description: Light Brown Clay & Silt, little cmf Sand (Visual)

Specimen type:	Reconstituted (90% D698)	Recompaction Dry Density:	97.3 PCF
In-Situ Moisture:	11.0 %	Optimum Moisture:	15.4 %



COMPACTION TEST REPORT



Test specification: ASTM D 698-12 Method B Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
3'-5'				2.7			0	

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 119.4 pcf Optimum moisture = 10.5 %	Light Brown cmf Sand, some Silt & Clay (Visual)

Project No. IRN 24-T-031 Client: Balanced Rock Power

Project: Ebba Solar, Lincoln County, CO

Date: 3/20/2024

○ Sample Number: TP-14, TRT-04

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Remarks:
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Figure

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Determination of Thermal Conductivity of Soil and Rock by Thermal Needle Probe (ASTM D5334)

Client Name: Balanced Rock Power
LAB IRN: 24-T-031
Project Name: Ebba Solar, Lincoln County, CO
Date: 3/20/2024

Sample ID: TP-14, TRT-04, 3'-5'
Description: Light Brown cmf Sand, some Silt & Clay (Visual)

Specimen type: Reconstituted (90% D698)
Recompaction Dry Density: 107.5 PCF
In-Situ Moisture: 5.5 %
Optimum Moisture: 10.5 %

S.No.	Moisture (%)		Thermal Conductivity (W/m-K)	Thermal Resistivity (°C-cm/W)
1	Dry	0.0	0.5219	191.6
2	¼ OMC	2.6	1.6091	62.1
3	½ OMC	5.3	2.2848	43.8
4	¾ OMC	7.9	2.3938	41.8
5	OMC	10.5	2.4792	40.3

Remarks:

1. Needle size: 2.4 mm diameter × 100 mm length.
2. Thermal grease used: High-density polysynthetics silver thermal compound
3. Tested under controlled room temperature conditions (20°C to 22°C).

Tested By: ES
Checked By: ANS

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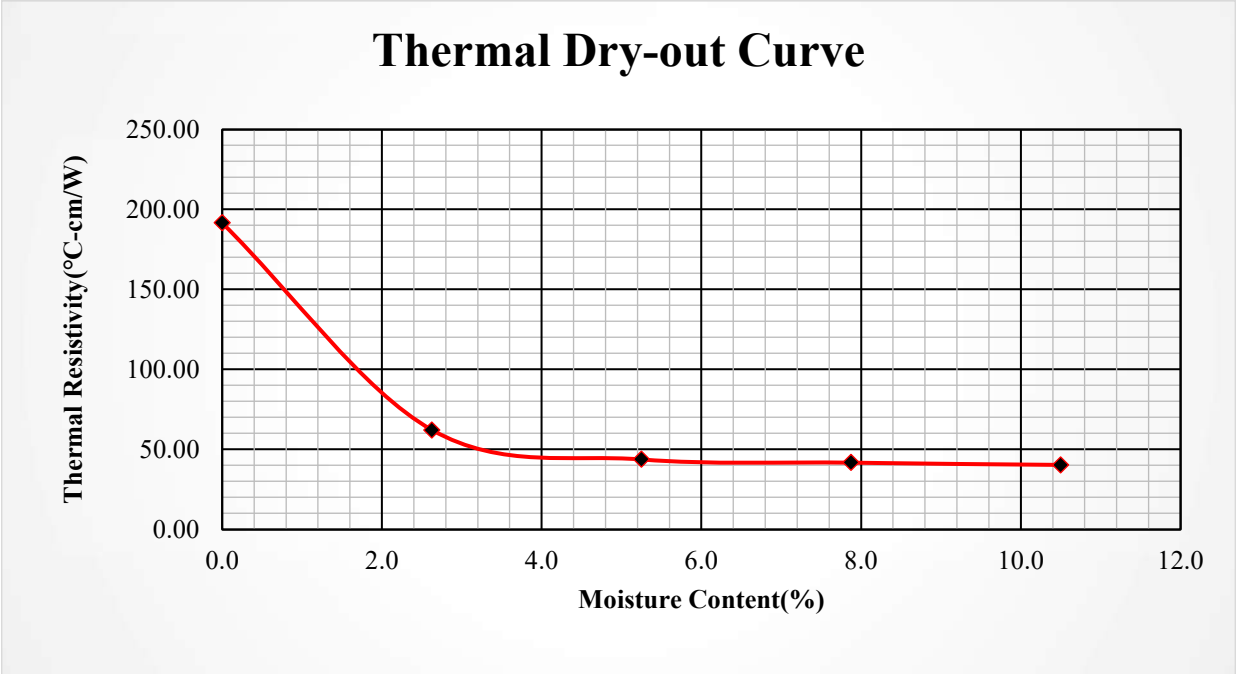
Thermal Dryout Curve (ASTM D5334)

Client Name:	Balanced Rock Power	LAB IRN:	24-T-031
Project Name:	Ebba Solar, Lincoln County, CO	Date:	3/20/2024

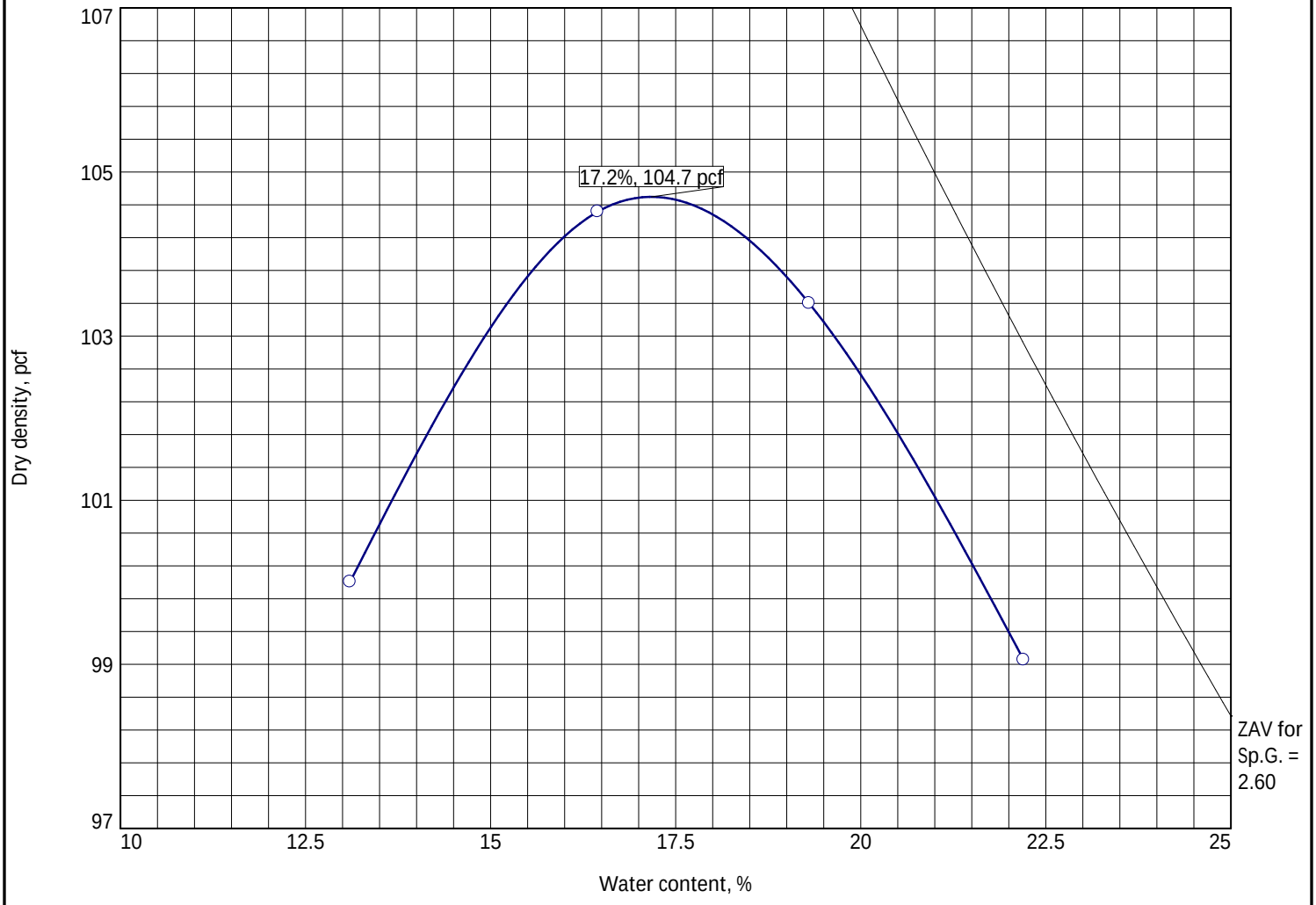
Sample ID: TP-14, TRT-04, 3'-5'

Description: Light Brown cmf Sand, some Silt & Clay (Visual)

Specimen type:	Reconstituted (90% D698)	Recompaction Dry Density:	107.5 PCF
In-Situ Moisture:	5.5 %	Optimum Moisture:	10.5 %



COMPACTION TEST REPORT



Test specification: ASTM D 698-12 Method B Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
3'-5'				2.7			0	

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 104.7 pcf Optimum moisture = 17.2 %	Dark Brown Clay & Silt, little cmf Sand (Visual)

Project No. IRN 24-T-031 Client: Balanced Rock Power

Project: Ebba Solar, Lincoln County, CO

Date: 3/20/2024

○ Sample Number: TP-15, TRT-05

Remarks:
SG Assumed

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South Plainfield, New Jersey

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Determination of Thermal Conductivity of Soil and Rock by Thermal Needle Probe (ASTM D5334)

Client Name: Balanced Rock Power
LAB IRN: 24-T-031
Project Name: Ebba Solar, Lincoln County, CO
Date: 3/20/2024

Sample ID: TP-15, TRT-05, 3'-5'
Description: Dark Brown Clay & Silt, little cmf Sand (Visual)

Specimen type: Reconstituted (90% D698)
Recompaction Dry Density: 94.2 PCF
In-Situ Moisture: 17.0 %
Optimum Moisture: 17.2 %

S.No.	Moisture (%)		Thermal Conductivity (W/m-K)	Thermal Resistivity (°C-cm/W)
1	Dry	0.0	0.4235	236.1
2	¼ OMC	4.3	0.5795	172.6
3	½ OMC	8.6	1.1812	84.7
4	¾ OMC	12.9	1.4842	67.4
5	OMC	17.2	1.6205	61.7

Remarks:

1. Needle size: 2.4 mm diameter × 100 mm length.
2. Thermal grease used: High-density polysynthetics silver thermal compound
3. Tested under controlled room temperature conditions (20°C to 22°C).

Tested By: ES
Checked By: ANS

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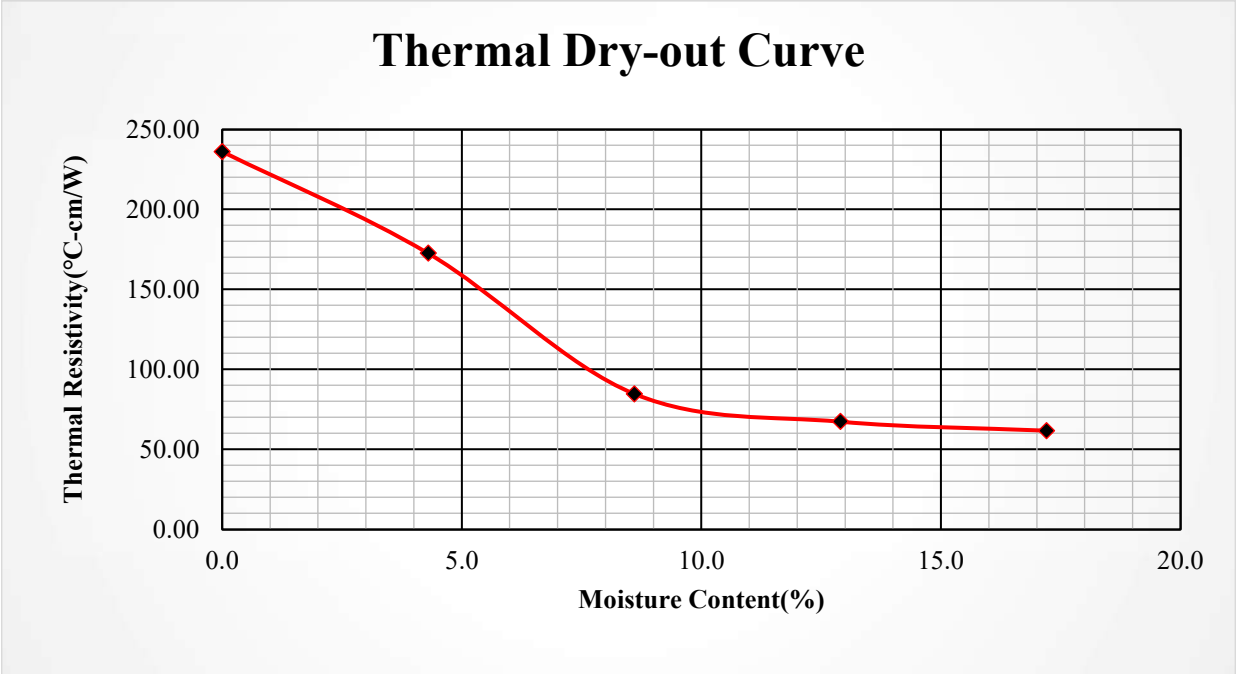
Thermal Dryout Curve (ASTM D5334)

Client Name:	Balanced Rock Power	LAB IRN:	24-T-031
Project Name:	Ebba Solar, Lincoln County, CO	Date:	3/20/2024

Sample ID: TP-15, TRT-05, 3'-5'

Description: Dark Brown Clay & Silt, little cmf Sand (Visual)

Specimen type:	Reconstituted (90% D698)	Recompaction Dry Density:	94.2 PCF
In-Situ Moisture:	17.0 %	Optimum Moisture:	17.2 %



CORROSIVITY SUITE RESULTS

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Corrosivity Testing of Soil

Client Name: Balanced Rock Power
Project Name: Ebba Solar, Lincoln County, CO
LAB IRN: 24-T-031
Date: 3/20/2024

S.No.	Sample	Depth	Soil Resistivity (ohm-cm)	pH of Soil	Sulfate Content (mg/kg)	Chloride Content (mg/kg)	Oxidation-Reduction Pot. (mV)
		Natural Moisture	ASTM G187	ASTM G51	ASTM C1580	AASHTO T291	ASTM G200
1	TP-01 CORR-01	2'-4'	2,850	7.8	<15	36	110
		19.3%		Brown Clay & Silt, little cmf Sand (Visual)			
2	TP-04 CORR-02	2'-4'	1,960	7.5	240	177	141
		17.1%		Dark Brown Clay & Silt, little cmf Sand (Visual)			
3	TP-07 CORR-03	2'-4'	2,420	7.7	<15	48	159
		16.9%		Dark Brown Clay & Silt, little cmf Sand (Visual)			
4	TP-10 CORR-04	2'-4'	6,630	8.0	30	45	170
		7.6%		Light Brown Silt & Clay, little cmf Sand (Visual)			
5	TP-12 CORR-05	2'-4'	3,590	8.0	<15	18	176
		14.6%		Dark Gray Clay & Silt, little cmf Sand (Visual)			
6	TP-13 CORR-06	2'-4'	7,310	7.7	<15	<10	201
		5.9%		Dark Brown Silt & Clay, little cmf Sand (Visual)			

Remarks:

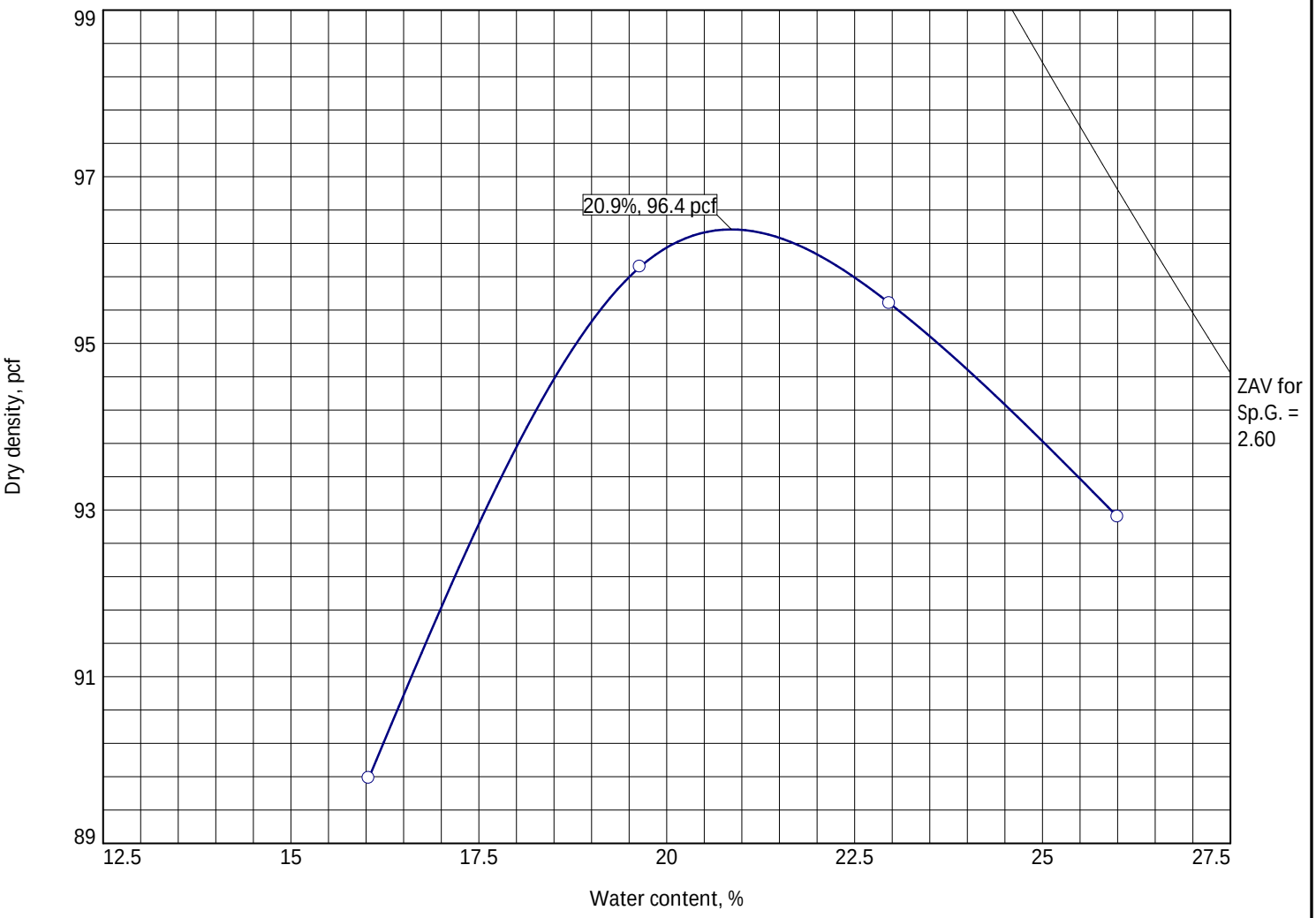
1. Turbidimetric procedure used for ASTM C1580.
2. Mohr's procedure with Silver Nitrate used for AASHTO T291.
3. Miller 400D Resistance Meter used for Resistivity testing, Multiplication factor = 1.
4. Tests conducted under standard laboratory conditions of temperature (72°F) and humidity.

Tested By: ES/HC

Checked By: ANS

CALIFORNIA BEARING RATIO RESULTS

COMPACTION TEST REPORT



Test specification: ASTM D 698-12 Method B Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
1'-2'				2.7			0	

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 96.4 pcf Optimum moisture = 20.9 %	Brown Clay & Silt, trace cmf Sand (Visual)

Project No. IRN 24-T-031 Client: Balanced Rock Power

Project: Ebba Solar, Lincoln County, CO

Date: 3/20/2024

○ Sample Number: TP-01, CBR-01

Remarks:
SG Assumed

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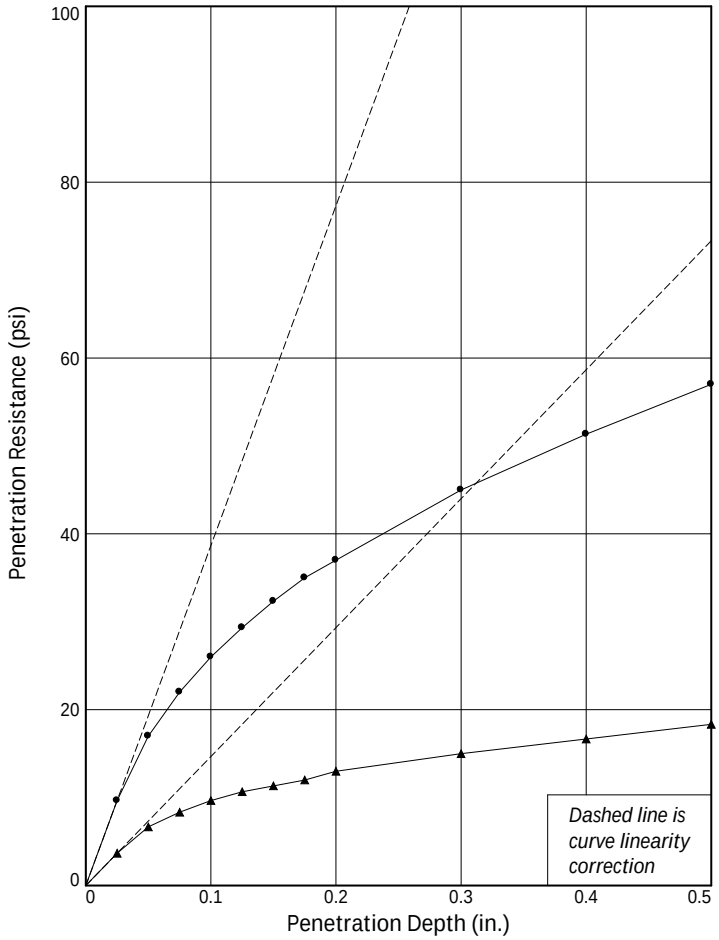
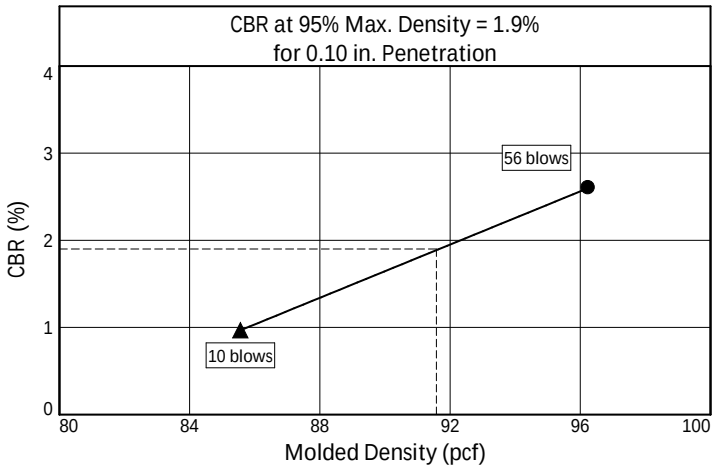
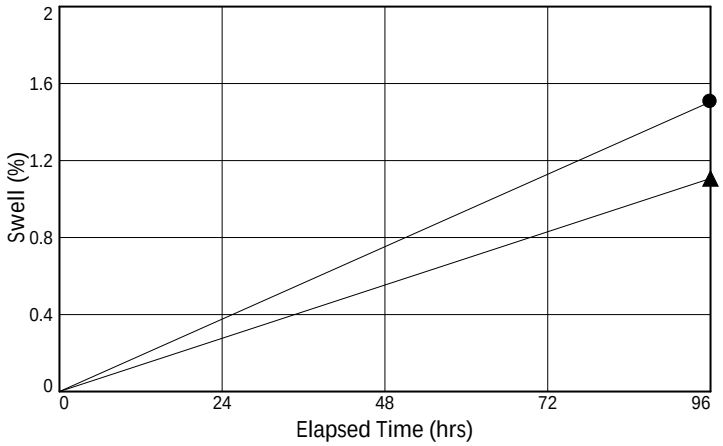
Figure

