Exhibit H

Geologic and Soil Stability

Biglow Canyon Wind Farm December 2025

Prepared for



Portland General Electric Company

Prepared by



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Acronyms and Abbreviations

AC alternating current

ASCE American Society of Civil Engineers

BCWF or Existing Facility Biglow Canyon Wind Farm

BESS battery energy storage system

BIGL or Project Developer BIGL bn, LLC

bgs below ground surface

BMP best management practice

Certificate Holder or PGE Portland General Electric Company

Council or EFSC Oregon Energy Facility Siting Council

DOGAMI Department of Geology and Mineral Industries

ESCP Erosion and Sediment Control Plan

FEMA Federal Emergency Management Agency

IBC International Building Code

IEEE Institute of Electrical and Electronics Engineers

MW megawatt

NRCS Natural Resources Conservation Service

OAR Oregon Administrative Rules

ODOE Oregon Department of Energy

OSSC Oregon Structural Specialty Code

RFA Request for Amendment

SLIDO Statewide Landslide Database

Site Certificate Site Certificate on Amendment 3

Solar Components photovoltaic solar energy generation and battery storage

USGS U.S. Geological Survey

1.0 Introduction

The Portland General Electric Company (PGE or Certificate Holder) submits this Request for Amendment (RFA) 4 to the Site Certificate on Amendment 3, issued October 31, 2008 (Site Certificate) for the Biglow Canyon Wind Farm (BCWF or Existing Facility) to add photovoltaic solar energy generation and battery storage (Solar Components) to the operating BCWF.

BCWF, owned and operated by PGE, is located within an approved site boundary comprising approximately 25,000 acres, approximately 4.5 miles northeast of the town of Wasco in Sherman County, Oregon. The BCWF operates under the Site Certificate from the Oregon Energy Facility Siting Council (Council or EFSC) as administered by the Oregon Department of Energy (ODOE). BCWF currently consists of 217 wind turbines, with a maximum blade tip height of 445 feet, and a peak generating capacity of 450 megawatts (MW).

In RFA 4, PGE proposes to add up to 125 MW alternating current (AC) generating capacity from photovoltaic solar arrays and 125 MW in battery storage capacity (Solar Components) in approximately 1,445 acres of land (Solar Area) sited within the existing BCWF site boundary Solar Micrositing Area (RFA 4 Site Boundary¹).

The Solar Micrositing Area is approximately 1,924 acres and provides a conservative estimate of the maximum area needed for development, micrositing, and temporary disturbances from the Solar Components during construction, rather than the anticipated temporary and permanent disturbance footprint. Within the Solar Micrositing Area, the Certificate Holder has identified a reduced footprint where Solar Components will be concentrated (Solar Area; 1,445 acres). Solar Components will include solar arrays, inverters, battery energy storage system (BESS) facilities and their subcomponents (i.e., inverters), a collector substation, approximately 600 feet of a new 230-kilovolt generation tie transmission line, medium voltage collector lines, operations and maintenance structures, site access roads, internal roads, perimeter fencing, facility entry gates, and temporary laydown areas. The maximum generating capacity from the Solar Components will be 125 MW AC, and the infrastructure will be fenced within the Solar Micrositing Area and will cover up to 1,445 acres (Solar Area).

PGE will own and operate the Solar Components as a part of the BCWF (together, Amended Facility or Facility), which, to date, have been developed by BIGL bn, LLC (BIGL or Project Developer). BIGL, in its capacity as the project developer, supports PGE in this RFA 4 and may construct and temporarily operate the Solar Components on behalf of PGE under a Build-Transfer Agreement.

Exhibit H provides the information required by Oregon Administrative Rules (OAR) 345-021-0010(1)(h) in support of RFA 4. Analysis in this exhibit incorporates and/or relies on reference information, analysis, and findings from previous geotechnical investigations performed for the areas in addition to new geotechnical investigations completed in the Solar Micrositing Area to

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¹ Note, as described in further detail in Section 4.1.1.2 of the RFA 4 Division 27 document, the Solar Micrositing Area is the equivalent of the RFA 4 Site Boundary.

demonstrate that the Facility, as modified by RFA 4, continues to comply with applicable Site Certificate Conditions and applicable laws, standards, and rules, providing evidence to support findings by the Council as required by OAR 345-022-0020.

2.0 Analysis Area

Consistent with OAR 345-027-0360(3), ODOE concurred with the Certificate Holder's use of a defined portion of the approved BCWF site boundary (i.e., Solar Micrositing Area/RFA 4 Site Boundary) to establish study area boundaries for RFA 4 under OAR 345-001-0010(35). The RFA 4 Site Boundary reflects the Solar Micrositing Area, and all study areas within the meaning of ORS 345-001-0010(35) are measured from the RFA 4 Site Boundary. The analysis area for structural standards is the area within the Solar Micrositing Area² (Figure H-1). The analysis area for historical and potentially active faults and earthquakes includes a 50-mile buffer around the Solar Micrositing Area (Figure H-2).

3.0 Geologic Report - OAR 345-021-0010(1)(h)(A)

OAR 345-021-0010(1)(h) Information from reasonably available sources regarding the geological and soil stability within the analysis area, providing evidence to support findings by the Council as required by OAR 345-022-0020, including:

OAR 345-021-0010(1)(h)(A) A geologic report meeting the Oregon State Board of Geologist Examiners geologic report guidelines. Current guidelines must be determined based on consultation with the Oregon Department of Geology and Mineral Industries, as described in paragraph (B) of this subsection;

Response: The required geological report is provided through the information in this exhibit, which includes analysis and findings from previous geotechnical investigations performed for areas within the Solar Micrositing Area. Current geologic report guidelines were determined based on consultation with the Oregon Department of Geology and Mineral Industries (DOGAMI) as described in Section 4.0 and Attachment H-1. Information previously provided for the Facility in previous geotechnical investigations, the Application for Site Certificate, and prior RFAs has been fully updated in this exhibit to provide current information and in conformance with updated requests from DOGAMI and ODOE.

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² ODOE concurred with excluding the remaining BCWF site boundary that does not overlap with the Solar Micrositing Area from analysis in RFA 4 because no changes are proposed to any BCWF components in the remaining BCWF site boundary as part of RFA 4.

3.1 Previous Geotechnical Investigations

Previous investigations have been completed in the vicinity of the Solar Micrositing Area:

- Initial Geotechnical Investigations Phase I Development, Biglow Canyon Wind Farm, Sherman County, Oregon, prepared by Cornforth Consultants for PGE, October 2006 (Cornforth 2006). This investigation was conducted in large portions of the Solar Micrositing Area.
- Report of Geotechnical Exploration, Biglow Canyon Wind Farm Phase I, northwest Wasco, Oregon, prepared by GN Northern, Inc., Consulting Geotechnical Engineers for Blattner & Sons, Inc., April 2007 (GN Northern 2007). This investigation was conducted in large portions of the Solar Micrositing Area.
- Report of Geotechnical Exploration, Biglow Canyon Wind Farm Phase II, northwest Wasco, Oregon, prepared by GN Northern, Inc., Consulting Geotechnical Engineers for Blattner & Sons, Inc., July 2008 (GN Northern 2008a). This investigation was conducted in an area northwest of the Solar Micrositing Area.
- Report of Geotechnical Exploration, Biglow Canyon Wind Farm Phase III, northwest Wasco, Oregon, prepared by GN Northern, Inc., Consulting Geotechnical Engineers for Blattner & Sons, Inc., November 21, 2008 (GN Northern 2008b). This investigation was conducted in areas west and south of the Solar Micrositing Area.

The following geotechnical investigation has been completed in the vicinity of and within the Solar Micrositing Area:

 Biglow Solar & BESS Preliminary Geotechnical Engineering Report, prepared by Terracon Consultants, Inc., for Bright Night, LLC, November 14, 2024 (Terracon 2024). The geotechnical engineering report is provided in Attachment H-2.

The geotechnical report scope of work included completion of 51 borings to depths of 5 to 51.5 feet below ground surface (bgs), laboratory testing, field electrical resistivity testing, pile load testing, engineering analysis, and preparation of the report.

3.2 Geologic Conditions

The topographic and geologic setting within the Solar Micrositing Area is described in the following sections.

3.2.1 Topographic Setting

The Solar Micrositing Area is in rural Sherman County, approximately 5 miles northeast of Wasco, Oregon, and approximately 4 miles south of the Columbia River. The topography is mainly influenced by drainages, including some drainages denoted as canyons, that have relatively gentle to moderate slopes. Steeper slopes are located along Biglow Canyon and a tributary to Biglow Canyon that bound the northeastern portion of the Solar Micrositing Area.

The Solar Micrositing Area occupies slopes from 0 to 35 percent, with an average of 4.9 percent. Elevations within the Solar Micrositing Area range from 727 to 1,561 feet above mean sea level.

3.2.2 Geologic Setting

The geologic setting of the Solar Micrositing Area is located in the Columbia Plateau province (NPS 2023). The topography in the province is dominated by geologically young lava flows that have occurred within the last 17 million years. Over 170,000 cubic kilometers of basaltic lava, known as the Columbia River basalts, cover the western part of the province. The native terrain within the Solar Micrositing Area is gently sloping downhill to the north toward the Columbia River. This sloping terrain is interrupted occasionally by geologic folds, one of which is Poverty Ridge.

Cataclysmic floods repeatedly swept through this area at the end of the last ice age, or about 13,000 to 15,000 years ago. These floods are named the Missoula floods and were the result of glacial damming of water in western Montana. Figure H-1 (DOGAMI 2025a and USGS 2025a) provides a geologic map for the Solar Micrositing Area. Surficial deposits are mapped as Holocene and Quaternary cultivated loess (USGS 2025a). Bedrock is mapped as the Tertiary Wanapum Basalt Frenchman Springs Member.

The geologic descriptions below are summarized from the DOGAMI geologic maps and publications (DOGAMI 2025a), U.S. Geological Survey (USGS) publications (USGS 2023a), as well as a geotechnical investigation (see Section 5.0) conducted within the Solar Micrositing Area.

3.2.2.1 Surficial Geologic Units

Surficial deposits generally consist of loess soil overlying alluvial soil. The site is underlain by Quaternary loess which consists of eolian (wind-deposited) silt to fine sand (Terracon 2024). Loess deposits are made up of a semi-stable soil structure commonly referred to as a "honeycomb" structure. This loess unit can often be broken into three units consisting of younger loess which was encountered during the geotechnical investigation underlying topsoil and extended to a maximum depth of 30 feet. A transition layer between younger and older loess extended to a maximum depth of 40 feet.. The older loess was also encountered at ground level in some areas and extended to a depth of 32 feet. The older loess is also described as semi-consolidated with strong calcium carbonate contents (referred to as cementation). This older unit is also referred to as caliche loess.

The loess is generally underlain by a layer of recent alluvium, consisting of unconsolidated silt, sand, and gravel generally derived from local sources (Terracon 2024). A summary of geotechnical boring log data from the Terracon (2024) geotechnical investigation is provided in Table H-1.

Stratum	Material Description	Consistency/Density
Loess	Silt with various amounts of sand to silty clay, moist.	Very soft to very stiff
Loess or Caliche Loess	Silt with various amounts of sand to silty sand, moist	Very stiff or medium dense
Caliche Loess	Silt with various amounts of sand to silty sand, moist	Hard or dense
Alluvium	Silt with various amounts of sand to silty sand, moist	Hard or dense
Bedrock	Basalt - highly to extremely fractured, moderately weathered	Medium strong

Previous geotechnical investigations (GN Northern Inc. 2007, 2008a, 2008b) generally confirm the geological materials. Surface materials were generally found to be loess and caliche, and basalt bedrock was encountered in borings from 2.5 to 60 bgs. Highly to completely weathered bedrock was encountered as very thin layers above the more competent bedrock and as thicker units.

Groundwater was not observed in the test borings to the maximum depth explored of 51 feet bgs except in borehole B-32 at 15 feet bgs (Terracon 2024). However, it is noted that the water encountered is indicated to be seepage and not a static groundwater condition. Based on the data collected, the seepage is indicated to be from localized perched groundwater. Groundwater was not encountered in borings for previous geotechnical investigations (GN Northern, Inc. 2007, 2008a, 2008b).

3.2.2.2 Bedrock Geologic Units

The alluvium is underlain by the Columbia River Basalt Group. The Columbia River Basalt consists of numerous fine-grained lava flows that primarily erupted from fissures in eastern Washington and Oregon and western Idaho from approximately 23.8 to 5.3 million years ago. Many individual flows are interbedded with thin paleosols formed during periods of volcanic inactivity. Basalt flows near and within the Solar Micrositing Area are mapped as the Wanapum basalt formation Frenchman Springs Member of the Tertiary Columbia River Basalt Group (DOGAMI 2025a; USGS 2025a). The Frenchman Springs Member is entirely mapped within the Solar Micrositing Area. The Wanapum Basalt formation consists of flows of gray to dark-gray, medium-grained, commonly plagioclase porphyritic basalt, and generally exhibits blocky to platy jointing. The Frenchman Springs Member is approximately 300 to 500 feet thick in the area of the Columbia Plateau.

3.2.2.3 Soils

Soils were evaluated within the Solar Micrositing Area. Seventy-four percent of the soils overlying the geologic bedrock units are silt loam soils with thicknesses greater than 7 feet with the other 26 percent having thicknesses of 12 to 40 inches to lithic bedrock. Permeability of the soils within the Solar Micrositing Area is moderate with slow to rapid runoff potential. At least 55 percent of soils within the Solar Micrositing Area have a severe hazard for erosion in terms of undeveloped roads.

Wind and water erosion susceptibility are generally moderate to moderately high. Less than 1 percent of the soils has a low compaction resistance.

4.0 Evidence of Consultation with DOGAMI – OAR 345-021-0010(1)(h)(B)

OAR 345-021-0010(1)(h)(B) A summary of consultation with the Oregon Department of Geology and Mineral Industries regarding the appropriate methodology and scope of the seismic hazards and geology and soil-related hazards assessments, and the appropriate site-specific geotechnical work that must be performed before submitting the application for the Department to determine that the application is complete;

Response: A meeting with DOGAMI was held on November 1, 2024, as documented in Attachment H-1. Meeting attendees included DOGAMI representatives, an ODOE representative, the Certificate Holder and their geotechnical contractor, and the consultant for the Certificate Holder. A brief presentation included an overview of the Amended Biglow Canyon Wind Farm and geologic hazards studies' findings, as well as an overview of the planned pre-construction geotechnical studies. DOGAMI provided feedback regarding the findings and presentation. The DOGAMI representatives provided additional resources including a digital dataset link and a Wasco County landslide publication link, requested that the latest earthquake data be included, and requested that a specific potentially active fault (Luna Butte Fault) be reviewed. DOGAMI also stated that the final geotechnical study plan should include more specific information such as field boring locations. DOGAMI was otherwise satisfied with the information and general conclusions presented.

5.0 Site-Specific Geotechnical Investigation – OAR 345-021-0010(1)(h)(C)

 $OAR\ 345-021-0010(1)(h)(C)\ A\ description\ and\ schedule\ of\ site-specific\ geotechnical\ work\ that\ will\ be\ performed\ before\ construction\ for\ inclusion\ in\ the\ site\ certificate\ as\ conditions;$

<u>Response</u>: A summary of relevant conclusions and recommendations from the previous geotechnical investigations performed for areas within the Solar Micrositing Area is included below, followed by the Certificate Holder's plan for future site-specific geotechnical work to be performed prior to construction.

5.1 Geotechnical Investigations

Three geotechnical reports were completed for the Biglow Canyon Wind Project Phases I-III in large portions of the Solar Micrositing Area (GN Northern, Inc. 2007, 2008a, 2008b). A field exploration program consisting of 78 exploratory borings, soil sampling, electrical resistivity testing, and seismic testing was completed in February and March 2007. PGE requested that GN Northern

explore Alternate Sites 1 through 4 as potential backup sites; thus, four additional borings were added to the original scope. A second (Phase II) field exploration program consisting of 81 exploratory borings, soil sampling, electrical resistivity testing, and seismic testing was completed in June 2008. Borings were completed at 74 proposed turbine sites and 7 alternate sites. A third (Phase III) field exploration program consisting of 76 exploratory borings, soil sampling, electrical resistivity testing, and seismic testing was completed in September and October 2008. Borings were completed at 76 proposed turbine sites.

Terracon Consultants, Inc., prepared the Biglow Solar & BESS Preliminary Geotechnical Engineering Report for Bright Night, LLC, on November 14, 2024 (Terracon 2024; Exhibit H-2). The geotechnical report scope of work included completion of 51 borings to depths of 5 to 51.5 feet bgs, laboratory testing, field electrical resistivity testing, pile load testing, engineering analysis, and preparation of the report. Fifteen of the borings (B-26 through B-40) were located within the Solar Micrositing Area with depths of 17 to 21.5 feet bgs. The geotechnical report identified earthwork considerations; predrilling considerations for the solar array; footing construction considerations for solar arrays, substations, and transmission line structures; shallow foundation and mat/slab foundation considerations; earthwork considerations; and considerations for access roads and parking areas. Based on the geotechnical report, the Solar Components can be constructed within the Solar Micrositing Area in consideration of the proper application of construction methods.

5.2 Future Geotechnical Investigation

The Certificate Holder will conduct a site-specific geological and geotechnical investigation in Q4 2025 before beginning construction and will provide draft and final reports to DOGAMI and ODOE consistent with Site Certificate Condition 66 in the Third Amended Site Certificate (Council 2008). The site-specific geotechnical investigations and Solar Components design will comply with the following conditions from the Third Amended Site Certificate: Conditions 112, 113, and 114 (Council 2008). The scope for this investigation is expected to be substantially similar to that identified in the preliminary geotechnical investigation report identified above. The quantity of samples collected and testing locations is likely to increase to reflect the greater level of granularity needed in foundation design. Nevertheless, the testing types, sampling methodologies, and analysis protocols are all expected to be consistent with the previous geotechnical investigation performed at the site.

6.0 Transmission Lines and Pipelines – OAR 345-021-0010(1)(h)(D)

OAR 345-021-0010(1)(h)(D) For all transmission lines, and for all pipelines that would carry explosive, flammable or hazardous materials, a description of locations along the proposed route where the applicant proposes to perform site specific geotechnical work, including but not limited to railroad crossings, major road crossings, river crossings, dead ends (for transmission lines), corners (for transmission lines), and portions of the proposed route where

geologic reconnaissance and other site specific studies provide evidence of existing landslides, marginally stable slopes or potentially liquefiable soils that could be made unstable by the planned construction or experience impacts during the facility's operation;

Response: The Solar Components do not include pipelines carrying hazardous substances as described in OAR 345-021-0010(1)(h)(D). The Solar Components will include one collector substation, a 230-kilovolt generation tie transmission line, and medium voltage collector lines. The Certificate Holder proposes geotechnical work in the areas of substations, the transmission line, and the collector lines.

7.0 Seismic Hazard Assessment – OAR 345-021-0010(1)(h)(E)

OAR 345-021-0010(1)(h)(E) An assessment of seismic hazards, in accordance with standard-of-practice methods and best practices, that addresses all issues relating to the consultation with the Oregon Department of Geology and Mineral Industries described in paragraph (B) of this subsection, and an explanation of how the applicant will design, engineer, construct, and operate the facility to avoid dangers to human safety and the environment from these seismic hazards. Furthermore, an explanation of how the applicant will design, engineer, construct and operate the facility to integrate disaster resilience design to ensure recovery of operations after major disasters. The applicant must include proposed design and engineering features, applicable construction codes, and any monitoring and emergency measures for seismic hazards, including tsunami safety measures if the site is located in the DOGAMI-defined tsunami evacuation zone; and

Response:

7.1 Methods

Available reference materials were reviewed, and a desktop seismic-hazard assessment was conducted. Topographic and geologic conditions and hazards within the Solar Micrositing Area were evaluated using topographic and geologic maps, aerial photographs, existing geologic reports, and data from DOGAMI, the Oregon Water Resources Department, the USGS, and the Natural Resources Conservation Service (NRCS).

A desktop seismic-hazard analysis characterized seismicity in the Solar Components' vicinity to evaluate potential seismic impacts. This work was based on the potential regional and local seismic activity described in the existing scientific literature and on subsurface soil and groundwater conditions found in the desktop evaluations. The seismic-hazard analysis consisted of the following tasks:

- 1. Detailed review of USGS, National Geophysical Data Center, and DOGAMI literature and databases;
- 2. Identification of potential seismic events and characterization of those events in terms of a series of design events;

- 3. Evaluation of seismic hazards, including potential fault rupture, earthquake-induced landslides, liquefaction and lateral spread, settlement, and subsidence;
- 4. Review of previous geotechnical investigation conducted in the Solar Micrositing Area and immediate vicinity; and
- 5. Mitigation recommendations based on the characteristics of the subsurface soils and design earthquakes, including specific seismic events that might have a significant effect on the site, potential for seismic energy amplification at the site, and the site-specific acceleration response spectrum.

As described in Section 5.0 and in accordance with Site Certificate Condition 66, appropriate site-specific geotechnical investigations will be conducted prior to construction to inform the final design. Results of the investigations will be reported to DOGAMI following the Oregon State Board of Geologist Examiners' Guideline for Preparing Engineering Geologic Reports (Oregon State Board of Geologist Examiners 2014).

7.2 Maximum Considered Earthquake Ground Motion under IBC 2021

Overall, the DOGAMI Oregon HazVu: Statewide Geohazards Viewer mapping tool (DOGAMI 2025b) indicates that the Cascadia earthquake hazard is moderate, and the general earthquake hazard in the Solar Micrositing Area is rated strong in most of the Solar Micrositing Area with an area rated very strong in a portion of the southwestern Solar Micrositing Area. The USGS Seismic Hazard Mapping Model (USGS 2025) developed ground motions using a probabilistic seismic hazard analysis that covered the Solar Micrositing Area. Though these motions are not site-specific, they reasonably estimate the ground motions within the Solar Micrositing Area. For new construction, the site should be designed for the maximum considered earthquake, according to the most recently updated International Building Code (IBC; ICC 2024) supplemented by the Oregon Structural Specialty Code (OSSC; State of Oregon 2025). The USGS earthquake hazard tool analysis was run for the Solar Micrositing Area, and the design event (6.47 magnitude earthquake) has a 2 percent probability of exceedance in 50 years, or a 2,475-year return period. This event has a peak ground acceleration of 0.2386 acceleration from gravity at the bedrock surface for the Solar Micrositing Area. The values of peak ground acceleration on rock are an average representation of the acceleration most likely to occur at the site for all seismic events (crustal, intraplate, or subduction).

Based on a review of the 2021 Oregon Seismic Hazard Database (DOGAMI 2021), the Solar Micrositing Area is located in an area of strong perceived shaking, light potential damage, and slight damage to buildings for an earthquake that has a 2 percent chance of occurring within the next 50 years; a light to moderate perceived shaking, none to very light potential damage, and very slight damage to buildings for an 9 magnitude Cascadia earthquake; and a very low probability of damaging shaking over the next 50 years.

Seismic design parameters were developed following IBC 2021. Using current information, the Solar Components will be designed for Site Class D, according to IBC requirements (Table H-2). Table H-2 shows the seismic design parameters based on Site Class D reflecting the worst-case

scenario surficial geology mapped within the Solar Micrositing Area. Site Class D represents the loess (eolian sand) deposits that are rated very strong. Eolian deposits are also rated as Site Class D by DOGAMI (2021).

Table H-2. Seismic Design Parameters - Maximum Considered Earthquake

Location	Site Class	Earthquake Magnitude ¹	Peak Horizontal Ground Acceleration	Return Period
Solar Micrositing Area	D	6.47	0.2386g	2,475 years
Solar Micrositing Area	D	6.57	0.1089g	475 years
Mean over all sources				
Source: USGS 2025				

7.2.1 Earthquake Sources

In northern Oregon, seismicity is generated when the Juan de Fuca Plate and the North American Plate converge at the Cascadia Subduction Zone. These plates converge at a rate of 1 to 2 inches per year, accumulating large amounts of stress that release abruptly in earthquake events. The four sources of earthquakes and seismic activity in this region are crustal, intraplate, volcanic, and the deep subduction zone (DOGAMI 2010).

Overall, earthquakes in Oregon are associated with active faults in four regional seismicity zones: the Cascade seismic zone, the Portland Hills zone (the Portland, Oregon, and Vancouver, Washington, metropolitan area), the south-central zone (Klamath Falls), and northeastern Oregon zone (Niewendorp and Newhouse 2003). Faults are considered active if there has been displacement in the last 10,000 years, and potentially active if there has been movement over the last Quaternary period (1.6 million years). Regionally, seismicity has been attributed to crustal deformation from the Cascadia Subduction Zone and volcanism. More than 6,000 earthquakes—most less than magnitude 3—have occurred in Oregon since 1981, with 75 percent of these recorded since March 1993 (Wong and Bott 1995).

Earthquakes are caused by movements along crustal faults, generally in the upper 10 to 15 miles of the earth's crust. In the vicinity of the Solar Micrositing Area, earthquakes occur within the crust of the North American tectonic plate when built-up stresses near the surface are released through fault rupture.

There are no faults mapped within the Solar Micrositing Area. Numerous undifferentiated, Quaternary-age, and Class B faults are mapped within 25 miles of the Solar Micrositing Area (Figure H-2). These faults are potentially active. The DOGAMI Oregon HazVu: Statewide Geohazards Viewer earthquake hazard layer (DOGAMI 2025b) and the USGS Geologic Hazards Science Center (USGS 2025b; Figure H-2) show that the nearest potentially active faults (undifferentiated and mid- to late Quaternary) are about 5 miles north along the Columbia River. Class B potentially active faults are located approximately 12 miles south/southeast of the Solar Micrositing Area. Class B faults have geologic evidence that demonstrates the existence of a fault or suggests Quaternary deformation,

but either (1) the fault might not extend deeply enough to be a potential source of significant earthquakes, or (2) the currently available geologic evidence is too strong to confidently assign the feature as a Class C (insufficient geologic evidence) but not strong enough to assign it to Class A (active fault) (USGS 2025b). The potentially active faults shown in Figure H-2, within 50 miles of the Solar Micrositing Area, present the largest potential for seismic contribution to the Solar Components.

The site-specific geotechnical investigation will assess the potential for any regional faults to affect the Solar Components, as described in Section 5.0. The investigation will include a description of any potentially active faults, their potential risk to the Solar Components, and any additional mitigation measures the Certificate Holder will employ to design, construct, and operate the Solar Components safely.

The 2013 Oregon Resilience Plan by the Oregon Seismic Safety Policy Advisory Commission (OSSPAC 2013) simulated the impact of a magnitude 9.0 Cascadia earthquake scenario. This plan places the Solar Micrositing Area into the "very light" shaking category. This means that a magnitude 9.0 Cascadia scenario earthquake would produce a very light shaking event that would be felt outdoors, wake sleepers, disturb or spill liquids, upset small unstable objects, and potentially swing doors or move pictures (OSSPAC 2013).

Probabilistic seismic-hazard disaggregation at 475-year intervals is shown in Attachment H-3 and at 2,475-year intervals in Attachment H-4.

7.2.2 Recorded Earthquakes

Figure H-2 displays the location and approximate magnitude of all recorded earthquakes within approximately 50 miles of the Solar Micrositing Area. The seismic events are grouped by magnitude and displayed with differently sized symbols based on the event's strength.

Table H-3 summarizes the earthquakes greater than magnitude 3.5 recorded within 50 miles of the Solar Micrositing Area. One earthquake greater than magnitude 4.5 was recorded approximately 40 miles southwest of the Solar Micrositing Area. The nearest earthquake is magnitude 2.5 to 3.5 and is located less than 5 miles north of the Solar Micrositing Area. Earthquakes between magnitude 3 and 4 are generally equivalent to a Modified Mercalli Intensity III associated with shaking that is "noticeable indoors but may not be recognized as an earthquake" (USGS 2025c).

Table H-3. Significant Historical Earthquakes within 50 Miles of the Solar Components by Magnitude*

Year	Month	Day	Latitude	Longitude	Moment Magnitude	Miles from Solar Micrositing Area
1975	7	1	45.62799835	-120.0019989	3.5	28.13
1975	7	1	45.60533142	-120.0161667	3.6	27.55
1976	10	10	45.27033234	-120.4994965	3.6	25.96
1976	4	17	45.15850067	-120.8473358	4	35.15
1976	4	13	45.07566833	-120.8588333	4.6	40.78
1979	2	17	46.1641655	-119.932663	3.6	45.92
1981	2	2	46.26283264	-120.9889984	4	44.83
1985	2	10	45.70449829	-119.6344986	3.9	45.82
1988	9	29	45.84983444	-120.2596664	3.5	19.59
1992	8	7	45.86033249	-119.5895004	3.9	49.59
1997	11	18	46.14316559	-120.4708328	3.9	32.58
1997	3	22	45.19733429	-120.0671692	3.9	39.62
1998	10	9	46.20366669	-120.7083359	4	36.79
1999	8	31	45.1863327	-120.0908356	3.5	39.50
2000	2	1	45.18999863	-120.1126633	3.6	38.66
2000	1	30	45.19716644	-120.1248322	4.1	37.91
2007	3	1	45.1238327	-120.934166	3.6	38.87
2007	6	14	45.12566757	-120.9440002	3.8	38.94
2008	12	27	45.13100052	-120.9513321	3.6	38.75
2008	4	5	45.13000107	-120.9424973	3.6	38.64
2008	7	14	45.12866592	-120.9499969	4.2	38.87
2009	4	20	45.13349915	-120.9550018	3.6	38.67
2010	12	30	45.13150024	-120.9319992	3.6	38.34
2010	1	2	45.13700104	-120.9554977	3.6	38.46
2010 *Magnitude of	6 3.5 or greater	17	46.10883331	-120.7429962	4.2	30.71

Source: USGS 2025c

The Ground Response Spectra Assessment (Attachment H-5) assessed the design response spectrum given in the 2021 IBC using the ASCE 7 Hazard Tool (ASCE 2025). Response spectra are provided for the maximum considered earthquake at the Solar Micrositing Area location. For the maximum considered earthquake, separate response spectra modified by the amplification factors for Site Class D are provided. Due to the presence of loess and stiff soils at depths up to 20 feet (Terracon 2024) in the Solar Micrositing Area, the Solar Components should be designed for the most conservative Site Class D.

7.2.3 Hazards Resulting from Seismic Events

Potential seismic hazards from a design seismic event for the Solar Components include seismic shaking or ground motion, fault displacement, instability from landslides or subsurface movement, and adverse effects from groundwater or surface water. These risks are discussed below. Since the Solar Components are far from the Oregon coast, and not in a DOGAMI-defined tsunami evacuation zone (DOGAMI 2025c), tsunami inundation is not considered a hazard.

7.2.4 Seismic Shaking or Ground Motion

The Solar Components will be designed to withstand the maximum risk-based design earthquake ground motions developed for the design seismic event that has a 2,475-year recurrence interval. The State of Oregon has adopted the IBC 2024 code for structural design. Specifically, this is Chapter 16, Section 1613 (Earthquake Loads) of the 2025 OSSC (State of Oregon 2025). Building codes are frequently updated; the IBC is updated every 3 years. The Certificate Holder will design, engineer, and construct the Proposed Facility following the latest IBC, OSSC, and building codes adopted by the State of Oregon at the time of construction.

Based on soil data provided by the NRCS Web Soil Survey (Exhibit I), and geologic and geotechnical information, the surficial materials in the Solar Micrositing Area range from Site Class C to Class D. As described above, Site Class D (silt loess, stiff soil) is the most conservative class appropriate for the Solar Components (Attachment H-5).

Based on site-specific analyses, the original equipment manufacturer will provide the structural engineer with site-specific foundation loads and requirements. The structural engineer then completes the foundation analyses based on the design site-specific parameters. The geotechnical studies and analyses provide site-specific parameters, including but not limited to moisture content and density, soil/bedrock bearing capacity, bedrock depth, settlement characteristics, structural backfill characteristics, soil improvement (if required), and dynamic soil/bedrock properties, including shear modulus and Poisson's ratio of the subgrade. The foundation design engineer will use these parameters to design a suitable foundation and verify that the foundation/soil interaction meets or exceeds the original equipment manufacturer's site-specific, minimum requirements.

7.2.5 Fault Rupture

Fault displacement is unlikely because there are no active faults within the Solar Micrositing Area. The nearest known active or potentially active faults are approximately 5 miles north and 12 miles south/southeast of the Solar Micrositing Area as shown on Figure H-2. Concern was expressed at

the DOGAMI meeting (Attachment H-1) regarding the possible extension of the Luna Butte Fault located north/northeast of the Solar Micrositing Area as shown on Figure H-2. Review of DOGAMI LiDAR mapping (DOGAMI 2025b) indicates that this fault could extend farther south/southeast and that the fault could be located within approximately 4.5 miles east of the Solar Micrositing Area. There is a mapped unnamed fault located about 0.5 to 1 mile north of the Solar Micrositing Area (Figure H-1). The fault is not considered active within recent geologic time.

7.2.6 Liquefaction

Liquefaction is when saturated and cohesionless soils are subjected to dynamic forces like intense or prolonged ground shaking and temporarily lose their strength and liquefy. There is no evidence of historic liquefaction or alluvial fan deposits within the Solar Micrositing Area. The soils in the Solar Micrositing Area are generally cohesive and unsaturated. Although eolian deposits within the Solar Micrositing Area have a relatively high liquefaction potential (DOGAMI 2021), groundwater is indicated to be at least 100 feet bgs within the bedrock based on the geotechnical investigation (Terracon 2024). Along with the relatively moderate seismic event potential, this indicates that soil liquefaction within the Solar Micrositing Area is unlikely. Using Oregon HazVu: Statewide Geohazards Viewer (DOGAMI 2025b), the Solar Micrositing Area is not located within an area susceptible to liquefaction (Figure H-2). In addition, no 100-year floodplains are mapped within the Solar Micrositing Area or immediate vicinity as shown in Figure H-4.

7.2.7 Seismically Induced Landslides

While regional seismicity could potentially trigger landslides and mass wasting processes in the Solar Micrositing Area, the risk is considered low to moderate for expected shaking in a Cascadia 9.0 magnitude event (DOGAMI 2025d). The landslide database does not show any historic landslides within the Solar Micrositing Area or within the immediate vicinity (DOGAMI 2025d). Construction will avoid steep slopes that are most susceptible to landslides. The site-specific geotechnical investigation will review evidence of active faults and landslides, which will inform the final design and layout. More detailed discussion on the location and type of landslides is included in Section 8.1.

7.2.8 Subsidence

Subsidence is the sudden sinking or gradual downward settling of surface land, often caused by groundwater drawdown, compaction, tectonic movements, mining, or explosive activity. The geotechnical investigation (Terracon 2024) has shown that the soils that are present on most of the Solar Micrositing Area are not saturated and groundwater is indicated to be at least 100 feet bgs within bedrock. Subsidence due to a seismic event is unlikely in the Solar Micrositing Area as the overlying soils are unsaturated where the Solar Components will be constructed.

Subsidence may also occur due to introduction of moisture into desiccated collapsible soils present in loess. Drainage changes produced by grading and site development can induce moisture changes

in the subsurface that can cause collapse of loess that is at a very low natural moisture content. Collapsible soils are discussed in Section 8.6. Design of site drainage will prevent ponding or other concentration of surface water flows, especially near structures. Development over existing drainage ways will be avoided wherever possible. If development over existing drainage ways cannot be avoided, rerouting of surface water will also be avoided so as to not induce potential subsidence.

7.2.9 Seismic Hazard Mitigation

The State of Oregon uses the 2024 IBC, with current amendments by the OSSC. Pertinent design codes relating to geology, seismicity, and near-surface soil are found in OSSC Chapter 16, Section 1613 (State of Oregon 2025). The Solar Components infrastructure will be designed to meet or exceed all current design code standards. Substation equipment will meet all requirements in the latest version of the Institute of Electrical and Electronics Engineers (IEEE) 693-2018 standard (which directs the design and qualification of equipment installed in substations and its ability to withstand a seismic event.). The region has a high to very high seismicity potential; however, the solar arrays and battery storage infrastructure will be designed to resist seismic loads.

As discussed in Section 5.0, site-specific geotechnical exploration will provide data that will guide the Solar Components infrastructure design to mitigate potential seismic-event hazards. The hazard of a surficial rupture along a fault is low, given the seismic history of the site displayed in geologic mapping. Because the Solar Components are in a sparsely populated area, there is minimal human safety and environmental risk. Mitigation for potential fault rupture is not needed. No structures will be built on steep slopes prone to instability, thus avoiding potential impacts. Disaster resilience design guidelines are further described in Section 9.0.

8.0 Non-Seismic Geological Hazards – OAR 345-021-0010(1) (h)(F)

OAR 345-021-0010(1)(h)(F) An assessment of geology and soil-related hazards which could, in the absence of a seismic event, adversely affect or be aggravated by the construction or operation of the facility, in accordance with standard-of-practice methods and best practices, that address all issues relating to the consultation with the Oregon Department of Geology and Mineral Industries described in paragraph (B) of this subsection. An explanation of how the applicant will design, engineer, construct and operate the facility to adequately avoid dangers to human safety and the environment presented by these hazards, as well as:

(i) An explanation of how the applicant will design, engineer, construct and operate the facility to integrate disaster resilience design to ensure recovery of operations after major disasters; and

(ii) An assessment of future climate conditions for the expected life span of the proposed facility and the potential impacts of those conditions on the proposed facility.

<u>Response</u>: Non-seismic geologic hazards in the Columbia Plateau region include landslides, volcanic eruptions, collapsing soils, and erosion. The area within the Solar Micrositing Area is primarily relatively flat and includes loess deposits, with the exception of several canyon drainages. The Solar Components will be constructed within a flat-lying portion of the Solar Micrositing Area. It will avoid steep slopes and drainages that could experience landslides and soil creep. A discussion of potential non-seismic geologic hazards is presented below.

8.1 Landslides

In 2021, DOGAMI released an update to the Oregon Statewide Landslide Database (SLIDO-4.4; DOGAMI 2025d). SLIDO is a statewide database of known landslides compiled from published maps. The database includes landslides, debris flows, alluvial fans, and colluvium or talus. The primary sources of this historical landslide information are published geologic reports and geologic hazard studies by the USGS and DOGAMI. The SLIDO-4.4 landslide database was used to overlay landslide areas or landslide-related features on Figure H-3; there are no mapped landslides within the Solar Micrositing Area, and most of the area is mapped as low susceptibility for landslides. Areas of moderate landslide susceptibility are mapped along drainages within the Solar Micrositing Area. Areas of high susceptibility for landslides are mapped along the drainages/canyons along the eastern and northwestern boundaries of the Solar Micrositing Area. In addition, based on an evaluation of geologic material class and slope during both dry and wet conditions (DOGAMI 2021), most of the Solar Micrositing Area is located in an area of low susceptibility to dry landslides and low to moderate susceptibility to wet landslides. Small areas along steeper drainages and the drainages and canyons along the northeastern boundaries are rated moderate to moderately high for susceptibility to dry landslides and high to very high for susceptibility to wet landslides. Site construction will follow appropriate IBC regulations for construction and avoid steep slopes.

Slopes within the vicinity of the Solar Micrositing Area range from approximately zero to 35 percent, with an average slope of 4.9 percent. If slope stability issues are identified in the final design geotechnical investigations, the structures will either be relocated during the micrositing process, or remedial measures will be implemented to improve slope stability.

Additional review was conducted from the DOGAMI Landslide Inventory and Risk Reduction of the North and Central Portions of Wasco County, Oregon (DOGAMI 2023). The Solar Micrositing Area is located east of the study area evaluated in this report.

8.2 Volcanic Activity

Volcanic activity in the Cascade Range is driven by the subduction of the Juan de Fuca Plate beneath the North American Plate. The closest volcano to the Solar Micrositing Area is Mount Hood (approximately 50 miles west/southwest). Most of the potential volcanic hazard impacts would occur within a 50-mile radius of the erupting volcano. Depending on the prevailing wind direction at the time of the eruption and the source of the eruption, ash fallout in the region surrounding the

Solar Components may occur. Because of the distance to the nearest volcanoes, the Solar Components' impacts from volcanic activity would be indirect and likely limited to ash fallout. In addition, the Solar Components are not located near any streams that would be subject to pyroclastic flows from a volcanic eruption from these close volcanoes. It is unlikely that there would be any adverse effects from volcanic activity on the construction or operation of the Solar Components.

8.3 Erosion

Erosion can occur when soils are increasingly exposed to wind or water. Wind erosion is influenced by wind intensity, vegetative cover, soil texture, soil moisture, the grain size of the unprotected soil surface, topography, and the frequency of soil disturbance. Wind erosion hazard is generally high to very high. Control measures will be implemented to mitigate wind and water erosion potential as identified in Exhibit I. Water erosion is primarily a function of soil type, vegetative cover, precipitation, and slope inclination. If left unmitigated, erosion from rainfall would be a hazard during construction. The runoff potential and water erosion hazard for site soils is generally moderately low. Slopes in the Solar Micrositing Area have an average slope of 4.9 percent; it is noted that slopes greater than 15 percent have a greater erosion risk. The hazard for erosion across the Solar Micrositing Area ranges from slight to severe. The general average annual rainfall for nearby Moro, Oregon (approximately 7.6 miles south/southwest of the Solar Micrositing Area) is 10.38 inches of precipitation and 16 inches of snowfall (US Climate 2025). Additional precipitation data is provided in Exhibit J (see Attachment J-1 to Exhibit J). The erosion potential and available precipitation make site soils sensitive to water erosion during winter and spring, particularly on steep slopes. A draft Erosion and Sediment Control Plan (ESCP) has been developed to reduce the potential for soil erosion (see Attachment I-1 to Exhibit I). The ESCP includes structural and nonstructural best management practices (BMP). Structural BMPs include the installation of silt fences or other physical controls to divert flows from exposed soils or otherwise limit runoff and pollutants from exposed areas. Nonstructural BMPs include the implementation of materials handling procedures, disposal requirements, and spill prevention methods.

The engineering, procurement, and construction (EPC) contractor will apply for a National Pollutant Discharge Elimination System stormwater construction permit though the Your DEQ Online platform. In addition, Exhibit I contains a comprehensive list of mitigation measures to avoid wind and water erosion and soil impacts.

8.4 Flooding

Federal Emergency Management Agency (FEMA) National Flood Hazard data (FEMA 2025) were compared to the temporary and permanent disturbance areas in the Solar Micrositing Area to evaluate flood hazards. Figure H-3 provides a map of FEMA floodplains (FEMA 2025). Additional DOGAMI floodplain mapping was not available (DOGAMI 2025b). No canyons or drainages within the Solar Micrositing Area are mapped within the 100-year floodplain. The Solar Components will not impact floodplain hazards.

Seasonal thunderstorms can result in concentrated stormwater runoff and localized flooding. The Solar Components will be designed and engineered to comply with zoning ordinances and building codes that establish flood protection standards for all construction to avoid dangers to the infrastructure, as well as human safety and the environment, including criteria to ensure that the foundation will withstand flood forces. The engineered access roads and drainages will direct stormwater runoff away from structures and into drainage ditches and culverts as required in the ESCP. Therefore, the risks and potential impacts to the Solar Components, human safety, and the environment from flood hazards are expected to be low.

8.5 Shrinking and Swelling Soils

Clayey soils are the most susceptible to shrinking and swelling. These soils were not found in the Existing Facility soil data (see Exhibit I). Previous geotechnical reports did not identify shrinking and swelling soils as a concern within the Solar Micrositing Area (Terracon 2013; Cornforth 2006). The shrink-swell potential of the soils will be evaluated during the site-specific geotechnical investigations and laboratory testing and analysis during the detailed engineering phase of the Solar Components. If shrinking or swelling soils are present at foundation locations or along road alignments, soil improvement will be necessary. Soil improvement can include reworking and compacting onsite soils, over-excavating soils with shrink-swell potential and replacing with compacted structural fill, constructing impermeable barriers to prevent saturation, or mixing soils to reduce the potential for shrinking and swelling.

8.6 Collapsing Soils

The Terracon (2024) geotechnical investigation found that the primary geotechnical consideration is collapsible soils in the upper 10 feet of loess. These soils are very soft to medium stiff and could be susceptible to collapse. Structures founded directly on these soils could experience total and differential settlements exceeding 1 inch. These soils, deposited by wind and the soil particles, are generally considered to be oriented in a "honeycomb"-like structure, which can make them susceptible to high volumetric strains due to collapse of the soil structure. The collapse of the honeycomb structure is typically instigated by wetting and/or loading. Based on laboratory collapse testing from the Shelby tube samples of the near-surface loess, this soil is susceptible to collapse upon loading and wetting generally ranging from 0.2 to 0.5 percent strain at full saturation. However, based on comparison testing at other nearby sites where block samples were collected, it is anticipated there would be two to six times that amount (due to the disturbance caused by Shelby tube sample extrusion). It is estimated that this hazard equates to about 1.2 to 3.6 inches of potential if the loess were to remain in place and be utilized for support. Collapsible soils were also identified as a geotechnical hazard in the previous Phase I-III geotechnical investigations for the BCWF (GN Northern, Inc. 2007, 2008a, 2008b).

Terracon (2024) concluded that proposed structures to be supported by shallow or mat foundations will likely require some level of soil improvement to reduce total and differential settlements to acceptable levels. Based on a foundation embedment depth of 2 feet for frost

protection, the following alternatives for subgrade improvement beneath new structures would be considered:

<u>Complete Removal and Recompaction</u>: Where total settlements need to be limited to less than 1 inch and mitigation of all collapse-related settlements, soft loess soils should be over excavated to expose very stiff to hard loess. The surface of the underlying soils should be scarified, wetted, and compacted prior to placement of new structural fill. The native soils encountered at the site are not suitable for reuse as structural fill.

<u>Partial Removal and Recompaction</u>: Where structures can tolerate total settlements of 3 inches, a partial over excavation could be implemented where the site soils are removed to a depth of 5 feet below the bottom of footing elevation (7 feet below site grades) and recompacted as described above. As an alternative to remove and replace, the alternative compaction techniques such as deep dynamic compaction, rapid impact compaction, or high-energy impact compaction could also be used to improve the minimum 5-foot-thick zone below footings. This option does not reduce potential collapse-related settlements as much as the first option, since some of the soft loess soils would remain in place.

9.0 Disaster Resilience

Pertinent design codes related to geology, seismicity, and near-surface soils are contained in OSSC Chapter 16, Section 1613 (Earthquake Loads) (State of Oregon 2025). The Solar Components will be designed to meet or exceed the minimum standards required by these design codes. The Certificate Holder acknowledges that DOGAMI encourages, but does not require, design and build for disaster resilience and future climate conditions using science, data, and community wisdom to protect against and adapt to risks. With this in mind, the Certificate Holder has extensive experience building energy facilities and designing projects to withstand non-seismic geologic hazards from a structural perspective.

The Solar Components will be designed, engineered, and constructed to meet all current standards to adequately avoid potential dangers to human safety presented by seismic hazards. A qualified engineer will assess and review the seismic, geologic, and soil hazards associated with the Solar Components infrastructure construction. Construction requirements will be modified, as needed, based on the site-specific characterization of seismic, geologic, and soil hazards. Substation structures will be designed under the current version of the OSSC. Substation, transmission line, and collector line equipment will be specified by the latest version of the IEEE standard (currently IEEE 693-2018). The Solar Components infrastructure will be in sparsely populated areas; therefore, the risks to human safety and the environment due to seismic hazards will be minimal.

The Solar Components infrastructure will be designed, engineered, and constructed to meet or exceed all current standards. The Certificate Holder proposes to design, engineer, and construct the Solar Components to avoid dangers to human safety-related and non-seismic hazards in many ways, including conducting site-specific geotechnical evaluations (see Section 5.0). Typical

mitigation measures for non-seismic hazards include avoiding potential hazards, conducting subsurface investigations to characterize the soils to adequately plan and design appropriate mitigation measures, creating detailed geologic hazard maps to aid in laying out facilities, providing warnings in the event of hazards, and purchasing insurance to cover the Solar Components in the event of hazards. Should Existing Facility elements like access roads be damaged, they will be assessed and repairs made quickly to ensure recovery of operations after a major storm event.

10.0 Climate Change

The University of Washington conducted a study to assess climate vulnerability and adaptation in the Columbia River Plateau, where the Solar Components will be located (Michalak et al. 2014). The study involved downscaling five climate models (CCM3, CGM3.1, GISS-ER, MIROC3.2, and Hadley). Climate projections were downscaled to approximately a 1-kilometer resolution for over 40 different direct (mean annual temperature/precipitation) and derived (number of growing-degree days, actual and potential evapotranspiration) climate variables (Michalak et al. 2014). The downscaling of the climate models for this area led to future projections of greater annual average and summer temperatures, and more severe storm events and wildfires, among other changes. These specific changes are expected to increase stress on power lines in the region.

Reinforcing the local electric grid with solar power and battery energy storage increases energy grid resilience in this part of Oregon. This reinforcement will be direct, by upgrading a system that is anticipated to experience higher loads under rising temperatures and related increases in power demand for summer cooling. It is also indirect by supporting the delivery of power generated through various sources, minimizing the potential reduction in hydropower's role under future conditions. All aspects of the Solar Components support resiliency in the face of future climate change and will be designed to withstand extreme events as explained above in Section 9.0.

11.0 Conclusions

The risk of seismic hazards to human safety at the Solar Components is low to moderate with the implementation of geotechnical mitigation measures. The Certificate Holder reviewed regional geologic information and performed a site-specific desktop analysis of potential seismic, geologic, and soils hazards. In addition, a geotechnical investigation has been conducted within areas of the Solar Micrositing Area that has evaluated seismic risk. A further and more robust site-specific geotechnical investigation will be conducted prior to construction, allowing the Certificate Holder to design, engineer, and construct the Solar Components to the most current standards at the time of construction (Condition 66, Council 2022). The site-specific geotechnical investigations and Solar Components design will comply with the following conditions from the Third Amended Site Certificate: Conditions 112, 112, and 114 (Council 2008). This exhibit reflects input from DOGAMI and demonstrates that the Certificate Holder can design, engineer, and construct the Solar

Components to avoid dangers to human safety. The following supporting evidence is provided, with the remaining evidence to be provided before construction:

- because the Certificate Holder will conduct an additional geotechnical investigation and follow the required design parameters for the Solar Components. The Certificate Holder has adequately characterized the seismic hazard risk of the site under OAR 345-022-0020(1)(a) and considered seismic events and amplification for the Facility's site-specific subsurface profile. The Solar Components include solar modules, transformers, generators, site access roads, BESS facilities, operation and maintenance structures, and two onsite substations with equipment. The proposed operations and maintenance building will be staffed; however, the probability of a large seismic event occurring while the operations and maintenance building is occupied is much lower than for a typical building or facility because the Solar Components will only be occupied periodically. This very low probability results in minimal risk to human safety. During preconstruction geotechnical investigations, any potentially active faults in the vicinity will be surveyed.
- The Certificate Holder has demonstrated that the Solar Components can be designed, engineered, and constructed to avoid dangers to human safety and the environment in case of a design seismic event by adhering to the most recently updated IBC requirements, following OAR 345-022-0020(1)(b). These standards require that for the design seismic event, the factors of safety used in the Solar Components design exceed specific values. For example, in the case of slope design, a factor of safety of at least 1.1 is usually required during seismic stability evaluation. This safety factor is introduced to account for uncertainties in the design process and ensure that performance is acceptable. If slope stability safety factors are not met, the Solar Components will either be relocated during the micrositing process or remedial measures to improve slope stability will be implemented. For slope stability, the remedial measures could include the use of ground improvement methods (such as retaining structures) to limit the movement to acceptable levels. Given the relatively low level of risk for the Solar Components, adherence to the IBC requirements will ensure that appropriate protection measures for human safety are taken.
- The Certificate Holder has provided appropriate site-specific information and demonstrated (per OAR 345-022-0020(1)(c)) that the construction and operation of the Solar Components, in the absence of a seismic event, will not adversely affect or aggravate the geological or soil conditions of the Existing Facility site or vicinity. The risks posed by non-seismic geologic hazards are generally considered low because the Solar Components can be designed to minimize or avoid the hazards of landslides and soil erosion. Landslide and slope stability issues will be identified during the final design and mitigated. Erosion hazard resulting from soil and wind action will be minimized by implementing an erosion control plan. The Certificate Holder will notify ODOE in the event that site investigations or trenching reveal conditions in the foundation rock different from what was evaluated, or if

- shear zones, artesian aquifers, deformations, or clastic dikes are found in the vicinity of the site.
- The Certificate Holder has demonstrated that the Solar Components can be designed, engineered, and constructed to avoid human safety and environment impacts from geological and soil hazards, per OAR 345-022-0020(1)(d). Accordingly, given the relatively small risks these hazards pose to human safety, standard methods of practice (including implementation of the current IBC) will be adequate for the design and construction of the Solar Components. Site-specific studies will be conducted, additional geotechnical work will be completed once the final locations of the structures are selected, and adequate measures will be implemented to control erosion.
- Finally, the Certificate Holder has assessed future climate conditions for the expected life span of the Solar Components, and the potential impacts of those conditions on the Solar Components.

Therefore, for the reasons outlined in this exhibit, the construction and operation of the proposed Solar Components will comply with the structural standards as outlined in OAR 345-022-0020, as well as the standard in OAR 345-021-0010(1)(h).

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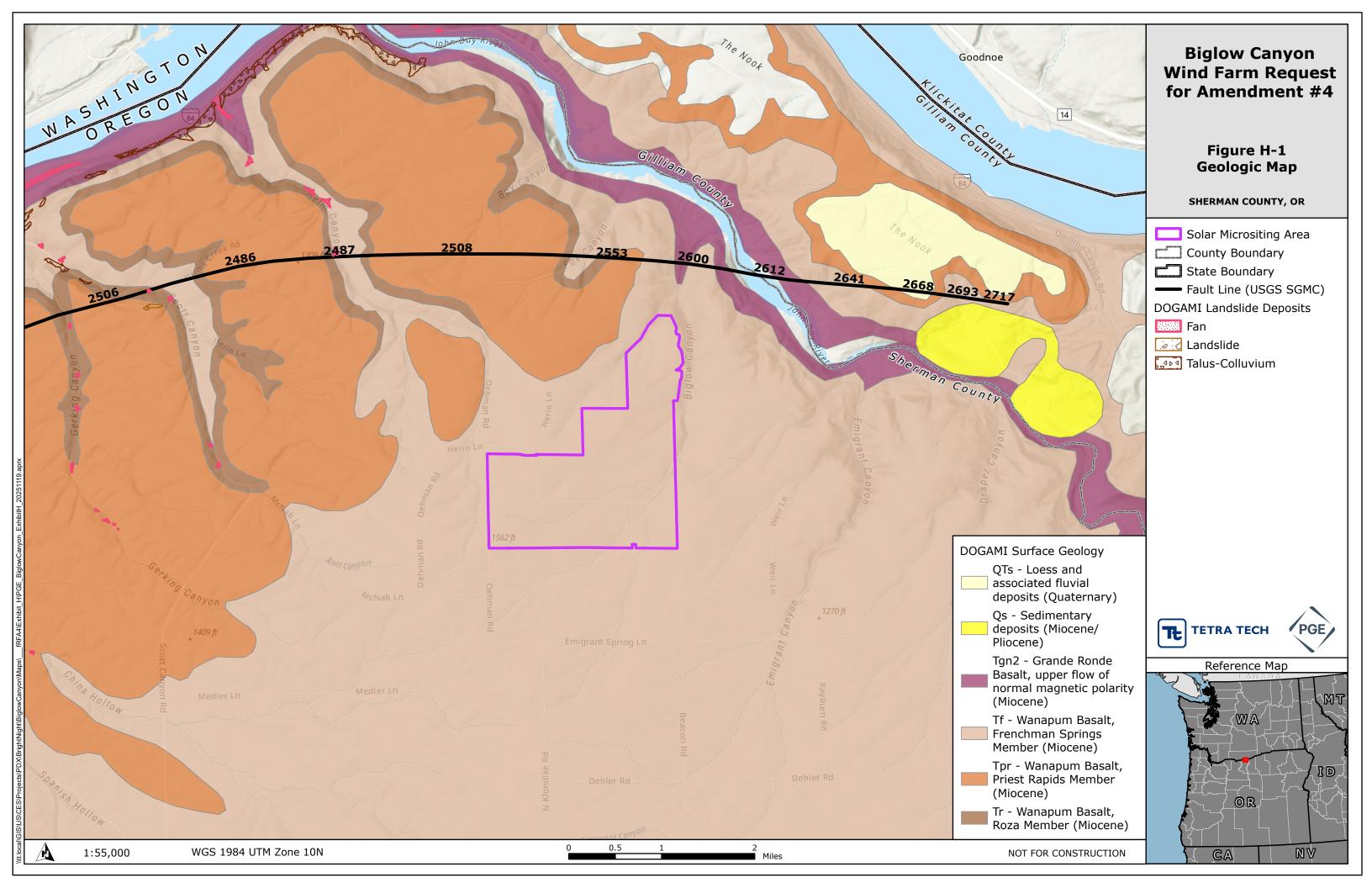
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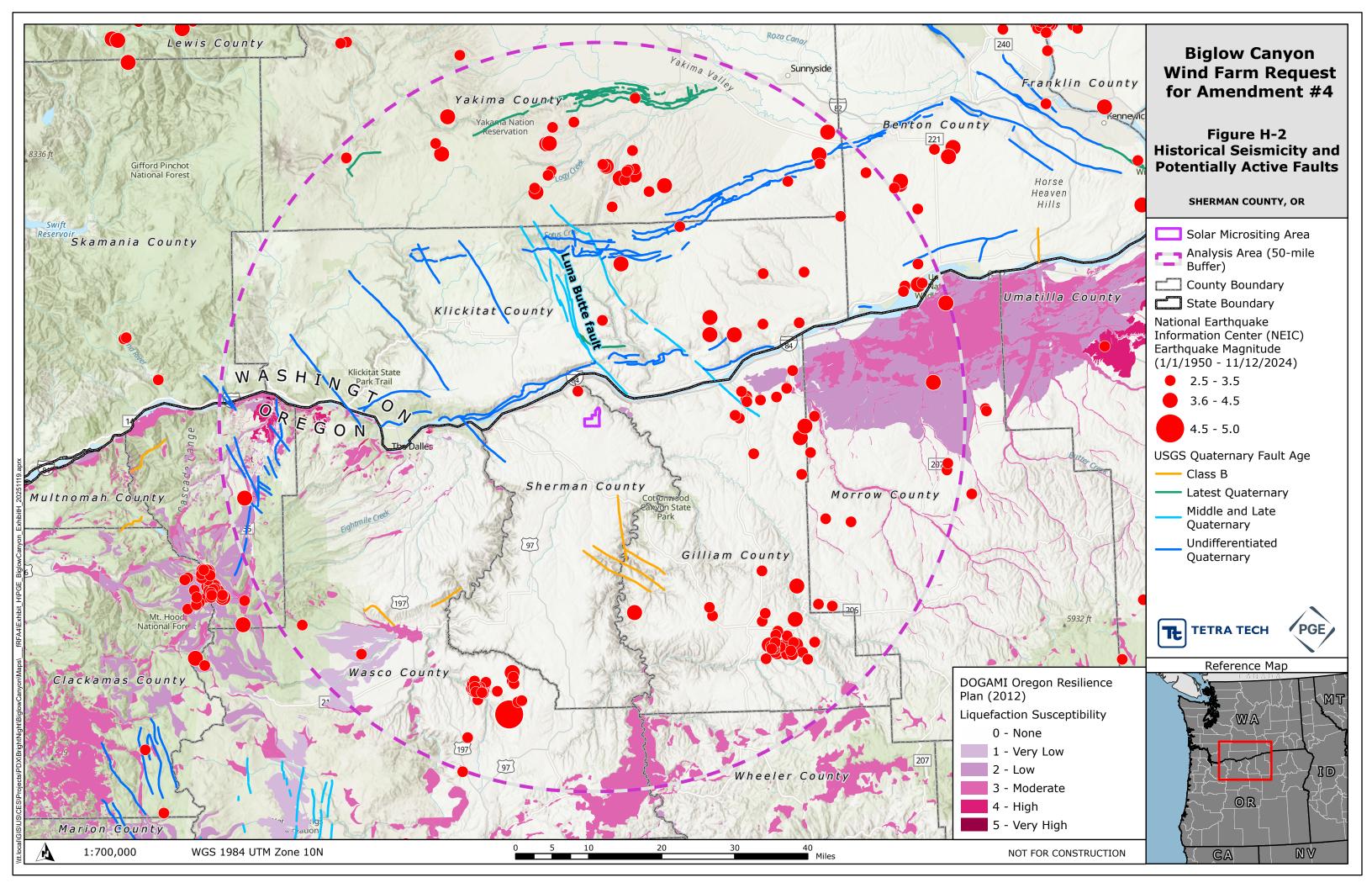
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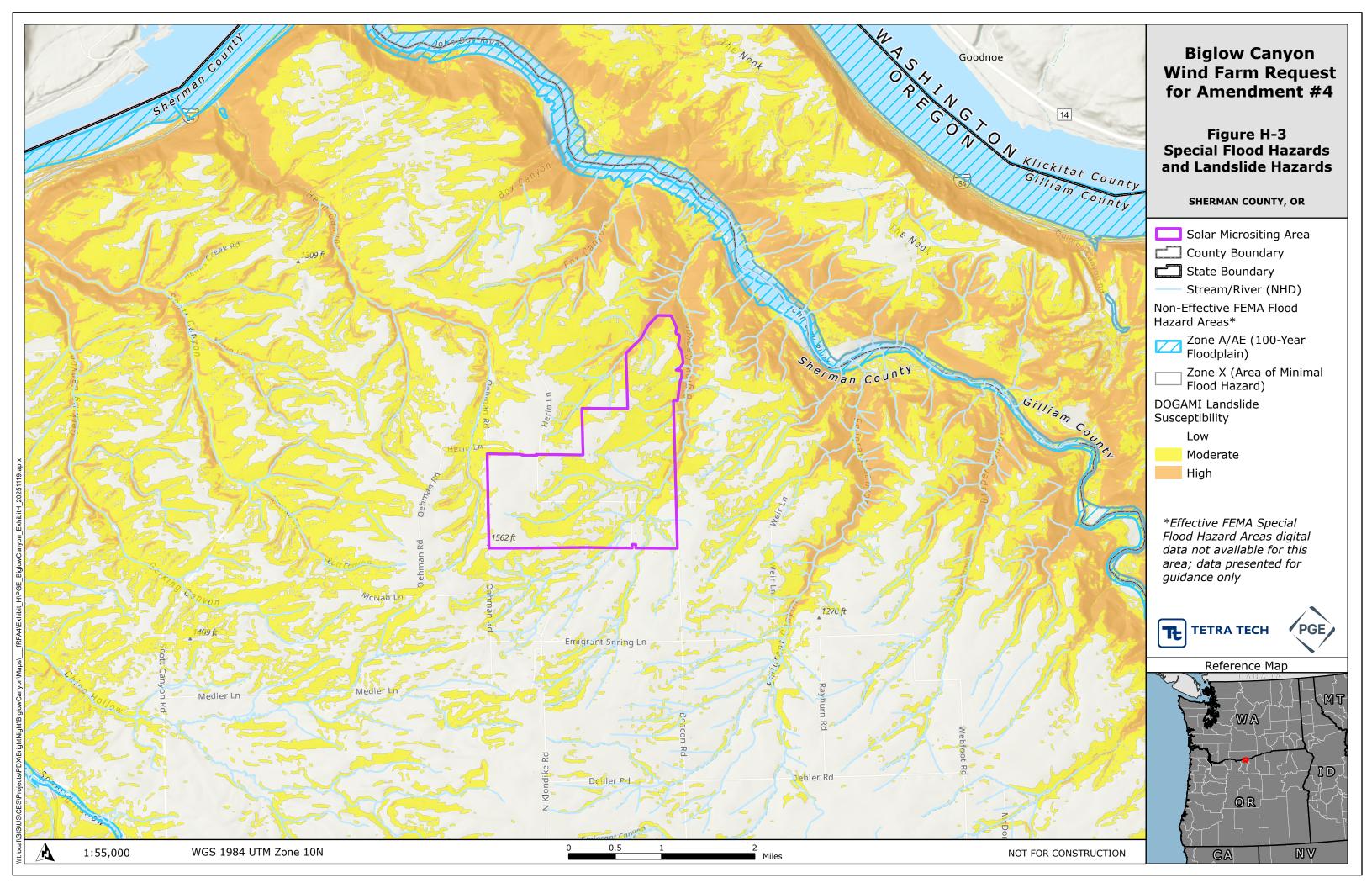
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Figures







Attachment H-1. Record of Correspondence with DOGAMI



Memorandum

Meeting Date: November 1, 2024

Project: Biglow Canyon Wind Farm – RFA 4

Subject: DOGAMI Consultation for EFSC process (Exhibit H)

<u>Virtual Meeting with Oregon Department of Geology and Mineral Industries (DOGAMI)</u> and Oregon Department of Energy (ODOE), November 1, 2024, at 2:00 pm PST

A virtual meeting was held with DOGAMI and ODOE on November 1, 2024, 2:00 pm PST with the following attendees present: Lalo Guerrero (DOGAMI), Jason McClaughry (DOGAMI), Christopher Clark (ODOE), Lenna Cope (PGE), Betsy Biesty (BrightNight), Todd Ellwood (BrightNight), Arturo Alvarez (BrightNight), Colin Canon (BrightNight), Cory Pollpeter (BrightNight), Kiana Ziola (Tetra Tech), and Rachel Miller (Tetra Tech).

Introductions were made for the meeting participants. The following Project information was presented (including a PowerPoint presentation) from the draft Exhibit H for the Biglow Canyon Wind Farm Request for Amendment (RFA) 4:

- Lenna Cope and Betsy Biesty provided a Project overview including a map of the overall Project features and vicinity.
- Rachel Miller discussed the resources and methods used for the geology and geologic hazards analyses that included a slide presentation.
- Rachel Miller discussed the geologic hazards studies including maps of the geology of the area, a map of seismic information including earthquakes and faults, and a map of landslide and floodplains hazards.
- Arturo Alvarez provided an overview of planned geotechnical studies at the site prior to construction.

The following feedback was received from DOGAMI:

Lalo provided an additional online resource (https://pubs.oregon.gov/dogami/dds/p-OSHD-1.htm) and publication (pubs.oregon.gov/dogami/ofr/O-23-02/O-23-02_report.pdf) to include in the evaluation. These resources include additional seismic information and additional landslide information for Wasco County. Rachel stated that the information would be reviewed, and discussion added to Exhibit H.

- Lalo also discussed potential concerns that a potentially active fault (Luna Butte Fault)
 might have suggestion of recent activity, and that Lidar data indicates the fault might
 extend farther southeast than what is currently mapped. Available information will be
 reviewed and documented in Exhibit H.
- Lalo also requested confirmation to ensure the most recent earthquake data is mapped
 on the seismic figure and that the figure provide the data range and data source
 information. Kiana agreed that GIS staff will double check and update the figure.
- Christopher requested that more detailed future geotechnical study information be provided in Exhibit H prior to submittal of the application. This information will be included in Exhibit H.

ACTION ITEMS			
ACTION ITEMS	RESPONSIBLE PARTY		
Draft memo of meeting for DOGAMI Review	Tetra Tech		
Submit Draft of Exhibit H for DOGAMI Review	Tetra Tech		

Attachment H-2. November 2024 Preliminary Geotechnical Engineering Report

Biglow Solar & BESS Preliminary Geotechnical Engineering Report

November 14, 2024 | Terracon Project No. 82245013

Prepared for:

BIGL bn, LLC 13123 E Emerald Coast Pkwy Ste B #158 Inlet Beach, FL 32461





700 NE 55th Avenue Portland, Oregon 97213 P (503) 659-3281 **Terracon.com**

November 14, 2024

BIGL bn, LLC 13123 E Emerald Coast Pkwy Ste B #158 Inlet Beach, FL 32461

Attn: Mr. Arturo Alvarez

P: 480-416-3051

E: arturo.alvarez@brightnightpower.com

Re: Preliminary Geotechnical Engineering Report

Biglow Solar & BESS Old Wasco Heppner Hwy

Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon

Terracon Project No. 82245013

Dear Mr. Alvarez,:

We have completed the scope of Preliminary Geotechnical Engineering services for the above-referenced project in general accordance with Terracon Proposal No. P82245013 Revision 2, dated February 27, 2024, and the expansion area per P82245013-Addendum dated on March 26, 2024. This report presents the findings of the subsurface exploration, pile load testing, and field electrical resistivity test and provides preliminary geotechnical recommendations for the proposed solar development. Additional geotechnical exploration, including more pile load testing and subsurface exploration, should be completed to refine the recommendations provided in this report further as the project design progresses.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely, **Terracon**

Expires June 30, 2025
Peyman Chaichi, P.E.
Kristopher T. Hauck, P.E.
Project Engineer
Office Manager I Senior Principal Engineer

Solar SME Review by: Brice W. Plouse, P.E.

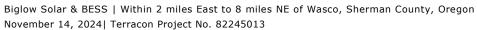
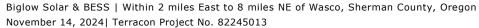




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Attachments

Field Exploration Results
Laboratory Test Results
Field Soil Electrical Resistivity Results
Test Pile Driving Data
Pile Load Test Results

Note: Blue Bold text in the report indicates a referenced section heading. The PDF **Perform** version includes hyperlinks that direct the reader to that section and clicking on the logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

Refer to each Attachment for a listing of contents.



Report Summary

Topic ¹	Overview Statement ²			
Project Description	It is our understanding that the client intends to develop one 250 MWac photovoltaic (PV) electric power facility with array areas, a substation, and a battery energy storage system (BESS) within a total of 4,000 acres. In addition, there will be a proposed new 2.7-mile-long Overhead Gen-Tie route that connects the on-site substation to the existing Portland General Electrical Biglow substation. The initial project site was only 2,000 acres, including array areas, substation, and battery energy storage system. However, the client added another 2,000 acres to the project site that only included array areas.			
Geotechnical Characterization	The subsurface conditions generally consisted of loess soil over alluvium soil underlain by bedrock. Loess units could be divided into multiple units, a younger loose unit transitioning to a cemented older unit with depth. The younger unit has a collapse potential when it gets saturated and/or loaded with strains ranging from about 1 to 3 percent. The cemented loess, dense alluvium, and bedrock conditions where encountered are considered to be a restrictive layer to driven piles.			
PV Piles	Several areas of the site have restrictive layers as described in Geotechnical Considerations that need pre-drilling prior to pile installation to avoid early refusal.			
Shallow/mat foundations for batteries and other electric equipment can be utilized provided the collapse settlem are reduced with partial overexcavation, scarification, a compaction, and backfill with structural fill.				
Deep Foundations	Deep foundations are recommended for substation and Gen-Tie areas. Drilled shafts are a common foundation type in this region and can be used to support the structure loads through a combination of end bearing in very stiff alluvium or highly weathered bedrock and skin friction in the overburden soils using parameters contained herein.			

Biglow Solar & BESS | Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024| Terracon Project No. 82245013



Topic ¹	Overview Statement ²		
Gravel-Surface	 With subgrade prepared as noted in Earthwork Consideration. Array area with an assumed ESAL of 1,000: 5-inch base course over the prepared subgrade. Substation with an assumed ESAL of 10,000:		
General Comments	This section contains important information about the limitations of this geotechnical engineering report.		

- 1. If the reader is reviewing this report as a PDF, the topics above can be used to access the appropriate section of the report by simply clicking on the topic itself.
- 2. This summary is for convenience only. It should be used in conjunction with the entire report for design purposes.

Biglow Solar & BESS | Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024| Terracon Project No. 82245013



Introduction

This report presents the results of our subsurface exploration and services performed for the proposed solar power facility to be located at various locations within about 2 miles east of Wasco to 8 miles northeast of Wasco, Sherman County, Oregon. The purpose of these services was to provide information and preliminary geotechnical engineering recommendations relative to the proposed solar development relative to:

- Subsurface soil and rock conditions
- Groundwater conditions
- Seismic site class per ASCE 7-16
- Site preparation and earthwork
- Foundation design and construction
- PV Pile foundations including load Pile Load Test results
- Aggregate roadways design and construction
- Infiltration test results

The geotechnical engineering Scope of Services for this project included the advancement of fifty-one borings to depths of 5 to 51½ feet below existing ground surface (bgs), laboratory testing, field electrical resistivity testing at 18 locations, pile load testing at 20 locations, engineering analysis, and preparation of this report.

Drawings showing the site and exploration locations are shown on the **Field Exploration Results**. The results of the laboratory testing performed on soil samples obtained from the site during our field exploration are included on the exploration logs and/or as separate graphs in the **Laboratory Test Results** section.

Project Description

Our initial understanding of the project was provided in our proposals and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description			
	We were provided with the following documents: Geotechnical Scope of Works dated February 2, 2024.			
Information Provided	KMZ of the site area.Preliminary Site Layout.			
	KMZ of the site area for the expansion area.			

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Item	Description			
	In addition, Terracon conducted a Stage 1 for Geotechnical Services dated September 21, 2023; Terracon Project No. GR235877.			
Project Description	It is our understanding that the client intends to develop one 250 MWac photovoltaic (PV) electric power facility with array areas, a substation, and a battery energy storage system (BESS) within a total of 4,000 acres. In addition, a new 2.7-mile-long Overhead Gen-Tie route will connect the on-site substation to the existing Portland General Electric Biglow Substation. The power plant will consist of solar panels installed on steel structures, various other electrical equipment, battery storage systems, and a substation.			
Proposed Structures	The proposed project will include the construction of ground-mounted solar panels on steel racks, preferably founded on driven W-Section steel beams (W6x9 or similar). Electrical equipment and substation elements are anticipated to be supported on concrete slabs-on-grade, spread footings, or drilled piers.			
Maximum Loads (assumed based on previous experience)	We have estimated the following foundation loads for the project: Panel array racking system: PV Module Downward: 1 - 7 kips PV Module Uplift: 0.5 - 3 kips PV Module Lateral: 1 - 2 kips PV Module Moment: 0.1 to 30 kip-ft Ancillary Electrical Equipment in the Array: 50 kips BESS Structures with Mat Foundations: 250 kips Substation and Transmission Lines Structures: No loads provided			
Grading/Slopes	Grading and/or site plans were not provided at this stage of the project. However, it is anticipated that the site work involves cuts and fills within +/- 2 feet (or less) of the existing grade. Localized high and low areas may require greater depths/heights of cut and/or fill; however, a site grading plan has not been developed at this time. We expect grading, if necessary, would only be needed in access roads, substation/switch-yard areas, and/or BESS areas.			