Tested By: JS Checked By: ANS

BEARING RATIO TEST REPORT
ASTM D1883-21







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ●	96.3	99.9	20.9	94.8	98.4	28.8	2.6	2.5	0.000	10	1.5
2 ▲	85.6	88.8	20.9	84.6	87.8	32.1	1.0	0.9	0.000	10	1.1
3 ■											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Brown Clay & Silt, trace cmf Sand (Visual)		96.4	20.9		

Project No: IRN 24-T-031
Project: Ebba Solar, Lincoln County, CO
Sample Number: TP-01, CBR-01 Depth: 1'-2'

Date: 3/20/2024

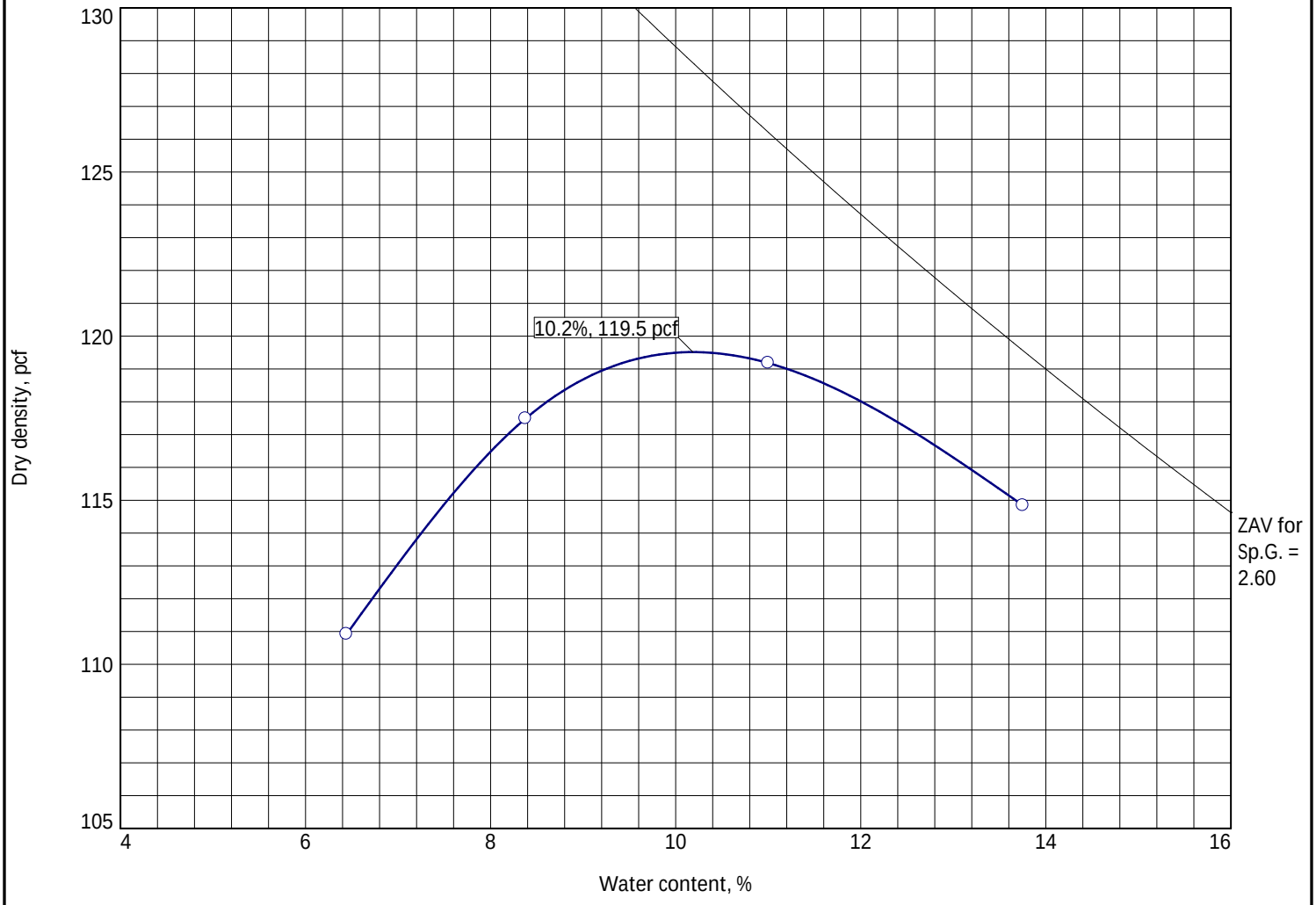
BEARING RATIO TEST REPORT
ANS CONSULTANTS, INC.

Test Remarks:
Saturation Period: 96 Hours

Figure _____

Tested By: ES Checked By: ANS

COMPACTION TEST REPORT



Test specification: ASTM D 698-12 Method B Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
1'-2'				2.7			0	

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 119.5 pcf Optimum moisture = 10.2 %	Dark Brown cmf Sand, some Silt & Clay (Visual)

Project No. IRN 24-T-031 Client: Balanced Rock Power

Project: Ebba Solar, Lincoln County, CO

Date: 3/20/2024

○ Sample Number: TP-06, CBR-02

Remarks:
SG Assumed

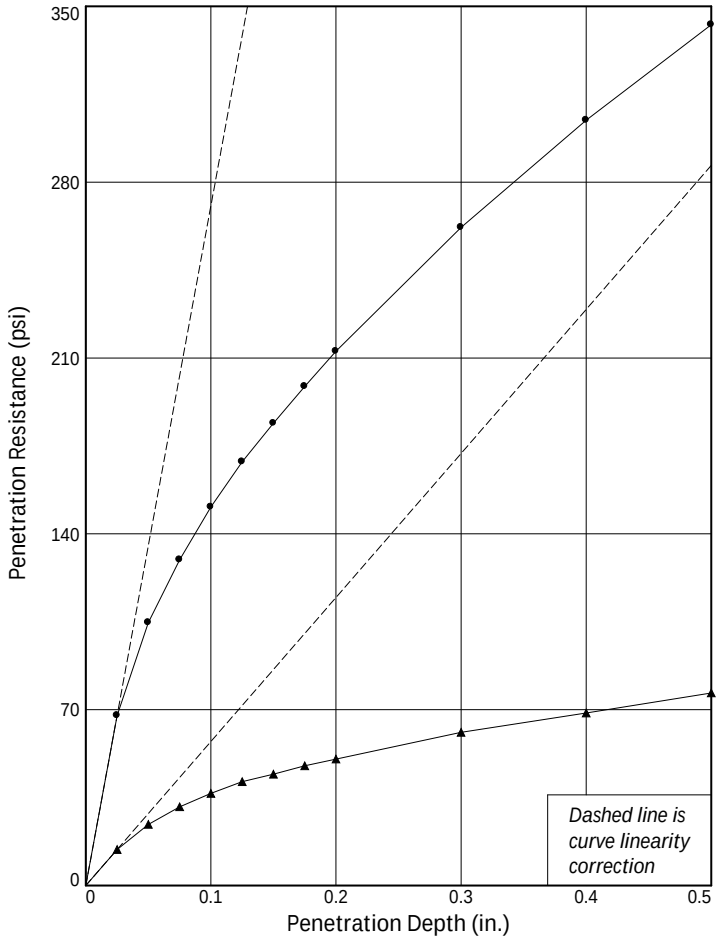
ANS CONSULTANTS, INC.

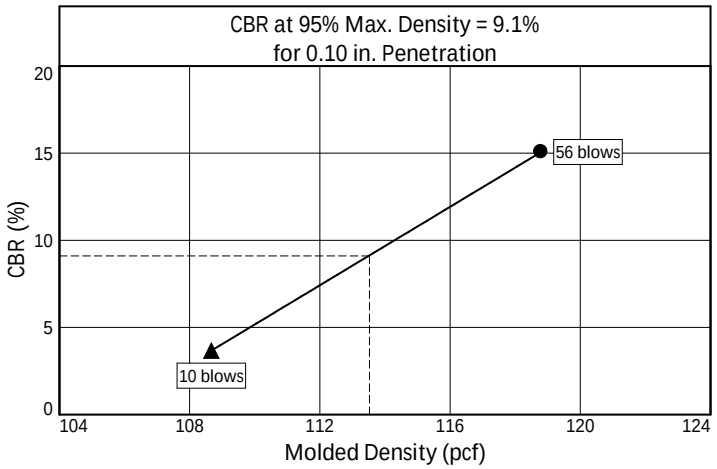
South Plainfield, New Jersey

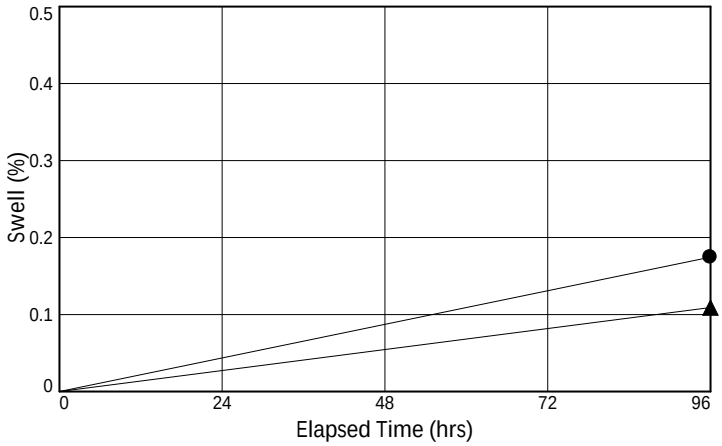
Figure

Tested By: JS Checked By: ANS

BEARING RATIO TEST REPORT
ASTM D1883-21







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ●	118.8	99.4	10.2	118.6	99.2	11.8	15.1	14.2	0.000	10	0.2
2 ▲	108.7	91	10.2	108.5	90.8	14.9	3.7	3.4	0.000	10	0.1
3 ■											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Dark Brown cmf Sand, some Silt & Clay (Visual)		119.5	10.2		

Project No: IRN 24-T-031

Project: Ebba Solar, Lincoln County, CO

Sample Number: TP-06, CBR-02 Depth: 1'-2'

Date: 3/20/2024

BEARING RATIO TEST REPORT

ANS CONSULTANTS, INC.

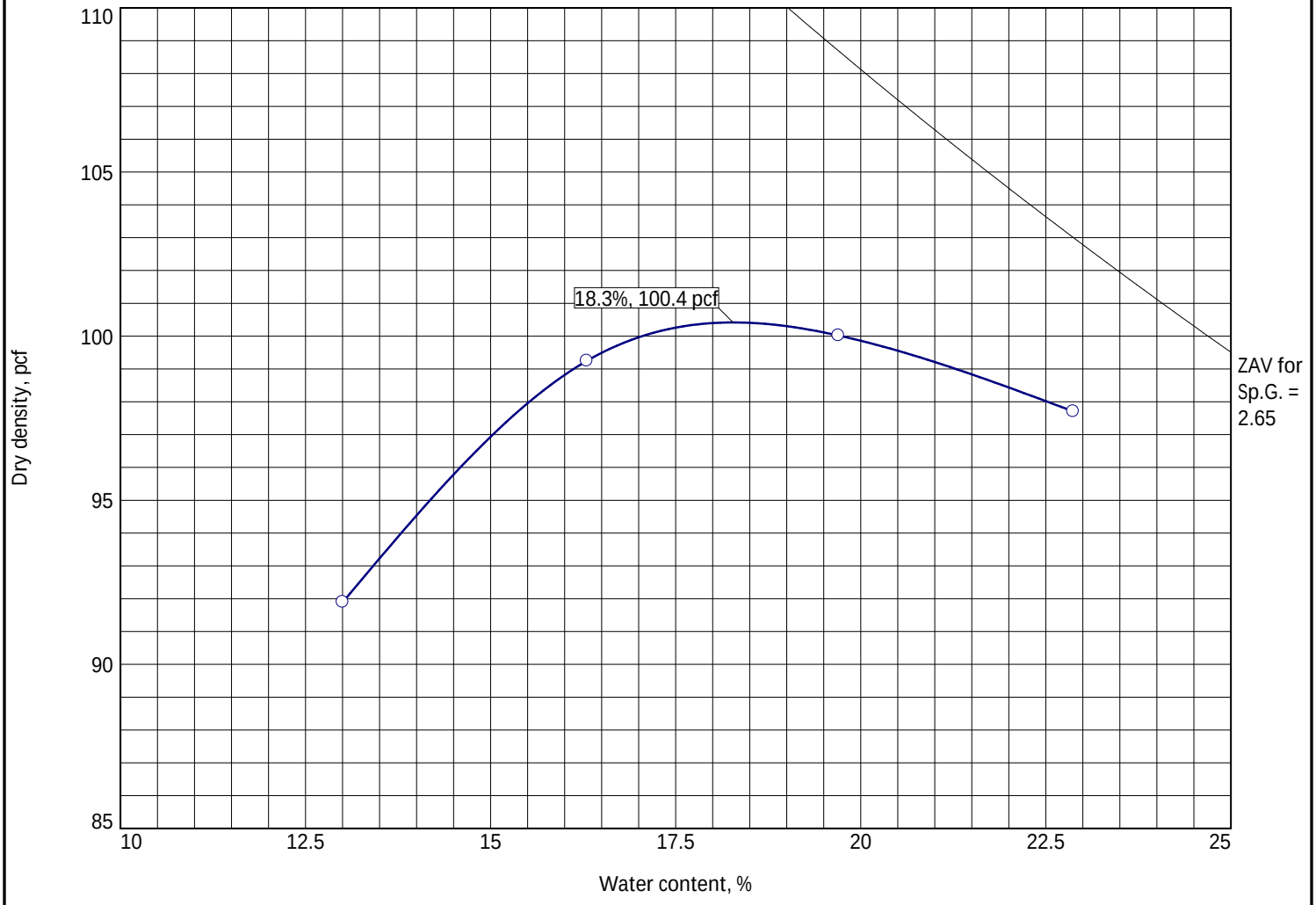
Test Remarks:

Saturation Period: 96 Hours

Figure _____

Tested By: ES Checked By: ANS

COMPACTION TEST REPORT



Test specification: ASTM D 698-12 Method B Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
1'-2'				2.7			0	

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 100.4 pcf Optimum moisture = 18.3 %	Dark Brown Clay & Silt, little(-) cmf Sand (Visual)

Project No. IRN 24-T-031 Client: Balanced Rock Power

Project: Ebba Solar, Lincoln County, CO

Date: 3/20/2024

○ Sample Number: TP-15, CBR-03

ANS CONSULTANTS, INC.

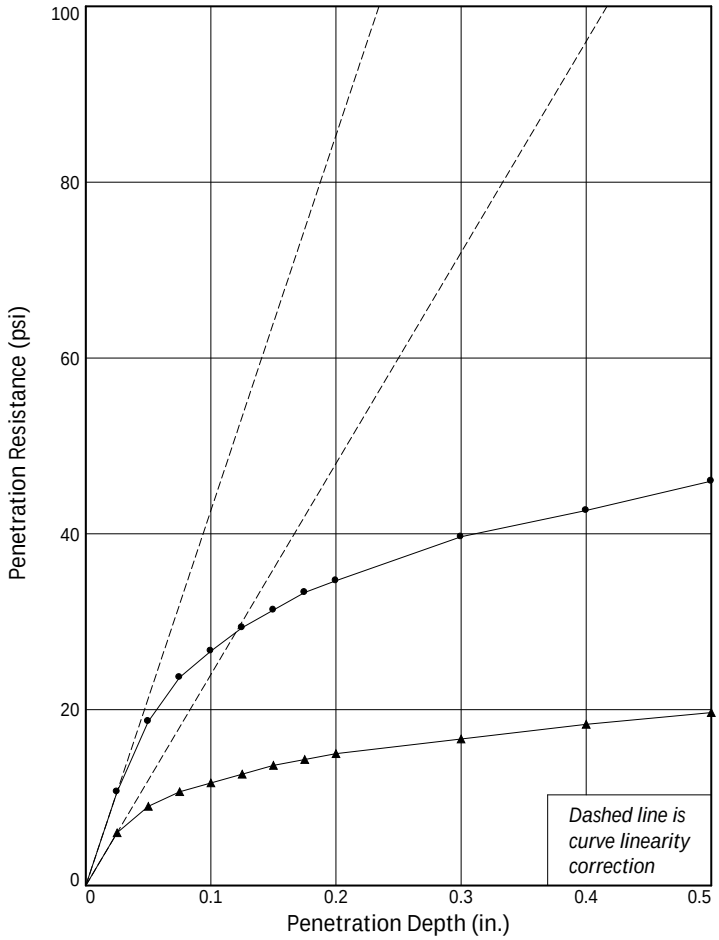
South Plainfield, New Jersey

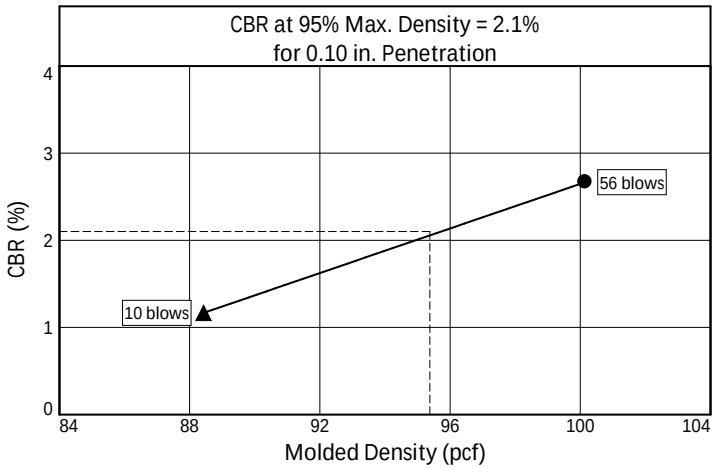
Remarks:
SG Assumed

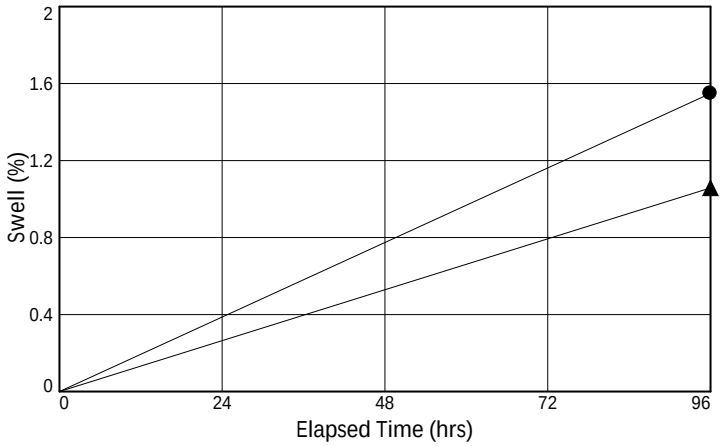
Figure

Tested By: JS Checked By: ANS

BEARING RATIO TEST REPORT
ASTM D1883-21







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ●	100.2	99.8	20.3	98.6	98.2	28.9	2.7	2.3	0.000	10	1.5
2 ▲	88.4	88	20.3	87.5	87.2	32.0	1.2	1.0	0.000	10	1.1
3 ■											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Dark Brown Clay & Silt, little(-) cmf Sand (Visual)		100.4	18.3		

Project No: IRN 24-T-031
Project: Ebba Solar, Lincoln County, CO
Sample Number: TP-15, CBR-03 Depth: 1'-2'

Date: 3/20/2024

BEARING RATIO TEST REPORT
ANS CONSULTANTS, INC.

Test Remarks:
Saturation Period: 96 Hours

Figure _____

Tested By: ES Checked By: ANS

Attachment F

Electrical Resistivity Test Data

Soil Resistivity Results

Client:	Balanced Rock Power	Date:	3/4-5/2024
Project Name:	Ebba Solar	Weather:	Sunny
Project Location:	Lincoln County, Colorado	Temperature:	32°F - 40°F
Equipment:	AGI MiniSting		
Test Method:	Wenner 4 Electrode Array		

Array		Data	Array spacing (ft)				
			2.00	5.00	10.00	25.00	50.00
ERT-01	N-S	Measured Resistance (Ω)	7.044	3.062	1.619	0.7195	0.4279
		Apparent Resistivity (Ω-m)	27.00	29.32	31.00	13.78	40.97
	E-W	Measured Resistance (Ω)	6.724	3.319	1.628	0.7457	0.4445
		Apparent Resistivity (Ω-m)	25.76	31.79	31.18	35.69	42.55
ERT-02	N-S	Measured Resistance (Ω)	7.803	3.989	2.310	0.8660	0.4199
		Apparent Resistivity (Ω-m)	29.89	38.19	44.23	41.45	40.20
	E-W	Measured Resistance (Ω)	7.965	3.855	2.254	0.8446	0.3692
		Apparent Resistivity (Ω-m)	30.51	36.91	43.16	40.45	35.36
ERT-03	N-S	Measured Resistance (Ω)	14.00	5.941	3.141	1.714	1.358
		Apparent Resistivity (Ω-m)	54.25	56.88	60.17	82.05	130.1
	E-W	Measured Resistance (Ω)	15.87	5.874	3.358	1.646	1.305
		Apparent Resistivity (Ω-m)	60.78	56.24	64.31	78.79	124.9
ERT-04	N-S	Measured Resistance (Ω)	15.28	7.232	4.459	2.229	1.125
		Apparent Resistivity (Ω-m)	58.52	69.25	85.37	106.7	107.7
	E-W	Measured Resistance (Ω)	14.13	6.783	3.823	2.229	1.121
		Apparent Resistivity (Ω-m)	54.13	64.95	73.21	103.1	107.3
ERT-05	N-S	Measured Resistance (Ω)	21.23	6.348	3.585	1.461	0.8431
		Apparent Resistivity (Ω-m)	81.29	60.78	68.67	69.95	80.74
	E-W	Measured Resistance (Ω)	19.78	6.837	2.989	1.475	0.842
		Apparent Resistivity (Ω-m)	75.77	65.47	57.24	70.62	80.62
ERT-06	N-S	Measured Resistance (Ω)	12.50	4.809	2.092	0.4251	0.1684
		Apparent Resistivity (Ω-m)	47.88	46.06	40.05	20.35	16.13
	E-W	Measured Resistance (Ω)	14.36	4.984	2.025	0.4244	0.1568
		Apparent Resistivity (Ω-m)	54.99	47.73	38.77	20.32	15.21
ERT-07	N-S	Measured Resistance (Ω)	39.59	12.34	7.486	3.569	1.095
		Apparent Resistivity (Ω-m)	151.6	118.2	143.4	170.9	104.8
	E-W	Measured Resistance (Ω)	41.62	12.95	7.597	3.401	0.8975
		Apparent Resistivity (Ω-m)	159.4	148.3	145.5	162.8	85.92
ERT-08	N-S	Measured Resistance (Ω)	43.10	15.39	6.318	1.728	0.7460
		Apparent Resistivity (Ω-m)	165.1	147.3	121.0	82.75	71.45
	E-W	Measured Resistance (Ω)	53.69	16.61	5.769	1.629	0.6050
		Apparent Resistivity (Ω-m)	205.6	159.0	110.5	78.00	57.94
		Site Average (Ω)	20.92	5.25	2.77	1.23	0.72
		Site Average (Ω-m)	80.16	50.30	53.11	56.93	68.48

Soil Resistivity Results

Client:	Balanced Rock Power	Date:	3/4-5/2024
Project Name:	Ebba Solar	Weather:	Sunny
Project Location:	Lincoln County, Colorado	Temperature:	32°F - 40°F
Equipment:	AGI MiniSting		
Test Method:	Wenner 4 Electrode Array		

Array		Data	Array spacing (ft)							
			2.00	5.00	10.00	25.00	50.00	100.00	150.00	200.00
ERT-SS-01	N-S	Measured Resistance (Ω)	5.080	1.984	0.8721	0.2819	0.1625	0.00613	0.2821	0.1529
		Apparent Resistivity (Ω-m)	19.46	19.40	16.70	13.50	15.56	11.74	8.105	5.855
	E-W	Measured Resistance (Ω)	5.718	2.420	0.7259	0.2678	0.1700	0.0072	0.0029	0.0078
		Apparent Resistivity (Ω-m)	21.90	23.17	13.90	12.82	16.34	13.85	8.34	2.25
		Site Average (Ω)	5.399	2.202	0.7990	0.2749	0.1663	0.0067	0.1425	0.0804
		Site Average (Ω-m)	20.68	21.29	15.30	13.16	15.95	12.80	8.222	4.051

Attachment G

Pile Load Test Logs

Pile Load Test Log

Project Name:	Balanced Rock Power - Ebba Solar	Embedment Depth (ft):	7.0	Pile ID:	PLT-01
Site Location:	Lincoln County, Colorado	Pushed to Depth (ft):	0.0	Pile Section:	W6x9
Date Installed:	3/8/2024	Pre-Excavation Depth (ft):	N/A	Pile Length (ft):	15.0
Date Tested:	3/16/2024	Pre-Drill Diameter (in):	N/A	Total Drive Time (sec):	23.8
Location:	39.19791° N, 103.69880° W	Pre-Drill Depth (ft):	N/A	Avg. Installation Rate (sec/ft):	3.4

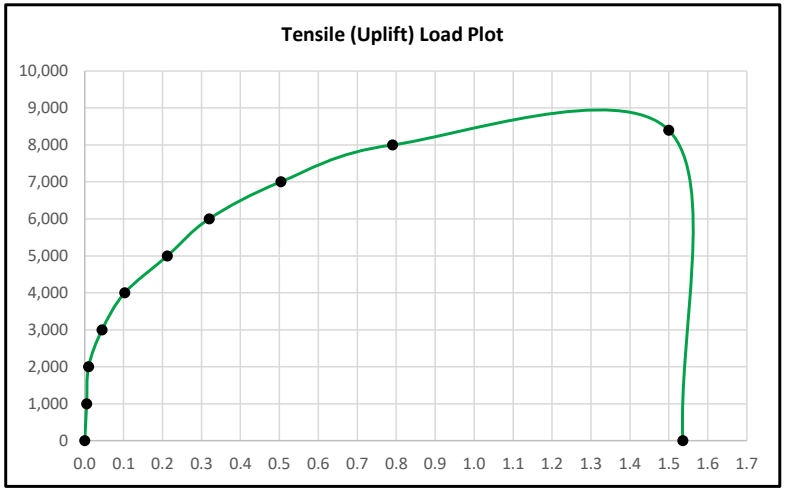
Embedment Data

Depth (ft)	Time (s)
1	3.2
2	3.6
3	1.8
4	4.9
5	5.2
6	5.2
7	3.1
Total Time (s) =	23.8

Field Notes

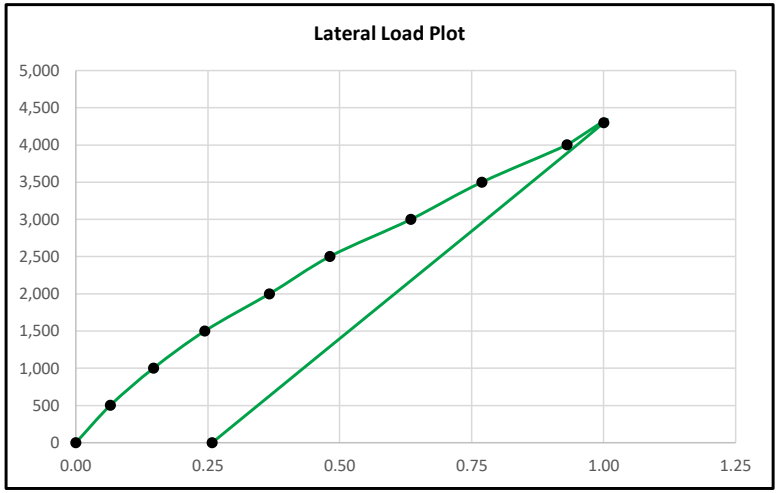
Tensile (Uplift) Testing

Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	1,000	1,000	0.0050	0.0050	0.0050
1	2,000	2,000	0.0100	0.0100	0.0100
1	3,000	3,000	0.0450	0.0450	0.0450
1	4,000	4,000	0.1030	0.1030	0.1030
1	5,000	5,000	0.2120	0.2120	0.2120
1	6,000	6,000	0.3200	0.3200	0.3200
1	7,000	7,000	0.5040	0.5040	0.5040
1	8,000	8,000	0.7910	0.7900	0.7905
1	9,000	8,400	1.5000	1.5000	1.5000
1	0	0	1.5330	1.5390	1.5360



Lateral Testing

Lateral Load Height Above Grade (ft):		4.0	Deflection Gauge Height (in):		6
Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	500	500	0.0680	0.0630	0.0655
1	1,000	1,000	0.1490	0.1450	0.1470
1	1,500	1,500	0.2470	0.2420	0.2445
1	2,000	2,000	0.3690	0.3640	0.3665
1	2,500	2,500	0.4790	0.4840	0.4815
1	3,000	3,000	0.6320	0.6370	0.6345
1	3,500	3,500	0.7670	0.7710	0.7690
1	4,000	4,000	0.9290	0.9320	0.9305
1	4,500	4,300	1.0000	1.0000	1.0000
1	0	0	0.2550	0.2610	0.2580



Pile Load Test Log

Project Name:	Balanced Rock Power - Ebba Solar	Embedment Depth (ft):	8.0	Pile ID:	PLT-02
Site Location:	Lincoln County, Colorado	Pushed to Depth (ft):	0.0	Pile Section:	W6x9
Date Installed:	3/8/2024	Pre-Excavation Depth (ft):	N/A	Pile Length (ft):	15.0
Date Tested:	3/16/2024	Pre-Drill Diameter (in):	N/A	Total Drive Time (sec):	60.8
Location:	39.19326° N, 103.70471° W	Pre-Drill Depth (ft):	N/A	Avg. Installation Rate (sec/ft):	7.6

Embedment Data

Depth (ft)	Time (s)
1	2.0
2	6.6
3	7.9
4	7.9
5	7.3
6	8.8
7	9.9
8	10.4
Total Time (s) =	60.8

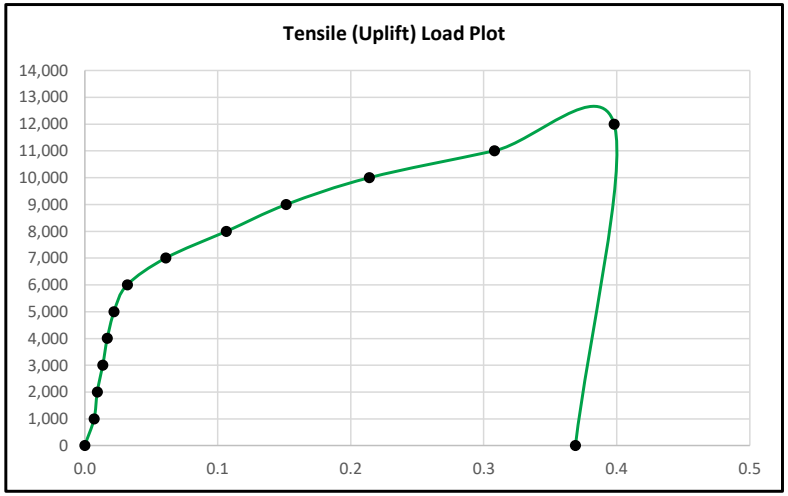
Field Notes

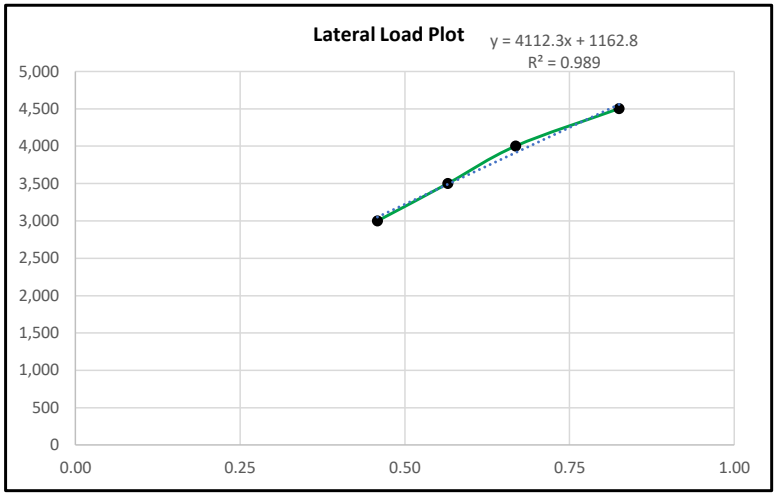
Tensile (Uplift) Testing

Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	1,000	1,000	0.0060	0.0080	0.0070
1	2,000	2,000	0.0090	0.0100	0.0095
1	3,000	3,000	0.0130	0.0140	0.0135
1	4,000	4,000	0.0170	0.0170	0.0170
1	5,000	5,000	0.0220	0.0220	0.0220
1	6,000	6,000	0.0310	0.0330	0.0320
1	7,000	7,000	0.0600	0.0620	0.0610
1	8,000	8,000	0.1060	0.1070	0.1065
1	9,000	9,000	0.1500	0.1530	0.1515
1	10,000	10,000	0.2130	0.2150	0.2140
1	11,000	11,000	0.3070	0.3090	0.3080
1	12,000	12,000	0.3950	0.4010	0.3980
1	0	0	0.3670	0.3710	0.3690

Lateral Testing

Lateral Load Height Above Grade (ft):		4.0	Deflection Gauge Height (in):		6
Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	500	500	0.0450	0.0500	0.0475
1	1,000	1,000	0.1150	0.1210	0.1180
1	1,500	1,500	0.1850	0.1920	0.1885
1	2,000	2,000	0.2710	0.2760	0.2735
1	2,500	2,500	0.3550	0.3610	0.3580
1	3,000	3,000	0.4550	0.4620	0.4585
1	3,500	3,500	0.5620	0.5680	0.5650
1	4,000	4,000	0.6650	0.6710	0.6680
1	4,500	4,500	0.8210	0.8290	0.8250
1	5,000	4,900	1.0000	1.0000	1.0000
1	0	0	0.4150	0.4200	0.4175





Pile Load Test Log

Project Name:	Balanced Rock Power - Ebba Solar	Embedment Depth (ft):	9.0	Pile ID:	PLT-03
Site Location:	Lincoln County, Colorado	Pushed to Depth (ft):	1.0	Pile Section:	W6x9
Date Installed:	3/8/2024	Pre-Excavation Depth (ft):	N/A	Pile Length (ft):	15.0
Date Tested:	3/16/2024	Pre-Drill Diameter (in):	N/A	Total Drive Time (sec):	20.4
Location:	39.18763° N, 103.69659° W	Pre-Drill Depth (ft):	N/A	Avg. Installation Rate (sec/ft):	2.5

Embedment Data

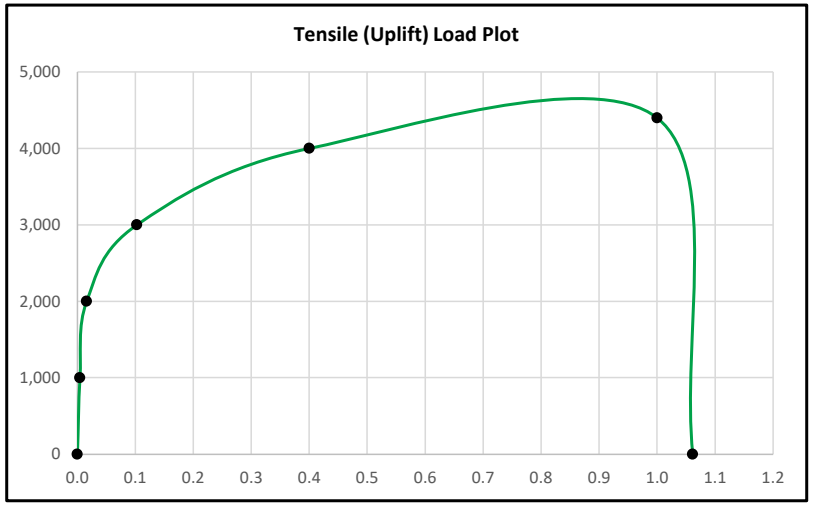
Depth (ft)	Time (s)
2	1.7
3	1.9
4	3.0
5	3.9
6	2.1
7	2.0
8	2.0
9	3.8
Total Time (s) =	20.4

Field Notes

Uplift: Pile released at 4,400 lbs.

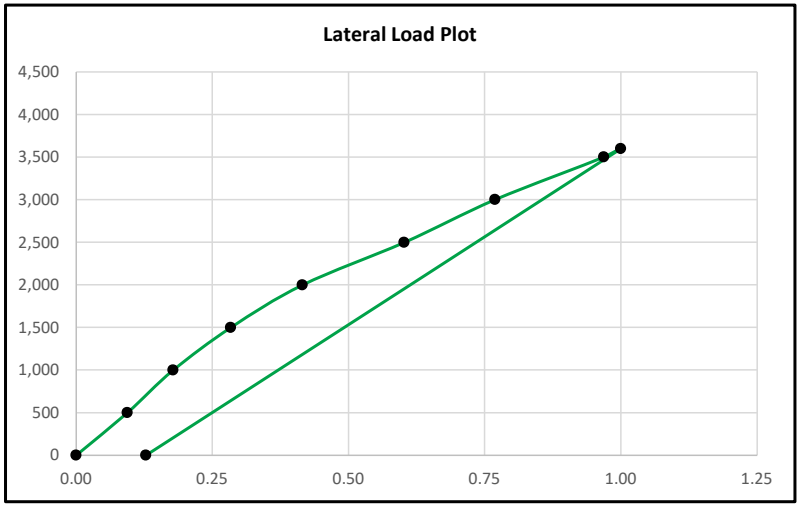
Tensile (Uplift) Testing

Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	1,000	1,000	0.0040	0.0050	0.0045
1	2,000	2,000	0.0150	0.0170	0.0160
1	3,000	3,000	0.1000	0.1050	0.1025
1	4,000	4,000	0.3990	0.4010	0.4000
1	5,000	4,400	1.0000	1.0000	1.0000
1	0	0	1.0610	1.0620	1.0615



Lateral Testing

Lateral Load Height Above Grade (ft):		4.0	Deflection Gauge Height (in):		6
Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	500	500	0.0900	0.0980	0.0940
1	1,000	1,000	0.1740	0.1820	0.1780
1	1,500	1,500	0.2800	0.2880	0.2840
1	2,000	2,000	0.4110	0.4200	0.4155
1	2,500	2,500	0.5980	0.6070	0.6025
1	3,000	3,000	0.7650	0.7730	0.7690
1	3,500	3,500	0.9650	0.9730	0.9690
1	4,000	3,600	1.0000	1.0000	1.0000
1	0	0	0.1260	0.1300	0.1280



Pile Load Test Log

Project Name:	Balanced Rock Power - Ebba Solar	Embedment Depth (ft):	10.0	Pile ID:	PLT-04
Site Location:	Lincoln County, Colorado	Pushed to Depth (ft):	1.0	Pile Section:	W6x9
Date Installed:	3/8/2024	Pre-Excavation Depth (ft):	N/A	Pile Length (ft):	15.0
Date Tested:	3/15/2024	Pre-Drill Diameter (in):	N/A	Total Drive Time (sec):	70.6
Location:	39.17908° N, 103.68865° W	Pre-Drill Depth (ft):	N/A	Avg. Installation Rate (sec/ft):	7.8

Embedment Data

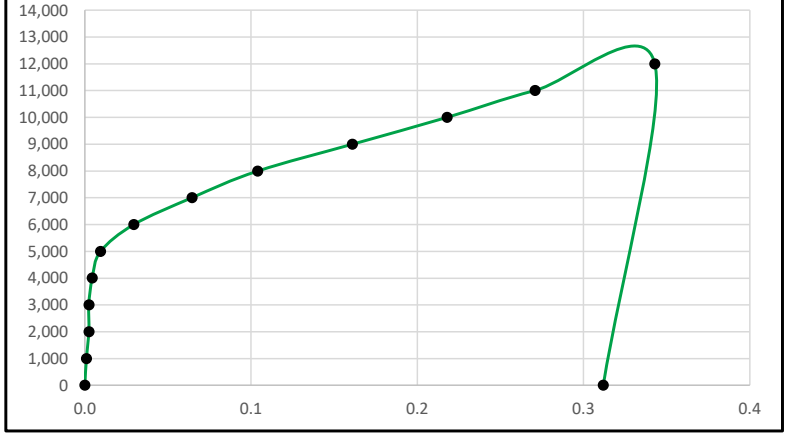
Depth (ft)	Time (s)
2	6.3
3	5.2
4	5.5
5	5.5
6	4.6
7	5.6
8	5.9
9	8.3
10	23.7
Total Time (s) =	70.6

Field Notes

Tensile (Uplift) Testing

Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	1,000	1,000	0.0010	0.0010	0.0010
1	2,000	2,000	0.0030	0.0020	0.0025
1	3,000	3,000	0.0030	0.0020	0.0025
1	4,000	4,000	0.0040	0.0050	0.0045
1	5,000	5,000	0.0090	0.0100	0.0095
1	6,000	6,000	0.0300	0.0290	0.0295
1	7,000	7,000	0.0660	0.0630	0.0645
1	8,000	8,000	0.1080	0.1000	0.1040
1	9,000	9,000	0.1640	0.1580	0.1610
1	10,000	10,000	0.2220	0.2140	0.2180
1	11,000	11,000	0.2710	0.2710	0.2710
1	12,000	12,000	0.3450	0.3410	0.3430
1	0	0	0.3110	0.3130	0.3120

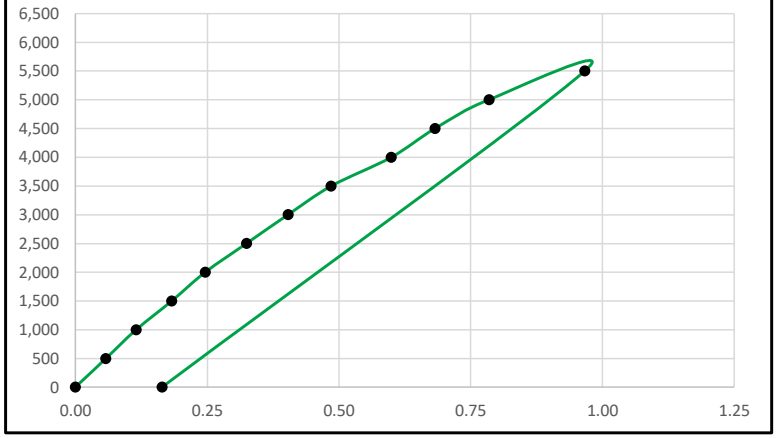
Tensile (Uplift) Load Plot



Lateral Testing

Lateral Load Height Above Grade (ft):		4.0	Deflection Gauge Height (in):		6
Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	500	500	0.0570	0.0580	0.0575
1	1,000	1,000	0.1130	0.1170	0.1150
1	1,500	1,500	0.1850	0.1800	0.1825
1	2,000	2,000	0.2430	0.2500	0.2465
1	2,500	2,500	0.3260	0.3230	0.3245
1	3,000	3,000	0.4050	0.4020	0.4035
1	3,500	3,500	0.4860	0.4840	0.4850
1	4,000	4,000	0.5990	0.5990	0.5990
1	4,500	4,500	0.6820	0.6820	0.6820
1	5,000	5,000	0.7840	0.7850	0.7845
1	5,500	5,500	0.9630	0.9700	0.9665
1	0	0	0.1610	0.1670	0.1640

Lateral Load Plot



Pile Load Test Log

Project Name:	Balanced Rock Power - Ebba Solar	Embedment Depth (ft):	7.0	Pile ID:	PLT-05
Site Location:	Lincoln County, Colorado	Pushed to Depth (ft):	1.0	Pile Section:	W6x9
Date Installed:	3/8/2024	Pre-Excavation Depth (ft):	N/A	Pile Length (ft):	15.0
Date Tested:	3/15/2024	Pre-Drill Diameter (in):	N/A	Total Drive Time (sec):	46.3
Location:	39.16689° N, 103.69906° W	Pre-Drill Depth (ft):	N/A	Avg. Installation Rate (sec/ft):	7.7

Embedment Data

Depth (ft)	Time (s)
2	3.3
3	7.4
4	7.6
5	8.2
6	9.5
7	10.3
Total Time (s) =	46.3

Field Notes

Uplift: Pile released at 9,700 lbs.