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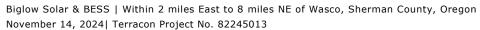


Item	Description			
Access Roads	Unpaved access roads are planned for the site as described below: Access roads are to support post-construction traffic, which we understand will be primarily light maintenance vehicles. The roads will be required to support a maximum vehicle load of 80,000 pounds for fire truck access. Additionally, the substation access road should be able to support heavy vehicle delivery (HS-20 loading) up to two times per year throughout the design life.			
	 We understand it is acceptable for the access roads to require ongoing maintenance throughout their design life. 			

Terracon should be notified if any of the above information is inconsistent with the planned construction, as modifications to our recommendations may be necessary.

Site Conditions

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and recent topographic maps.





Item	Description		
Parcel Information	The project site is located at various locations within about 2 miles east of Wasco to 8 miles northeast of Wasco, Sherman County, Oregon. Approximate Coordinates for the middle of the initial 2,000-acre site are: Latitude: 45.6072° N Longitude: 120.6351° W For Expansion 2,000-acre: Approximate Coordinates for the middle of the 1,500-acre site at Herin Ln are: Latitude: 45.6500° N Longitude: 120.5988° W Approximated Coordinates for the middle of the 500-acre site at Old Wasco Heppner Hwy are: Latitude: 45.5884° N Longitude: 120.6503° W See Site Location.		
Existing Improvements	The site is mostly undeveloped, and some areas appear to have been previously utilized for agriculture or grazing land. There are a few farmhouses around the site and there are some wind turbines across the site with their access roads.		
Current Ground Cover	Most of the site is occupied by agricultural fields.		
Existing Topography	A topographic site plan was not provided. According to Google Earth Pro imagery, a portion of site had slope as much as 15% either in the north-south or the west-east directions.		

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Geotechnical Characterization

Site Geology

Based on our review of the geologic map¹ of the area and experience in the area, the site is underlain by Quaternary Loess (QI), which consists of eolian (wind-deposited) silt to fine sand. Loess deposits are made up of a semi-stable soil structure commonly referred to as a "honeycomb" structure. This structure makes the soil susceptible to collapse under additional applied load and/or saturation. In addition to the collapse potential of this soil type, other characteristics of this soil unit are low relative density and high void ratios.

This loess unit can often be broken into three units consisting of younger Loess (GeoModel Layer 1) which was encountered underlying topsoil and extended to a maximum depth of 30 feet, transition layer between younger and older loess (GeoModel Layer 2) which was underlying Geomodel Layer 1 and extended to a maximum depth of 40 feet, and older loess (GeoModel Layer 3) was encountered at a depth of an existing ground level to a depth of 32 feet. The older loess is also described as semi-consolidated with strong calcium carbonate contents (referred to as cementation in this report). Consensus from the geologic community is that the calcium carbonate was leached from the upper loess layer by infiltrating surface water and precipitated out as the water evaporated^{2,3} and is generally found in the loess deposits where mean annual precipitation is less than 15 inches. This older unit is referred to as Caliche Loess (GeoModel Layer 3) in this report. The caliche loess is generally not susceptible to collapse due to cementation and semi-consolidation. In the area of this site, there appears to be a layer of transition between the younger loess and an older loess unit (referred to as GeoModel Layer 2 Loess to Caliche Loess).

Bela, J.L., 1982, Geologic and neotectonic evaluation of north-central Oregon: The Dalles 1 degree x 2 degree quadrangle, Oregon Department of Geology and Mineral Industries, Geological Map Series 27, 1:250,000

Washington Department of Transportation Publication WA-RD 69.1, Development of Guidelines for Cuts in Loess Soils, by Higgins, Fragaszy, and Beard (1985)

Engineering Geology in Washington (Volume II), Washington Division of Geology and Earth Resources – Bulletin 78, article titled "Engineering Geology of Loess in Southeastern Washington", by J. D. Higgins, R. J. Fragaszy, and L. D Beard (p. 887-898)

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The loess is generally underlain by a layer of recent alluvium, consisting of unconsolidated silt, sand, and gravel generally derived from local sources (GeoModel Layers 4). The alluvium is underlain by the Frenchman Springs member of the Miocene Columbia River Basalt Group. The Columbia River Basalt (GeoModel Layer 5) consists of numerous fine-grained lava flows that primarily erupted from fissures in eastern Washington and Oregon and western Idaho from approximately 23.8 to 5.3 million years ago. Many individual flows are interbedded with thin paleosols formed during periods of volcanic inactivity.

GeoModel

We have developed a general characterization of the subsurface conditions based on our review of the subsurface exploration, laboratory data, geologic setting, and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of the site. Conditions observed at each exploration point are indicated on the individual logs. The individual logs can be found in the **Field Exploration Results** and the GeoModels for project areas can be found in the **Figures** attachment of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description
1	Loess	Silt with various amounts of sand (ML) to silty clay (CL-ML), very soft to very stiff, light brown to white, moist.
2	Loess to Caliche Loess	Silt with various amounts of sand (ML) to silty sand (SM): light brown to white or brown, very stiff or medium dense, moist.
3	Caliche Loess	Silt with various amounts of sand (ML) to silty sand (SM): brown to white, hard or dense, moist.
4	Alluvium	Silt with various amounts of sand (ML) to silty sand (SM): reddish brown, hard or dense, moist.
5	Bedrock	Silty gravel with sand (GM), poorly graded gravel with sand and silt (GP-GM), to Basalt: gray to brown, highly to extremely fractured, moderately weathered, medium strong.

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Bedrock

The GeoModel layers presented in the previous table summarize our interpretations of the subsurface conditions encountered in at the site. As presented on the logs, some areas of interpreted bedrock conditions may be described using soil descriptions because very limited samples were retrieved from the SPT and our geotechnical boring was able to penetrate into the materials. Highly weathered basalt bedrock was encountered at boreholes SUB-1, GEN-1, GEN-2, GEN-3, GEN-4, GEN-5, GEN-6, GEN-7, B-03, B-04, B-05, B-09, B-11, B-13, B-14, B-15, B-17, B-18, B-19, B-20, B-22, B-23, B-24, B-25, B-26, B-29, B-30, B-31, B-32, B-33, B-34, B-36, B-37, B-38, and B-40.

When reviewing the boring logs, it is important to note the GeoModel layer interpretation for the geologic units encountered when considering the excavatability and/or drilling ability with large augers within the materials. In places, the Caliche Loess could be significantly cemented that excavation could be very difficult and it's important to note that the geotechnical drilling auger is only about 6 inches in diameter and able to advance in weathered bedrock materials before refusal (unlike an auger for shafts with diameters much bigger will encounter refusal much shallower).

Groundwater

We observed our explorations while drilling and after completion for the presence and level of groundwater. Static groundwater was not observed during the explorations except at borehole B-32 in a seepage format.

Exploration Number	Approximate Ground Surface Elevation (feet) ¹	Approximate Depth to Seepage while Drilling (feet)
B-32	1267	15

 Based on elevations obtained from Google Earth and depth to the observed groundwater during explorations. Note the assumed ground surface elevation is presented on the exploration logs.

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Well logs available on the Oregon Water Resources Department (OWRD)⁴ website indicates that groundwater levels in the site are generally over 100 feet below site grades, depending on topography.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff, and other factors not evident at the time the explorations were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the exploration logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

Field Electrical Resistivity

A total of 18 field electrical resistivity tests were performed by Terracon from March 11 to March 13, 2024, and from April 8 to April 9, 2024. The location and results of the field electrical resistivity testing are included in the **Field Soil Electrical Resistivity Test Results** section of this report.

Infiltration

Infiltration tests were conducted at 2 locations in general accordance with the Falling Head Infiltration Test method as described in Chapter 3 of the 1980 EPA Onsite Wastewater Treatment and Disposal Systems Design Manual (1980 EPA). Tests were conducted at 3 and 2.5 feet below the existing ground surface. Adjacent borings were advanced a minimum of 10 feet beyond the depth of the infiltration test to determine the presence of groundwater. The tests were conducted in 6-inch inner diameter hollow-stem augers. The test pipes were filled with 12 inches of water, and the soils were allowed to soak for 4 hours in accordance with the test method. After the soaking period, we adjusted the water level so that there were approximately 6 inches of water in the pipe, and the drop in water level was recorded at 30-minute intervals. Measurements were taken with a water level meter and recorded to the nearest 1/16 of an inch. Soil samples were collected at the infiltration test depths for laboratory analysis.

Oregon Water Resources Department, 2024. Well Log Records, accessed May 2024, from OWRD web site: http://apps.wrd.state.or.us/apps/gw/well_log/.

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We conducted the tests in general accordance with the test method until a relatively steady infiltration rate was observed at each test location, as presented in the following table:

Location	Adjacent Boring	Soil Type	Depth of Test (ft)	Measured Infiltration Rate (in./hr.)
T-1	Sub-1	Silt with Sand	3	1/4
IT-2	B-13	Silty Gravel with Sand	21/2	1

Subsurface Variations

Variations in subsurface conditions and the presence of fine layering can affect the infiltration rate of the receptor soils. Variable fine contents were noted in the near-surface sand soils. These mixtures can impede vertical infiltration of stormwater. Due to the low in situ infiltration rates of near-surface soils, we recommend the design and construction of an infiltration facility large enough to facilitate the appropriate average design rainfall event.

Construction Considerations

The infiltration rate of the receptor soils will be reduced in the event that fine sediment or organic materials are allowed to accumulate on the exposed soil surface. The use of an infiltration facility as a temporary construction phase sedimentation pond is not recommended. If site conditions are such that this cannot be avoided, it will likely be necessary to excavate the soils below the infiltration facility bottom that have been contaminated with sediment, organic materials, or other deleterious materials that may reduce the permeability of the receptor soils, prior to operation of the facility for infiltration purposes. Additional field infiltration testing may be necessary to verify that the restoration activity has been successful and that the infiltration rate of the receptor soils is consistent with that considered in the design.

Operation of heavy equipment may densify the receptor soils below the infiltration facility. The soils exposed at the bottom of the infiltration facility should not be compacted. It may be necessary to scarify the infiltration facility subgrade to facilitate infiltration.

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Geologic Hazards

Seismic Hazards

Seismic hazards resulting from earthquake motions can include slope stability, liquefaction, and surface rupture due to faulting or lateral spreading. Liquefaction is the phenomenon wherein soil strength is dramatically reduced when subjected to vibration or shaking.

We reviewed the Statewide Geohazards Viewer (HazVu) published by the Oregon Department of Geology and Mineral Industries (DOGAMI) and available online⁵. The viewer categorizes the expected earthquake shaking as light, moderate, strong, very strong, severe, and violent; and the landslide susceptibility from low, moderate, high, and very high.

Earthquake Liquefaction Hazard: N/A (non-liquefiable)

Expected Earthquake Shaking: Moderate

Landslide Susceptibility (due to earthquake): Low to moderate

Nearby Faults

The United States Geological Survey (USGS) maintains the Quaternary Fault and Fold Database containing descriptions and locations of recently active faults within the United States. The three closest faults to the project site include the Luna Butte fault (No.579), the Columbia Hills structures (No.568), and the Faults near The Dalles (No.580). Published information about each fault or fault zone is provided in the following table:

Fault Name	Luna Butte fault	Columbia Hills structures	Faults near The Dalles
USGS Fault Number	579	568	580
USGS Fault Class	Α	Α	Α
Distance and Direction of Fault from the Site	4 mi NE	7 mi NW	8 mi W
Length of Fault	19 miles	100 miles	43 miles

Statewide Geohazards Viewer (HazVu) published by the Oregon Department of Geology and Mineral Studies (DOGAMI) https://gis.dogami.oregon.gov/hazvu/, accessed May 2024

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Fault Name	Luna Butte fault	Columbia Hills structures	Faults near The Dalles
Strike (degrees)	N24°W	N75°E	N38°W
Sense of Movement	Right lateral	Thrust	Right lateral, Normal
Dip Direction	90°	2-80° S	Vertical
Slip-rate Category	Less than 0.2 mm/yr	Less than 0.2 mm/yr	Less than 0.2 mm/yr
Most recent prehistoric deformation	Middle and late Quaternary (<750 ka)	Undifferentiated Quaternary (<1.6 Ma)	Undifferentiated Quaternary (<1.6 Ma)

Based on our review of the available fault information, the depth to bedrock, and the site's proximity to the nearest known faults, it is our opinion that the risk of surface rupture due to ground faulting is low.

Seismic Site Class

The seismic design requirements for structures are based on the Seismic Design Category. Site Class is required to determine the Seismic Design Category for a structure. The Site Class is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength by Section 20.4 of ASCE 7-16. Based on the soil properties observed at the site and as described in the exploration logs and results, our professional opinion is that a **Seismic Site Class of D** be considered for the project.

Description	Value
2022 Oregon Structural Specialty Code (2022 OSSC) Site Class	D ^{1,2}
Site Latitude	45.6072°N
Site Longitude	120.6351°W
S_s Mapped Spectral Acceleration for Short (0.2 second) Period ³	0.409g
S_1 Mapped Spectral Acceleration for 1 Second Period ³	0.182g
F _a Site Coefficient, 0.2 second	1.473
F_V Site Coefficient, 1.0 second	2.235
S _{DS}	0.402g
S_{D1}	0.272g

1. Seismic site class in general accordance with the 2022 OSSC, which refers to ASCE 7-16.

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Description

Value

- 2. ASCE 7-16 requires a site soil profile extending to a depth of 100 feet to be used for seismic site classification. Explorations associated with the projects extended to a maximum depth of 51.5 feet. The site properties below the maximum boring depth of 100 feet were estimated based on our experience and knowledge of the geologic conditions of the general area. Additional deeper borings or geophysical testing may be performed to confirm the conditions below the current boring depth.
- These values were obtained using online seismic design maps and tools available on the Applied Technology Council (ATC) website referenced in Section 1613.2.1 of the 2022 OSSC.

Liquefaction

Liquefaction is the phenomenon where saturated soils develop high pore-water pressures during seismic shaking and lose their strength characteristics. This phenomenon generally occurs in areas of high seismicity, where groundwater is shallow and loose granular soils or relatively low- to non-plastic fine-grained soils are present.

As indicated above, the site is in an area mapped as having no potential for liquefaction. Regional groundwater is anticipated to underly the site at depths greater than 100 feet bgs within the bedrock. Based on the depth of groundwater, it is our professional opinion that the site is non-liquefiable. Based on a review of geologic mapping and our previous experience on the site, we do not anticipate liquefiable conditions to be present at depths below those explored as part of this assignment.

Liquefaction - Lateral Spread

Lateral spreading is not a concern at this site due to groundwater mapped at approximately 100 feet below the ground surface and the presence of bedrock at the groundwater depth.

Geotechnical Overview

The site appears suitable for the proposed construction based on geotechnical conditions encountered in the explorations, provided that the recommendations provided in this report are implemented in the design and construction phases of this project.

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General Soil Conditions

The subsurface materials generally consisted of silt with varying amounts of sand extending to gravelly soil underlain by basalt bedrock. However, we did not encounter gravelly soil or bedrock in the maximum depth of drilling in some of the boreholes. Groundwater was not encountered within the maximum depths of exploration during or at the completion of drilling except in one borehole B-32 at 15 feet bgs. The individual logs can be found in the **Field Exploration Results** and the GeoModels for project areas can be found in the **Figures** attachment of this report.

Earthwork Considerations

Based on laboratory collapse testing from the shelby tube samples of the near-surface loess, this soil is susceptible to collapse upon loading and wetting generally ranging from 0.2 to 0.5 percent strain at full saturation. However, based on comparison testing at other nearby sites where block samples were collected, we would anticipate 2 to 6 times that amount (due to the disturbance caused by shelby tube sample extrusion). We estimate that this hazard equates to about 1.2 to 3.6 inches of potential collapse-related settlements across the site if the loess were to remain in place and be utilized for support We have prepared recommendations to reduce the risk of collapsible settlement for foundations that may be supported on the reworked loess soils as per Collapsible Soil section. In addition, the grading designer needs to take necessary actions to provide drainage away from any shallow or mat foundations where possible if surface waters are collected. Site preparation recommendations, including subgrade improvement and fill placement, are provided in the Earthwork Considerations section.

Additionally, we believe heavy-duty construction equipment, such as a hoe ram, a heavy dozer equipped with a ripper, a rock saw, or jackhammer or with rock trenching equipment, is likely suitable for grading, shallow excavations, and utility trench excavations. Due to the presence of a shallow restrictive layer in Predrill pile zone 1 of array area and zone 1 of Gen-Tie area, pier and utility trench excavation will encounter very hard materials. A drilled-pier drilling rig equipped with hard formation drilling bits (rock drill type bit) having high torque capacity may be required for the installation of short piers to achieve appropriate pier depths. Solar pile pilot holes can be accomplished with an air-rotary button head drill bit.

Array Area Predrilling Considerations

Due to the presence of a near-surface restrictive layer within the Predrill pile zone, it is our opinion that pre-drilling in advance of pile installations will be required at this site. Undersized pilot holes should be predrilled to design embedment depths. For our pile load testing program, a button head, air rotary drilling method was utilized to develop

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the undersized (6-inch outside diameter) predrilled holes. During the backfill of pilot holes with the native soils prior to pile driving, all materials greater than 2 inches in nominal diameter should be removed to limit early pile refusal. Based on the air rotary method, oversized cuttings are usually not a concern.

The results provided herein for the Predrill pile zone are applicable for predrilling undersized pilot holes up to 6 inch outside diameter utilizing air rotary drilling methods, or similar, to target embedment depths only.

Additionally, the predrilling equipment should be able to predrill the hole within the structural design tolerances for vertical and horizontal planes.

Construction Considerations

We recommend that the top 12 inches of the exposed subgrade at the footing locations be sacrificed and compacted before placing a new fill. In addition, we recommend that footing subgrade over-excavate at least 12 inches to place aggregate course under the footings.

Based on anticipated loads and subsurface conditions, we expect drilled shafts could be used to support substation and transmission line structures. We have provided preliminary axial and lateral parameters to aid in developing cost estimates for drilled shafts as per the **Drilled Shaft** section.

Our opinion of gravel-surfaced drives and parking section thickness design has been developed based on our understanding of the intended use, assumed traffic, and subgrade preparation recommended herein using methodology contained in Chapter 4 Low-Volume Road Design found in AASHTO 1993. We have provided aggregate roadway design parameters as per the **Gravel-Surfaced Drives and Parking** section.

General Comments

The recommendations contained in this report are based upon the results of field and laboratory testing (presented in the **Field Exploration Results** and **Laboratory Test Results**), engineering analyses, and our current understanding of the proposed project. The **General Comments** section provides an understanding of the report's limitations.

Pile Load Testing

We completed a preliminary pile load testing program that included:

Directing the installation of a group of three test piles at each of 20 locations.

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- Performing full-scale testing under axial compressive loads for one test pile at each location (20 tests).
- Performing full-scale testing under axial tensile loads for two test piles in each group (40 tests).
- Performing full-scale testing under lateral loads for two test piles in each group (40 tests).

A summary of the total drive times and load test results is provided below. A summary of the installation procedures and drive time curves is included in the **Test Pile Driving Data** section.

Summary of Pile Installation and Test Results

The piles were advanced by McDowell Pile King, Inc. on April 2 -3, 2024, and April 15-16, 2024, with an excavator-mounted pile driver equipped with a TB425 1,100-pound hydraulic hammer to embedment depths ranging from approximately 5 to 10 feet below the ground surface (bgs). All 5 and 8-foot embedded piles were installed at the base of an undersized predrilled hole using an air-rotary drill rig with a button head drill bit. The diameter of the undersized predrill hole measured approximately 6 inches and was extended to the planned embedment depth; the undersized hole was backfilled with soil cuttings prior to pile installation.

The time rate of pile installation was recorded with a stopwatch. A summary of the total drive times and load test results is provided below. Additional installation details and pile drive time curves are included in the **Test Pile Driving Data** section.

Summary of Pile Installation Times

Embedment Depth	Total Drive Time (seconds)			
(feet-bgs) ^{1,2}	Min.	Max.	Average	
5	0.6	5.3	2.14	
7	5.1	33.4	11	
8	4.79	76.66	24.9	
10	6.65	76.4	28.77	

- 1. Piles embedded 5 and 8 feet were installed into undersized predrilled holes.
- 2. Piles installed 7 and 10 feet were directly embedded.

The individual pile load test results are provided in the **Pile Load Test Results** section. The following table provides a summary of each test pile location, embedment depth, total

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drive time, uplift load at ¼-inch of vertical displacement, lateral load at ½-inch of lateral displacement, and compressive load at ¼-inch of vertical displacement:

Pile Load Test Results Summary

Location	Pile Tip Depth (ft- bgs)	Total Drive Time (seconds)	Uplift Load at '4" Displacement (lbs)	Lateral Load at ½" Displacement (lbs)	Compression Load at 1/4" Displacement (lbs)
PLT-01 A	10	21.2	>4,000	2,610	
PLT-01 B	7	16.9	2,000	2,750	
PLT-01 C	7	18.8			>6,000
PLT-02 A ³	8	65.0	1,000	1,120	
PLT-02 B ³	5	5.3	700	1,370	
PLT-02 C ³	5	3.5			>6,000
PLT-03 A	10	68.5	>4,000	2,770	
PLT-03 B	7	33.4	>4,000	2,480	
PLT-03 C	7	6.5			5,790
PLT-04 A	10	15.3	2,500	2,550	
PLT-04 B	7	5.1	1,070	2,080	
PLT-04 C	7	7.4			>6,000
PLT-05 A	10	36.3	3,500	2,160	
PLT-05 B	7	21.0	3,000	2,210	
PLT-05 C	7	26.5			>6,000
PLT-06 A	10	76.4	2,000	2,250	
PLT-06 B	7	16.8	>4,000	2,000	
PLT-06 C	7	14.1			>6,000
PLT-07 A ³	8	15.8	>4,000	1,030	

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Pile Load Test Results Summary

Location	Pile Tip Depth (ft- bgs)	Total Drive Time (seconds)	Uplift Load at '¼" Displacement (lbs)	Lateral Load at ½" Displacement (lbs)	Compression Load at 1/4" Displacement (lbs)
PLT-07 B ³	5	5.2	130	530	
PLT-07 C ³	5	1.8			330 ⁵
PLT-08 A ³	8	17.9	>4,000	1,540	
PLT-08 B ³	5	0.6	130	850	
PLT-08 C ³	5	1.5			2,110
PLT-09 A	10	24.3	>4,000	1,780	
PLT-09 B	7	10.2	1,520	2,140	
PLT-09 C	7	6.9			3,940
PLT-10 A ³	8	6.2	2,120	2,000	
PLT-10 B ³	5	2.5	620	710	
PLT-10 C ³	5	0.6			>6,000
PLT-11 A	10	6.65	3,660	2,340	
PLT-11 B	7	6	1,220	2,960	
PLT-11 C	7	4.15			2,040
PLT-12 A ³	8	4.79	8,620	1,670	
PLT-12 B ³	5	2.08	1,090	1,630	
PLT-12 C ³	5	1.2			8,040
PLT-13 A	10	10.07	2,430	1,960	
PLT-13 B	7	4.59	680	1,860	
PLT-13 C	7	4.96			610

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Pile Load Test Results Summary

Location	Pile Tip Depth (ft- bgs)	Total Drive Time (seconds)	Uplift Load at '4" Displacement (lbs)	Lateral Load at ½" Displacement (lbs)	Compression Load at ¼" Displacement (lbs)
PLT-14 A ³	8	17.72	4,000	1,460	
PLT-14 B ³	5	1.01	1,310	1,620	
PLT-14 C ³	5	0.67			1,740
PLT-15 A ⁴	8	76.66	6,500	1,750	
PLT-15 B	7	25.88	>10,000	4,500	
PLT-15 C	7	9.75			>8,000
PLT-16 A	8	13.19	4,230	2,180	
PLT-16 B	5	1.97	6,000	3,510	
PLT-16 C	5	2.09			3,730
PLT-17 A	10	8.6	7,500	3,090	
PLT-17 B	7	2.84	2,680	2,680	
PLT-17 C	7	3.43			8,530
PLT-18 A ⁴	8.8	123.9	>6,000	2,580	
PLT-18 B	7	14.63	>6,000	2,570	
PLT-18 C	7	10.05			>10,000
PLT-19 A	10	39.27	>9,000	2,620	
PLT-19 B	7	5.41	4,000	2,590	
PLT-19 C	7	5.42			>10,000
PLT-20 A	10	9.91	>10,000	2,660	
PLT-20 B	7	4.13	1,100	2,080	

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Pile Load Test Results Summary

Location	Pile Tip Depth (ft- bgs)	Total Drive Time (seconds)	Uplift Load at '¼" Displacement (lbs)	Lateral Load at ½" Displacement (lbs)	Compression Load at ¼" Displacement (lbs)
PLT-20 C	7	3.47			5,650

- 1. Pile tip depth is shown in feet below the ground surface.
- 2. The ">" sign indicates the load was achieved prior to reaching the noted deflection.
- 3. These piles were installed in 6-inch diameter pre-drilled holes.
- 4. PLT-15A and PLT-18A achieved refusal prior to reaching the target embedment depth
- 5. We expect this reading may be an anomaly due to lack of a restrictive layer or pile not full driven to predrilled depth before testing.

Driven Steel Piles

Geotechnical Considerations

Based on the results of the soil borings and pile load tests, we believe driven piles will be suitable for support of the PV panels. Driven piles or mat/slab foundations should also be suitable to support inverters in the array area. Approximate 25 percentage of the site will require predrilling of a pilot hole with a diameter of approximately 80 to 90 percent of the design pile's maximum cross-sectional measurement before installation with typical direct drive methods. This is based on the depth to encountered restrictive layer and the test pile program.

A restrictive layer for this project is defined as any soil or bedrock that has a Standard Penetration Test blow count of 40 blow per foot or greater. Restrictive layers were encountered at several boring locations at depths ranging from about 4 to greater than 20 below the ground surface (bgs). A summary of the depth to the restrictive layer at each boring location is included below.

Exploration Location	Depth to Restrictive Layer (feet bgs) ¹
B-01	NE
B-02	20
B-03	6

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Exploration Location	Depth to Restrictive Layer (feet bgs) ¹
B-04	4
B-05	8
B-06	6
B-07	NE
B-08	4
B-09	10
B-10	4
B-11	10
B-12	8
B-13	2
B-14	20
B-15	4
B-16	15
B-17	20
B-18	8
B-19	4
B-20	8
B-21	NE
B-22	20
B-23	2
B-24	2
B-25	6
B-26	10
B-27	NE
B-28	NE
B-29	2
B-30	6
B-31	10
B-32	20
B-33	4
B-34	15
B-35	NE
B-36	15
B-37	6
B-38	20

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Exploration Location	Depth to Restrictive Layer (feet bgs) ¹
B-39	NE
B-40	8
SUB-1	30
SUB-2	45
BESS-1	30
BESS-2	20
GEN-1	20
GEN-2	4
GEN-3	20
GEN-4	25
GEN-5	15
GEN-6	8
GEN-7	4
1. "NE" stands fo	r Not Encountered. A probable

Based on the results of the pile load testing program and subsurface conditions, we have divided the site into three axial zones (Predrill, Zone 2, and Zone 3) and two lateral zones (Predrill and Direct Embedment) as shown on the **Pile Zoning Plan** in the **Test Pile Driving Data** section and summarized below.

restrictive layer was not encountered in the maximum depth explored of the exploration.

Preliminary Zones

Axial Zone	Lateral Zone	Pile Load Tests in Zones ¹
1	Predrill	PLT-02, PLT-07, PLT-08, PLT-10, PLT-12, PLT-14, PLT-16
2	Direct Embedment	PLT-04, PLT-06, PLT-09, PLT-11, PLT-13, PLT-20
3	Direct Embedment	PLT-01, PLT-03, PLT-05, PLT-15, PLT-17, PLT-18, PLT-19

1. Axial Zone 2 and Zone 3 represent pile locations where piles were directly embedded.

It should be noted that the axial tension, axial compression, and lateral performance may vary significantly in unexplored areas across the site, and while an attempt has been made to quantify this variability with generalized zoning of pile capacity design parameters, isolated areas of lower strength soils within zones of relatively high strength soils may

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exist, and vice versa. When carrying out the quality control program of testing production piles across the site, some of these relatively weaker soil areas may be encountered.

The boundaries of these zones are approximate and based on widely spaced pile load tests and explorations. If more refined boundaries are required, we recommend performing more pile load testing and explorations. We do not believe geophysical methods will be able to delineate significant differences in the subsurface.

Adfreeze Stress and Depth Which Adfreeze Applies

It is Terracon's professional opinion that the near-surface overburden soils encountered in the borings drilled at this site are frost-susceptible. In cold weather climates, design to resist frost heave forces exerted on foundations is often a significant factor in the foundation design. However, due to groundwater not being encountered in the soil borings, the potential for the development of an ice lens and subsequent frost heave is considered negligible. Therefore, it is our opinion that frost heave loads will not develop on piles for this project. However, due to strength losses from freeze-thaw cycles the project site would experience, we recommend neglecting the upper 1.2-feet of soil when determining axial capacity and reducing the p-multiplier of this soil layer for lateral analysis based on UFC 3-130-06, Calculation Methods for Determination of Depth of Freeze and Thaw in Soil.

Preliminary Axial Capacity

The axial uplift capacity of driven piles may be estimated based on skin friction developed along the perimeter of the pile, while the compression capacity may be estimated using the skin friction and end bearing. When determining embedment depths, the perimeter of a wide flange beam should be taken as twice the sum of the flange width and section depth. The upper 1.2 feet of soil for each pile should be neglected in the axial capacity analyses due to considerations of strength losses that can occur due to freeze/thaw action, soil moisture variations and shrinkage, and other potential surface disturbances.

The table below summarizes the recommended design parameters for piles installed at this site:

Axial Design Parameters

Axial Zone	Minimum Pile Embedment Depth (feet-bgs)	Ultimate Uplift and Compression Skin Friction, q _s (psf) ^{1, 2}	Ultimate End Bearing, Qult(end) (lbs) 1, 2
1	1.2 - 5	15	500
Predrill Locations	5.1 - 8	140	500

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Axial Design Parameters

Axial Zone	Minimum Pile Embedment Depth (feet-bgs)	Ultimate Uplift and Compression Skin Friction, q _s (psf) ^{1, 2}	Ultimate End Bearing, Q _{ult(end)} (lbs) ^{1, 2}
2	2 - 7	70	2,000
Direct Embedment	7.1 - 10	150	2,000
3	1.2 - 7	225	2,000
Direct Embedment	7.1 - 10	245	2,000

- 1. The upper 1.2 feet of soil should be neglected when determining the skin friction capacity of the pile due to freeze/thaw effects.
- 2. The values provided in this table are only applicable to predrilled piles with a minimum embedment depth of 5 feet, and direct embedment piles with a minimum embedment of 7 feet. The values may be used for piles installed deeper than 8 feet for predrilled locations and 10 feet for direct embedment piles but would require the use of a higher factor of safety.

The above values are to be used in the following equations to obtain the ultimate uplift or compression load capacity of a pile:

$$\begin{split} Q_{\text{ult (compressive)}} &= Q_{\text{ult (end)}} + \Sigma H \ x \ P \ x \ q_s \\ Q_{\text{ult (uplift)}} &= \Sigma H \ x \ P \ x \ q_s \end{split}$$

Qult = Ultimate uplift or compression capacity of pile (lbs.)

H = Depth of embedment of pile (ft)

P = Box perimeter area/ft. of pile. (i.e. W6x9 = 1.64 ft.)

 q_s = Skin friction per table above (psf).

For Allowable Stress Design (ASD), we recommend the allowable skin friction and end bearing values be determined by applying a factor of safety of at least 1.5 to the ultimate value. For predrilled piles embedded deeper than 8 feet, and direct embedded piles embedded deeper than 10 feet, we recommend using a factor of safety of 2.0.

An example calculation to determine the allowable tension capacity for a 9-foot embedded pile in Zone 3 is shown below:

Qallowable (uplift) = (7-1) x 1.64 x
$$\frac{225}{1.5}$$
 + (9-7) x 1.64 x $\frac{245}{1.5}$ = 2,012 pounds

An example calculation to determine the allowable tension capacity for a 15-foot embedded pile in Zone 3 is shown below:

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Qallowable (uplift) =
$$(7-1) \times 1.64 \times \frac{225}{1.5} + (10-7) \times 1.64 \times \frac{245}{1.5} + (15-10) \times 1.64 \times \frac{245}{2.0} = 3,284$$
 pounds

The provided skin friction values are applicable for piles that are driven using equipment with a hydraulically operated hammer operating near 1,100 pounds.

Piles should have a minimum center-to-center spacing of at least five times their largest cross-sectional dimension to prevent reduction in the axial capacities due to group effects.

Final pile design to be completed by an engineering licensed in the State of Oregon based upon information contained in this geotechnical report and independent pile load testing.

Preliminary Lateral Capacity

Lateral load response of pile foundations was calculated using the computer program LPILE 2022, by Ensoft, Inc. The stiffness of the pile and the stress-strain properties of the surrounding soils determine the lateral resistance of the foundation. We modeled the lateral response of the tested piles to evaluate LPILE input parameters that can be used for design of the production piles. It should be noted that the following geotechnical design parameters are utilized for the modeling of the soils relative to the "best fit" of the pile load tests and LPILE design software models. Recommended LPILE input parameters for lateral load analysis for driven pile foundations are shown in the following table:

LPILE Parameters for Predrill Lateral Zone

Depth Interval (feet-bgs)	LPILE Soil Type	Effective Unit Weight (pcf)	Friction Angle (degree)	Soil Modulus (k)
0 to 8	Sand (Reese)	100	29	Default

LPILE Parameters for Direct Embedment Lateral Zones

Depth Interval (feet-bgs)	LPILE Soil Type	Effective Unit Weight (pcf)	Friction Angle (degree)	Soil Modulus (k)
0 to 5	Sand (Reese)	110	34	Default
5 to 20	Sand (Reese)	120	36	Default

The lateral load test results were varied between the different locations and embedment depths at the site. Therefore, we are providing the following table of p-multiplier values that should be used for the corresponding zone and embedment depth:

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Lateral Zone	Pile Embedment Depth (feet-bgs)	P-Multiplier ^{1, 2,3}
Predrill Locations	≥5	1.0
Direct Embedment Locations	≥7	1.6

- 1. The p-multiplier in the upper 1.2 feet should be reduced by 30% due to seasonal freeze/thaw impacts. For example, the p-multiplier for upper 1.2 feet of a pile installed to a depth of 6 feet in Zone A would be 1.12.
- 2. The p-multiplier values provided in this table are only applicable to piles installed to a depth of at least 5 feet for Predrill locations, and 7 feet for Zone A.
- 3. The p-multiplier value for the 10-foot-deep piles may be used for piles installed deeper than 10 feet for Zone A.

Lateral analyses were performed by using LPILE to generate a load vs. deflection curve that was generally consistent with the field load test results. The shear load was applied at approximately 3.5 feet above the ground surface and deflections were recorded at about 6 inches above the ground surface. The effective unit weight and friction angle and were based on the results of the SPT borings. The p-multiplier was then adjusted (by trial-and-error method) such that the applied load resulted in a deflection value that matched the load test results. Please note that this procedure was based on only one discrete set of data determined at about six inches from the ground surface during the field load testing. These results should be used for LPILE analysis only using the 2022 version of LPILE. These parameters are only applicable to piles installed a minimum of 5 and 7 feet-bgs, depending on predrill or direct embedment installation methods. In our evaluation, the piles were modeled as a Steel AISC Section Strong Axis.

Driven Pile Construction Considerations

Based on the field exploration and laboratory testing, it is our opinion that the soils on a majority of the site are suitable for direct drive pile installation into native soils. However, we expect that piles will encounter difficult driving conditions or refusal within localized areas of the project site where embedment depths exceed the depths as described in the **Geotechnical Considerations** of **Driven Steel Pile** section.

A geotechnical engineer should be engaged to make periodic observations of pile driving operations and production pile load testing (i.e., proof testing). Each pile should be observed and checked by the installation contractor for buckling, crimping and alignment in addition to recording penetration resistance, depth of embedment, and general pile driving operations.

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Shallow Foundations

We understand the main foundation component in the array area will include driven pile foundations for support of solar arrays; however, some lightly loaded inverter structures are typically required across the site. In general, inverter structures may be supported on driven piles or isolated mat/slab foundation systems bearing on improved subgrades if the client accepts the associated risk of collapsing potential of loess soil when saturated. Shallow foundations should be over excavated a minimum of 1-foot to place 12 inches of structural fill over 12 inches of scarified and compacted native subgrade to provide adequate improvement for shallow foundation support of these structures. The **Earthwork Considerations** section of this report should provide adequate improvement for shallow foundation support of these structures.

The following sections present design recommendations and construction considerations for shallow foundation support of inverters.

Shallow Foundation Recommendation

Description	Footing
Maximum Net allowable bearing pressure (over minimum 12-inch of scarified and compacted native subgrade and 1-foot of granular pad) 1	2,000 psf
Minimum dimensions	2 feet
Minimum embedment below finished grade ²	1.2 feet
Approximate total elastic settlement ^{3,5}	1 inch
Estimated differential elastic settlement	½ inch over 8 feet
Ultimate coefficient of sliding friction ⁴	0.5 (granular material) 0.35 (native silts and sands)

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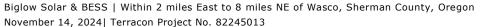
Description Footing

- 1. The recommended net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. It assumes any unsuitable soils, if encountered, will be replaced with compacted structural fill.
- 2. Frost depth based on UFC 3-130-06, Calculation Methods for Determination of Depth of Freeze and Thaw in Soil.
- 3. The foundation settlement will depend upon the variations within the subsurface soil profile, the structural loading conditions, the embedment depth of the footings, the thickness of compacted fill, and the quality of the earthwork operations. Footings should be proportioned to relatively constant dead-load pressure in order to reduce differential movement between adjacent footings.
- 4. Sliding friction along the base of the footing will not develop where net uplift conditions exist.
- 5. There is a risk of collapse (punching shear) settlement should the soils beneath the compacted native subgrade become saturated. For the preparation method described in this table, we estimate this total collapse settlement to be approximately ¾ to 2 inches. See the **Collapsible Soils** section for subgrade improvement options should saturated soils be of concern.

Mat/Slab Foundation Design Recommendations

If the site has been prepared in accordance with the requirements noted in the **Earthwork Considerations** section, the mat/slab foundations should be designed based on the criteria outlined below:

Item Description		
Maximum Net Allowable Bearing pressure over compacted subgrade 1,2	1,250 psf	
Maximum Net Allowable Bearing pressure over 12-inch gravel pad and compacted subgrade ^{1,2}	2,000 psf	
	Length, feet	Width, feet
Mat Foundation Dimensions	Length, feet Minimum: 10	Width, feet Minimum: 10
Mat Foundation Dimensions		





Item	Description
Ultimate Coefficient of Sliding Friction ⁵	0.50 (granular material)
Minimum Embedment below Finished Grade ⁶	Exterior footings in unheated areas: 1.2 feet
Estimated Total Elastic Settlement from Structural Loads ^{2,8}	Less than about 1 inch
Estimated Differential Elastic Settlement ^{2,7}	About ¾ of total settlement

- 1. The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. An appropriate factor of safety has been applied.
- 2. Values provided are for maximum loads noted in the **Project Description** section.
- 3. Unsuitable or soft soils should be over-excavated and replaced per the recommendations presented in the **Earthwork Consideration** section.
- 4. Use of passive earth pressures require the sides of the excavation for the spread footing foundation to be nearly vertical and the concrete placed neat against these vertical faces or that the footing forms be removed and compacted structural fill be placed against the vertical footing face.
- 5. Can be used to compute sliding resistance where foundations are placed on suitable soil/materials. Should be neglected for foundations subject to net uplift conditions.
- 6. Embedment necessary to minimize the effects of frost and/or seasonal water content variations. For sloping ground, maintain depth below the lowest adjacent exterior grade within 5 horizontal feet of the structure.
- 7. Differential settlements are measured over a span of 30 feet.
- 8. There is a risk of collapse (punching shear) settlement should the soils beneath the compacted native subgrade become saturated. For the preparation method described in this table, we estimate this total collapse settlement to be approximately ¾ to 2 inches. See the Collapsible Soils section for subgrade improvement options should saturated soils be of concern.

The bearing pressures presented above can be increased by 30 percent when used to evaluate short-term loading conditions such as wind and seismic load conditions.

Foundations should be reinforced as necessary to reduce the potential for distress caused by differential foundation movement. The use of joints at openings or other discontinuities in walls is recommended.

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Foundation excavations should be observed by the geotechnical engineer. If the soil conditions encountered differ significantly from those presented in this report, supplemental recommendations will be required.

Drilled Shafts

Drilled shafts could be used to support substation and transmission line structures. We have provided preliminary axial and lateral parameters to aid in developing cost estimates for drilled shafts.

Drilled Shaft Parameters

Soil design parameters are provided below in the **Drilled Shaft Summary** tables for the developing cost estimates for drilled shaft foundations. The values presented for allowable side friction and end bearing include a factor of safety. Based on varieties subsurface soil condition, we divided the area into 3 areas:

Drilled Shaft Parameters Zones	Locations
Substation	Substation
1	GEN-2, GEN-6, GEN-7
2	GEN-1, GEN-3, G-4, GEN-5

Drilled Shaft Summary for Substation ¹

		Stratigraphy ²	Allowable	Allowable
Depth (feet)	GeoModel	Material	Skin Friction (psf) ³	End Bearing Pressure (psf) ⁴
0 to 2.6	1	Sand	-	-
2.6 to 20	1	Sand	120	-
20 to 29	2	Sand	250	5,000
29 to 37	3	Sand	350	9,000
37 to 44	4	Sand	450	14,000
>44	5	Gravel	1,800	20,000

Drilled Shaft Summary for Zone 1 1

0 to 2.6	1	Sand	-	-

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Donth CooMedel		Stratigraphy ²	Allowable	Allowable End Bearing
Depth (feet)	GeoModel	Material	Skin Friction (psf) ³	Pressure (psf) 4
2.6 to 9	1	Sand	50	5,000
9 to 20	5	Gravel	550	9,000
>20	5	Gravel	1,400	14,000

Drilled Shaft Summary for Zone 2 1

		Stratigraphy ²	Allowable Skin Friction (psf) ³	Allowable
Depth (feet)	GeoModel	Material		End Bearing Pressure (psf) 4
0 to 2.6	1	Sand	-	-
2.6 to 25	1	Sand	100	-
25 to 30	4	Sand	300	15,000
>30	5	Gravel	1,500	20,000

- 1. Design capacities are dependent upon the method of installation and quality control parameters. The values provided based on determined zones and locations are estimates and should be verified when installation protocol have been finalized.
- 2. See GeoModel in Figures appendix for more details on stratigraphy.
- 3. Applicable for compressive loading only. Reduce to 2/3 of values shown for uplift loading. The effective weight of the shaft can be added to uplift load resistance to the extent permitted by IBC.
- 4. Shafts should extend at least one diameter into the bearing stratum (or to a depth equal to the bell diameter for belled shafts) for end bearing to be considered.

Shafts should be adequately reinforced for both tension and shear to sufficient depths. Buoyant unit weights of the soil and concrete should be used in the calculations below the highest anticipated groundwater elevation.

Drilled shaft should have a minimum (center-to-center) spacing of three diameters. Closer spacing may require a reduction in axial load capacity. Axial capacity reduction can be determined by comparing the allowable axial capacity determined from the sum of individual piles in a group versus the capacity calculated using the perimeter and base of the pile group acting as a unit. The lesser of the two capacities should be used in design.

A minimum shaft diameter of 18 inches should be used. Drilled shafts should extend into the bearing strata at least one shaft/pile/bell diameter for the allowable end-bearing pressures listed in the above table.

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Post-construction settlements of drilled shafts designed and constructed as described in this report are estimated to range from about $\frac{1}{2}$ to $\frac{3}{4}$ inch. Differential settlement between individual shafts is expected to be $\frac{1}{2}$ to $\frac{2}{3}$ of the total settlement.

Drilled Shaft Lateral Loading

The following table lists input values for use in LPILE analyses. Such analysis should be considered if lateral loads exceed 10 kips. Modern versions of LPILE provide estimated default values of k_h and E_{50} based on strength and are recommended for the project. Since deflection or a service limit criterion will most likely control lateral capacity design, no safety/resistance factor is included with the parameters.

GeoModel ¹	LPILE Soil	Su	φ²	γ″	C	K (1	pci)
Geomodei	Model	(psf) ²	Ψ	(pcf) ²	€50	Static	Cyclic
1	Sand (Reese)		22°	90	Use	Default \	/alue
2	Sand (Reese)		30°	95	Use	Default \	/alue
3	Sand (Reese)		33°	95	Use	Default \	/alue
4	Sand (Reese)		36°	120	Use	Default \	/alue
5	Sand (Reese)		46°	145	Use	Default \	/alue

- 1. See Subsurface Profile in **GeoModel** in the **Figure** section for more details on Stratigraphy.
- 2. Definition of Terms:

Su: Undrained shear strength

φ: Internal friction angle

 γ' : Effective unit weight

Spacing closer than 3D (where D is the diameter of the shaft) is not recommended without additional geotechnical consultation due to potential for the installation of a new shaft disturbing an adjacent installed shaft likely resulting in axial capacity reduction.

Drilled Shaft Construction Considerations

The drilling contractor should be experienced in the subsurface conditions observed at the site, and the excavations should be performed with equipment capable of providing a clean bearing surface. The drilled straight-shaft foundation system should be installed in

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general accordance with the procedures presented in "Drilled Shafts: Construction Procedures and Design Methods," FHWA Publication No. FHWA-NHI 18-024.

The contractor is generally expected to use conventional "dry" techniques for installation of the drilled shaft. Subsurface water was not encountered in explorations during the drilling activities. Subsurface water levels are influenced by seasonal and climatic conditions, which result in fluctuations in subsurface water elevations. Additionally, it is common for water to be present after periods of significant rainfall. Casing or slurry drilling procedures could be required in soils zones of higher sand to reduce the potential for excavation sidewall collapse.

A full-depth temporary steel casing may be required to shore the sides of the shaft excavations in the overburden. Difficult drilling conditions should be expected within both the sandy silt layers above the bedrock and in the weathered bedrock, and the potential for hard bedrock drilling conditions should also be anticipated. If casing is removed during concrete placement, care should be exercised to maintain concrete inside the casing at a sufficient level to resist earth and hydrostatic pressures present on a casing exterior. Water or loose soil should be removed from the bottom of the drilled shafts prior to placement of the concrete.

Care should be taken to not disturb the sides and bottom of the excavation during construction. The bottom of the shaft excavation should be free of loose material before concrete placement. Concrete should be placed as soon as possible after the foundation excavation is completed, to reduce potential disturbance of the bearing surface.

The drilled shaft installation process should be performed under the observation of the Geotechnical Engineer. The Geotechnical Engineer should document the shaft installation process including soil/rock and groundwater conditions observed, consistency with expected conditions, and details of the installed shaft.

Earthwork Considerations

The site work conditions will be largely dependent on the weather conditions and the contractor's means and methods in controlling surface drainage and protecting the subgrade. Site preparation in the substation, BESS areas, or where array transformer foundations will be installed should include clearing and grubbing, installation of a site drainage system (where necessary), and subgrade preparation. Site preparation is not necessary in the PV Array field (with the exception of where shallow foundations are utilized for equipment support and roadways) or where transformers will be supported on driven piles except to improve site drainage where necessary. The following information is being provided to assist with construction cost estimating. More detailed earthwork recommendations should be developed as part of a design level geotechnical study.

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Site Preparation

Strip and remove existing vegetation, debris, existing fill soils, and other deleterious materials from proposed substation, BESS areas, access road areas, and any proposed mat foundations supporting transformers or other equipment. Stripping depths based on the widely spaced borings are estimated to be about 2 to 6 inches but could vary considerably between our exploration locations and across the site. We recommend actual stripping depths be evaluated during construction to aid in preventing removal of excess material. Trees, tree stumps, and large vegetation should be cleared from the site at the location of mat foundations and roadway areas. Exposed surfaces should be free of mounds and depressions which could prevent uniform compaction in proposed substation, BESS, array panel, transformer and access road areas.

Where fill is placed on existing slopes steeper than 5H:1V, benches should be cut into the existing slopes prior to fill placement. The benches should have a minimum vertical face height of 1 foot and a maximum vertical face height of 3 feet and should be cut wide enough to accommodate the compaction equipment. This benching will help provide a positive bond between the fill and natural soils and reduce the possibility of failure along the fill/natural soil interface.

Subgrade Preparation

After stripping, cutting to design subgrade improvement elevations, and prior to placement of new fill in areas below final grades, we recommend that the exposed subgrades be observed and evaluated for the presence of soft, loose or unsuitable materials. Due to the nature of loess soils, disconnected and distinct areas of additional removal of Loess soils will likely be necessary and the earthwork contractor should be prepared to complete additional overexcavation in discrete areas across the pads as necessary.

We recommend that the soils within the footprint of the proposed structures be removed to a minimum depth of 1 foot below the bottom of footings or 1 foot below existing grades, whichever is deeper. Structural fill placed beneath the entire footprint of the foundations should extend horizontally a minimum distance of 5 feet beyond the outside edge of footings.

Subgrade soils beneath proposed exterior slabs and gravel-surface roadways should be removed to a depth of 1 foot beneath proposed slab or roadways section, or existing grade, whichever is greater.

The subgrade should be proofrolled with an adequately loaded vehicle such as a fully-loaded tandem-axle dump truck. The proofrolling should be performed under the observation of the Geotechnical Engineer or his/her representative. Areas excessively deflecting under the proofroll should be delineated and subsequently addressed by the

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Geotechnical Engineer. Such areas should either be removed. Excessively wet or dry material should either be removed, or moisture conditioned and recompacted. Where proofrolling is not feasible, the subgrade should be evaluated by the geotechnical engineer's representative by using a T-probe.

All exposed areas which will receive fill, once properly cleared and benched where necessary, should be scarified to a minimum depth of 12 inches, moisture conditioned as necessary, and compacted per the compaction requirements in this report. Compacted structural fill soils should then be placed to the proposed design grade and the moisture content and compaction of subgrade soils should be maintained until foundation construction.

Excavation

Based on the encountered subsurface conditions, we believe heavy-duty construction equipment, such as a hoe ram, a heavy dozer equipped with a ripper, a rock saw or jack hammer or with rock trenching equipment, is likely suitable for grading, shallow excavations, and utility trench excavations. Due to presence of shallow bedrock or restrictive layers in Predrill pile zone, pier and utility trench excavation will encounter very hard materials. A drilled-pier drilling rig equipped with hard formation drilling bits (rock drill type bit) having high torque capacity may be required for installation of short piers to achieve appropriate pier depths. Solar pile pilot holes can be accomplished with an air-rotary button head drill bit.

The descriptions provided below are a guide to conditions generally encountered in the region of the project site. Required excavation techniques will vary based on weathering of the materials to be excavated, and the fracturing, jointing and overall stratigraphy of the feature. Actual field conditions usually display a gradual weathering progression with poorly defined and uneven boundaries between layers of different materials. We recommend that the following definitions for rock in earthwork excavation and drilled-pier construction be included in bid documents:

Excavation Type	Bedrock Definition
Mass Excavation	Any material occupying an original volume of more than 1 cubic yard which cannot be excavated with a single-toothed ripper drawn by a crawler tractor having a minimum draw bar pull rating of not less than 80,000 pounds usable pull (Caterpillar D-8 or larger).
Trench Excavation	Any material occupying an original volume of more than ½ cubic yard which cannot be excavated with a backhoe having a bucket curling rate of not less than 40,000 pounds, using a rock bucket and rock teeth (a John Deere 790 or larger).

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Exc	cavation Type	Bedrock Definition
	Drilled Pier Excavation	Any natural hard and dense undisturbed subsurface material which cannot be removed with an earth auger or underreaming tool, or for which the penetration rate is less than 2 inches per 5 minutes of drilling at full crowd force (with a rock auger or core barrel with hard formation drilling bit).

Fill Material Types

Fill required to achieve design grade should be classified as structural fill and general fill. Structural fill is material used below, or within 5 feet of mat/slab or shallow foundations, below access roadways, or to construct the substation pad. General fill is material used to achieve grade outside of these areas or in the array.

Reuse of On-Site Soil: Excavated on-site soil may be reused as fill. However, portions of the on-site soil have an elevated fines content and will be sensitive to moisture conditions (particularly during seasonally wet periods) and may not be suitable for reuse when above optimum moisture content.

Fill Materials: Structural fill materials should meet the following material property requirements. Regardless of its source, compacted fill should consist of approved materials that are free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade.

Fill Type ¹	Specifications	Acceptable Location for Placement (for Structural Fill)
Common Fill	Oregon Department of Transportation Standard Specifications for Construction (ODOT SSC) Section 00330.13 Selected General Backfill (Maximum PI = 10% and LL = 40%)	All locations across the site. Dry weather only acceptable
Select Fill	ODOT SSC Section 00330.14 Selected Granular Backfill ²	All locations across the site. Wet and dry weather acceptable.
Crushed Aggregate Base (CAB)	ODOT SSC Section 02630.10 Dense Graded Aggregate (2"-0 to 3/4"-0)2	All locations across the site. Wet and dry weather acceptable.

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Fill Type ¹	Specifications	Acceptable Location for Placement (for Structural Fill)
Trench Backfill	ODOT SSC Section 00405.14 for Trench Backfill with additional stipulations 4	Acceptable materials include Common and Select Fill listed above.
Subgrade Stabilization	ODOT SSC Section 00330.14 for Selected Granular Backfill above groundwater seepage and OSSC Section 00330.16 for Stone Embankment Material with additional stipulations 4	12-inch compacted lift in wet or soft subgrades encountered in subgrade and other utility excavations.
Bedding & Haunching	ODOT SSC Section 00405.13, Pipe Zone Material	Thickness above and below pipe recommended by Electrical Engineer

- 1. Controlled, compacted fill should consist of approved materials that are free (free = less than 3% by weight) of organic matter and debris (i.e. wood sticks greater than ½ inch in diameter). A sample of each material type should be submitted to the geotechnical engineer for evaluation.
- 2. Material should have a maximum aggregate size of 2 inches, and a minimum laboratory CBR of 20% for granular soils, and no more than 8% passing the No. 200 sieve by weight determined by ASTM D6913. Fines should have a Plasticity Index (PI) of less than 20% per ASTM D4318. Reclaimed glass will not be accepted.
- 3. The contractor shall select the appropriate material for use based on the current and forecasted weather conditions at the time of construction.
- 4. Maximum aggregate size shall be limited to 2½ inches.

Collapsible Soils

The primary geotechnical consideration for this site is that the upper 10 feet of loess soils are very soft to medium stiff and could be susceptible to collapse. Structures founded directly on these soils could experience total and differential settlements exceeding 1 inch. These soils were deposited by wind and the soil particles are generally considered to be oriented in a "honeycomb" like structure, which can make them susceptible to high volumetric strains due to collapse of the soil structure. The collapse of the "honeycomb" structure is typically instigated by wetting and/or loading. Based on laboratory collapse testing from the shelby tube samples of the near-surface loess, this soil is susceptible to collapse upon loading and wetting generally ranging from 0.2 to 0.5 percent strain at full saturation. However, based on comparison testing at other nearby sites where block samples were collected, we would anticipate 2 to 6 times that amount (due to the disturbance caused by shelby tube sample extrusion). We estimate that this hazard equates to about 1.2 to 3.6 inches of potential if the loess were to remain in place and be utilized for support.

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Proposed structures to be supported by shallow or mat foundations will likely require some level of soil improvement to reduce total and differential settlements to acceptable levels. Based on a foundation embedment depth of 1.2 feet for frost protection, we offer the following alternatives for subgrade improvement beneath new structures:

- Complete Removal and Recompaction: Where total settlements need to be limited to less than 1-inch and mitigation of all collapse related settlements, soft loess soils (GeoModel Layer 1) should be over excavated to expose very stiff to hard Loess (GeoModel Layer 2 & 3). The surface of the underlying soils should be scarified, wetted and compacted prior to placement of new structural fill. The native soils encountered at the site are not suitable for reuse as structural fill.
- Partial Removal and Recompaction: Where structures can tolerate total settlements of 3 inches, a partial over excavation could be implemented where the site soils are removed to a depth of 5 feet below the bottom of footing elevation (7 feet below site grades) and recompacted as described above. As an alternative to remove and replace, the Alternative Compaction Techniques such as Deep Dynamic Compaction (DDC), Rapid Impact Compaction, or High-Energy Impact Compaction (HEIC) could also be used to improve the minimum 5-foot-thick zone below footings. This option does not reduce potential collapse related settlements as much as the first option, since some of the soft loess soils would remain in place.

Gravel-Surfaced Drives and Parking

General Comments

Roadway designs are provided for the traffic conditions and gravel-surfaced drives life conditions as noted in the **Project Description** and in the following sections of this report. A critical aspect of roadway performance is site preparation. Roadway sections noted in this section are contingent upon the site being adequately prepared. Additionally, our recommendations are based on *Chapter 4 Low-Volume Road Design* found in AASHTO 1993.

Subgrade Preparation

On most project sites, the site grading is accomplished relatively early in the construction phase. Fills are typically placed and compacted in a uniform manner. However, as construction proceeds, the subgrade may be disturbed due to utility excavations, construction traffic, desiccation, or rainfall/snow melt. As a result, the aggregate-surfaced roadway or parking area subgrade may not be suitable for construction and corrective action will be

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required. The subgrade should be carefully evaluated at the time of construction for signs of disturbance or instability. We recommend the top 12 inches of the exposed subgrade should be scarified, moisture conditioned, and recompacted to at least 95 percent of the maximum dry unit weight as determined by ASTM D1557 before any new fill or aggregate is placed, if less than 3 feet of the fill is required to reach final grade. We recommend that the compacted subgrade be thoroughly proof rolled with a loaded tandem-axle dump truck prior to final grading.

The native soil design California Bearing Ratio (CBR) value based on the results of the laboratory CBR tests which found CBR values ranging from 17.2 to 31 for 95% of maximum dry density and 7.3 to 13.9 for 90% of maximum dry density. We recommend using a value of 5 for design based on our experience with similar projects in the area.

Design Parameters

We understand unpaved access roads are planned throughout the site. The unpaved road sections for post-construction use have been developed under the following assumptions:

Aggregate Roadway Design Parameters					
Parameter Design Value		Comments			
Traffic Loading	Array Area = 1,000 ESAL ¹	Assumed			
Traffic Loading	Substation Roadway = 10,000 ESAL ¹	Assumed			
Design Life	30 years	Assumed			
Design CBR	5.0 (Compacted subgrade)	Based on experience			
	5,000 psi (frozen)				
Resilient	2,000 psi (saturated)	Based on lab testing and			
Modulus	3,000 psi (wet)	regional weather fluctuations			
	4,000 psi (dry)				
Aggregate Base Elastic Modulus	25,000 psi	Assumed			
Allowable Rut Depth	2 inches	Assumed			
Design Serviceability Loss	2.0	Assumed			

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Aggregate Roadway Design Parameters			
Parameter	Design Value	Comments	
Vehicle Tire Pressure	80 psi	Assumed	

1. 18 kips Equivalent Single Axle Load

Access Road Sections

As a minimum, we recommend the following options for unpaved access roads:

Typical Unpaved Road Section – Post Construction Traffic			
Area Option	Base Course ¹ Thickness (inches)	Subbase Type	Geogrid Stabilization
Substation Road	10	Compacted Native Soil	N/A
Array Area	5	Compacted Native Soil	N/A

- 1. Base materials should meet ODOT SSC Section 02630.10 Dense Graded Aggregate (2"-0 to 34"-0).
- 2. N/A = Not applicable

Note that whichever type of unpaved road is chosen, there will be a need for an ongoing maintenance program. Ruts or potholes that develop should be filled with additional aggregate base rather than by re-grading. Also, the unpaved roadway would need to be constructed with adequate drainage to prevent the ponding of water which would contribute to additional ongoing maintenance.

General Comments

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing

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services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Terracon can grant reliance to third-party entities to be specifically named upon further review and intended use of this report. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly effect excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety and cost estimating including excavation support and dewatering requirements/design are the responsibility of others. Construction and site development have the potential to affect adjacent properties. Such impacts can include damages due to vibration, modification of groundwater/surface water flow during construction, foundation movement due to undermining or subsidence from excavation, as well as noise or air quality concerns. Evaluation of these items on nearby properties are commonly associated with contractor means and methods and are not addressed in this report. The owner and contractor should consider a preconstruction/precondition survey of surrounding development. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

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Figures

Contents:

GeoModel for Substation, BESS, and Gen-Tie GeoModel for B-01 to B-10 $\,$

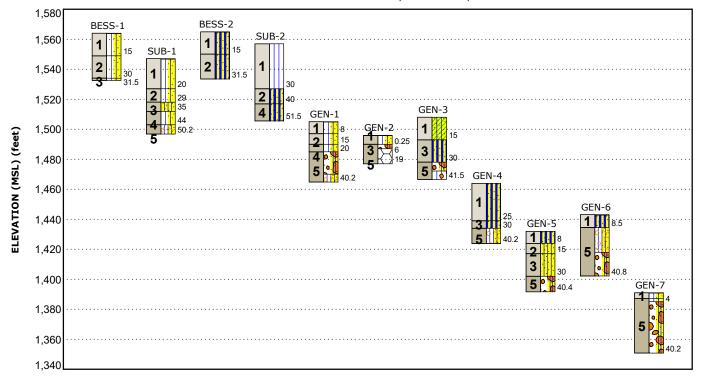
GeoModel for B-11 to B-20

GeoModel for B-21 to B-30

GeoModel for B-31 to B-40



GeoModel For Substation, BESS, and Gen-Tie



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description	Leg	end
1	Loess	Silt with various amounts of sand (ML) to silty clay (CL-ML), very soft to very stiff, light brown to white, moist.		Silt with Sand
2	Loess to Caliche Loess	Silt with various amounts of sand (ML) to silty sand (SM): light brown to white or brown, very stiff or medium dense, moist.	Silty Sand	Silty Gravel with Sand Sand Sandy Silt
3	Caliche Loess	Silt with various amount of sand (ML) to silty sand(SM): brown to white, hard or dense, moist.	Poorly-graded Gravel with Silt and Sand	
4	Alluvium	Silt with various amount of sand (ML) to silty sand(SM): reddish brown, hard or dense, moist.	Sandy Silty Clay Poorly-graded	Silt with Gravel
5	Bedrock	Silty gravel with sand (GM), poorly graded gravel with sand and silt (GP-GM), to Basalt: gray to brown, highly to extremely fractured, moderately weathered, medium strong.	Poorly-graded Gravel with Silt	

▼ First Water Observation

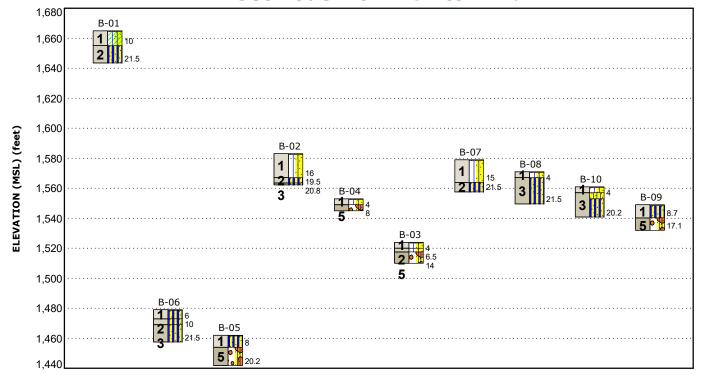
Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time

Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:



GeoModel For B-01 to B-10



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description	Leg	end
1	Loess	Silt with various amounts of sand (ML) to silty clay (CL-ML), very soft to very stiff, light brown to white, moist.		Silty Clay with Sand
2	Loess to Caliche Loess	Silt with various amounts of sand (ML) to silty sand (SM): light brown to white or brown, very stiff or medium dense, moist.	Sandy Silt Poorly-graded Gravel with Silt and	Silt with Sand
3	Caliche Loess	Silt with various amount of sand (ML) to silty sand(SM): brown to white, hard or dense, moist.	Sand	
4	Alluvium	Silt with various amount of sand (ML) to silty sand(SM): reddish brown, hard or dense, moist.		
5	Bedrock	Silty gravel with sand (GM), poorly graded gravel with sand and silt(GP-GM), to Basalt: gray to brown, highly to extremely fractured, moderately weathered, medium strong.		

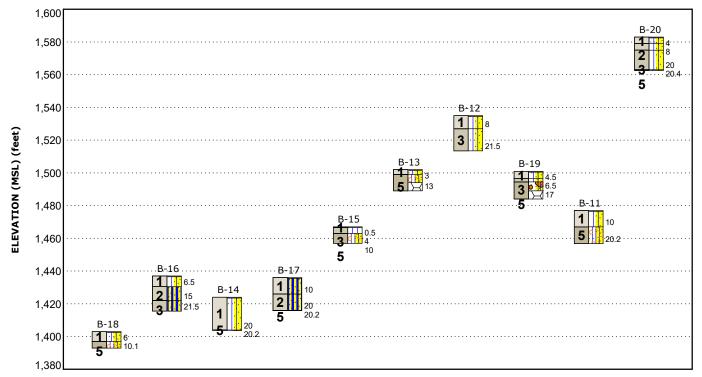
Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time

Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:



GeoModel For B-11 to B-20



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description	Leg	jend
1	Loess	Silt with various amounts of sand (ML) to silty clay (CL-ML), very soft to very stiff, light brown to white, moist.	Topsoil Silty Gravel with	Silt with Sand
2	Loess to Caliche Loess	Silt with various amounts of sand (ML) to silty sand (SM): light brown to white or brown, very stiff or medium dense, moist.	Sand Poorly-graded Gravel with Silt and	Basalt Silt
3	Caliche Loess	Silt with various amount of sand (ML) to silty sand(SM): brown to white, hard or dense, moist.	Sand Sandy Silt	
4	Alluvium	Silt with various amount of sand (ML) to silty sand(SM): reddish brown, hard or dense, moist. Silty gravel with sand (GM), poorly graded gravel with sand		
5	Bedrock	and silt(GP-GM), to Basalt: gray to brown, highly to extremely fractured, moderately weathered, medium strong.		

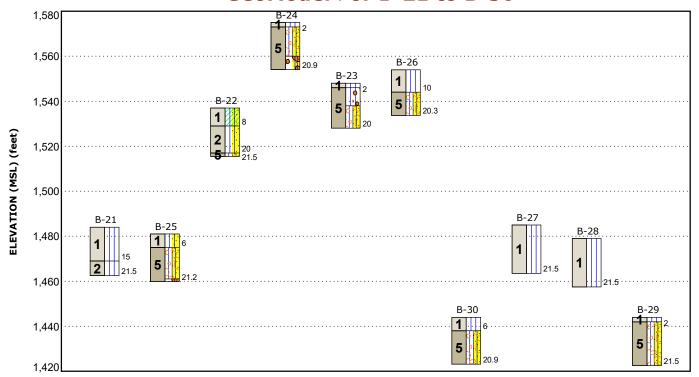
Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time

Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:



GeoModel For B-21 to B-30



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description	Legend
1	Loess	Silt with various amounts of sand (ML) to silty clay (CL-ML), very soft to very stiff, light brown to white, moist.	
2	Loess to Caliche Loess	Silt with various amounts of sand (ML) to silty sand (SM): light brown to white or brown, very stiff or medium dense, moist.	Silt with Sand Silt with Gravel Silt with Gravel Gravel with Sand Poorly-graded Gravel with Silt and
3	Caliche Loess	Silt with various amount of sand (ML) to silty sand(SM): brown to white, hard or dense, moist.	Sand
4	Alluvium	Silt with various amount of sand (ML) to silty sand(SM): reddish brown, hard or dense, moist.	
5	Bedrock	Silty gravel with sand (GM), poorly graded gravel with sand and silt(GP-GM), to Basalt: gray to brown, highly to extremely fractured, moderately weathered, medium strong.	

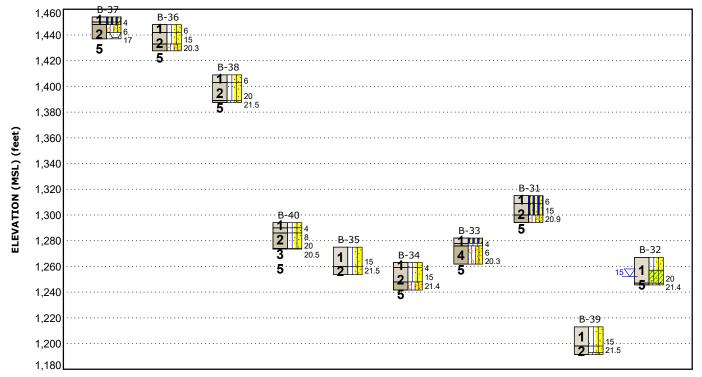
Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time

Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:



GeoModel For B-31 to B-40



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description	Legend
1	Loess	Silt with various amounts of sand (ML) to silty clay (CL-ML), very soft to very stiff, light brown to white, moist.	Sandy Silt Silty Gravel with Sand
2	Loess to Caliche	Silt with various amounts of sand (ML) to silty sand (SM): light brown to white or brown, very stiff or medium dense,	Silt with Sand
2	Loess	moist.	Silt with Gravel
3	Caliche Loess	Silt with various amount of sand (ML) to silty sand(SM): brown to white, hard or dense, moist.	Basalt
4	Alluvium	Silt with various amount of sand (ML) to silty sand(SM): reddish brown, hard or dense, moist.	
5	Bedrock	Silty gravel with sand (GM), poorly graded gravel with sand and silt(GP-GM), to Basalt: gray to brown, highly to extremely fractured, moderately weathered, medium strong.	