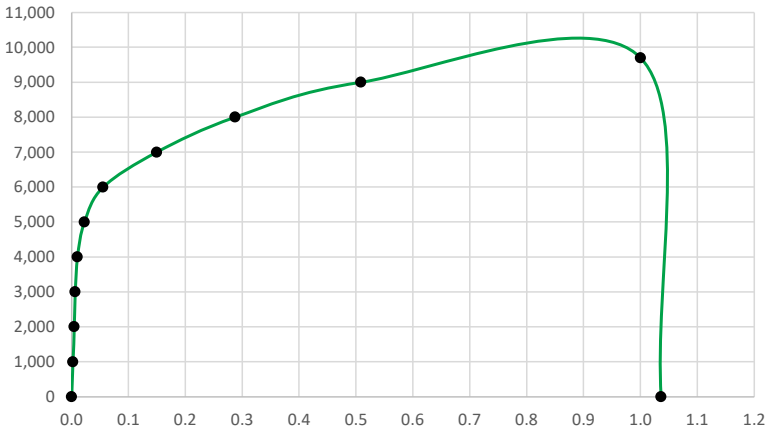
Tensile (Uplift) Testing

Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	1,000	1,000	0.0030	0.0020	0.0025
1	2,000	2,000	0.0050	0.0040	0.0045
1	3,000	3,000	0.0070	0.0060	0.0065
1	4,000	4,000	0.0100	0.0110	0.0105
1	5,000	5,000	0.0220	0.0230	0.0225
1	6,000	6,000	0.0550	0.0560	0.0555
1	7,000	7,000	0.1490	0.1510	0.1500
1	8,000	8,000	0.2850	0.2900	0.2875
1	9,000	9,000	0.5070	0.5100	0.5085
1	10,000	9,700	1.0000	1.0000	1.0000
1	0	0	1.0350	1.0370	1.0360

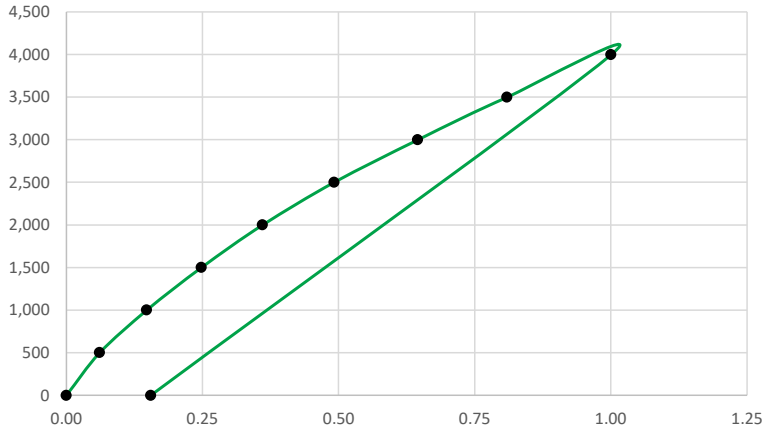
Lateral Testing

Lateral Load Height Above Grade (ft):	4.0	Deflection Gauge Height (in):		6
Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	500	500	0.0600	0.0620	0.0610
1	1,000	1,000	0.1460	0.1490	0.1475
1	1,500	1,500	0.2470	0.2490	0.2480
1	2,000	2,000	0.3590	0.3610	0.3600
1	2,500	2,500	0.4910	0.4920	0.4915
1	3,000	3,000	0.6450	0.6460	0.6455
1	3,500	3,500	0.8090	0.8090	0.8090
1	4,000	4,000	1.0000	1.0000	1.0000
1	0	0	0.1550	0.1550	0.1550

Tensile (Uplift) Load Plot



Lateral Load Plot



Pile Load Test Log

Project Name:	Balanced Rock Power - Ebba Solar	Embedment Depth (ft):	8.0	Pile ID:	PLT-06
Site Location:	Lincoln County, Colorado	Pushed to Depth (ft):	1.0	Pile Section:	W6x9
Date Installed:	3/8/2024	Pre-Excavation Depth (ft):	N/A	Pile Length (ft):	15.0
Date Tested:	3/15/2024	Pre-Drill Diameter (in):	N/A	Total Drive Time (sec):	69.1
Location:	39.15955° N, 103.71171° W	Pre-Drill Depth (ft):	N/A	Avg. Installation Rate (sec/ft):	9.9

Embedment Data

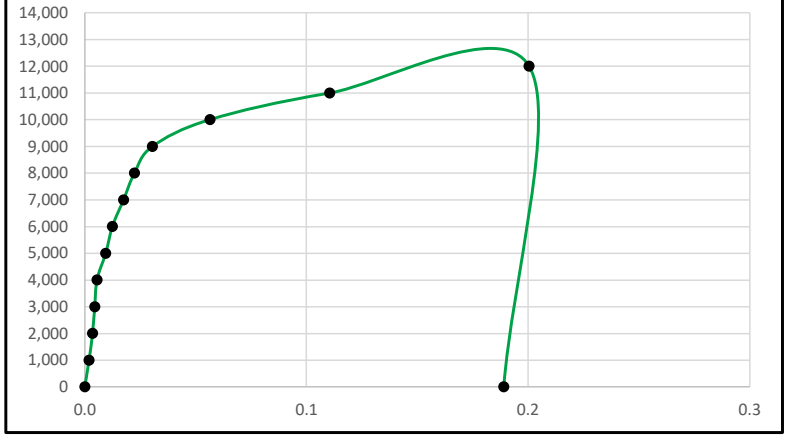
Depth (ft)	Time (s)
2	1.6
3	1.8
4	2.4
5	6.1
6	12.8
7	16.9
8	27.7
Total Time (s) =	69.1

Field Notes

Tensile (Uplift) Testing

Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	1,000	1,000	0.0020	0.0020	0.0020
1	2,000	2,000	0.0030	0.0040	0.0035
1	3,000	3,000	0.0040	0.0050	0.0045
1	4,000	4,000	0.0050	0.0060	0.0055
1	5,000	5,000	0.0090	0.0100	0.0095
1	6,000	6,000	0.0120	0.0130	0.0125
1	7,000	7,000	0.0170	0.0180	0.0175
1	8,000	8,000	0.0220	0.0230	0.0225
1	9,000	9,000	0.0300	0.0310	0.0305
1	10,000	10,000	0.0560	0.0570	0.0565
1	11,000	11,000	0.1100	0.1110	0.1105
1	12,000	12,000	0.2000	0.2010	0.2005
1	0	0	0.1890	0.1890	0.1890

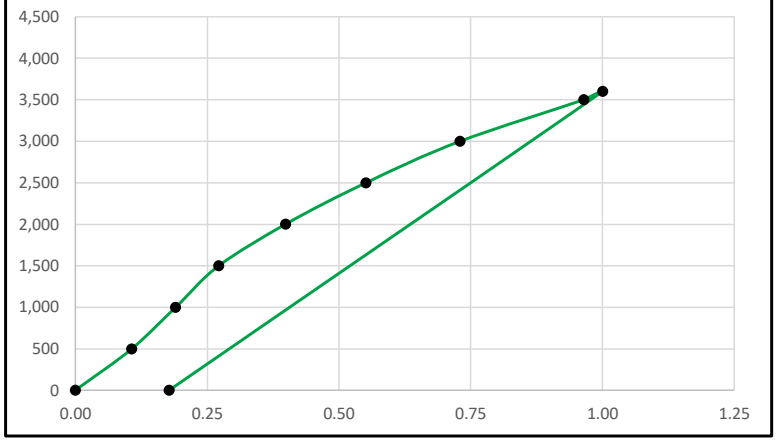
Tensile (Uplift) Load Plot



Lateral Testing

Lateral Load Height Above Grade (ft):		4.0	Deflection Gauge Height (in):		6
Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	500	500	0.1030	0.1100	0.1065
1	1,000	1,000	0.1850	0.1950	0.1900
1	1,500	1,500	0.2670	0.2770	0.2720
1	2,000	2,000	0.3970	0.4000	0.3985
1	2,500	2,500	0.5500	0.5520	0.5510
1	3,000	3,000	0.7310	0.7280	0.7295
1	3,500	3,500	0.9690	0.9600	0.9645
1	4,000	3,600	1.0000	1.0000	1.0000
1	0	0	0.1750	0.1800	0.1775

Lateral Load Plot



Pile Load Test Log

Project Name:	Balanced Rock Power - Ebba Solar	Embedment Depth (ft):	9.0	Pile ID:	PLT-07
Site Location:	Lincoln County, Colorado	Pushed to Depth (ft):	1.0	Pile Section:	W6x9
Date Installed:	3/8/2024	Pre-Excavation Depth (ft):	N/A	Pile Length (ft):	15.0
Date Tested:	3/15/2024	Pre-Drill Diameter (in):	N/A	Total Drive Time (sec):	90.0
Location:	39.15957° N, 103.69272° W	Pre-Drill Depth (ft):	N/A	Avg. Installation Rate (sec/ft):	11.2

Embedment Data

Depth (ft)	Time (s)
2	4.5
3	6.8
4	7.7
5	9.9
6	12.4
7	13.9
8	16.1
9	18.7
Total Time (s) =	90.0

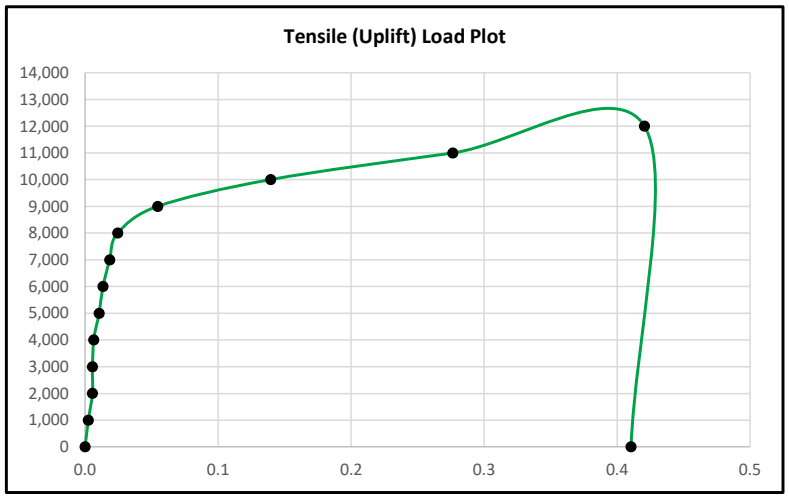
Field Notes

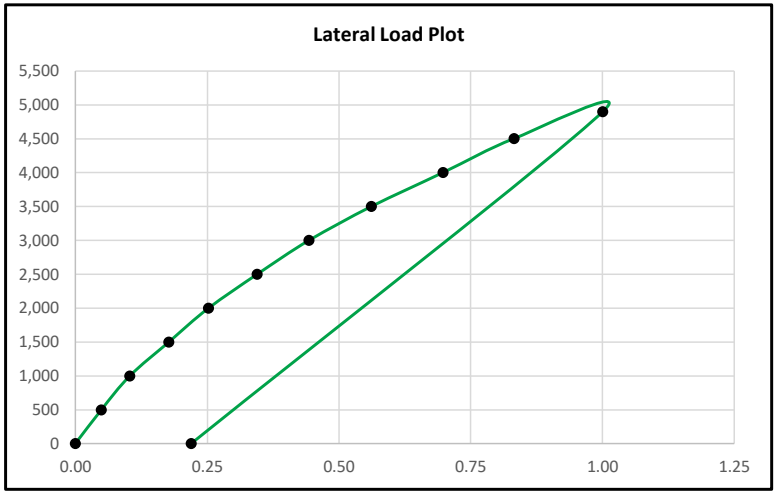
Tensile (Uplift) Testing

Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	1,000	1,000	0.0020	0.0030	0.0025
1	2,000	2,000	0.0050	0.0060	0.0055
1	3,000	3,000	0.0050	0.0060	0.0055
1	4,000	4,000	0.0060	0.0070	0.0065
1	5,000	5,000	0.0100	0.0110	0.0105
1	6,000	6,000	0.0130	0.0140	0.0135
1	7,000	7,000	0.0180	0.0190	0.0185
1	8,000	8,000	0.0240	0.0250	0.0245
1	9,000	9,000	0.0540	0.0550	0.0545
1	10,000	10,000	0.1380	0.1410	0.1395
1	11,000	11,000	0.2760	0.2770	0.2765
1	12,000	12,000	0.4200	0.4210	0.4205
1	0	0	0.4100	0.4110	0.4105

Lateral Testing

Lateral Load Height Above Grade (ft):		4.0	Deflection Gauge Height (in):		6
Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	500	500	0.0470	0.0510	0.0490
1	1,000	1,000	0.1020	0.1040	0.1030
1	1,500	1,500	0.1770	0.1770	0.1770
1	2,000	2,000	0.2530	0.2520	0.2525
1	2,500	2,500	0.3470	0.3420	0.3445
1	3,000	3,000	0.4460	0.4400	0.4430
1	3,500	3,500	0.5630	0.5600	0.5615
1	4,000	4,000	0.6970	0.6970	0.6970
1	4,500	4,500	0.8310	0.8330	0.8320
1	5,000	4,900	1.0000	1.0000	1.0000
1	0	0	0.2200	0.2190	0.2195





Pile Load Test Log

Project Name:	Balanced Rock Power - Ebba Solar	Embedment Depth (ft):	10.0	Pile ID:	PLT-08
Site Location:	Lincoln County, Colorado	Pushed to Depth (ft):	0.0	Pile Section:	W6x9
Date Installed:	3/8/2024	Pre-Excavation Depth (ft):	N/A	Pile Length (ft):	15.0
Date Tested:	3/15/2024	Pre-Drill Diameter (in):	N/A	Total Drive Time (sec):	43.2
Location:	39.15679° N, 103.69866° W	Pre-Drill Depth (ft):	N/A	Avg. Installation Rate (sec/ft):	4.3

Embedment Data

Depth (ft)	Time (s)
1	1.6
2	2.5
3	2.0
4	3.2
5	4.2
6	2.8
7	4.0
8	7.5
9	5.0
10	10.5
Total Time (s) =	43.2

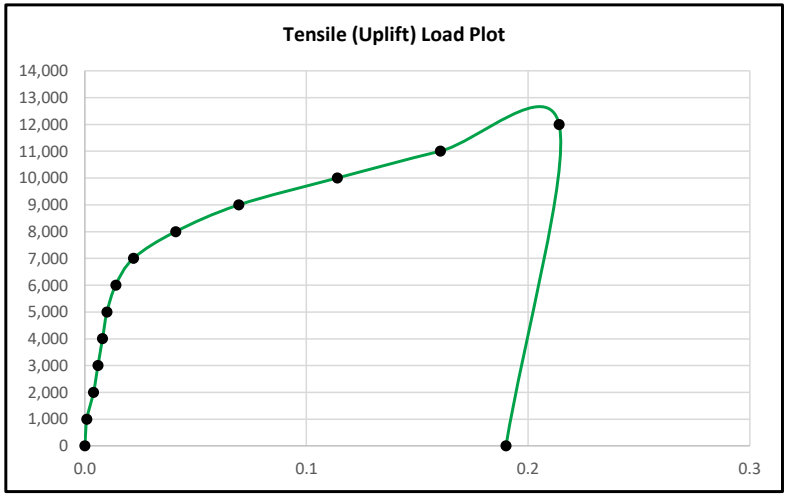
Field Notes

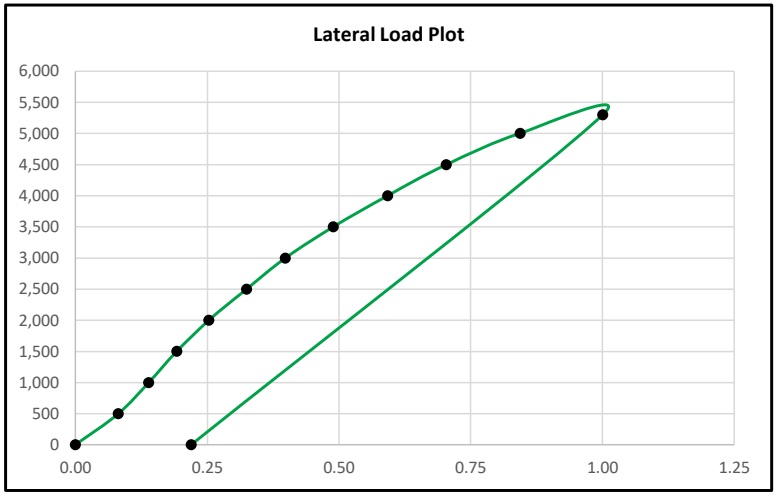
Tensile (Uplift) Testing

Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	1,000	1,000	0.0010	0.0010	0.0010
1	2,000	2,000	0.0040	0.0040	0.0040
1	3,000	3,000	0.0060	0.0060	0.0060
1	4,000	4,000	0.0080	0.0080	0.0080
1	5,000	5,000	0.0100	0.0100	0.0100
1	6,000	6,000	0.0140	0.0140	0.0140
1	7,000	7,000	0.0220	0.0220	0.0220
1	8,000	8,000	0.0410	0.0410	0.0410
1	9,000	9,000	0.0710	0.0680	0.0695
1	10,000	10,000	0.1150	0.1130	0.1140
1	11,000	11,000	0.1620	0.1590	0.1605
1	12,000	12,000	0.2150	0.2130	0.2140
1	0	0	0.1890	0.1910	0.1900

Lateral Testing

Lateral Load Height Above Grade (ft):		4.0	Deflection Gauge Height (in):		6
Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	500	500	0.0820	0.0800	0.0810
1	1,000	1,000	0.1400	0.1380	0.1390
1	1,500	1,500	0.1930	0.1910	0.1920
1	2,000	2,000	0.2540	0.2520	0.2530
1	2,500	2,500	0.3240	0.3250	0.3245
1	3,000	3,000	0.3970	0.3990	0.3980
1	3,500	3,500	0.4880	0.4900	0.4890
1	4,000	4,000	0.5920	0.5920	0.5920
1	4,500	4,500	0.7020	0.7050	0.7035
1	5,000	5,000	0.8430	0.8440	0.8435
1	5,500	5,300	1.0000	1.0000	1.0000
1	0	0	0.2190	0.2200	0.2195





Pile Load Test Log

Project Name:	Balanced Rock Power - Ebba Solar	Embedment Depth (ft):	7.0	Pile ID:	PLT-09
Site Location:	Lincoln County, Colorado	Pushed to Depth (ft):	0.0	Pile Section:	W6x9
Date Installed:	3/8/2024	Pre-Excavation Depth (ft):	N/A	Pile Length (ft):	15.0
Date Tested:	3/12/2024	Pre-Drill Diameter (in):	N/A	Total Drive Time (sec):	19.4
Location:	39.15271° N, 103.70500° W	Pre-Drill Depth (ft):	N/A	Avg. Installation Rate (sec/ft):	2.8

Embedment Data

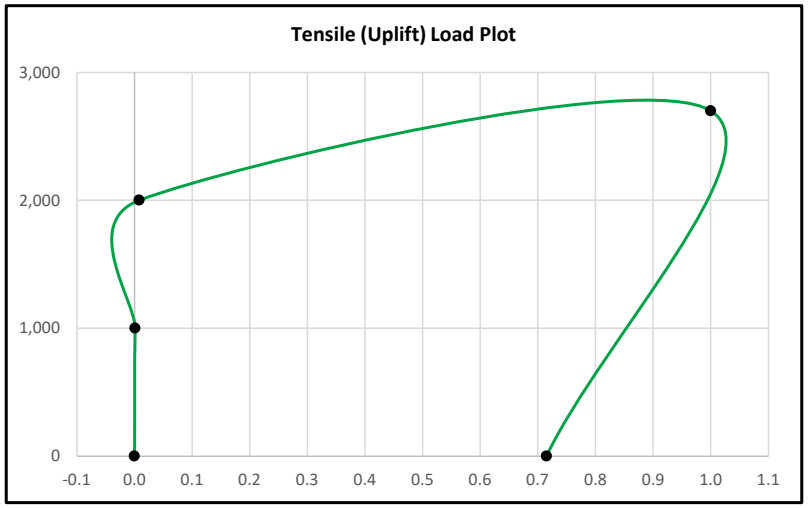
Depth (ft)	Time (s)
1	1.9
2	3.6
3	2.1
4	1.3
5	2.2
6	3.1
7	5.2
Total Time (s) =	19.4

Field Notes

Uplift: Pile released at 2,700 lbs.

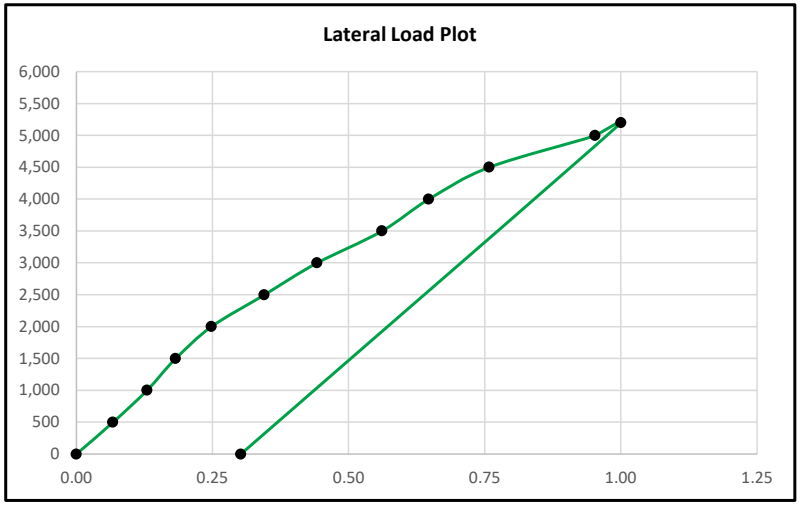
Tensile (Uplift) Testing

Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	1,000	1,000	0.0010	0.0010	0.0010
1	2,000	2,000	0.0080	0.0090	0.0085
1	3,000	2,700	1.0000	1.0000	1.0000
1	0	0	0.7150	0.7150	0.7150



Lateral Testing

Lateral Load Height Above Grade (ft):	4.0	Deflection Gauge Height (in):		6
Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	500	500	0.0640	0.0700	0.0670
1	1,000	1,000	0.1240	0.1350	0.1295
1	1,500	1,500	0.1750	0.1890	0.1820
1	2,000	2,000	0.2410	0.2550	0.2480
1	2,500	2,500	0.3350	0.3550	0.3450
1	3,000	3,000	0.4320	0.4520	0.4420
1	3,500	3,500	0.5600	0.5620	0.5610
1	4,000	4,000	0.6440	0.6500	0.6470
1	4,500	4,500	0.7530	0.7630	0.7580
1	5,000	5,000	0.9500	0.9550	0.9525
1	5,500	5,200	1.0000	1.0000	1.0000
1	0	0	0.3040	0.3000	0.3020



Pile Load Test Log

Project Name:	Balanced Rock Power - Ebba Solar	Embedment Depth (ft):	8.0	Pile ID:	PLT-10
Site Location:	Lincoln County, Colorado	Pushed to Depth (ft):	0.0	Pile Section:	W6x9
Date Installed:	3/8/2024	Pre-Excavation Depth (ft):	N/A	Pile Length (ft):	15.0
Date Tested:	3/12/224	Pre-Drill Diameter (in):	N/A	Total Drive Time (sec):	92.6
Location:	39.14545° N, 103.69731° W	Pre-Drill Depth (ft):	N/A	Avg. Installation Rate (sec/ft):	11.6

Embedment Data

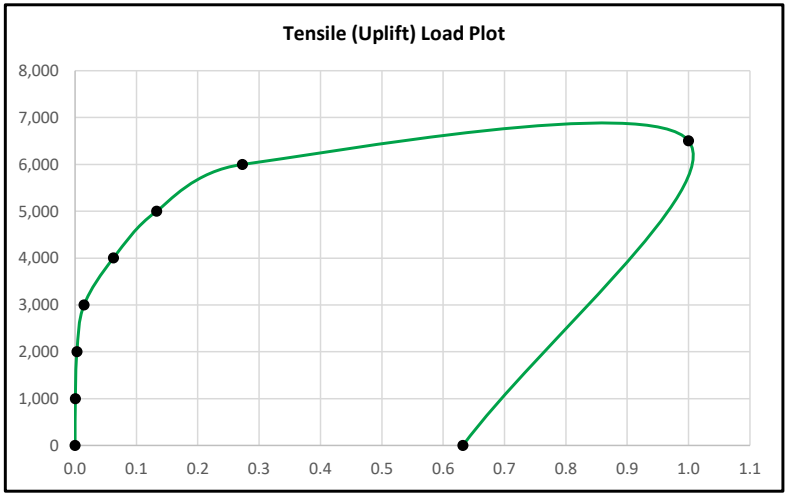
Depth (ft)	Time (s)
2	4.7
3	8.4
4	10.9
5	13.4
6	15.3
7	17.6
8	22.3
Total Time (s) =	92.6

Field Notes

Uplift: Pile released at 6,500 lbs.