▼ First Water Observation

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time

Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:

Biglow Solar & BESS | Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024 | Terracon Project No. 82245013



Attachments

Biglow Solar & BESS | Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024| Terracon Project No. 82245013



Field Exploration Results

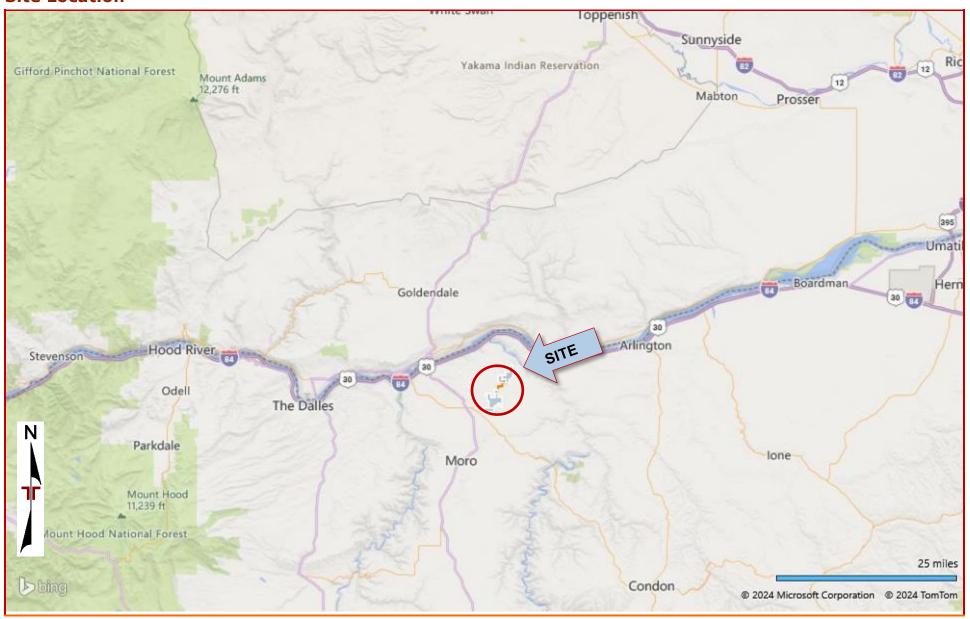
Contents:

Site Location
Exploration Location Plan with Boring Locations (3 pages)
Exploration and Testing Procedures (4 pages)
Boring Logs (SUB-1 to SUB-2, BESS-1 to BESS-2, B-01 to B-40)
Infiltration Test Results (2 pages)
General Notes
Unified Soil Classification System
Rock Classification Notes

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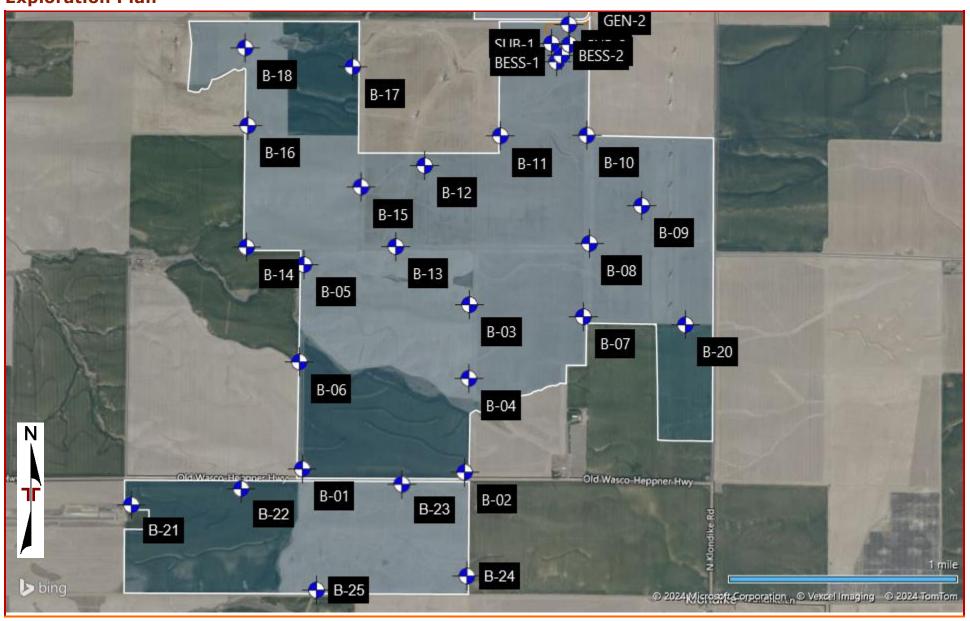
Site Location



Biglow Solar & BESS | Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024| Terracon Project No. 82245013



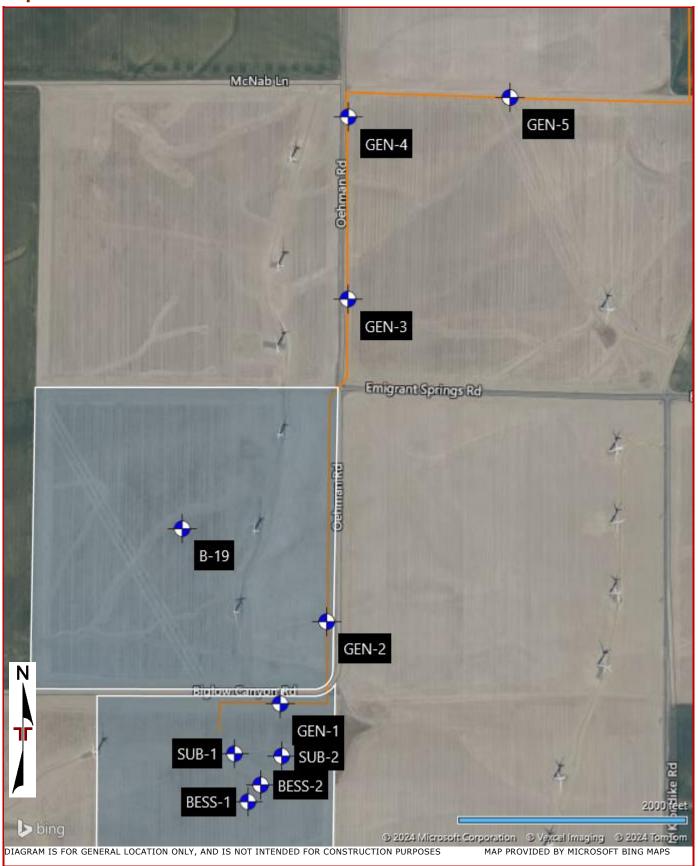
Exploration Plan



Biglow Solar & BESS \mid Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024 \mid Terracon Project No. 82245013



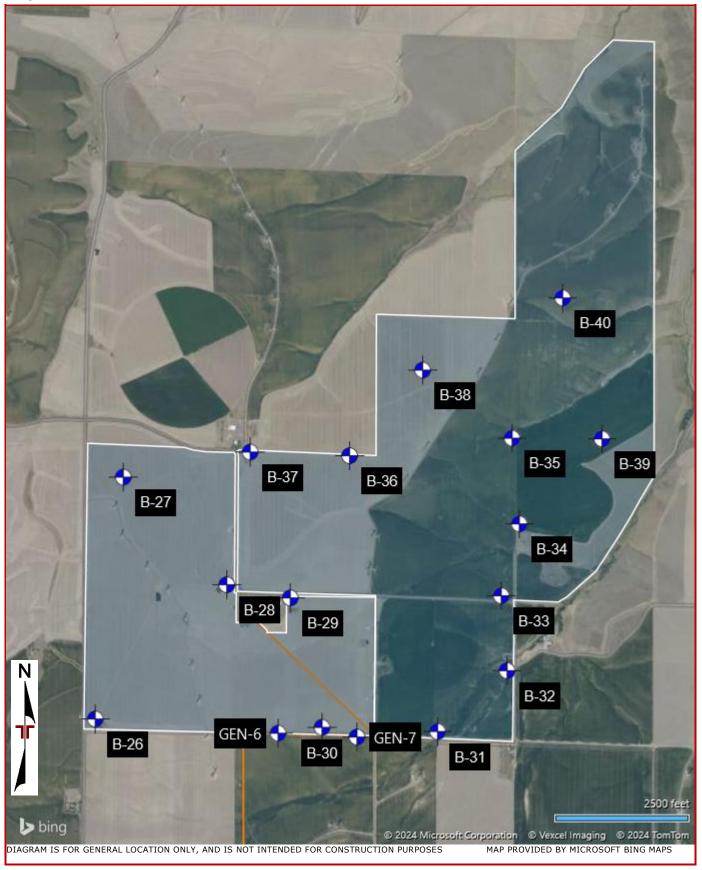
Exploration Plan



Biglow Solar & BESS \mid Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024 \mid Terracon Project No. 82245013



Exploration Plan



Biglow Solar & BESS | Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024 | Terracon Project No. 82245013



Exploration and Testing Procedures

Field Exploration

Exploration	Exploration	Approximate Exploration	Location						
Number			Latitude	Longitude					
B-01	Drilled Boring	21.5	45.5923°N	120.6505°W					
B-02	Drilled Boring	20.8	45.5921°N	120.6358°W					
B-03	Drilled Boring	14	45.6027°N	120.6353°W					
B-04	Drilled Boring	8	45.5981°N	120.6354°W					
B-05	Drilled Boring	20.2	45.6053°N	120.6503°W					
B-06	Drilled Boring	21.5	45.5991°N	120.6507°W					
B-07	Drilled Boring	21.5	45.6020°N	120.6250°W					
B-08	Drilled Boring	21.5	45.6066°N	120.6244°W					
B-09	Drilled Boring	17.1	45.6090°N	120.6197°W					
B-10	Drilled Boring	20.2	45.6134°N	120.6247°W					
B-11	Drilled Boring	20.2	45.6134°N	120.6325°W					
B-12	Drilled Boring	21.5	45.6116°N	120.6394°W					
B-13	Drilled Boring	13	45.6064°N	120.6420°W					
B-14	Drilled Boring	20.2	45.6064°N	120.6555°W					
B-15	Drilled Boring	10	45.6102°N	120.6451°W					
B-16	Drilled Boring	21.5	45.6141°N	120.6554°W					
B-17	Drilled Boring	20.2	45.6180°N	120.6462°W					
B-18	Drilled Boring	10.1	45.6190°N	120.6557°W					
B-19	Drilled Boring	17	45.6247°N	120.6297°W					
B-20	Drilled Boring	20.4	45.6015°N	120.6158°W					
B-21	Drilled Boring	21.5	45.5900°N	120.6660°W					
B-22	Drilled Boring	21.5	45.5911°N	120.6560°W					
B-23	Drilled Boring	20	45.5914°N	120.6414°W					
B-24	Drilled Boring	20.9	45.5855°N	120.6355°W					
B-25	Drilled Boring	21.2	45.5847°N	120.6492°W					
B-26			45.6431°N	120.6232°W					
B-27	Drilled Boring	21.5	45.6555°N	120.6211°W					
B-28	Drilled Boring	21.5	45.6410°N	120.6135°W					
B-29	Drilled Boring	21.5	45.6493°N	120.6088°W					

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Exploration	Exploration	Approximate	Location						
Number	Туре	Exploration Depth (feet)	Latitude	Longitude					
B-30	Drilled Boring	20.9	45.6426°N	120.6065°W					
B-31	Drilled Boring	20.9	45.6424°N	120.5980°W					
B-32	Drilled Boring	21.4	45.6455°N	120.5929°W					
B-33	Drilled Boring	20.3	45.6494°N	120.5933°W					
B-34	Drilled Boring	21.4	45.6531°N	120.5920°W					
B-35	Drilled Boring	21.5	45.6575°N	120.5925°W					
B-36	Drilled Boring	20.3	45.6566°N	120.6044°W					
B-37	Drilled Boring	17	45.6568°N	120.61180°W					
B-38	Drilled Boring	21.5	45.6610°N	120.5991°W					
B-39	Drilled Boring	21.5	45.6575°N	120.5859°W					
B-40	Drilled Boring	20.5	45.6647°N	120.5888°W					
SUB-1	Drilled Boring	50.2	45.6193°N	120.6279°W					
SUB-2	Drilled Boring	51.5	45.6192°N	120.6263°W					
BESS-1	Drilled Boring	31.5	45.6181°N	120.6274°W					
BESS-2	Drilled Boring	31.5	45.6185°N	120.6270°W					
GEN-1	Drilled Boring	40.2	45.6205°N	120.6263°W					
GEN-2	Drilled Boring	19	45.6225°N	120.6247°W					
GEN-3	Drilled Boring	41.5	45.6302°N	120.6240°W					
GEN-4	Drilled Boring	40.2	45.6346°N	120.6240°W					
GEN-5	Drilled Boring	40.4	45.6350°N	120.6184°W					
GEN-6	Drilled Boring	40.75	45.6423°N	120.6097°W					
GEN-7	Drilled Boring	40.2	45.6421°N	120.6039°W					

Boring Layout and Elevations: Terracon personnel staked the boring layout using handheld GPS equipment (estimated horizontal accuracy of about ±20 feet) and referencing existing site features. Approximate ground surface elevations were obtained by interpolation from Google Earth Pro aerial imagery. If elevations and a more precise boring layout are desired, we recommend borings be surveyed.

Subsurface Exploration Procedures: We advanced the borings with a track-mounted, rotary drill rig using hollow stem, continuous flight augers. Four samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. In the thin-walled tube sampling procedure, a thin-walled, seamless steel tube with a sharp cutting edge was pushed hydraulically into the soil to obtain a relatively undisturbed sample. In the split barrel- sampling procedure, a standard 2-inch outer diameter split barrel- sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required- to

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advance the sampling spoon the last 12 inches of a normal 18inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated- on the boring logs at the test depths.

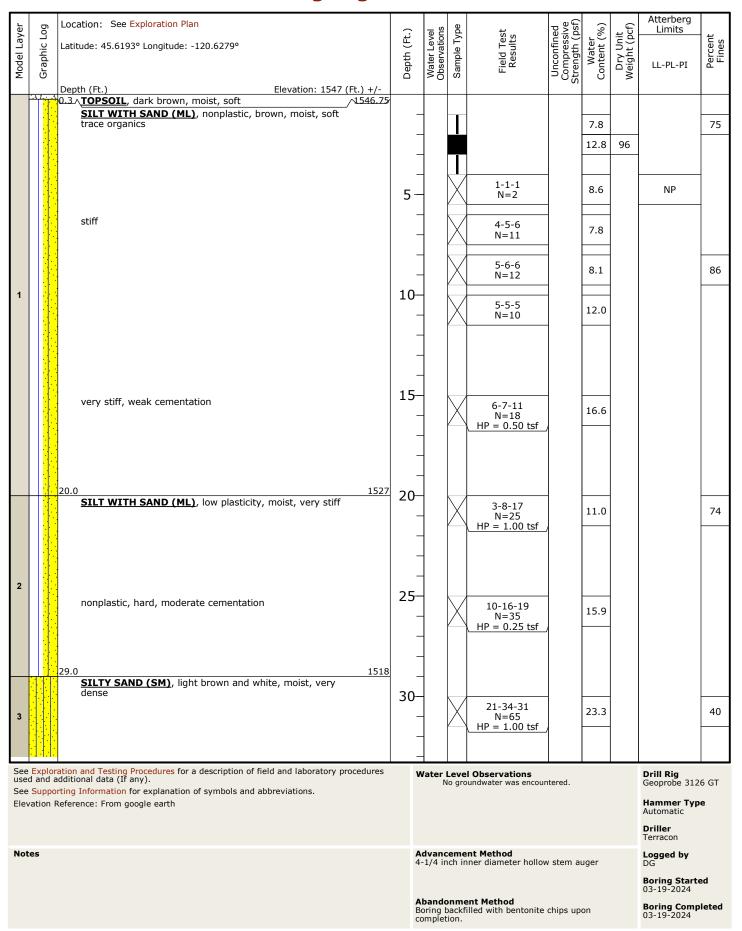
We also observed the boreholes while drilling and at the completion of drilling for the presence of groundwater. The groundwater was not observed at these times in the boreholes.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials observed during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

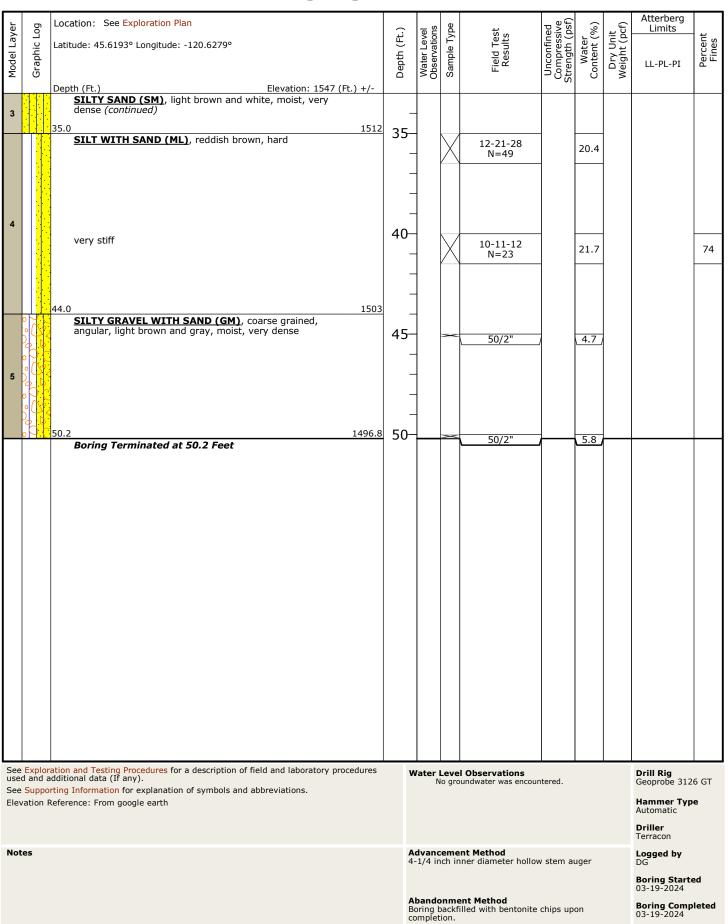
Rock classification was conducted using locally accepted practices for engineering purposes; petrographic analysis may reveal other rock types. Rock core samples typically provide an improved specimen for this classification. Exploration log rock classification was determined using the **Rock Classification Notes**.

Infiltration Testing: Two infiltration tests were conducted in the areas requested. The tests were conducted in general accordance with the 1980 EPA Encased Falling Head test method. Details of the testing are presented in the **Infiltration Testing** section of this report. Results of the infiltration testing are presented in the **Field Exploration Results**.

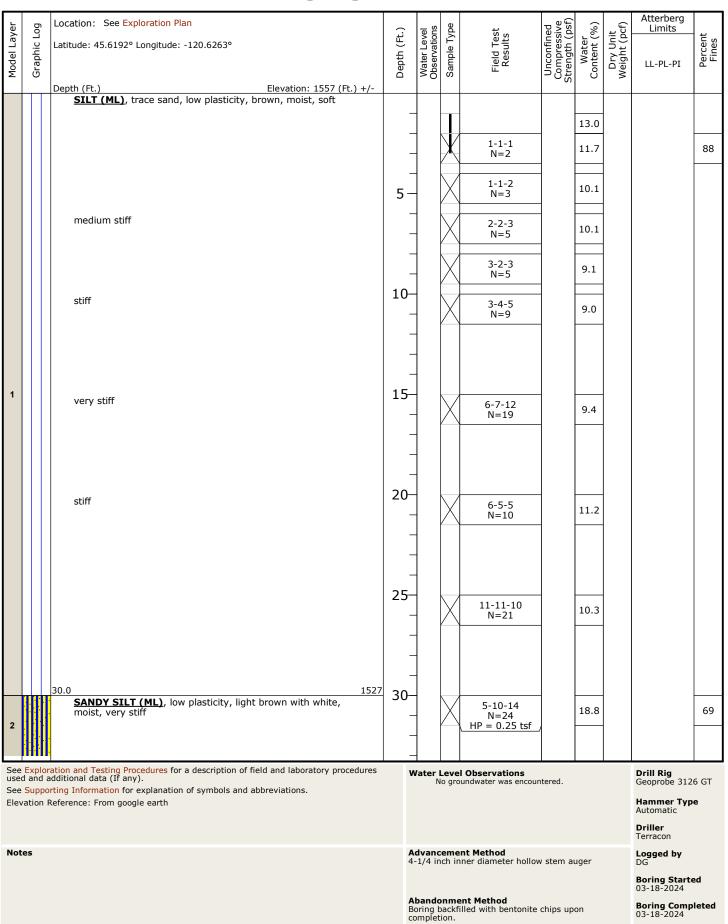




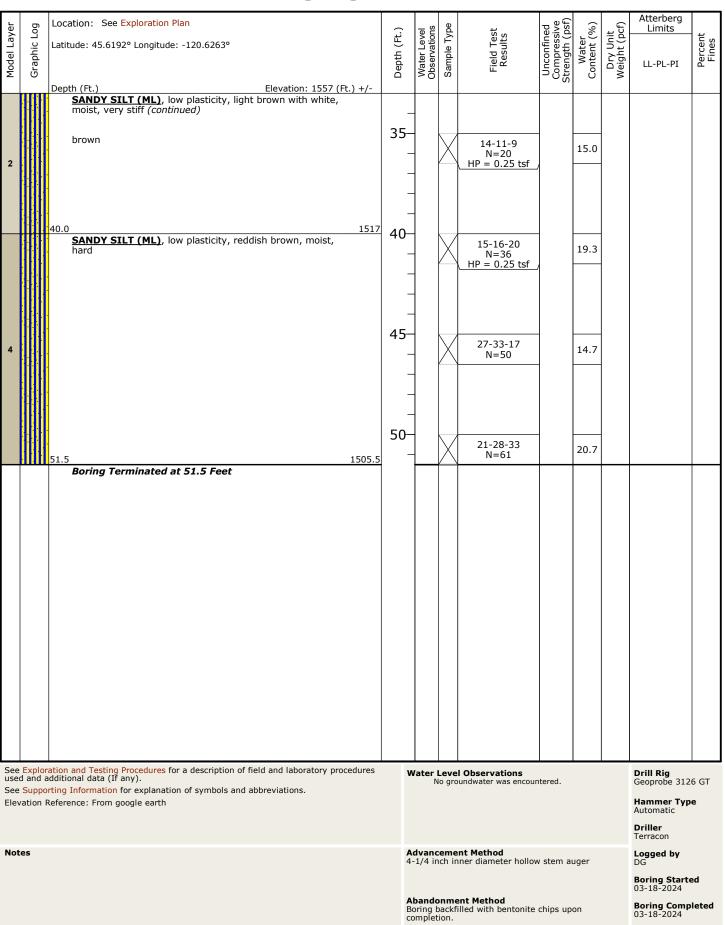






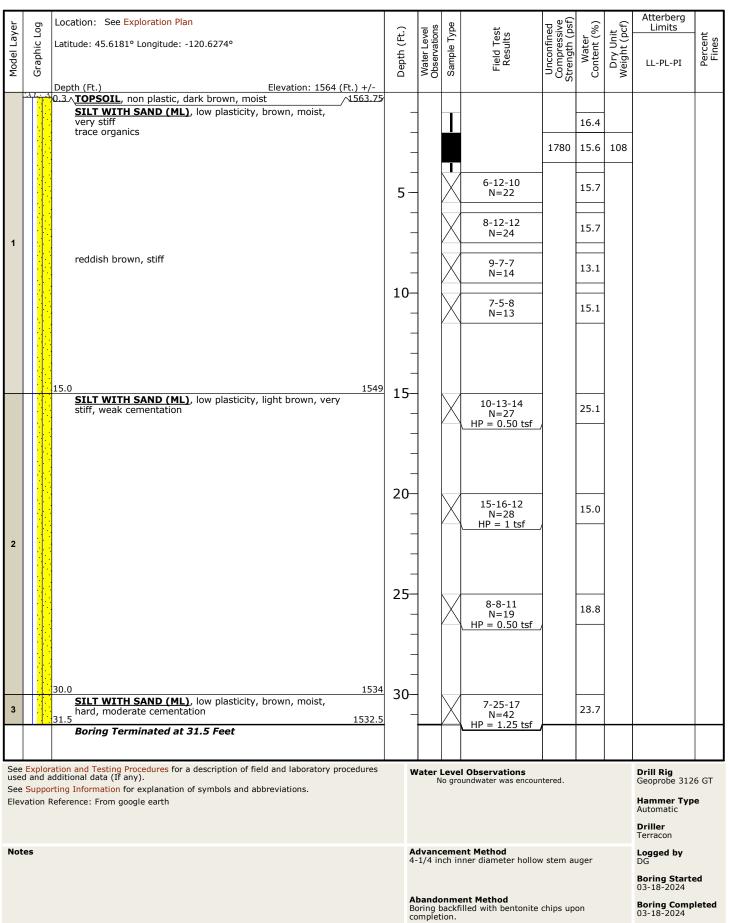






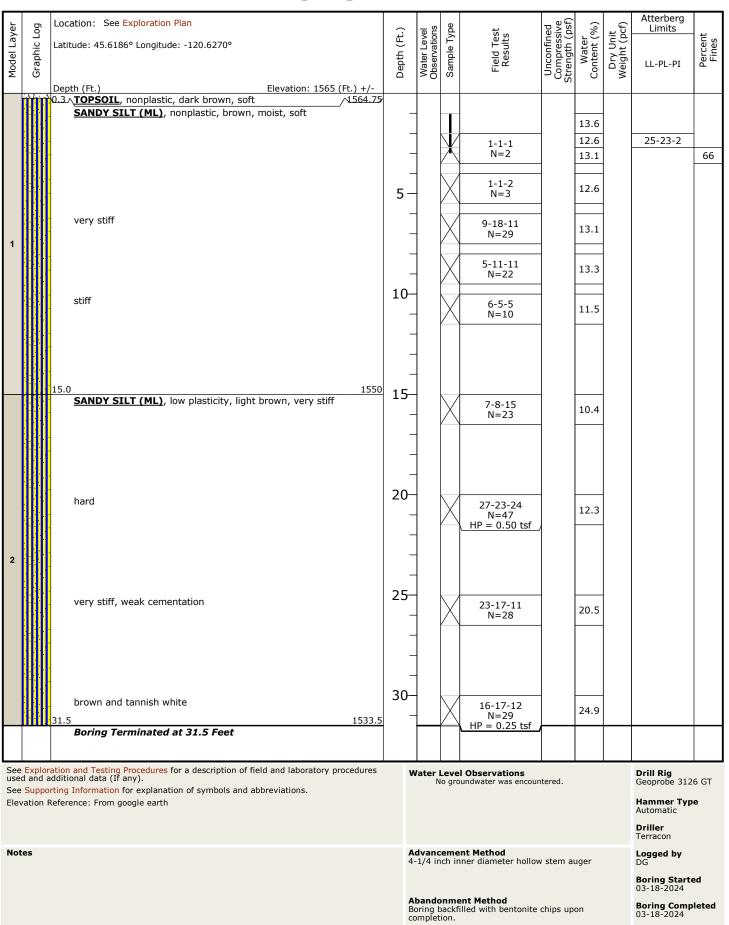


Boring Log No. BESS-1

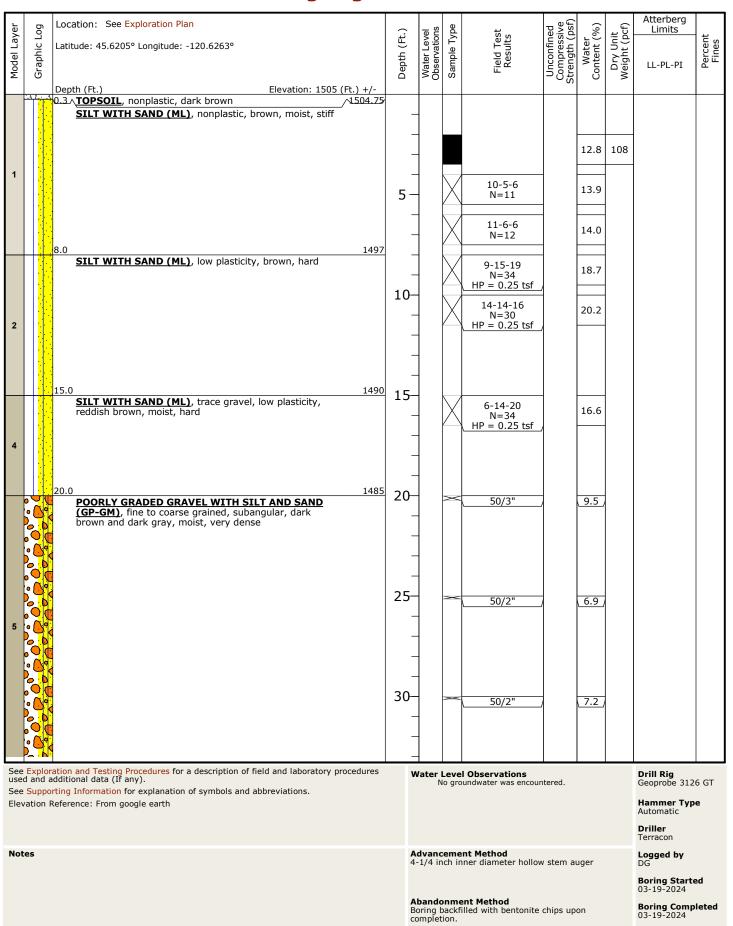




Boring Log No. BESS-2



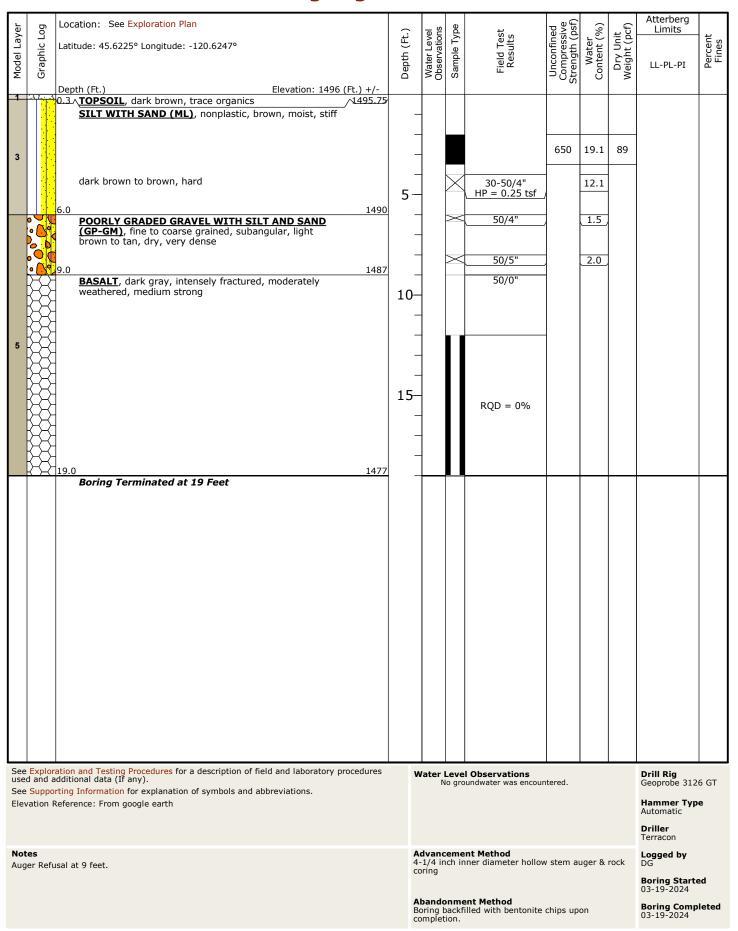




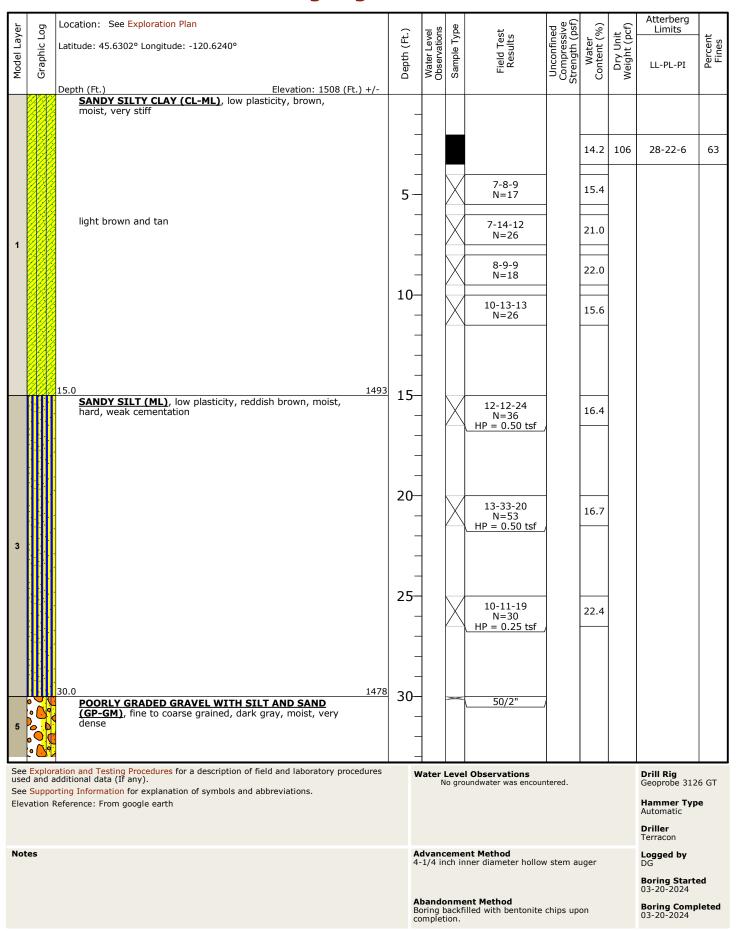


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er	g	Location: See Exploration Plan		_ o	e e		d ve isf)	(0)	J)	Atterberg Limits	
Model Layer	Graphic Log	Latitude: 45.6205° Longitude: -120.6263°	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)	2	Percent Fines
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	0	Depth (Ft.) Elevation: 1505 (Ft.) +/- POORLY GRADED GRAVEL WITH SILT AND SAND									
		(GP-GM) , fine to coarse grained, subangular, dark brown and dark gray, moist, very dense (continued)	-								
		brown and dark gray, moist, very dense (continued) 35.0 SILTY GRAVEL WITH SAND (GM), fine to coarse	⁰ 35-			33-50/1"	-	18.3			
		grained, dark gray and orangish brown, very dense	_			33 30/1		10.5			
5			_								
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		40.2 1464 Boring Terminated at 40.2 Feet	8 40			50/1"	\vdash	7.9			
See	Explora	ation and Testing Procedures for a description of field and laboratory procedures dditional data (If any).				l Observations	tor			Drill Rig	6 CT
See Supporting Information for explanation of symbols and abbreviations.			No groundwater was encountered.					Geoprobe 312			
Elevation Reference: From google earth									Hammer Typ Automatic	e	
										Driller	
Not	ec			Advancement Method					Terracon		
1400				Advancement Method 4-1/4 inch inner diameter hollow stem auger					Logged by DG		
									Boring Starte 03-19-2024	ed	
			Ā	Abandonment Method Boring backfilled with bentonite chips upon Boring 2010				leted			
			C	oring omple	tion.	med with pentonite	cinps up	UII		03-19-2024	

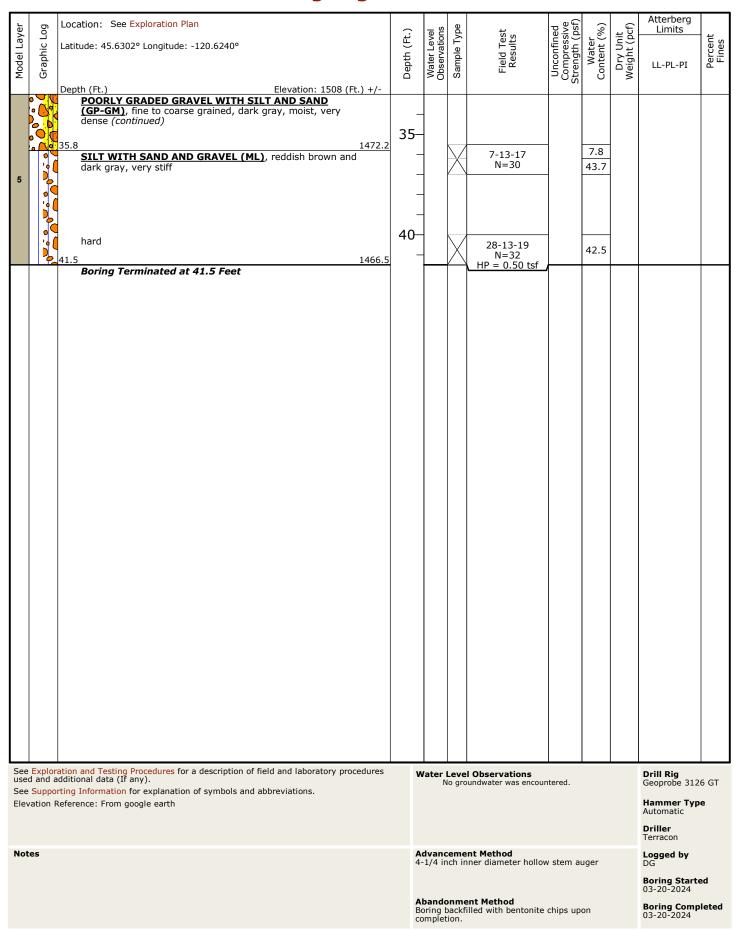




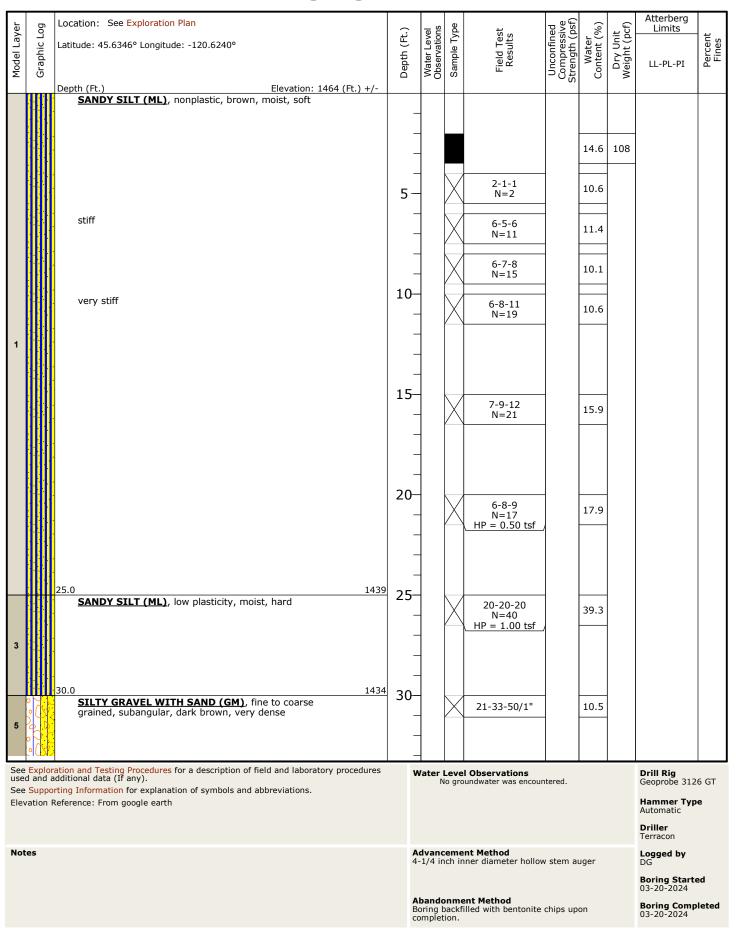




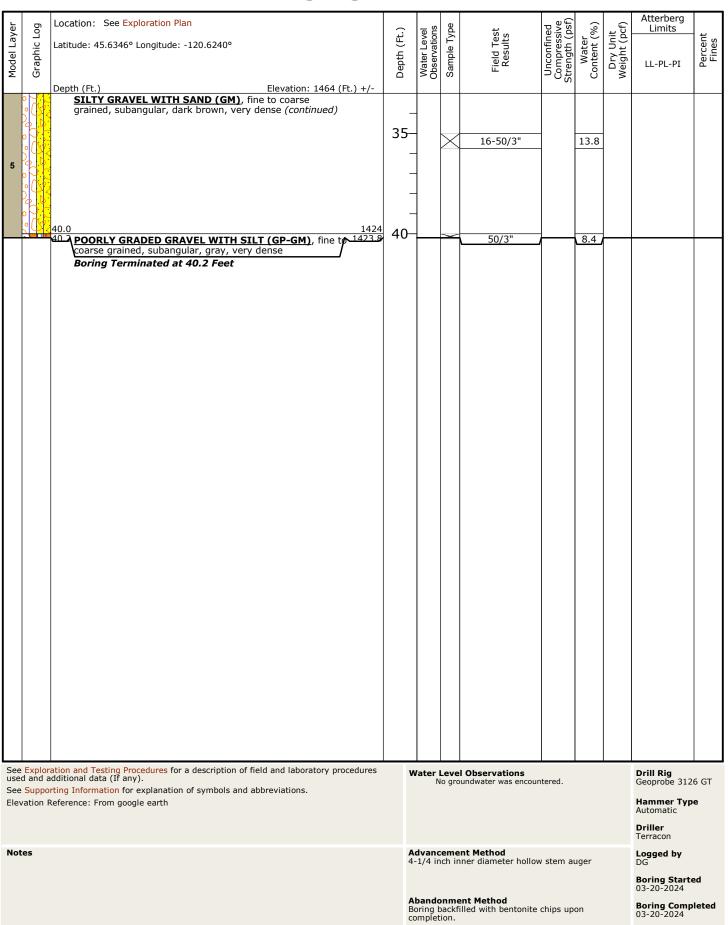




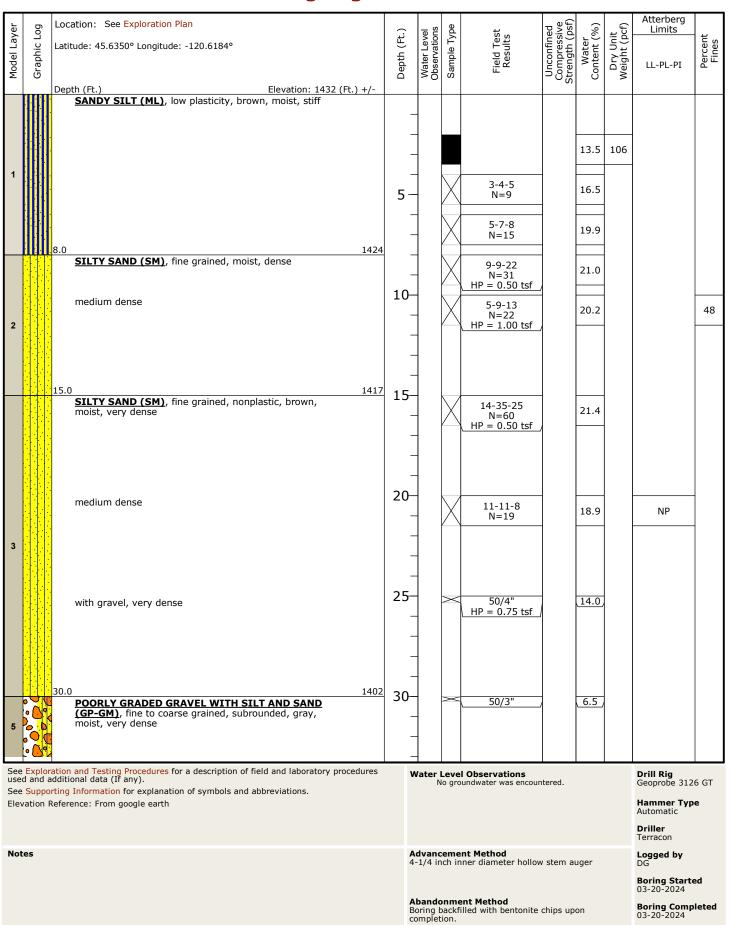








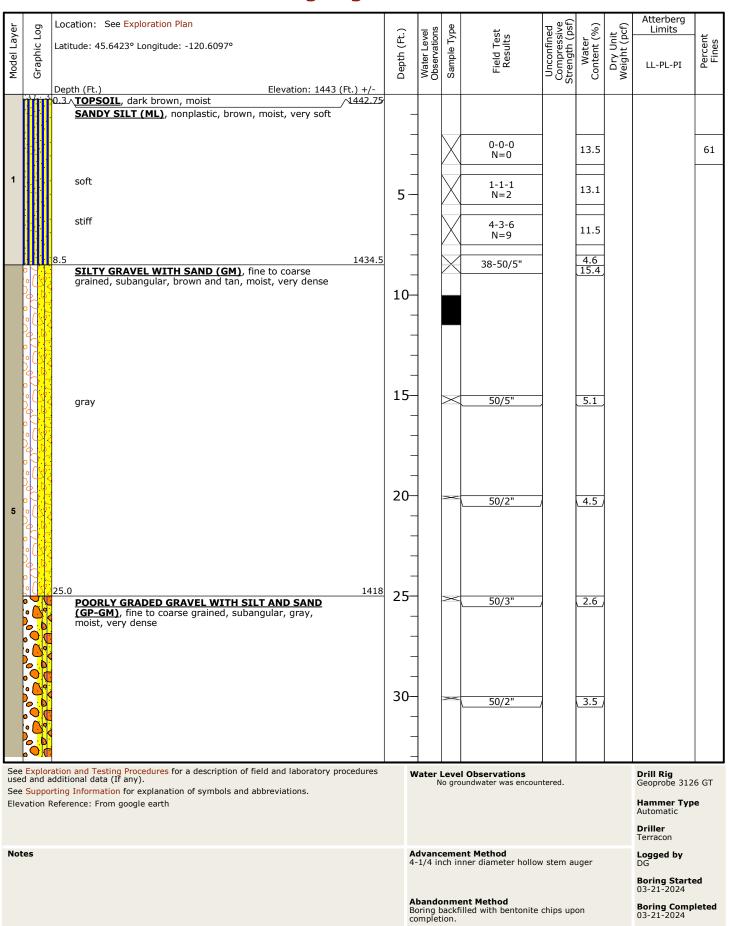






Location: See Exploration Plan Latitude: 45.6350° Longitude: -120.6184° Lettude: 45.6350° Longitude: -120.6184° Lettude: 45.6350° Longitude: -120.6184° Depth (Ft.) Elevation: 1432 (Ft.) +/- POORLY GRADED GRAVEL WITH SILT AND SAND (GP-CM), line to coarse grained, subrounded, gray, moist, very dense (continues) POORLY GRADED GRAVEL WITH SILT AND SAND (GP-CM), line to coarse grained, subrounded, gray, moist, very dense (continues) 1391.6 40 50/5° 50/1° 6.3 Attribute (Hither Units) Lettude: 45.6350° Longitude: -120.6184° Attribute (Hither Units) Results (Hither Units) See Line (Hither Units) Results (Hither Units
Latitude: 45.6350° Longitude: -120.6184° Latitude: 45.6350° Longitude: -120.6184° Depth (Ft.) Depth (Ft.) POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM), fine to coarse grained, subrounded, gray, moist, very dense (continued) 1391.6 1391.6 1391.6 1391.6
Depth (Ft.) Elevation: 1432 (Ft.) +/- POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM), fine to coarse grained, subrounded, gray, moist, very dense (continued) 35 50/1" 6.3 40.4 subangular
Depth (Ft.) Elevation: 1432 (Ft.) +/- POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM), fine to coarse grained, subrounded, gray, moist, very dense (continued) 35 50/1" 6.3 40.4 subangular
Depth (Ft.) Elevation: 1432 (Ft.) +/- POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM), fine to coarse grained, subrounded, gray, moist, very dense (continued) 35 50/1" 6.3 40.4 subangular
(GP-GM), fine to coarse grained, subrounded, gray, moist, very dense (continued) 5 40.4 subangular
moist, very dense (continued) 35 50/1" 6.3
35 50/1" 6.3
5
1391.6 40 50/5" 5.9
1391.6 40 \$50/5" 5.9 ## 5.9
40.4 subangular Boring Terminated at 40.4 Feet 1391.6 40 50/5* 5.9
40.4 Subangular ## Boring Terminated at 40.4 Feet ## 1391.6 ## 1391.6 ## 1391.6
1391.6 40 Solys
Boring Terminated at 40.4 Feet
See Evaluation and Testing Procedures for a description of field and laboratory procedures
See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any). Water Level Observations No groundwater was encountered. Drill Rig Geoprobe 3126 (
See Supporting Information for explanation of symbols and abbreviations.
Elevation Reference: From google earth Hammer Type Automatic
Driller
Terracon
Terracon
Notes Advancement Method 4-1/4 inch inner diameter hollow stem auger Terracon Logged by DG
Notes Advancement Method 4-1/4 inch inner diameter hollow stem auger Boring Started 03-20-2024
Notes Advancement Method 4-1/4 inch inner diameter hollow stem auger Boring Started

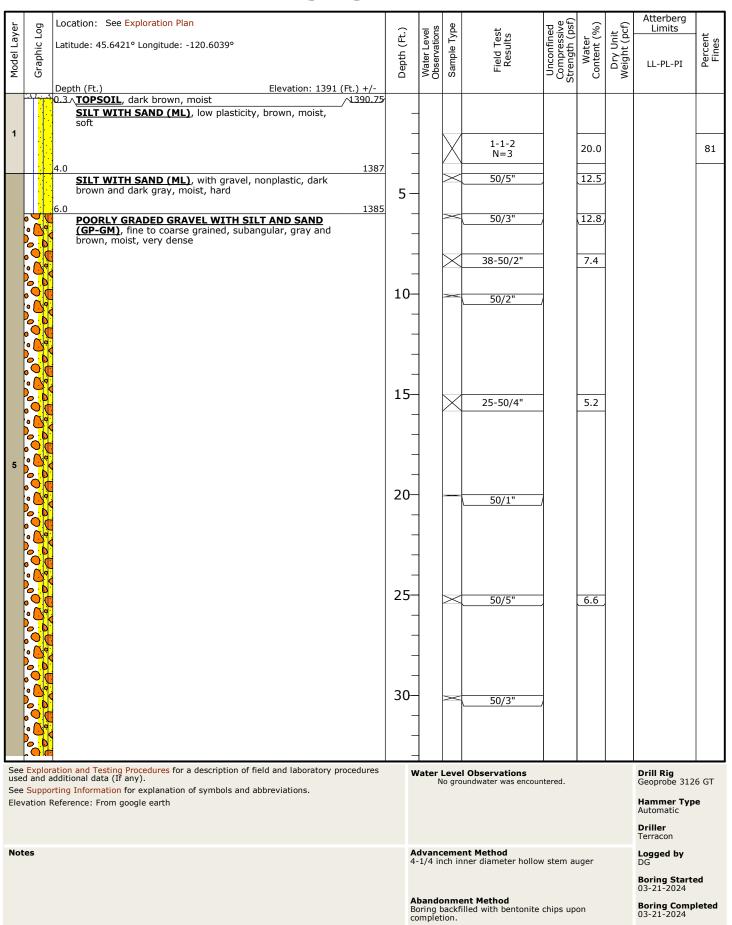






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'n	<u> </u>	60.	Location: See Exploration Plan	$\overline{}$	el su	ğ	st .	Unconfined Compressive Strength (psf)	(%	t icf)	Atterberg Limits	
Model Lever		Grapnic Log	Latitude: 45.6423° Longitude: -120.6097°	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	nfin ress th (I	Water Content (%)	Dry Unit Weight (pcf)		Percent Fines
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	0	7 ([:	Depth (Ft.) Elevation: 1443 (Ft.) +/- POORLY GRADED GRAVEL WITH SILT AND SAND			\vdash						
	6		(GP-GM) , fine to coarse grained, subangular, gray, moist, very dense (continued)	_	-							
	C			35-	-		50/1"		2.9			
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Г			Boring Terminated at 40.8 Feet									
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S	ee Exp	plora	ation and Testing Procedures for a description of field and laboratory procedures dditional data (If any).	W			l Observations	ham d			Drill Rig	c c=
S	ee Su	ppor	ting Information for explanation of symbols and abbreviations.		Ν	io gro	undwater was encoun	tered.			Geoprobe 312	
El	evati	on R	eference: From google earth								Hammer Typ Automatic	е
											Driller	
N.	otes				dvar	ome	nt Mathod				Terracon	
N	otes			4	-1/4 ir	nch in	nt Method iner diameter hollow	stem a	uger		Logged by DG	
											Boring Starte 03-21-2024	ed
				А	bando	onme	ent Method				Boring Comp	leted
				B	oring l omplet	oackfi ion.	illed with bentonite	chips up	on		03-21-2024	.e.eu

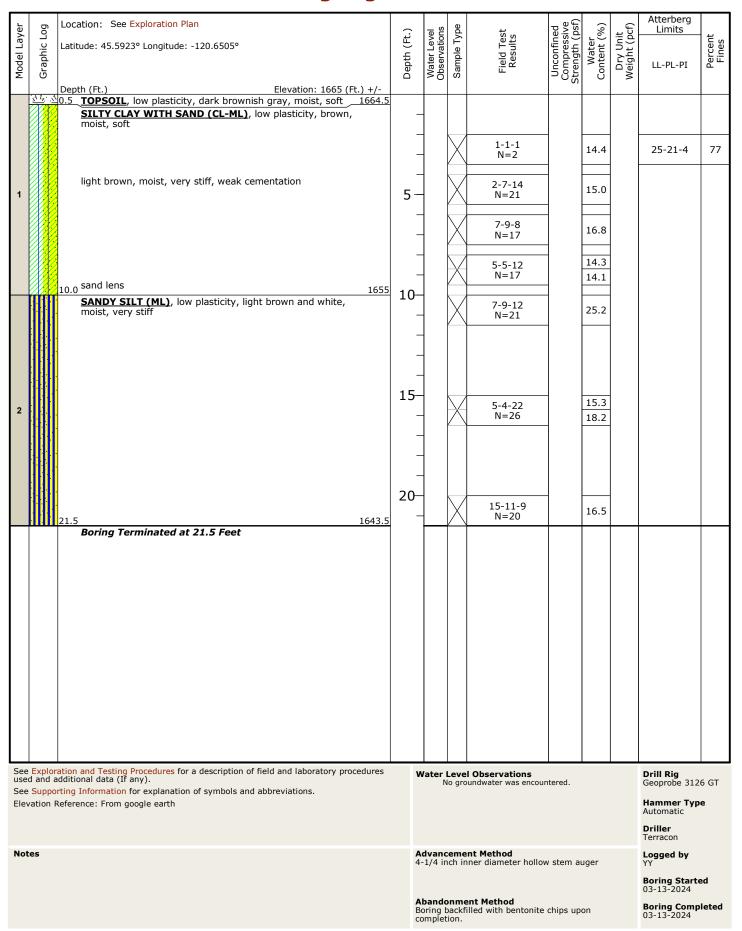




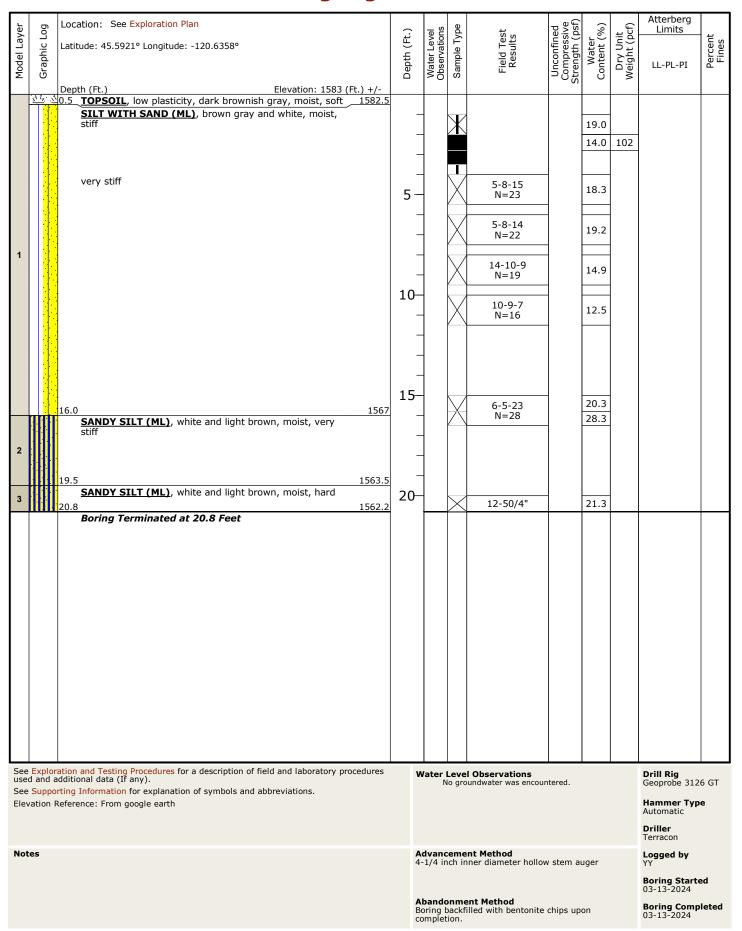


		Dorning Log N									
Į.		Location: See Exploration Plan		_ s	g g		d ve sf)	(9)	f)	Atterberg Limits	
Model Laver	Graphic Log	Latitude: 45.6421° Longitude: -120.6039°	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	fine essiv h (p	Water Content (%)	Dry Unit Weight (pcf)	Litties	Percent Fines
del	aph		pth	ater I	lmple	ield Resi	mpr engt	Wai	Ory eight	LL-PL-PI	Perc
ĮΣ	ָּט		De	Šå	Sa	ш	Unconfined Compressive Strength (psf)	ပိ	Me		
	0 7	Depth (Ft.) Elevation: 1391 (Ft.) +/- POORLY GRADED GRAVEL WITH SILT AND SAND									
	6	(GP-GM), fine to coarse grained, subangular, gray and	-	-							
		prown, moist, very dense (<i>conunuea</i>)	35-	-	><	50/3"		5.6			
	6		_	-				3.5			
5			_								
	6	o T	_								
			_								
	6	40.2 1350.8	40-								
		Boring Terminated at 40.2 Feet	1			50/1"		4.2			
Se	e Exp	I loration and Testing Procedures for a description of field and laboratory procedures diadditional data (If any).	v	Vater	Leve	l Observations				Drill Rig	
		d additional data (If any). porting Information for explanation of symbols and abbreviations.				oundwater was encoun	tered.			Geoprobe 312	6 GT
		n Reference: From google earth								Hammer Typ Automatic	e
										Driller	
										Terracon	
No	otes		A	dvand -1/4 ir	ceme nch in	nt Method nner diameter hollow	stem a	uger		Logged by DG	
										Boring Starte	ed
			A	bando	onme	ent Method				03-21-2024	loto-
			В	oring l omplet	oackfi	illed with bentonite	chips up	on		Boring Comp 03-21-2024	reced

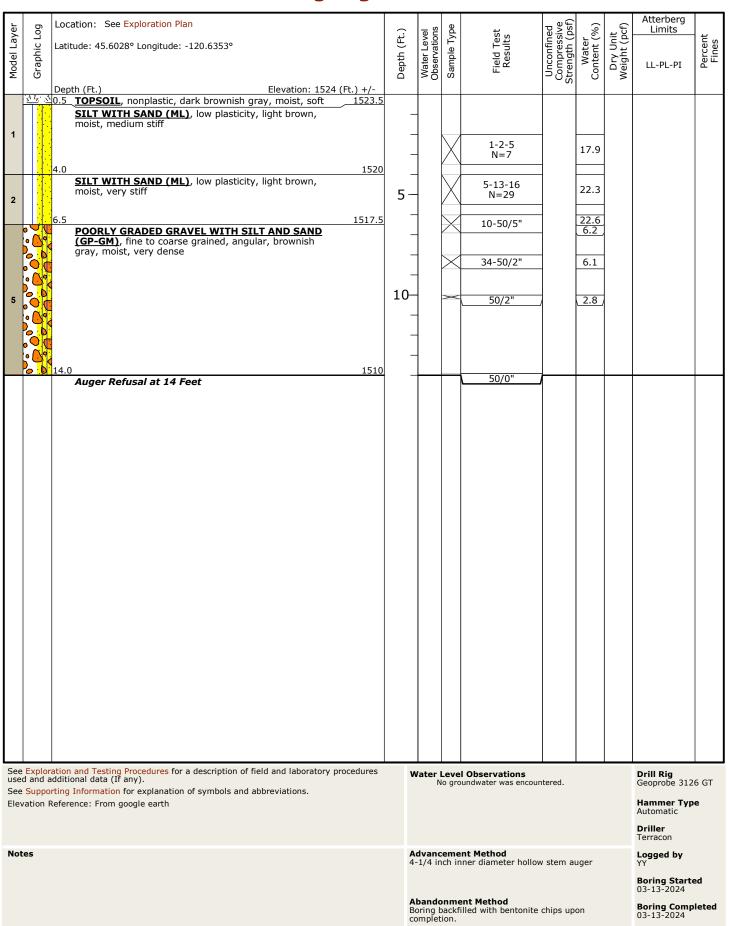








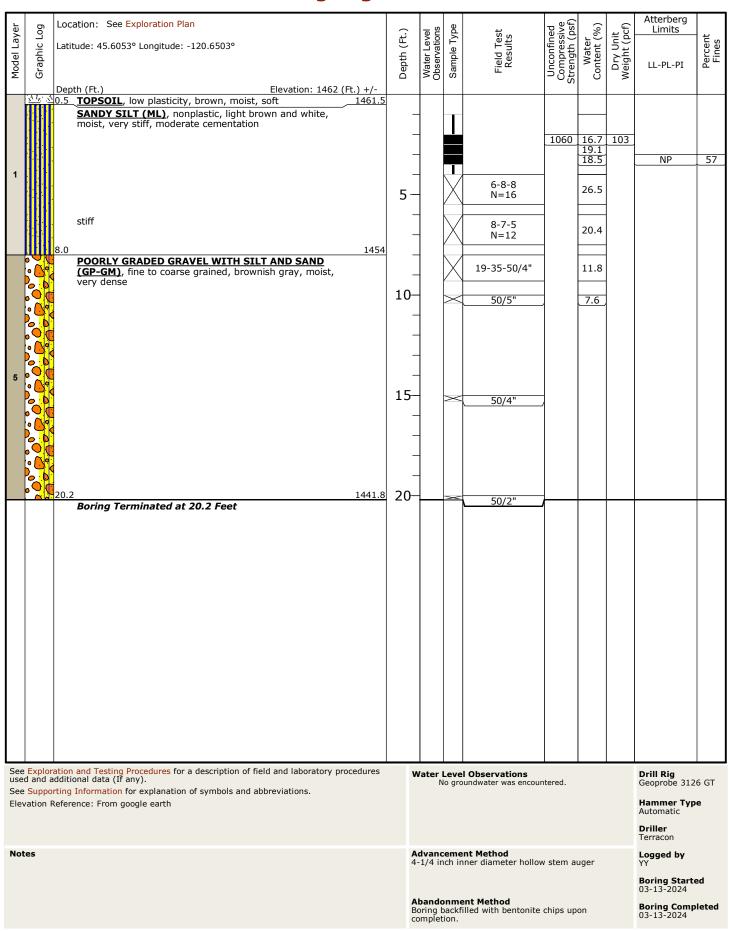




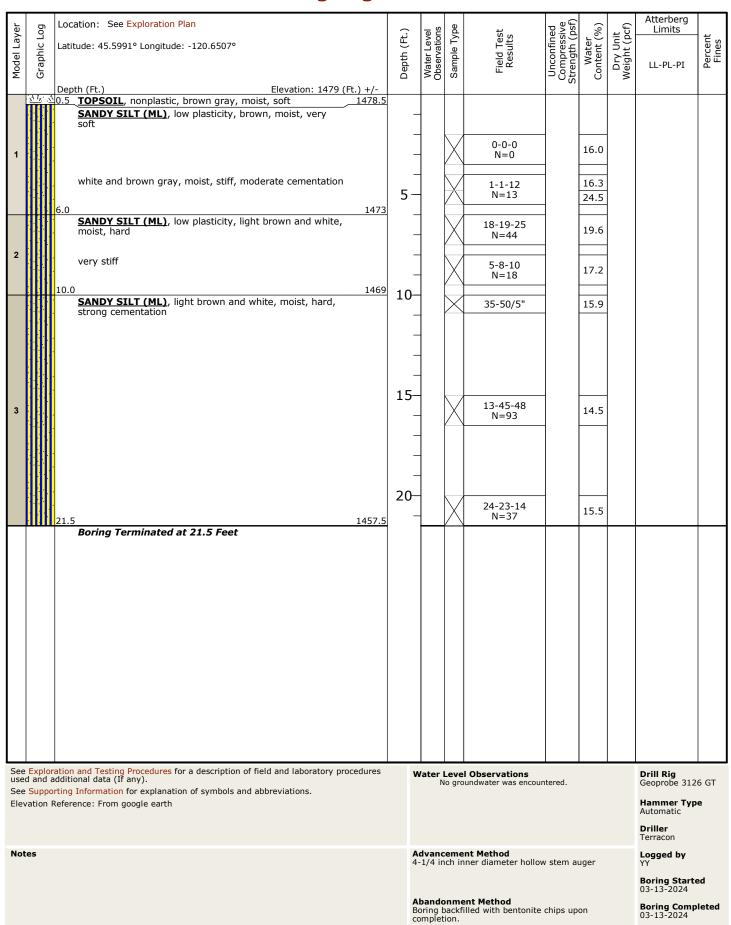


		Borning Log i									
er)g	Location: See Exploration Plan		_ s)e	t.	ve ve osf)	(%)	cf)	Atterberg Limits	
Model Layer	Graphic Log	Latitude: 45.5981° Longitude: -120.6354°	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)		Percent Fines
lodel	raph		epth	Vater bserv	ampl	Field Res	Jncol ompi reng	Wa	Dry /eigh	LL-PL-PI	Per
_ ≥		Depth (Ft.) Elevation: 1553 (Ft.) +/-		>0	S		Stor	O	>		
	<u> </u>	0.5 TOPSOIL, medium plasticity, light brown, moist, soft SILT WITH SAND (ML), medium plasticity, light brown,									
1		moist, medium stiff									
'					M	1-2-3 N=5		16.7			
		4.0 1549				14-3					
		<u>POORLY GRADED GRAVEL WITH SILT AND SAND</u> (GP-GM), fine to coarse grained, brown gray, moist,	5-		M	17-34-34 N=68		19.7			
5	0	very dense									
			_			50/2"	1	(13.0)			
	2	8.0 1545	_			50/0"					
		Auger Refusal at 8 Feet				30/0					
l											
l											
l											
L	Evel-	abian and Tasking Dungaduung fau a dagari-king of find and labour-king			Ш						
		ation and Testing Procedures for a description of field and laboratory procedures dditional data (if any).	W			I Observations undwater was encour	itered.			Drill Rig Geoprobe 312	6 GT
		rting Information for explanation of symbols and abbreviations. Reference: From google earth								Hammer Typ	e
										Automatic Driller	
						M				Terracon	
Not	tes					nt Method ner diameter hollow	stem a	uger		Logged by YY	
										Boring Starte 03-13-2024	ed
			A	band	onme backfi	ent Method illed with bentonite	chins un	on		Boring Comp	leted
			CC	omple	tion.	With bentonite	onpo up	011		03-13-2024	