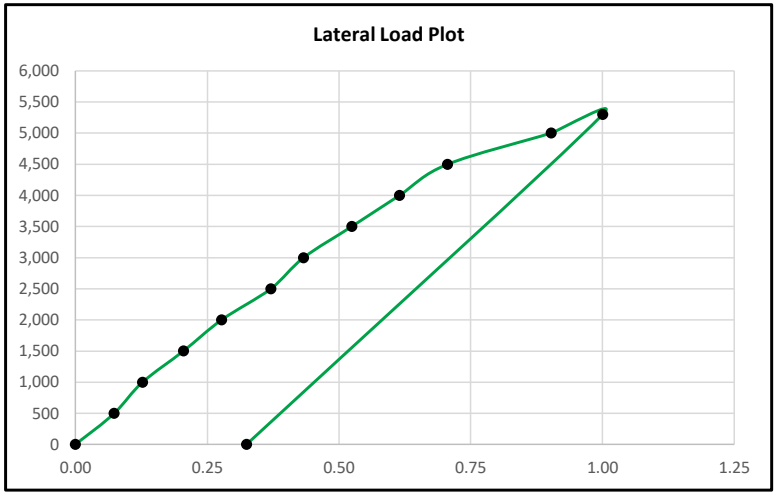
Tensile (Uplift) Testing

Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	1,000	1,000	0.0000	0.0010	0.0005
1	2,000	2,000	0.0020	0.0040	0.0030
1	3,000	3,000	0.0140	0.0150	0.0145
1	4,000	4,000	0.0620	0.0630	0.0625
1	5,000	5,000	0.1320	0.1340	0.1330
1	6,000	6,000	0.2720	0.2740	0.2730
1	7,000	6,500	1.0000	1.0000	1.0000
1	0	0	0.6340	0.6300	0.6320



Lateral Testing

Lateral Load Height Above Grade (ft):		4.0	Deflection Gauge Height (in):		6
Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	500	500	0.0750	0.0720	0.0735
1	1,000	1,000	0.1280	0.1260	0.1270
1	1,500	1,500	0.2050	0.2050	0.2050
1	2,000	2,000	0.2760	0.2780	0.2770
1	2,500	2,500	0.3690	0.3720	0.3705
1	3,000	3,000	0.4300	0.4350	0.4325
1	3,500	3,500	0.5220	0.5260	0.5240
1	4,000	4,000	0.6120	0.6170	0.6145
1	4,500	4,500	0.7040	0.7070	0.7055
1	5,000	5,000	0.9050	0.9000	0.9025
1	5,500	5,300	1.0000	1.0000	1.0000
1	0	0	0.3250	0.3240	0.3245



Pile Load Test Log

Project Name:	Balanced Rock Power - Ebba Solar	Embedment Depth (ft):	9.0	Pile ID:	PLT-11
Site Location:	Lincoln County, Colorado	Pushed to Depth (ft):	1.0	Pile Section:	W6x9
Date Installed:	3/8/2024	Pre-Excavation Depth (ft):	N/A	Pile Length (ft):	15.0
Date Tested:	3/12/224	Pre-Drill Diameter (in):	N/A	Total Drive Time (sec):	26.8
Location:	39.14097° N, 103.70621° W	Pre-Drill Depth (ft):	N/A	Avg. Installation Rate (sec/ft):	3.3

Embedment Data

Depth (ft)	Time (s)
2	5.6
3	4.8
4	2.7
5	2.5
6	2.6
7	2.5
8	2.6
9	3.4
Total Time (s) =	26.8

Tensile (Uplift) Testing

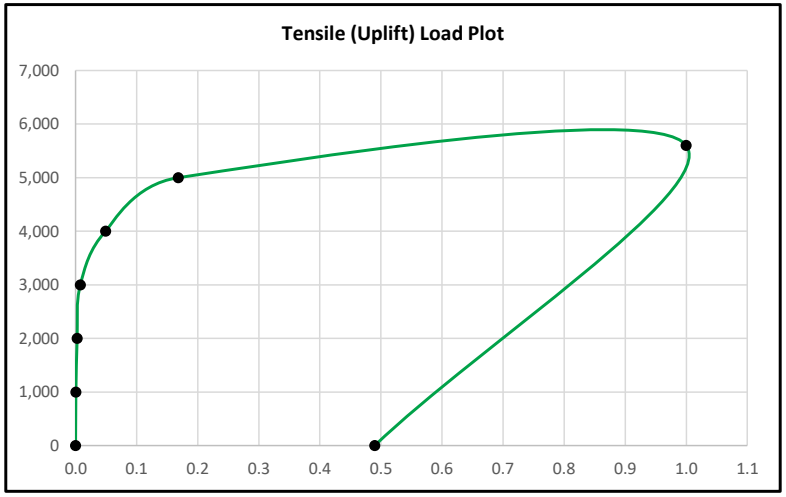
Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	1,000	1,000	0.0010	0.0000	0.0005
1	2,000	2,000	0.0020	0.0030	0.0025
1	3,000	3,000	0.0070	0.0080	0.0075
1	4,000	4,000	0.0450	0.0530	0.0490
1	5,000	5,000	0.1630	0.1730	0.1680
1	6,000	5,600	1.0000	1.0000	1.0000
1	0	0	0.4900	0.4900	0.4900

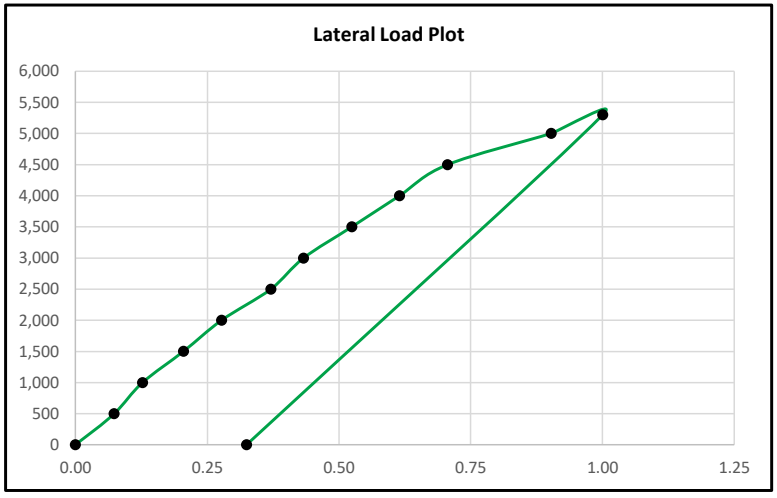
Lateral Testing

Lateral Load Height Above Grade (ft):	4.0		Deflection Gauge Height (in):		6
Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	500	500	0.0750	0.0720	0.0735
1	1,000	1,000	0.1280	0.1260	0.1270
1	1,500	1,500	0.2050	0.2050	0.2050
1	2,000	2,000	0.2760	0.2780	0.2770
1	2,500	2,500	0.3690	0.3720	0.3705
1	3,000	3,000	0.4300	0.4350	0.4325
1	3,500	3,500	0.5220	0.5260	0.5240
1	4,000	4,000	0.6120	0.6170	0.6145
1	4,500	4,500	0.7040	0.7070	0.7055
1	5,000	5,000	0.9050	0.9000	0.9025
1	5,500	5,300	1.0000	1.0000	1.0000
1	0	0	0.3250	0.3240	0.3245

Field Notes

Uplift: Pile released at 5,600 lbs.





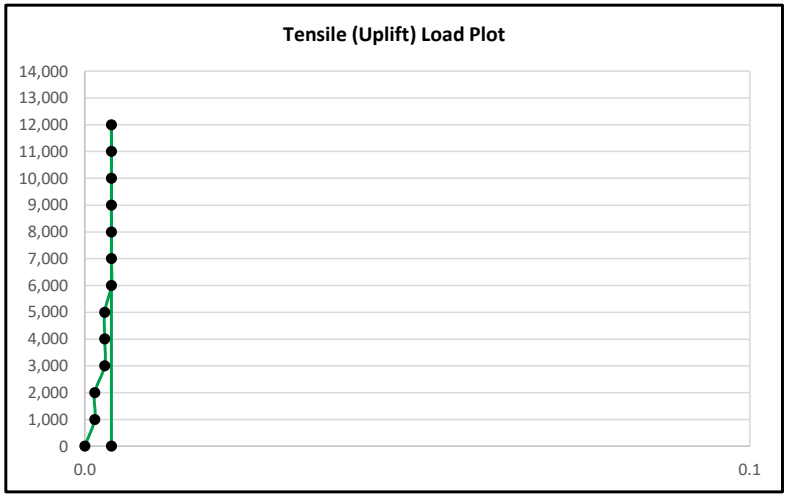
Pile Load Test Log

Project Name:	Balanced Rock Power - Ebba Solar	Embedment Depth (ft):	10.0	Pile ID:	PLT-12
Site Location:	Lincoln County, Colorado	Pushed to Depth (ft):	0.0	Pile Section:	W6x9
Date Installed:	3/9/2024	Pre-Excavation Depth (ft):	N/A	Pile Length (ft):	15.0
Date Tested:	3/12/2024	Pre-Drill Diameter (in):	N/A	Total Drive Time (sec):	207.1
Location:	39.13862° N, 103.71449° W	Pre-Drill Depth (ft):	N/A	Avg. Installation Rate (sec/ft):	20.7

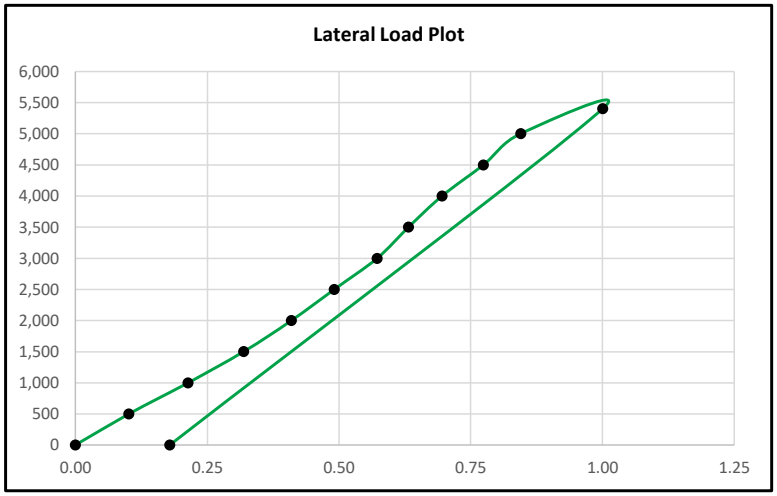
Embedment Data	
Depth (ft)	Time (s)
1	1.9
2	3.2
3	8.8
4	11.8
5	18.5
6	25.4
7	31.8
8	35.7
9	30.1
10	40.0
Total Time (s) =	207.1

Field Notes

Tensile (Uplift) Testing					
Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	1,000	1,000	0.0020	0.0010	0.0015
1	2,000	2,000	0.0020	0.0010	0.0015
1	3,000	3,000	0.0030	0.0030	0.0030
1	4,000	4,000	0.0030	0.0030	0.0030
1	5,000	5,000	0.0030	0.0030	0.0030
1	6,000	6,000	0.0040	0.0040	0.0040
1	7,000	7,000	0.0040	0.0040	0.0040
1	8,000	8,000	0.0040	0.0040	0.0040
1	9,000	9,000	0.0040	0.0040	0.0040
1	10,000	10,000	0.0040	0.0040	0.0040
1	11,000	11,000	0.0040	0.0040	0.0040
1	12,000	12,000	0.0040	0.0040	0.0040
1	0	0	0.0040	0.0040	0.0040



Lateral Testing					
Lateral Load Height Above Grade (ft):		4.0	Deflection Gauge Height (in):		6
Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	500	500	0.0970	0.1050	0.1010
1	1,000	1,000	0.2070	0.2200	0.2135
1	1,500	1,500	0.3130	0.3250	0.3190
1	2,000	2,000	0.4040	0.4150	0.4095
1	2,500	2,500	0.4860	0.4960	0.4910
1	3,000	3,000	0.5670	0.5770	0.5720
1	3,500	3,500	0.6270	0.6370	0.6320
1	4,000	4,000	0.6910	0.7000	0.6955
1	4,500	4,500	0.7680	0.7800	0.7740
1	5,000	5,000	0.8400	0.8500	0.8450
1	5,500	5,400	1.0000	1.0000	1.0000
1	0	0	0.1840	0.1740	0.1790



Pile Load Test Log

Project Name:	Balanced Rock Power - Ebba Solar	Embedment Depth (ft):	7.0	Pile ID:	PLT-13
Site Location:	Lincoln County, Colorado	Pushed to Depth (ft):	0.0	Pile Section:	W6x9
Date Installed:	3/8/2024	Pre-Excavation Depth (ft):	N/A	Pile Length (ft):	15.0
Date Tested:	3/12/2024	Pre-Drill Diameter (in):	N/A	Total Drive Time (sec):	55.8
Location:	39.13306° N, 103.70778° W	Pre-Drill Depth (ft):	N/A	Avg. Installation Rate (sec/ft):	8.0

Embedment Data

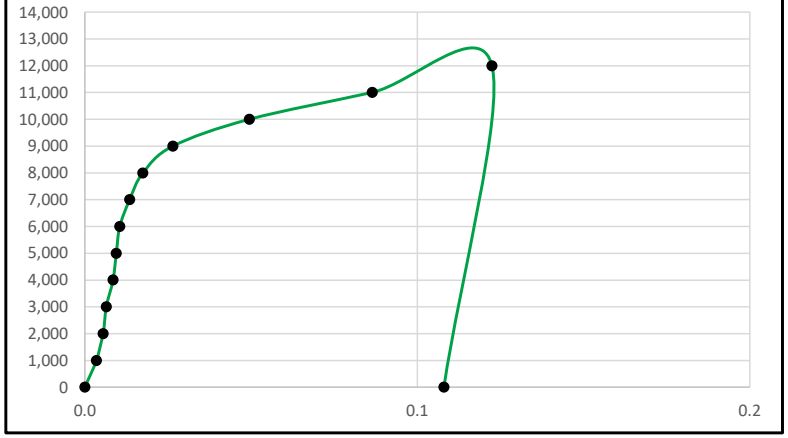
Depth (ft)	Time (s)
1	3.0
2	4.2
3	7.1
4	7.0
5	9.6
6	11.2
7	13.7
Total Time (s) =	55.8

Field Notes

Tensile (Uplift) Testing

Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	1,000	1,000	0.0030	0.0040	0.0035
1	2,000	2,000	0.0050	0.0060	0.0055
1	3,000	3,000	0.0060	0.0070	0.0065
1	4,000	4,000	0.0080	0.0090	0.0085
1	5,000	5,000	0.0090	0.0100	0.0095
1	6,000	6,000	0.0100	0.0110	0.0105
1	7,000	7,000	0.0130	0.0140	0.0135
1	8,000	8,000	0.0170	0.0180	0.0175
1	9,000	9,000	0.0260	0.0270	0.0265
1	10,000	10,000	0.0490	0.0500	0.0495
1	11,000	11,000	0.0860	0.0870	0.0865
1	12,000	12,000	0.1220	0.1230	0.1225
1	0	0	0.1070	0.1090	0.1080

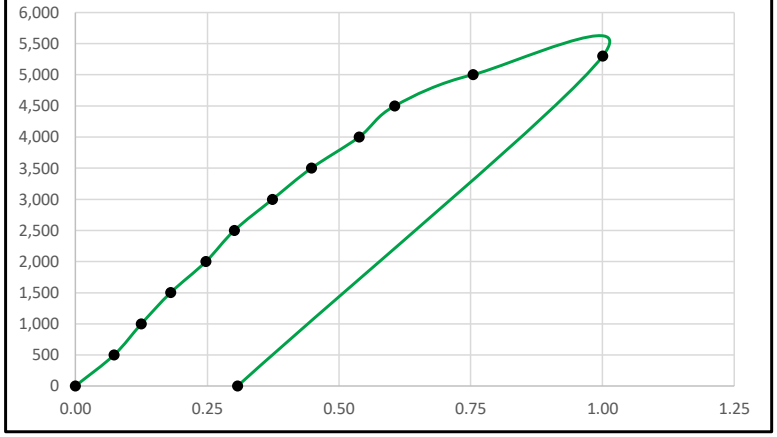
Tensile (Uplift) Load Plot



Lateral Testing

Lateral Load Height Above Grade (ft):		4.0	Deflection Gauge Height (in):		6
Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	500	500	0.0680	0.0780	0.0730
1	1,000	1,000	0.1200	0.1300	0.1250
1	1,500	1,500	0.1770	0.1840	0.1805
1	2,000	2,000	0.2430	0.2520	0.2475
1	2,500	2,500	0.2960	0.3070	0.3015
1	3,000	3,000	0.3670	0.3800	0.3735
1	3,500	3,500	0.4400	0.4550	0.4475
1	4,000	4,000	0.5330	0.5430	0.5380
1	4,500	4,500	0.5990	0.6120	0.6055
1	5,000	5,000	0.7570	0.7520	0.7545
1	5,500	5,300	1.0000	1.0000	1.0000
1	0	0	0.3100	0.3050	0.3075

Lateral Load Plot



Pile Load Test Log

Project Name:	Balanced Rock Power - Ebba Solar	Embedment Depth (ft):	8.0	Pile ID:	PLT-14
Site Location:	Lincoln County, Colorado	Pushed to Depth (ft):	0.0	Pile Section:	W6x9
Date Installed:	3/8/2024	Pre-Excavation Depth (ft):	N/A	Pile Length (ft):	15.0
Date Tested:	3/12/2024	Pre-Drill Diameter (in):	N/A	Total Drive Time (sec):	187.1
Location:	39.13304° N, 103.69759° W	Pre-Drill Depth (ft):	N/A	Avg. Installation Rate (sec/ft):	23.4

Embedment Data	
Depth (ft)	Time (s)
1	1.9
2	5.1
3	10.7
4	13.8
5	20.8
6	30.6
7	42.5
8	61.7
Total Time (s) =	187.1

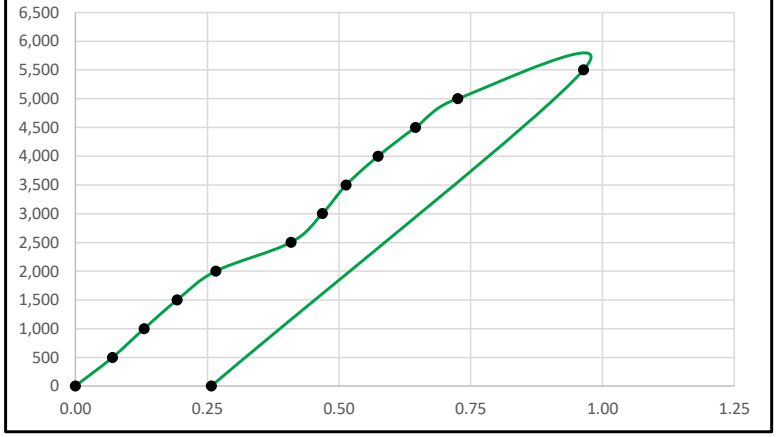
Field Notes

Tensile (Uplift) Testing					
Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	1,000	1,000	0.0030	0.0040	0.0035
1	2,000	2,000	0.0070	0.0060	0.0065
1	3,000	3,000	0.0100	0.0090	0.0095
1	4,000	4,000	0.0120	0.0110	0.0115
1	5,000	5,000	0.0160	0.0150	0.0155
1	6,000	6,000	0.0190	0.0180	0.0185
1	7,000	7,000	0.0230	0.0220	0.0225
1	8,000	8,000	0.0270	0.0260	0.0265
1	9,000	9,000	0.0310	0.0290	0.0300
1	10,000	10,000	0.0350	0.0340	0.0345
1	11,000	11,000	0.0410	0.0390	0.0400
1	12,000	12,000	0.0550	0.0540	0.0545
1	0	0	0.0360	0.0380	0.0370

Tensile (Uplift) Load Plot

Lateral Testing					
Lateral Load Height Above Grade (ft):		4.0	Deflection Gauge Height (in):		6
Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	500	500	0.0660	0.0740	0.0700
1	1,000	1,000	0.1260	0.1340	0.1300
1	1,500	1,500	0.1880	0.1980	0.1930
1	2,000	2,000	0.2610	0.2710	0.2660
1	2,500	2,500	0.4030	0.4150	0.4090
1	3,000	3,000	0.4620	0.4750	0.4685
1	3,500	3,500	0.5070	0.5200	0.5135
1	4,000	4,000	0.5680	0.5800	0.5740
1	4,500	4,500	0.6400	0.6500	0.6450
1	5,000	5,000	0.7200	0.7300	0.7250
1	5,500	5,500	0.9640	0.9640	0.9640
1	0	0	0.2570	0.2580	0.2575

Lateral Load Plot



Pile Load Test Log

Project Name:	Balanced Rock Power - Ebba Solar	Embedment Depth (ft):	9.0	Pile ID:	PLT-15
Site Location:	Lincoln County, Colorado	Pushed to Depth (ft):	0.0	Pile Section:	W6x9
Date Installed:	3/8/2024	Pre-Excavation Depth (ft):	N/A	Pile Length (ft):	15.0
Date Tested:	3/12/2024	Pre-Drill Diameter (in):	N/A	Total Drive Time (sec):	75.9
Location:	39.13014° N, 103.71323° W	Pre-Drill Depth (ft):	N/A	Avg. Installation Rate (sec/ft):	8.4

Embedment Data

Depth (ft)	Time (s)
1	1.5
2	3.7
3	8.6
4	6.6
5	7.3
6	8.5
7	9.8
8	14.9
9	15.0
Total Time (s) =	75.9