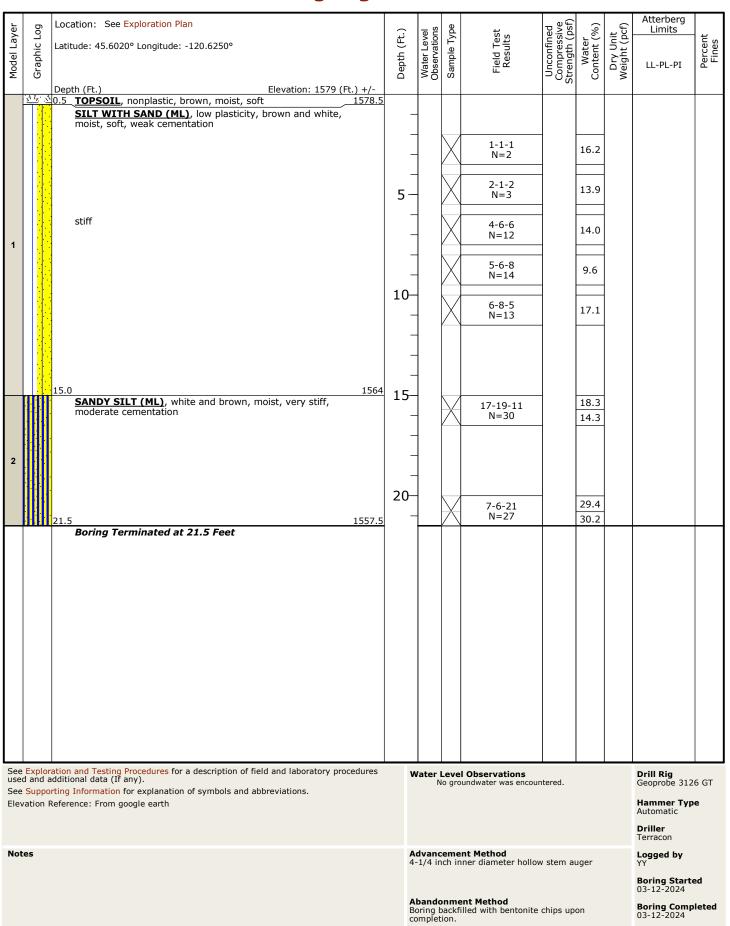




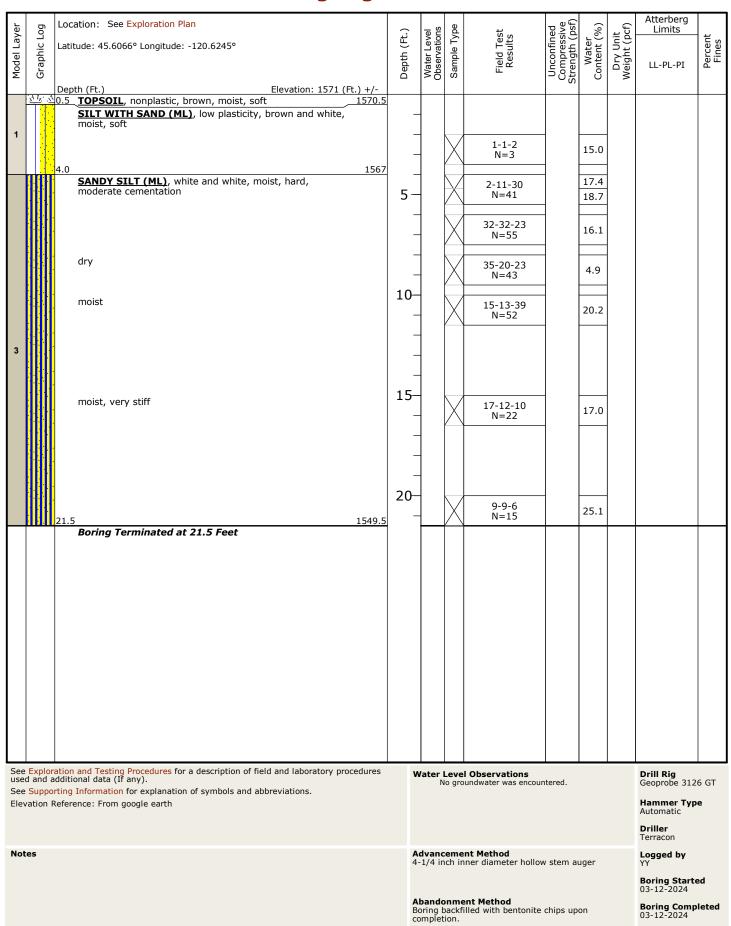




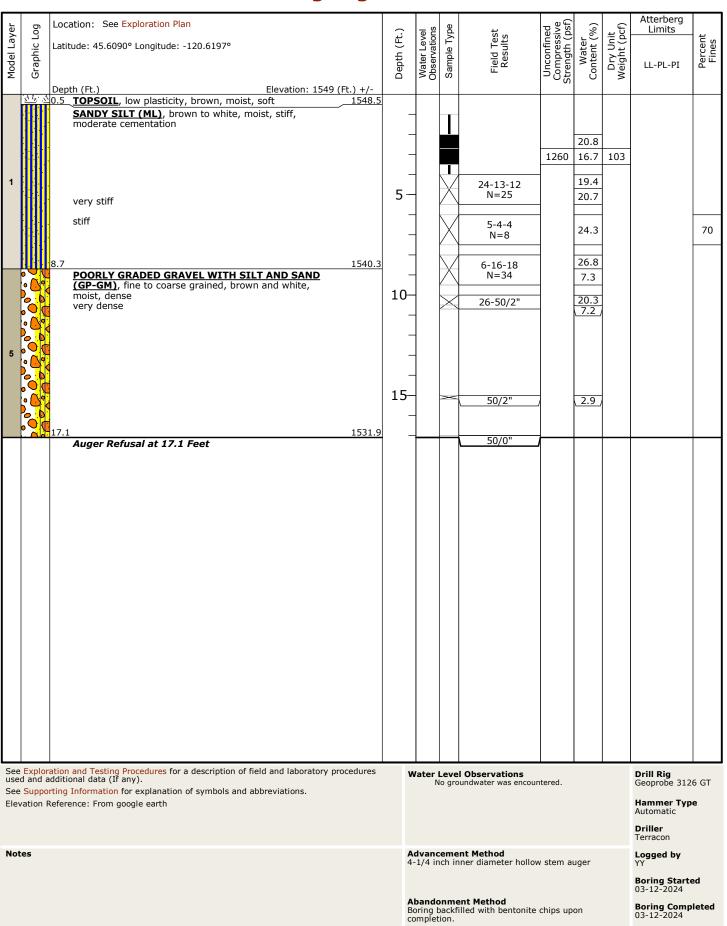




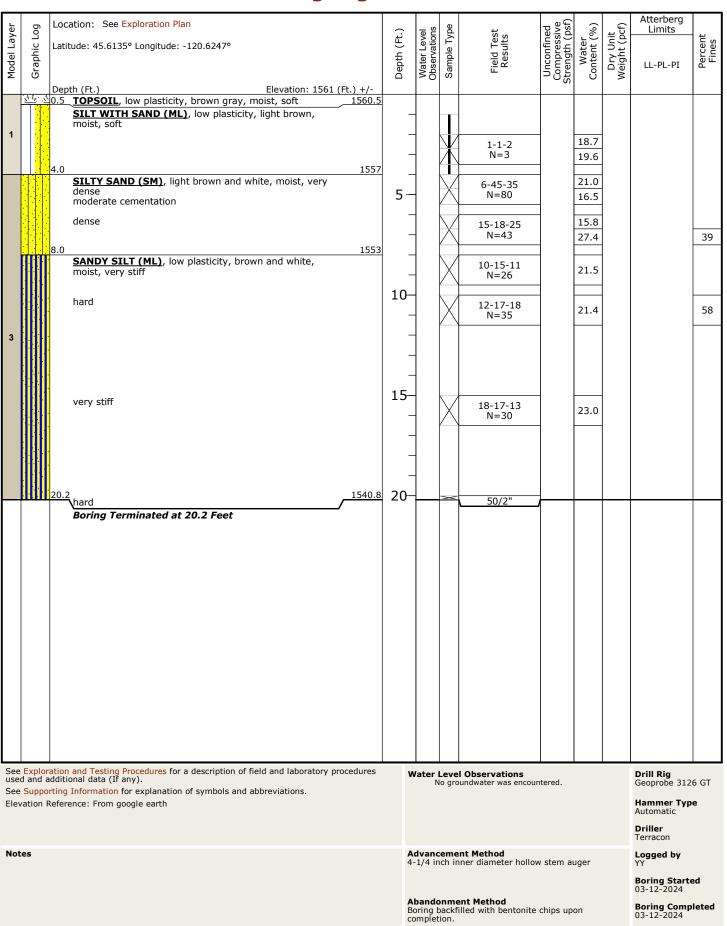




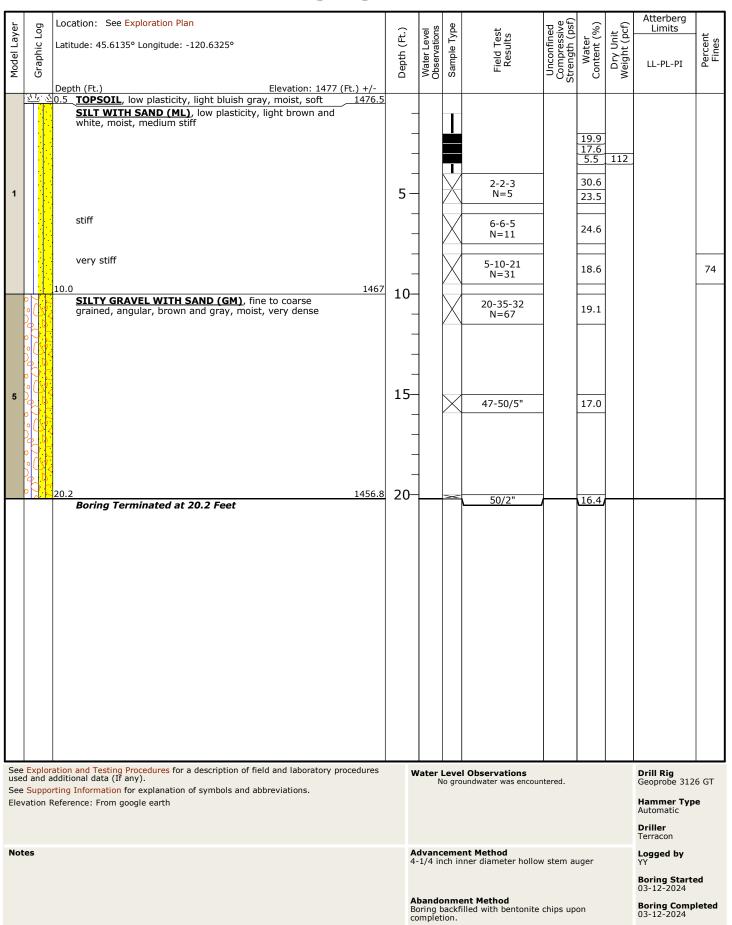




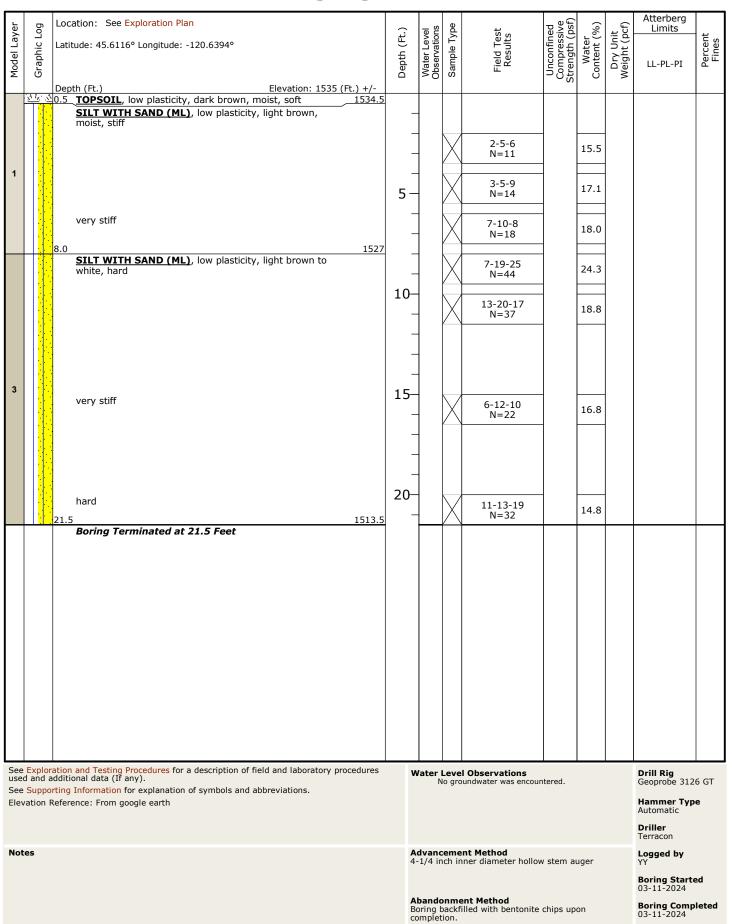




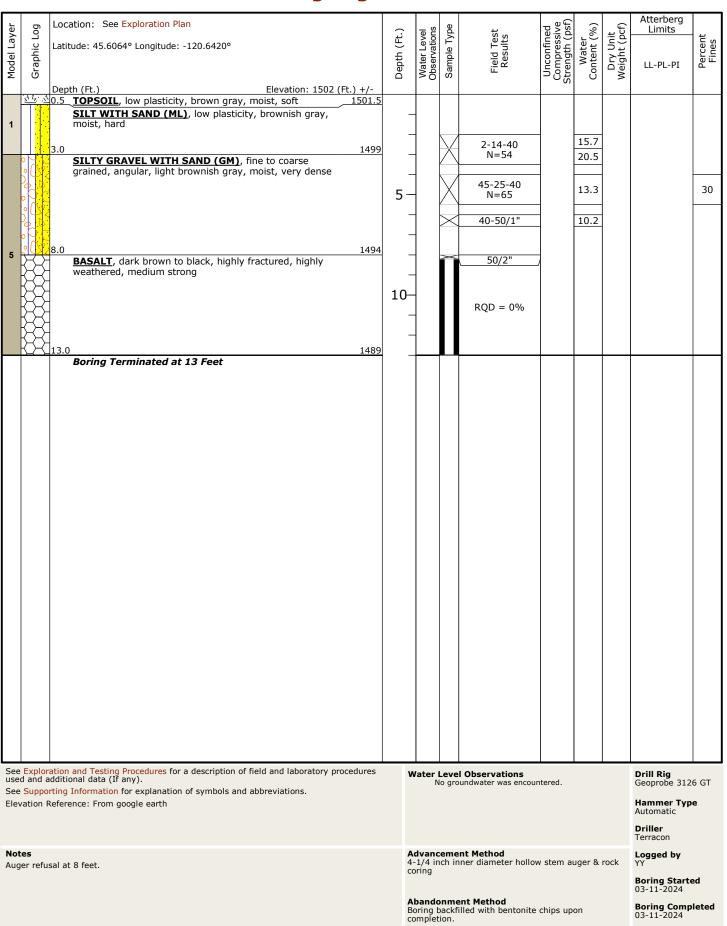




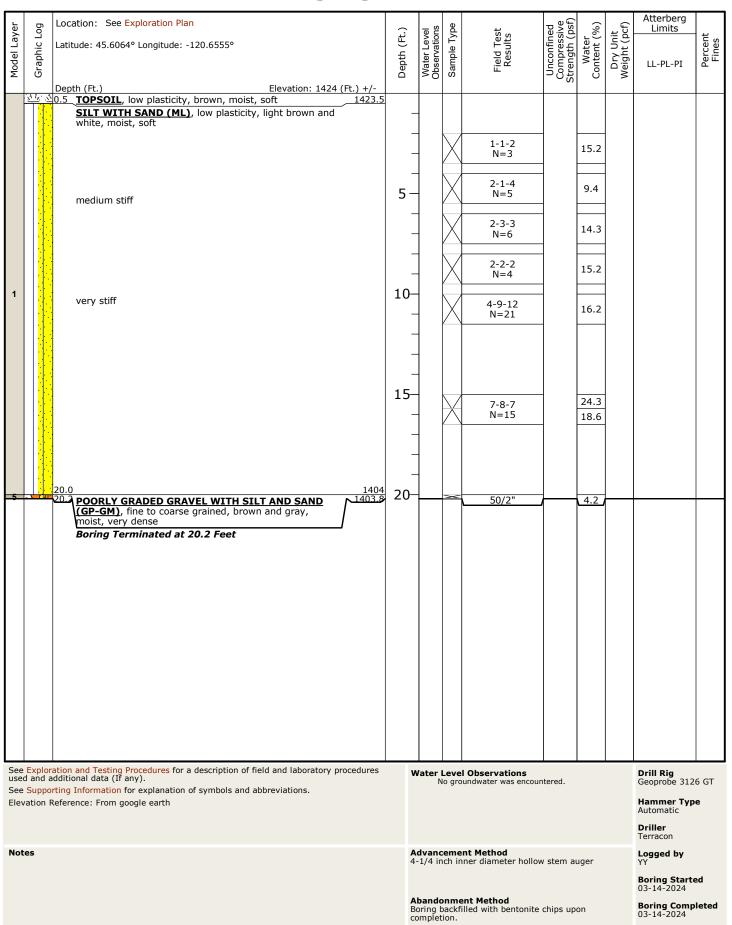




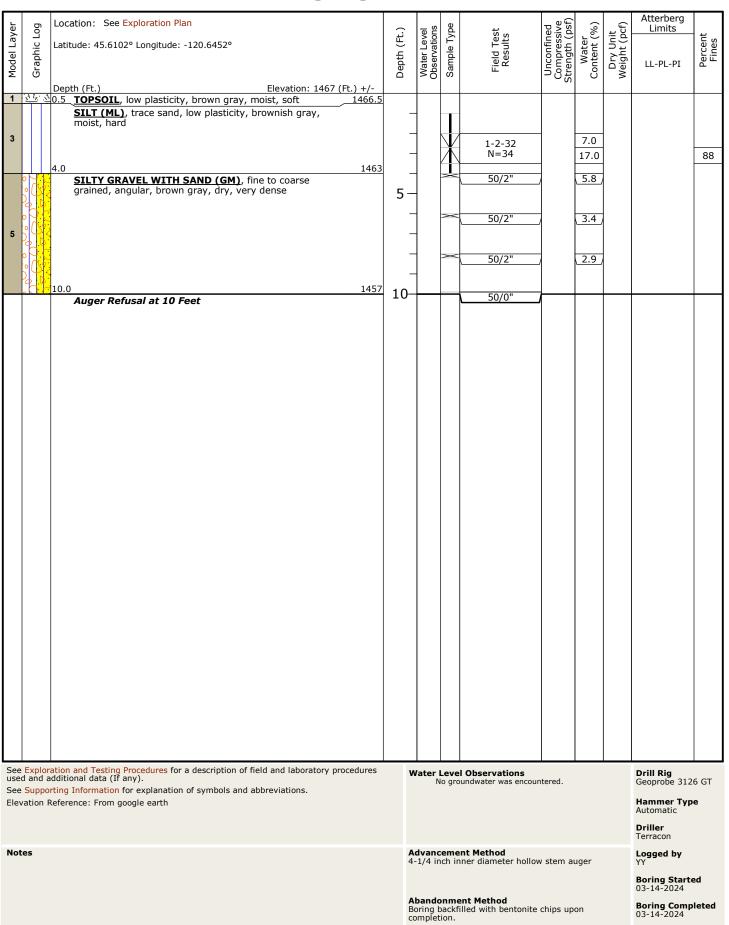




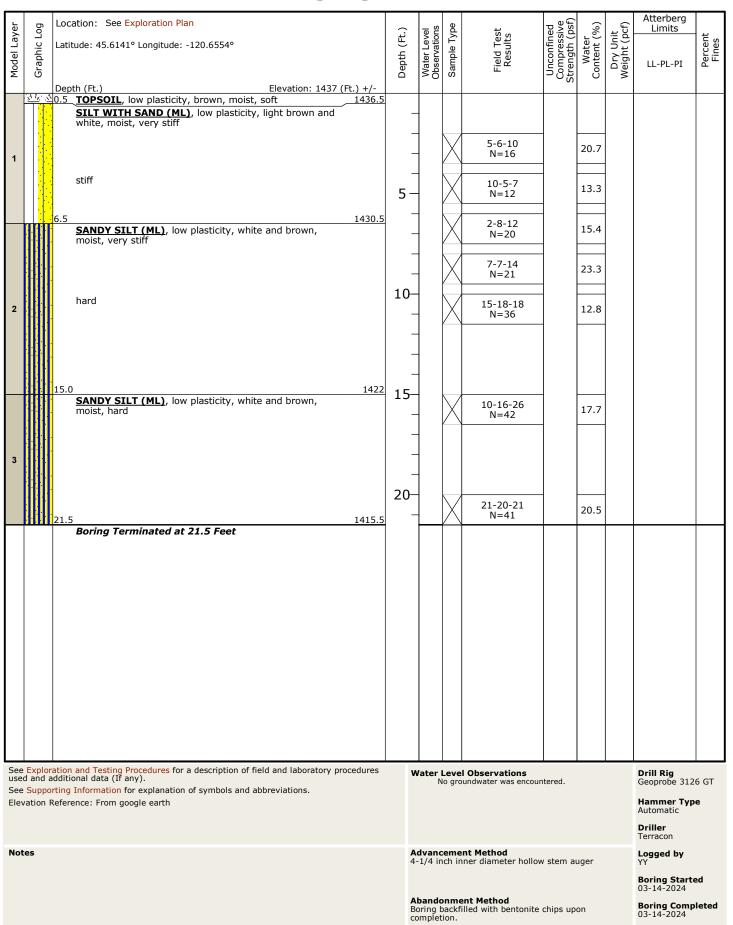




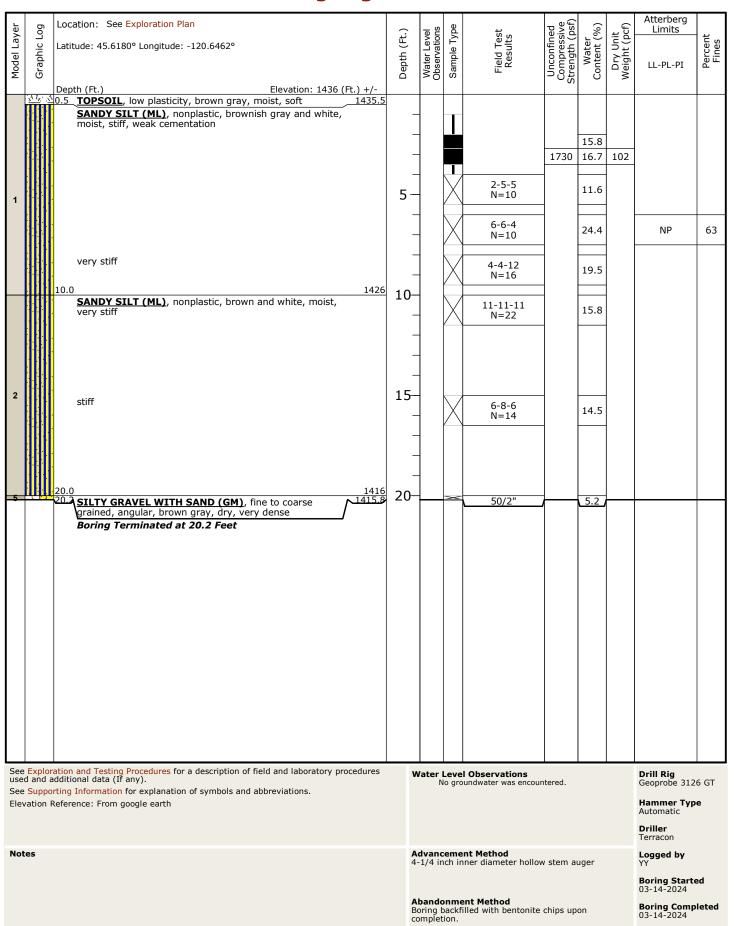




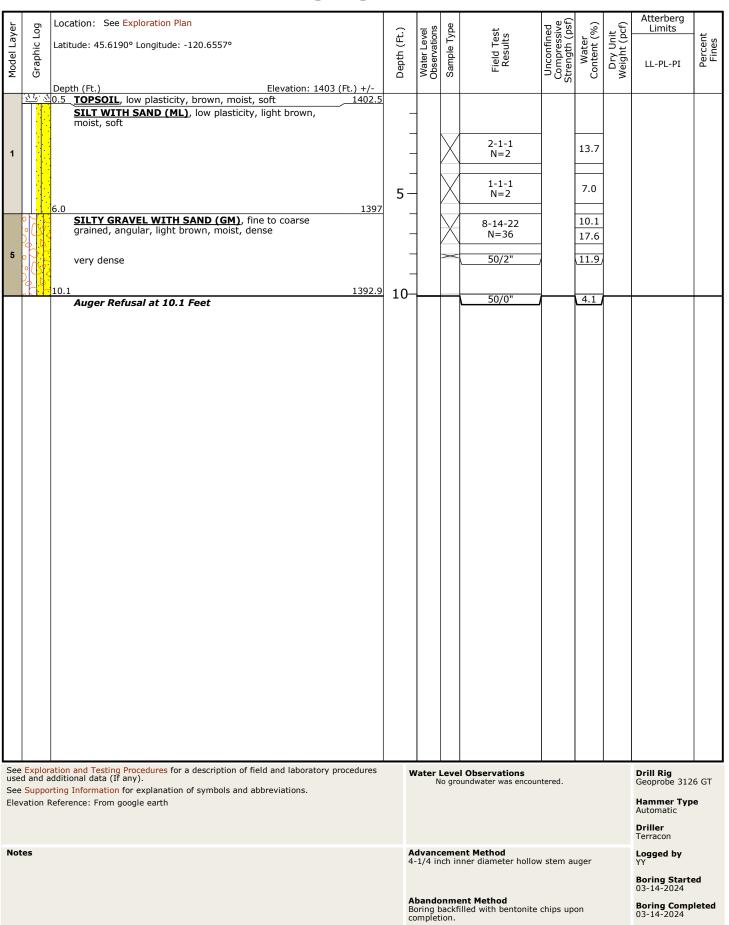




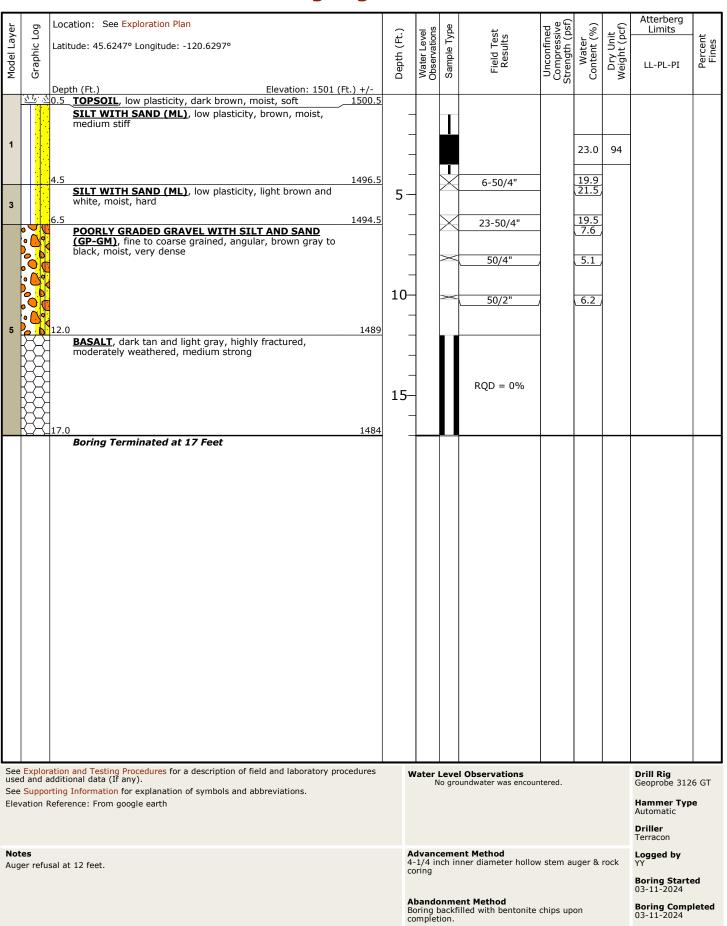




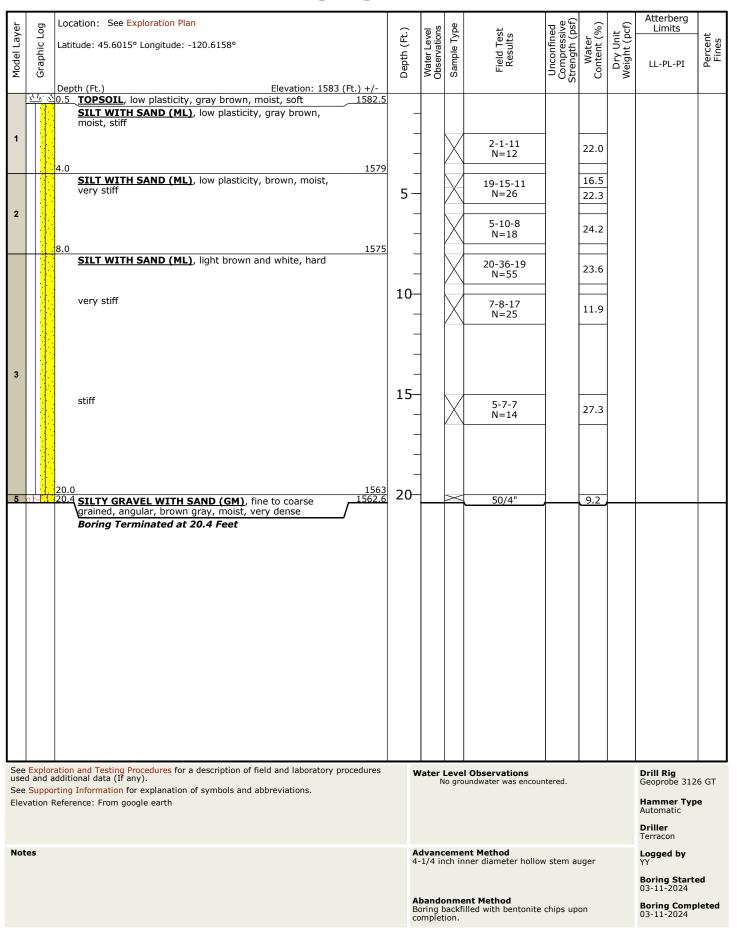








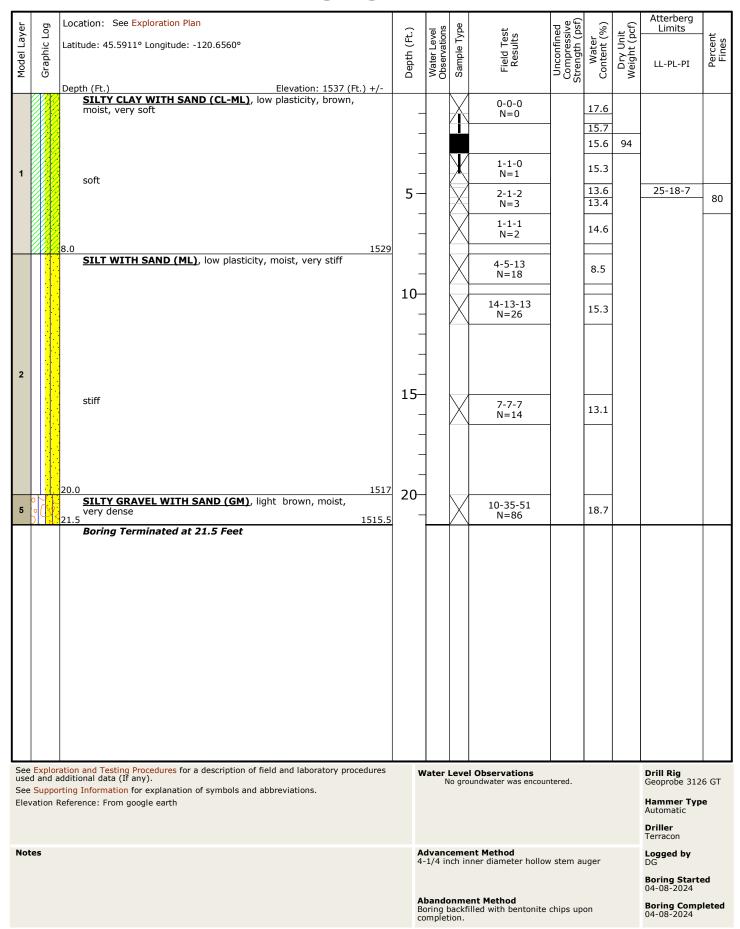




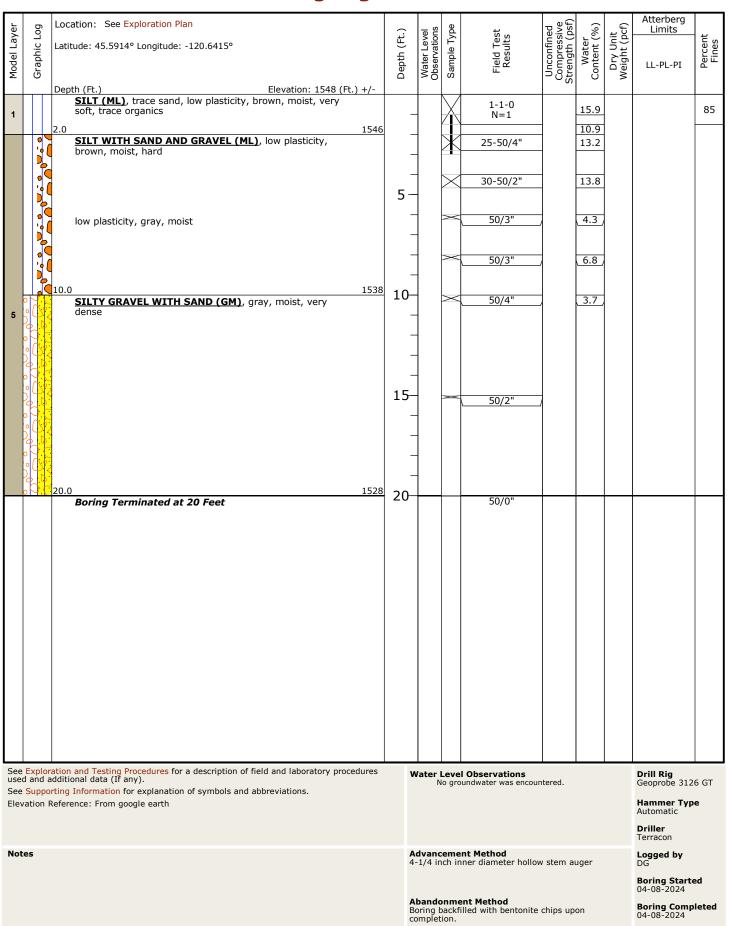


Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 45.5901° Longitude: -120.6660°	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
Mo	Ģ	Donth (Ft.)	De	ops Ng Ng	Sa	<u>i:</u> —	Str	Col	We		
		Depth (Ft.) Elevation: 1484 (Ft.) +/- SILT (ML), trace sand, low plasticity, brown, moist, very soft	_		X	1-0-0 N=0		16.9			
			-		X	1-0-1 N=1		16.0			
			- 5 -			1-0-1 N=1		13.3			
		medium stiff	_			1-2-5 N=7	-	15.4			
1			_			5-4-4		14.1			86
			10-			N=8	-				00
			-		X	2-2-3 N=5		12.5			
			_	_							
		15.0 1469 SILT (ML), trace sand, low plasticity, brown, very stiff	15-			6-9-11	-				
			_			6-9-11 N=20					
2			-								
			20-			10-12-12 N=24	-	17.9			
		21.5 1462.5 Boring Terminated at 21.5 Feet			\vdash	11-24					
		_									
		ration and Testing Procedures for a description of field and laboratory procedures additional data (If any). rting Information for explanation of symbols and abbreviations.	W	/ater	Leve lo gro	I Observations undwater was encour	ntered.			Drill Rig Geoprobe 312	6 GT
		Reference: From google earth								Hammer Typ Automatic	e
Note	es		A	dvanc	eme	nt Method				Driller Terracon Logged by DG	
			4-	-1/4 ir	ich in	ner diameter hollow	stem a	iger		Boring Starte 04-08-2024	ed
			В	bando oring l omplet	oackfi	ent Method illed with bentonite	chips up	on		Boring Comp 04-08-2024	

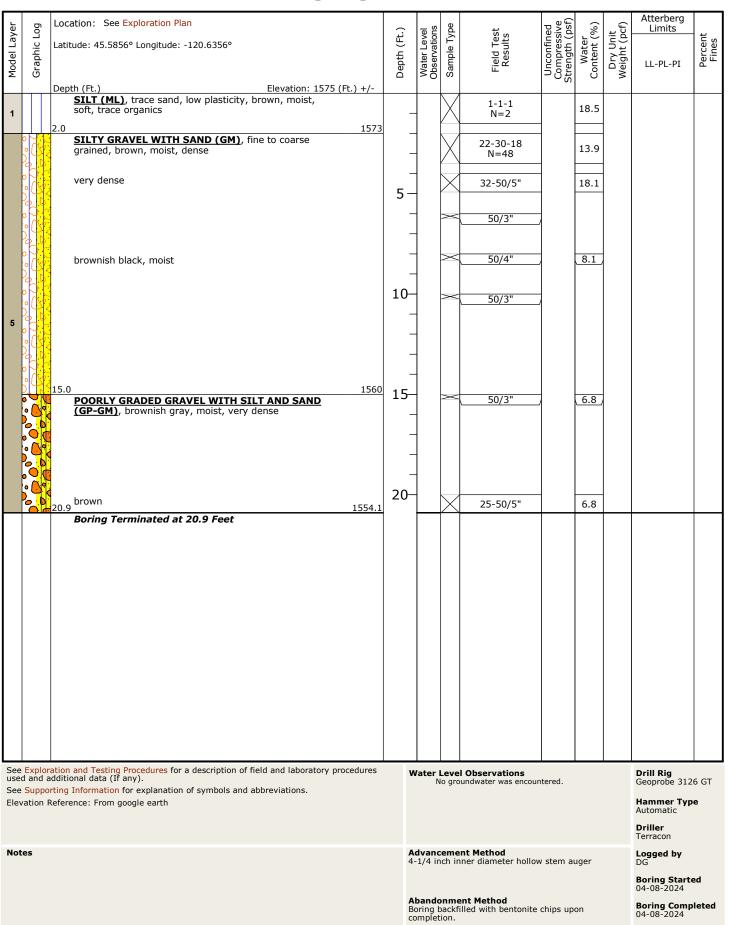




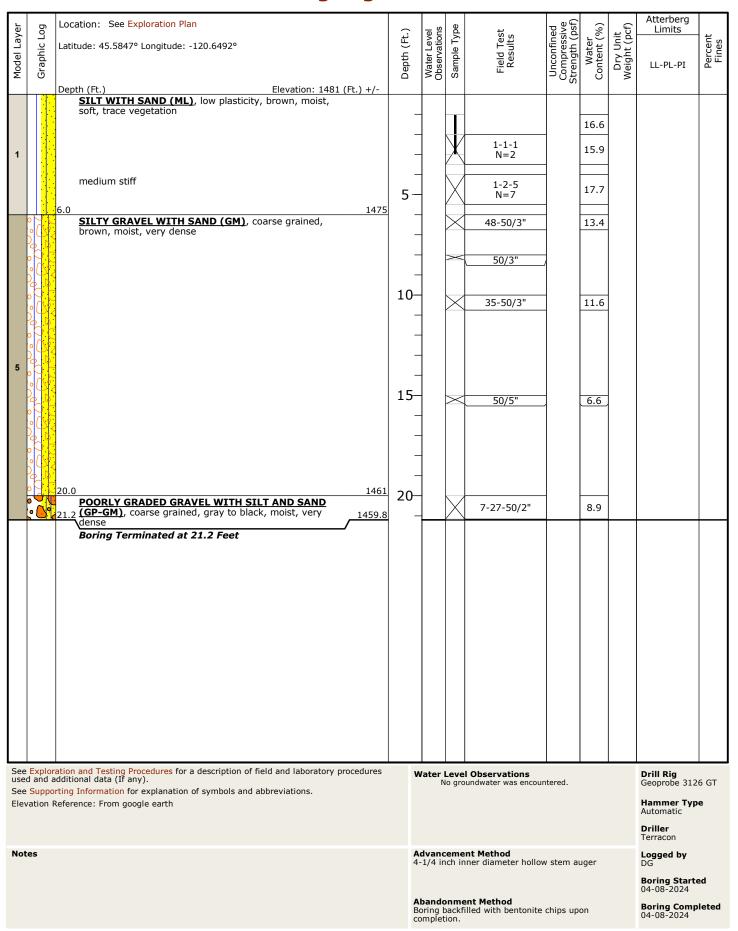




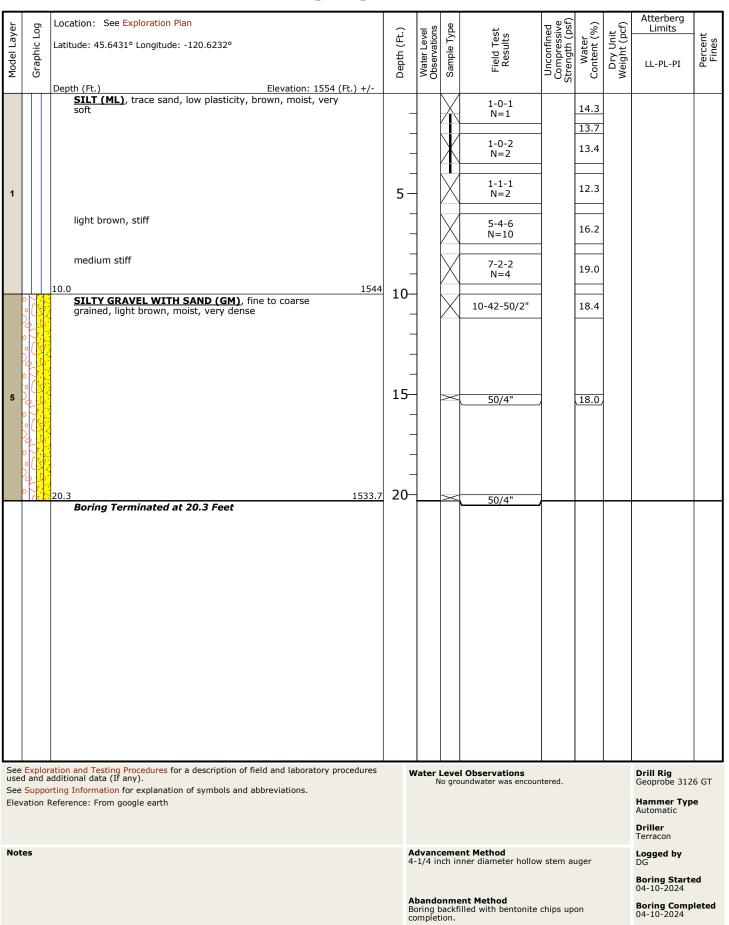












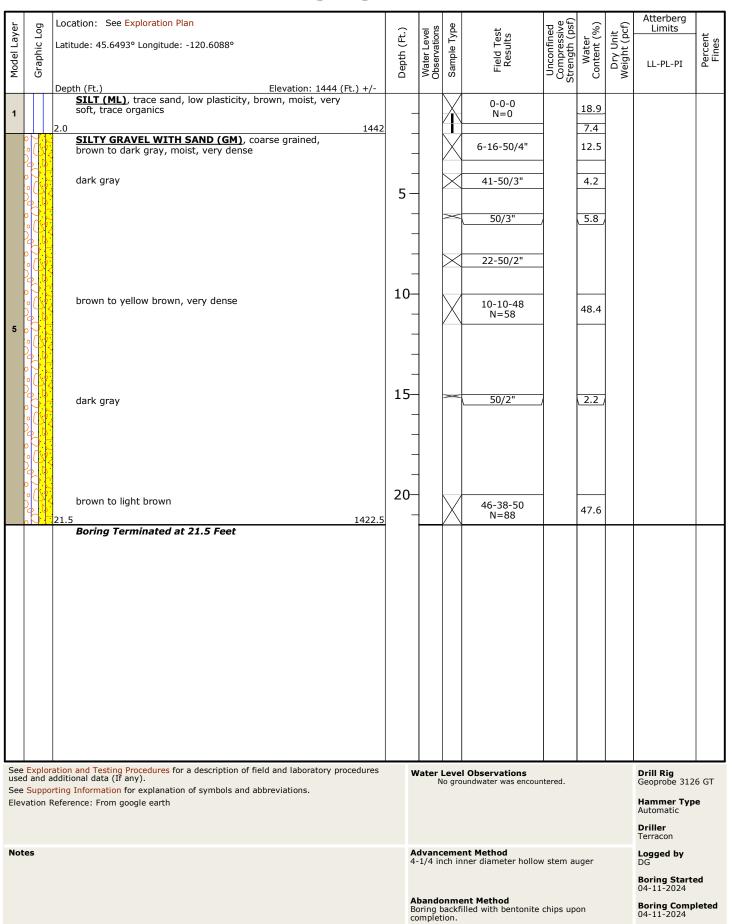


					,						
ayer	Log	Location: See Exploration Plan	ن; ا	vel	ype	est :s	Unconfined Compressive Strength (psf)	r (%)	nit pcf)	Atterberg Limits	ر. ب ا
Model Layer	Graphic Log	Latitude: 45.6555° Longitude: -120.6211°	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	confii npres ngth	Water Content (%)	Dry Unit Weight (pcf)	LL-PL-PI	Percent Fines
Мос	Gra		Der	Wa	Sar	<u> </u>	Con Stre	Con	Mei	LL-PL-PI	Δ.
		Depth (Ft.) Elevation: 1485 (Ft.) +/- SILT (ML), trace sand, low plasticity, brown, moist, very				0-0-0		15.9			
		soft	_			N=0		16.9			
								13.3	92		
			_		X	1-0-0 N=0		11.8			
			5 –	1		0-1-1		11.8			
		medium stiff	_		$\langle \rangle$	N=2 2-1-3					
			_		\triangle	N=4		8.3			
			_			3-3-4		9.7			
			10-			N=7					
1		stiff	10		M	6-8-7 N=15		13.3			
			_								
			_								
			_								
		light brown and white	15-			9-6-8 N=14		14.2			
			_		\triangle	N=14		14.2			
			_								
		light brown, very stiff	20-								
		21.5 1463.5	_		X	11-10-10 N=20		12.0			
		Boring Terminated at 21.5 Feet									
See	Explor	ration and Testing Procedures for a description of field and laboratory procedures additional data (If any).	W	Vater I	Level	Observations				Drill Rig Geoprobe 312	
See	Suppo	rting Information for explanation of symbols and abbreviations.		N	o gro	undwater was encoun	tered.				
Elev	ation l	Reference: From google earth								Hammer Typ Automatic	æ
										Driller Terracon	
Note	es		A 4-	dvanc -1/4 in	eme ch in	nt Method ner diameter hollow	stem au	uger		Logged by DG	
										Boring Starte 04-10-2024	ed
			В	oring b	ackfi	nt Method lled with bentonite	chips up	on		Boring Comp 04-10-2024	leted
			CC	omplet	ion.					J- 10-2024	



				1	,		1			A.L. 1	
yer	Log	Location: See Exploration Plan	t.)	sus	ype	sst	Unconfined Compressive Strength (psf)	(%)	it pcf)	Atterberg Limits	날
Model Layer	Graphic Log	Latitude: 45.6500° Longitude: -120.6135°	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	onfir presi gth (Water Content (%)	Dry Unit Weight (pcf)		Percent Fines
Mod	Grap		Dept	Wate	Sam	Fiel	Com	Cont	Dr Weig	LL-PL-PI	Pe
		Depth (Ft.) Elevation: 1479 (Ft.) +/-					- 6				
		<u>SILT (ML)</u> , trace sand, low plasticity, brown, moist, very soft	_		X	1-0-0 N=0		14.4			
			_					14.6 13.2	98		
			_					14.7	90		
			_	-	X	1-1-1 N=2		13.3			
			5 –		M	1-1-1		15.1			
		soft	_	1	()	N=2					
		Solt	_	1	X	2-1-2 N=3		11.4			
		medium stiff	_	1		2-3-4					
			-		X	N=7		10.9			
		stiff	10-			F 6 6					
1			-	1	M	5-6-6 N=12		11.8			
			-	1							
			_	<u> </u> 							
			_								
		light brown and white	15-			8-7-4					
			_		M	8-7-4 N=11		11.6			
			-	1							
			-								
			_								
			20-		M	4-4-7		10.5			
		21.5 1457.5	_		\triangle	N=11		13.5			
		Boring Terminated at 21.5 Feet									
See	Explor	ation and Testing Procedures for a description of field and laboratory procedures	14	Vator	l ave	l Observations				Drill Pig	
		ation and Testing Procedures for a description of field and laboratory procedures idditional data (If any). rting Information for explanation of symbols and abbreviations.	V	N	lo gro	undwater was encoun	itered.			Drill Rig Geoprobe 312	6 GT
		Reference: From google earth								Hammer Typ Automatic	е
										Driller	
Note	es		Δ	dvanc	eme	nt Method				Terracon	
	-		4	-1/4 in	ich in	ner diameter hollow	stem a	uger		Logged by DG	
										Boring Starte 04-11-2024	ed
			В	oring b	ackfi	ent Method lled with bentonite	chips up	on		Boring Comp 04-11-2024	leted
			CC	omplet	ion.					UT 11 2024	





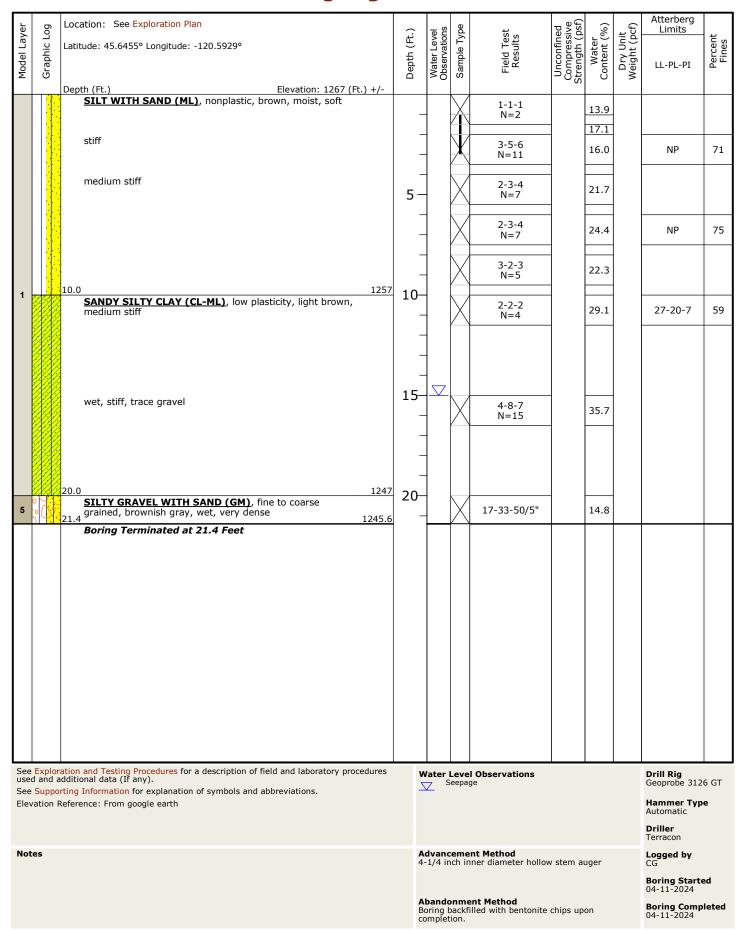


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yer	og-	Location: See Exploration Plan	<u>:</u>	ins de	, be	st	Unconfined Compressive Strength (psf)	(%	it ocf)	Atterberg Limits	<u>_</u>
Model Layer	Graphic Log	Latitude: 45.6426° Longitude: -120.6065°	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	nfin ress ith (Water Content (%)	Dry Unit Weight (pcf)		Percent Fines
ode	rapł		epth	/ater	amb	Fielc Res	Juco Juco Jeng	Wa	Dry eigh	LL-PL-PI	Per
Σ	Ŋ	Depth (Ft.) Elevation: 1444 (Ft.) +/-		S Q	S	_	Str	ŭ	>		
		SILT (ML), trace sand, low plasticity, brown, moist,			\bigvee	1-1-1		16.3			
		soft, trace organics	-	1	M	N=2		16.3			
			-	1	$\downarrow \downarrow$	2.1.1					
1			-	-	X	2-1-1 N=2		12.0			
		stiff	_	-		_					
		Still	5-		IXI	2-4-5 N=9		12.3			
		6.0 1438									
		SILTY GRAVEL WITH SAND (GM), fine to coarse grained, brown, moist, very dense	_		X	14-50/4"		19.3			
	4 1	· · · · · · · · · · · · · · · · · · ·									
			_			50/3"		7.2			
				1							
	M.		10-	1		50/3"		7.5			
			-	1							
			-	1							
5	JA S		-	+							
3			_	1							
		dayle gyaye	15-			12 50/2"		F 4			
(dark gray	_			13-50/2"		5.4			
			_								
K	j Ç		_								
		20.9 1423.1	20-		X	30-50/5"		4.2			
		Boring Terminated at 20.9 Feet									
		<u> </u>			Ш						
usec	and a	ration and Testing Procedures for a description of field and laboratory procedures additional data (If any).	W			Observations undwater was encour	itered.			Drill Rig Geoprobe 312	26 GT
		orting Information for explanation of symbols and abbreviations. Reference: From google earth								Hammer Typ	
	20011									Automatic	
										Driller Terracon	
Notes Advancement Method Logged by											
			4-	-1/4 ir	nch ini	ner diameter hollow	ı stem aı	ıger			
										Boring Starte 04-11-2024	ed
			A Bo	bando orina l	onme backfil	nt Method lled with bentonite	chips un	on		Boring Comp 04-11-2024	oleted

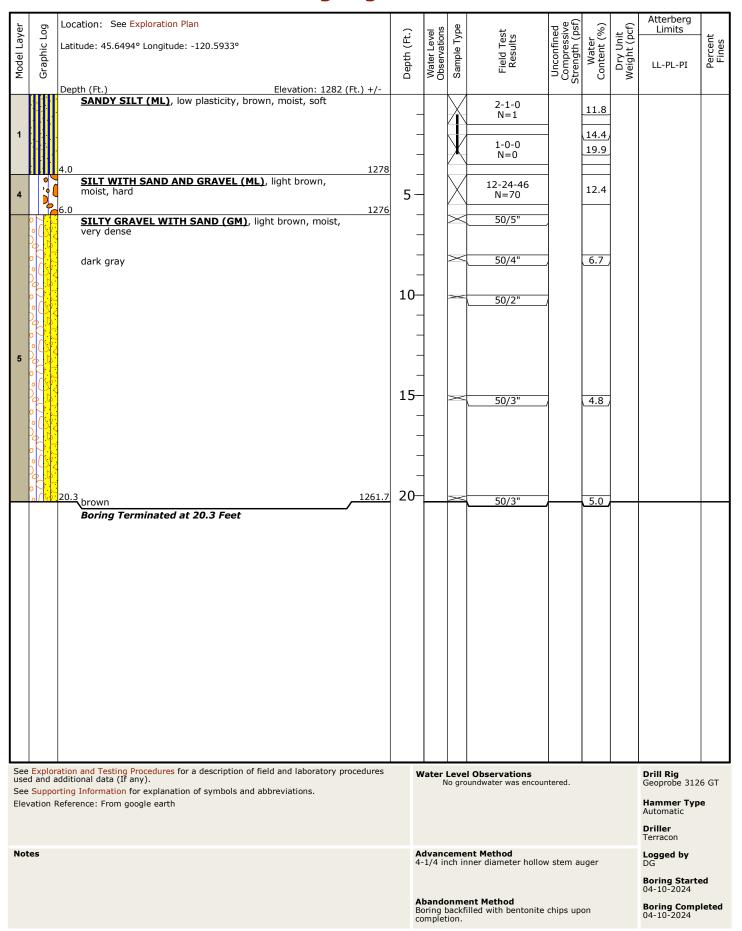


yer	Log	Location: See Exploration Plan	t.)	vel ons	ype	s	Unconfined Compressive Strength (psf)	(%)	it ocf)	Atterberg Limits	ا پا
Model Layer	Graphic Log	Latitude: 45.6424° Longitude: -120.5980°	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	onfin pres: gth (Water Content (%)	Dry Unit Weight (pcf)		Percent Fines
Mode	Grap		Dept	Wate	Sam	Fiel	Unc Comj tren	Cont	Dr	LL-PL-PI	Pe
		Depth (Ft.) Elevation: 1315 (Ft.) +/-					S				
	Ш	SANDY SILT (ML), nonplastic, brown, moist, very soft	_		X	0-0-1 N=1		19.9			
			_					18.0			
1		brown to light brown, very stiff	_					19.7	97		
			_		XL	45-15-10 N=25				NP	
	Ш	stiff	5 –			9-6-6		16.5			69
	ШШ	6.0 1309	_		Δ	N=12		10.5			09
		SANDY SILT (ML), nonplastic, brown to light brown, very stiff	_]	X	8-10-12 N=22		12.3			
			_								
	ШШ	•	_		X	10-9-9 N=18		12.8			
		hard	10-	- [
2	ШШ	. Hard	_		X	7-14-35 N=49		14.3			
			_	- [
			_	-							
		•	_	1							
		15.0 1300 SILTY GRAVEL WITH SAND (GM), fine to coarse	15–	-	\downarrow						
	500	grained, brownish gray, very dense	_	 	4	12-42-50/2"		16.0			34
			_	-							
5	50		_	1							
			_	1							
			20–	+	\downarrow	28-50/5"		10.4			
		20.9 1294.1 Boring Terminated at 20.9 Feet			\uparrow	20 00/0		20			
_											
		ration and Testing Procedures for a description of field and laboratory procedures additional data (If any).	W			Observations ndwater was encoun	tered.			Drill Rig Geoprobe 312	26 GT
See Supporting Information for explanation of symbols and abbreviations. Elevation Reference: From google earth Hamn								Hammer Typ	oe .		
										Automatic Driller	
										Terracon	
Not	tes		A -	dvance -1/4 inc	men th inn	it Method ier diameter hollow	stem a	ıger		Logged by DG	
										Boring Starte 04-11-2024	ed
										0 7 11 2024	
			A P	bandon	nmer	nt Method led with bentonite of	chine un	nn .		Boring Comp 04-11-2024	oleted

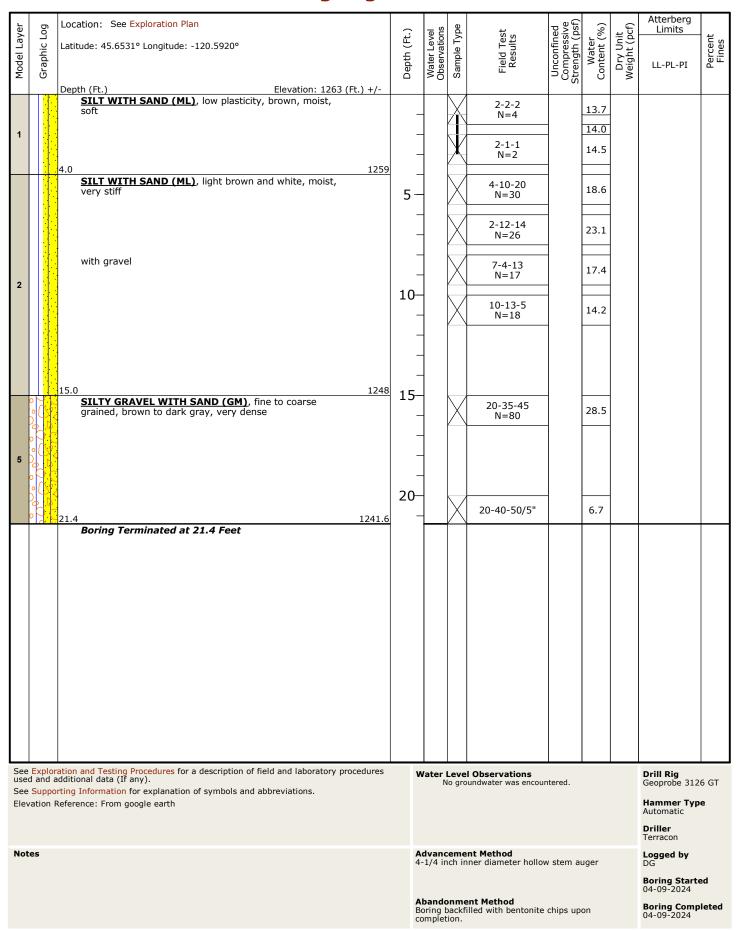




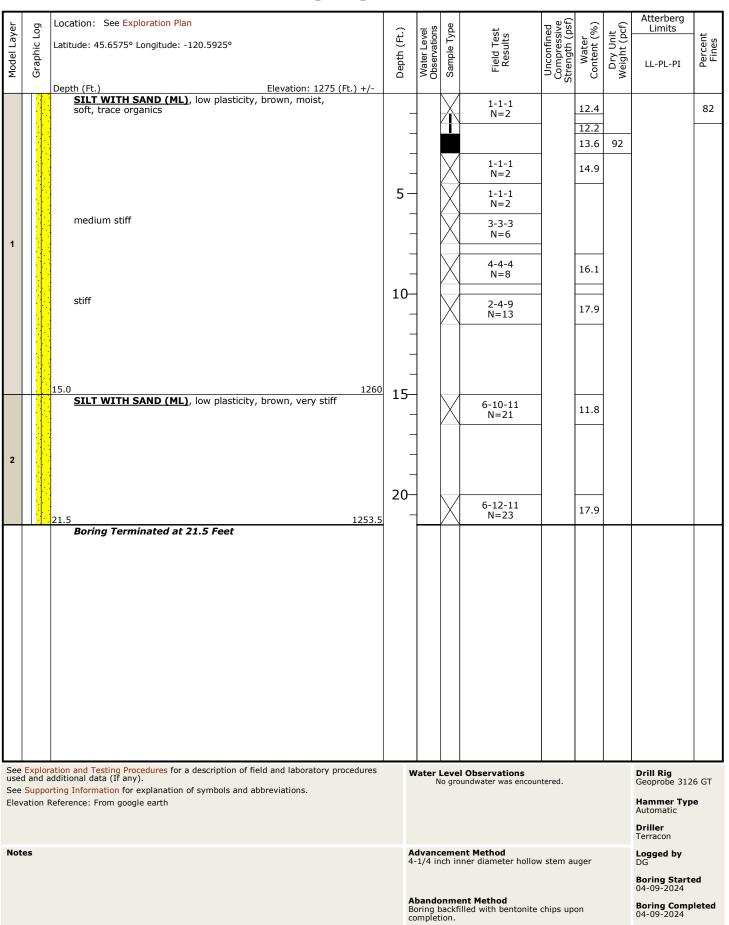




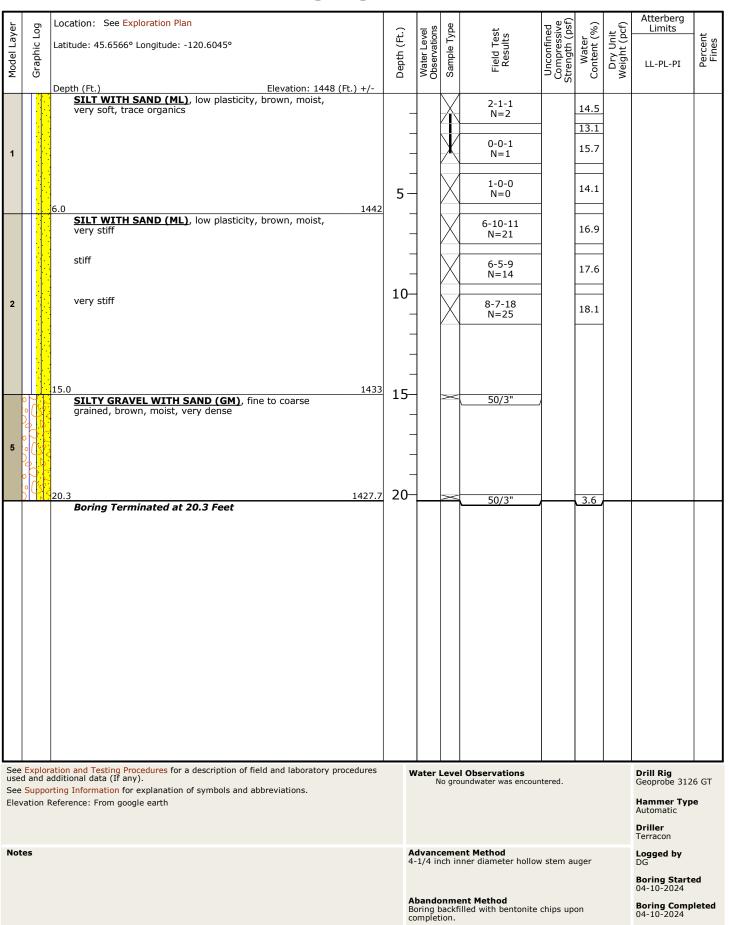




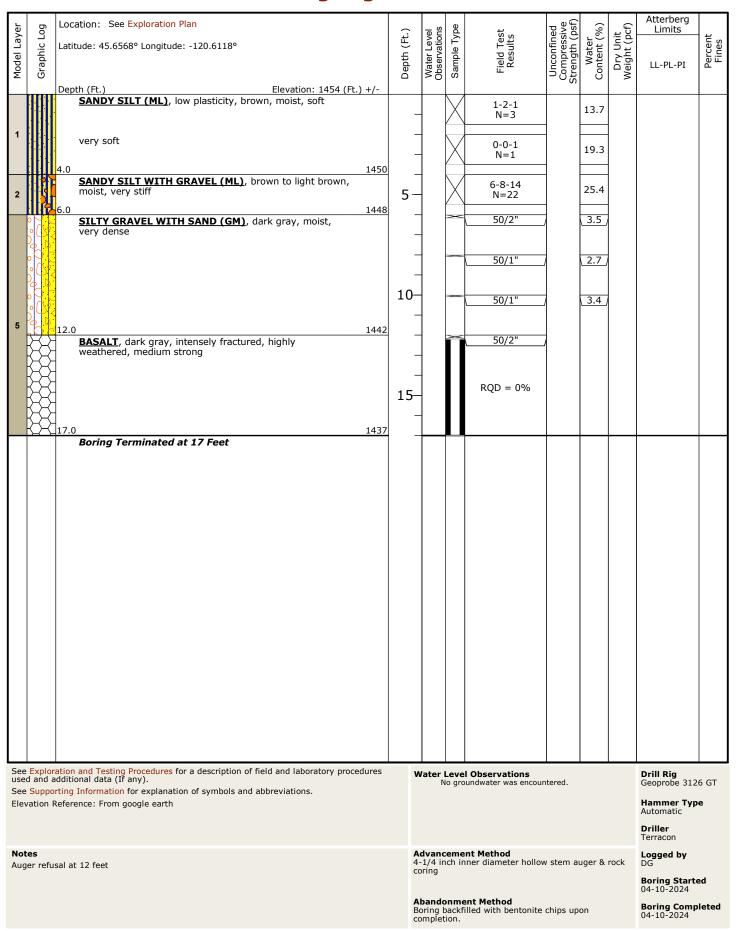




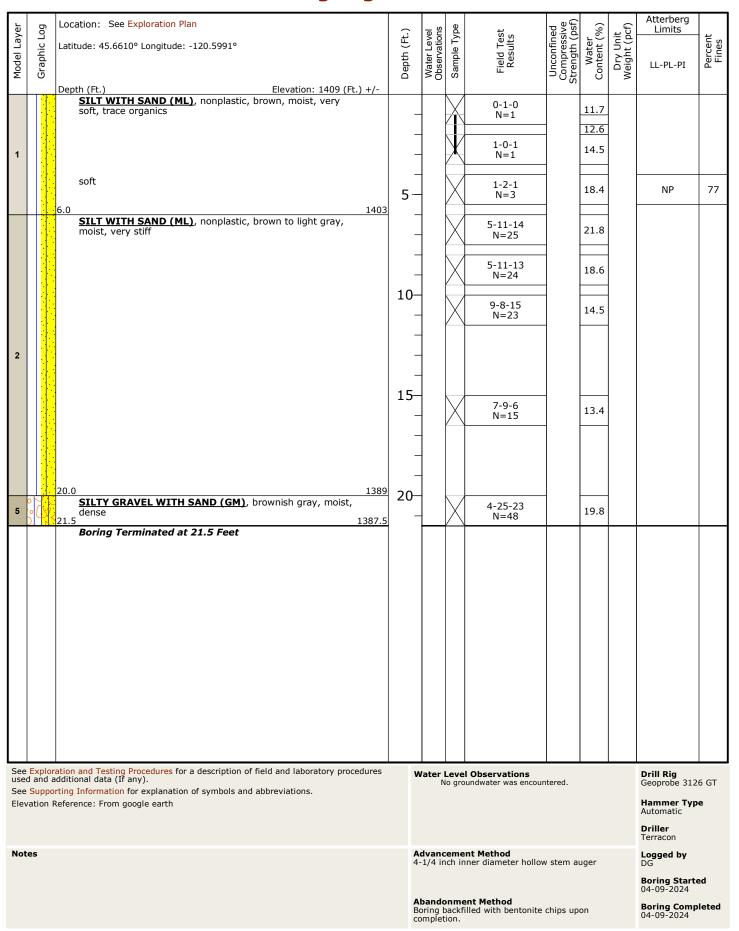




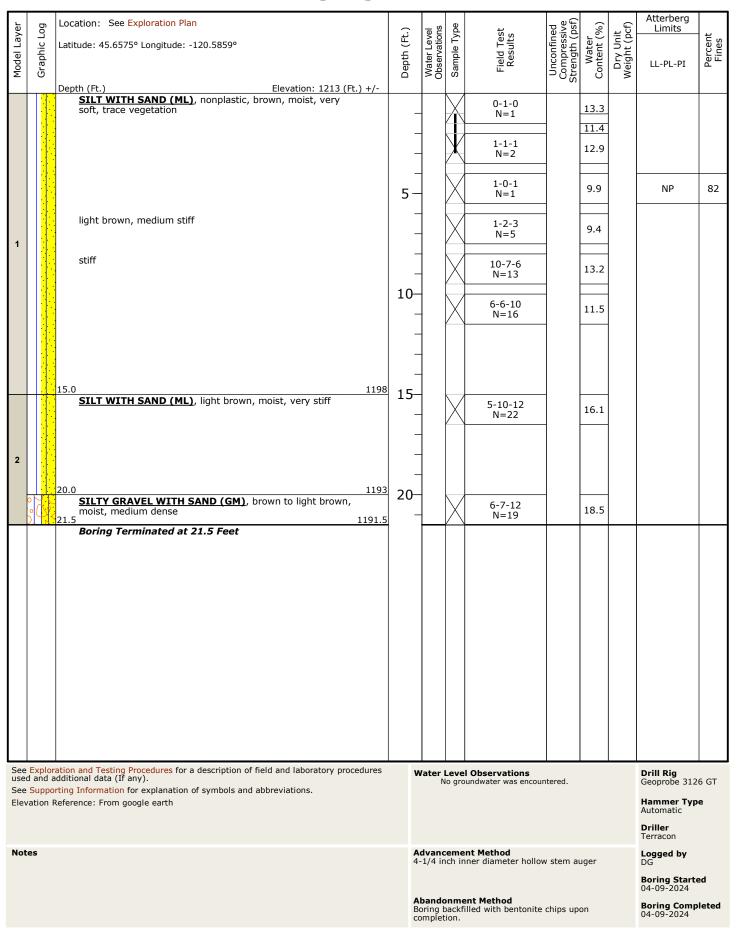




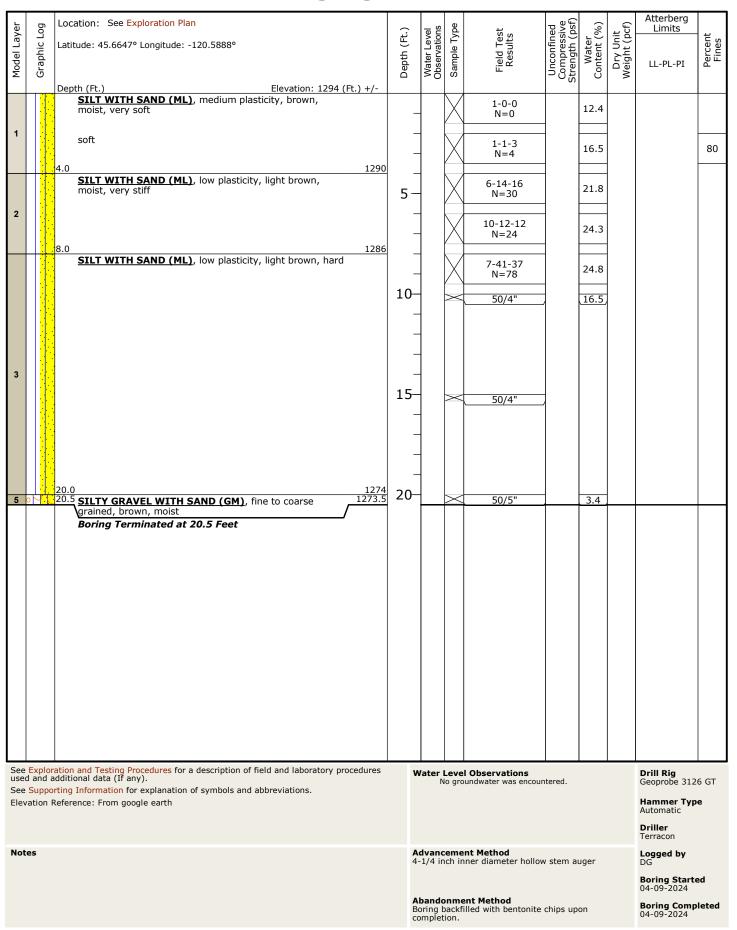












Infiltration Testing Results

Biglow Solar | Wasco, Sherman, Oregon

Test Date: March 14, 2024 | Terracon Project No. 82245013



Project	Biglow Solar		Date	3/14/2024	Exploration Number	IT-1	
Test Method	1980 EPA Falling H	lead					
Inner Dia	meter of Pipe	6 inches	Infiltration Test Depth	3 ft	Approximate Elevation ¹	1530 ft	
Soil at infiltr	ation test depth	Silt with Sand					
Presaturation Start Time 7:45 AM							
Presaturat	tion End Time	11:45 AM	Presaturation Notes	Water added periodically to maintain 12 inch head			
Head During	g Presaturation	12 inches					
Time	Time Interval	Measurement ²	Drop in Water level	Infiltration Rate ³	Remarks		
Time	(Minutes)	(inches)	(inches)	(inches per hour)	Remarks	1	
11:45 AM		36			Water adjusted to provide 6 in	nch head	
12:15 PM	30	36 1/8	1/8	1/4			
12:45 PM	30	36 1/4	1/8	1/4			
1:15 PM	30	36 3/8	1/8	1/4			
1:45 PM	30	36 1/2	1/8	1/4			
2:15 PM	30	36 5/8	1/8	1/4			

¹ Elevation interpolated from Google Earth Pro

² Measured to nearest 1/16 inch from top of pipe

³ Values calculated are raw (unfactored) rates.

Infiltration Testing Results

Biglow Solar | Wasco, Sherman, Oregon

Test Date: March 14, 2024 | Terracon Project No. 82245013



Project	Biglow Solar		Date	3/14/2024	Exploration Number	IT-2	
Test Method	1980 EPA Falling H	lead					
Inner Dia	meter of Pipe	6 inches	Infiltration Test Depth	2.5 ft	Approximate Elevation ¹	1500 ft	
Soil at infiltr	ation test depth	Silty Gravel with S	and				
Presaturation Start Time 8:30 AM							
Presaturation End Time		12:30 PM	Presaturation Notes	Water added periodically to maintain 12 inch head			
Head Durin	g Presaturation	12 inches					
Time	Time Interval	Measurement ²	Drop in Water level	Infiltration Rate ³	Remarks		
rime	(Minutes)	(inches)	(inches)	(inches per hour)	Remarks		
12:30 PM		30			Water adjusted to provide 6 ir	nch head	
1:00 PM	30	30 3/4	3/4	1 1/2			
1:30 PM	30	31 1/4	1/2	1			
2:00 PM	30	31 3/4	1/2	1			
2:30 PM	30	32 1/4	1/2	1			
3:00 PM	30	32 3/4	1/2				

¹ Elevation interpolated from Google Earth Pro

² Measured to nearest 1/16 inch from top of pipe

³ Values calculated are raw (unfactored) rates.



General Notes

Sampling	Water Level	Field Tests
Auger Cuttings Grab Shelby Tube Standard Penetration Test	Water Initially Encountered Water Level After a Specified Period of Time Water Level After a Specified Period of Time Cave In Encountered Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In	N Standard Penetration Test Resistance (Blows/Ft.) (HP) Hand Penetrometer (T) Torvane (DCP) Dynamic Cone Penetrometer UC Unconfined Compressive Strength (PID) Photo-Ionization Detector
	low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	(OVA) Organic Vapor Analyzer

Descriptive Soil Classification

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

Location And Elevation Notes

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

(More than 50% reta	Coarse-Grained Soils sined on No. 200 sieve.) andard Penetration Resistance	Consistency of Fine-Grained Soils (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance				
Relative Density	Standard Penetration or N-Value (Blows/Ft.)		Unconfined Compressive Strength Qu (psf)	ve Standard Penetration or N-Value (Blows/Ft.)		
Very Loose	0 - 3	Very Soft	less than 500	0 - 1		
Loose	4 - 9	Soft	500 to 1,000	2 - 4		
Medium Dense	10 - 29	Medium Stiff	1,000 to 2,000	4 - 8		
Dense	30 - 50	Stiff	2,000 to 4,000	8 - 15		
Very Dense	Very Dense > 50		4,000 to 8,000	15 - 30		
		Hard	> 8,000	> 30		

Strength Terms

Relevance of Exploration and Laboratory Test Results

Exploration/field results and/or laboratory test data contained within this document are intended for application to the project as described in this document. Use of such exploration/field results and/or laboratory test data should not be used independently of this document.

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Unified Soil Classification System

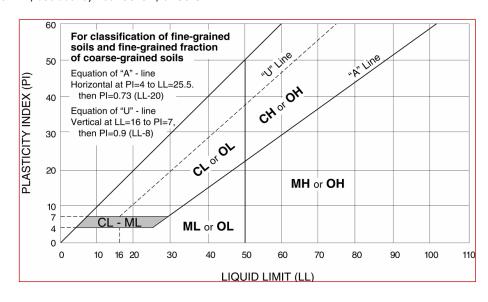
Criteria for A	ssianina Group	Symbols and G	roup Names Using	Soil Classification		
	Laboratory Tests ^A					
	Gravels:	Clean Gravels:	Cu≥4 and 1≤Cc≤3 ^E	GW	Well-graded gravel F	
	More than 50% of	Less than 5% fines ^c	Cu<4 and/or [Cc<1 or Cc>3.0] ^E	GP	Poorly graded gravel F	
	coarse fraction retained on No. 4	Gravels with Fines:	Fines classify as ML or MH	GM	Silty gravel F, G, H	
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	sieve	More than 12% fines ^c	Fines classify as CL or CH	GC	Clayey gravel F, G, H	
	Sands: 50% or more of coarse fraction passes No. 4 sieve	Clean Sands:	Cu≥6 and 1≤Cc≤3 ^E	SW	Well-graded sand ^I	
		Less than 5% fines D	Cu<6 and/or [Cc<1 or Cc>3.0] E	SP	Poorly graded sand ^I	
		Sands with Fines: More than 12% fines D	Fines classify as ML or MH	SM	Silty sand ^{G, H, I}	
			Fines classify as CL or CH	SC	Clayey sand G, H, I	
		Inorganic:	PI > 7 and plots above "A" line ¹	CL	Lean clay ^{K, L, M}	
	Silts and Clays: Liquid limit less than	inorganic.	PI < 4 or plots below "A" line ³	ML	Silt K, L, M	
	50	Organic:	$\frac{LL \ oven \ dried}{LL \ not \ dried} < 0.75$	OL	Organic clay K, L, M, N	
Fine-Grained Soils: 50% or more passes the		Organic.	LL not dried 0.73	OL	Organic silt ^{K, L, M, O}	
No. 200 sieve		Inorganic:	PI plots on or above "A" line	CH	Fat clay ^{K, L, M}	
	Silts and Clays: Liquid limit 50 or	inorganic.	PI plots below "A" line	MH	Elastic silt K, L, M	
	more	Organic:	$\frac{LL \ oven \ dried}{LL \ not \ dried} < 0.75$	ОН	Organic clay K, L, M, P	
		O. game.	LL not dried 0.73		Organic silt ^{K, L, M, Q}	
Highly organic soils:	Primarily (organic matter, dark in c	color, and organic odor	PT	Peat	

- A Based on the material passing the 3-inch (75-mm) sieve.
- B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
- ^c Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.
- Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

E Cu =
$$D_{60}/D_{10}$$
 Cc = $\frac{(D_{30})^2}{D_{10}}$

- F If soil contains ≥ 15% sand, add "with sand" to group name.
- G If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

- H If fines are organic, add "with organic fines" to group name.
- If soil contains ≥ 15% gravel, add "with gravel" to group name.
 If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.
- K If soil contains 15 to 29% plus No. 200, add "with sand" or
- "With gravel," whichever is predominant.
- $^{\text{L}}$ If soil contains \geq 30% plus No. 200 predominantly sand, add "sandy" to group name.
- M If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.
- N PI ≥ 4 and plots on or above "A" line.
- OPI < 4 or plots below "A" line.
- P PI plots on or above "A" line.
- Q PI plots below "A" line.



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Rock Classification Notes

		WEATH	IERING			
Term			Description			
Fresh		stals appear bright; show no discolor tend into intact rock.	ation. Features show little or now st	aining or	surfaces. Discoloration	
Slightly weathered	Rock generators.	ally fresh except along fractures. Sor	me fractures stained and discoloration	on may e	xtend <0.5 inches into	
Moderately weathered		portions of rock are dull and discolor oil zones of limited extent may occur	· • • • • • • • • • • • • • • • • • • •	r than in	fresh state near	
Highly weathered		nd discolored throughout. Majority of d; isolated zones of stronger rock ar	· · · · · · · · · · · · · · · · · · ·	nd has de	ecomposed and/or	
Completely weathered		terial is decomposed and/or disintegones of stronger rock may occur locall		is still e	vident and largely intact.	
		STRENGTH O	R HARDNESS			
Description		Field Identi	fication		Uniaxial Compressive Strength, psi	
Extremely strong	•	chipped with geological hammer. Roith a sharp pick. Hand specimens red	_		>36,000	
Very strong		ws of a geological hammer to fractur eel nail. Can be scratched with a geo			15,000-36,000	
Strong	20d nail or	More than one blow of a geological hammer needed to fracture. Can be scratched with a 20d nail or geologist's pick. Gouges or grooves to ¼ inch deep can be excavated by a hard blow of a geologist's pick. Hand specimens can be detached by a moderate blow.				
Medium strong	One blow of geological hammer needed to fracture. Can be distinctly scratched with 20d nail. Can be grooved or gouged 1/16 in. deep by firm pressure with a geologist's pick point. Can be fractured with single firm blow of geological hammer. Can be excavated in small chips (about 1-in. maximum size) by hard blows of the point of a geologist's pick;					
Weak	readily with	ent by firm blow with geological ham geologist's pick point. Can be excav lows of a pick point. Small thin piece	ated in pieces several inches in size		700-3,500	
Very weak	the point of	nder firm blow with geological hamm a geologist's pick. Pieces 1-in. or m an be scratched readily by fingernail	ore in thickness can be broken with		150-700	
	_	DISCONTINUIT	Y DESCRIPTION			
(Joi		Spacing Other Fractures)	Bedding (May Include Foli			
Description	on	Spacing	Description		Spacing	
Intensely frac	ctured	< 2.5 inches	Laminated		< ½-inch	
Highly fract	ured	2.5 - 8 inches	Very thin		½ – 2 inches	
Moderately fra	ctured	8 inches to 2 feet	Thin		2 inches – 1 foot	
Slightly fract	tured	2 to 6.5 feet	Medium		1 - 3 feet	
Very slightly fr	actured	> 6.5 feet	Thick		3 - 10 feet	
			Massive	> 10 feet		
		ROCK QUALITY DES	SIGNATION (RQD) 1			
	Descr	iption	RQD Va	lue (%)		
	Very	Poor	0 -	25		
	Po	or	25 - 50			
	Fa	nir	50 - 75			
	Go	od	75 – 90			
	Exce	llent	90 - 100			

^{1.} The combined length of all sound and intact core segments equal to or greater than 4 inches in length, expressed as a percentage of the total core run length.

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Laboratory Test Results

Contents:

Laboratory Testing Procedures
Laboratory Proctor Results (16 pages)
Laboratory Thermal Resistivity Test Results (16 pages)
Laboratory Corrosion Series Test Results (6 pages)
CBR Test Results (4 pages)
Atterberg Limit Results
Unconfined Compression Test (5 pages)
Collapse Test (5 pages)

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Laboratory Testing Procedures

The project engineer reviewed the field data and assigned laboratory tests. The laboratory testing program included the following types of tests:

- Moisture Content
- Standard Proctor or Modified Proctor
- Unconfined Compressive Test
- Collapse Test
- Specific Gravity
- California Bearing Ratio
- Atterberg Limit
- Grain Size Analysis

The laboratory testing program also included review of soil samples by an engineer. Based on the results of our field and laboratory programs, we described and classified the soil samples in accordance with the Unified Soil Classification System.

Thermal Resistivity: Laboratory thermal resistivity testing was performed by Terracon on soil samples obtained during our field explorations from a depth of approximately 0 to 4 feet below the existing ground surface. The thermal resistivity testing was performed in general accordance with the IEEE standard. The dry-out curves were developed from soil specimens compacted between 85% and 95% of the standard Proctor criteria (ASTM D698) at the optimum moisture content and dried to 0% moisture.

Initially, twenty-one laboratory thermal resistivity tests were completed on remolded samples for the initial phase. Additionally, fifteen samples were completed on remolded or intact samples for the expansion area. Samples were remolded to 85 and 95% of the material's maximum dry density, and in addition, the material was tested in in-situ unit weight. The individual laboratory thermal resistivity dry-out curves are provided in the attachment and are summarized below. The compaction percentages shown in the table are relative to the soil's standard Proctor (ASTM D698) maximum dry density.

Thermal Resistivity Test Results Summary

Test	Thermal R	Number of			
Condition	Parameter ^{1,2}	Min.	Max.	Average	Tests
Remolded to	Remolded Wet	84	97	89	12
85%	Remolded Dry	239	384	321	12

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Thermal Resistivity Test Results Summary

Test	Thermal R	Number of			
Condition	Parameter ^{1,2}	Min.	Max.	Average	Tests
Remolded to 95%	Remolded Wet	75	88	80	12
	Remolded Dry	181	292	243	12
In situ	Remolded Wet	74	101	84	12
	Remolded Dry	181	322	267	12

- 1. The "Remolded Wet" samples were tested near the optimum moisture content.
- 2. The "Dry" samples were tested at a moisture content of 0%.

Corrosivity Testing: Bulk samples of near surface soils were tested in the laboratory for the following properties in general accordance with the corresponding standards:

- pH Analysis (ASTM G51)
- Chloride (ASTM D512)
- Sulfate (ASTM C1580)
- Sulfide Content (AWWA 4500-S D)
- Oxidation-Reduction Potential (ASTM G200)
- Electrical Resistivity Testing (ASTM G187)

The table below lists the results of laboratory pH, soluble sulfate, sulfides, soluble chloride, total salts, oxidation-reduction potential (redox), and electrical resistivity testing. The values may be used to estimate potential corrosive characteristics of the on-site soils with respect to contact with the various underground materials which will be used for project construction.

Corrosivity Test Results Summary

Parameter	Number of Tests	Min.	Max.	Average
рН	20	6.49	8.67	7.9
Soluble Sulfate (mg/kg)	20	<0.01	0.01	0.01

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Corrosivity Test Results Summary

Parameter	Number of Tests	Min.	Max.	Average
Sulfides (mg/kg)	20	Nil	Nil	Nil
Soluble Chloride (%)	20	0.01	0.02	0.012
Total Salts (mg/kg)	20	203	1,993	786
Redox (mV)	20	715	734	725
Electrical Resistivity (Ω -cm)	20	1,273	5,025	2,608

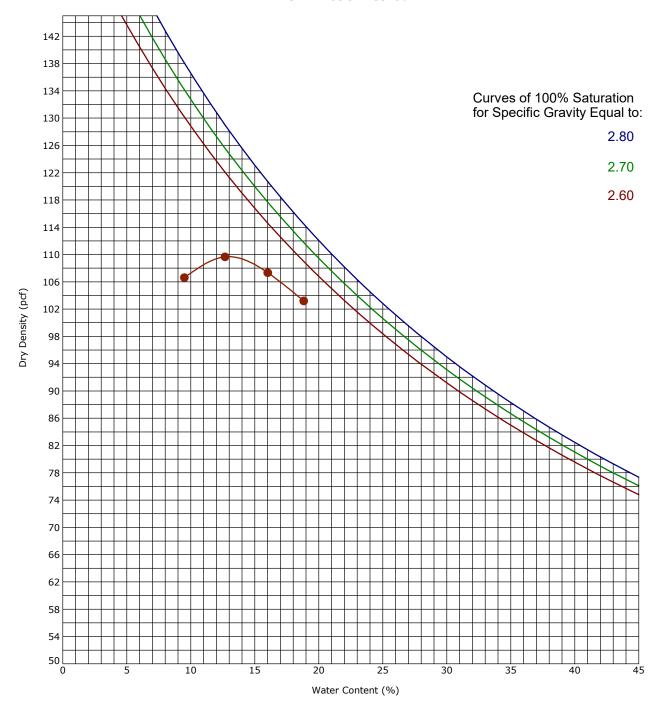
Results of soluble sulfate testing can be classified in accordance with ACI 318 – Building Code Requirements for Structural Concrete. Based on the soluble sulfates the soils can be designated as S1 be ACI 318. Therefore, a maximum water–cement ratio of 0.5 and type II concrete with a minimum of 4000 psi strength is recommended. Numerous sources are available to characterize corrosion potential to buried metals using the parameters above. Section 10.7.5 of the AASHTO LRFD Bridge Manual, 8th Edition, 2017, states the following soil or site conditions should be considered as indicative of potential deterioration or corrosion situation for steel piles:

- Soil electrical resistivity less than 2,000 ohm-cm
- Ph less than 5.5
- Ph between 5.5 and 8.5 with high organic content
- Sulfate concentration greater than 1,000 ppm (mg/kg)

These test results are provided to assist in determining the type and degree of corrosion protection that may be required. We recommend that a NACE certified corrosion professional be retained to analyze the need for corrosion protection and to design appropriate protective measures, if required.

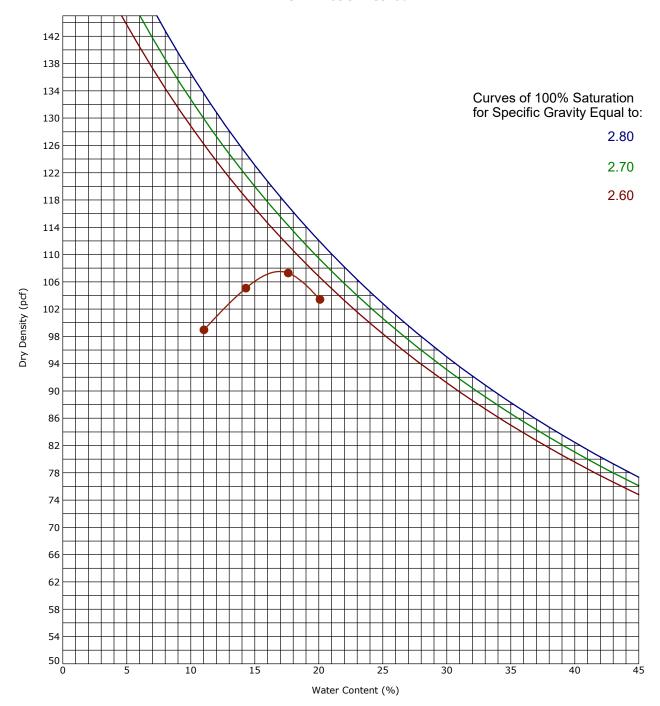
Imported fill materials may have significantly different properties than the site materials noted above and should be evaluated if expected to be in contact with metals used for construction.





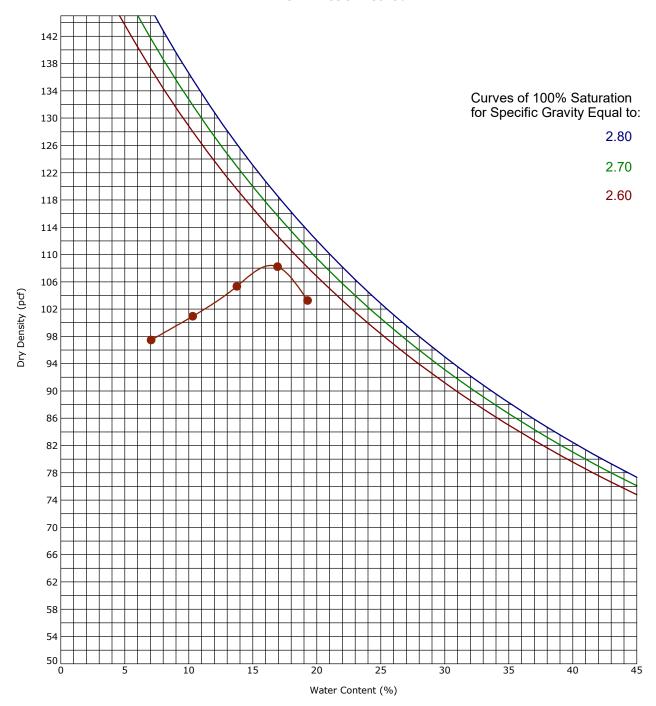
Во	oring ID	Depth ((Ft)		Description of Materials					
	SUB-1	1 - 4			Silt with Sand					
Fines (%)	Fraction > mm size	ш	PL	PI	Test Method Maximum Dry Density Optimum Water Content (%)					
	0.0				ASTM D698-Method A 109.7 13.0					





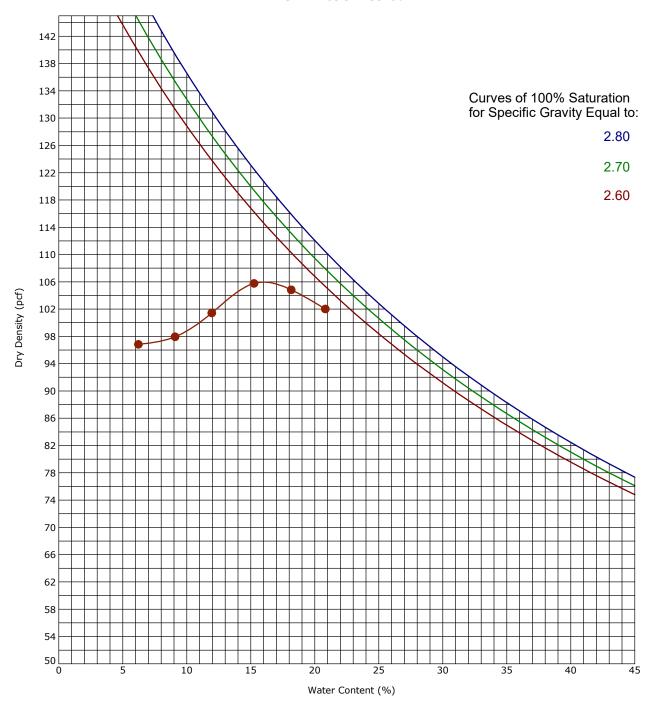
Во	ring ID	Depth ((Ft)		Description of Materials				
В	ESS-1	1 - 4			Silt with Sand				
Fines (%)	Fraction > mm size	LL	PL	PI	Test Method Maximum Dry Density Optimum Water Content (pcf) (%)				
	0.0				ASTM D698-Method A 107.5 16.9				





Во	oring ID	Depth ((Ft)	Description of Materials						
	B-02	1 - 4			Silt with Sand					
Fines (%)	Fraction > mm size	ш	PL	PI	Test Method Maximum Dry Density Optimum Water Content (pcf) (%)					
	0.0				ASTM D698-Method A 108.4 16.4					

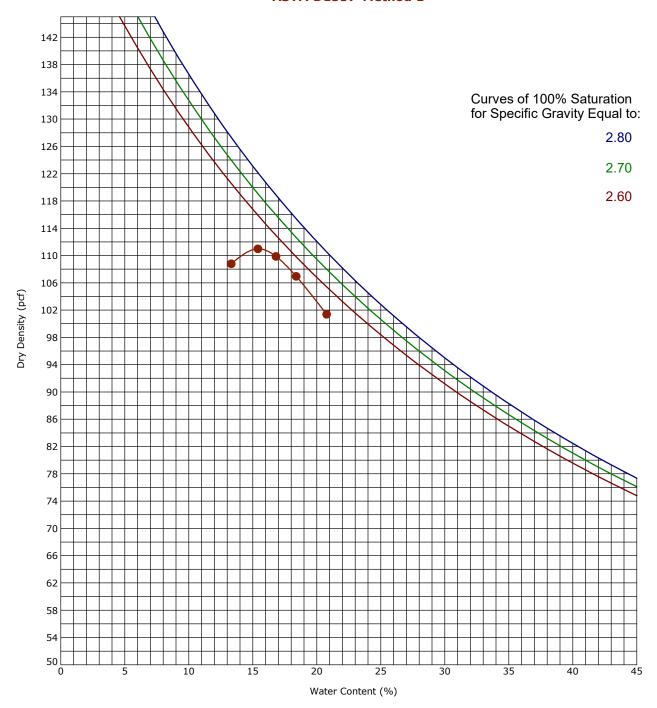




Во	oring ID	Depth ((Ft)	Description of Materials					
	B-09	1 - 4			Sandy Silt				
Fines (%)	Fraction > mm size	ш	PL	PI	I Test Method Maximum Dry Density Optimum Water Content (%)				
	0.0				ASTM D698-Method B 106.0 16.0				

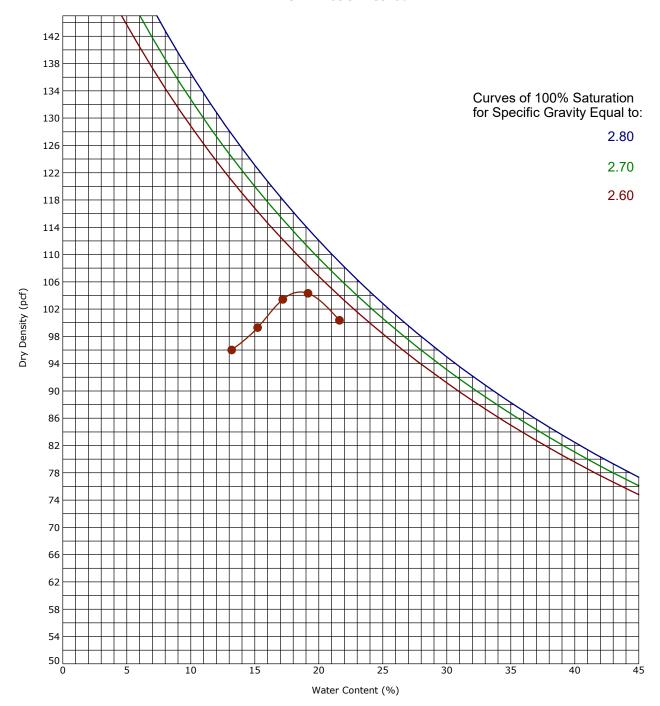


ASTM D1557-Method B



Во	oring ID	Depth ((Ft)	Description of Materials						
	B-10	1 - 4	ļ		Silt with Sand and trace gravel					
Fines (%)	Fraction > mm size	LL	PL	PI	PI Test Method Maximum Dry Density Optimum Water Content (pcf) (%)					
	0.0				ASTM D1557-Method B 111.0 15.4					

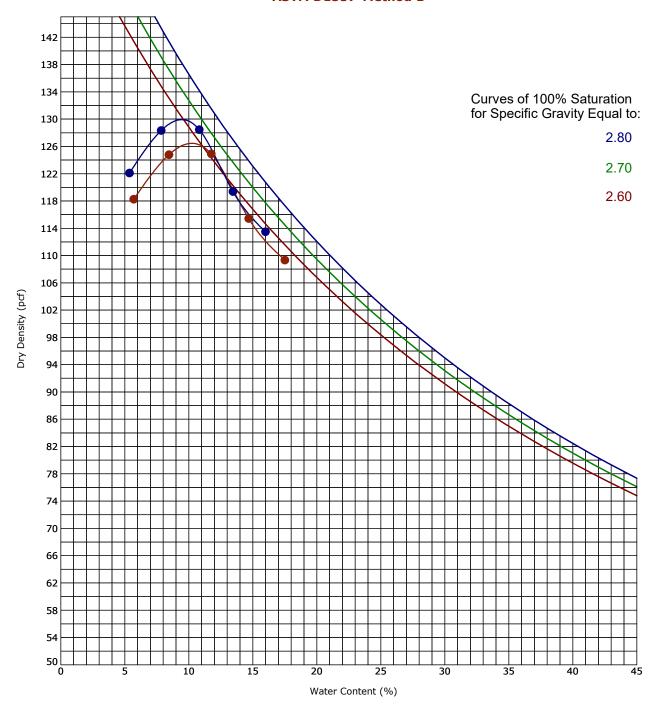




Во	oring ID	Depth ((Ft)	Description of Materials					
	B-11	1 - 4			Silt with Sand				
Fines (%)	Fraction > mm size	ш	PL	PI	Test Method Maximum Dry Density Optimum Water Content (pcf) (%)				
	0.0				ASTM D698-Method A 104.5 18.5				

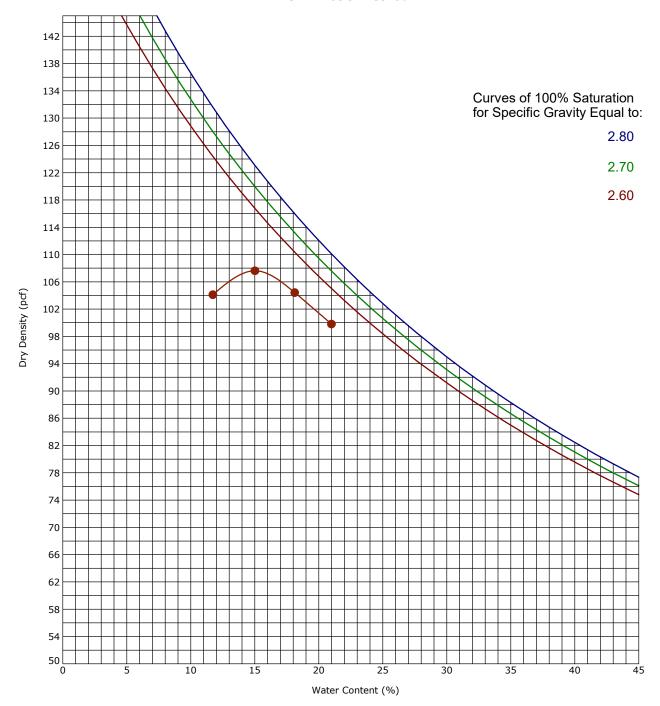


ASTM D1557-Method B



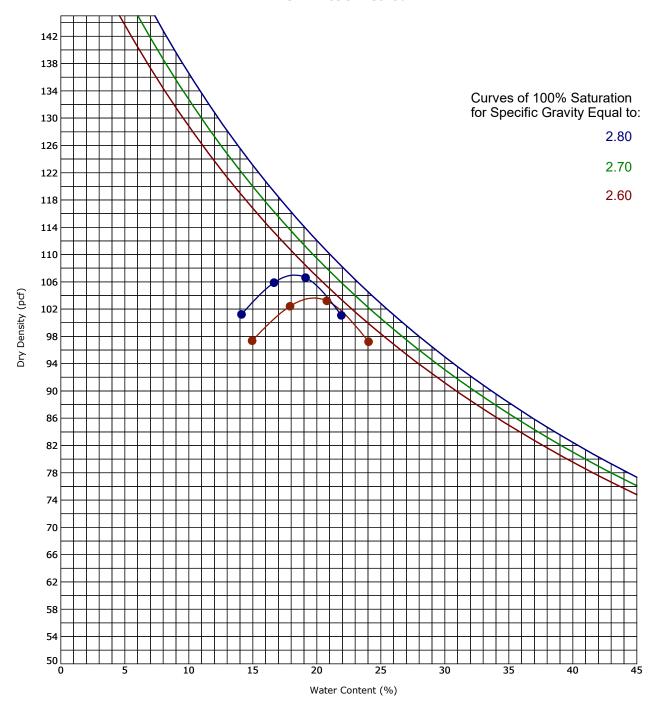
Во	oring ID	Depth ((Ft)		С	Description of Materials				
	B-15	1 - 4			Silt with Gravel					
							 Uncorrected Corrected 			
Fines (%)	Fraction >9.5 mm size	LL	PL	PI	Test Method	Max DD (pcf)	Optimum WC (%)	Max DD (pcf)	Optimum WC (%)	
	10.0				ASTM D1557-Method B	126.4	10.2	129.9	9.4	





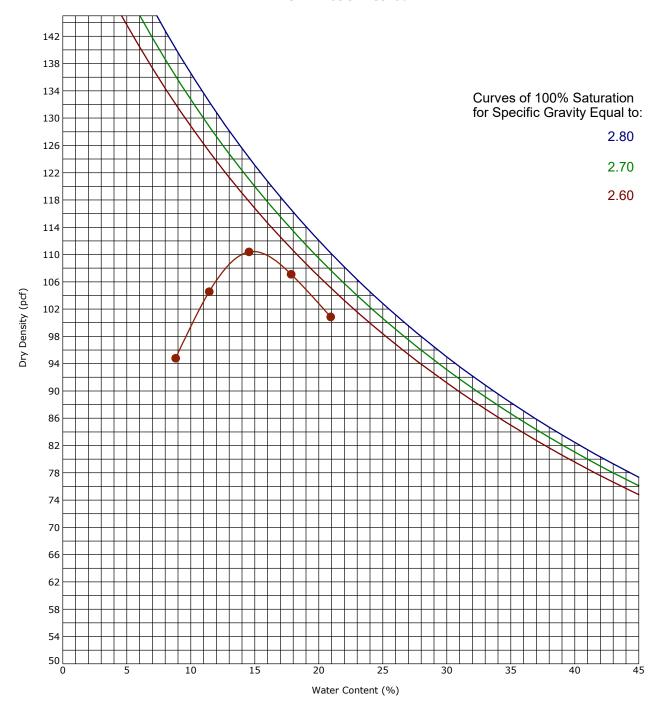
Во	oring ID	Depth ((Ft)	Description of Materials						
	B-17	1 - 4	1 - 4 Sandy Silt			Sandy Silt				
Fines (%)	Fraction > mm size	ш	PL	PI	PI Test Method Maximum Dry Density Optimum Water Content (%)					
	0.0				ASTM D698-Method A 107.6 15.0					





Во	oring ID	Depth ((Ft)		C	Description of Materials				
	B-19	1 - 4	ļ.		Silt with Gravel					
							Uncorrected			
Fines (%)	Fraction >9.5 mm size	ш	PL	PI	Test Method	Max DD (pcf)	Optimum WC (%)	Max DD (pcf)	Optimum WC (%)	
	14.2				ASTM D698-Method B	103.6	19.7	107.0	18.2	

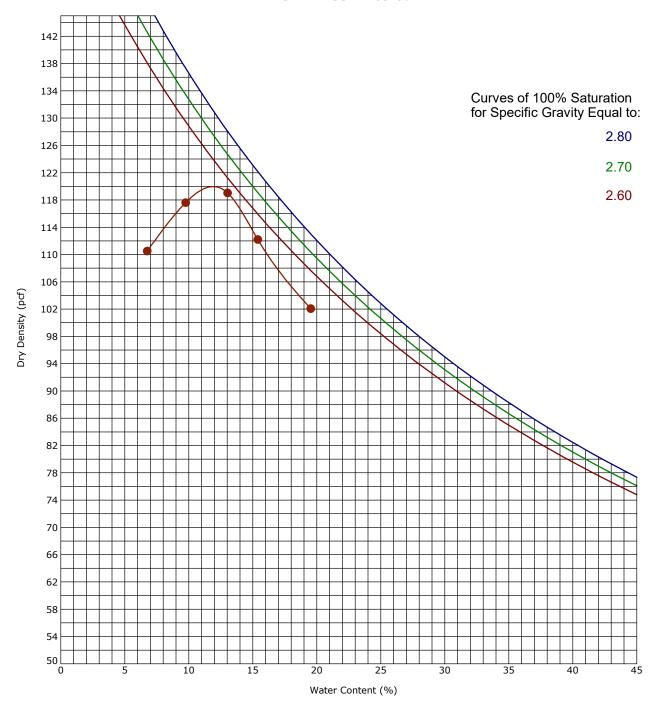




Во	oring ID	Depth ((Ft)		Description of Materials									
	B-22	1 - 4			1 - 4 Silty Clay with Sand				Silty Clay with Sand					
Fines (%)	Fraction > mm size	ш	PL	PI	PI Test Method Maximum Dry Density Optimum Water Content (%)									
	0.0				ASTM D698-Method A 110.4 14.9									

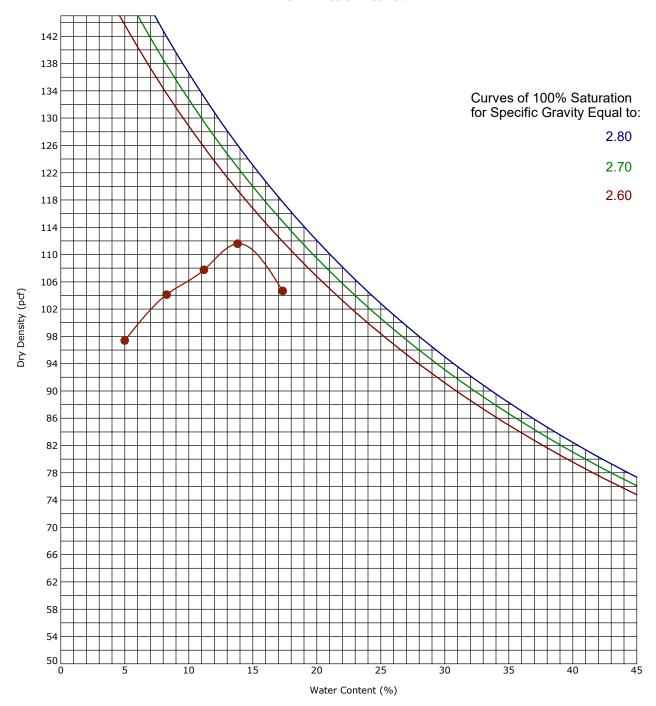


ASTM D1557-Method A



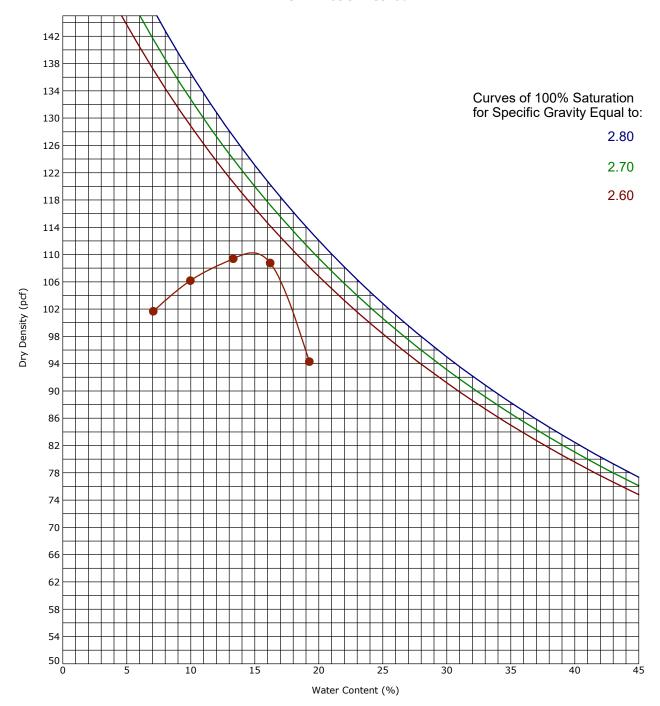
Во	oring ID	Depth ((Ft)		Description of Materials				
	B-26	1 - 4			Silt				
Fines (%)	Fraction > mm size	ш	PL	PI	Test Method Maximum Dry Density Optimum Water Content (pcf) (%)				
	0.0				ASTM D1557-Method A 120.0 11.8				





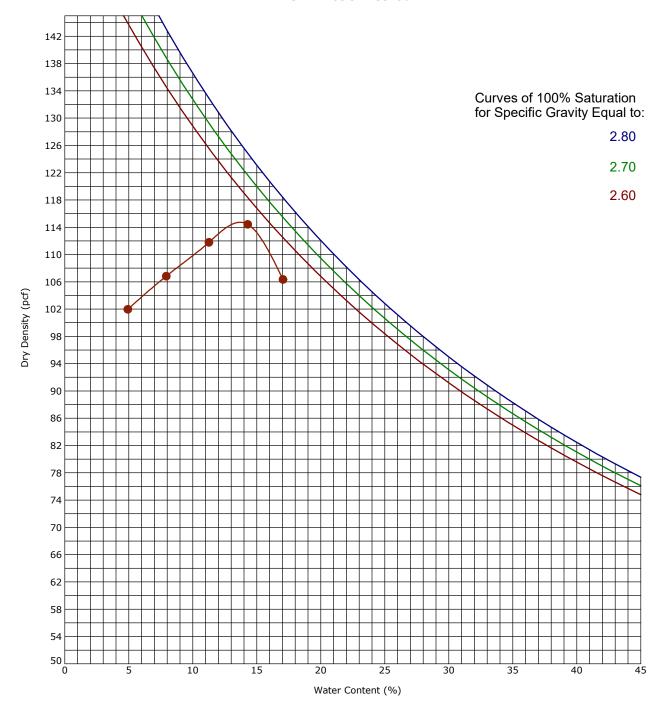
Во	oring ID	Depth ((Ft)	Description of Materials					
	B-27	1 - 3			Silt trace sand				
Fines (%)	Fraction > mm size	LL	PL	ΡI	Test Method Maximum Dry Density Optimum Water Content (pcf) (%)				
	0.0				ASTM D698-Method A 111.6 13.8				





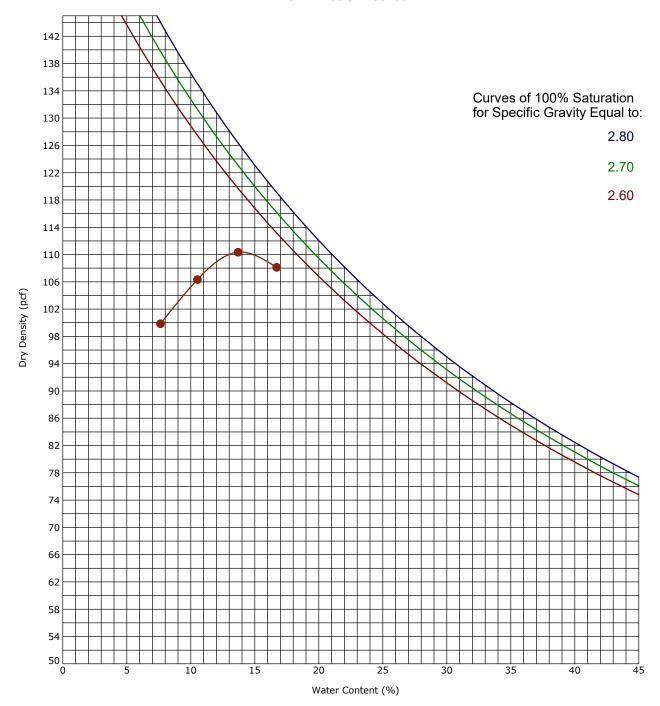
Boring ID		Depth ((Ft)		Description of Materials			
B-28		1 - 4			Silt trace Sand			
Fines (%)	Fraction > mm size	ш	PL	ΡI	Test Method	Maximum Dry Density (pcf)	Optimum Water Content (%)	
	0.0				ASTM D698-Method A	110.2	14.8	





Boring ID		Depth (Ft)		Description of Materials			
B-31		1 - 3		Sandy Silt			
Fines (%)	Fraction > mm size	ш	PL	PI	Test Method	Maximum Dry Density (pcf)	Optimum Water Content (%)
	0.0				ASTM D698-Method A	114.7	13.7



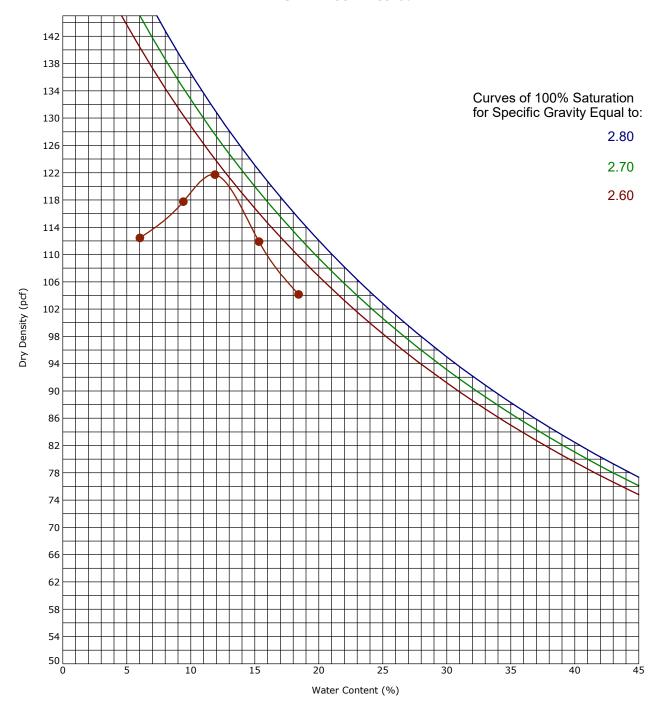


Boring ID		Depth ((Ft)		Description of Materials			
B-35		1 - 3			Silt with Sand			
Fines (%)	Fraction > mm size	ш	PL	PI	Test Method	Maximum Dry Density (pcf)	Optimum Water Content (%)	
	0.0				ASTM D698-Method A	110.4	13.9	



Moisture-Density Relationship

ASTM D1557-Method A



Во	oring ID	Depth ((Ft)	Description of Materials				
	B-36	1 - 3	1 - 3		Silt with Sand			
Fines (%)	Fraction > mm size	LL	PL	PI	Test Method	Maximum Dry Density (pcf)	Optimum Water Content (%)	
	0.0				ASTM D1557-Method A	121.7	11.8	

April 22, 2024

Terracon 700 NE 55th Ave Portland, OR 97213

Attn: Peyman Chaichi, PE

Re: Thermal Analysis of Native Soil Samples <u>Biglow Solar & BESS - Wasco, OR (Project No. 82245013)</u>

The following is the report of thermal dryout characterization tests conducted on fourteen (14) bulk soil samples from the referenced project sent to our laboratory.

<u>Thermal Resistivity Tests:</u> The samples were tested at the 'optimum' moisture content and at 85% and 95% of the standard Proctor dry density *provided by Terracon*. In addition, each sample was tested at the specified moisture content and density. The tests were conducted in accordance with the **IEEE standard 442-2017**. The results are tabulated below and the thermal dry out curves are presented in **Figures 1 to 7**.

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

Sample ID	Depth (ft)	Effort	Description			Moisture Content	Dry Density
	17 (7)	(%)	(Terracon)	Wet	Dry	(%)	(lb/ft³)
B-02	1 – 4	85	Silt w/ Sand	89	347	16	92
B-02	1 - 4	95	Silt w/ Sand	80	264	16	103
B-02	2 – 3.5	Specified	Silt w/ Sand	86	270	14	102
B-09	1 – 4	85	Sandy Silt	94	275	16	90
B-09	1 - 4	95	Sandy Silt	85	208	16	101
B-09	2 – 3.5	Specified	Sandy Silt	81	181	17	103
B-11	1 – 4	85	Silt w/ Sand	94	384	19	89
B-11	1 - 4	95	Silt w/ Sand	85	292	19	99
B-11	2 – 3.5	Specified	Silt w/ Sand	101	248	6	112
B-17	1 – 4	85	Silt w/ Sand	88	342	15	92
B-17	1 - 4	95	Silt w/ Sand	79	259	15	102
B-17	2 – 3.5	Specified	Silt w/ Sand	74	254	17	102

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



Sample ID	Depth (ft)	Effort	Description	Thermal Resistivity (°C-cm/W)		Moisture Content	Dry Density
	-	(%)	(Terracon)	Wet	Dry	(%)	(lb/ft³)
B-19	1 – 4	85	Sandy Silt	97	290	20	88
B-19	1 - 4	95	Sandy Silt	88	220	20	98
B-19	2 – 3.5	Specified	Sandy Silt	90	261	23	94
BESS-1	1 – 4	85	Silt w/ Sand	90	349	17	91
BESS-1	1 - 4	95	Silt w/ Sand	86	270	17	102
BESS-1	2 – 3.5	Specified	Silt w/ Sand	77	235	16	108
SUB-1	1 – 4	85	Silt	85	345	13	93
SUB-1	1 - 4	95	Silt	77	261	13	104
SUB-1	2 – 3.5	Specified	Silt	83	322	13	96

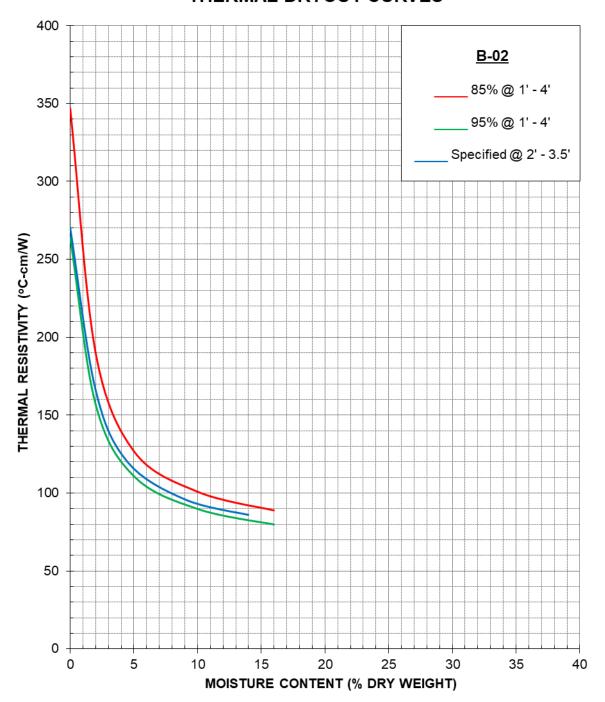
<u>Comments:</u> The thermal characteristic depicted in the dryout curves apply for the soils at their respective test dry density.

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

Geotherm USA, LLC

Nimesh Patel



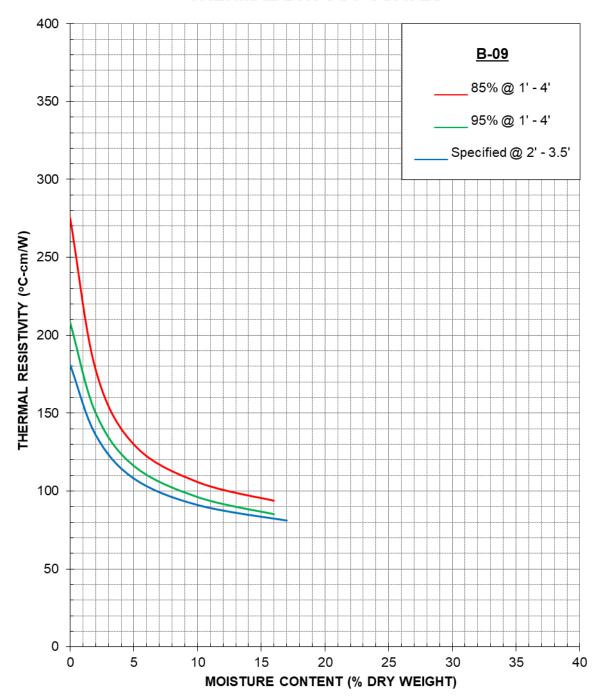


Terracon (Project No. 82245013)

Biglow Solar & BESS - Wasco, OR

Thermal Analysis of Native Soil Samples



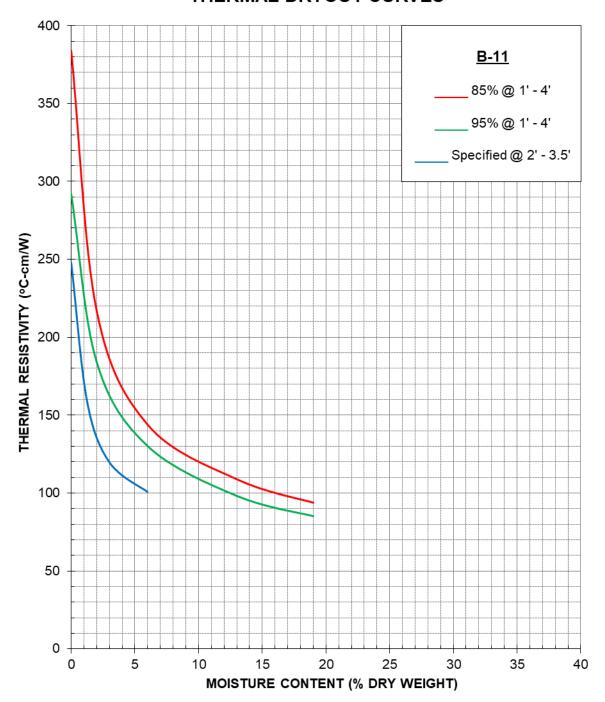


Terracon (Project No. 82245013)

Biglow Solar & BESS - Wasco, OR

Thermal Analysis of Native Soil Samples



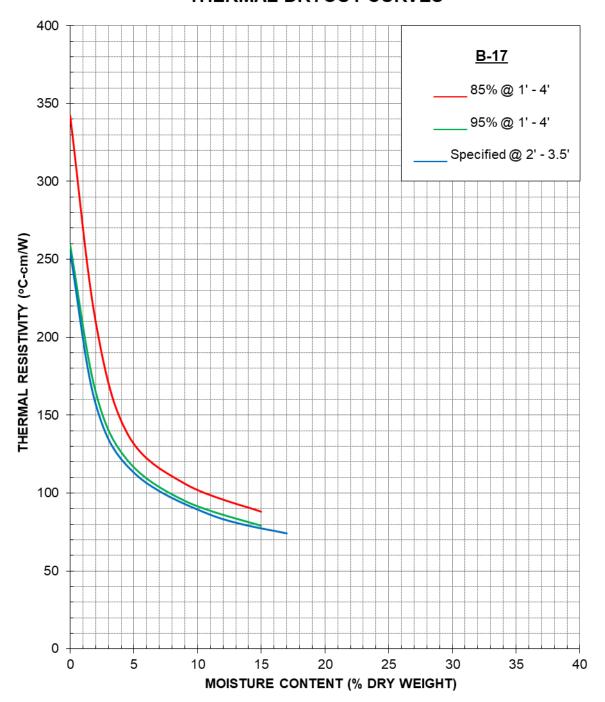


Terracon (Project No. 82245013)

Biglow Solar & BESS - Wasco, OR

Thermal Analysis of Native Soil Samples



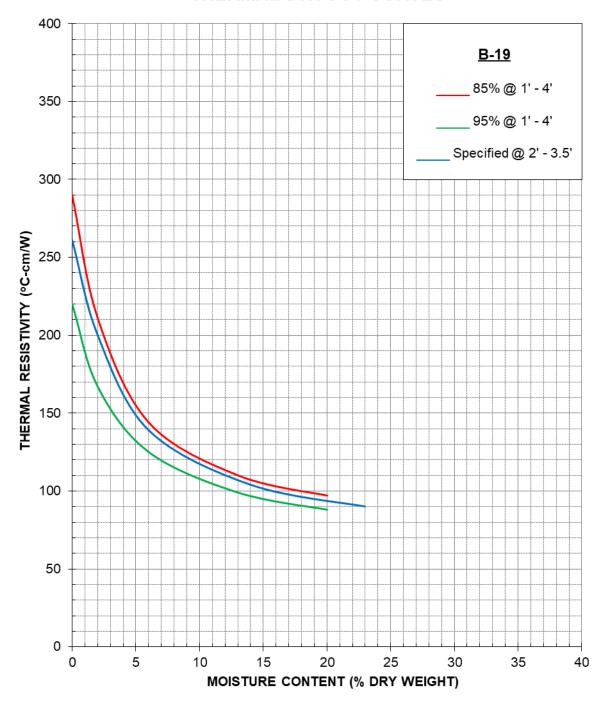


Terracon (Project No. 82245013)

Biglow Solar & BESS - Wasco, OR

Thermal Analysis of Native Soil Samples



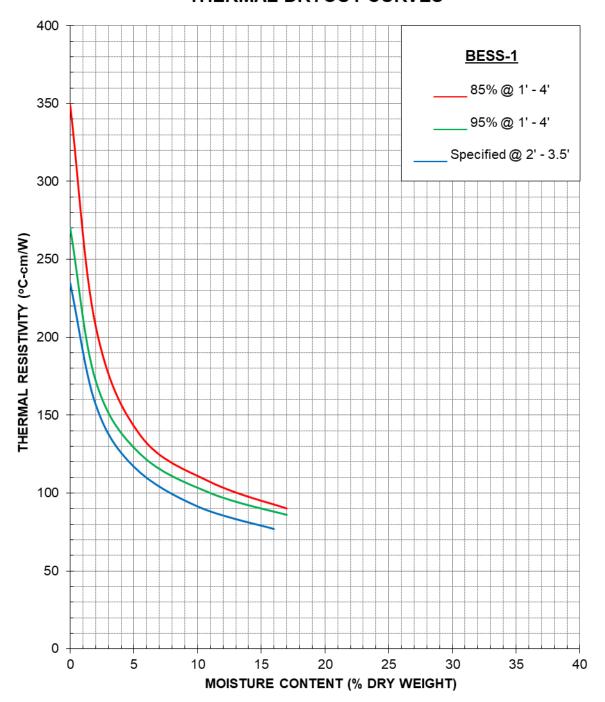


Terracon (Project No. 82245013)

Biglow Solar & BESS - Wasco, OR

Thermal Analysis of Native Soil Samples



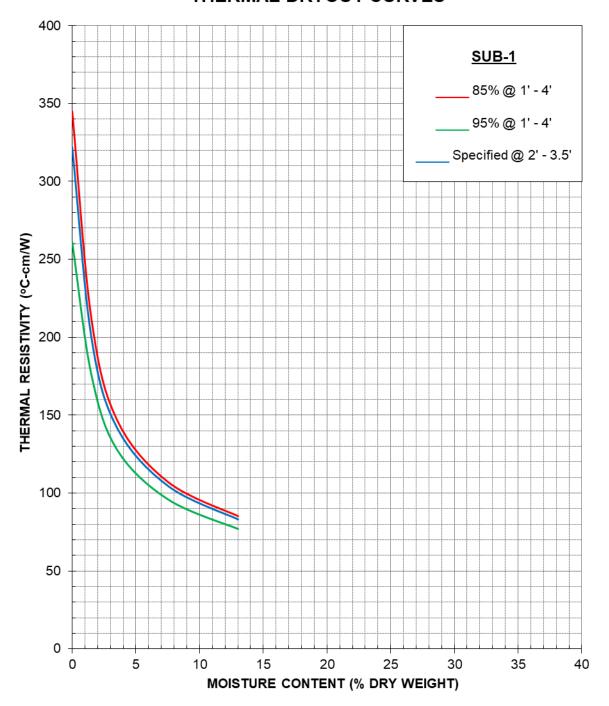


Terracon (Project No. 82245013)

Biglow Solar & BESS - Wasco, OR

Thermal Analysis of Native Soil Samples





Terracon (Project No. 82245013)

Biglow Solar & BESS - Wasco, OR

Thermal Analysis of Native Soil Samples

21239 FM529 Rd., Bldg F Cypress, TX 77433 Office: 291-985-9344

info@geothermusa.com http://www.geothermusa.com

May 20, 2024

Terracon 700 NE 55th Ave Portland, OR 97213 Attn: Peyman Chaichi

Re: Thermal Analysis of Native Soil Samples Biglow Solar & BESS – Wasco, OR (Project No. 82245013)

The following is the report of thermal dryout characterization tests conducted on the five (5) bulk samples and five (5) undisturbed tube samples from the referenced project sent to our laboratory.

<u>Thermal Resistivity Tests:</u> The undisturbed tube samples were tested 'as is'. The bulk samples were tested at the 'optimum' moisture content and at 85% and 95% of the standard Proctor dry density *provided by Terracon*. The tests were conducted in accordance with the **IEEE standard 442-2017**. The results are tabulated below and the thermal dryout curves are presented in **Figures 1 to 5**.

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

Sample ID	Depth Effort	Description	Thermal Resistivity (°C-cm/W)		Moisture Content	Dry Density	
Sample 1D	(ft) (%) (Terracon) Wet		Dry	(%)	(lb/ft ³)		
B-22	1 - 4	85	Silt with Sand	85	310	15	94
B-22	1 - 4	95	Silt with Sand	77	231	15	105
B-22	2 - 3	Tube	Silt with Sand	83	301	15	95
B-27	1 - 4	85	Silt	84	324	14	95
B-27	1 - 4	95	Silt	76	245	14	106
B-27	2 - 3	Tube	Silt	82	314	13	96
B-28	1 - 4	85	Silt	84	344	15	94
B-28	1 - 4	95	Silt	76	260	15	105
B-28	2 - 3	Tube	Silt	79	282	15	99

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



Sample ID	Depth Effort	Description	Thermal Resistivity (°C-cm/W)		Moisture Content	Dry Density	
Sample 1D	(ft)	(%)	(Terracon)	Wet	Dry	(%)	(lb/ft ³)
B-31	1 - 4	85	Sandy Silt	86	239	14	98
B-31	1 - 4	95	Sandy Silt	75	181	14	109
B-31	2 - 3	Tube	Sandy Silt	80	232	20	98
B-35	1 - 4	85	Silt with Sand	86	306	14	94
B-35	1 - 4	95	Silt with Sand	78	232	14	105
B-35	2 - 3	Tube	Silt with Sand	84	303	13	94

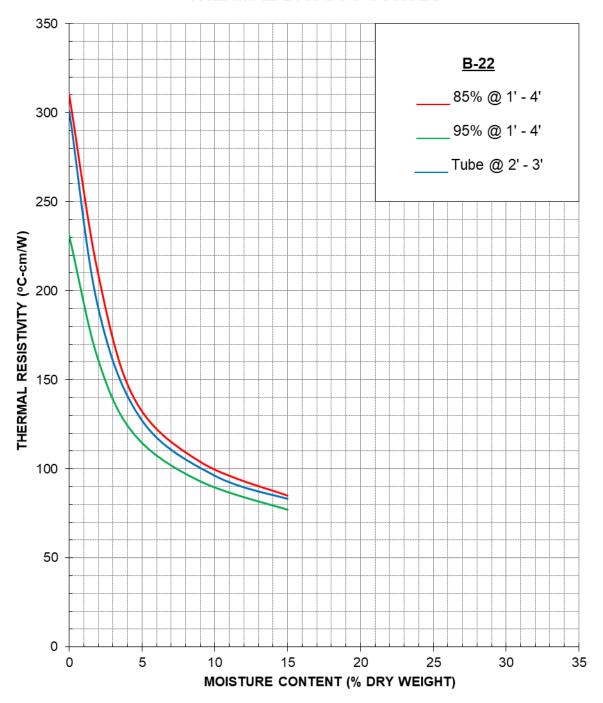
<u>Comments:</u> The thermal characteristic depicted in the dryout curves apply for the soils at their respective test dry density.

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

Geotherm USA

Nimesh Patel



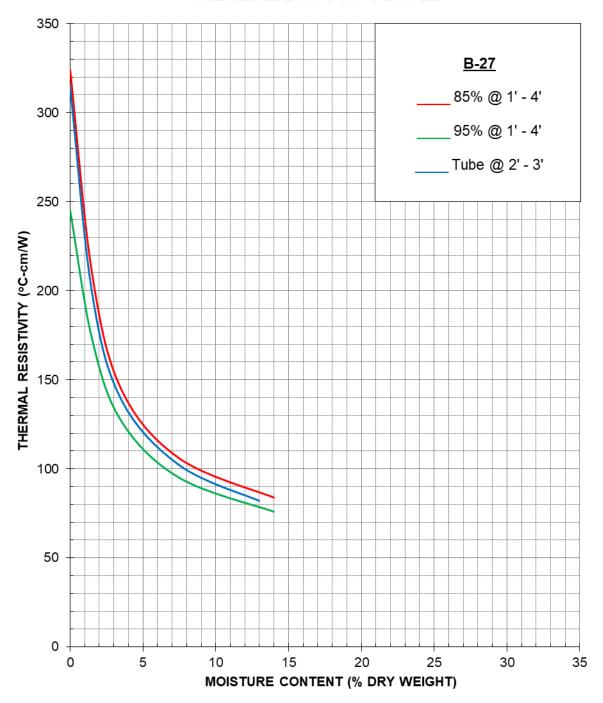


Terracon (Project No. 82245013)

Biglow Solar & BESS - Wasco, OR

Thermal Analysis of Native Soil Samples



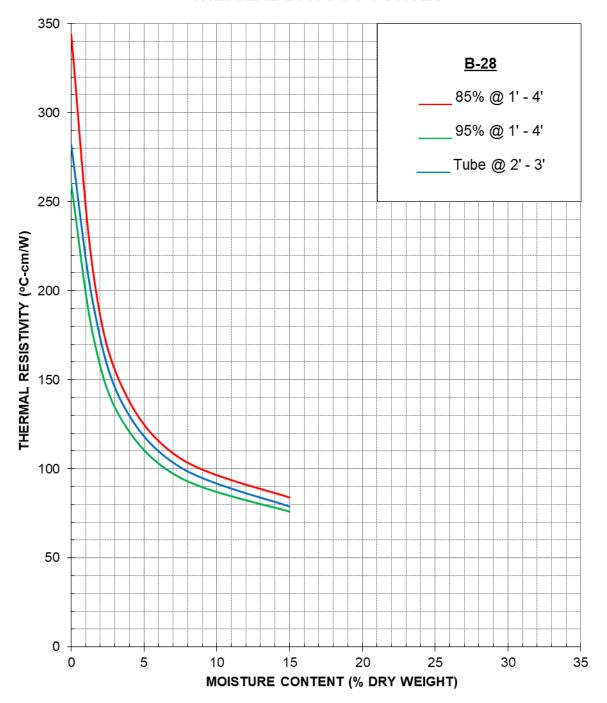


Terracon (Project No. 82245013)

Biglow Solar & BESS - Wasco, OR

Thermal Analysis of Native Soil Samples



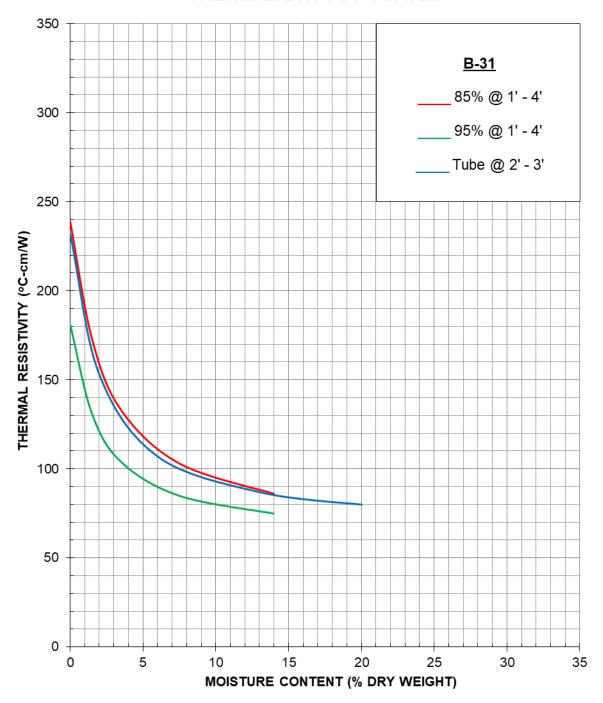


Terracon (Project No. 82245013)

Biglow Solar & BESS - Wasco, OR

Thermal Analysis of Native Soil Samples



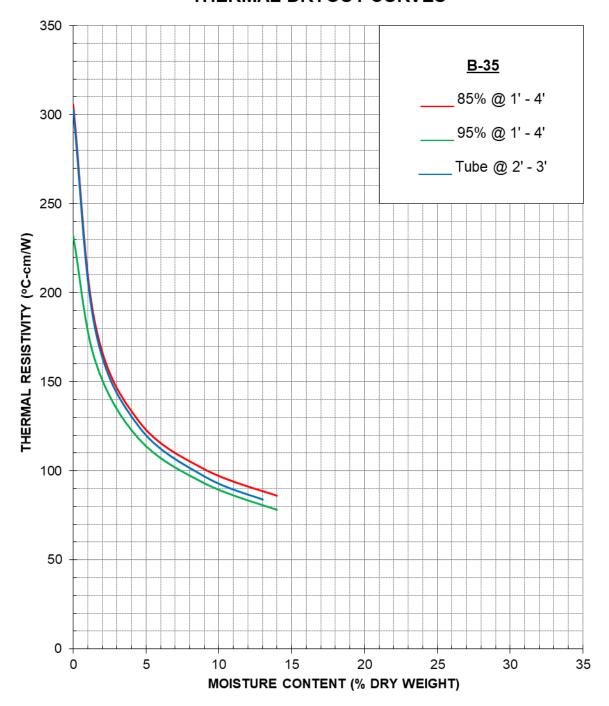


Terracon (Project No. 82245013)

Biglow Solar & BESS - Wasco, OR

Thermal Analysis of Native Soil Samples





Terracon (Project No. 82245013)

Biglow Solar & BESS - Wasco, OR

Thermal Analysis of Native Soil Samples



Client

BrightNight LLC

ProjectBiglow Solar & BESS

Sample Submitted By: Terracon (82) Date Received: 3/22/2024 Lab No.: 24-0121

Results of Corrosion Analysis						
Sample Number						
Sample Location	B-10	B-12	B-14	B-16		
Sample Depth (ft.)	1.0-5.0	2.0	2.0	2.0		
pH Analysis, ASTM G51	7.84	8.04	8.24	8.11		
Water Soluble Sulfate (SO4), ASTM C 1580 (Percent %)	0.01	0.01	0.01	0.01		
Sulfides, AWWA 4500-S D, (mg/Kg)	Nil	Nil	Nil	Nil		
Chlorides, ASTM D512, (Percent %)	0.01	0.02	0.01	0.01		
Red-Ox, ASTM G200, (mV)	+722	+725	+733	+723		
Total Salts, AWWA 2520 B, (mg/Kg)	1105	756	259	882		
Saturated Minimum Resistivity, ASTM G-187, (ohm-cm)	1541	1809	2613	2010		

Analyzed By

Nathan Campo Laboratory Coordinator

M. Cargo



Client

BrightNight LLC

ProjectBiglow Solar & BESS

Sample Submitted By: Terracon (82) Date Received: 3/22/2024 Lab No.: 24-0121

Results of Corrosion Analysis S-1 Sample Number B-17 B-20 **Sample Location** 0.0 - 4.02.0 Sample Depth (ft.) 7.87 8.20 pH Analysis, ASTM G51 Water Soluble Sulfate (SO4), ASTM C 1580 0.01 0.01 (Percent %) Sulfides, AWWA 4500-S D, (mg/Kg) Nil Nil 0.01 0.01 Chlorides, ASTM D512, (Percent %) Red-Ox, ASTM G200, (mV) +728 +723 Total Salts, AWWA 2520 B, (mg/Kg) 687 921 Saturated Minimum Resistivity, ASTM G-187, 1943 1809 (ohm-cm)

Analyzed By

Nathan Campo Laboratory Coordinator

M. Cary



Client

BrightNight LLC

ProjectBiglow Solar & BESS

Sample Submitted By: Terracon (82) Date Received: 3/22/2024 Lab No.: 24-0121

Results of Corrosion Analysis						
Sample Number						
Sample Location	B-2	B-3	B-6	B-9		
Sample Depth (ft.)	0.0-4.0	2.0	2.0	1.0-4.0		
pH Analysis, ASTM G51	8.01	9.30	8.08	7.97		
Water Soluble Sulfate (SO4), ASTM C 1580 (Percent %)	0.01	0.01	0.01	0.01		
Sulfides, AWWA 4500-S D, (mg/Kg)	Nil	Nil	Nil	Nil		
Chlorides, ASTM D512, (Percent %)	0.01	0.01	0.01	0.02		
Red-Ox, ASTM G200, (mV)	+723	+715	+728	+722		
Total Salts, AWWA 2520 B, (mg/Kg)	885	1993	554	1069		
Saturated Minimum Resistivity, ASTM G-187, (ohm-cm)	2211	1273	1675	2211		

Analyzed By

Nathan Campo Laboratory Coordinator

M. Cargo



Client

BrightNight LLC

ProjectBiglow Solar & BESS

Sample Submitted By: Terracon (82) Date Received: 4/29/2024 Lab No.: 24-0173

Results of Corrosion Analysis

Sample Number		
Sample Location	B-38	B-39
Sample Depth (ft.)	1.0-4.0	1.0-4.0
pH Analysis, ASTM G51	6.49	6.99
Water Soluble Sulfate (SO4), ASTM C 1580 (Percent %)	0.01	0.01
Sulfides, AWWA 4500-S D, (mg/Kg)	Nil	Nil
Chlorides, ASTM D512, (Percent %)	0.01	0.01
Red-Ox, ASTM G200, (mV)	+728	+731
Total Salts, AWWA 2520 B, (mg/Kg)	415	380
Saturated Minimum Resistivity, ASTM G-187, (ohm-cm)	3417	4690

Analyzed By

Nathan Campo Laboratory Coordinator

M. Cargo



Client

BrightNight LLC

ProjectBiglow Solar & BESS

Sample Submitted By: Terracon (82) Date Received: 4/29/2024 Lab No.: 24-0173

Results of Corrosion Analysis							
Sample Number							
Sample Location	B-23	B-25	B-28	B-29			
Sample Depth (ft.)	1.0-4.0	1.0-4.0	1.0-4.0	1.0-4.0			
pH Analysis, ASTM G51	8.45	6.85	7.30	8.13			
Water Soluble Sulfate (SO4), ASTM C 1580 (Percent %)	0.01	0.01	0.01	<0.01			
Sulfides, AWWA 4500-S D, (mg/Kg)	Nil	Nil	Nil	Nil			
Chlorides, ASTM D512, (Percent %)	0.02	0.01	0.01	0.01			
Red-Ox, ASTM G200, (mV)	+724	+733	+734	+723			
Total Salts, AWWA 2520 B, (mg/Kg)	815	262	203	881			
Saturated Minimum Resistivity, ASTM G-187, (ohm-cm)	3082	4087	5025	2747			

Analyzed By

Nathan Campo Laboratory Coordinator

M. Carp



Client

BrightNight LLC

ProjectBiglow Solar & BESS

Sample Submitted By: Terracon (82) Date Received: 4/29/2024 Lab No.: 24-0173

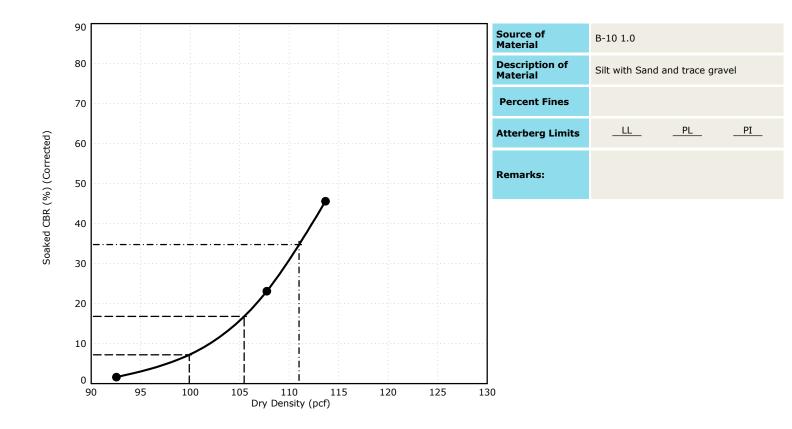
Results of Corrosion Analysis							
Sample Number							
Sample Location	B-32	B-33	B-34	B-37			
Sample Depth (ft.)	1.0-4.0	1.0-4.0	1.0-4.0	1.0-4.0			
pH Analysis, ASTM G51	8.67	8.30	7.66	7.84			
Water Soluble Sulfate (SO4), ASTM C 1580 (Percent %)	<0.01	<0.01	<0.01	<0.01			
Sulfides, AWWA 4500-S D, (mg/Kg)	Nil	Nil	Nil	Nil			
Chlorides, ASTM D512, (Percent %)	0.02	0.02	0.02	0.02			
Red-Ox, ASTM G200, (mV)	+728	+724	+721	+721			
Total Salts, AWWA 2520 B, (mg/Kg)	680	792	1038	1142			
Saturated Minimum Resistivity, ASTM G-187, (ohm-cm)	3350	2512	2278	1876			

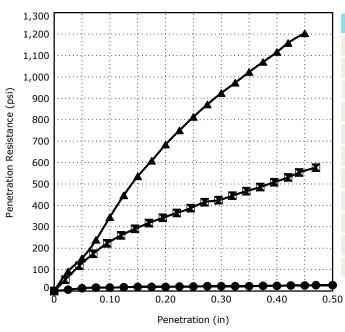
Analyzed By

Nathan Campo Laboratory Coordinator

M. Cargo





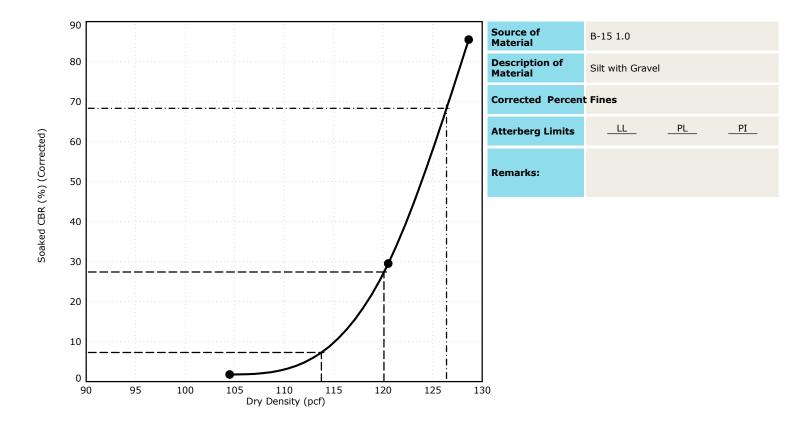


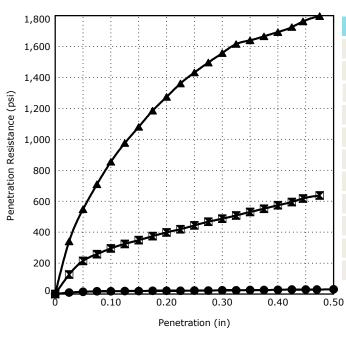
Sample No.	1	2	3
Sample Condition	Soaked		
Compaction Method	A	ASTM 15576	3
Maximum Dry Density (pcf)	111	111	111
Optimum Moisture Content (%)	15.4	15.4	15.4
Dry Density before Soaking, (pcf)	92.54	107.74	113.67
Moisture Content, (%)			
After Compaction	15.9	15.8	16
Top 1" After Soaking	25.1	20.4	17.7
Surcharge, (lbs)	10.00	10.00	10.00
Swell, (%)	0.20	-0.04	0.16
Bearing Ratio, (%)	1.3	23.1	45.6

Dry Density @ 90%	99.9	_ pcf
Dry Density @ 95%	105.5	_ pcf
Dry Density @ 100%	111.0	_ pcf

CBR @ 90% Density	7.2
CBR @ 95% Density	16.8
CBR @ 100% Density	34.8





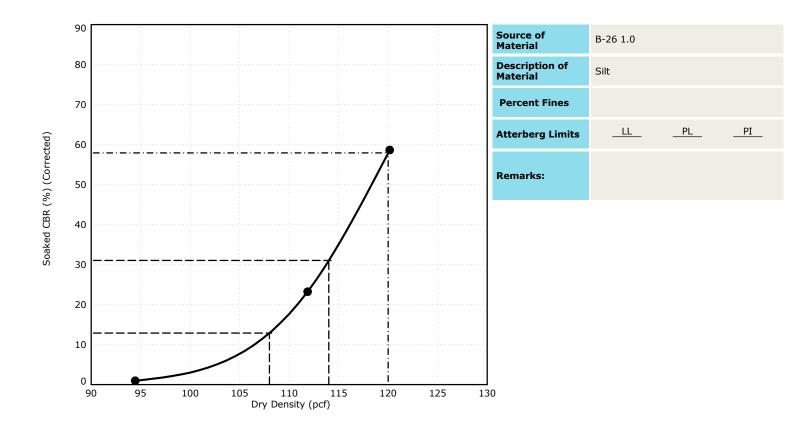


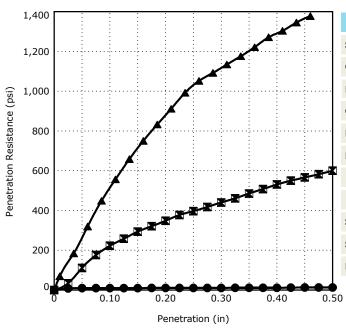
Sample No.	1	2	3			
Sample Condition		Soaked				
Compaction Method ASTM 1557B						
Corrected Maximum Dry Density (pcf)	129.9	129.9	129.9			
Corrected Optimum Moisture Content (%	9.4	9.4	9.4			
Dry Density before Soaking, (pcf)	104.50	120.51	128.63			
Moisture Content, (%)						
After Compaction	9.8	10.1	9.9			
Top 1" After Soaking	19.7	14.8	12.2			
Surcharge, (lbs)	10.00	10.00	10.00			
Swell, (%)	0.20	0.38	-0.51			
Bearing Ratio, (%)	1.8	29.5	85.5			

Dry Density @ 90%	113.8	pcf
Dry Density @ 95%	120.1	_ pcf
Dry Density @ 100%	126.4	_ pcf

CBR @ 90% Density	7.3
CBR @ 95% Density	27.4
CBR @ 100% Density	68.3





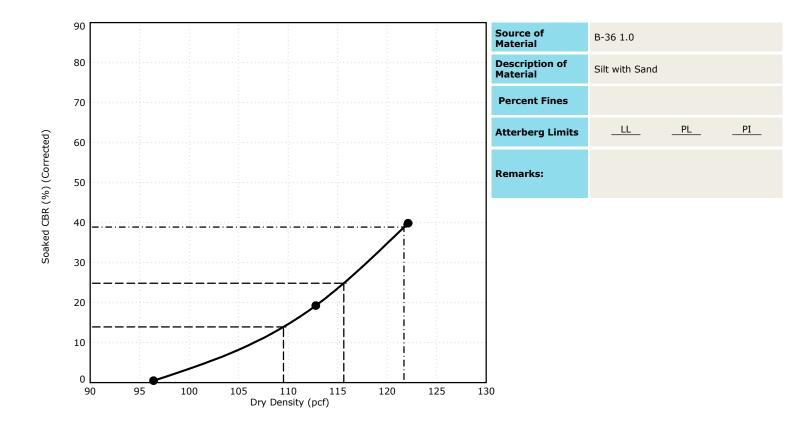


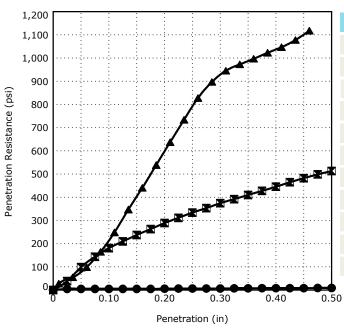
Sample No.	1	2	3	
Sample Condition		Soaked		
Compaction Method	ASTM D1557A			
Maximum Dry Density (pcf)	120	120	120	
Optimum Moisture Content (%)	11.8	11.8	11.8	
Dry Density before Soaking, (pcf)	94.45	111.86	120.15	
Moisture Content, (%)				
After Compaction	12.6	12.6	11.7	
Top 1" After Soaking	20.6	16.4	14	
Surcharge, (lbs)	10.00	10.00	10.00	
Swell, (%)	0.07	0.51	0.29	
Bearing Ratio, (%)	0.7	23.2	58.6	

Dry Density @ 90% _	108.0	_ pcf
Dry Density @ 95% _	114.0	_ pcf
Dry Density @ 100%	120 0	pcf

CBR @ 90% Density _	12.9
CBR @ 95% Density _	31.0
CBR @ 100% Density	57.9







Sample No.	1	2	3	
Sample Condition		Soaked		
Compaction Method	ASTM D1557A			
Maximum Dry Density (pcf)	121.7	121.7	121.7	
Optimum Moisture Content (%)	11.8	11.8	11.8	
Dry Density before Soaking, (pcf)	96.40	112.79	122.11	
Moisture Content, (%)				
After Compaction	11.1	12.1	12.1	
Top 1" After Soaking	18.7	13.6	12.1	
Surcharge, (lbs)	10.00	10.00	10.00	
Swell, (%)	0.11	0.40	0.53	
Bearing Ratio, (%)	0.4	19.2	39.9	

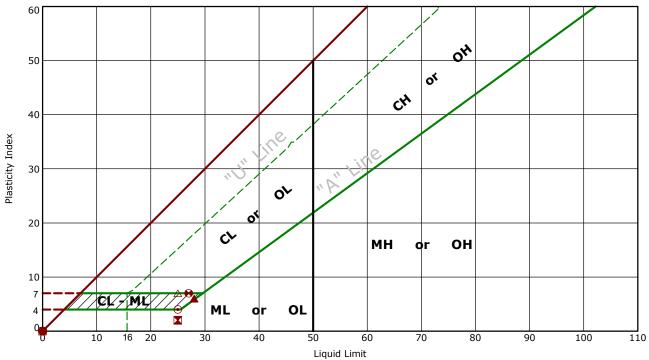
Dry Density @ 90%	109.5	_ pcf
Dry Density @ 95%	115.6	_ pcf
Dry Density @ 100%	121.7	_ pcf