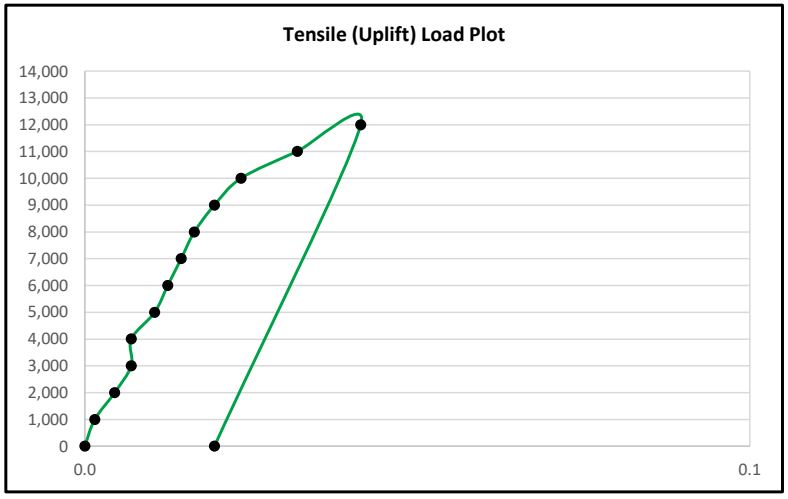
Field Notes

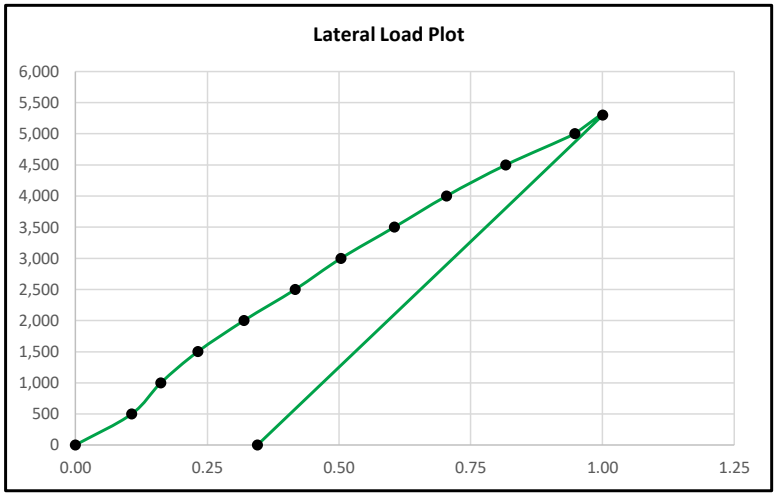
Tensile (Uplift) Testing

Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	1,000	1,000	0.0010	0.0020	0.0015
1	2,000	2,000	0.0040	0.0050	0.0045
1	3,000	3,000	0.0070	0.0070	0.0070
1	4,000	4,000	0.0070	0.0070	0.0070
1	5,000	5,000	0.0100	0.0110	0.0105
1	6,000	6,000	0.0120	0.0130	0.0125
1	7,000	7,000	0.0140	0.0150	0.0145
1	8,000	8,000	0.0160	0.0170	0.0165
1	9,000	9,000	0.0190	0.0200	0.0195
1	10,000	10,000	0.0220	0.0250	0.0235
1	11,000	11,000	0.0310	0.0330	0.0320
1	12,000	12,000	0.0410	0.0420	0.0415
1	0	0	0.0200	0.0190	0.0195

Lateral Testing

Lateral Load Height Above Grade (ft):		4.0	Deflection Gauge Height (in):		6
Hold Time (min)	Target Load (lbs)	Applied Load (lbs)	Deflection 1 (in.)	Deflection 2 (in.)	Average Deflection (in.)
1	0	0	0.0000	0.0000	0.0000
1	500	500	0.1080	0.1050	0.1065
1	1,000	1,000	0.1640	0.1600	0.1620
1	1,500	1,500	0.2340	0.2300	0.2320
1	2,000	2,000	0.3220	0.3170	0.3195
1	2,500	2,500	0.4190	0.4150	0.4170
1	3,000	3,000	0.5030	0.5040	0.5035
1	3,500	3,500	0.6100	0.6000	0.6050
1	4,000	4,000	0.7100	0.6980	0.7040
1	4,500	4,500	0.8250	0.8080	0.8165
1	5,000	5,000	0.9600	0.9350	0.9475
1	5,500	5,300	1.0000	1.0000	1.0000
1	0	0	0.3550	0.3350	0.3450





Attachment H

Seismic Hazard Mapping

ASCE Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Latitude:**	39.163852
Risk Category:	II	**Longitude:**	-103.696804
Soil Class:	D - Stiff Soil	**Elevation:**	5537.520858667197 ft (NAVD 88)

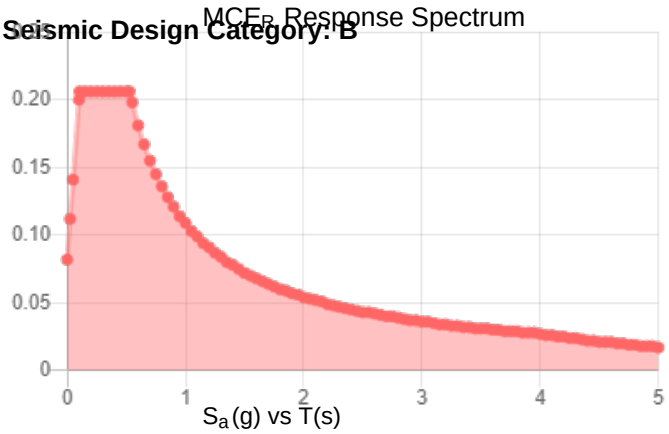
Seismic

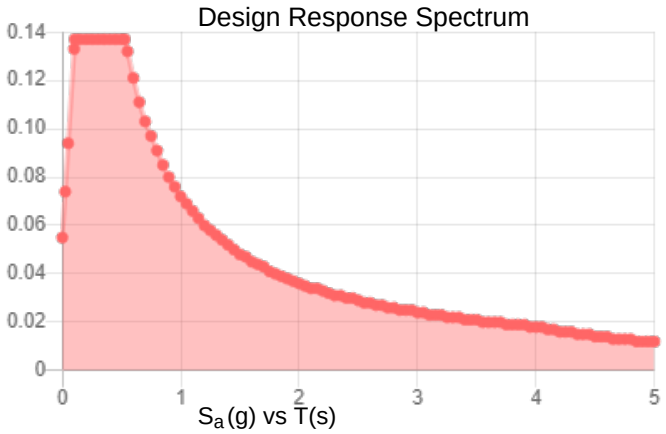
Site Soil Class: D - Stiff Soil

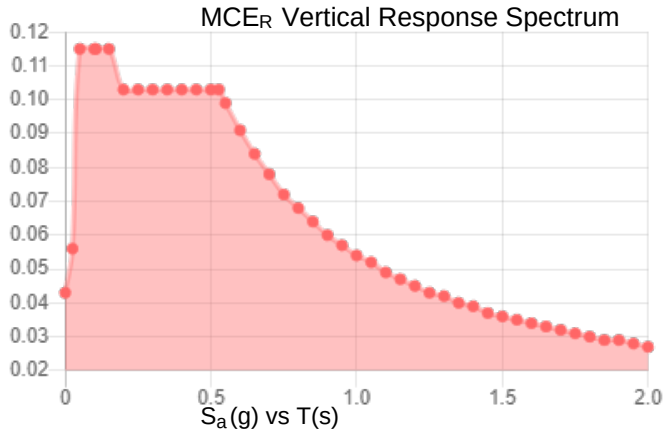
Results:

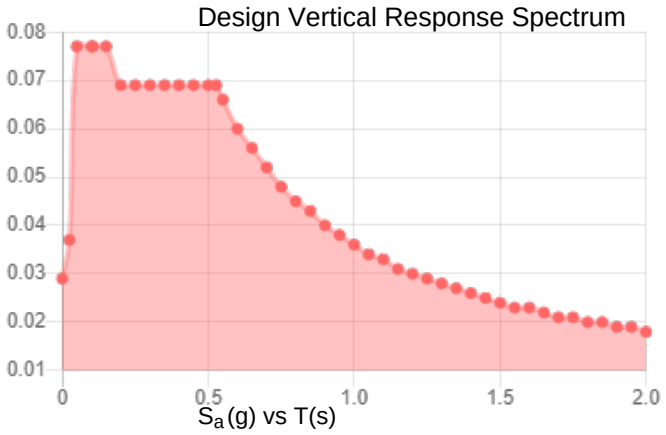
S_S :	0.129	S_{D1} :	0.072
S_1 :	0.045	T_L :	4
F_a :	1.6	PGA :	0.064
F_v :	2.4	PGA_M :	0.102
S_{MS} :	0.206	F_{PGA} :	1.6
S_{M1} :	0.109	I_e :	1
S_{DS} :	0.137	C_v :	0.7

Seismic Design Category: B









Data Accessed: **Wed Jan 10 2024**

Date Source:

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

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Attachment I

NRCS Mapping

United States Department of Agriculture

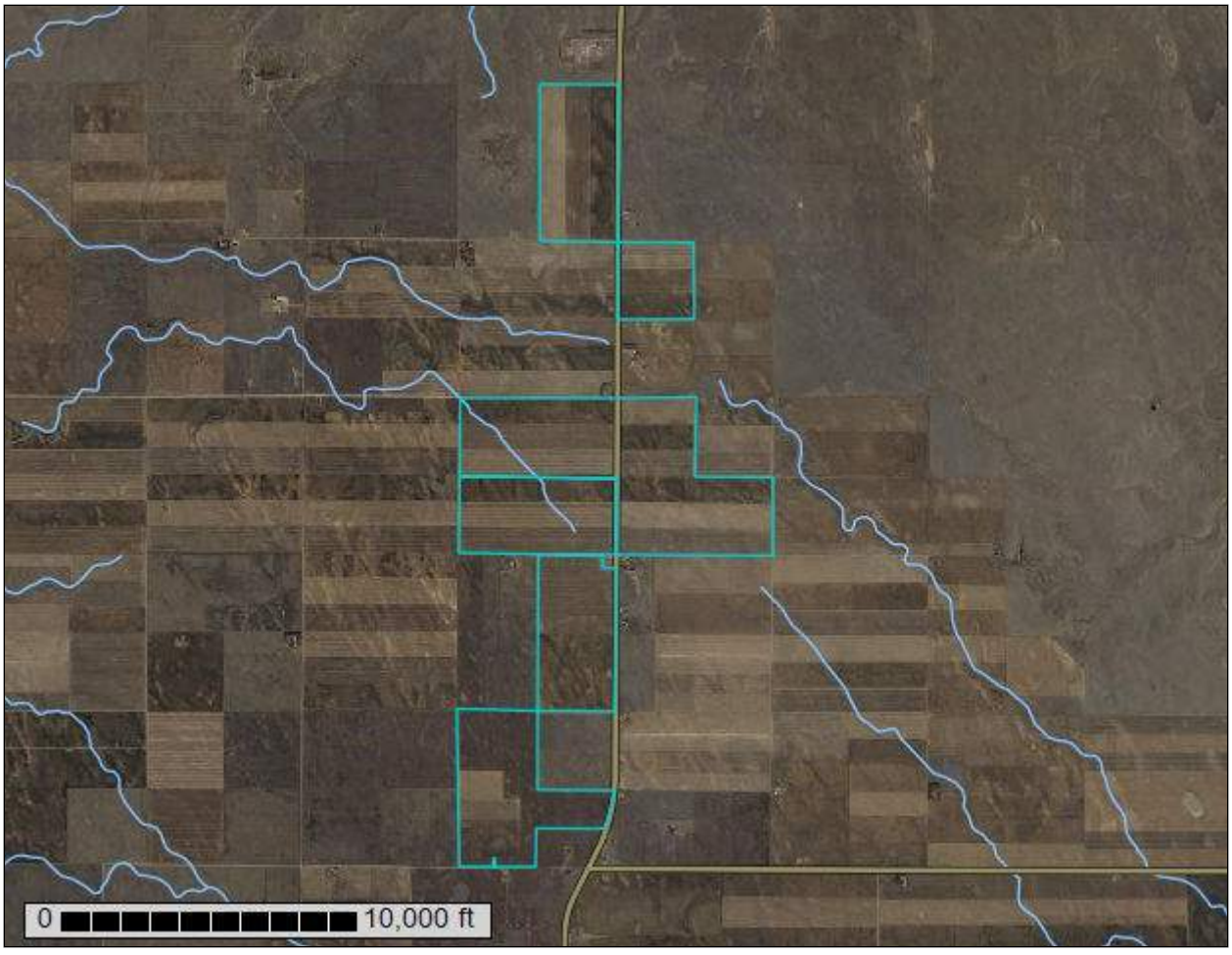
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Elbert County, Colorado, Eastern Part; and Lincoln County, Colorado

Ebba Solar NRCS Report



March 1, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map (Ebba Solar NRCS Report)

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:20,000 to 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Elbert County, Colorado, Eastern Part
Survey Area Data: Version 20, Aug 24, 2023

Soil Survey Area: Lincoln County, Colorado
Survey Area Data: Version 22, Aug 24, 2023

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 11, 2022—Apr 18, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (Ebba Solar NRCS Report)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AnC	Ascalon sandy loam, 3 to 5 percent slopes	1.9	0.1%
ApC2	Ascalon complex, 3 to 5 percent slopes, eroded	5.6	0.2%
Lo	Loamy alluvial land	0.1	0.0%
PmA	Platner loam, 0 to 3 percent slopes	0.6	0.0%
PsB	Platner-Ascalon sandy loams, 0 to 3 percent slopes	1.5	0.1%
Subtotals for Soil Survey Area		**9.7**	**0.4%**
Totals for Area of Interest		**2,313.0**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
101	Apishapa clay loam, 0 to 3 percent slopes, rarely ponded	31.6	1.4%
103	Ascalon sandy loam, 0 to 3 percent slopes	502.8	21.7%
104	Ascalon sandy loam, 3 to 5 percent slopes	304.8	13.2%
109	Ascalon-Haxtun complex, 0 to 3 percent slopes	81.7	3.5%
122	Colby-Weld silt loams, 1 to 5 percent slopes	50.3	2.2%
144	Kimst loam, 3 to 12 percent slopes	2.8	0.1%
169	Otero sandy loam, 1 to 3 percent slopes	75.6	3.3%
172	Platner loam, 0 to 3 percent slopes	73.9	3.2%
173	Platner-Ascalon complex, 0 to 3 percent slopes	358.1	15.5%
175	Rago silt loam, 0 to 2 percent slopes, rarely flooded	18.8	0.8%
179	Sampson loam, 0 to 2 percent slopes, rarely flooded	10.2	0.4%
197	Vona loamy sand, warm, 3 to 6 percent slopes	137.2	5.9%
209	Wages loam, 2 to 6 percent slopes	245.8	10.6%
213	Weld silt loam, 0 to 3 percent slopes	274.2	11.9%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
215	Wiley silt loam, 0 to 3 percent slopes	135.4	5.9%
Subtotals for Soil Survey Area		**2,303.2**	**99.6%**
Totals for Area of Interest		**2,313.0**	**100.0%**

Map Unit Descriptions (Ebba Solar NRCS Report)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Elbert County, Colorado, Eastern Part

AnC—Ascalon sandy loam, 3 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2tlnt
Elevation: 3,550 to 5,970 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 135 to 160 days
Farmland classification: Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60

Map Unit Composition

Ascalon and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ascalon

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind-reworked alluvium and/or calcareous sandy eolian deposits

Typical profile

Ap - 0 to 6 inches: sandy loam
Bt1 - 6 to 12 inches: sandy clay loam
Bt2 - 12 to 19 inches: sandy clay loam
Bk - 19 to 35 inches: sandy clay loam
C - 35 to 80 inches: sandy loam

Properties and qualities

Slope: 3 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline (0.1 to 1.9 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: B
Ecological site: R067BY024CO - Sandy Plains, R072XY111KS - Sandy Plains

Hydric soil rating: No

Minor Components

Stoneham

Percent of map unit: 10 percent
Landform: Interfluves
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY002CO - Loamy Plains, R072XY100KS - Loamy Tableland
Hydric soil rating: No

Vona

Percent of map unit: 8 percent
Landform: Interfluves
Landform position (two-dimensional): Shoulder, backslope, footslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY024CO - Sandy Plains, R072XY111KS - Sandy Plains
Hydric soil rating: No

Platner

Percent of map unit: 2 percent
Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY002CO - Loamy Plains, R072XY100KS - Loamy Tableland
Hydric soil rating: No

ApC2—Ascalon complex, 3 to 5 percent slopes, eroded

Map Unit Setting

National map unit symbol: 364h
Elevation: 4,500 to 6,500 feet
Mean annual precipitation: 13 to 17 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 130 to 160 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Ascalon, eroded, and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ascalon, Eroded

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Outwash

Typical profile

H1 - 0 to 7 inches: sandy clay loam
H2 - 7 to 19 inches: sandy clay loam
H3 - 19 to 24 inches: sandy loam
H4 - 24 to 60 inches: sandy loam

Properties and qualities

Slope: 3 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

Minor Components

Stoneham

Percent of map unit: 9 percent
Hydric soil rating: No

Yoder

Percent of map unit: 9 percent
Hydric soil rating: No

Bresser

Percent of map unit: 7 percent
Hydric soil rating: No

Lo—Loamy alluvial land

Map Unit Setting

National map unit symbol: 365b
Elevation: 3,500 to 6,000 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 125 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Loamy alluvial land: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Loamy Alluvial Land

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 18 inches: loam
H2 - 18 to 60 inches: stratified clay loam to sand

Properties and qualities

Slope: 0 to 3 percent
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Frequency of flooding: Occasional
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: B
Ecological site: R067BY036CO - Overflow
Other vegetative classification: OVERFLOW (067BY036CO)
Hydric soil rating: No

Minor Components

Bankard
Percent of map unit: 15 percent
Hydric soil rating: No

Haverson
Percent of map unit: 15 percent
Hydric soil rating: No

PmA—Platner loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 2tln0
Elevation: 4,000 to 4,930 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 135 to 160 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Platner and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Platner

Setting
Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed eolian deposits over tertiary aged alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile
Ap - 0 to 6 inches: loam
Bt1 - 6 to 11 inches: clay
Bt2 - 11 to 20 inches: clay
Bk1 - 20 to 27 inches: loam
Bk2 - 27 to 37 inches: sandy clay loam
C - 37 to 80 inches: sandy clay loam

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline (0.0 to 1.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Minor Components

Ascalon

Percent of map unit: 10 percent
Landform: Interfluves
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Rago, rarely flooded

Percent of map unit: 4 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R067BY036CO - Overflow
Hydric soil rating: No

Rago, ponded

Percent of map unit: 1 percent
Landform: Playas
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R067BY010CO - Closed Depression
Hydric soil rating: No

PsB—Platner-Ascalon sandy loams, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tlpg
Elevation: 5,300 to 6,100 feet
Mean annual precipitation: 12 to 17 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Platner and similar soils: 40 percent
Ascalon and similar soils: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Platner

Setting

Landform: Interfluves
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed eolian deposits over calcareous tertiary alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

Ap - 0 to 7 inches: sandy loam
Bt1 - 7 to 15 inches: clay loam
Bt2 - 15 to 19 inches: clay loam
Btk - 19 to 26 inches: sandy clay loam
Bk - 26 to 42 inches: sandy clay loam
C - 42 to 80 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.1 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

Description of Ascalon

Setting

Landform: Interfluves
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind-reworked alluvium and/or calcareous sandy eolian deposits

Typical profile

Ap - 0 to 4 inches: sandy loam
Bt1 - 4 to 7 inches: sandy clay loam
Bt2 - 7 to 15 inches: sandy clay loam
Bk1 - 15 to 29 inches: fine sandy loam
Bk2 - 29 to 80 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.1 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

Minor Components

Stoneham

Percent of map unit: 10 percent
Landform: Interfluves
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

Ascalon, 3 to 5 percent slopes

Percent of map unit: 10 percent
Landform: Interfluves, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear

Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

Pleasant

Percent of map unit: 5 percent
Landform: Closed depressions
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R067BY010CO - Closed Depression
Hydric soil rating: No

Lincoln County, Colorado

101—Apishapa clay loam, 0 to 3 percent slopes, rarely ponded

Map Unit Setting

National map unit symbol: 3j84
Elevation: 4,400 to 6,000 feet
Mean annual precipitation: 11 to 16 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 135 to 155 days
Farmland classification: Not prime farmland

Map Unit Composition

Apishapa, rarely ponded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Apishapa, Rarely Ponded

Setting

Landform: Depressions
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alkaline clayey alluvium

Typical profile

Ap - 0 to 8 inches: clay loam
C - 8 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Rare
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: R067BY010CO - Closed Depression
Hydric soil rating: Yes

Minor Components

Rago

Percent of map unit: 5 percent
Landform: Flood plains

Ecological site: R067BY036CO - Overflow
Hydric soil rating: No

Satanta

Percent of map unit: 5 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Ecological site: R067BY002CO - Loamy Plains
Other vegetative classification: LOAMY PLAINS (067XY002CO_1)
Hydric soil rating: No

103—Ascalon sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2swl3
Elevation: 3,870 to 5,960 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 135 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Ascalon and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ascalon

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind-reworked alluvium and/or calcareous sandy eolian deposits

Typical profile

Ap - 0 to 6 inches: sandy loam
Bt1 - 6 to 12 inches: sandy clay loam
Bt2 - 12 to 19 inches: sandy clay loam
Bk - 19 to 35 inches: sandy clay loam
C - 35 to 80 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.1 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: B
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

Minor Components

Olnest

Percent of map unit: 10 percent
Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

Vona

Percent of map unit: 5 percent
Landform: Interfluves
Landform position (two-dimensional): Summit
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

104—Ascalon sandy loam, 3 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2tlnt
Elevation: 3,550 to 5,970 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 135 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Ascalon and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ascalon

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind-reworked alluvium and/or calcareous sandy eolian deposits

Typical profile

Ap - 0 to 6 inches: sandy loam
Bt1 - 6 to 12 inches: sandy clay loam
Bt2 - 12 to 19 inches: sandy clay loam
Bk - 19 to 35 inches: sandy clay loam
C - 35 to 80 inches: sandy loam

Properties and qualities

Slope: 3 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline (0.1 to 1.9 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: B
Ecological site: R067BY024CO - Sandy Plains, R072XY111KS - Sandy Plains
Hydric soil rating: No

Minor Components

Stoneham

Percent of map unit: 10 percent
Landform: Interfluves
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R072XY100KS - Loamy Tableland , R067BY002CO - Loamy Plains
Hydric soil rating: No

Vona

Percent of map unit: 8 percent
Landform: Interfluves
Landform position (two-dimensional): Shoulder, backslope, footslope

Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY024CO - Sandy Plains, R072XY111KS - Sandy Plains
Hydric soil rating: No

Platner

Percent of map unit: 2 percent
Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY002CO - Loamy Plains, R072XY100KS - Loamy Tableland
Hydric soil rating: No

109—Ascalon-Haxtun complex, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 3j8d
Elevation: 4,400 to 6,000 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 135 to 155 days
Farmland classification: Not prime farmland

Map Unit Composition

Ascalon and similar soils: 55 percent
Haxtun and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ascalon

Setting

Landform: Plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits

Typical profile

Ap - 0 to 4 inches: sandy loam
Bt - 4 to 15 inches: sandy clay loam
Bk - 15 to 60 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: B
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

Description of Haxtun

Setting

Landform: Drainageways
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and/or eolian deposits

Typical profile

Ap - 0 to 4 inches: loamy sand
BA - 4 to 17 inches: sandy loam
Bt - 17 to 44 inches: sandy clay loam
Btkb - 44 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

Minor Components

Olnest

Percent of map unit: 3 percent
Landform: Plains

Ecological site: R067BY024CO - Sandy Plains
Other vegetative classification: SANDY PLAINS (067XY024CO_1)
Hydric soil rating: No