CBR @ 90% Density	13.9
CBR @ 95% Density	24.9
CBR @ 100% Density	38.9



Atterberg Limit Results

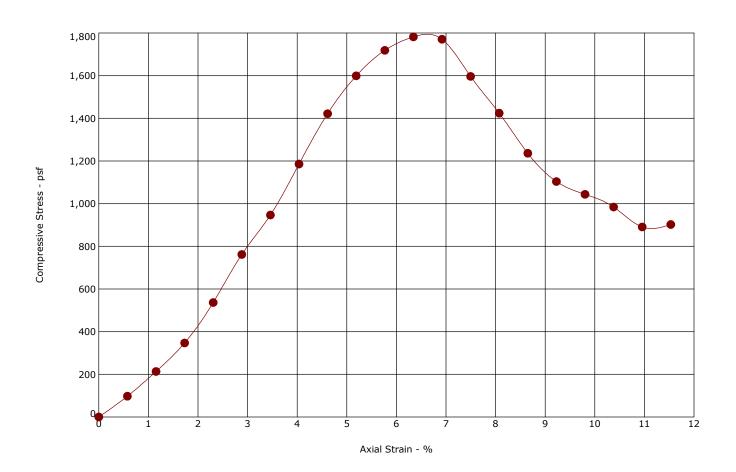
ASTM D4318



	Boring ID	Depth (Ft)	LL	PL	PI	Fines	USCS	Description
•	SUB-1	4 - 5.5	NP	NP	NP		ML	Silt with Sand
×	BESS-2	2 - 2.7	25	23	2		ML	Sandy Silt
•	GEN-3	2 - 3.5	28	22	6	62.7	CL-ML	Sandy Silty Clay
*	GEN-5	20 - 21.5	NP	NP	NP		SM	Silty Sand
•	B-01	2 - 3.5	25	21	4	76.6	CL-ML	Silt Clay with Sand
٠	B-05	3 - 3.5	NP	NP	NP	57.4	ML	Sandy Silt
0	B-17	6 - 7.5	NP	NP	NP	63.3	GM	Silty Gravel with Sand
Δ	B-22	4.5 - 5.2	25	18	7		CL-ML	Silty Clay with Sand
8	B-31	3 - 4.5	NP	NP	NP		ML	Sandy Silt
Ф	B-32	2 - 3.5	NP	NP	NP	70.9	ML	Silt with Sand
	B-32	6 - 7.5	NP	NP	NP	74.7	ML	Silt with Sand
0	B-32	10 - 11.5	27	20	7	59.5	CL-ML	Sandy Silty Clay
•	B-38	4 - 5.5	NP	NP	NP	76.9	ML	Silt with Sand
*	B-39	4 - 5.5	NP	NP	NP	81.9	ML	Silt with Sand



Unconfined Compression Test



Boring ID	Depth (Ft)	Sample type	LL	PL	PI	Fines (%)	Description
BESS-1	2 - 3.5	Shelby Tube					Silt with Sand

J	eptii (i t)	Sample type		1 11165 (70)	Description
BESS-1	2 - 3.5	Shelby Tube			Silt with Sand



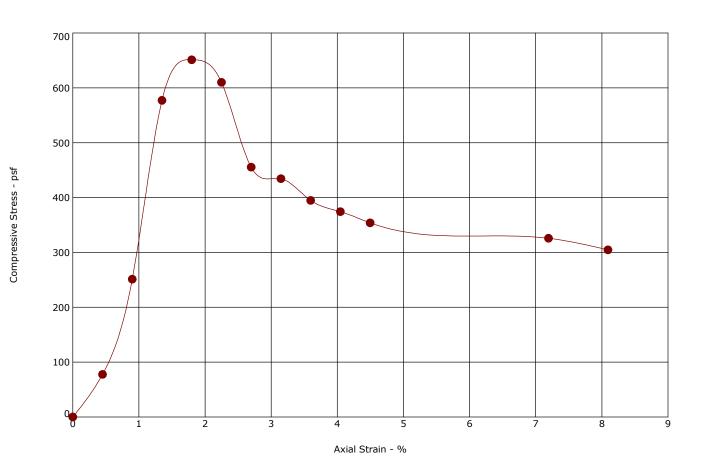
Specimen Failure Mode

Specimen	Test Data
Moisture Content (%):	15.6
Dry Density (pcf):	108
Diameter (in.):	2.84
Height (in.):	3.47
Height / Diameter Ratio:	1.22
Calculated Saturation (%):	74.46
Calculated Void Ratio:	0.57
Assumed Specific Gravity:	2.7
Failure Strain (%):	6.34
Unconfined Compressive Strength (psf):	1782
Undrained Shear Strength (psf):	891
Strain Rate (in/min):	

Remarks: The height to Diamtere ratio did not comply with ASTM D2166



Unconfined Compression Test



Boring ID	Depth (Ft)	Sample type	LL	PL	ΡI	Fines (%)	Description
GEN-2	2 - 3.5	Shelby Tube					Silt with Sand

Boring 1D	Depth (Ft)	Sample type	LL	PL	PI	Fines (%)	Description
GEN-2	2 - 3.5	Shelby Tube					Silt with Sand



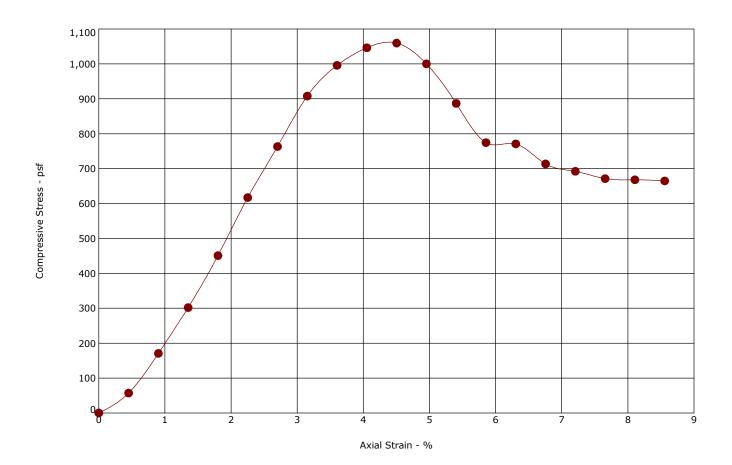
Specimen Failure Mode

Specimen	Test Data
Moisture Content (%):	19.1
Dry Density (pcf):	89
Diameter (in.):	2.85
Height (in.):	4.45
Height / Diameter Ratio:	1.56
Calculated Saturation (%):	57.72
Calculated Void Ratio:	0.89
Assumed Specific Gravity:	2.7
Failure Strain (%):	1.80
Unconfined Compressive Strength (psf):	651
Undrained Shear Strength (psf):	326
Strain Rate (in/min):	

Remarks: The height to Diamtere ratio did not comply with ASTM D2166



Unconfined Compression Test



Boring ID	Depth (Ft)	Sample type	LL	PL	ΡI	Fines (%)	Description
B-05	2.01 - 2.5						Sandy Silt

Builing ID Depti	h (Ft) Sample type	LL	PL	PI	Fines (%)	Description
B-05 2.01	- 2.5					Sandy Silt

Remarks:

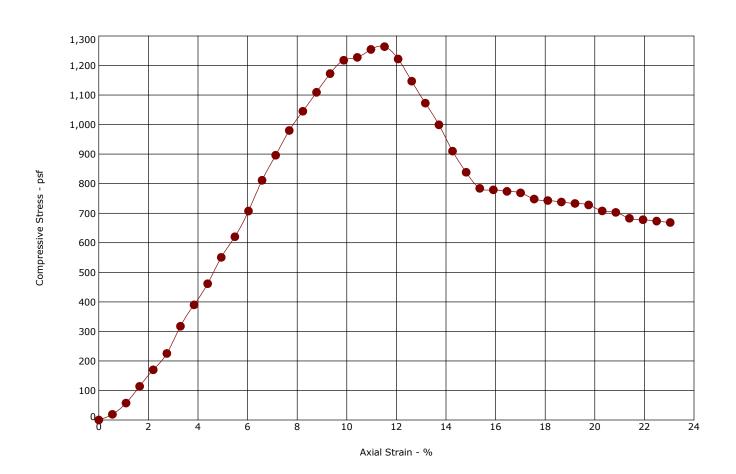


Specimen Failure Mode

Specimen	Test Data
Moisture Content (%):	16.7
Dry Density (pcf):	83
Diameter (in.):	2.87
Height (in.):	4.44
Height / Diameter Ratio:	1.55
Calculated Saturation (%):	70.38
Calculated Void Ratio:	0.64
Assumed Specific Gravity:	2.7
Failure Strain (%):	4.50
Unconfined Compressive Strength (psf):	1060
Undrained Shear Strength (psf):	530
Strain Rate (in/min):	



Unconfined Compression Test ASTM D2166



Boring ID	Depth (Ft)	Sample type	LL	PL	PI	Fines (%)	Description
B-09	2.7 - 3.5	Shelby Tube					Sandy Silt

Boring ID	Depth (Ft)	Sample type	LL	PL	PI	Fines (%)	Description
B-09	2.7 - 3.5	Shelby Tube					Sandy Silt



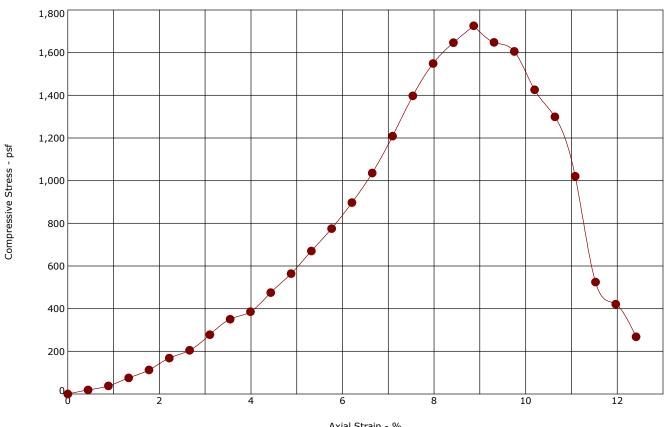
Specimen Failure Mode

Specimen	Test Data
Moisture Content (%):	16.7
Dry Density (pcf):	89
Diameter (in.):	2.86
Height (in.):	3.65
Height / Diameter Ratio:	1.27
Calculated Saturation (%):	71.56
Calculated Void Ratio:	0.63
Assumed Specific Gravity:	2.7
Failure Strain (%):	11.52
Unconfined Compressive Strength (psf):	1264
Undrained Shear Strength (psf):	632
Strain Rate (in/min):	

Remarks: The height to Diamtere ratio did not comply with ASTM D2166



Unconfined Compression TestASTM D2166



Axial	Strain	-	%
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Boring ID	Depth (Ft)	Sample type	LL	PL	PI	Fines (%)	Description
B-17	2.7 - 3.5	Shelby Tube					Sandy Silt

Specimen	Failure	Mode	



Specimen Test Data							
Moisture Content (%):	16.7						
Dry Density (pcf):	102						
Diameter (in.):	2.87						
Height (in.):	4.51						
Height / Diameter Ratio:	1.57						
Calculated Saturation (%):	68.52						
Calculated Void Ratio:	0.66						
Assumed Specific Gravity:	2.7						
Failure Strain (%):	8.87						
Unconfined Compressive Strength (psf):	1726						
Undrained Shear Strength (psf):	863						
Strain Pate (in/min):							

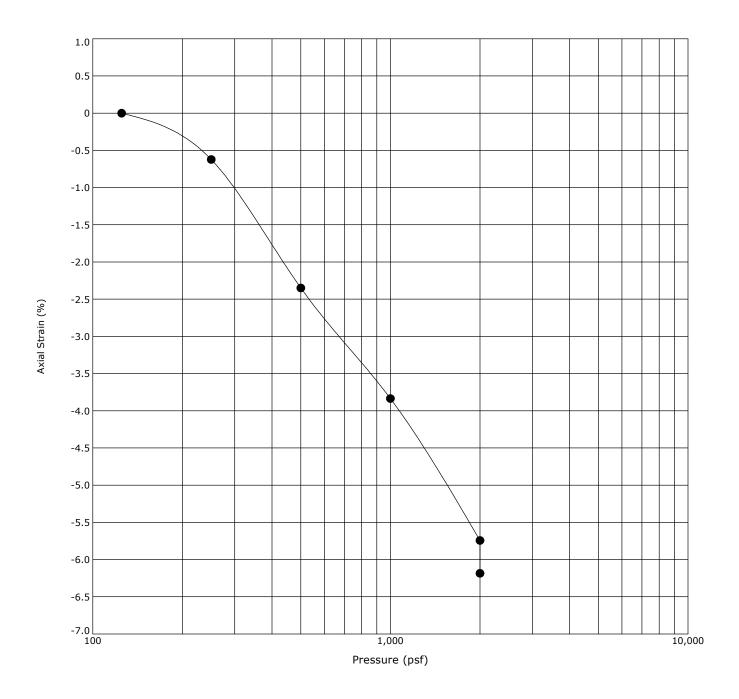
Strain Rate (in/min):

Remarks: The height to Diamtere ratio did not comply with ASTM D2166



One-Dimensional Swell or Collapse

ASTM D4546



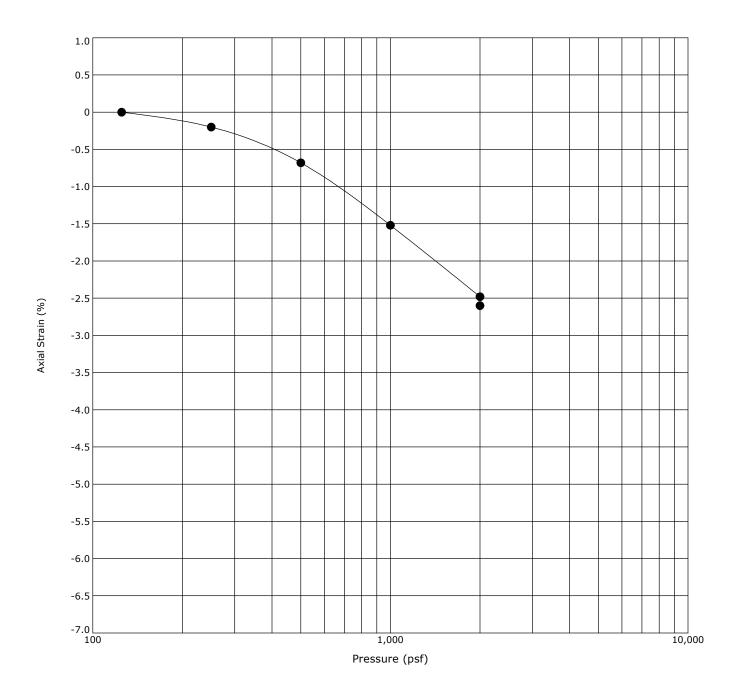
Boring ID Depth (Ft)		Depth (Ft)	Description	USCS	$\gamma_{\rm d(pcf)}$	WC (%)
•	SUB-1	2 - 3	Silt with Sand	ML	96	13.0

Notes: Saturation and the initial void ratio are calculated using the assumed specific gravity. Sample was Inundate at 2000 psf, and collapse rate was about 0.3%



One-Dimensional Swell or Collapse

ASTM D4546



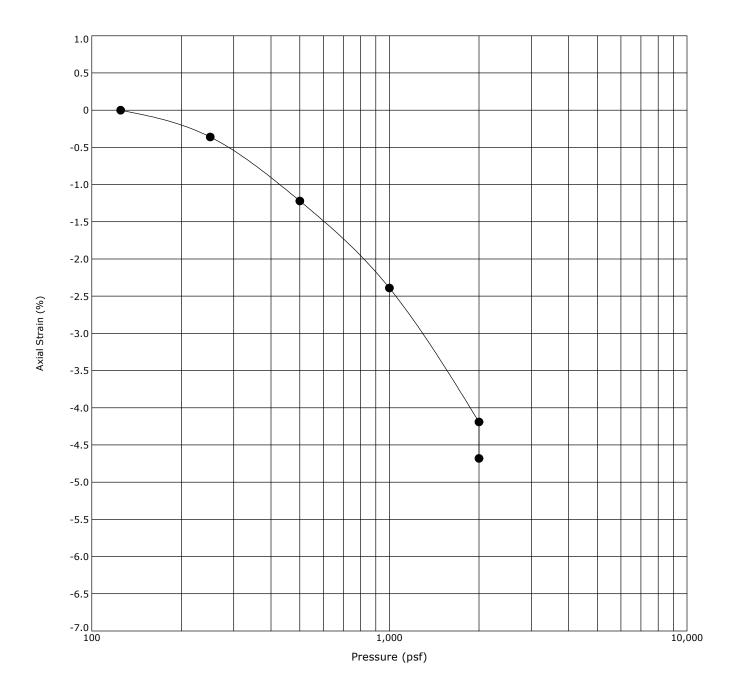
Boring ID Dept		Depth (Ft)	Description	uscs	$\gamma_{\rm d(pcf)}$	WC (%)
•	BESS-1	2 - 3.5	Silt with Sand	ML	108	15.6

Notes: Saturation and the initial void ratio are calculated using the assumed specific gravity. Sample was Inundate at 2000 psf, and the collapse rate was about 0.2%.



One-Dimensional Swell or Collapse



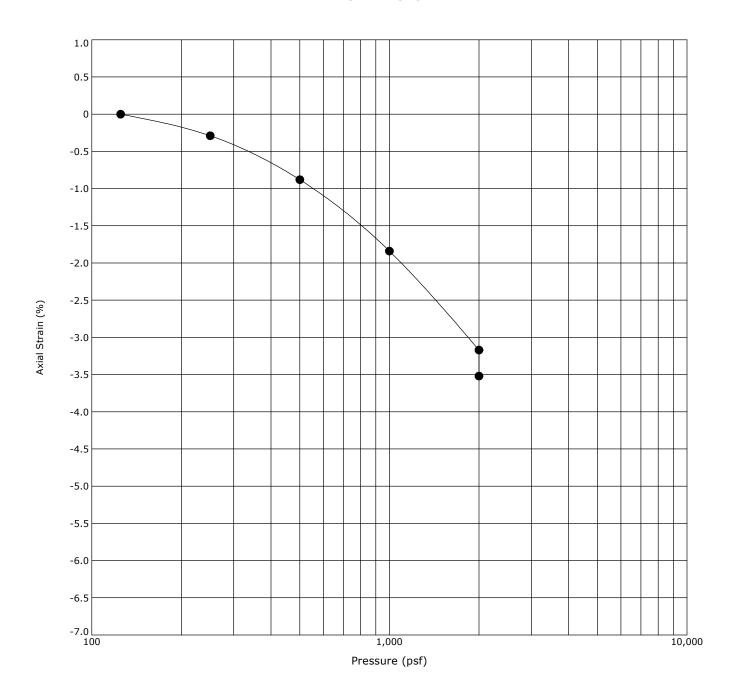


	Boring ID Depth (Ft)		Description	uscs	$\gamma_{d(pcf)}$	WC (%)
•	B-11	3 - 3.5			112	6.0

Notes: Saturation and the initial void ratio are calculated using the assumed specific gravity. Sample was Inundate at 2000 psf, and the collapse rate was about 0.5%.



One-Dimensional Swell or Collapse ASTM D4546

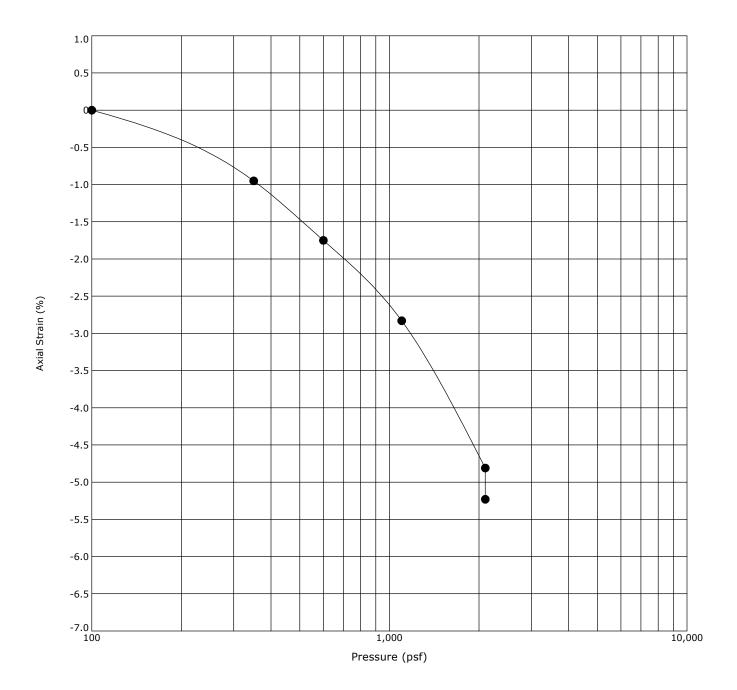


	Boring ID	Depth (Ft)	Description	uscs	$\gamma_{\rm d(pcf)}$	WC (%)
•	B-17	2.7 - 3.5	Sandy Silt	ML	102	16.7

Notes: Saturation and the initial void ratio are calculated using the assumed specific gravity. Sample was Inundate at 2000 psf, and the collapse rate was about 0.4%.



One-Dimensional Swell or Collapse ASTM D4546



	Boring ID	Depth (Ft)	Description	uscs	$\gamma_{\rm d(pcf)}$	WC (%)
•	B-27	2 - 3	Silt trace sand	ML	92	13.3

Notes: Saturation and the initial void ratio are calculated using the assumed specific gravity. Sample was Inundate at 2000 psf, and the collapse rate was about 0.5%.

Biglow Solar & BESS | Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024| Terracon Project No. 82245013



Field Soil Electrical Resistivity Test Results

Contents:

Electrical Resistivity Test Procedures Electrical Resistivity Test Location Plan (2 pages) Electrical Resistivity Results (18 pages)

Biglow Solar & BESS | Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024| Terracon Project No. 82245013



Field Electrical Resistivity Test Procedures

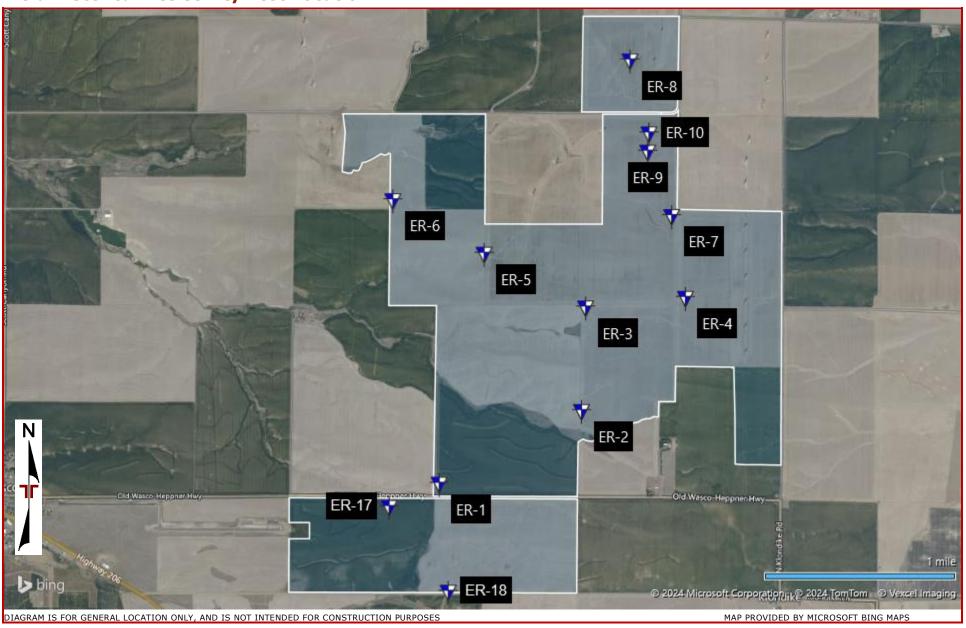
Field measurements of soil electrical resistivity were performed by Terracon from March 11 to March 13, 2024, and from April 8 to April 9, 2024. Field measurements of soil electrical resistivity were performed in general accordance with ASTM Test Method G 57, and IEEE Standard 81, using the Wenner Four-Electrode method. Readings were recorded with a L+R Instruments MiniRes. The Wenner arrangement (equal electrode spacing) was used with the following "a" spacings: 0.5, 1, 1.5, 2, 3, 5, 7, 10, 15, 20, 30, 45, 70,100, 150, 200 and 300" feet at 2 locations within the substation and BESS solar and 16 locations within the array areas for this project with "a" spacings: 2, 5, 10, 20, and 50 feet.

The "a" spacing is generally considered to be the depth of influence of the test. The testing was performed in both a north-south and an east-west orientation at each location.

Biglow Solar & BESS | Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024| Terracon Project No. 82245013



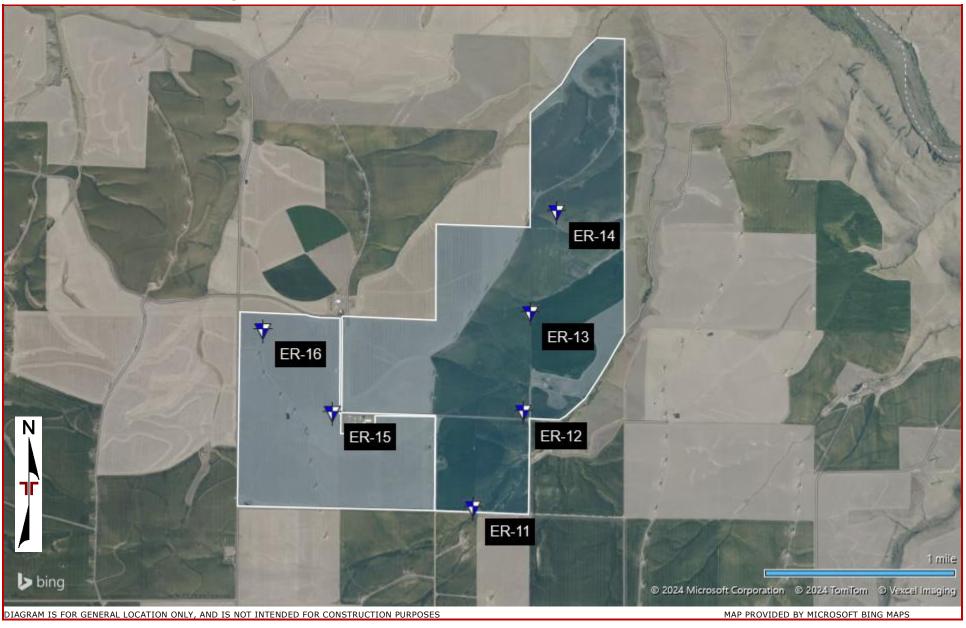
Field Electrical Resistivity Test Location



Biglow Solar & BESS | Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024| Terracon Project No. 82245013



Field Electrical Resistivity Test Location



Biglow Solar | Wasco, Oregon

Test Date:March 12, 2024 | Terracon Project No. 82245013



Array Loc. ER-1 (45.5928053 N, -120.650328 W)

Instrument MiniRes Weather 47 F, very windy, cloudy

Serial # SN-347 Ground Cond. Relativey flat; tilled farm land

Cal. Check Yes Tested By DG

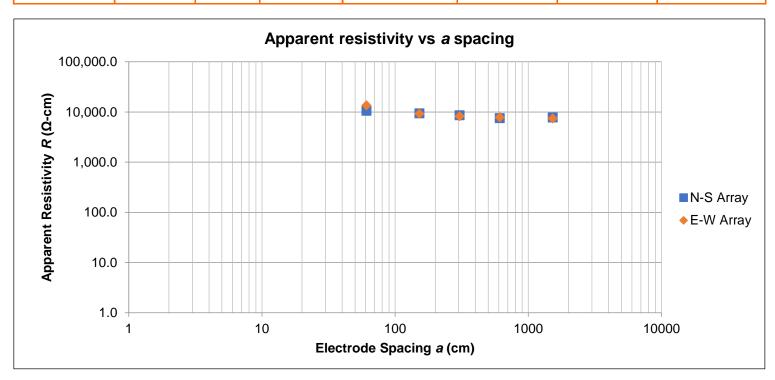
Test Date March 12, 2024 **Method** Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)

Notes &

Conflicts Agricultural field, with active tilling $4\pi aR$

Apparent resistivity
$$\rho$$
 is calculated as : $\rho = \frac{4\pi aR}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$

Electrode S	pacing <i>a</i>	Electrode Depth b		N-S T	est	E-W Test	
(feet)	centimeters	(inches)	centimeters	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>
				Ω	(Ω-cm)	Ω	(Ω-cm)
2	61	6	15	25.10	10550	32.40	13620
5	152	6	15	9.70	9420	9.52	9250
10	305	6	15	4.48	8620	4.29	8250
20	610	6	15	1.97	7540	2.04	7830
50	1524	6	15	0.81	7790	0.78	7460



Biglow Solar | Wasco, Oregon

Test Date: March 12, 2024 | Terracon Project No. 82245013



Array Loc. ER-2 (45.59831216 N, -120.6349101 W)

Weather 48 F, very windy, partly sunny **Instrument** MiniRes Ground Cond. Slightly rolling; tilled farm land Serial # SN-347

Cal. Check Yes Tested By DG

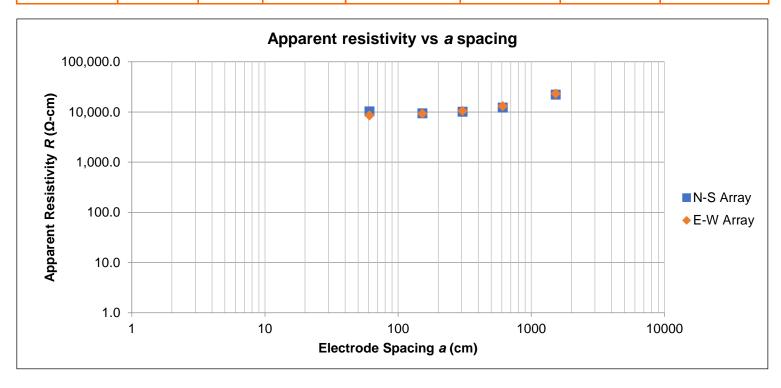
Method Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012) Test Date March 12, 2024

Notes &

Conflicts Agricultural field, with active farm tilling

Apparent resistivity ρ is calculated as : $\rho = 0$

Electrode S	Spacing <i>a</i>	Electrode Depth b		N-S T	est	E-W	Test
(feet)	centimeters	(inches)	centimeters	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>
				Ω	(Ω-cm)	Ω	(Ω-cm)
2	61	6	15	24.40	10260	20.30	8530
5	152	6	15	9.67	9390	9.54	9270
10	305	6	15	5.26	10110	5.47	10530
20	610	6	15	3.19	12230	3.40	13050
50	1524	6	15	2.32	22260	2.43	23230



Biglow Solar | Wasco, Oregon

Test Date:March 12, 2024 | Terracon Project No. 82245013



Array Loc. ER-3 (45.60615525 N, -120.6344618 W)

Instrument MiniRes Weather 46 F, cloudy, windy, some rain

Serial # SN-347 Ground Cond. Rolling tilled farm land

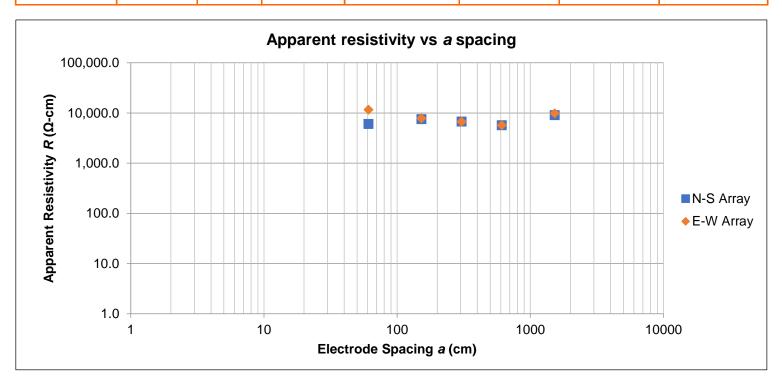
Cal. Check Yes Tested By DG

 Test Date
 March 12, 2024
 Method
 Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)

Notes &

Apparent resistivity
$$\rho$$
 is calculated as : $\rho = \frac{4\pi aR}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$

Electrode	Spacing <i>a</i>	Electro	de Depth <i>b</i>	N-S T	est	E-W	Test
(feet)	centimeters	(inches)	centimeters	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>
				Ω	(Ω-cm)	Ω	(Ω-cm)
2	61	6	15	14.38	6040	27.70	11640
5	152	6	15	7.76	7530	8.08	7850
10	305	6	15	3.51	6760	3.47	6690
20	610	6	15	1.48	5690	1.49	5710
50	1524	6	15	0.95	9070	1.02	9800
·							



Biglow Solar | Wasco, Oregon

Test Date:March 12, 2024 | Terracon Project No. 82245013



Array Loc. ER-4 (45.60688203 N, -120.6236579 W)

Instrument MiniRes Weather 44 F, cloudy, windy

Serial # SN-347 Ground Cond. Relatively flat, tilled farm land

Cal. Check Yes Tested By DG

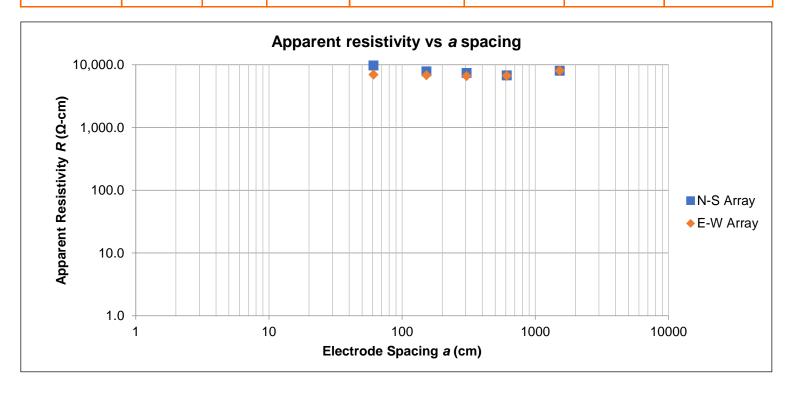
Test Date March 12, 2024 **Method** Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)

Notes &

Conflicts Agricultural field, with active farm tilling

Apparent resistivity ρ is calculated as : $\rho = \frac{4\pi aR}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$

Electrode S	Spacing <i>a</i>	Electrode Depth b		N-S T	N-S Test		' Test
(feet)	centimeters	(inches)	centimeters	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>
				Ω	(Ω-cm)	Ω	(Ω-cm)
2	61	6	15	23.20	9750	16.62	6990
5	152	6	15	8.09	7850	7.04	6830
10	305	6	15	3.86	7430	3.45	6640
20	610	6	15	1.77	6780	1.75	6710
50	1524	6	15	0.84	8040	0.84	8070



Biglow Solar | Wasco, Oregon

Test Date:March 13, 2024 | Terracon Project No. 82245013



Array Loc. ER-5 (45.61022367 N, -120.6454619 W)

Instrument MiniRes Weather 37 F, partly sunny, windy

Serial # SN-347 Ground Cond. Relatively flat, tilled farm land

Cal. Check Yes Tested By DG

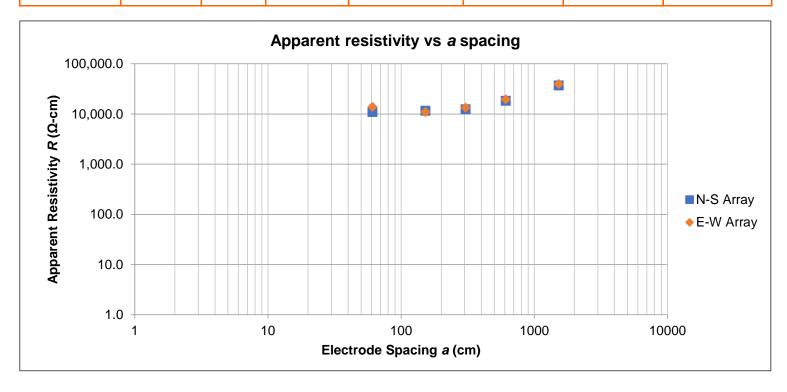
Test Date March 13, 2024 **Method** Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)

Notes &

Conflicts Agricultural field, with active farm tilling

Apparent resistivity ρ is calculated as : $\rho = \frac{4\pi aR}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$

Electrode S	Spacing <i>a</i>	Electro	le Depth <i>b</i>	N-S T	est	E-W Test	
(feet)	centimeters	(inches)	centimeters	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>	Measured Resistance <i>R</i>	Apparent Resistivity <i>ρ</i>
				Ω	(Ω-cm)	Ω	(Ω-cm)
2	61	6	15	26.20	11010	33.10	13910
5	152	6	15	11.99	11650	11.30	10970
10	305	6	15	6.47	12450	6.95	13370
20	610	6	15	4.78	18350	5.09	19530
50	1524	6	15	3.88	37140	4.13	39570



Biglow Solar | Wasco, Oregon

Test Date: March 13, 2024 | Terracon Project No. 82245013



Array Loc. ER-6 (45.61427349 N, -120.655348 W)

Instrument MiniRes Weather 39 F, sunny, windy

Serial # SN-347 Ground Cond. Relatively flat, tilled farm land

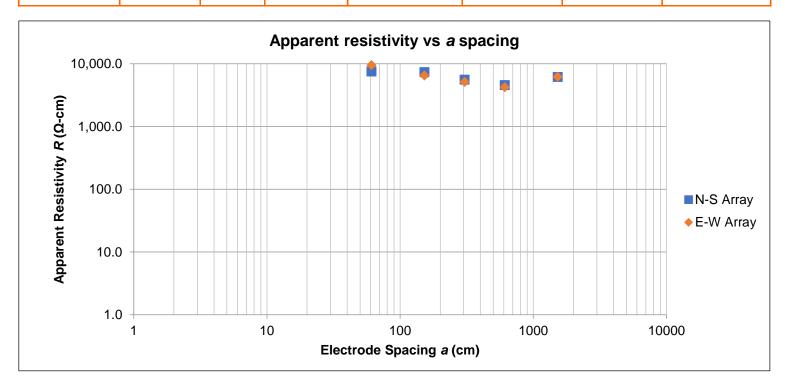
Cal. Check Yes Tested By DG

Test Date March 13, 2024 **Method** Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)

Notes &

Apparent resistivity
$$\rho$$
 is calculated as : $\rho = \frac{4\pi aR}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$

Electrode S	Spacing <i>a</i>	Electro	de Depth <i>b</i>	N-S T	est	E-W	Test
(feet)	centimeters	(inches)	centimeters	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>
				Ω	(Ω-cm)	Ω	(Ω-cm)
2	61	6	15	17.90	7520	22.70	9540
5	152	6	15	7.58	7360	6.71	6510
10	305	6	15	2.91	5590	2.68	5150
20	610	6	15	1.19	4570	1.11	4250
50	1524	6	15	0.65	6180	0.65	6200



Biglow Solar | Wasco, Oregon

Test Date: March 12, 2024 | Terracon Project No. 82245013



Array Loc. ER-7 (45.61307956 N, -120.6251441 W)

Instrument MiniRes Weather 45 F, partly sunny, windy

Serial # SN-347 Ground Cond. Open, rolling, tilled farm land

Cal. Check Yes Tested By DG

 Test Date
 March 12, 2024

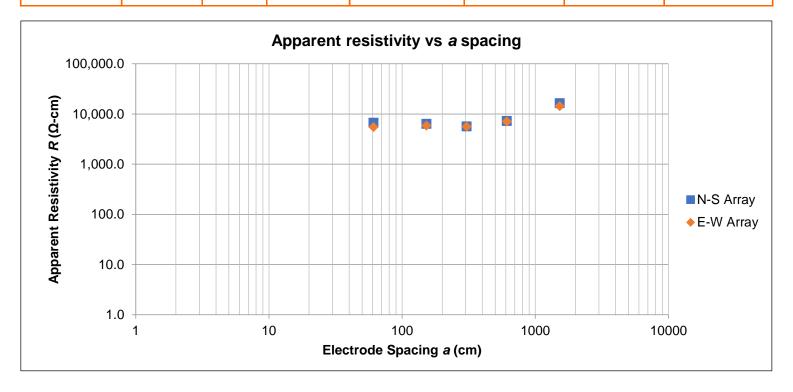
 Method
 Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)

Notes &

Conflicts Agricultural field, with active farm tilling

Apparent resistivity ρ is calculated as : $\rho = \frac{4\pi aR}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$

Spacing <i>a</i>	Electrode Depth b		N-S Test		E-W Test	
centimeters	(inches)	centimeters	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>
			Ω	(Ω-cm)	Ω	(Ω-cm)
61	6	15	15.97	6710	13.09	5500
152	6	15	6.55	6360	6.05	5880
305	6	15	2.95	5680	2.93	5630
610	6	15	1.90	7270	1.86	7140
1524	6	15	1.72	16440	1.50	14350
	61 152 305 610	61 6 152 6 305 6 610 6	152 6 15 305 6 15 610 6 15	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	centimeters (inches) centimeters Resistance R Resistivity ρ 61 6 15 15.97 6710 152 6 15 6.55 6360 305 6 15 2.95 5680 610 6 15 1.90 7270	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$



Biglow Solar | Wasco, Oregon

Test Date: March 11, 2024 | Terracon Project No. 82245013



Array Loc. ER-8 (45.6248596 N, -120.6296577 W)

Instrument MiniRes Weather 43 F, sunny
Serial # SN-347 Ground Cond. Open, rolling, tilled farm land

Cal. Check Yes Tested By DG

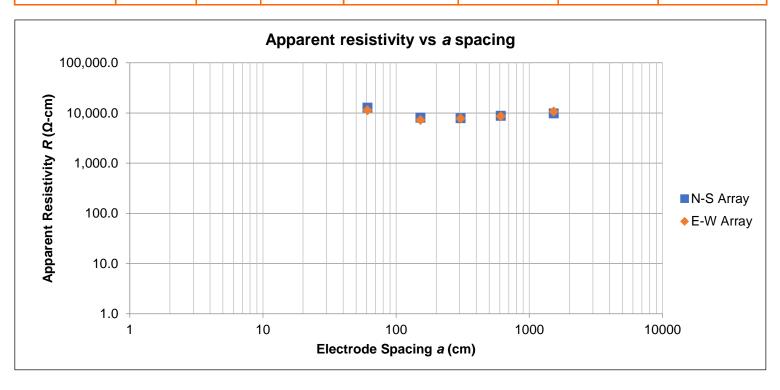
Test Date March 11, 2024 **Method** Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)

Notes &

Conflicts Agricultural field, with active farm tilling

Apparent resistivity ρ is calculated as : $\rho = \frac{4\pi aR}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$

Electrode	Spacing <i>a</i>	Electro	de Depth <i>b</i>	N-S T	est	E-W	Test
(feet)	centimeters	(inches)	centimeters	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>
				Ω	(Ω-cm)	Ω	(Ω-cm)
2	61	6	15	30.40	12780	27.10	11390
5	152	6	15	8.30	8060	7.51	7290
10	305	6	15	4.09	7860	4.05	7790
20	610	6	15	2.30	8830	2.25	8620
50	1524	6	15	1.03	9850	1.12	10690



Biglow Solar | Wasco, Oregon

Test Date: March 13, 2024 | Terracon Project No. 82245013



Array Loc. ER-9 (45.61795256 N, -120.6277373 W)

Instrument MiniRes Weather 49 F, sunny, windy
Serial # SN-347 Ground Cond. Steep, rolling, open tilled farm land
Cal. Check Yes Tested By DG

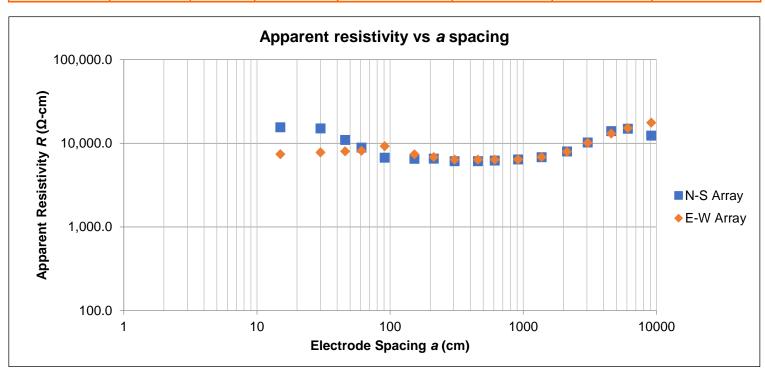
Test Date March 13, 2024 Method Wenner 4-pin (ASTM G57-06 (2020); IEEE 81

Notes &

Conflicts Agricultural field, with active farm tilling. BESS site.

Apparent resistivity ρ is calculated as : $\rho=\frac{4\pi aR}{1+\frac{2a}{\sqrt{a^2+4b^2}}-\frac{a}{\sqrt{a^2+b^2}}}$

Electrode S	pacing <i>a</i>	Electro	de Depth b	N-S T	est	E-W	Test			
				Measured	Apparent	Measured	Apparent			
(feet)	centimeters	(inches)	centimeters	Resistance R	Resistivity $ ho$	Resistance R	Resistivity $ ho$			
							Ω	(Ω-cm)	Ω	(Ω-cm)
0.5	15	6	15	97.90	15540	46.70	7410			
1	30	6	15	60.80	15080	31.30	7760			
1.5	46	6	15	32.70	10960	23.90	8010			
2	61	6	15	21.10	8870	19.30	8110			
3	91	6	15	11.23	6710	15.44	9230			
5	152	6	15	6.71	6510	7.60	7380			
7	213	6	15	4.86	6560	5.07	6840			
10	305	6	15	3.17	6090	3.32	6390			
15	457	6	15	2.12	6090	2.22	6380			
20	610	6	15	1.62	6210	1.66	6370			
30	914	6	15	1.12	6410	1.12	6410			
45	1372	6	15	0.79	6810	0.79	6830			
70	2134	6	15	0.60	7990	0.59	7910			
100	3048	6	15	0.53	10230	0.53	10130			
150	4572	6	15	0.49	13990	0.46	13070			
200	6096	6	15	0.39	14930	0.40	15190			
300	9144	6	15	0.22	12370	0.31	17620			



Biglow Solar | Wasco, Oregon

Test Date: March 11, 2024 | Terracon Project No. 82245013



Array Loc. ER-10 (45.61933758 N, -120.6276065 W)

Instrument MiniRes

Serial # SN-347

Cal. Check Yes

Test Date March 11, 2024

Weather 47 F, cloudy

Ground Cond. Steep, rolling, tilled farm land

Tested By DG

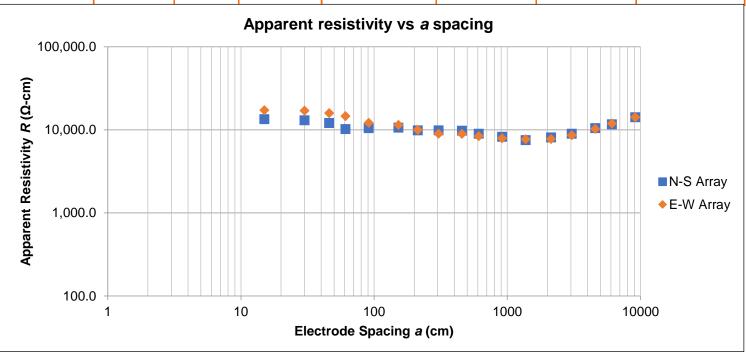
Method Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)

Notes &

Conflicts Agricultural field, with active farm tilling. Substation site.

Apparent resistivity ρ is calculated as : $\rho = \frac{4\pi aR}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$

Electrode S	Spacing <i>a</i>	Electro	le Depth <i>b</i>	N-S T	est	E-W	Test
				Measured	Apparent	Measured	Apparent
(feet)	centimeters	(inches)	centimeters	Resistance R	Resistivity $ ho$	Resistance R	Resistivity $ ho$
				Ω	(Ω-cm)	Ω	(Ω-cm)
0.5	15	6	15	84.70	13450	108.90	17290
1	30	6	15	52.70	13070	68.60	17020
1.5	46	6	15	36.10	12100	47.50	15920
2	61	6	15	24.30	10210	34.80	14630
3	91	6	15	17.58	10510	20.30	12140
5	152	6	15	10.95	10630	11.83	11480
7	213	6	15	7.30	9850	7.42	10010
10	305	6	15	5.13	9870	4.66	8970
15	457	6	15	3.41	9800	3.12	8960
20	610	6	15	2.35	9000	2.19	8410
30	914	6	15	1.44	8260	1.38	7940
45	1372	6	15	0.88	7540	0.89	7680
70	2134	6	15	0.61	8110	0.58	7760
100	3048	6	15	0.47	8980	0.45	8620
150	4572	6	15	0.37	10510	0.36	10280
200	6096	6	15	0.30	11660	0.31	11950
300	9144	6	15	0.25	14220	0.25	14210



Biglow Solar | Wasco, Oregon

Test Date: April 08, 2024 | Terracon Project No. 82245013



Array Loc. ER-11 (45.64252796 N, -120.5985043 W)

Instrument MiniRes Weather 53 F, cloudy, very windy

Serial # SN-347 Ground Cond. Open, slightly sloping, actively tilled land

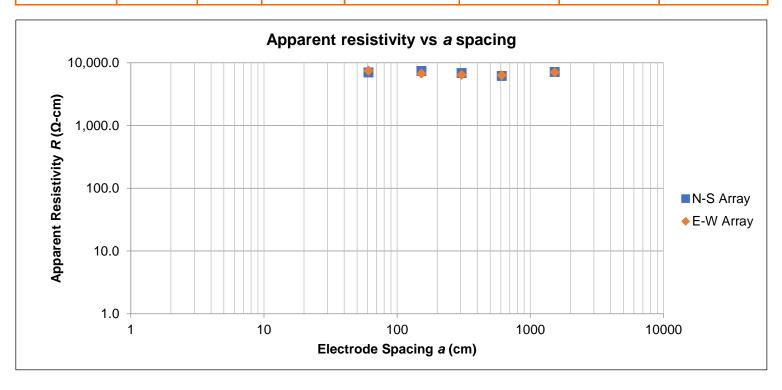
Cal. Check Yes Tested By DG

 Test Date
 April 8, 2024
 Method
 Wenner 4-pin (ASTM G57-06 (2020); IEEE 81

Notes &

Apparent resistivity
$$\rho$$
 is calculated as : $\rho = \frac{4\pi aR}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$

Electrode	Spacing <i>a</i>	Electro	le Depth <i>b</i>	N-S T	est	E-W	Test
(feet)	centimeters	(inches)	centimeters	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>
				Ω	(Ω-cm)	Ω	(Ω-cm)
2	61	6	15	16.68	7010	17.80	7480
5	152	6	15	7.61	7390	6.95	6750
10	305	6	15	3.57	6880	3.35	6440
20	610	6	15	1.61	6190	1.65	6330
50	1524	6	15	0.75	7140	0.74	7060



Biglow Solar | Wasco, Oregon

Test Date: April 09, 2024 | Terracon Project No. 82245013



Array Loc. ER-12 (45.64979408 N, -120.5930549 W)

Instrument MiniRes Weather 55 F, very windy, sunny
Serial # SN-347 Ground Cond. Open, flat, tilled farm land

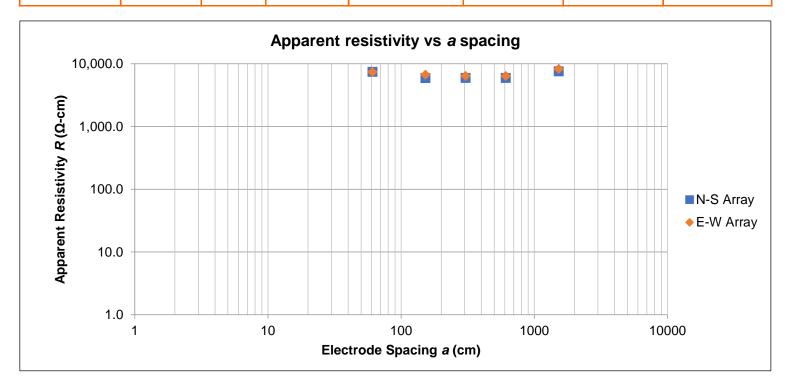
Cal. Check Yes Tested By DG

 Test Date
 April 9, 2024
 Method
 Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)

Notes &

Apparent resistivity
$$\rho$$
 is calculated as : $\rho = \frac{4\pi aR}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$

Electrode S	Spacing <i>a</i>	Electro	le Depth <i>b</i>	N-S T	est	E-W	Test
(feet)	centimeters	(inches)	centimeters	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>
				Ω	(Ω-cm)	Ω	(Ω-cm)
2	61	6	15	17.70	7440	17.65	7420
5	152	6	15	6.10	5930	6.91	6710
10	305	6	15	3.10	5960	3.32	6390
20	610	6	15	1.56	5980	1.67	6400
50	1524	6	15	0.79	7600	0.86	8270



Biglow Solar | Wasco, Oregon

Test Date: April 09, 2024 | Terracon Project No. 82245013



Array Loc. ER-13 (45.65727702 N, -120.5922881 W)

Instrument MiniRes Weather 54 F, very windy, sunny

Serial # SN-347 Ground Cond. Open, sloping, tilled farm land

Cal. Check Yes Tested By DG

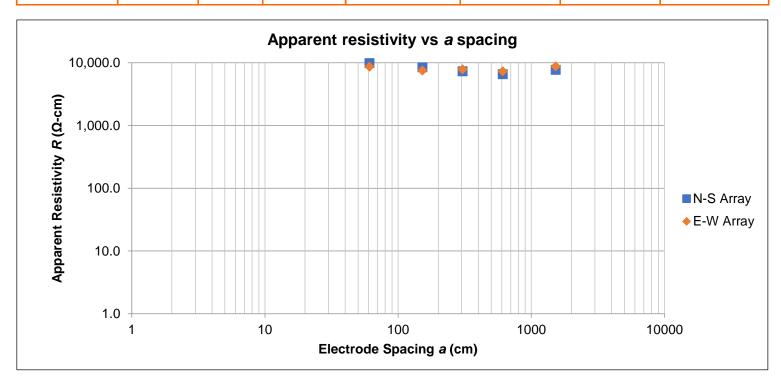
Test Date April 9, 2024 **Method** Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)

Notes &

Conflicts Agricultural field, with active farm tilling

Apparent resistivity ρ is calculated as : $\rho = \frac{4\pi aR}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$

Electrode	Spacing <i>a</i>	Electrode Depth b		N-S T	est	E-W Test	
(feet)	centimeters	(inches)	centimeters	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>
				Ω	(Ω-cm)	Ω	(Ω-cm)
2	61	6	15	23.50	9880	20.60	8660
5	152	6	15	8.76	8500	7.75	7530
10	305	6	15	3.80	7310	4.09	7860
20	610	6	15	1.72	6590	1.91	7340
50	1524	6	15	0.81	7730	0.92	8770



Biglow Solar | Wasco, Oregon

Test Date: April 09, 2024 | Terracon Project No. 82245013



Array Loc. ER-14 (45.66492226 N, -120.5894529 W)

Instrument MiniRes **Weather** 50 F, very windy, sunny

Serial # SN-347 Ground Cond. Open, slightly sloping, tilled farm land

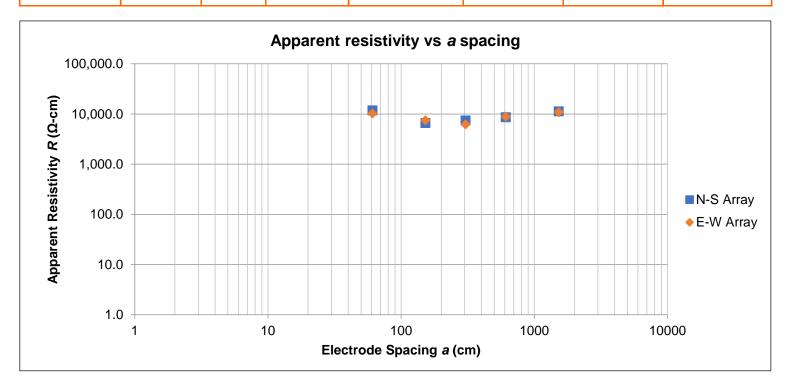
Cal. Check Yes Tested By DG

Test Date April 9, 2024 **Method** Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)

Notes &

Apparent resistivity
$$\rho$$
 is calculated as : $\rho = \frac{4\pi aR}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$

Electrode S	Spacing <i>a</i>	Electro	le Depth <i>b</i>	N-S T	est	E-W	Test
(feet)	centimeters	(inches)	centimeters	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>
				Ω	(Ω-cm)	Ω	(Ω-cm)
2	61	6	15	28.10	11810	24.50	10300
5	152	6	15	6.80	6600	7.69	7470
10	305	6	15	3.88	7460	3.25	6250
20	610	6	15	2.24	8600	2.32	8890
50	1524	6	15	1.18	11270	1.14	10930



Biglow Solar | Wasco, Oregon

Test Date: April 09, 2024 | Terracon Project No. 82245013



Array Loc. ER-15 (45.64971043 N, -120.6137516 W)

Instrument MiniRes

Serial # SN-347

Ground Cond. Open, rolling, tilled farm land

Tested By DG

Cal. Check Yes Tested By DG

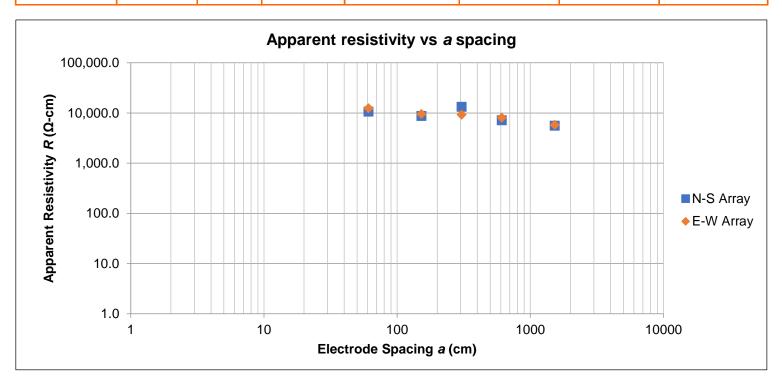
 Test Date
 April 9, 2024

 Method
 Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)

Notes &

Apparent resistivity
$$\rho$$
 is calculated as : $\rho = \frac{4\pi aR}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$

Electrode	Spacing <i>a</i>	Electro	le Depth <i>b</i>	N-S T	est	E-W	Test
(feet)	centimeters	(inches)	centimeters	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>
				Ω	(Ω-cm)	Ω	(Ω-cm)
2	61	6	15	25.30	10630	29.50	12400
5	152	6	15	9.02	8760	9.82	9530
10	305	6	15	6.92	13310	4.80	9240
20	610	6	15	1.86	7150	2.10	8050
50	1524	6	15	0.59	5600	0.60	5780



Biglow Solar | Wasco, Oregon

Test Date: April 08, 2024 | Terracon Project No. 82245013



Array Loc. ER-16 (45.65596621 N, -120.6212749 W)

Instrument MiniRes Weather 56 F, sunny, very windy

Serial # SN-347 Ground Cond. Open, slightly sloping, tilled farm land

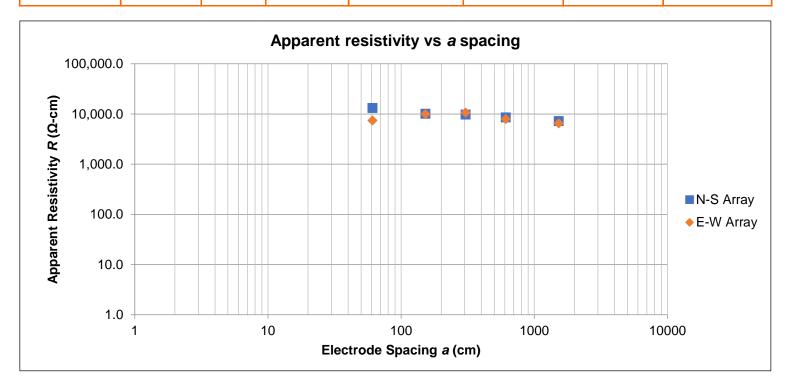
Cal. Check Yes Tested By DG

Test Date April 8, 2024 **Method** Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)

Notes &

Apparent resistivity
$$\rho$$
 is calculated as : $\rho = \frac{4\pi aR}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$

Electrode 9	Spacing <i>a</i>	Electro	le Depth <i>b</i>	N-S T	est	E-W	Test
(feet)	centimeters	(inches)	centimeters	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>
				Ω	(Ω-cm)	Ω	(Ω-cm)
2	61	6	15	31.40	13200	17.76	7460
5	152	6	15	10.43	10130	10.31	10010
10	305	6	15	5.06	9740	5.52	10620
20	610	6	15	2.22	8530	2.07	7950
50	1524	6	15	0.75	7210	0.68	6520



Biglow Solar | Wasco, Oregon

Test Date: April 08, 2024 | Terracon Project No. 82245013



Array Loc. ER-17 (45.59104489 N, -120.655751 W)

Instrument MiniRes Weather 52 F, cloudy, windy **Ground Cond.** Open, slightly sloping, tilled farm land Serial # SN-347

Cal. Check Yes **Tested By** DG

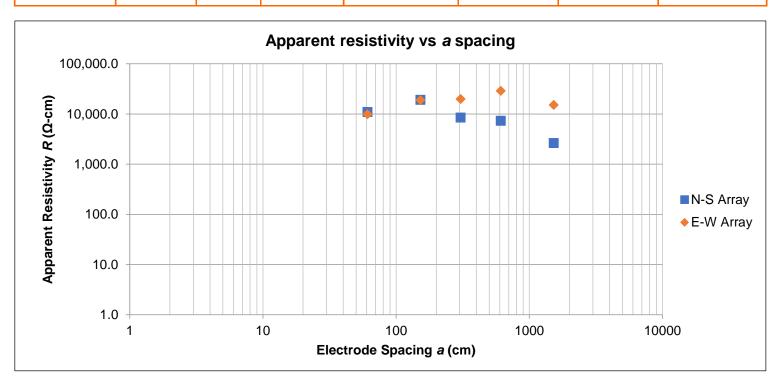
Method Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012) Test Date April 8, 2024

Notes &

Conflicts Agricultural field, with active farm tilling. Re-do needed to be done several times.

Apparent resistivity
$$\rho$$
 is calculated as : $\rho = \frac{4\pi aR}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$

Electrode S	Spacing <i>a</i>	Electro	le Depth b	N-S T	est	E-W	Test
(feet)	centimeters	(inches)	centimeters	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>
				Ω	(Ω-cm)	Ω	(Ω-cm)
2	61	6	15	26.10	10970	23.50	9880
5	152	6	15	19.80	19230	19.40	18840
10	305	6	15	4.42	8510	10.30	19830
20	610	6	15	1.92	7350	7.55	28970
50	1524	6	15	0.28	2650	1.58	15170



Biglow Solar | Wasco, Oregon

Test Date: April 08, 2024 | Terracon Project No. 82245013



Array Loc. ER-18 (45.5846234 N, -120.6493555 W)

Instrument MiniRes Weather 51 F, cloudy, windy
Serial # SN-347 Ground Cond. Open, slightly rolling, tilled farm land

Cal. Check Yes Tested By DG

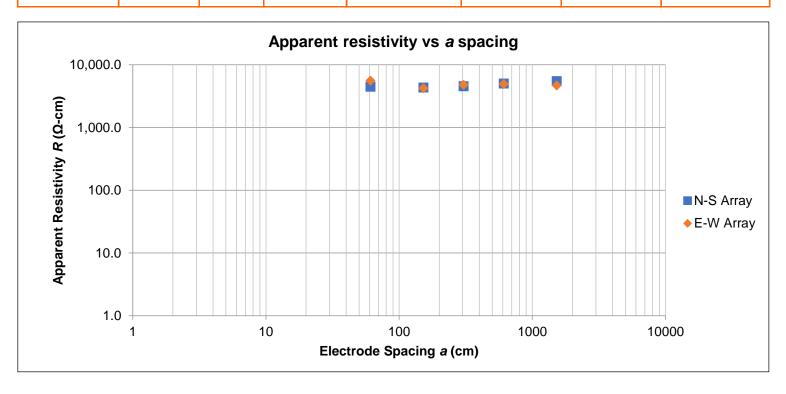
 Test Date
 April 8, 2024
 Method
 Wenner 4-pin (ASTM G57-06 (2020); IEEE 81-2012)

Notes &

Conflicts Agricultural field, with active farm tilling

Apparent resistivity ρ is calculated as : $\rho = \frac{4\pi aR}{1 + \frac{2a}{\sqrt{a^2 + 4b^2}} - \frac{a}{\sqrt{a^2 + b^2}}}$

Electrode S	Spacing <i>a</i>	Electro	le Depth <i>b</i>	N-S T	est	E-W	Test
(feet)	centimeters	(inches)	centimeters	Measured Resistance <i>R</i>	Apparent Resistivity <i>p</i>	Measured Resistance <i>R</i>	Apparent Resistivity $ ho$
				Ω	(Ω-cm)	Ω	(Ω-cm)
2	61	6	15	10.61	4460	13.33	5600
5	152	6	15	4.46	4330	4.36	4230
10	305	6	15	2.36	4550	2.50	4810
20	610	6	15	1.31	5030	1.29	4940
50	1524	6	15	0.57	5490	0.49	4700



Biglow Solar & BESS | Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024| Terracon Project No. 82245013



Test Pile Driving Data

Contents:

Test Pile Installation Details Pile Zoning Plan (2 pages)

Biglow Solar & BESS | Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024| Terracon Project No. 82245013



Test Pile Installation Details

Pile Location Procedures

The test locations were established in the field by using a hand-held GPS (accurate to about 20 feet) and existing site features as reference points. The mapped test locations should be considered accurate only to the degree implied by the means and methods used to define them.

Test Pile Installation

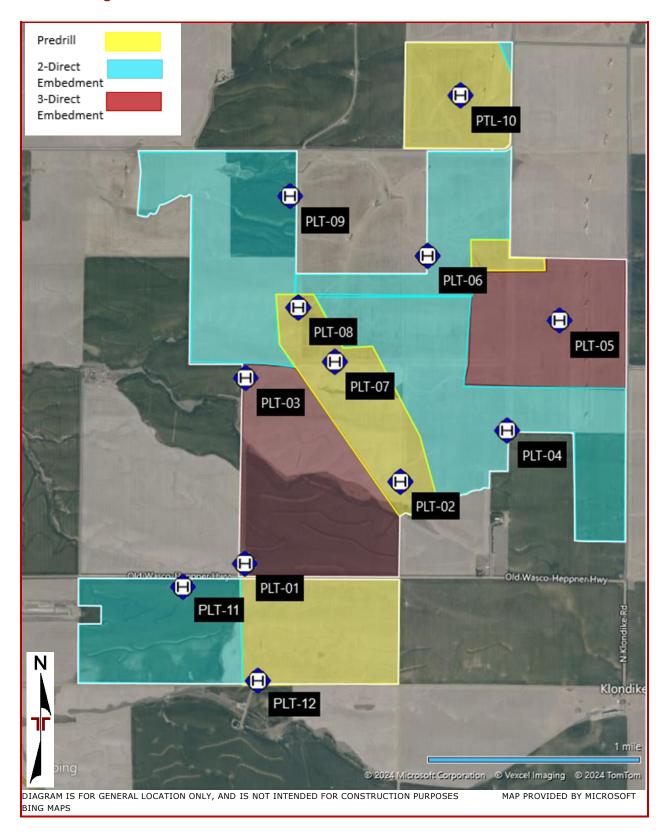
The test piles consisted of wide-flange, bare steel W6x9 sections. A group of three test piles were installed at each of the 20 test locations. The pile identification system for each location begins with "PLT" and is followed by the number corresponding to the test pile group location and a letter identifying the pile. The "A" piles were installed to 8 feet below grade within predrilled locations, and 10 feet below grade at direct embedment locations. The "B" piles were installed to 5 feet below grade within predrilled locations, and 7 feet below grade at direct embedment locations. "C" piles were installed to either 5 or 7 feet below grad and were solely for compression load testing.

The piles were advanced on April 2-3 and April 15-16, 2024, with an excavator mounted pile driver equipped with a TB425 1,100-pound hydraulic hammer to embedment depths ranging from approximately 5 to 10 feet below the ground surface (bgs). Select pile locations, including PLT-02, PLT-07, PLT-08, PLT-10, PLT-12, PLT-14, and PLT-16 were installed at the base of an undersized predrilled hole that extended to the planned embedment depth, and backfilled loosely with cuttings from predrilling.

Biglow Solar & BESS | Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024| Terracon Project No. 82245013



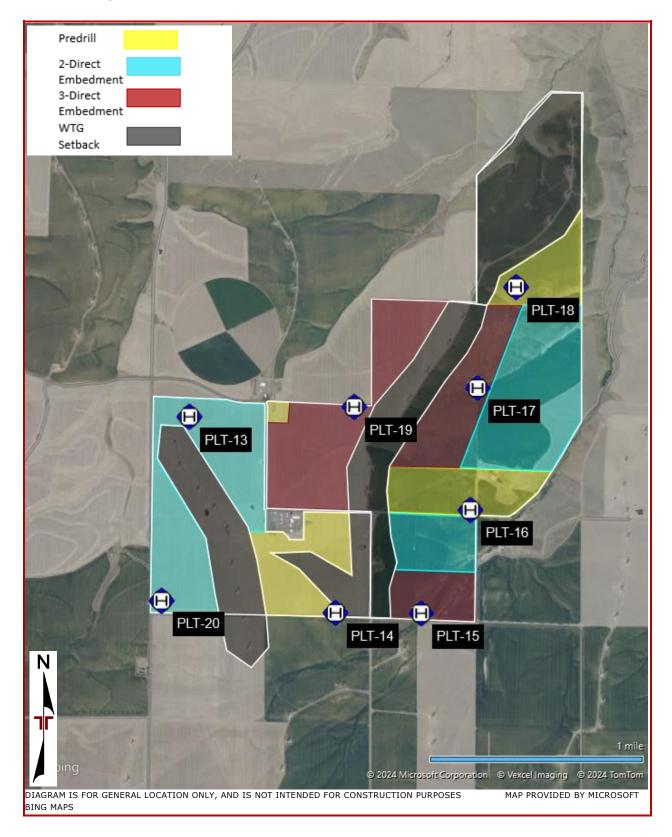
Pile Zoning Plan 1 of 2



Biglow Solar & BESS | Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024| Terracon Project No. 82245013



Pile Zoning Plan 2 of 2



Biglow Solar & BESS | Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024| Terracon Project No. 82245013



Pile Load Test Results

Contents:

Load Test Procedures (2 pages)
Axial Tension Test Results (40 pages)
Lateral Test Results (40 pages)
Axial Compression Test Results (20 pages)

Biglow Solar & BESS | Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024| Terracon Project No. 82245013



Load Test Procedures

Testing Under Axial Tensile ("pull-out") Load

We performed testing under axial tensile load for the piles at each location using the procedures generally outlined below.

Twenty piles, two piles at each PLT location, were tested under axial tensile ("pull-out") load. The test piles with the designations "A" and "B" were tested under axial tensile load with the designation "A" being embedded 8 feet below the ground surface for predrilled locations and 10 feet below ground surface for direct embedment locations. The test piles with the designation "B" were embedded 5 feet below the ground surface for predrilled locations and 7 feet below ground surface for direct embedment locations.

The "pull-out" load reaction was supported using a John Deere 130G excavator supported at an appropriate lateral distance from the pile.

Axial loads were applied to the test pile using a hydraulic pump and 10-kip pull cylinder. Connections to the test piles were made using a 5-ton plate clamp (vertical) designed for connection to W-sections.

The hydraulic pull cylinder and load cell were connected in series with chains and clevises to the two test piles. The load was applied by pulling the chain through the chain fall in successive 500-pound increments from 0 to 4,000 pounds for PLT-01 through PLT-10 and from 0 to 10,000 pounds for PLT-11 through PLT-20, or until a deflection of about 1 inch was achieved. Following the final loading, the load was reduced back to 0 pounds and the final displacement readings were recorded. Each load increment was sustained for about 30 seconds and the stabilized deflection reading of both indicator gauges was recorded.

Deflections were measured with digital gauges and loads were measured with a Digital Dynamometer 25-kip electronic load cell. The gauges and load cell were read, and the data was recorded manually by Terracon field personnel.

Testing Under Lateral Load

After testing under axial tensile load, the piles at each location were then tested under lateral load as described below.

For lateral testing, the piles were connected with a series of straps and shackles to the excavator and pulled in the strong axis direction; deflections of each pile were measured approximately 6 inches above ground surface. The load for the lateral tests was applied at about 3.5 feet above the ground surface against the strong axis of the piles. The loads were applied in 500-pound increments in 5 cycles from 0 pounds to a maximum load of 4,500 pounds for PLT-01 through PLT-10 and in 6 cycles from 0 pounds to a

Biglow Solar & BESS | Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024| Terracon Project No. 82245013



maximum load of 6,000 pounds for PLT-11 through PLT-20 or a deflection of 1 inch was achieved. Each load increment was held for at least 1 minute and the stabilized deflection reading of both indicator gauges was recorded.

Deflections were measured with digital gauges and loads were measured with a Digital Dynamometer 25-kip electronic load cell. The gauges and load cell were read, and the data was recorded manually by Terracon field personnel.

Testing Under Axial Compressive Load

One pile at each location were tested under axial compressive load. The test piles with the designation "C" were tested under axial compressive load and were embedded either 5 feet below the ground surface for predrilled locations or 7 feet below ground surface for direct embedment piles.

We performed tests under axial compressive loads as generally described below. These procedures were developed with reference to ASTM D1143, *Test Methods for Deep Foundations under Static Axial Compressive Load.*

A John Deere 130G excavator was mobilized to the site to provide a reaction for the applied vertical compression test loads. A load cell on the top of the pile, a hydraulic cylinder (jack) was placed above the load cell and under excavator bucket.

The loads were applied in 500-pound to 1,000-pound increments up to a maximum load of 6,000 pounds for PLT-01 through PLT-10, and to 11,000 pounds for PLT-11 through PLT-20, which is the maximum safe working load of our equipment. Each load increment was held for about 30 seconds and the stabilized deflection reading of both indicator gauges was recorded.

Deflections were measured with digital gauges and loads were measured with a 25-kip electronic load cell. The gauges and load cell were read, and the data was recorded manually by Terracon field personnel.