Otero

Percent of map unit: 3 percent
Landform: Hills
Landform position (three-dimensional): Side slope
Ecological site: R067BY024CO - Sandy Plains
Other vegetative classification: SANDY PLAINS (067XY024CO_1)
Hydric soil rating: No

Platner

Percent of map unit: 3 percent
Landform: Plains
Ecological site: R067BY002CO - Loamy Plains
Other vegetative classification: LOAMY PLAINS (067XY002CO_1)
Hydric soil rating: No

Pleasant

Percent of map unit: 3 percent
Landform: Depressions
Ecological site: R067BY010CO - Closed Depression
Hydric soil rating: Yes

Vona

Percent of map unit: 3 percent
Landform: Hills
Landform position (three-dimensional): Side slope
Ecological site: R067BY024CO - Sandy Plains
Other vegetative classification: SANDY PLAINS (067XY024CO_1)
Hydric soil rating: No

122—Colby-Weld silt loams, 1 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2t52z
Elevation: 4,700 to 5,800 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Colby and similar soils: 50 percent
Weld and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Colby

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Head slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 5 inches: silt loam
Bk1 - 5 to 16 inches: silt loam
Bk2 - 16 to 32 inches: silt loam
Bk3 - 32 to 79 inches: silt loam

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Maximum salinity: Very slightly saline (2.0 to 3.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.6 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R067BY002CO - Loamy Plains
Forage suitability group: Loamy (G067BW017CO)
Other vegetative classification: Loamy (G067BW017CO)
Hydric soil rating: No

Description of Weld

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Typical profile

A - 0 to 4 inches: silt loam
Bt - 4 to 19 inches: silty clay
Btk - 19 to 33 inches: silty clay loam
Bk - 33 to 44 inches: silty clay loam
BCk - 44 to 79 inches: silt loam

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Maximum salinity: Very slightly saline (2.0 to 3.9 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Minor Components

Keith

Percent of map unit: 5 percent
Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Pleasant

Percent of map unit: 3 percent
Landform: Closed depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R067BY010CO - Closed Depression
Hydric soil rating: No

Karval

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R067BY063CO - Gravel Breaks
Other vegetative classification: GRAVEL BREAKS (067XY063CO_1)
Hydric soil rating: No

144—Kimst loam, 3 to 12 percent slopes

Map Unit Setting

National map unit symbol: 3jhc
Elevation: 4,400 to 6,000 feet
Mean annual precipitation: 11 to 16 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 135 to 155 days
Farmland classification: Not prime farmland

Map Unit Composition

Kimst and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kimst

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and/or eolian deposits

Typical profile

Ap - 0 to 5 inches: loam
Bk - 5 to 60 inches: sandy clay loam

Properties and qualities

Slope: 3 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Minor Components

Apishapa, rarely ponded
Percent of map unit: 3 percent
Landform: Depressions
Ecological site: R067BY010CO - Closed Depression
Hydric soil rating: Yes

Arvada
Percent of map unit: 3 percent
Landform: Fans, drainageways
Ecological site: R067BY033CO - Salt Flat
Other vegetative classification: Salt Flat (069AY033CO_1)
Hydric soil rating: No

Karval
Percent of map unit: 2 percent
Landform: Hills
Landform position (three-dimensional): Side slope
Ecological site: R067BY063CO - Gravel Breaks
Other vegetative classification: GRAVEL BREAKS (067XY063CO_1)
Hydric soil rating: No

Vona
Percent of map unit: 2 percent
Landform: Hills
Landform position (three-dimensional): Side slope
Ecological site: R067BY024CO - Sandy Plains
Other vegetative classification: SANDY PLAINS (067XY024CO_1)
Hydric soil rating: No

169—Otero sandy loam, 1 to 3 percent slopes

Map Unit Setting
National map unit symbol: 2w4pj
Elevation: 3,430 to 5,580 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition
Otero and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Otero

Setting
Landform: Interfluves

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Old alluvium and/or eolian deposits

Typical profile

A - 0 to 6 inches: sandy loam
Bw - 6 to 14 inches: sandy loam
Bk - 14 to 79 inches: sandy loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 8 percent
Maximum salinity: Very slightly saline (2.0 to 3.9 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: A
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

Minor Components

Vona

Percent of map unit: 10 percent
Landform: Interfluves
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

Fort collins

Percent of map unit: 3 percent
Landform: Interfluves
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Ascalon

Percent of map unit: 2 percent
Landform: Interfluves
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

172—Platner loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tln0
Elevation: 4,000 to 4,930 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 135 to 160 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Platner and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Platner

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed eolian deposits over tertiary aged alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

Ap - 0 to 6 inches: loam
Bt1 - 6 to 11 inches: clay
Bt2 - 11 to 20 inches: clay
Bk1 - 20 to 27 inches: loam
Bk2 - 27 to 37 inches: sandy clay loam
C - 37 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline (0.0 to 1.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): 3s

Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Minor Components

Ascalon
Percent of map unit: 10 percent
Landform: Interfluves
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Rago, rarely flooded
Percent of map unit: 4 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R067BY036CO - Overflow
Hydric soil rating: No

Rago, ponded
Percent of map unit: 1 percent
Landform: Playas
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R067BY010CO - Closed Depression
Hydric soil rating: No

173—Platner-Ascalon complex, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 2tlpc
Elevation: 5,000 to 5,900 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 120 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Platner and similar soils: 50 percent
Ascalon and similar soils: 35 percent

Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Platner

Setting

Landform: Interfluves
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed eolian deposits over calcareous tertiary alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

Ap - 0 to 6 inches: loam
Bt1 - 6 to 11 inches: clay
Bt2 - 11 to 20 inches: clay
Bk1 - 20 to 27 inches: loam
Bk2 - 27 to 37 inches: sandy clay loam
C - 37 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.1 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: C
Ecological site: R069XY006CO - Loamy Plains, R067BY002CO - Loamy Plains
Hydric soil rating: No

Description of Ascalon

Setting

Landform: Interfluves
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind-reworked alluvium and/or calcareous sandy eolian deposits

Typical profile

Ap - 0 to 6 inches: sandy loam
Bt1 - 6 to 12 inches: sandy clay loam
Bt2 - 12 to 19 inches: sandy clay loam
Bk - 19 to 35 inches: sandy clay loam
C - 35 to 80 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.1 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: B
Ecological site: R069XY026CO - Sandy Plains, R067BY024CO - Sandy Plains
Hydric soil rating: No

Minor Components

Otero

Percent of map unit: 8 percent
Landform: Interfluves
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R069XY026CO - Sandy Plains, R067BY024CO - Sandy Plains
Hydric soil rating: No

Pleasant

Percent of map unit: 7 percent
Landform: Closed depressions
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R067BY010CO - Closed Depression
Hydric soil rating: No

175—Rago silt loam, 0 to 2 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: 3jjc
Elevation: 4,400 to 6,000 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 135 to 155 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Rago, rarely flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rago, Rarely Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

Ap - 0 to 10 inches: silt loam
Btkb - 10 to 47 inches: silty clay
Bk - 47 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: C
Ecological site: R067BY036CO - Overflow
Hydric soil rating: No

Minor Components

Keith

Percent of map unit: 5 percent
Landform: Plains
Ecological site: R067BY002CO - Loamy Plains
Other vegetative classification: LOAMY PLAINS (067XY002CO_1)
Hydric soil rating: No

Pleasant

Percent of map unit: 5 percent
Landform: Depressions
Ecological site: R067BY010CO - Closed Depression
Hydric soil rating: Yes

179—Sampson loam, 0 to 2 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: 3jjh
Elevation: 4,400 to 6,000 feet
Mean annual precipitation: 11 to 16 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 135 to 155 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Sampson, rarely flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sampson, Rarely Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 7 inches: loam
Bt - 7 to 36 inches: clay loam
Bk - 36 to 60 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: C
Ecological site: R067BY036CO - Overflow
Hydric soil rating: No

Minor Components

Apishapa, rarely ponded
Percent of map unit: 4 percent
Landform: Depressions
Ecological site: R067BY010CO - Closed Depression
Hydric soil rating: Yes

Fort collins
Percent of map unit: 3 percent
Landform: Plains
Ecological site: R067BY002CO - Loamy Plains
Other vegetative classification: LOAMY PLAINS (067XY002CO_1)
Hydric soil rating: No

Vona
Percent of map unit: 3 percent
Landform: Hills
Landform position (three-dimensional): Side slope
Ecological site: R067BY024CO - Sandy Plains
Other vegetative classification: SANDY PLAINS (067XY024CO_1)
Hydric soil rating: No

197—Vona loamy sand, warm, 3 to 6 percent slopes

Map Unit Setting
National map unit symbol: 2t515
Elevation: 3,420 to 5,580 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60

Map Unit Composition
Vona, warm, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vona, Warm

Setting
Landform: Sand sheets
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian sands

Typical profile

Ap - 0 to 7 inches: loamy sand
Bt - 7 to 16 inches: sandy loam
Bk1 - 16 to 25 inches: sandy loam
Bk2 - 25 to 79 inches: loamy sand

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R067BY024CO - Sandy Plains
Forage suitability group: Loamy, Dry (G067BW019CO)
Other vegetative classification: Loamy, Dry (G067BW019CO)
Hydric soil rating: No

Minor Components

Olnest, warm

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY024CO - Sandy Plains
Other vegetative classification: Loamy, Dry (G067BW019CO)
Hydric soil rating: No

Otero

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY024CO - Sandy Plains
Other vegetative classification: Loamy, Dry (G067BW019CO), SANDY PLAINS (067XY024CO_1)
Hydric soil rating: No

Valent, warm

Percent of map unit: 5 percent

Landform: Sand sheets
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R067BY015CO - Deep Sand
Other vegetative classification: Sandy, Dry (G067BW026CO), Deep Sands #15 (067XY015CO_3)
Hydric soil rating: No

209—Wages loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2xst5
Elevation: 3,820 to 5,800 feet
Mean annual precipitation: 13 to 20 inches
Mean annual air temperature: 46 to 54 degrees F
Frost-free period: 135 to 165 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Wages and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wages

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium and/or eolian deposits

Typical profile

Ap - 0 to 5 inches: loam
Bt - 5 to 12 inches: loam
Bk - 12 to 17 inches: loam
C - 17 to 80 inches: loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Calcium carbonate, maximum content: 12 percent
Maximum salinity: Nonsaline to very slightly saline (0.1 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Minor Components

Kimst

Percent of map unit: 5 percent
Landform: Interfluves
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Platner

Percent of map unit: 3 percent
Landform: Interfluves
Landform position (two-dimensional): Summit
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Pleasant, rarely ponded

Percent of map unit: 2 percent
Landform: Closed depressions
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R067BY010CO - Closed Depression
Hydric soil rating: No

213—Weld silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2x0hx
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 12 to 18 inches
Mean annual air temperature: 46 to 54 degrees F
Frost-free period: 115 to 155 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Weld and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Weld

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous loess

Typical profile

Ap - 0 to 3 inches: silt loam
Bt1 - 3 to 11 inches: silty clay
Bt2 - 11 to 15 inches: silty clay
Btk - 15 to 21 inches: silty clay
Bk - 21 to 31 inches: silt loam
C - 31 to 80 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Maximum salinity: Nonsaline to very slightly saline (0.1 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: High (about 11.7 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: C
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Minor Components

Colby

Percent of map unit: 7 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Keith

Percent of map unit: 5 percent
Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Adena

Percent of map unit: 5 percent
Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Rago, rarely flooded

Percent of map unit: 2 percent
Landform: Drainageways
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R067BY036CO - Overflow
Hydric soil rating: No

Pleasant, ponded

Percent of map unit: 1 percent
Landform: Closed depressions, playas
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R067BY010CO - Closed Depression
Hydric soil rating: Yes

215—Wiley silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 3jkn
Elevation: 4,400 to 6,000 feet
Mean annual precipitation: 11 to 16 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 135 to 155 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Wiley and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wiley

Setting

Landform: Plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 4 inches: silt loam
Btk - 4 to 23 inches: silty clay loam
C - 23 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Minor Components

Arvada

Percent of map unit: 3 percent
Landform: Fans, drainageways
Ecological site: R067BY033CO - Salt Flat
Other vegetative classification: Salt Flat (069AY033CO_1)
Hydric soil rating: No

Colby

Percent of map unit: 3 percent
Landform: Plains
Ecological site: R067BY002CO - Loamy Plains
Other vegetative classification: Loamy Plains (067XY002)
Hydric soil rating: No

Karval

Percent of map unit: 3 percent
Landform: Hills
Landform position (three-dimensional): Side slope
Ecological site: R067BY063CO - Gravel Breaks
Other vegetative classification: GRAVEL BREAKS (067XY063CO_1)
Hydric soil rating: No

Pleasant

Percent of map unit: 3 percent
Landform: Depressions
Ecological site: R067BY010CO - Closed Depression
Hydric soil rating: Yes

Vona

Percent of map unit: 3 percent
Landform: Hills
Landform position (three-dimensional): Side slope
Ecological site: R067BY024CO - Sandy Plains
Other vegetative classification: SANDY PLAINS (067XY024CO_1)
Hydric soil rating: No

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

Building Site Development

Building site development interpretations are designed to be used as tools for evaluating soil suitability and identifying soil limitations for various construction purposes. As part of the interpretation process, the rating applies to each soil in its described condition and does not consider present land use. Example interpretations can include corrosion of concrete and steel, shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping.

Corrosion of Concrete (Ebba Solar NRCS Report)

ENG

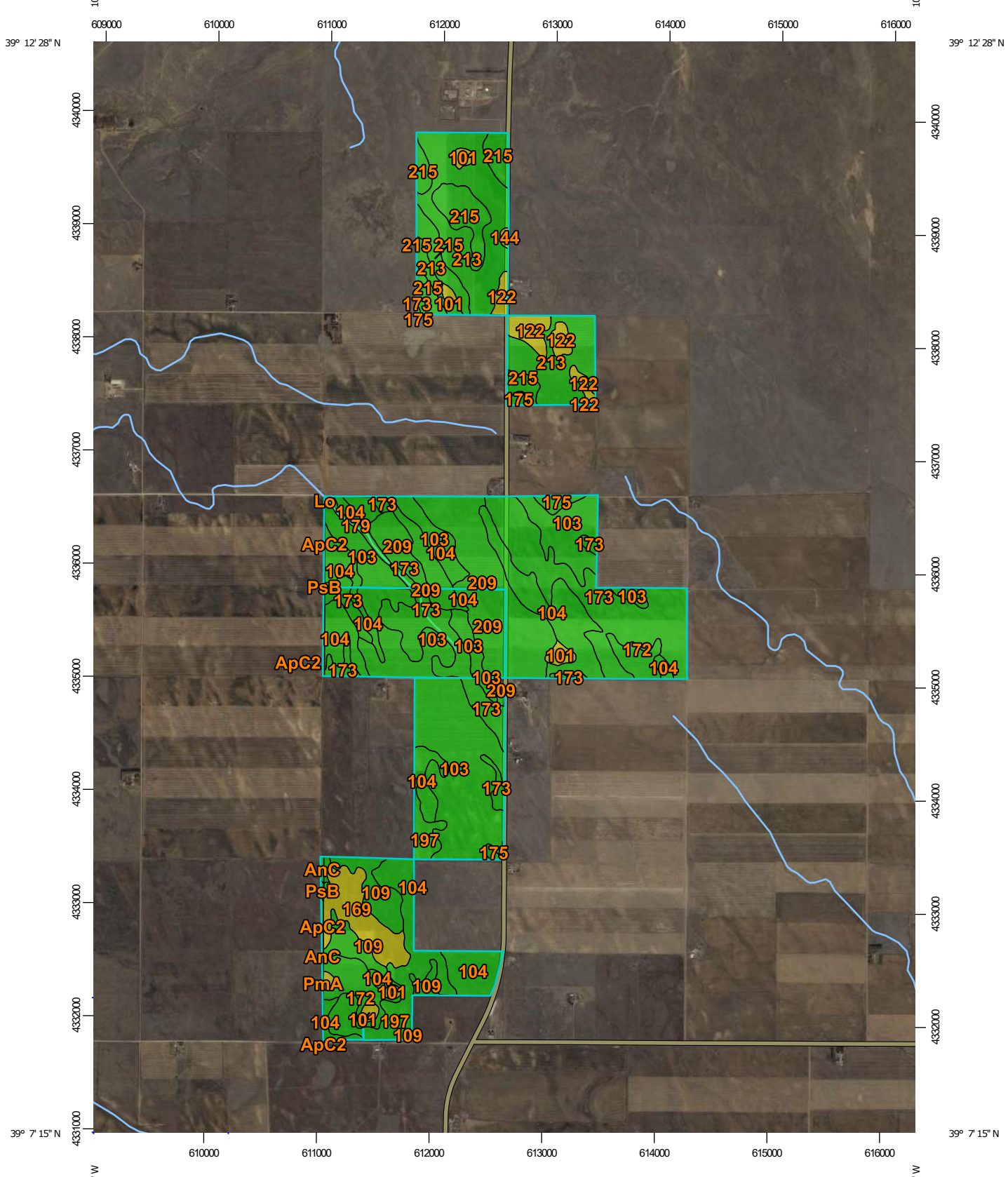
Engineering

AGR

Agronomy

"Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens concrete. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the concrete in installations that are entirely within one kind of soil or within one soil layer.

The risk of corrosion is expressed as "low," "moderate," or "high."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ApC2
Map Scale: 1:47,000 if printed on A portrait (8.5" x 11") sheet.
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Feet
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Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

High

Moderate

Low

Not rated or not available

Soil Rating Lines

High

Moderate

Low

Not rated or not available

Soil Rating Points

High

Moderate

Low

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:20,000 to 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Elbert County, Colorado, Eastern Part
Survey Area Data: Version 20, Aug 24, 2023

Soil Survey Area: Lincoln County, Colorado
Survey Area Data: Version 22, Aug 24, 2023

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 11, 2022—Apr 18, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Corrosion of Concrete (Ebba Solar NRCS Report)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AnC	Ascalon sandy loam, 3 to 5 percent slopes	Low	1.9	0.1%
ApC2	Ascalon complex, 3 to 5 percent slopes, eroded	Low	5.6	0.2%
Lo	Loamy alluvial land	Low	0.1	0.0%
PmA	Platner loam, 0 to 3 percent slopes	Low	0.6	0.0%
PsB	Platner-Ascalon sandy loams, 0 to 3 percent slopes	Low	1.5	0.1%
Subtotals for Soil Survey Area			**9.7**	**0.4%**
Totals for Area of Interest			**2,313.0**	**100.0%**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
101	Apishapa clay loam, 0 to 3 percent slopes, rarely ponded	Moderate	31.6	1.4%
103	Ascalon sandy loam, 0 to 3 percent slopes	Low	502.8	21.7%
104	Ascalon sandy loam, 3 to 5 percent slopes	Low	304.8	13.2%
109	Ascalon-Haxtun complex, 0 to 3 percent slopes	Low	81.7	3.5%
122	Colby-Weld silt loams, 1 to 5 percent slopes	Moderate	50.3	2.2%
144	Kimst loam, 3 to 12 percent slopes	Moderate	2.8	0.1%
169	Otero sandy loam, 1 to 3 percent slopes	Moderate	75.6	3.3%
172	Platner loam, 0 to 3 percent slopes	Low	73.9	3.2%
173	Platner-Ascalon complex, 0 to 3 percent slopes	Low	358.1	15.5%
175	Rago silt loam, 0 to 2 percent slopes, rarely flooded	Low	18.8	0.8%
179	Sampson loam, 0 to 2 percent slopes, rarely flooded	Low	10.2	0.4%
197	Vona loamy sand, warm, 3 to 6 percent slopes	Low	137.2	5.9%
209	Wages loam, 2 to 6 percent slopes	Low	245.8	10.6%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
213	Weld silt loam, 0 to 3 percent slopes	Low	274.2	11.9%
215	Wiley silt loam, 0 to 3 percent slopes	Low	135.4	5.9%
Subtotals for Soil Survey Area			**2,303.2**	**99.6%**
Totals for Area of Interest			**2,313.0**	**100.0%**

Rating Options—Corrosion of Concrete (Ebba Solar NRCS Report)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Corrosion of Steel (Ebba Solar NRCS Report)

ENG

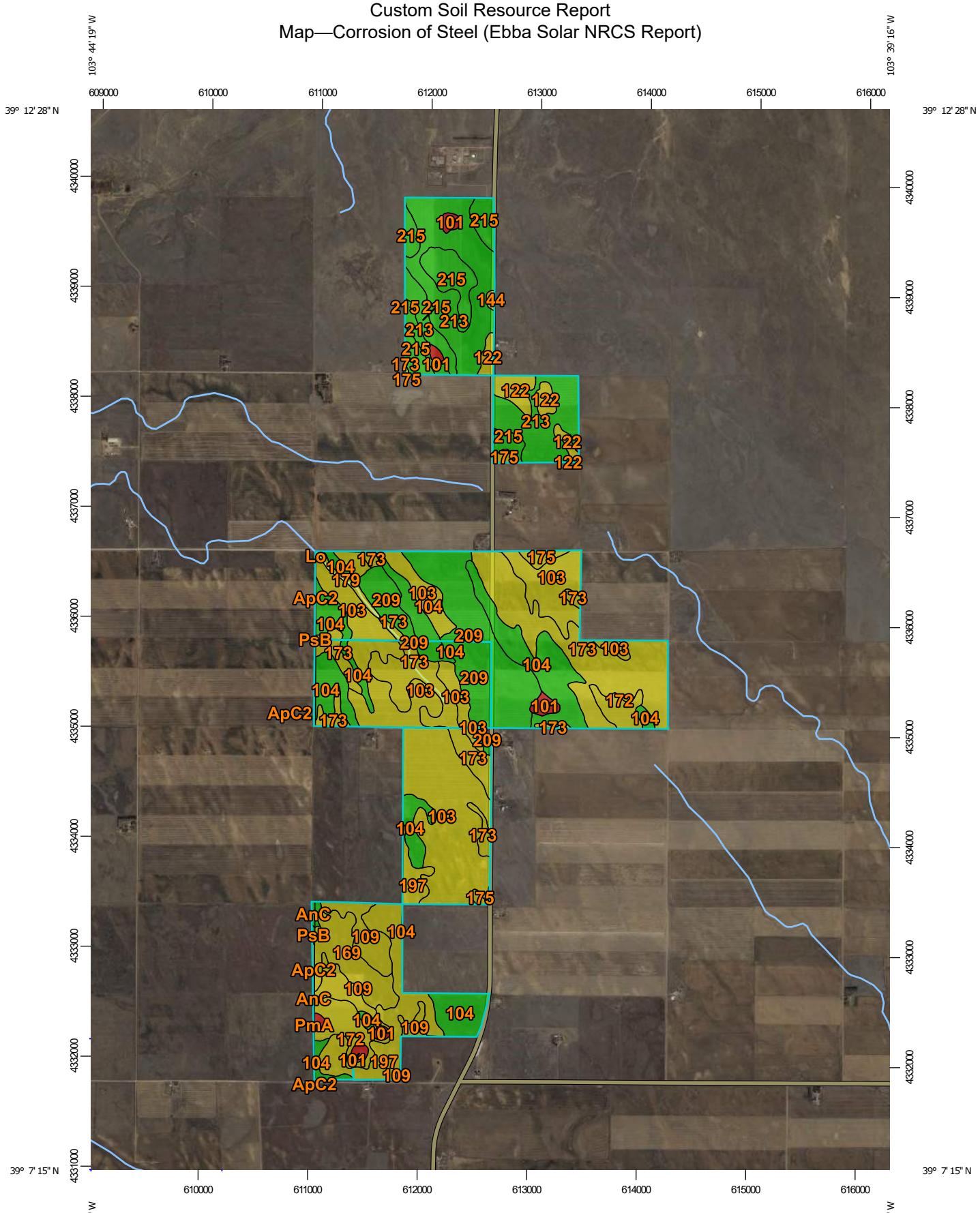
Engineering

AGR

Agronomy

"Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel in installations that are entirely within one kind of soil or within one soil layer.

The risk of corrosion is expressed as "low," "moderate," or "high."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ApC2
Map Scale: 1:47,000 if printed on A portrait (8.5" x 11") sheet.
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Feet
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Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

High

Moderate

Low

Not rated or not available

Soil Rating Lines

High

Moderate

Low

Not rated or not available

Soil Rating Points

High

Moderate

Low

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:20,000 to 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Elbert County, Colorado, Eastern Part
Survey Area Data: Version 20, Aug 24, 2023

Soil Survey Area: Lincoln County, Colorado
Survey Area Data: Version 22, Aug 24, 2023

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 11, 2022—Apr 18, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Corrosion of Steel (Ebba Solar NRCS Report)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AnC	Ascalon sandy loam, 3 to 5 percent slopes	Low	1.9	0.1%
ApC2	Ascalon complex, 3 to 5 percent slopes, eroded	Moderate	5.6	0.2%
Lo	Loamy alluvial land	High	0.1	0.0%
PmA	Platner loam, 0 to 3 percent slopes	Moderate	0.6	0.0%
PsB	Platner-Ascalon sandy loams, 0 to 3 percent slopes	Low	1.5	0.1%
Subtotals for Soil Survey Area			**9.7**	**0.4%**
Totals for Area of Interest			**2,313.0**	**100.0%**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
101	Apishapa clay loam, 0 to 3 percent slopes, rarely ponded	High	31.6	1.4%
103	Ascalon sandy loam, 0 to 3 percent slopes	Moderate	502.8	21.7%
104	Ascalon sandy loam, 3 to 5 percent slopes	Low	304.8	13.2%
109	Ascalon-Haxtun complex, 0 to 3 percent slopes	Moderate	81.7	3.5%
122	Colby-Weld silt loams, 1 to 5 percent slopes	Moderate	50.3	2.2%
144	Kimst loam, 3 to 12 percent slopes	Moderate	2.8	0.1%
169	Otero sandy loam, 1 to 3 percent slopes	Moderate	75.6	3.3%
172	Platner loam, 0 to 3 percent slopes	Moderate	73.9	3.2%
173	Platner-Ascalon complex, 0 to 3 percent slopes	Moderate	358.1	15.5%
175	Rago silt loam, 0 to 2 percent slopes, rarely flooded	Moderate	18.8	0.8%
179	Sampson loam, 0 to 2 percent slopes, rarely flooded	Moderate	10.2	0.4%
197	Vona loamy sand, warm, 3 to 6 percent slopes	Moderate	137.2	5.9%
209	Wages loam, 2 to 6 percent slopes	Low	245.8	10.6%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
213	Weld silt loam, 0 to 3 percent slopes	Low	274.2	11.9%
215	Wiley silt loam, 0 to 3 percent slopes	Low	135.4	5.9%
Subtotals for Soil Survey Area			**2,303.2**	**99.6%**
Totals for Area of Interest			**2,313.0**	**100.0%**

Rating Options—Corrosion of Steel (Ebba Solar NRCS Report)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Land Management

Land management interpretations are tools designed to guide the user in evaluating existing conditions in planning and predicting the soil response to various land management practices, for a variety of land uses, including cropland, forestland, hayland, pastureland, horticulture, and rangeland. Example interpretations include suitability for a variety of irrigation practices, log landings, haul roads and major skid trails, equipment operability, site preparation, suitability for hand and mechanical planting, potential erosion hazard associated with various practices, and ratings for fencing and waterline installation.

Erosion Hazard (Off-Road, Off-Trail) (Ebba Solar NRCS Report)

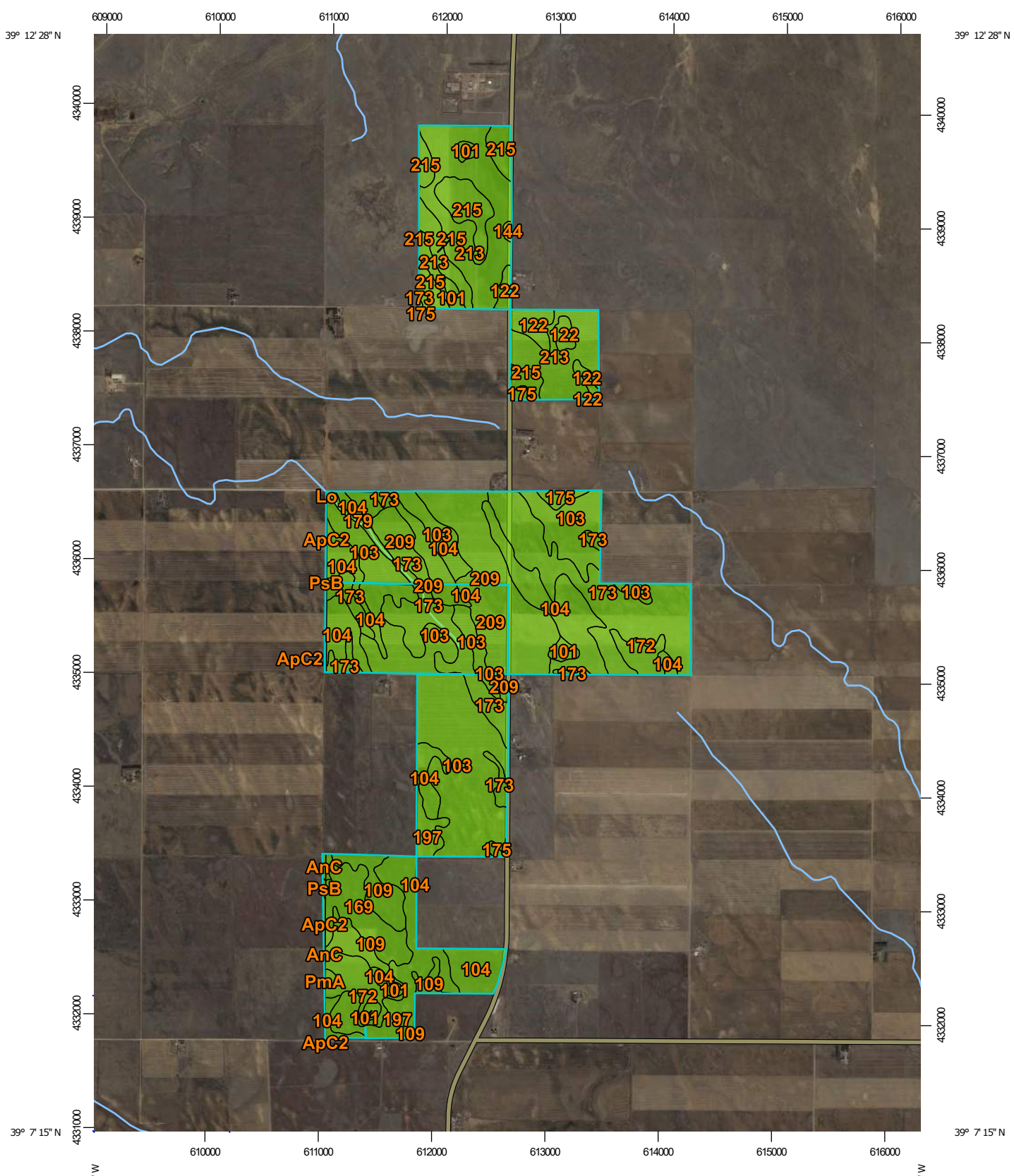
The ratings in this interpretation indicate the hazard of soil loss from off-road and off-trail areas after disturbance activities that expose the soil surface. The ratings are based on slope, soil erosion factor K, and an index of rainfall erosivity (R). The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance.

The ratings are both verbal and numerical. The hazard is described as "slight," "moderate," "severe," or "very severe." A rating of "slight" indicates that erosion is unlikely under ordinary climatic conditions; "moderate" indicates that some erosion is likely and that erosion-control measures may be needed; "severe" indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and "very severe" indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.



Map Scale: 1:47,000 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 500 1000 2000 3000

Feet
0 2000 4000 8000 12000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

Soil Rating Lines
- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

Soil Rating Points
- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:20,000 to 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Elbert County, Colorado, Eastern Part
Survey Area Data: Version 20, Aug 24, 2023

Soil Survey Area: Lincoln County, Colorado
Survey Area Data: Version 22, Aug 24, 2023

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 11, 2022—Apr 18, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Tables—Erosion Hazard (Off-Road, Off-Trail) (Ebba Solar NRCS Report)

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
AnC	Ascalon sandy loam, 3 to 5 percent slopes	Slight	Ascalon (80%)		1.9	0.1%
			Stoneham (10%)			
			Vona (8%)			
			Platner (2%)			
ApC2	Ascalon complex, 3 to 5 percent slopes, eroded	Slight	Ascalon, eroded (75%)		5.6	0.2%
Lo	Loamy alluvial land	Slight	Loamy alluvial land (70%)		0.1	0.0%
PmA	Platner loam, 0 to 3 percent slopes	Slight	Platner (85%)		0.6	0.0%
			Ascalon (10%)			
			Rago, rarely flooded (4%)			
			Rago, ponded (1%)			
PsB	Platner-Ascalon sandy loams, 0 to 3 percent slopes	Slight	Platner (40%)		1.5	0.1%
			Ascalon (35%)			
			Ascalon, 3 to 5 percent slopes (10%)			
			Stoneham (10%)			
			Pleasant (5%)			
Subtotals for Soil Survey Area					**9.7**	**0.4%**
Totals for Area of Interest					**2,313.0**	**100.0%**

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
101	Apishapa clay loam, 0 to 3 percent slopes, rarely ponded	Slight	Apishapa, RARELY PONDED (90%)		31.6	1.4%
			Rago (5%)			
			Satanta (5%)			
103	Ascalon sandy loam, 0 to 3 percent slopes	Slight	Ascalon (85%)		502.8	21.7%
			Olnest (10%)			
			Vona (5%)			
104	Ascalon sandy loam, 3 to 5 percent slopes	Slight	Ascalon (80%)		304.8	13.2%
			Stoneham (10%)			

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Vona (8%)			
			Platner (2%)			
109	Ascalon-Haxtun complex, 0 to 3 percent slopes	Slight	Ascalon (55%)		81.7	3.5%
			Haxtun (30%)			
			Vona (3%)			
			Pleasant (3%)			
			Olnest (3%)			
			Otero (3%)			
			Platner (3%)			
122	Colby-Weld silt loams, 1 to 5 percent slopes	Slight	Colby (50%)		50.3	2.2%
			Weld (40%)			
			Keith (5%)			
			Pleasant (3%)			
			Karval (2%)			
144	Kimst loam, 3 to 12 percent slopes	Moderate	Kimst (90%)	Surface kw times slope times R index (0.07)	2.8	0.1%
			Vona (2%)	Surface kw times slope times R index (0.05)		
169	Otero sandy loam, 1 to 3 percent slopes	Slight	Otero (85%)		75.6	3.3%
			Vona (10%)			
			Fort Collins (3%)			
			Ascalon (2%)			
172	Platner loam, 0 to 3 percent slopes	Slight	Platner (85%)		73.9	3.2%
			Ascalon (10%)			
			Rago, rarely flooded (4%)			
			Rago, ponded (1%)			
173	Platner-Ascalon complex, 0 to 3 percent slopes	Slight	Platner (50%)		358.1	15.5%
			Ascalon (35%)			
			Otero (8%)			
			Pleasant (7%)			
175	Rago silt loam, 0 to 2 percent slopes, rarely flooded	Slight	Rago, RARELY FLOODED (90%)		18.8	0.8%
			Keith (5%)			
			Pleasant (5%)			
179	Sampson loam, 0 to 2 percent slopes, rarely flooded	Slight	Sampson, RARELY FLOODED (90%)		10.2	0.4%

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Apishapa, RARELY PONDED (4%)			
			Fort Collins (3%)			
			Vona (3%)			
197	Vona loamy sand, warm, 3 to 6 percent slopes	Slight	Vona, warm (85%)		137.2	5.9%
			Valent, warm (5%)			
			Olnest, warm (5%)			
			Otero (5%)			
209	Wages loam, 2 to 6 percent slopes	Slight	Wages (90%)		245.8	10.6%
			Kimst (5%)			
			Platner (3%)			
			Pleasant, rarely ponded (2%)			
213	Weld silt loam, 0 to 3 percent slopes	Slight	Weld (80%)		274.2	11.9%
			Colby (7%)			
			Adena (5%)			
			Keith (5%)			
			Rago, rarely flooded (2%)			
			Pleasant, ponded (1%)			
215	Wiley silt loam, 0 to 3 percent slopes	Slight	Wiley (85%)		135.4	5.9%
			Vona (3%)			
			Pleasant (3%)			
			Arvada (3%)			
			Colby (3%)			
			Karval (3%)			
Subtotals for Soil Survey Area					**2,303.2**	**99.6%**
Totals for Area of Interest					**2,313.0**	**100.0%**

Rating	Acres in AOI	Percent of AOI
Slight	2,310.1	99.9%
Moderate	2.8	0.1%
Totals for Area of Interest	**2,313.0**	**100.0%**

Rating Options—Erosion Hazard (Off-Road, Off-Trail) (Ebba Solar NRCS Report)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Erosion Hazard (Road, Trail) (Ebba Solar NRCS Report)

FOR - Forestry

The ratings in this interpretation indicate the hazard of soil loss from unsurfaced roads and trails. The ratings are based on soil erosion factor K, slope, and content of rock fragments.

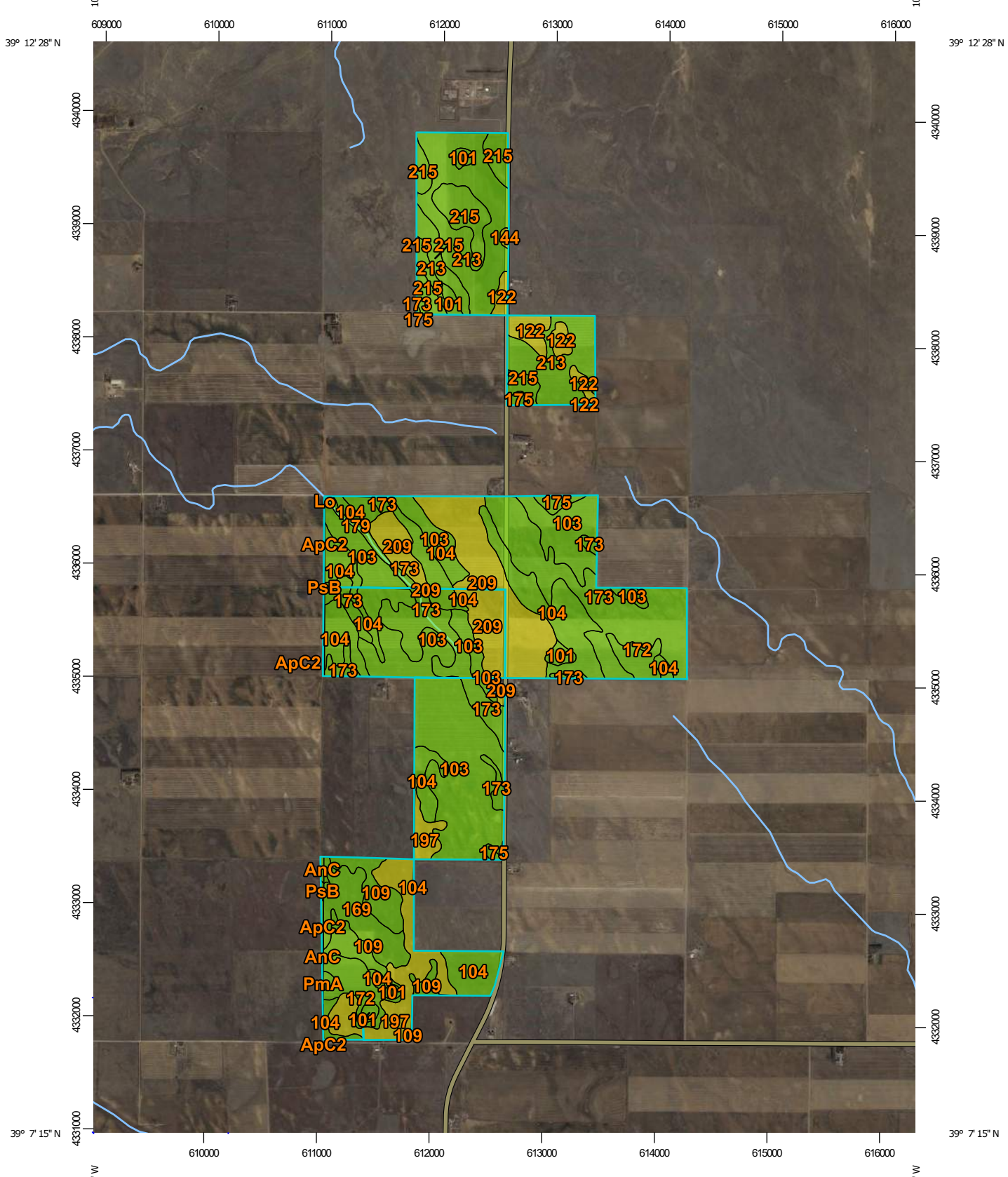
The ratings are both verbal and numerical. The hazard is described as "slight," "moderate," or "severe." A rating of "slight" indicates that little or no erosion is likely; "moderate" indicates that some erosion is likely, that the roads or trails may require occasional maintenance, and that simple erosion-control measures are needed; and "severe" indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Map—Erosion Hazard (Road, Trail) (Ebba Solar NRCS Report)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

Soil Rating Lines
- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

Soil Rating Points
- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:20,000 to 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Elbert County, Colorado, Eastern Part
Survey Area Data: Version 20, Aug 24, 2023

Soil Survey Area: Lincoln County, Colorado
Survey Area Data: Version 22, Aug 24, 2023

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 11, 2022—Apr 18, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Tables—Erosion Hazard (Road, Trail) (Ebba Solar NRCS Report)

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
AnC	Ascalon sandy loam, 3 to 5 percent slopes	Slight	Ascalon (80%)		1.9	0.1%
			Vona (8%)			
ApC2	Ascalon complex, 3 to 5 percent slopes, eroded	Slight	Ascalon, eroded (75%)		5.6	0.2%
Lo	Loamy alluvial land	Slight	Loamy alluvial land (70%)		0.1	0.0%
PmA	Platner loam, 0 to 3 percent slopes	Slight	Platner (85%)		0.6	0.0%
			Ascalon (10%)			
			Rago, rarely flooded (4%)			
			Rago, ponded (1%)			
PsB	Platner-Ascalon sandy loams, 0 to 3 percent slopes	Slight	Platner (40%)		1.5	0.1%
			Ascalon (35%)			
			Ascalon, 3 to 5 percent slopes (10%)			
			Stoneham (10%)			
			Pleasant (5%)			
Subtotals for Soil Survey Area					**9.7**	**0.4%**
Totals for Area of Interest					**2,313.0**	**100.0%**

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
101	Apishapa clay loam, 0 to 3 percent slopes, rarely ponded	Slight	Apishapa, RARELY PONDED (90%)		31.6	1.4%
			Rago (5%)			
			Satanta (5%)			
103	Ascalon sandy loam, 0 to 3 percent slopes	Slight	Ascalon (85%)		502.8	21.7%
			Olnest (10%)			
			Vona (5%)			
104	Ascalon sandy loam, 3 to 5 percent slopes	Slight	Ascalon (80%)		304.8	13.2%
			Vona (8%)			
109	Ascalon-Haxtun complex, 0 to 3 percent slopes	Slight	Ascalon (55%)		81.7	3.5%
			Haxtun (30%)			

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Pleasant (3%)			
			Olnest (3%)			
			Otero (3%)			
			Platner (3%)			
122	Colby-Weld silt loams, 1 to 5 percent slopes	Moderate	Colby (50%)	Slope/erodibility (0.50)	50.3	2.2%
144	Kimst loam, 3 to 12 percent slopes	Moderate	Kimst (90%)	Slope/erodibility (0.50)	2.8	0.1%
			Arvada (3%)	Slope/erodibility (0.50)		
			Karval (2%)	Slope/erodibility (0.50)		
169	Otero sandy loam, 1 to 3 percent slopes	Slight	Otero (85%)		75.6	3.3%
			Vona (10%)			
			Fort Collins (3%)			
			Ascalon (2%)			
172	Platner loam, 0 to 3 percent slopes	Slight	Platner (85%)		73.9	3.2%
			Ascalon (10%)			
			Rago, rarely flooded (4%)			
			Rago, ponded (1%)			
173	Platner-Ascalon complex, 0 to 3 percent slopes	Slight	Platner (50%)		358.1	15.5%
			Ascalon (35%)			
			Otero (8%)			
			Pleasant (7%)			
175	Rago silt loam, 0 to 2 percent slopes, rarely flooded	Slight	Rago, RARELY FLOODED (90%)		18.8	0.8%
			Keith (5%)			
			Pleasant (5%)			
179	Sampson loam, 0 to 2 percent slopes, rarely flooded	Slight	Sampson, RARELY FLOODED (90%)		10.2	0.4%
			Apishapa, RARELY PONDED (4%)			
			Fort Collins (3%)			
197	Vona loamy sand, warm, 3 to 6 percent slopes	Moderate	Vona, warm (85%)	Slope/erodibility (0.50)	137.2	5.9%
			Valent, warm (5%)	Slope/erodibility (0.50)		

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Otero (5%)	Slope/erodibility (0.50)		
209	Wages loam, 2 to 6 percent slopes	Moderate	Wages (90%)	Slope/erodibility (0.50)	245.8	10.6%
213	Weld silt loam, 0 to 3 percent slopes	Slight	Weld (80%)		274.2	11.9%
			Adena (5%)			
			Keith (5%)			
			Rago, rarely flooded (2%)			
			Pleasant, ponded (1%)			
215	Wiley silt loam, 0 to 3 percent slopes	Slight	Wiley (85%)		135.4	5.9%
			Pleasant (3%)			
			Colby (3%)			
			Karval (3%)			
Subtotals for Soil Survey Area					**2,303.2**	**99.6%**
Totals for Area of Interest					**2,313.0**	**100.0%**

Rating	Acres in AOI	Percent of AOI
Slight	1,876.8	81.1%
Moderate	436.1	18.9%
Totals for Area of Interest	**2,313.0**	**100.0%**

Rating Options—Erosion Hazard (Road, Trail) (Ebba Solar NRCS Report)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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