Biglow Solar & BESS | Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024 | Terracon Project No. 82245013



Axial Tension Test Results



Tension Load Test Result for PLT-01A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillion Ed Junior

Test Date and Representative

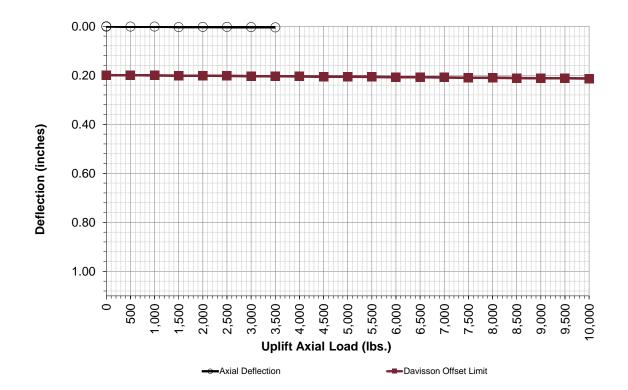
Tested By Terracon Rep: David
Date Tested: 4/11/2024

Pile Information

Pile ID: PLT-01A
Latitude [deg.]: 45.59230
Longitude[deg.]: -120.65048
Pile Type: W6X9

Pile Embedment Depth [in.]: 5.9
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 48
Axial Design Load [lbs.]: 4,000
Pile Area [sq. in.]: 2.96
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 21.24

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
13%	500	0.001	0.001	0.200	
25%	1000	0.001	0.001	0.201	
38%	1500	0.004	0.002	0.201	
50%	2000	0.003	0.003	0.202	
63%	2500	0.003	0.003	0.203	
75%	3000	0.004	0.004	0.203	
88%	3500	0.005	0.005	0.204	
100%	4000		0.006	0.205	
113%	4500		0.006	0.205	
125%	5000		0.007	0.206	
138%	5500		0.008	0.207	
150%	6000		0.008	0.208	
163%	6500		0.009	0.208	
175%	7000		0.010	0.209	
188%	7500		0.010	0.210	
200%	8000		0.011	0.210	
213%	8500		0.012	0.211	
225%	9000		0.013	0.212	
238%	9500		0.013	0.212	
250%	10000		0.014	0.213	
0%	0	0.002	0.000	0.199	





Tension Load Test Result for PLT-01B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/11/2024

Pile Information

Pile Information

Pile ID: PLT-01B

Latitude [deg.]: 45.59230

Longitude[deg.]: -120.65048

Pile Type: W6X9

Pile Embedment Depth [in.]: 5.9

Pile Diameter [in.]: 5.9

Pile Stick-Up [in.]: 48

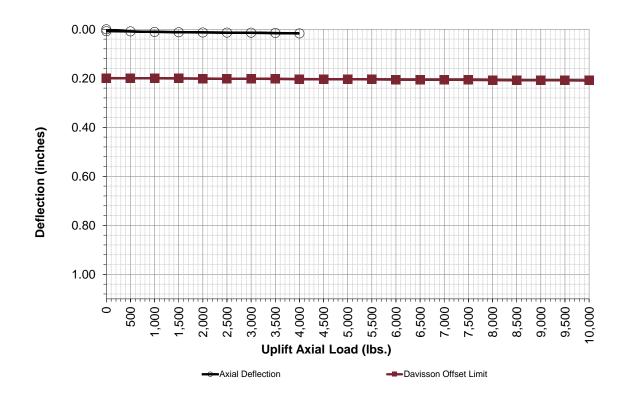
Axial Design Load [lbs.]: 4,000

Pile Area [sq. in.]: 2.96

Elastic Modulus [ksi.]: 29,000

Drive Time [sec.]: 16.88

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
13%	500	0.009	0.000	0.200	
25%	1000	0.011	0.001	0.200	
38%	1500	0.012	0.001	0.201	
50%	2000	0.013	0.002	0.201	
63%	2500	0.014	0.002	0.202	
75%	3000	0.014	0.003	0.202	
88%	3500	0.015	0.003	0.203	
100%	4000	0.017	0.004	0.203	
113%	4500		0.004	0.204	
125%	5000		0.005	0.204	
138%	5500		0.005	0.205	
150%	6000		0.006	0.205	
163%	6500		0.006	0.206	
175%	7000		0.007	0.206	
188%	7500		0.007	0.207	
200%	8000		0.008	0.207	
213%	8500		0.008	0.207	
225%	9000		0.009	0.208	
238%	9500		0.009	0.208	
250%	10000		0.010	0.209	
0%	0	0.008	0.000	0.199	





Tension Load Test Result for PLT-02A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillion Ed Junior

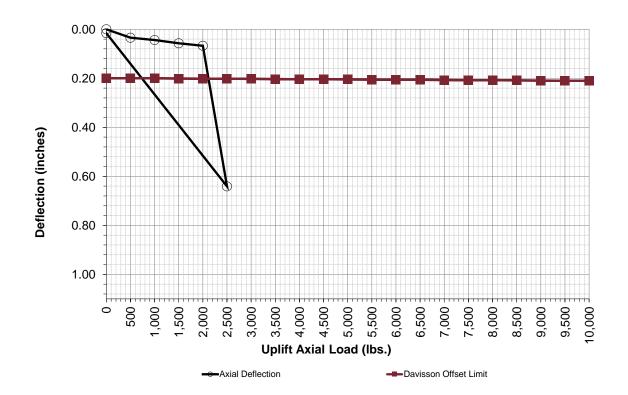
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/10/2024

Pile Information

Pile ID: PLT-02A
Latitude [deg.]: 45.59809
Longitude[deg.]: -120.63540
Pile Type: W6X9
Pile Embedment Depth [in.]: 96
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 48
Axial Design Load [lbs.]: 4,000
Pile Area [sq. in.]: 2.96
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 64.99

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
13%	500	0.035	0.001	0.200	
25%	1000	0.044	0.001	0.200	
38%	1500	0.057	0.002	0.201	
50%	2000	0.068	0.002	0.201	
63%	2500	0.641	0.003	0.202	
75%	3000		0.003	0.203	
88%	3500		0.004	0.203	
100%	4000		0.004	0.204	
113%	4500		0.005	0.204	
125%	5000		0.006	0.205	
138%	5500		0.006	0.205	
150%	6000		0.007	0.206	
163%	6500		0.007	0.206	
175%	7000		0.008	0.207	
188%	7500		0.008	0.208	
200%	8000		0.009	0.208	
213%	8500		0.010	0.209	
225%	9000		0.010	0.209	
238%	9500		0.011	0.210	
250%	10000		0.011	0.210	
0%	0	0.016	0.000	0.199	





Tension Load Test Result for PLT-02B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillion Ed Junior

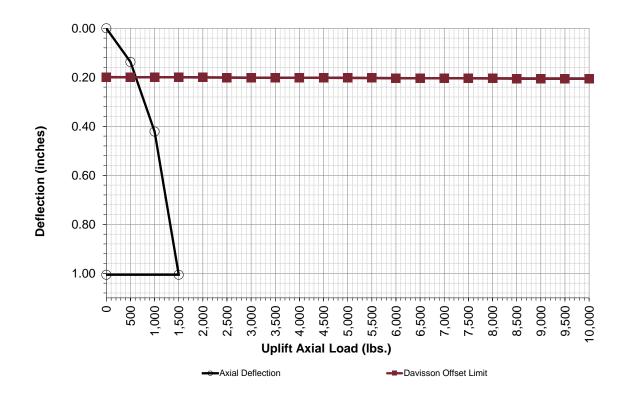
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/10/2024

Pile Information

Pile ID: PLT-02B
Latitude [deg.]: 45.59809
Longitude[deg.]: -120.63540
Pile Type: W6X9
Pile Embedment Depth [in.]: 60
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 48
Axial Design Load [lbs.]: 4,000
Pile Area [sq. in.]: 2.96
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 5.3

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
13%	500	0.138	0.000	0.200	
25%	1000	0.422	0.001	0.200	
38%	1500	1.006	0.001	0.200	
50%	2000		0.001	0.201	
63%	2500		0.002	0.201	
75%	3000		0.002	0.201	
88%	3500		0.002	0.202	
100%	4000		0.003	0.202	
113%	4500		0.003	0.202	
125%	5000		0.003	0.203	
138%	5500		0.004	0.203	
150%	6000		0.004	0.203	
163%	6500		0.005	0.204	
175%	7000		0.005	0.204	
188%	7500		0.005	0.204	
200%	8000		0.006	0.205	
213%	8500		0.006	0.205	
225%	9000		0.006	0.205	
238%	9500		0.007	0.206	
250%	10000		0.007	0.206	
0%	0	1.006	0.000	0.199	





Tension Load Test Result for PLT-03A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillion Ed Junior

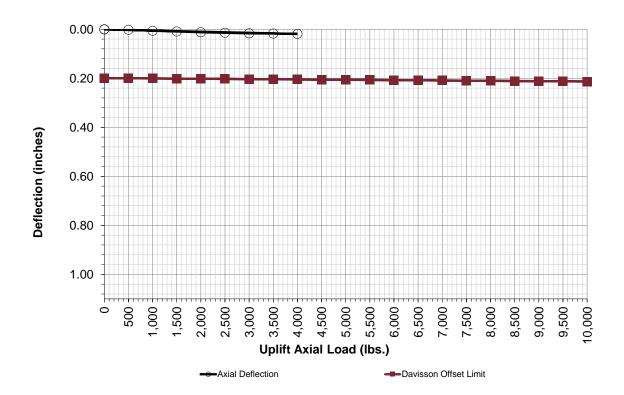
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/11/2024

Pile Information

Pile ID: PLT-03A
Latitude [deg.]: 45.60511
Longitude[deg.]: -120.65040
Pile Type: W6X9
Pile Embedment Depth [in.]: 5.9
Pile Stick-Up [in.]: 48
Axial Design Load [lbs.]: 4,000
Pile Area [sq. in.]: 2.96
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 68.52

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
13%	500	0.002	0.001	0.200	
25%	1000	0.006	0.001	0.201	
38%	1500	0.009	0.002	0.201	
50%	2000	0.012	0.003	0.202	
63%	2500	0.015	0.003	0.203	
75%	3000	0.017	0.004	0.203	
88%	3500	0.018	0.005	0.204	
100%	4000	0.019	0.006	0.205	
113%	4500		0.006	0.205	
125%	5000		0.007	0.206	
138%	5500		0.008	0.207	
150%	6000		0.008	0.208	
163%	6500		0.009	0.208	
175%	7000		0.010	0.209	
188%	7500		0.010	0.210	
200%	8000		0.011	0.210	
213%	8500		0.012	0.211	
225%	9000		0.013	0.212	
238%	9500		0.013	0.212	
250%	10000		0.014	0.213	
0%	0	0.001	0.000	0.199	





Tension Load Test Result for PLT-03B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/11/2024

Pile Information

Pile Information

Pile ID: PLT-03B

Latitude [deg.]: 45.60511

Longitude[deg.]: -120.65040

Pile Type: W6X9

Pile Embedment Depth [in.]: 5.9

Pile Diameter [in.]: 5.9

Pile Stick-Up [in.]: 48

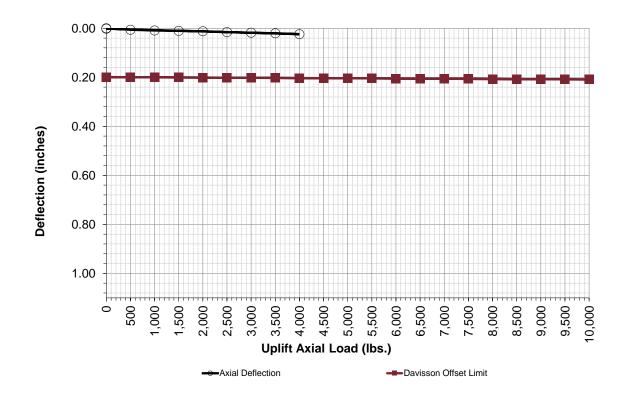
Axial Design Load [lbs.]: 4,000

Pile Area [sq. in.]: 2.96

Elastic Modulus [ksi.]: 29,000

Drive Time [sec.]: 33.4

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
13%	500	0.006	0.000	0.200	
25%	1000	0.009	0.001	0.200	
38%	1500	0.011	0.001	0.201	
50%	2000	0.012	0.002	0.201	
63%	2500	0.016	0.002	0.202	
75%	3000	0.018	0.003	0.202	
88%	3500	0.021	0.003	0.203	
100%	4000	0.024	0.004	0.203	
113%	4500		0.004	0.204	
125%	5000		0.005	0.204	
138%	5500		0.005	0.205	
150%	6000		0.006	0.205	
163%	6500		0.006	0.206	
175%	7000		0.007	0.206	
188%	7500		0.007	0.207	
200%	8000		0.008	0.207	
213%	8500		0.008	0.207	
225%	9000		0.009	0.208	
238%	9500		0.009	0.208	
250%	10000		0.010	0.209	
0%	0	0.002	0.000	0.199	





Tension Load Test Result for PLT-04A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/10/2024

Pile Information

Pile Information

Pile ID: PLT-04A

Latitude [deg.]: 45.60197

Longitude[deg.]: -120.62483

Pile Type: W6X9

Pile Embedment Depth [in.]: 5.9

Pile Diameter [in.]: 5.9

Pile Stick-Up [in.]: 48

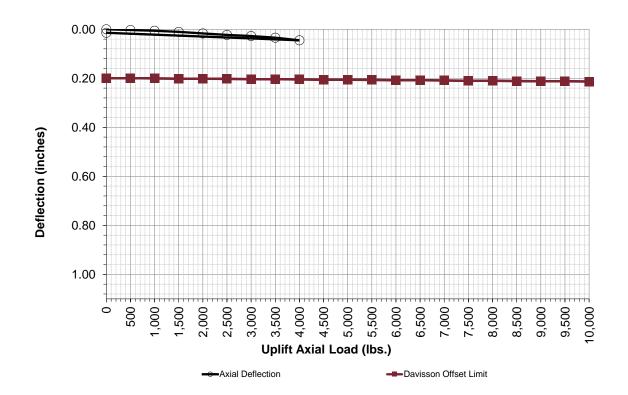
Axial Design Load [lbs.]: 4,000

Pile Area [sq. in.]: 2.96

Elastic Modulus [ksi.]: 29,000

Drive Time [sec.]: 15.26

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
13%	500	0.003	0.001	0.200	
25%	1000	0.006	0.001	0.201	
38%	1500	0.011	0.002	0.201	
50%	2000	0.017	0.003	0.202	
63%	2500	0.023	0.003	0.203	
75%	3000	0.028	0.004	0.203	
88%	3500	0.035	0.005	0.204	
100%	4000	0.045	0.006	0.205	
113%	4500		0.006	0.205	
125%	5000		0.007	0.206	
138%	5500		0.008	0.207	
150%	6000		0.008	0.208	
163%	6500		0.009	0.208	
175%	7000		0.010	0.209	
188%	7500		0.010	0.210	
200%	8000		0.011	0.210	
213%	8500		0.012	0.211	
225%	9000		0.013	0.212	
238%	9500		0.013	0.212	
250%	10000		0.014	0.213	
0%	0	0.015	0.000	0.199	





Tension Load Test Result for PLT-04B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillion Ed Junior

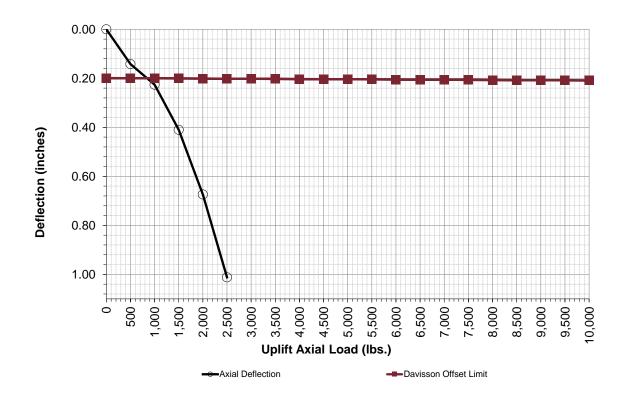
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/10/2024

Pile Information

Pile ID: PLT-04B
Latitude [deg.]: 45.60197
Longitude[deg.]: -120.62483
Pile Type: W6X9
Pile Embedment Depth [in.]: 84
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 48
Axial Design Load [lbs.]: 4,000
Pile Area [sq. in.]: 2.96
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 5.14

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
13%	500	0.142	0.000	0.200	
25%	1000	0.226	0.001	0.200	
38%	1500	0.410	0.001	0.201	
50%	2000	0.674	0.002	0.201	
63%	2500	1.012	0.002	0.202	
75%	3000		0.003	0.202	
88%	3500		0.003	0.203	
100%	4000		0.004	0.203	
113%	4500		0.004	0.204	
125%	5000		0.005	0.204	
138%	5500		0.005	0.205	
150%	6000		0.006	0.205	
163%	6500		0.006	0.206	
175%	7000		0.007	0.206	
188%	7500		0.007	0.207	
200%	8000		0.008	0.207	
213%	8500		0.008	0.207	
225%	9000		0.009	0.208	
238%	9500		0.009	0.208	
250%	10000		0.010	0.209	
0%	0		0.000	0.199	





Tension Load Test Result for PLT-05A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/10/2024

Pile Information

Pile Information

Pile ID: PLT-05A

Latitude [deg.]: 45.60946

Longitude[deg.]: -120.62043

Pile Type: W6X9

Pile Embedment Depth [in.]: 5.9

Pile Diameter [in.]: 5.9

Pile Stick-Up [in.]: 48

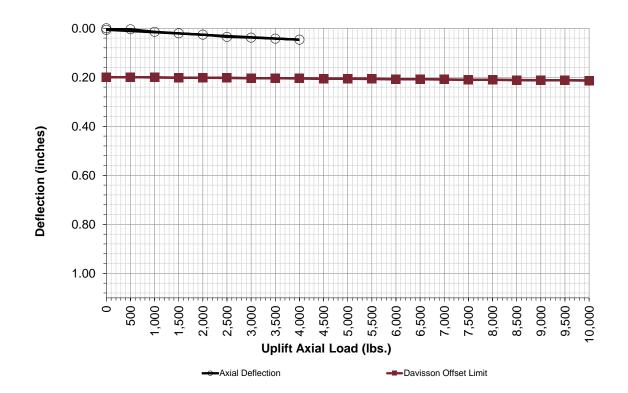
Axial Design Load [lbs.]: 4,000

Pile Area [sq. in.]: 2.96

Elastic Modulus [ksi.]: 29,000

Drive Time [sec.]: 36.26

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
13%	500	0.004	0.001	0.200	
25%	1000	0.015	0.001	0.201	
38%	1500	0.021	0.002	0.201	
50%	2000	0.026	0.003	0.202	
63%	2500	0.035	0.003	0.203	
75%	3000	0.038	0.004	0.203	
88%	3500	0.043	0.005	0.204	
100%	4000	0.047	0.006	0.205	
113%	4500		0.006	0.205	
125%	5000		0.007	0.206	
138%	5500		0.008	0.207	
150%	6000		0.008	0.208	
163%	6500		0.009	0.208	
175%	7000		0.010	0.209	
188%	7500		0.010	0.210	
200%	8000		0.011	0.210	
213%	8500		0.012	0.211	
225%	9000		0.013	0.212	
238%	9500		0.013	0.212	
250%	10000		0.014	0.213	
0%	0	0.007	0.000	0.199	





Tension Load Test Result for PLT-05B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillion Ed Junior

Test Date and Representative

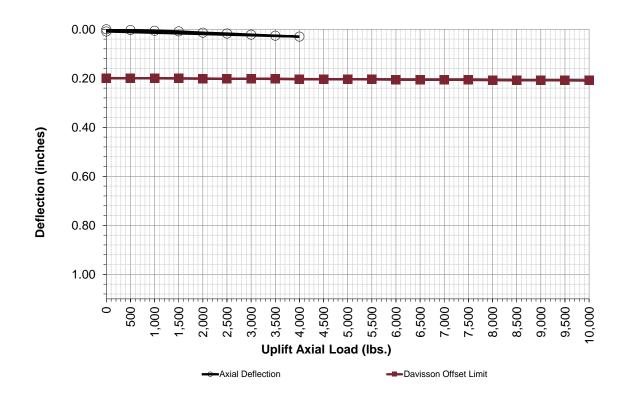
Tested By Terracon Rep: David
Date Tested: 4/10/2024

Pile Information

Pile ID: PLT-05B
Latitude [deg.]: 45.60946
Longitude[deg.]: -120.62043
Pile Type: W6X9

Pile Embedment Depth [in.]: 5.9
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 48
Axial Design Load [lbs.]: 4,000
Pile Area [sq. in.]: 2.96
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 20.99

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
13%	500	0.003	0.000	0.200	
25%	1000	0.006	0.001	0.200	
38%	1500	0.009	0.001	0.201	
50%	2000	0.014	0.002	0.201	
63%	2500	0.018	0.002	0.202	
75%	3000	0.022	0.003	0.202	
88%	3500	0.026	0.003	0.203	
100%	4000	0.030	0.004	0.203	
113%	4500		0.004	0.204	
125%	5000		0.005	0.204	
138%	5500		0.005	0.205	
150%	6000		0.006	0.205	
163%	6500		0.006	0.206	
175%	7000		0.007	0.206	
188%	7500		0.007	0.207	
200%	8000		0.008	0.207	
213%	8500		0.008	0.207	
225%	9000		0.009	0.208	
238%	9500		0.009	0.208	
250%	10000		0.010	0.209	
0%	0	0.009	0.000	0.199	





Tension Load Test Result for PLT-06A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillion Ed Junior

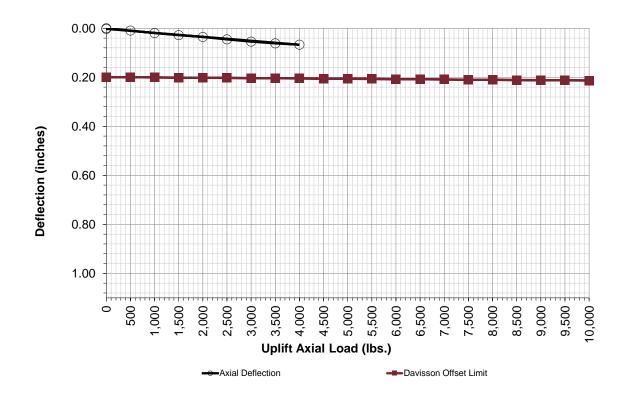
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/10/2024

Pile Information

Pile ID: PLT-06A
Latitude [deg.]: 45.61345
Longitude[deg.]: -120.63250
W6X9
Pile Embedment Depth [in.]: 5.9
Pile Stick-Up [in.]: 48
Axial Design Load [lbs.]: 4,000
Pile Atte Modulus [ksi.]: 29,000
Drive Time [sec.]: 76.39

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
13%	500	0.010	0.001	0.200	
25%	1000	0.020	0.001	0.201	
38%	1500	0.028	0.002	0.201	
50%	2000	0.036	0.003	0.202	
63%	2500	0.046	0.003	0.203	
75%	3000	0.055	0.004	0.203	
88%	3500	0.062	0.005	0.204	
100%	4000	0.067	0.006	0.205	
113%	4500		0.006	0.205	
125%	5000		0.007	0.206	
138%	5500		0.008	0.207	
150%	6000		0.008	0.208	
163%	6500		0.009	0.208	
175%	7000		0.010	0.209	
188%	7500		0.010	0.210	
200%	8000		0.011	0.210	
213%	8500		0.012	0.211	
225%	9000		0.013	0.212	
238%	9500		0.013	0.212	
250%	10000		0.014	0.213	
0%	0	0.003	0.000	0.199	





Tension Load Test Result for PLT-06B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/10/2024

Pile Information

Pile Information

Pile ID: PLT-06B

Latitude [deg.]: 45.61345

Longitude[deg.]: -120.63250

Pile Type: W6X9

Pile Embedment Depth [in.]: 84

Pile Diameter [in.]: 5.9

Pile Stick-Up [in.]: 48

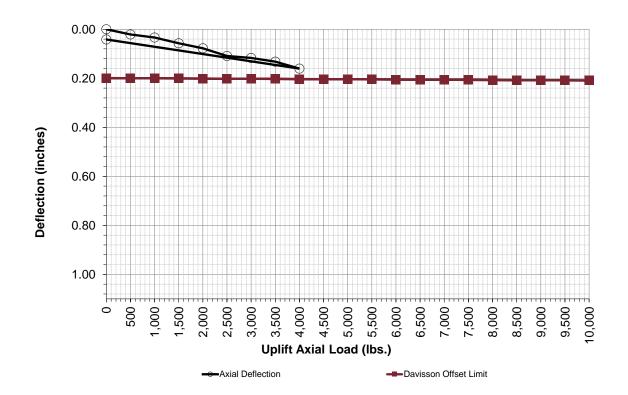
Axial Design Load [lbs.]: 4,000

Pile Area [sq. in.]: 2.96

Elastic Modulus [ksi.]: 29,000

Drive Time [sec.]: 16.8

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
13%	500	0.021	0.000	0.200	
25%	1000	0.034	0.001	0.200	
38%	1500	0.057	0.001	0.201	
50%	2000	0.078	0.002	0.201	
63%	2500	0.109	0.002	0.202	
75%	3000	0.117	0.003	0.202	
88%	3500	0.132	0.003	0.203	
100%	4000	0.161	0.004	0.203	
113%	4500		0.004	0.204	
125%	5000		0.005	0.204	
138%	5500		0.005	0.205	
150%	6000		0.006	0.205	
163%	6500		0.006	0.206	
175%	7000		0.007	0.206	
188%	7500		0.007	0.207	
200%	8000		0.008	0.207	
213%	8500		0.008	0.207	
225%	9000		0.009	0.208	
238%	9500		0.009	0.208	
250%	10000		0.010	0.209	
0%	0	0.042	0.000	0.199	





Tension Load Test Result for PLT-07A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/11/2024

Pile Information

Pile In: PLT-07A

Latitude [deg.]: 45.60635

Longitude[deg.]: -120.64196

Pile Type: W6X9

Pile Embedment Depth [in.]: 96

Pile Diameter [in.]: 5.9

Pile Stick-Up [in.]: 48

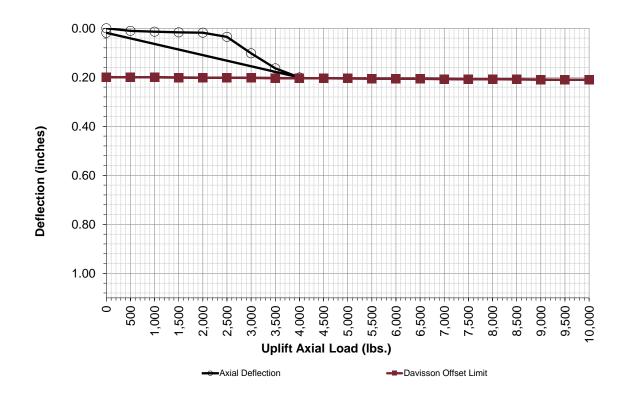
Axial Design Load [lbs.]: 4,000

Pile Area [sq. in.]: 2.96

Elastic Modulus [ksi.]: 29,000

Drive Time [sec.]: 15.75

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
13%	500	0.011	0.001	0.200	
25%	1000	0.014	0.001	0.200	
38%	1500	0.017	0.002	0.201	
50%	2000	0.018	0.002	0.201	
63%	2500	0.035	0.003	0.202	
75%	3000	0.102	0.003	0.203	
88%	3500	0.164	0.004	0.203	
100%	4000	0.201	0.004	0.204	
113%	4500		0.005	0.204	
125%	5000		0.006	0.205	
138%	5500		0.006	0.205	
150%	6000		0.007	0.206	
163%	6500		0.007	0.206	
175%	7000		0.008	0.207	
188%	7500		0.008	0.208	
200%	8000		0.009	0.208	
213%	8500		0.010	0.209	
225%	9000		0.010	0.209	
238%	9500		0.011	0.210	
250%	10000		0.011	0.210	
0%	0	0.019	0.000	0.199	





Tension Load Test Result for PLT-07B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillion Ed Junior

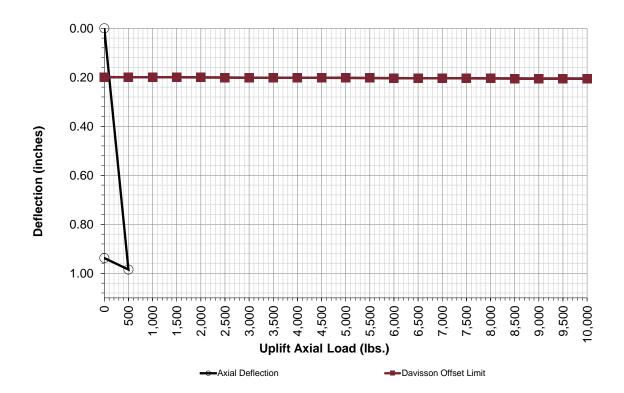
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/11/2024

Pile Information

Pile ID: PLT-07B
Latitude [deg.]: 45.60635
Longitude[deg.]: -120.64196
Pile Type: W6X9
Pile Embedment Depth [in.]: 60
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 48
Axial Design Load [lbs.]: 4,000
Pile Area [sq. in.]: 29,6
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 5.21

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
13%	500	0.985	0.000	0.200	
25%	1000		0.001	0.200	
38%	1500		0.001	0.200	
50%	2000		0.001	0.201	
63%	2500		0.002	0.201	
75%	3000		0.002	0.201	
88%	3500		0.002	0.202	
100%	4000		0.003	0.202	
113%	4500		0.003	0.202	
125%	5000		0.003	0.203	
138%	5500		0.004	0.203	
150%	6000		0.004	0.203	
163%	6500		0.005	0.204	
175%	7000		0.005	0.204	
188%	7500		0.005	0.204	
200%	8000		0.006	0.205	
213%	8500		0.006	0.205	
225%	9000		0.006	0.205	
238%	9500		0.007	0.206	
250%	10000		0.007	0.206	
0%	0	0.938	0.000	0.199	





Tension Load Test Result for PLT-08A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/11/2024

Pile Information

Pile Inc.

Pile ID:

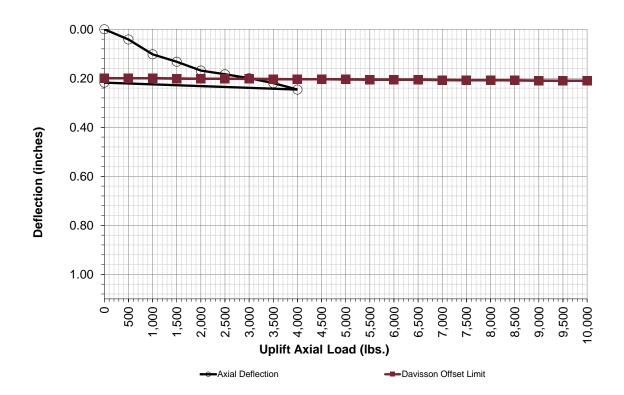
Latitude [deg.]:
45.61018

Longitude[deg.]:
-120.64516

W6X9

Pile Embedment Depth [in.]:
Pile Diameter [in.]:
Pile Stick-Up [in.]:
Axial Design Load [lbs.]:
Pile Area [sq. in.]:
Elastic Modulus [ksi.]:
29,000
Drive Time [sec.]:

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
13%	500	0.042	0.001	0.200	
25%	1000	0.102	0.001	0.200	
38%	1500	0.133	0.002	0.201	
50%	2000	0.169	0.002	0.201	
63%	2500	0.184	0.003	0.202	
75%	3000	0.200	0.003	0.203	
88%	3500	0.220	0.004	0.203	
100%	4000	0.246	0.004	0.204	
113%	4500		0.005	0.204	
125%	5000		0.006	0.205	
138%	5500		0.006	0.205	
150%	6000		0.007	0.206	
163%	6500		0.007	0.206	
175%	7000		0.008	0.207	
188%	7500		0.008	0.208	
200%	8000		0.009	0.208	
213%	8500		0.010	0.209	
225%	9000		0.010	0.209	
238%	9500		0.011	0.210	
250%	10000		0.011	0.210	
0%	0	0.218	0.000	0.199	





Tension Load Test Result for PLT-08B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillion Ed Junior

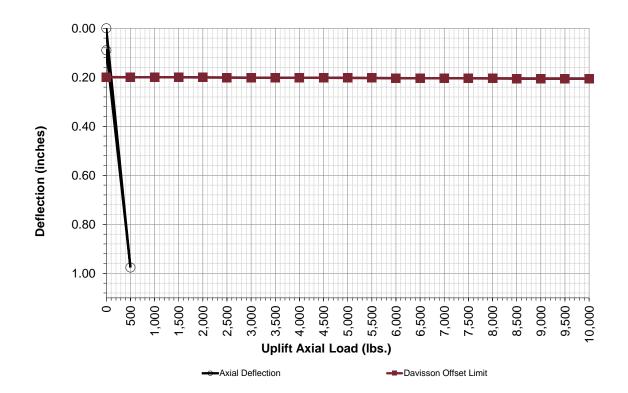
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/11/2024

Pile Information

Pile ID: PLT-08B
Latitude [deg.]: 45.61018
Longitude[deg.]: -120.64516
Pile Type: W6X9
Pile Embedment Depth [in.]: 5.9
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 48
Axial Design Load [lbs.]: 4,000
Pile Area [sq. in.]: 2.96
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 0.55

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
13%	500	0.976	0.000	0.200	
25%	1000		0.001	0.200	
38%	1500		0.001	0.200	
50%	2000		0.001	0.201	
63%	2500		0.002	0.201	
75%	3000		0.002	0.201	
88%	3500		0.002	0.202	
100%	4000		0.003	0.202	
113%	4500		0.003	0.202	
125%	5000		0.003	0.203	
138%	5500		0.004	0.203	
150%	6000		0.004	0.203	
163%	6500		0.005	0.204	
175%	7000		0.005	0.204	
188%	7500		0.005	0.204	
200%	8000		0.006	0.205	
213%	8500		0.006	0.205	
225%	9000		0.006	0.205	
238%	9500		0.007	0.206	
250%	10000		0.007	0.206	
0%	0	0.090	0.000	0.199	





Tension Load Test Result for PLT-09A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/11/2024

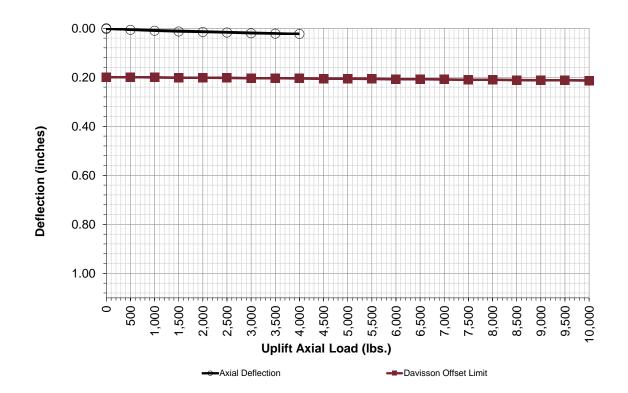
Pile Information

Pile ID: PLT-09A
Latitude [deg.]: 45.61774
Longitude[deg.]: -120.64554
Pile Type: W6X9

Pile Embedment Depth [in.]: 5.9
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 48

Axial Design Load [lbs.]: 4,000
Pile Area [sq. in.]: 2.96
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 24.32

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
13%	500	0.007	0.001	0.200	
25%	1000	0.010	0.001	0.201	
38%	1500	0.013	0.002	0.201	
50%	2000	0.015	0.003	0.202	
63%	2500	0.018	0.003	0.203	
75%	3000	0.021	0.004	0.203	
88%	3500	0.022	0.005	0.204	
100%	4000	0.023	0.006	0.205	
113%	4500		0.006	0.205	
125%	5000		0.007	0.206	
138%	5500		0.008	0.207	
150%	6000		0.008	0.208	
163%	6500		0.009	0.208	
175%	7000		0.010	0.209	
188%	7500		0.010	0.210	
200%	8000		0.011	0.210	
213%	8500		0.012	0.211	
225%	9000		0.013	0.212	
238%	9500		0.013	0.212	
250%	10000		0.014	0.213	
0%	0	0.003	0.000	0.199	





Tension Load Test Result for PLT-09B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillion Ed Junior

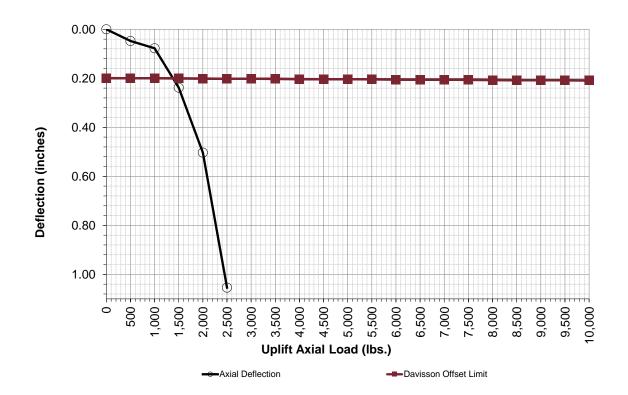
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/11/2024

Pile Information

Pile ID: PLT-09B
Latitude [deg.]: 45.61774
Longitude[deg.]: -120.64554
Pile Type: W6X9
Pile Embedment Depth [in.]: 84
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 48
Axial Design Load [lbs.]: 4,000
Pile Area [sq. in.]: 2.96
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 10.18

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
13%	500	0.048	0.000	0.200	
25%	1000	0.078	0.001	0.200	
38%	1500	0.238	0.001	0.201	
50%	2000	0.503	0.002	0.201	
63%	2500	1.054	0.002	0.202	
75%	3000		0.003	0.202	
88%	3500		0.003	0.203	
100%	4000		0.004	0.203	
113%	4500		0.004	0.204	
125%	5000		0.005	0.204	
138%	5500		0.005	0.205	
150%	6000		0.006	0.205	
163%	6500		0.006	0.206	
175%	7000		0.007	0.206	
188%	7500		0.007	0.207	
200%	8000		0.008	0.207	
213%	8500		0.008	0.207	
225%	9000		0.009	0.208	
238%	9500		0.009	0.208	
250%	10000		0.010	0.209	
0%	0		0.000	0.199	





Tension Load Test Result for PLT-10A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillion Ed Junior

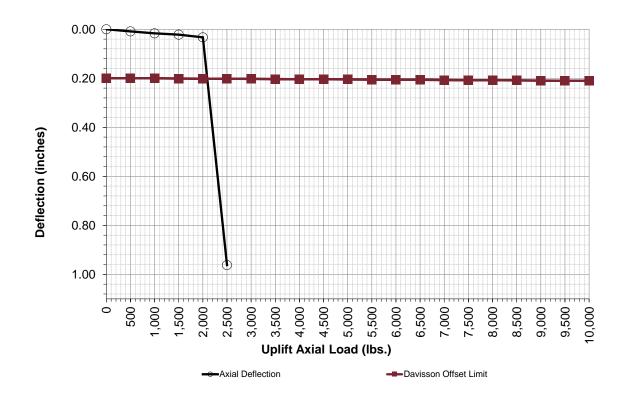
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/10/2024

Pile Information

Pile ID: PLT-10A
Latitude [deg.]: 45.62470
Longitude[deg.]: -120.62967
Pile Type: W6X9
Pile Embedment Depth [in.]: 96
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 48
Axial Design Load [lbs.]: 4,000
Pile Area [sq. in.]: 29,6
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 6.23

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
13%	500	0.009	0.001	0.200	
25%	1000	0.017	0.001	0.200	
38%	1500	0.022	0.002	0.201	
50%	2000	0.033	0.002	0.201	
63%	2500	0.962	0.003	0.202	
75%	3000		0.003	0.203	
88%	3500		0.004	0.203	
100%	4000		0.004	0.204	
113%	4500		0.005	0.204	
125%	5000		0.006	0.205	
138%	5500		0.006	0.205	
150%	6000		0.007	0.206	
163%	6500		0.007	0.206	
175%	7000		0.008	0.207	
188%	7500		0.008	0.208	
200%	8000		0.009	0.208	
213%	8500		0.010	0.209	
225%	9000		0.010	0.209	
238%	9500		0.011	0.210	
250%	10000		0.011	0.210	
0%	0		0.000	0.199	





Tension Load Test Result for PLT-10B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillion Ed Junior

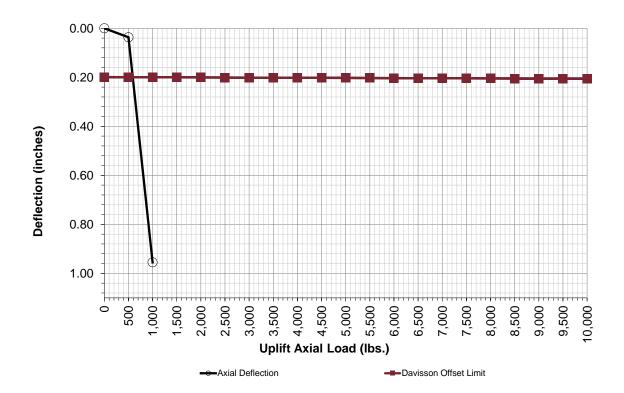
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/10/2024

Pile Information

Pile ID:
Latitude [deg.]:
Longitude[deg.]:
Pile Type:
Pile Embedment Depth [in.]:
Pile Diameter [in.]:
Pile Stick-Up [in.]:
Axial Design Load [lbs.]:
Pile Area [sq. in.]:
Elastic Modulus [ksi.]:
Prive Time [sec.]:
Pile T-10B
45.62470
-120.62967
W6X9
46X9
4700
48
48
4,000
2.96
Elastic Modulus [ksi.]:
29,000
Drive Time [sec.]:

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
13%	500	0.037	0.000	0.200	
25%	1000	0.955	0.001	0.200	
38%	1500		0.001	0.200	
50%	2000		0.001	0.201	
63%	2500		0.002	0.201	
75%	3000		0.002	0.201	
88%	3500		0.002	0.202	
100%	4000		0.003	0.202	
113%	4500		0.003	0.202	
125%	5000		0.003	0.203	
138%	5500		0.004	0.203	
150%	6000		0.004	0.203	
163%	6500		0.005	0.204	
175%	7000		0.005	0.204	
188%	7500		0.005	0.204	
200%	8000		0.006	0.205	
213%	8500		0.006	0.205	
225%	9000		0.006	0.205	
238%	9500		0.007	0.206	
250%	10000		0.007	0.206	
0%	0		0.000	0.199	





Tension Load Test Result for PLT-11A

Project Information

Project Name: Biglow Solar Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillon Ed Junior

Test Date and Representative

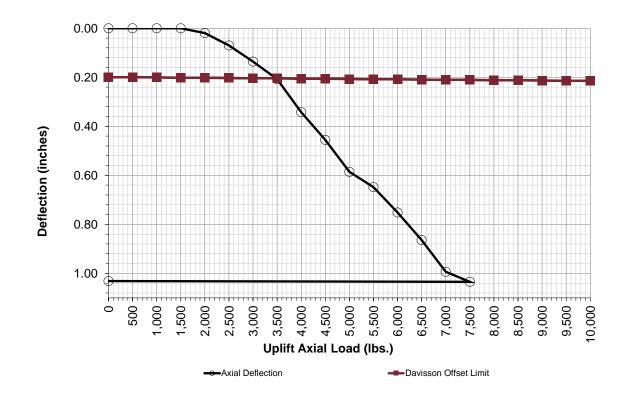
Tested By Terracon Rep: CAS

Date Tested: 5/2/2024

Pile Information

Pile ID: PLT-11A
Latitude [deg.]: 45.59109
Longitude[deg.]: -120.65643
Pile Type: W6x9
Pile Embedment Depth [in.]: 5.9
Pile Stick-Up [in.]: 48
Axial Design Load [lbs.]: 10,000
Pile Aste [sq. in.]: 2.68
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 6.65

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
5%	500	0.000	0.001	0.200	
10%	1000	0.000	0.002	0.201	
15%	1500	0.000	0.002	0.201	
20%	2000	0.020	0.003	0.202	
25%	2500	0.070	0.004	0.203	
30%	3000	0.136	0.005	0.204	
35%	3500	0.208	0.005	0.205	
40%	4000	0.343	0.006	0.205	
45%	4500	0.456	0.007	0.206	
50%	5000	0.586	0.008	0.207	
55%	5500	0.648	0.008	0.208	
60%	6000	0.752	0.009	0.208	
65%	6500	0.864	0.010	0.209	
70%	7000	0.994	0.011	0.210	
75%	7500	1.035	0.012	0.211	
80%	8000		0.012	0.212	
85%	8500		0.013	0.212	
90%	9000		0.014	0.213	
95%	9500		0.015	0.214	
100%	10000		0.015	0.215	
0%	0	1.032	0.000	0.199	





Tension Load Test Result for PLT-11B

Project Information

Project Name: Biglow Solar Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillon Ed Junior

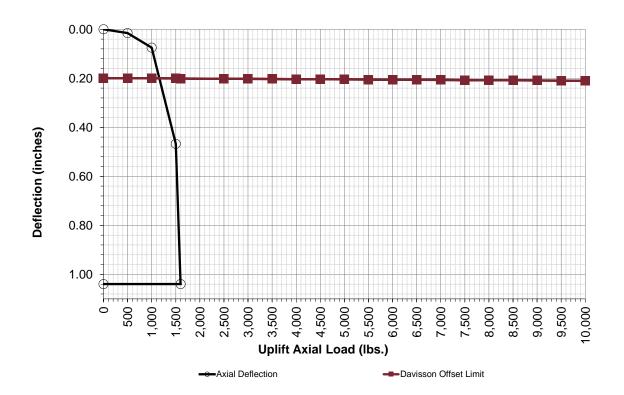
Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/2/2024

Pile Information

Pile ID: PLT-11B
Latitude [deg.]: 45.59109
Longitude[deg.]: -120.65643
Pile Type: W6x9
Pile Embedment Depth [in.]: 84
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 48
Axial Design Load [lbs.]: 10,000
Pile Area [sq. in.]: 2.68
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 6

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
5%	500	0.016	0.001	0.200	
10%	1000	0.075	0.001	0.200	
15%	1500	0.468	0.002	0.201	
16%	1600	1.040	0.002	0.201	
25%	2500		0.003	0.202	
30%	3000		0.003	0.202	
35%	3500		0.004	0.203	
40%	4000		0.004	0.203	
45%	4500		0.005	0.204	
50%	5000		0.005	0.205	
55%	5500		0.006	0.205	
60%	6000		0.006	0.206	
65%	6500		0.007	0.206	
70%	7000		0.008	0.207	
75%	7500		0.008	0.207	
80%	8000		0.009	0.208	
85%	8500		0.009	0.208	
90%	9000		0.010	0.209	
95%	9500		0.010	0.209	
100%	10000		0.011	0.210	
0%	0	1.040	0.000	0.199	





Tension Load Test Result for PLT-12A

Project Information

Project Name: Biglow Solar Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

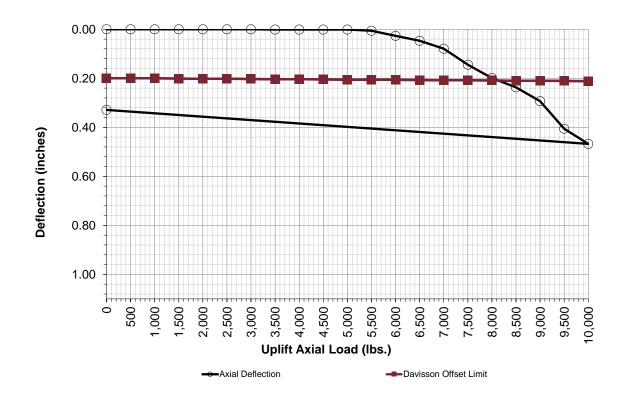
Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillon Ed Junior

Test Date and Representative

Tested By Terracon Rep: CAS Date Tested: 5/2/2024

Pile Information Pile ID: PLT-12A Latitude [deg.]: 45.58466 Longitude[deg.]: -120.64912 Pile Type: W6x9 Pile Embedment Depth [in.]: 96 Pile Diameter [in.]: 5.9 Pile Stick-Up [in.]: 48 Axial Design Load [lbs.]: 10,000 Pile Area [sq. in.]: 2.68 Elastic Modulus [ksi.]: 29,000 Drive Time [sec.]: 4.79

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
5%	500	0.000	0.001	0.200	
10%	1000	0.000	0.001	0.200	
15%	1500	0.000	0.002	0.201	
20%	2000	0.000	0.002	0.202	
25%	2500	0.000	0.003	0.202	
30%	3000	0.000	0.004	0.203	
35%	3500	0.001	0.004	0.203	
40%	4000	0.001	0.005	0.204	
45%	4500	0.001	0.006	0.205	
50%	5000	0.001	0.006	0.205	
55%	5500	0.006	0.007	0.206	
60%	6000	0.027	0.007	0.207	
65%	6500	0.047	0.008	0.207	
70%	7000	0.079	0.009	0.208	
75%	7500	0.145	0.009	0.208	
80%	8000	0.199	0.010	0.209	
85%	8500	0.237	0.010	0.210	
90%	9000	0.294	0.011	0.210	
95%	9500	0.406	0.012	0.211	
100%	10000	0.468	0.012	0.212	
0%	0	0.329	0.000	0.199	





Tension Load Test Result for PLT-12B

Project Information

Project Name: Biglow Solar Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillon Ed Junior

Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/2/2024

Pile Information

Pile ID: PLT-12B

Latitude [deg.]: 45.58466

Longitude[deg.]: -120.64912

Pile Type: W6x9

Pile Embedment Depth [in.]: 60

Pile Diameter [in.]: 48

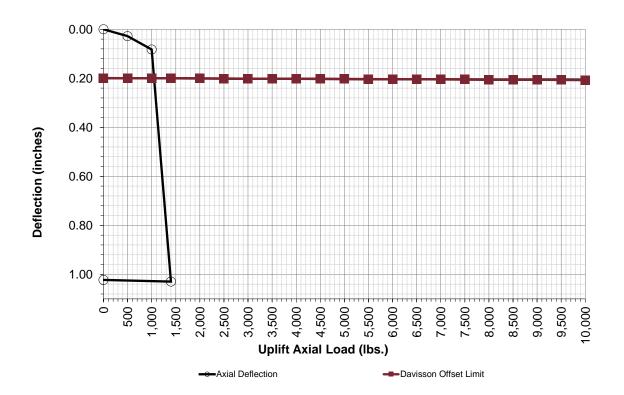
Axial Design Load [lbs.]: 10,000

Pile Area [sq. in.]: 2.68

Elastic Modulus [ksi.]: 29,000

Drive Time [sec.]: 2.08

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
5%	500	0.028	0.000	0.200	
10%	1000	0.083	0.001	0.200	
14%	1400	1.030	0.001	0.200	
20%	2000		0.002	0.201	
25%	2500		0.002	0.201	
30%	3000		0.002	0.201	
35%	3500		0.003	0.202	
40%	4000		0.003	0.202	
45%	4500		0.003	0.203	
50%	5000		0.004	0.203	
55%	5500		0.004	0.203	
60%	6000		0.005	0.204	
65%	6500		0.005	0.204	
70%	7000		0.005	0.205	
75%	7500		0.006	0.205	
80%	8000		0.006	0.205	
85%	8500		0.007	0.206	
90%	9000		0.007	0.206	
95%	9500		0.007	0.207	
100%	10000		0.008	0.207	
0%	0	1.023	0.000	0.199	





Tension Load Test Result for PLT-13A

Project Information

Project Name: Biglow Solar Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillon Ed Junior

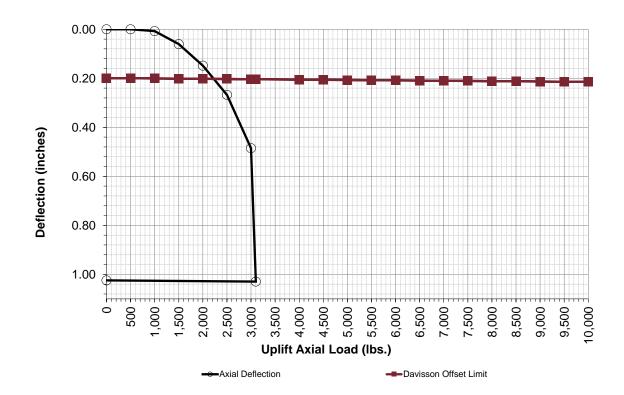
Test Date and Representative

Tested By Terracon Rep: CAS Date Tested: 5/2/2024

Pile Information

Pile ID: PLT-13A Latitude [deg.]: 45.65586 Longitude[deg.]: -120.62025 Pile Type: W6x9 Pile Embedment Depth [in.]: 120 Pile Diameter [in.]: 5.9 Pile Stick-Up [in.]: 48 Axial Design Load [lbs.]: 10,000 Pile Area [sq. in.]: 2.68 Elastic Modulus [ksi.]: 29,000 Drive Time [sec.]: 10.07

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection ∆ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
5%	500	0.000	0.001	0.200	
10%	1000	0.008	0.002	0.201	
15%	1500	0.061	0.002	0.201	
20%	2000	0.149	0.003	0.202	
25%	2500	0.268	0.004	0.203	
30%	3000	0.485	0.005	0.204	
31%	3100	1.030	0.005	0.204	
40%	4000		0.006	0.205	
45%	4500		0.007	0.206	
50%	5000		0.008	0.207	
55%	5500		0.008	0.208	
60%	6000		0.009	0.208	
65%	6500		0.010	0.209	
70%	7000		0.011	0.210	
75%	7500		0.012	0.211	
80%	8000		0.012	0.212	
85%	8500		0.013	0.212	
90%	9000		0.014	0.213	
95%	9500		0.015	0.214	
100%	10000		0.015	0.215	
0%	0	1.025	0.000	0.199	





Tension Load Test Result for PLT-13B

Project Information

Project Name: Biglow Solar Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillon Ed Junior

Test Date and Representative

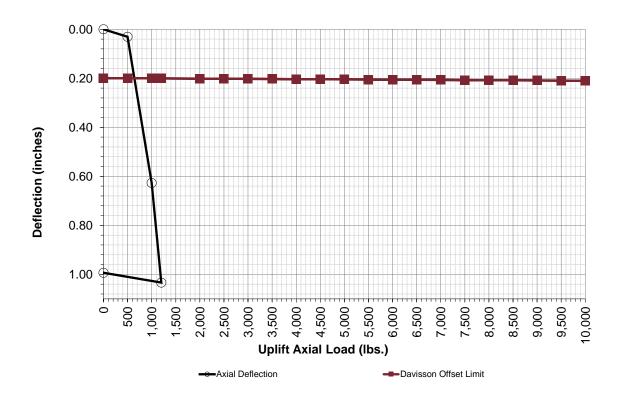
Tested By Terracon Rep: CAS

Date Tested: 5/2/2024

Pile Information

Pile ID: PLT-13B
Latitude [deg.]: 45.65586
Longitude[deg.]: Pile Type: W6x9
Pile Embedment Depth [in.]: 84
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 48
Axial Design Load [ibs.]: 10,000
Pile Area [sq. in.]: 268
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 4.59

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
5%	500	0.031	0.001	0.200	
10%	1000	0.627	0.001	0.200	
12%	1200	1.034	0.001	0.200	
20%	2000		0.002	0.201	
25%	2500		0.003	0.202	
30%	3000		0.003	0.202	
35%	3500		0.004	0.203	
40%	4000		0.004	0.203	
45%	4500		0.005	0.204	
50%	5000		0.005	0.205	
55%	5500		0.006	0.205	
60%	6000		0.006	0.206	
65%	6500		0.007	0.206	
70%	7000		0.008	0.207	
75%	7500		0.008	0.207	
80%	8000		0.009	0.208	
85%	8500		0.009	0.208	
90%	9000		0.010	0.209	
95%	9500		0.010	0.209	
100%	10000		0.011	0.210	
0%	0	0.994	0.000	0.199	





Tension Load Test Result for PLT-14A

Project Information

Project Name: Biglow Solar Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

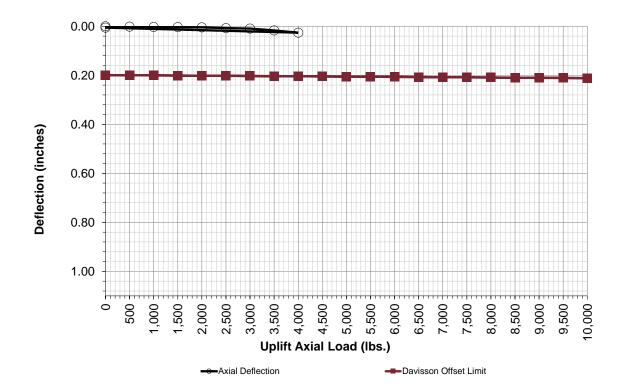
Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillon Ed Junior

Test Date and Representative

Tested By Terracon Rep: CAS Date Tested: 5/1/2024

Pile Information Pile ID: PLT-14A Latitude [deg.]: 45.64247 Longitude[deg.]: -120.60591 Pile Type: W6x9 Pile Embedment Depth [in.]: 96 Pile Diameter [in.]: 5.9 Pile Stick-Up [in.]: 48 Axial Design Load [lbs.]: 10,000 Pile Area [sq. in.]: 2.68 Elastic Modulus [ksi.]: 29,000 Drive Time [sec.]: 17.72

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
5%	500	0.002	0.001	0.200	
10%	1000	0.003	0.001	0.200	
15%	1500	0.004	0.002	0.201	
20%	2000	0.005	0.002	0.202	
25%	2500	0.008	0.003	0.202	
30%	3000	0.010	0.004	0.203	
35%	3500	0.017	0.004	0.203	
40%	4000	0.026	0.005	0.204	
45%	4500		0.006	0.205	
50%	5000		0.006	0.205	
55%	5500		0.007	0.206	
60%	6000		0.007	0.207	
65%	6500		0.008	0.207	
70%	7000		0.009	0.208	
75%	7500		0.009	0.208	
80%	8000		0.010	0.209	
85%	8500		0.010	0.210	
90%	9000		0.011	0.210	
95%	9500		0.012	0.211	
100%	10000		0.012	0.212	
0%	0	0.006	0.000	0.199	





Tension Load Test Result for PLT-14B

Project Information

Project Name: Biglow Solar Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillon Ed Junior

Test Date and Representative

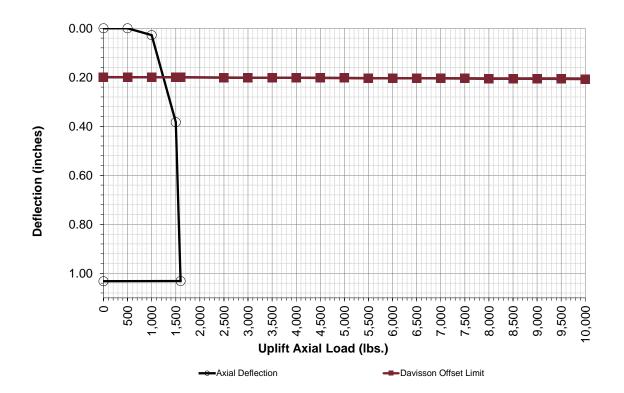
Tested By Terracon Rep: CAS

Date Tested: 5/1/2024

Pile Information

Pile ID: Latitude [deg.]: 45.64247
Longitude[deg.]: -120.60591
Pile Type: W6x9
Pile Embedment Depth [in.]: 60
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 48
Axial Design Load [lbs.]: 10,000
Pile Area [sq. in.]: 2.68
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 1.01

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
5%	500	0.000	0.000	0.200	
10%	1000	0.028	0.001	0.200	
15%	1500	0.383	0.001	0.200	
16%	1600	1.032	0.001	0.200	
25%	2500		0.002	0.201	
30%	3000		0.002	0.201	
35%	3500		0.003	0.202	
40%	4000		0.003	0.202	
45%	4500		0.003	0.203	
50%	5000		0.004	0.203	
55%	5500		0.004	0.203	
60%	6000		0.005	0.204	
65%	6500		0.005	0.204	
70%	7000		0.005	0.205	
75%	7500		0.006	0.205	
80%	8000		0.006	0.205	
85%	8500		0.007	0.206	
90%	9000		0.007	0.206	
95%	9500		0.007	0.207	
100%	10000		0.008	0.207	
0%	0	1.032	0.000	0.199	





Tension Load Test Result for PLT-15A

Project Information

Project Name: Biglow Solar Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

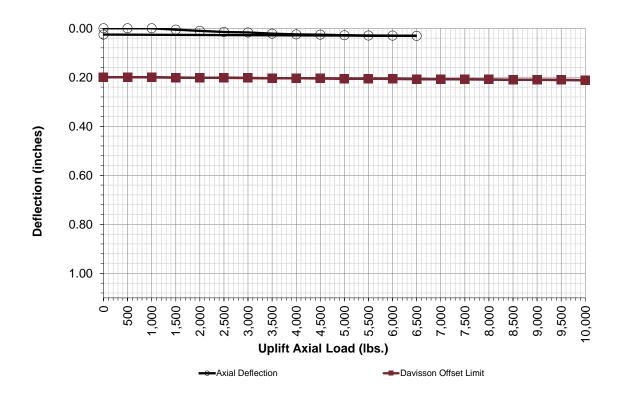
Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillon Ed Junior

Test Date and Representative

Tested By Terracon Rep: CAS Date Tested: 5/1/2024

Pile Information Pile ID: PLT-15A Latitude [deg.]: 45.64248 Longitude[deg.]: -120.59773 Pile Type: W6x9 Pile Embedment Depth [in.]: 96 Pile Diameter [in.]: 5.9 Pile Stick-Up [in.]: 48 Axial Design Load [lbs.]: 10,000 Pile Area [sq. in.]: 2.68 Elastic Modulus [ksi.]: 29,000 Drive Time [sec.]: 76.66

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
5%	500	0.000	0.001	0.200	
10%	1000	0.000	0.001	0.200	
15%	1500	0.006	0.002	0.201	
20%	2000	0.011	0.002	0.202	
25%	2500	0.015	0.003	0.202	
30%	3000	0.017	0.004	0.203	
35%	3500	0.022	0.004	0.203	
40%	4000	0.025	0.005	0.204	
45%	4500	0.026	0.006	0.205	
50%	5000	0.029	0.006	0.205	
55%	5500	0.030	0.007	0.206	
60%	6000	0.030	0.007	0.207	
65%	6500	0.031	0.008	0.207	
70%	7000		0.009	0.208	
75%	7500		0.009	0.208	
80%	8000		0.010	0.209	
85%	8500		0.010	0.210	
90%	9000		0.011	0.210	
95%	9500		0.012	0.211	
100%	10000		0.012	0.212	
0%	0	0.026	0.000	0.199	





Tension Load Test Result for PLT-15B

Project Information

Project Name: Biglow Solar Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

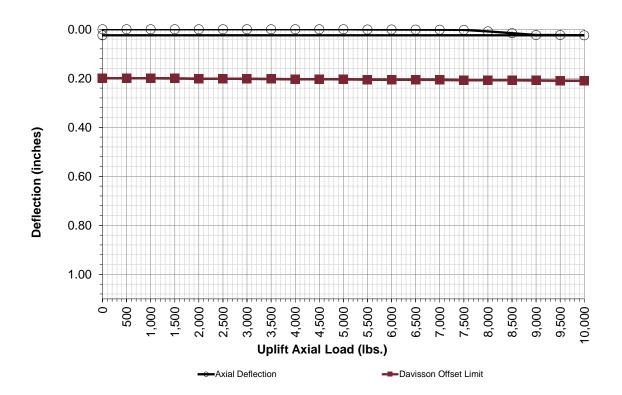
Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillon Ed Junior

Test Date and Representative

Tested By Terracon Rep: CAS Date Tested: 5/1/2024

Pile Information Pile ID: PLT-15B Latitude [deg.]: 45.64248 Longitude[deg.]: -120.59773 Pile Type: W6x9 Pile Embedment Depth [in.]: 84 Pile Diameter [in.]: 5.9 Pile Stick-Up [in.]: 48 Axial Design Load [lbs.]: 10,000 Pile Area [sq. in.]: 2.68 Elastic Modulus [ksi.]: 29,000 Drive Time [sec.]: 25.88

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection ∆ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
5%	500	0.000	0.001	0.200	
10%	1000	0.000	0.001	0.200	
15%	1500	0.000	0.002	0.201	
20%	2000	0.000	0.002	0.201	
25%	2500	0.000	0.003	0.202	
30%	3000	0.000	0.003	0.202	
35%	3500	0.000	0.004	0.203	
40%	4000	0.000	0.004	0.203	
45%	4500	0.000	0.005	0.204	
50%	5000	0.000	0.005	0.205	
55%	5500	0.001	0.006	0.205	
60%	6000	0.001	0.006	0.206	
65%	6500	0.002	0.007	0.206	
70%	7000	0.002	0.008	0.207	
75%	7500	0.003	0.008	0.207	
80%	8000	0.009	0.009	0.208	
85%	8500	0.016	0.009	0.208	
90%	9000	0.024	0.010	0.209	
95%	9500	0.024	0.010	0.209	
100%	10000	0.025	0.011	0.210	
0%	0	0.025	0.000	0.199	





Tension Load Test Result for PLT-16A

Project Information

Project Name: Biglow Solar Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillon Ed Junior

Test Date and Representative

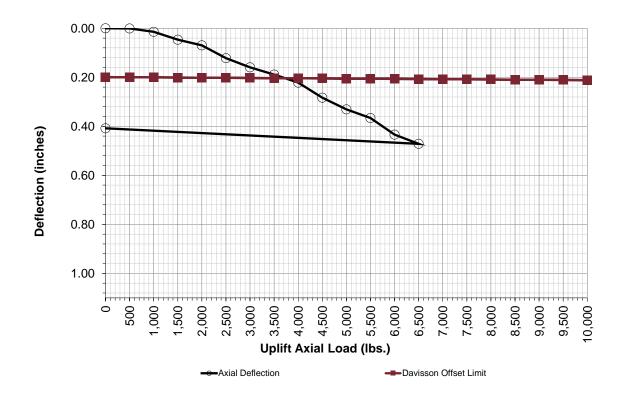
Tested By Terracon Rep: CAS

Date Tested: 5/1/2024

Pile Information

Pile ID: PLT-16A
Latitude [deg.]: 45.64944
Longitude[deg.]: -120.59293
Pile Type: W6x9
Pile Embedment Depth [in.]: 96
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 48
Axial Design Load [lbs.]: 10,000
Pile Area [sq. in.]: 2.68
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 13.19

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
5%	500	0.001	0.001	0.200	
10%	1000	0.015	0.001	0.200	
15%	1500	0.047	0.002	0.201	
20%	2000	0.070	0.002	0.202	
25%	2500	0.122	0.003	0.202	
30%	3000	0.160	0.004	0.203	
35%	3500	0.189	0.004	0.203	
40%	4000	0.222	0.005	0.204	
45%	4500	0.283	0.006	0.205	
50%	5000	0.331	0.006	0.205	
55%	5500	0.366	0.007	0.206	
60%	6000	0.434	0.007	0.207	
65%	6500	0.472	0.008	0.207	
70%	7000		0.009	0.208	
75%	7500		0.009	0.208	
80%	8000		0.010	0.209	
85%	8500		0.010	0.210	
90%	9000		0.011	0.210	
95%	9500		0.012	0.211	
100%	10000		0.012	0.212	
0%	0	0.408	0.000	0.199	





Tension Load Test Result for PLT-16B

Project Information

Project Name: Biglow Solar Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

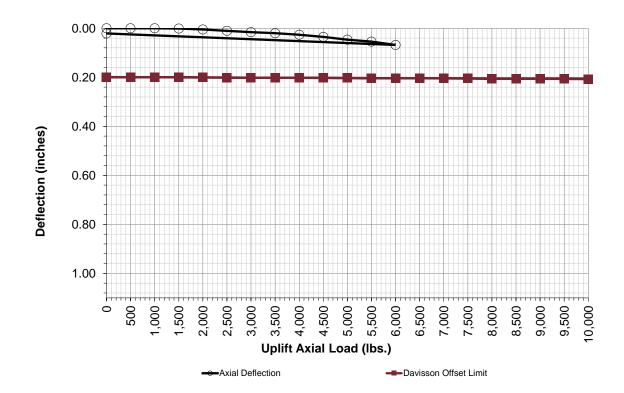
Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillon Ed Junior

Test Date and Representative

Tested By Terracon Rep: CAS Date Tested: 5/1/2024

Pile Information Pile ID: PLT-16B Latitude [deg.]: 45.64944 Longitude[deg.]: -120.59293 Pile Type: W6x9 Pile Embedment Depth [in.]: 60 Pile Diameter [in.]: 5.9 Pile Stick-Up [in.]: 48 Axial Design Load [lbs.]: 10,000 Pile Area [sq. in.]: 2.68 Elastic Modulus [ksi.]: 29,000 Drive Time [sec.]: 1.97

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
5%	500	0.000	0.000	0.200	
10%	1000	0.000	0.001	0.200	
15%	1500	0.001	0.001	0.200	
20%	2000	0.005	0.002	0.201	
25%	2500	0.011	0.002	0.201	
30%	3000	0.016	0.002	0.201	
35%	3500	0.020	0.003	0.202	
40%	4000	0.027	0.003	0.202	
45%	4500	0.035	0.003	0.203	
50%	5000	0.047	0.004	0.203	
55%	5500	0.055	0.004	0.203	
60%	6000	0.068	0.005	0.204	
65%	6500		0.005	0.204	
70%	7000		0.005	0.205	
75%	7500		0.006	0.205	
80%	8000		0.006	0.205	
85%	8500		0.007	0.206	
90%	9000		0.007	0.206	
95%	9500		0.007	0.207	
100%	10000		0.008	0.207	
0%	0	0.021	0.000	0.199	





Tension Load Test Result for PLT-17A

Project Information

Project Name: Biglow Solar Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

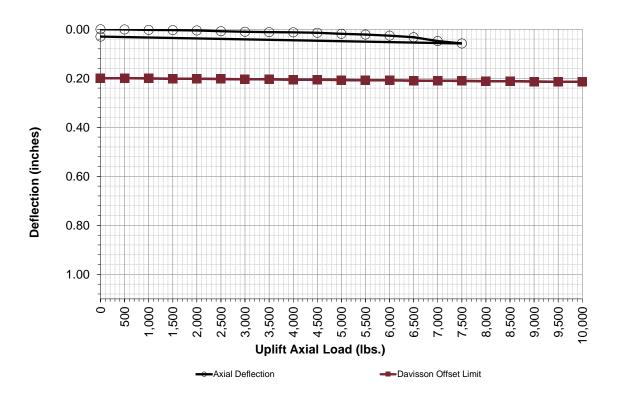
Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillon Ed Junior

Test Date and Representative

Tested By Terracon Rep: CAS Date Tested: 5/1/2024

Pile Information Pile ID: PLT-17A Latitude [deg.]: 45.65780 Longitude[deg.]: -120.59221 Pile Type: W6x9 Pile Embedment Depth [in.]: 120 Pile Diameter [in.]: 5.9 Pile Stick-Up [in.]: 48
Axial Design Load [lbs.]: 10,000 Pile Area [sq. in.]: 2.68 Elastic Modulus [ksi.]: 29,000 Drive Time [sec.]: 8.6

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection ∆ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
5%	500	0.001	0.001	0.200	
10%	1000	0.003	0.002	0.201	
15%	1500	0.004	0.002	0.201	
20%	2000	0.005	0.003	0.202	
25%	2500	0.008	0.004	0.203	
30%	3000	0.010	0.005	0.204	
35%	3500	0.012	0.005	0.205	
40%	4000	0.013	0.006	0.205	
45%	4500	0.015	0.007	0.206	
50%	5000	0.019	0.008	0.207	
55%	5500	0.022	0.008	0.208	
60%	6000	0.026	0.009	0.208	
65%	6500	0.033	0.010	0.209	
70%	7000	0.048	0.011	0.210	
75%	7500	0.058	0.012	0.211	
80%	8000		0.012	0.212	
85%	8500		0.013	0.212	
90%	9000		0.014	0.213	
95%	9500		0.015	0.214	
100%	10000		0.015	0.215	
0%	0	0.030	0.000	0.199	





Tension Load Test Result for PLT-17B

Project Information

Project Name: Biglow Solar Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillon Ed Junior

Test Date and Representative

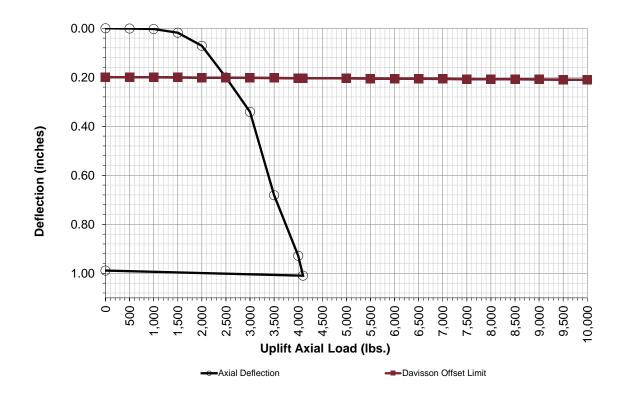
Tested By Terracon Rep: CAS

Date Tested: 5/1/2024

Pile Information

Pile ID: PLT-17B
Latitude [deg.]: 45.65780
Longitude[deg.]: Pile Type: W6x9
Pile Embedment Depth [in.]: Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 48
Axial Design Load [lbs.]: 10,000
Pile Area [sq. in.]: 2.68
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 2.84

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection ∆ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
5%	500	0.001	0.001	0.200	
10%	1000	0.003	0.001	0.200	
15%	1500	0.018	0.002	0.201	
20%	2000	0.072	0.002	0.201	
25%	2500	0.201	0.003	0.202	
30%	3000	0.341	0.003	0.202	
35%	3500	0.681	0.004	0.203	
40%	4000	0.929	0.004	0.203	
41%	4100	1.010	0.004	0.204	
50%	5000		0.005	0.205	
55%	5500		0.006	0.205	
60%	6000		0.006	0.206	
65%	6500		0.007	0.206	
70%	7000		0.008	0.207	
75%	7500		0.008	0.207	
80%	8000		0.009	0.208	
85%	8500		0.009	0.208	
90%	9000		0.010	0.209	
95%	9500		0.010	0.209	
100%	10000		0.011	0.210	
0%	0	0.989	0.000	0.199	





Tension Load Test Result for PLT-18A

Project Information

Project Name: Biglow Solar Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

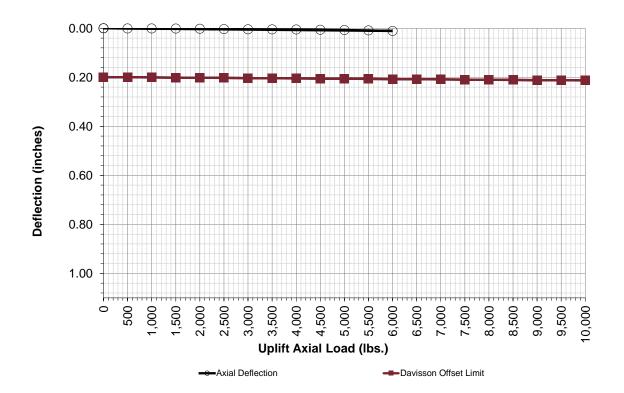
Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillon Ed Junior

Test Date and Representative

Tested By Terracon Rep: CAS Date Tested: 5/2/2024

Pile Information Pile ID: PLT-18A Latitude [deg.]: 45.66467 Longitude[deg.]: -120.58845 Pile Type: W6x9 Pile Embedment Depth [in.]: 106 Pile Diameter [in.]: 5.9 Pile Stick-Up [in.]: 48
Axial Design Load [lbs.]: 10,000 Pile Area [sq. in.]: 2.68 Elastic Modulus [ksi.]: 29,000 Drive Time [sec.]: 123.9

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
5%	500	0.001	0.001	0.200	
10%	1000	0.001	0.001	0.201	
15%	1500	0.001	0.002	0.201	
20%	2000	0.002	0.003	0.202	
25%	2500	0.004	0.003	0.203	
30%	3000	0.004	0.004	0.203	
35%	3500	0.005	0.005	0.204	
40%	4000	0.005	0.005	0.205	
45%	4500	0.006	0.006	0.205	
50%	5000	0.007	0.007	0.206	
55%	5500	0.009	0.008	0.207	
60%	6000	0.011	0.008	0.207	
65%	6500		0.009	0.208	
70%	7000		0.010	0.209	
75%	7500		0.010	0.209	
80%	8000		0.011	0.210	
85%	8500		0.012	0.211	
90%	9000		0.012	0.211	
95%	9500		0.013	0.212	
100%	10000		0.014	0.213	
0%	0	0.000	0.000	0.199	





Tension Load Test Result for PLT-18B

Project Information

Project Name: Biglow Solar Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

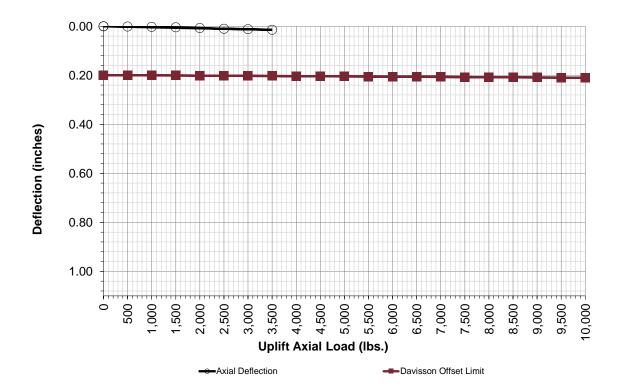
Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillon Ed Junior

Test Date and Representative

Tested By Terracon Rep: CAS Date Tested: 5/2/2024

Pile Information Pile ID: PLT-18B Latitude [deg.]: 45.66467 Longitude[deg.]: -120.58845 Pile Type: W6x9 Pile Embedment Depth [in.]: 84 Pile Diameter [in.]: 5.9 Pile Stick-Up [in.]: 48 Axial Design Load [lbs.]: 10,000 Pile Area [sq. in.]: 2.68 Elastic Modulus [ksi.]: 29,000 Drive Time [sec.]: 14.63

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
5%	500	0.001	0.001	0.200	
10%	1000	0.003	0.001	0.200	
15%	1500	0.004	0.002	0.201	
20%	2000	0.007	0.002	0.201	
25%	2500	0.010	0.003	0.202	
30%	3000	0.012	0.003	0.202	
35%	3500	0.015	0.004	0.203	
40%	4000		0.004	0.203	
45%	4500		0.005	0.204	
50%	5000		0.005	0.205	
55%	5500		0.006	0.205	
60%	6000		0.006	0.206	
65%	6500		0.007	0.206	
70%	7000		0.008	0.207	
75%	7500		0.008	0.207	
80%	8000		0.009	0.208	
85%	8500		0.009	0.208	
90%	9000		0.010	0.209	
95%	9500		0.010	0.209	
100%	10000		0.011	0.210	
0%	0	0.000	0.000	0.199	





Tension Load Test Result for PLT-19A

Project Information

Project Name: Biglow Solar Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

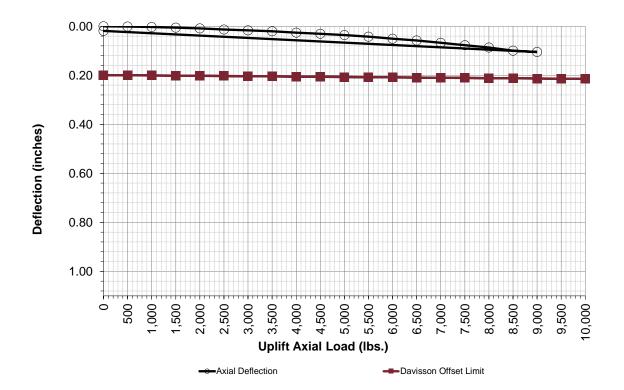
Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillon Ed Junior

Test Date and Representative

Tested By Terracon Rep: CAS Date Tested: 5/2/2024

Pile Information Pile ID: PLT-19A Latitude [deg.]: 45.65705 Longitude[deg.]: -120.60382 Pile Type: W6x9 Pile Embedment Depth [in.]: 120 Pile Diameter [in.]: 5.9 Pile Stick-Up [in.]: 48 Axial Design Load [lbs.]: 10,000 Pile Area [sq. in.]: 2.68 Elastic Modulus [ksi.]: 29,000 Drive Time [sec.]: 39.27

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection ∆ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
5%	500	0.001	0.001	0.200	
10%	1000	0.003	0.002	0.201	
15%	1500	0.006	0.002	0.201	
20%	2000	0.009	0.003	0.202	
25%	2500	0.013	0.004	0.203	
30%	3000	0.017	0.005	0.204	
35%	3500	0.021	0.005	0.205	
40%	4000	0.026	0.006	0.205	
45%	4500	0.031	0.007	0.206	
50%	5000	0.036	0.008	0.207	
55%	5500	0.043	0.008	0.208	
60%	6000	0.051	0.009	0.208	
65%	6500	0.058	0.010	0.209	
70%	7000	0.068	0.011	0.210	
75%	7500	0.077	0.012	0.211	
80%	8000	0.087	0.012	0.212	
85%	8500	0.100	0.013	0.212	
90%	9000	0.105	0.014	0.213	
95%	9500		0.015	0.214	
100%	10000		0.015	0.215	
0%	0	0.019	0.000	0.199	





Tension Load Test Result for PLT-19B

Project Information

Project Name: Biglow Solar Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

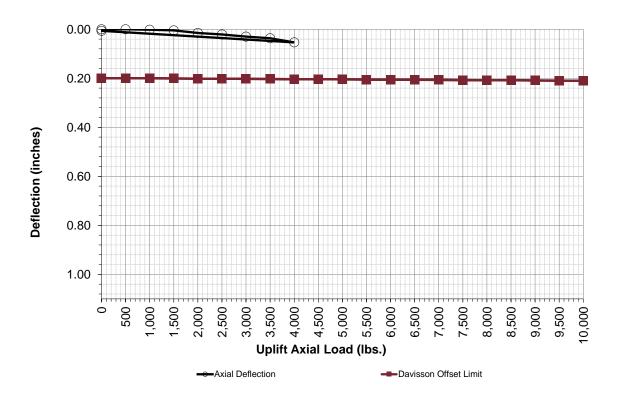
Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillon Ed Junior

Test Date and Representative

Tested By Terracon Rep: CAS Date Tested: 5/2/2024

Pile Information Pile ID: PLT-19B Latitude [deg.]: 45.65705 Longitude[deg.]: -120.60382 Pile Type: W6x9 Pile Embedment Depth [in.]: 84 Pile Diameter [in.]: 5.9 Pile Stick-Up [in.]: 48 Axial Design Load [lbs.]: 10,000 Pile Area [sq. in.]: 2.68 Elastic Modulus [ksi.]: 29,000 Drive Time [sec.]: 5.41

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
5%	500	0.000	0.001	0.200	
10%	1000	0.002	0.001	0.200	
15%	1500	0.005	0.002	0.201	
20%	2000	0.015	0.002	0.201	
25%	2500	0.021	0.003	0.202	
30%	3000	0.030	0.003	0.202	
35%	3500	0.037	0.004	0.203	
40%	4000	0.054	0.004	0.203	
45%	4500		0.005	0.204	
50%	5000		0.005	0.205	
55%	5500		0.006	0.205	
60%	6000		0.006	0.206	
65%	6500		0.007	0.206	
70%	7000		0.008	0.207	
75%	7500		0.008	0.207	
80%	8000		0.009	0.208	
85%	8500		0.009	0.208	
90%	9000		0.010	0.209	
95%	9500		0.010	0.209	
100%	10000		0.011	0.210	
0%	0	0.007	0.000	0.199	





Tension Load Test Result for PLT-20A

Project Information

Project Name: Biglow Solar Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

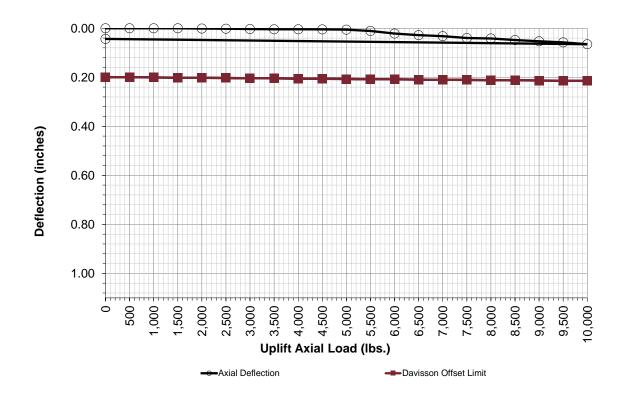
Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillon Ed Junior

Test Date and Representative

Tested By Terracon Rep: CAS Date Tested: 5/2/2024

Pile Information Pile ID: PLT-20A Latitude [deg.]: 45.64330 Longitude[deg.]: -120.62276 Pile Type: W6x9 Pile Embedment Depth [in.]: 120 Pile Diameter [in.]: 5.9 Pile Stick-Up [in.]: 48
Axial Design Load [lbs.]: 10,000 Pile Area [sq. in.]: 2.68 Elastic Modulus [ksi.]: 29,000 Drive Time [sec.]: 9.91

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection Δ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
5%	500	0.000	0.001	0.200	
10%	1000	0.000	0.002	0.201	
15%	1500	0.000	0.002	0.201	
20%	2000	0.001	0.003	0.202	
25%	2500	0.002	0.004	0.203	
30%	3000	0.003	0.005	0.204	
35%	3500	0.004	0.005	0.205	
40%	4000	0.004	0.006	0.205	
45%	4500	0.005	0.007	0.206	
50%	5000	0.006	0.008	0.207	
55%	5500	0.011	0.008	0.208	
60%	6000	0.022	0.009	0.208	
65%	6500	0.028	0.010	0.209	
70%	7000	0.032	0.011	0.210	
75%	7500	0.040	0.012	0.211	
80%	8000	0.042	0.012	0.212	
85%	8500	0.048	0.013	0.212	
90%	9000	0.053	0.014	0.213	
95%	9500	0.058	0.015	0.214	
100%	10000	0.065	0.015	0.215	
0%	0	0.044	0.000	0.199	





Tension Load Test Result for PLT-20B

Project Information

Project Name: Biglow Solar Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in.]: 6 Load Cell: Dillon Ed Junior

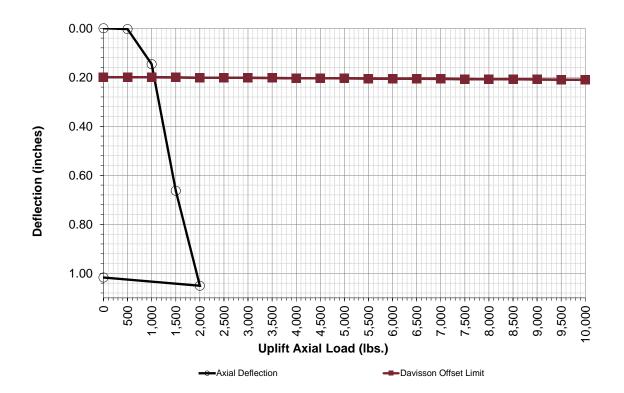
Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/2/2024

Pile Information

Pile ID: PLT-20B
Latitude [deg.]: 45.64330
Longitude[deg.]: -120.62276
Pile Type: W6x9
Pile Embedment Depth [in.]: 84
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 48
Axial Design Load [lbs.]: 10,000
Pile Area [sq. in.]: 2.68
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 4.13

	Tension Te	est Results		Davisson Offset Limit Lines	
% of	Axial		Elastic	Davisson Offest	
Design	Load	Deflection ∆ (in.)	Data (in.)	Limit (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	(PL/AE)	(0.15+D/120+(PL/AE))	
0%	0	0.000	0.000	0.199	
5%	500	0.004	0.001	0.200	
10%	1000	0.147	0.001	0.200	
15%	1500	0.663	0.002	0.201	
20%	2000	1.051	0.002	0.201	
25%	2500		0.003	0.202	
30%	3000		0.003	0.202	
35%	3500		0.004	0.203	
40%	4000		0.004	0.203	
45%	4500		0.005	0.204	
50%	5000		0.005	0.205	
55%	5500		0.006	0.205	
60%	6000		0.006	0.206	
65%	6500		0.007	0.206	
70%	7000		0.008	0.207	
75%	7500		0.008	0.207	
80%	8000		0.009	0.208	
85%	8500		0.009	0.208	
90%	9000		0.010	0.209	
95%	9500		0.010	0.209	
100%	10000		0.011	0.210	
0%	0	1.017	0.000	0.199	



Preliminary Geotechnical Engineering Report

Biglow Solar & BESS | Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024 | Terracon Project No. 82245013



Lateral Test Results



Lateral Load Test Results for PLT-01A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges: 0
Number of Bottom Gauges: 2
Height of Top Gauges [in.]: NA
leight of Bottom Gauges [in.]: 6
Height of Applied Load [in.]: 42
Load Cell: Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/11/2024

Pile Information

Pile ID: PLT-01A
Latitude [deg.]: 45.59230
Longitude [deg.]: -120.65048
Pile Type: W6X9
Pile Embedment Depth [in.]: 120
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 4,500
Drive Time [sec.]: 21.24

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
11%	500	0.124	
22%	1,000	0.185	
0%	0	0.041	
22%	1,000	0.195	
33%	1,500	0.265	
44%	2,000	0.363	
0%	0	0.058	
44%	2,000	0.378	
56%	2,500	0.477	
67%	3,000	0.586	
0%	0	0.111	
67%	3,000	0.693	
78%	3,500	0.805	
89%	4,000	0.976	
0%	0	0.163	
89%	4,000	1.000	
100%	4,500	1.030	
0%	0	0.129	



---Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Results for PLT-01B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges: 0
Number of Bottom Gauges: 2
Height of Top Gauges [in.]: NA
Height of Bottom Gauges [in.]: 6
Height of Applied Load [in.]: 42
Load Cell: Dillion Ed Junior

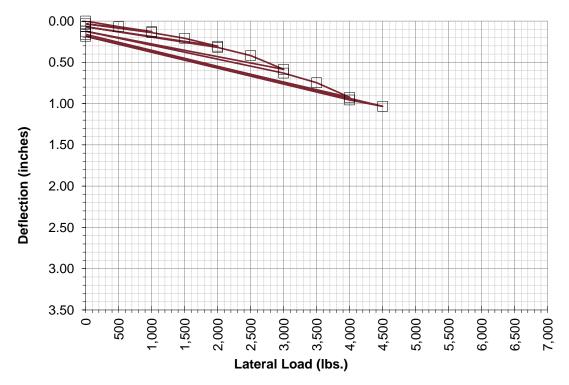
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/11/2024

Pile Information

Pile ID: PLT-01B
Latitude [deg.]: 45.59230
Longitude [deg.]: -120.65048
Pile Type: W6X9
Pile Embedment Depth [in.]: 84
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 4,500
Drive Time [sec.]: 16.88

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
11%	500	0.068	
22%	1,000	0.129	
0%	0	0.034	
22%	1,000	0.140	
33%	1,500	0.209	
44%	2,000	0.305	
0%	0	0.070	
44%	2,000	0.320	
56%	2,500	0.418	
67%	3,000	0.585	
0%	0	0.123	
67%	3,000	0.631	
78%	3,500	0.747	
89%	4,000	0.924	
0%	0	0.185	
89%	4,000	0.957	
100%	4,500	1.033	
0%	0	0.161	



---Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Results for PLT-02A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges: 0
Number of Bottom Gauges: 2
Height of Top Gauges [in.]: NA
Height of Bottom Gauges [in.]: 6
Height of Applied Load [in.]: 42
Load Cell: Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/10/2024

Pile Information

Pile ID: PLT-02A
Latitude [deg.]: 45.59809
Longitude [deg.]: -120.63540
Pile Type: W6X9
Pile Embedment Depth [in.]: 96
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 4,500
Drive Time [sec.]: 64.99

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
11%	500	0.271	
22%	1,000	0.449	
0%	0	0.050	
22%	1,000	0.490	
33%	1,500	0.666	
44%	2,000	0.831	
0%	0	0.073	
44%	2,000	0.845	
56%	2,500	0.933	
67%	3,000	0.986	
0%	0	0.064	
0%	0		



---Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Results for PLT-02B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges: 0
Number of Bottom Gauges: 2
Height of Top Gauges [in.]: NA
Height of Bottom Gauges [in.]: 6
Height of Applied Load [in.]: 42
Load Cell: Dillion Ed Junior

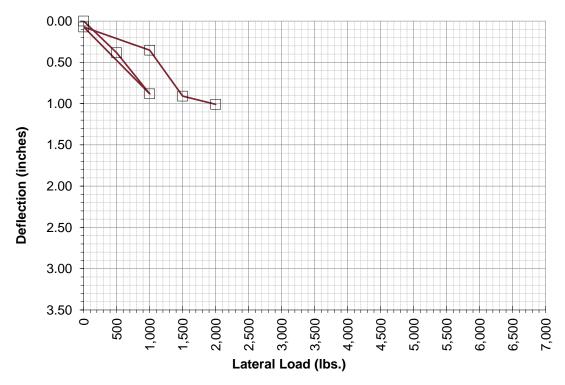
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/10/2024

Pile Information

Pile ID: PLT-02B
Latitude [deg.]: 45.59809
Longitude [deg.]: -120.63540
Pile Type: W6X9
Pile Embedment Depth [in.]: 60
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 4,500
Drive Time [sec.]: 5.3

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
11%	500	0.384	
22%	1,000	0.882	
0%	0	0.071	
22%	1,000	0.353	
33%	1,500	0.910	
44%	2,000	1.009	
0%	0		



---Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Results for PLT-03A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges: 0 Number of Bottom Gauges: 2 Height of Top Gauges [in.]: NA Height of Bottom Gauges [in.]: 6 Height of Applied Load [in.]: 42 Load Cell: Dillion Ed Junior

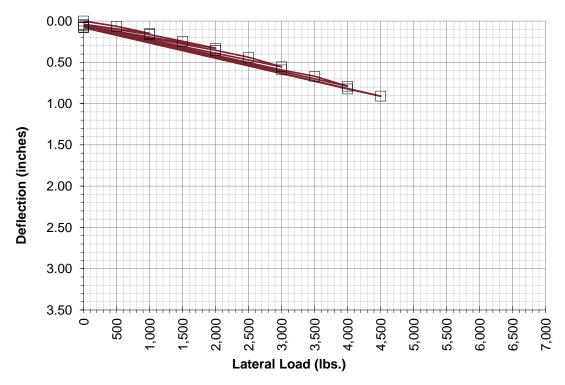
Test Date and Representative

Tested By Terracon Rep: David Date Tested: 4/11/2024

Pile Information

Pile ID: PLT-03A Latitude [deg.]: 45.60511 Longitude [deg.]: -120.65040 Pile Type: W6X9 Pile Embedment Depth [in.]: 120 Pile Stick-Up [in.]: 48 Lateral Design Load [lbs.]: 4,500 Drive Time [sec.]: 68.52

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
11%	500	0.064	
22%	1,000	0.150	
0%	0	0.039	
22%	1,000	0.165	
33%	1,500	0.245	
44%	2,000	0.329	
0%	0	0.057	
44%	2,000	0.355	
56%	2,500	0.439	
67%	3,000	0.555	
0%	0	0.060	
67%	3,000	0.592	
78%	3,500	0.670	
89%	4,000	0.790	
0%	0	0.076	
89%	4,000	0.823	
100%	4,500	0.910	
0%	0	0.080	



---Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Results for PLT-03B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges: 0
Number of Bottom Gauges: 2
Height of Top Gauges [in.]: NA
Height of Bottom Gauges [in.]: 6
Height of Applied Load [in.]: 42
Load Cell: Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/11/2024

Pile Information

Pile ID: PLT-03B
Latitude [deg.]: 45.60511
Longitude [deg.]: -120.65040
Pile Type: W6X9
Pile Embedment Depth [in.]: 84
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 4,500
Drive Time [sec.]: 33.4

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
11%	500	0.093	
22%	1,000	0.191	
0%	0	0.030	
22%	1,000	0.208	
33%	1,500	0.293	
44%	2,000	0.385	
0%	0	0.047	
44%	2,000	0.411	
56%	2,500	0.505	
67%	3,000	0.642	
0%	0	0.057	
67%	3,000	0.689	
78%	3,500	0.781	
89%	4,000	0.902	
0%	0	0.079	
89%	4,000	0.932	
100%	4,500	1.018	
0%	0	0.083	



---Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Results for PLT-04A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges: 0
Number of Bottom Gauges: 2
Height of Top Gauges [in.]: NA
Height of Bottom Gauges [in.]: 6
Height of Applied Load [in.]: 42
Load Cell: Dillion Ed Junior

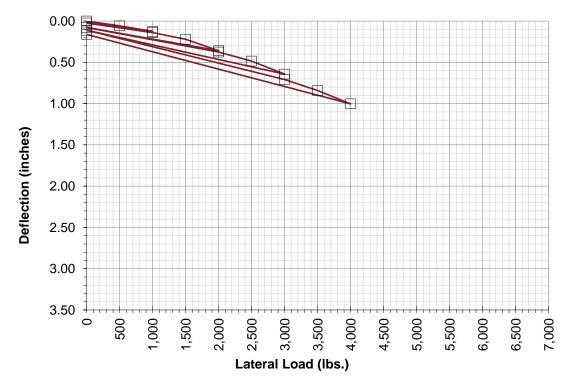
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/10/2024

Pile Information

Pile ID: PLT-04A
Latitude [deg.]: 45.60197
Longitude [deg.]: -120.62483
Pile Type: W6X9
Pile Embedment Depth [in.]: 120
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 4,500
Drive Time [sec.]: 15.26

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
11%	500	0.059	
22%	1,000	0.124	
0%	0	0.024	
22%	1,000	0.140	
33%	1,500	0.221	
44%	2,000	0.359	
0%	0	0.077	
44%	2,000	0.376	
56%	2,500	0.485	
67%	3,000	0.642	
0%	0	0.112	
67%	3,000	0.709	
78%	3,500	0.842	
89%	4,000	1.004	
0%	0	0.162	



---Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Results for PLT-04B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges: 0
Number of Bottom Gauges: 2
Height of Top Gauges [in.]: NA
Height of Bottom Gauges [in.]: 6
Height of Applied Load [in.]: 42
Load Cell: Dillion Ed Junior

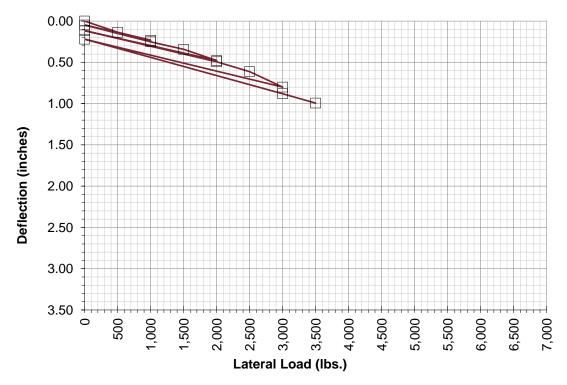
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/10/2024

Pile Information

Pile ID: PLT-04B
Latitude [deg.]: 45.60197
Longitude [deg.]: -120.62483
Pile Type: W6X9
Pile Embedment Depth [in.]: 84
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 4,500
Drive Time [sec.]: 5.14

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
11%	500	0.136	
22%	1,000	0.233	
0%	0	0.047	
22%	1,000	0.252	
33%	1,500	0.342	
44%	2,000	0.478	
0%	0	0.116	
44%	2,000	0.494	
56%	2,500	0.612	
67%	3,000	0.800	
0%	0	0.220	
67%	3,000	0.880	
78%	3,500	0.994	
0%	0		



---Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Results for PLT-05A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges: 0

Number of Bottom Gauges: 2

Height of Top Gauges [in.]: NA

Height of Bottom Gauges [in.]: 6

Height of Applied Load [in.]: 42

Load Cell: Dillion Ed Junior

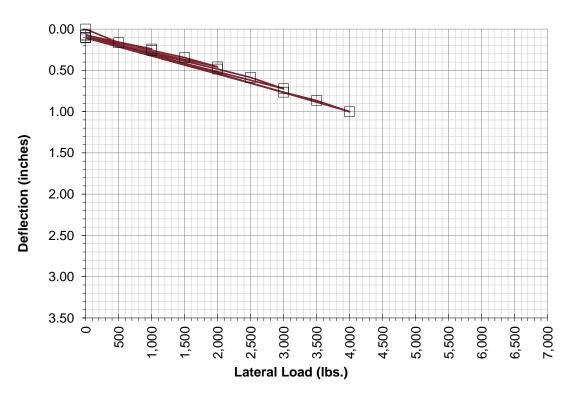
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/10/2024

Pile Information

Pile ID: PLT-05A
Latitude [deg.]: 45.60946
Longitude [deg.]: -120.62043
Pile Type: W6X9
Pile Embedment Depth [in.]: 120
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 4,500
Drive Time [sec.]: 36.26

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
11%	500	0.166	
22%	1,000	0.243	
0%	0	0.074	
22%	1,000	0.258	
33%	1,500	0.346	
44%	2,000	0.458	
0%	0	0.101	
44%	2,000	0.485	
56%	2,500	0.586	
67%	3,000	0.724	
0%	0	0.107	
67%	3,000	0.766	
78%	3,500	0.866	
89%	4,000	1.002	
0%	0	0.072	



---Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Results for PLT-05B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges: 0
Number of Bottom Gauges: 2
Height of Top Gauges [in.]: NA
Height of Bottom Gauges [in.]: 6
Height of Applied Load [in.]: 42
Load Cell: Dillion Ed Junior

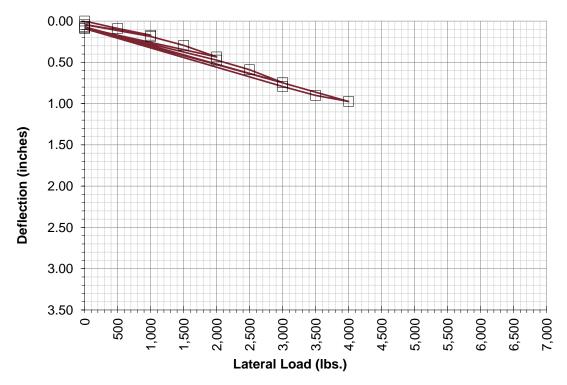
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/10/2024

Pile Information

Pile ID: PLT-05B
Latitude [deg.]: 45.60946
Longitude [deg.]: -120.62043
Pile Type: W6X9
Pile Embedment Depth [in.]: 84
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 4,500
Drive Time [sec.]: 20.99

% of	Lateral		
Design	Load	Deflection ∆ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
11%	500	0.090	
22%	1,000	0.171	
0%	0	0.043	
22%	1,000	0.187	
33%	1,500	0.295	
44%	2,000	0.435	
0%	0	0.082	
44%	2,000	0.473	
56%	2,500	0.590	
67%	3,000	0.746	
0%	0	0.091	
67%	3,000	0.793	
78%	3,500	0.901	
89%	4,000	0.975	
0%	0	0.069	



---Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Results for PLT-06A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges: 0
Number of Bottom Gauges: 2
Height of Top Gauges [in.]: NA
Height of Bottom Gauges [in.]: 6
Height of Applied Load [in.]: 42
Load Cell: Dillion Ed Junior

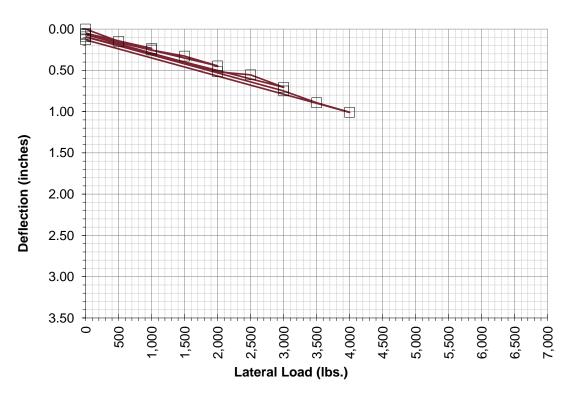
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/10/2024

Pile Information

Pile ID: PLT-06A
Latitude [deg.]: 45.61345
Longitude [deg.]: -120.63250
Pile Type: W6X9
Pile Embedment Depth [in.]: 120
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 4,500
Drive Time [sec.]: 76.39

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
11%	500	0.149	
22%	1,000	0.235	
0%	0	0.052	
22%	1,000	0.255	
33%	1,500	0.327	
44%	2,000	0.446	
0%	0	0.066	
44%	2,000	0.517	
56%	2,500	0.555	
67%	3,000	0.705	
0%	0	0.094	
67%	3,000	0.749	
78%	3,500	0.892	
89%	4,000	1.009	
0%	0	0.131	



---Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Results for PLT-06B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges: 0 Number of Bottom Gauges: 2 Height of Top Gauges [in.]: NA Height of Bottom Gauges [in.]: 6 Height of Applied Load [in.]: 42 Load Cell: Dillion Ed Junior

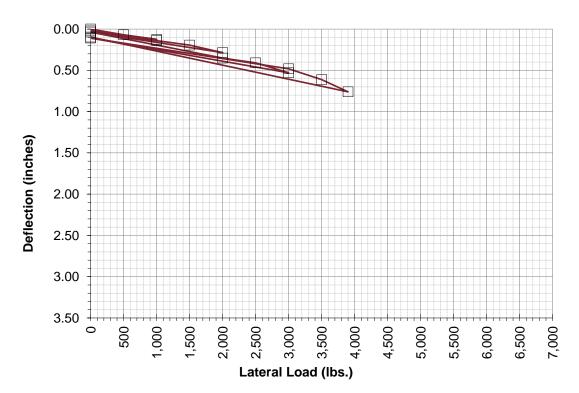
Test Date and Representative

Tested By Terracon Rep: David Date Tested: 4/10/2024

Pile Information

Pile ID: PLT-06B Latitude [deg.]: 45.61345 Longitude [deg.]: -120.63250 Pile Type: W6X9 Pile Embedment Depth [in.]: 84 Pile Stick-Up [in.]: 48 Lateral Design Load [lbs.]: 4,500 Drive Time [sec.]: 16.8

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
11%	500	0.070	
22%	1,000	0.126	
0%	0	0.023	
22%	1,000	0.141	
33%	1,500	0.195	
44%	2,000	0.285	
0%	0	0.037	
44%	2,000	0.352	
56%	2,500	0.410	
67%	3,000	0.530	
0%	0	0.109	
67%	3,000	0.482	
78%	3,500	0.612	
87%	3,900	0.761	
0%	0	0.097	



---Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Results for PLT-07A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges: 0
Number of Bottom Gauges: 2
Height of Top Gauges [in.]: NA
Height of Bottom Gauges [in.]: 6
Height of Applied Load [in.]: 42
Load Cell: Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/11/2024

Pile Information

Pile ID: PLT-07A
Latitude [deg.]: 45.60635
Longitude [deg.]: -120.64196
Pile Type: W6X9
Pile Embedment Depth [in.]: 96
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 4,500
Drive Time [sec.]: 15.75

% of Design	Lateral Load	Deflection ∆ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
11%	500	0.349	
22%	1,000	0.493	
0%	0	0.161	
22%	1,000	0.516	
33%	1,500	0.614	
44%	2,000	0.724	
0%	0	0.185	
44%	2,000	0.758	
56%	2,500	0.902	
67%	3,000	0.976	
0%	0	0.369	



---Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Results for PLT-07B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges: 0
Number of Bottom Gauges: 2
Height of Top Gauges [in.]: NA
Height of Bottom Gauges [in.]: 6
Height of Applied Load [in.]: 42
Load Cell: Dillion Ed Junior

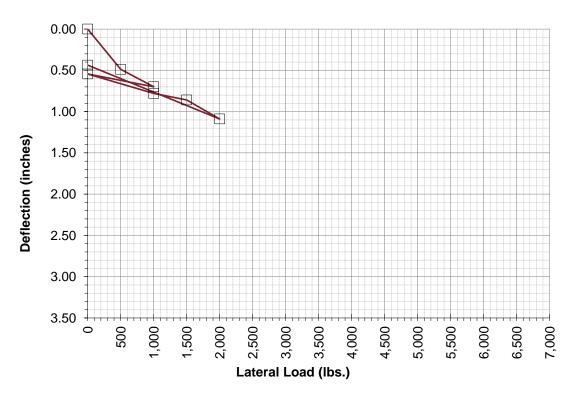
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/11/2024

Pile Information

Pile ID: PLT-07B
Latitude [deg.]: 45.60635
Longitude [deg.]: -120.64196
Pile Type: W6X9
Pile Embedment Depth [in.]: 60
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 4,500
Drive Time [sec.]: 5.21

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
11%	500	0.488	
22%	1,000	0.699	
0%	0	0.544	
22%	1,000	0.780	
33%	1,500	0.859	
44%	2,000	1.089	
00/	0	0.427	
0%	0	0.437	



---Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Results for PLT-08A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

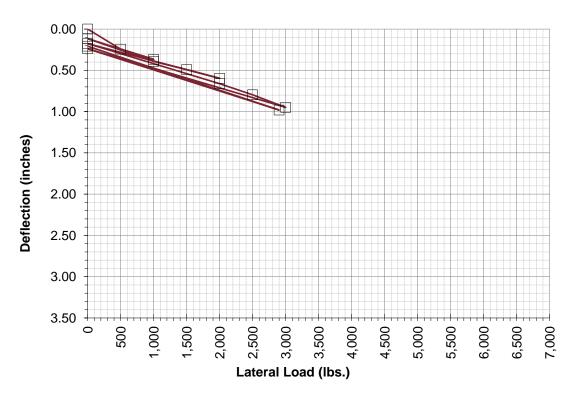
Number of Top Gauges: 0
Number of Bottom Gauges: 2
Height of Top Gauges [in.]: NA
Height of Bottom Gauges [in.]: 6
Height of Applied Load [in.]: 42
Load Cell: Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/11/2024

Pile Information

% of Design	Lateral Load	Deflection △ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
11%	500	0.243	
22%	1,000	0.368	
0%	0	0.117	
22%	1,000	0.392	
33%	1,500	0.492	
44%	2,000	0.597	
0%	0	0.176	
44%	2,000	0.662	
56%	2,500	0.797	
67%	3,000	0.949	
0%	0	0.239	
64%	2,900	0.981	
0%	0	0.208	



---Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Results for PLT-08B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges: 0
Number of Bottom Gauges: 2
Height of Top Gauges [in.]: NA
Height of Bottom Gauges [in.]: 6
Height of Applied Load [in.]: 42
Load Cell: Dillion Ed Junior

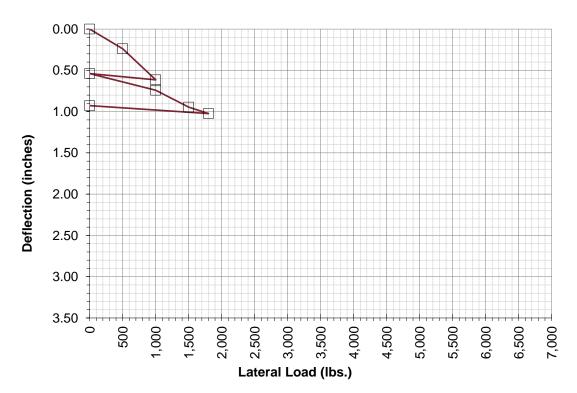
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/11/2024

Pile Information

Pile ID: PLT-08B
Latitude [deg.]: 45.61018
Longitude [deg.]: -120.64516
Pile Type: W6X9
Pile Embedment Depth [in.]: 60
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 4,500
Drive Time [sec.]: 0.55

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
11%	500	0.239	
22%	1,000	0.615	
0%	0	0.539	
22%	1,000	0.742	
33%	1,500	0.945	
40%	1,800	1.024	
0%	0	0.927	



---Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Results for PLT-09A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges:

Number of Bottom Gauges:

Height of Top Gauges [in.]:

Height of Bottom Gauges [in.]:

Height of Applied Load [in.]:

Load Cell:

Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/11/2024

Pile Information

Pile ID: PLT-09A
Latitude [deg.]: 45.61774
Longitude [deg.]: -120.64554
Pile Type: W6X9
Pile Embedment Depth [in.]: 120
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 4,500
Drive Time [sec.]: 24.32

% of	Lateral Load	Deflection Δ (in.)	
Design			Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
11%	500	0.242	
22%	1,000	0.341	
0%	0	0.149	
22%	1,000	0.356	
33%	1,500	0.439	
44%	2,000	0.550	
0%	0	0.167	
44%	2,000	0.591	
56%	2,500	0.699	
67%	3,000	0.855	
0%	0	0.206	
67%	3,000	0.940	
78%	3,500	1.008	
0%	0	0.187	



---Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Results for PLT-09B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges: 0 Number of Bottom Gauges: 2 Height of Top Gauges [in.]: NA Height of Bottom Gauges [in.]: 6 Height of Applied Load [in.]: 42 Load Cell: Dillion Ed Junior

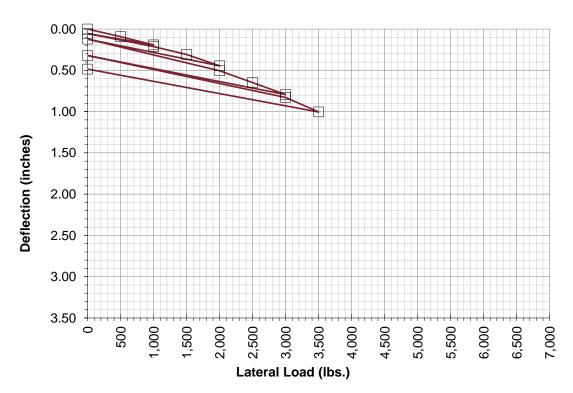
Test Date and Representative

Tested By Terracon Rep: David Date Tested: 4/11/2024

Pile Information

Pile ID: PLT-09B Latitude [deg.]: 45.61774 Longitude [deg.]: -120.64554 Pile Type: W6X9 Pile Embedment Depth [in.]: 84 Pile Stick-Up [in.]: 48 Lateral Design Load [lbs.]: 4,500 Drive Time [sec.]: 10.18

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
11%	500	0.092	
22%	1,000	0.192	
0%	0	0.055	
22%	1,000	0.213	
33%	1,500	0.308	
44%	2,000	0.445	
0%	0	0.122	
44%	2,000	0.506	
56%	2,500	0.649	
67%	3,000	0.795	
0%	0	0.321	
67%	3,000	0.829	
78%	3,500	1.005	
0%	0	0.486	



---Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Results for PLT-10A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges: 0
Number of Bottom Gauges: 2
Height of Top Gauges [in.]: NA
Height of Bottom Gauges [in.]: 6
Height of Applied Load [in.]: 42
Load Cell: Dillion Ed Junior

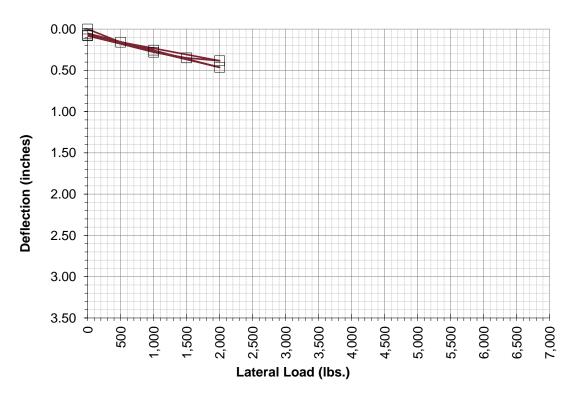
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/10/2024

Pile Information

Pile ID: PLT-10A
Latitude [deg.]: 45.62470
Longitude [deg.]: -120.62967
Pile Type: W6X9
Pile Embedment Depth [in.]: 96
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 4,500
Drive Time [sec.]: 6.23

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
11%	500	0.159	
22%	1,000	0.256	
0%	0	0.074	
22%	1,000	0.281	
33%	1,500	0.350	
44%	2,000	0.384	
0%	0	0.083	
44%	2,000	0.464	
0%	0	0.051	



---Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Results for PLT-10B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges: 0
Number of Bottom Gauges: 2
Height of Top Gauges [in.]: NA
Height of Bottom Gauges [in.]: 6
Height of Applied Load [in.]: 42
Load Cell: Dillion Ed Junior

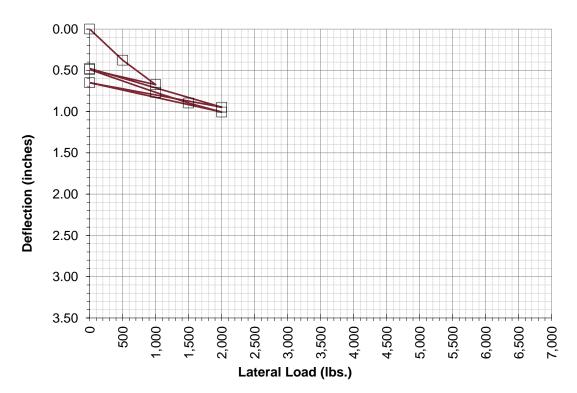
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/10/2024

Pile Information

Pile ID: PLT-10B
Latitude [deg.]: 45.62470
Longitude [deg.]: -120.62967
Pile Type: W6X9
Pile Embedment Depth [in.]: 60
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 4,500
Drive Time [sec.]: 2.51

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
11%	500	0.377	
22%	1,000	0.674	
0%	0	0.490	
22%	1,000	0.768	
33%	1,500	0.896	
44%	2,000	1.005	
0%	0	0.650	
44%	2,000	0.947	
0%	0	0.478	



---Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Result for PLT-11A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

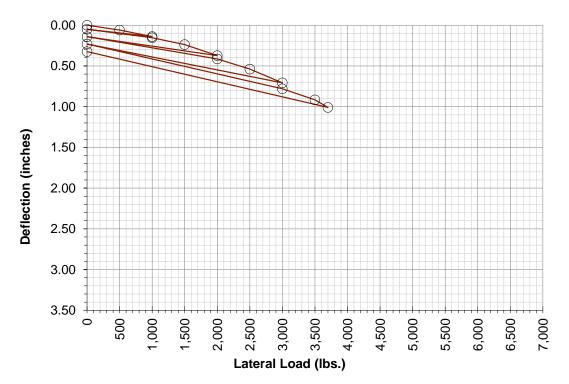
Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in.]:	NA
Height of Top Gauges [in.]: Height of Bottom Gauges [in.]:	6
Height of Applied Load [in.]:	42
Load Cell:	Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/2/2024

Pile Information

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.059	
17%	1,000	0.140	
0%	0	0.049	
17%	1,000	0.154	
25%	1,500	0.238	
33%	2,000	0.374	
0%	0	0.141	
33%	2,000	0.414	
42%	2,500	0.539	
50%	3,000	0.707	
0%	0	0.231	
50%	3,000	0.780	
58%	3,500	0.916	
62%	3,700	1.009	
0%	0		
67%	4,000		
75%	4,500		
0%	0		
75%	4,500		
83%	5,000		
92%	5,500		
0%	0	0.324	



--- Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Result for PLT-11B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in.]:	NA
Height of Top Gauges [in.]: Height of Bottom Gauges [in.]:	6
Height of Applied Load [in.]:	42
Load Cell:	Dillion Ed Junior

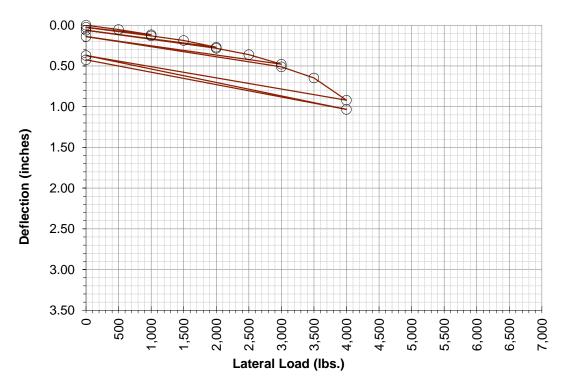
Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/2/2024

Pile ID: PLT-11B

Latitude [deg.]: Longitude [deg.]: Pile Type: Pile Embedment Depth [in.]: Pile Stick-Up [in.]: Lateral Design Load [lbs.]: Drive Time [sec.]:	45.59109
Longitude [deg.]:	-120.65643
Pile Type:	W6x9
Pile Embedment Depth [in.]:	84
Pile Stick-Up [in.]:	48
Lateral Design Load [lbs.]:	6,000
Drive Time [sec.]:	6

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.053	
17%	1,000	0.117	
0%	0	0.026	
17%	1,000	0.131	
25%	1,500	0.188	
33%	2,000	0.270	
0%	0	0.062	
33%	2,000	0.284	
42%	2,500	0.361	
50%	3,000	0.478	
0%	0	0.139	
50%	3,000	0.511	
58%	3,500	0.648	
67%	4,000	0.921	
0%	0	0.372	
67%	4,000	1.034	
75%	4,500		
0%	0		
75%	4,500		
83%	5,000		
92%	5,500		
0%	0	0.425	



----Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Result for PLT-12A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Top Gauges: Number of Bottom Gauges:	2
Height of Top Gauges [in.]:	NA
Height of Top Gauges [in.]: Height of Bottom Gauges [in.]:	6
Height of Applied Load [in.]:	42
Load Cell:	Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/2/2024

Pile ID:	PLT-12A
Latitude [deg.]: Longitude [deg.]: Pile Type: Pile Embedment Depth [in.]:	45.58466
Longitude [deg.]:	-120.64912
Pile Type:	W6x9
Pile Embedment Depth [in.]:	96
Pile Stick-Up [in.]:	48
Lateral Design Load [lbs.]: Drive Time [sec.]:	6,000
Drive Time [sec.]:	4.79

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.145	
17%	1,000	0.262	
0%	0	0.061	
17%	1,000	0.305	
25%	1,500	0.414	
33%	2,000	0.606	
0%	0	0.115	
33%	2,000	0.663	
42%	2,500	0.794	
50%	3,000	0.989	
0%	0	0.125	
50%	3,000	1.024	
58%	3,500		
67%	4,000		
0%	0		
67%	4,000		
75%	4,500		
0%	0		
75%	4,500		
83%	5,000		
92%	5,500		
0%	0	0.134	



--- Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Result for PLT-12B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

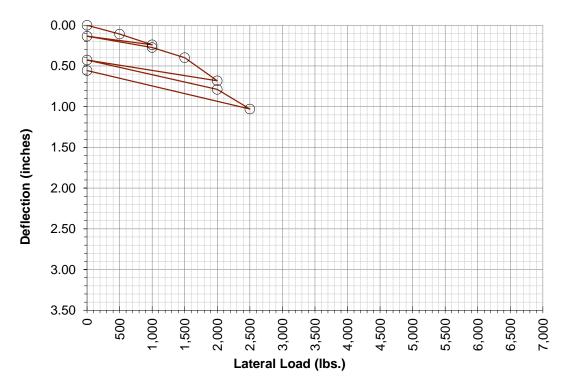
Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in.]:	NA
Height of Top Gauges [in.]: Height of Bottom Gauges [in.]:	6
Height of Applied Load [in.]:	42
Load Cell:	Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/2/2024

lie Information	
	PLT-12B
Latitude [deg.]:	45.58466
Longitude [deg.]:	-120.64912
Pile Type:	W6x9
Pile Embedment Depth [in.]:	60
Pile Stick-Up [in.]:	48
Lateral Design Load [lbs.]:	6,000
Drive Time [sec.]:	2.08

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.108	
17%	1,000	0.240	
0%	0	0.134	
17%	1,000	0.274	
25%	1,500	0.398	
33%	2,000	0.682	
0%	0	0.428	
33%	2,000	0.788	
42%	2,500	1.029	
50%	3,000		
0%	0		
50%	3,000		
58%	3,500		
67%	4,000		
0%	0		
67%	4,000		
75%	4,500		
0%	0		
75%	4,500		
83%	5,000		
92%	5,500		
0%	0	0.556	



--- Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Result for PLT-13A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Top Gauges: Number of Bottom Gauges:	2
Height of Top Gauges [in.]: Height of Bottom Gauges [in.]:	NA
Height of Bottom Gauges [in.]:	6
Height of Applied Load [in.]:	42
Load Cell:	Dillion Ed Junior

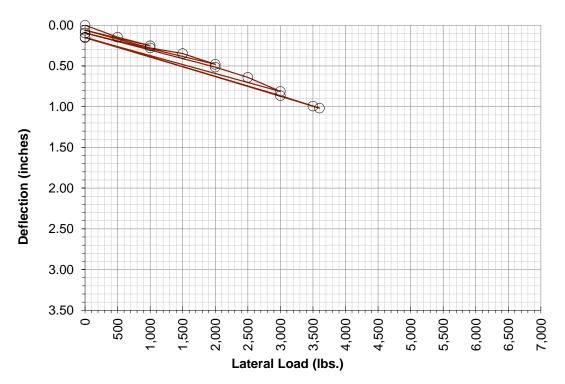
Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/2/2024

Pile ID: PLT-13A

Latitude [deg.]:	45.65586
Longitude [deg.]: Pile Type:	-120.62025
Pile Type:	W6x9
Pile Embedment Depth [in.]:	120
Pile Stick-Up [in.]:	48
Lateral Design Load [lbs.]:	6,000
Drive Time [sec.]:	10.07

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.147	
17%	1,000	0.252	
0%	0	0.062	
17%	1,000	0.278	
25%	1,500	0.348	
33%	2,000	0.480	
0%	0	0.096	
33%	2,000	0.515	
42%	2,500	0.641	
50%	3,000	0.813	
0%	0	0.152	
50%	3,000	0.864	
58%	3,500	0.993	
60%	3,600	1.018	
0%	0		
67%	4,000		
75%	4,500		
0%	0		
75%	4,500		
83%	5,000		
92%	5,500		
0%	0	0.146	



----Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Result for PLT-13B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

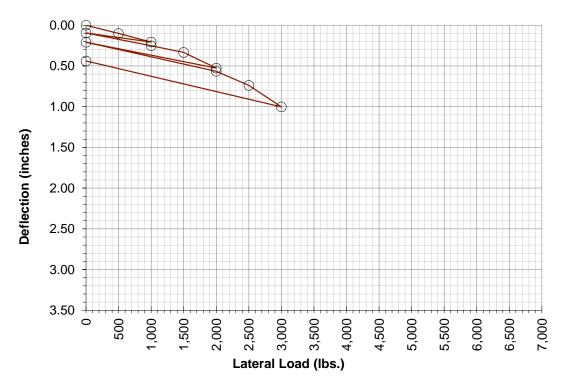
Number of Top Gauges:	0
Number of Top Gauges: Number of Bottom Gauges:	2
Height of Top Gauges [in.]:	NA
Height of Top Gauges [in.]: Height of Bottom Gauges [in.]:	6
Height of Applied Load [in.]:	42
Load Cell:	Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/2/2024

Pile ID:	PLT-13B
Latitude [deg.]: Longitude [deg.]:	45.65586
Longitude [deg.]:	-120.62025
Pile Type:	W6x9
Pile Embedment Depth [in.]:	84
Pile Stick-Up [in.]:	48
Lateral Design Load [lbs.]: Drive Time [sec.]:	6,000
Drive Time [sec.]:	4.59

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.101	
17%	1,000	0.207	
0%	0	0.096	
17%	1,000	0.252	
25%	1,500	0.334	
33%	2,000	0.527	
0%	0	0.209	
33%	2,000	0.566	
42%	2,500	0.739	
50%	3,000	1.003	
0%	0		
50%	3,000		
58%	3,500		
67%	4,000		
0%	0		
67%	4,000		
75%	4,500		
0%	0		
75%	4,500		
83%	5,000		
92%	5,500		
0%	0	0.439	



----Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Result for PLT-14A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Top Gauges: Number of Bottom Gauges:	2
Height of Top Gauges [in.]:	NA
Height of Top Gauges [in.]: Height of Bottom Gauges [in.]:	6
Height of Applied Load [in.]:	42
Load Cell:	Dillion Ed Junior

Test Date and Representative

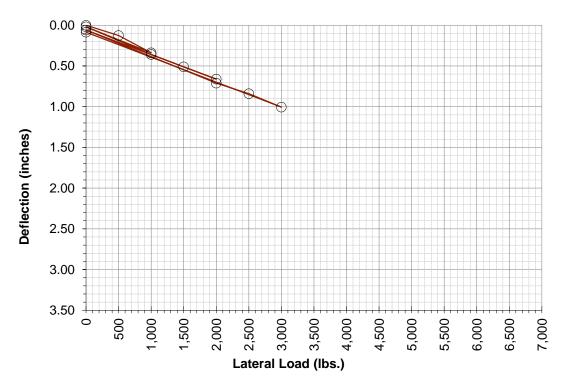
Tested By Terracon Rep: CAS
Date Tested: 5/1/2024

Pile ID: PLT-14A

Pile Information

Latitude [deg.]: 45.64247
Longitude [deg.]: -120.60591
Pile Type: W6x9
Pile Embedment Depth [in.]: 96
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 6,000
Drive Time [sec.]: 17.72

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.126	
17%	1,000	0.338	
0%	0	0.019	
17%	1,000	0.359	
25%	1,500	0.511	
33%	2,000	0.662	
0%	0	0.059	
33%	2,000	0.711	
42%	2,500	0.841	
50%	3,000	1.006	
0%	0		
50%	3,000		
58%	3,500		
67%	4,000		
0%	0		
67%	4,000		
75%	4,500		
0%	0		
75%	4,500		
83%	5,000		
92%	5,500		
0%	0	0.085	



--- Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Result for PLT-14B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in.]:	NA
Height of Top Gauges [in.]: Height of Bottom Gauges [in.]:	6
Height of Applied Load [in.]:	42
Load Cell:	Dillion Ed Junior

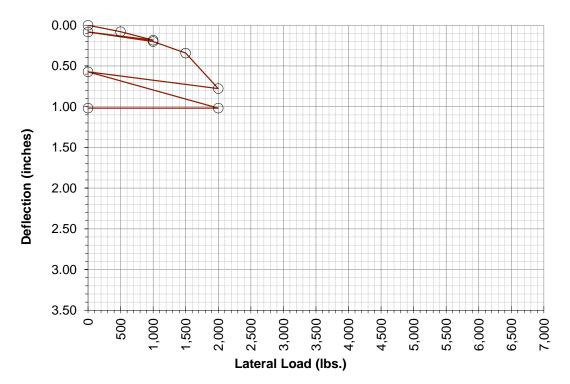
Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/1/2024

Pile ID: PLT-14B

Latitude [deg.]:	45.64247
Latitude [deg.]: Longitude [deg.]: Pile Type: Pile Embedment Depth [in.]:	-120.60591
Pile Type:	W6x9
Pile Embedment Depth [in.]:	60
Pile Stick-Up [in.]:	48
Lateral Design Load [lbs.]:	6,000
Pile Stick-Up [in.]: Lateral Design Load [lbs.]: Drive Time [sec.]:	1.01

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.080	
17%	1,000	0.184	
0%	0	0.083	
17%	1,000	0.200	
25%	1,500	0.342	
33%	2,000	0.778	
0%	0	0.572	
33%	2,000	1.018	
42%	2,500		
50%	3,000		
0%	0		
50%	3,000		
58%	3,500		
67%	4,000		
0%	0		
67%	4,000		
75%	4,500		
0%	0		
75%	4,500		
83%	5,000		
92%	5,500		
0%	0	1.018	



----Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Result for PLT-15A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Top Gauges: Number of Bottom Gauges:	2
Height of Top Gauges [in.]:	NA
Height of Top Gauges [in.]: Height of Bottom Gauges [in.]:	6
Height of Applied Load [in.]:	42
Load Cell:	Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep:	CAS
Date Tested:	5/1/2024

Pile ID: PLT-15A

Latitude [deg.]:	45.64248
Latitude [deg.]: Longitude [deg.]: Pile Type: Pile Embedment Depth [in.]:	-120.59773
Pile Type:	W6x9
Pile Embedment Depth [in.]:	96
Pile Stick-Up [in.]:	48
Lateral Design Load [lbs.]:	6,000
Pile Stick-Up [in.]: Lateral Design Load [lbs.]: Drive Time [sec.]:	76.66

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.203	
17%	1,000	0.323	
0%	0	0.025	
17%	1,000	0.359	
25%	1,500	0.443	
33%	2,000	0.545	
0%	0	0.041	
33%	2,000	0.556	
42%	2,500	0.631	
50%	3,000	0.706	
0%	0	0.050	
50%	3,000	0.724	
58%	3,500	0.775	
67%	4,000	0.857	
0%	0	0.065	
67%	4,000	0.877	
75%	4,500	0.929	
0%	0		
75%	4,500	1.016	
83%	5,000		
92%	5,500		
0%	0	0.111	



----Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Result for PLT-15B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in.]:	NA
Height of Top Gauges [in.]: Height of Bottom Gauges [in.]:	6
Height of Applied Load [in.]:	42
Load Cell:	Dillion Ed Junior

Test Date and Representative

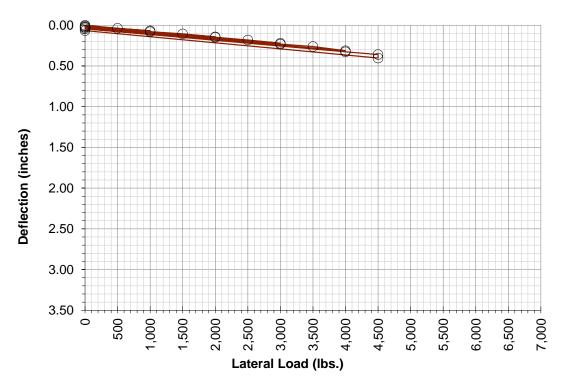
Tested By Terracon Rep: CAS
Date Tested: 5/1/2024

Pile ID: PLT-15B

Pile Information

Latitude [deg.]: 45.64248
Longitude [deg.]: -120.59773
Pile Type: W6x9
Pile Embedment Depth [in.]: 84
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 6,000
Drive Time [sec.]: 25.88

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.038	
17%	1,000	0.069	
0%	0	0.011	
17%	1,000	0.080	
25%	1,500	0.106	
33%	2,000	0.143	
0%	0	0.021	
33%	2,000	0.148	
42%	2,500	0.182	
50%	3,000	0.221	
0%	0	0.030	
50%	3,000	0.232	
58%	3,500	0.262	
67%	4,000	0.313	
0%	0	0.044	
67%	4,000	0.326	
75%	4,500	0.360	
0%	0		
75%	4,500	0.403	
83%	5,000		
92%	5,500		
0%	0	0.066	



--- Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Result for PLT-16A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in.]:	NA
Height of Top Gauges [in.]: Height of Bottom Gauges [in.]:	6
Height of Applied Load [in.]:	42
Load Cell:	Dillion Ed Junior

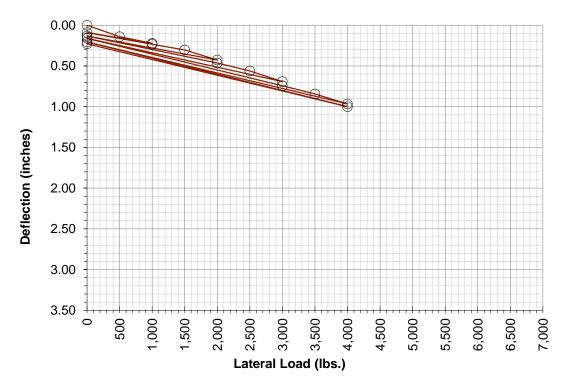
Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/1/2024

Pile ID: PLT-16A

Latitude [deg.]:	45.64944
Latitude [deg.]: Longitude [deg.]: Pile Type: Pile Embedment Depth [in.]: Pile Stick-Up [in.]:	-120.59293
Pile Type:	W6x9
Pile Embedment Depth [in.]:	96
Pile Stick-Up [in.]:	48
Lateral Design Load [lbs.]: Drive Time [sec.]:	6,000
Drive Time [sec.]:	13.19

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.141	
17%	1,000	0.222	
0%	0	0.091	
17%	1,000	0.234	
25%	1,500	0.303	
33%	2,000	0.427	
0%	0	0.133	
33%	2,000	0.465	
42%	2,500	0.562	
50%	3,000	0.692	
0%	0	0.161	
50%	3,000	0.744	
58%	3,500	0.845	
67%	4,000	0.967	
0%	0	0.206	
67%	4,000	1.000	
75%	4,500		
0%	0		
75%	4,500		
83%	5,000		
92%	5,500		
0%	0	0.229	



--- Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Result for PLT-16B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in.]:	NA
Height of Top Gauges [in.]: Height of Bottom Gauges [in.]:	6
Height of Applied Load [in.]:	42
Load Cell:	Dillion Ed Junior

Test Date and Representative

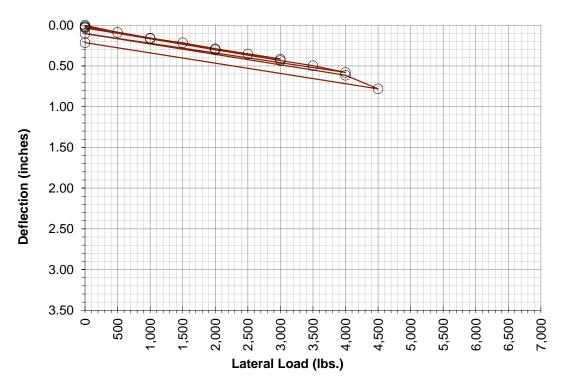
Tested By Terracon Rep: CAS
Date Tested: 5/1/2024

Pile ID: PLT-16B

Pile Information

Latitude [deg.]: 45.64944
Longitude [deg.]: -120.59293
Pile Type: W6x9
Pile Embedment Depth [in.]: 60
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 6,000
Drive Time [sec.]: 1.97

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.088	
17%	1,000	0.159	
0%	0	0.013	
17%	1,000	0.165	
25%	1,500	0.215	
33%	2,000	0.290	
0%	0	0.023	
33%	2,000	0.300	
42%	2,500	0.353	
50%	3,000	0.415	
0%	0	0.033	
50%	3,000	0.434	
58%	3,500	0.497	
67%	4,000	0.579	
0%	0	0.103	
67%	4,000	0.615	
75%	4,500	0.781	
0%	0		
75%	4,500		
83%	5,000		
92%	5,500		
0%	0	0.214	



--- Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Result for PLT-17A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in.]:	NA
Height of Top Gauges [in.]: Height of Bottom Gauges [in.]:	6
Height of Applied Load [in.]:	42
Load Cell:	Dillion Ed Junior

Test Date and Representative

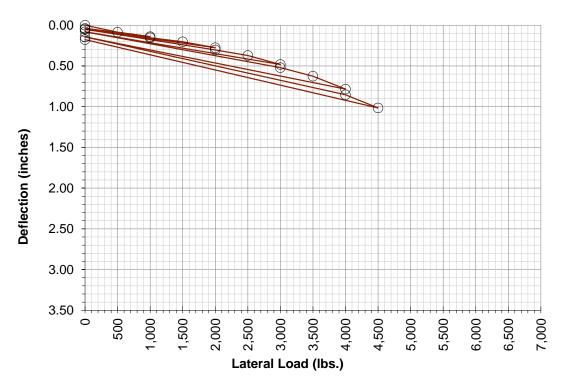
Tested By Terracon Rep: CAS
Date Tested: 5/1/2024

Pile ID: PLT-17A

Pile Information

Latitude [deg.]: 45.65780
Longitude [deg.]: -120.59221
Pile Type: W6x9
Pile Embedment Depth [in.]: 120
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 6,000
Drive Time [sec.]: 8.6

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.085	
17%	1,000	0.141	
0%	0	0.039	
17%	1,000	0.154	
25%	1,500	0.203	
33%	2,000	0.276	
0%	0	0.049	
33%	2,000	0.303	
42%	2,500	0.372	
50%	3,000	0.482	
0%	0	0.081	
50%	3,000	0.521	
58%	3,500	0.627	
67%	4,000	0.785	
0%	0	0.143	
67%	4,000	0.854	
75%	4,500	1.016	
0%	0		
75%	4,500		
83%	5,000		
92%	5,500		
0%	0	0.177	



--- Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Result for PLT-17B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in.]:	NA
Height of Top Gauges [in.]: Height of Bottom Gauges [in.]:	6
Height of Applied Load [in.]:	42
Load Cell:	Dillion Ed Junior

Test Date and Representative

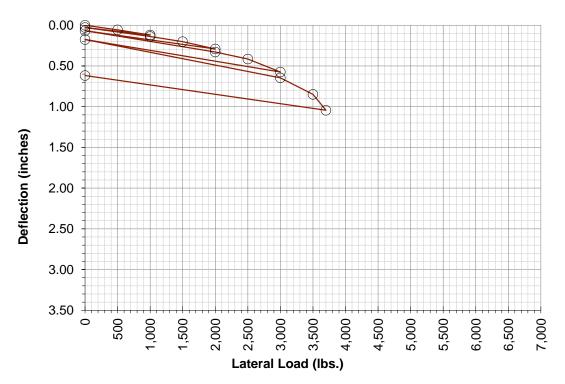
Tested By Terracon Rep: CAS
Date Tested: 5/1/2024

Pile ID: PLT-17B

Pile Information

Latitude [deg.]: 45.65780
Longitude [deg.]: -120.59221
Pile Type: W6x9
Pile Embedment Depth [in.]: 84
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 6,000
Drive Time [sec.]: 2.84

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.057	
17%	1,000	0.121	
0%	0	0.028	
17%	1,000	0.138	
25%	1,500	0.202	
33%	2,000	0.291	
0%	0	0.068	
33%	2,000	0.329	
42%	2,500	0.415	
50%	3,000	0.575	
0%	0	0.175	
50%	3,000	0.646	
58%	3,500	0.849	
62%	3,700	1.044	
0%	0		
67%	4,000		
75%	4,500		
0%	0		
75%	4,500		
83%	5,000		
92%	5,500		
0%	0	0.618	



--- Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Result for PLT-18A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in.]:	NA
Height of Top Gauges [in.]: Height of Bottom Gauges [in.]:	6
Height of Applied Load [in.]:	42
Load Cell:	Dillion Ed Junior

Test Date and Representative

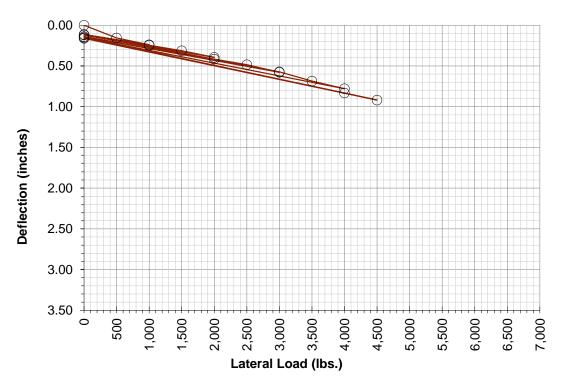
Tested By Terracon Rep: CAS
Date Tested: 5/2/2024

Pile ID: PLT-18A

Pile Information

Latitude [deg.]: 45.66467
Longitude [deg.]: -120.58845
Pile Type: W6x9
Pile Embedment Depth [in.]: 106
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 6,000
Drive Time [sec.]: 123.9

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.157	
17%	1,000	0.240	
0%	0	0.115	
17%	1,000	0.246	
25%	1,500	0.314	
33%	2,000	0.395	
0%	0	0.119	
33%	2,000	0.416	
42%	2,500	0.485	
50%	3,000	0.578	
0%	0	0.139	
50%	3,000	0.573	
58%	3,500	0.686	
67%	4,000	0.780	
0%	0	0.151	
67%	4,000	0.833	
75%	4,500	0.919	
0%	0		
75%	4,500		
83%	5,000		
92%	5,500		
0%	0	0.161	



--- Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Result for PLT-18B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in.]:	NA
Height of Top Gauges [in.]: Height of Bottom Gauges [in.]: Height of Applied Load [in.]:	6
Height of Applied Load [in.]:	42
Load Cell:	Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/2/2024

Pile ID: PLT-18B

Pile Information

Latitude [deg.]: 45.66467
Longitude [deg.]: -120.58845
Pile Type: W6x9
Pile Embedment Depth [in.]: 84
Pile Stick-Up [in.]: 48
Lateral Design Load [lbs.]: 6,000
Drive Time [sec.]: 14.63

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.089	
17%	1,000	0.217	
0%	0	0.012	
17%	1,000	0.199	
25%	1,500	0.333	
33%	2,000	0.412	
0%	0	0.013	
33%	2,000	0.425	
42%	2,500	0.489	
50%	3,000	0.563	
0%	0	0.022	
50%	3,000	0.576	
58%	3,500	0.650	
67%	4,000	0.732	
0%	0	0.032	
67%	4,000	0.769	
75%	4,500	0.857	
0%	0		
75%	4,500		
83%	5,000		
92%	5,500		
0%	0	0.035	



--- Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Result for PLT-19A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

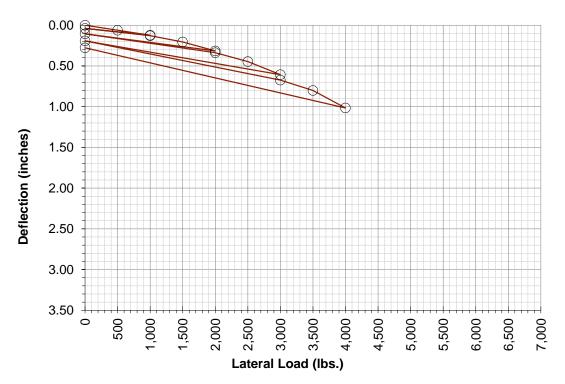
Number of Top Gauges:	0
Number of Top Gauges: Number of Bottom Gauges:	2
Height of Top Gauges [in.]:	NA
Height of Top Gauges [in.]: Height of Bottom Gauges [in.]:	6
Height of Applied Load [in.]:	42
Load Cell:	Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/2/2024

ne milorination	
	PLT-19A
Latitude [deg.]:	45.65705
Longitude [deg.]: Pile Type: Pile Embedment Depth [in.]:	-120.6038
Pile Type:	W6x9
Pile Embedment Depth [in.]:	120
Pile Stick-Up [in.]:	48
Lateral Design Load [lbs.]:	6,000
Pile Stick-Up [in.]: Lateral Design Load [lbs.]: Drive Time [sec.]:	39.27

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.062	
17%	1,000	0.123	
0%	0	0.039	
17%	1,000	0.128	
25%	1,500	0.205	
33%	2,000	0.316	
0%	0	0.106	
33%	2,000	0.337	
42%	2,500	0.447	
50%	3,000	0.607	
0%	0	0.193	
50%	3,000	0.674	
58%	3,500	0.802	
67%	4,000	1.016	
0%	0		
67%	4,000		
75%	4,500		
0%	0		
75%	4,500		
83%	5,000		
92%	5,500		
0%	0	0.278	



----Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Result for PLT-19B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in.]:	NA
Height of Top Gauges [in.]: Height of Bottom Gauges [in.]: Height of Applied Load [in.]:	6
Height of Applied Load [in.]:	42
Load Cell:	Dillion Ed Junior

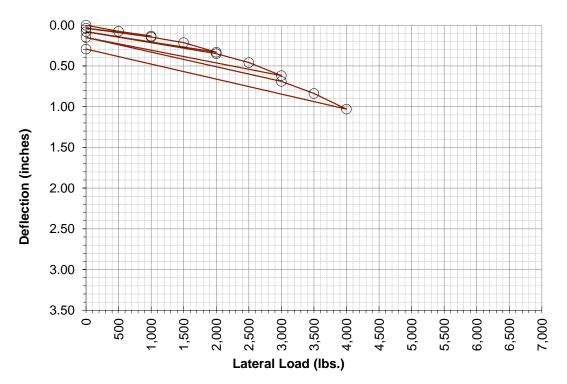
Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/2/2024

Pile ID: PLT-19B

Latitude [deg.]:	45.65705
Latitude [deg.]: Longitude [deg.]: Pile Type: Pile Embedment Depth [in.]:	-120.60382
Pile Type:	W6x9
Pile Embedment Depth [in.]:	84
Pile Stick-Up [in.]:	48
Lateral Design Load [lbs.]:	6,000
Pile Stick-Up [in.]: Lateral Design Load [lbs.]: Drive Time [sec.]:	5.41

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.075	
17%	1,000	0.133	
0%	0	0.037	
17%	1,000	0.146	
25%	1,500	0.214	
33%	2,000	0.331	
0%	0	0.079	
33%	2,000	0.350	
42%	2,500	0.459	
50%	3,000	0.619	
0%	0	0.150	
50%	3,000	0.690	
58%	3,500	0.838	
67%	4,000	1.030	
0%	0		
67%	4,000		
75%	4,500		
0%	0		
75%	4,500		
83%	5,000		
92%	5,500		
0%	0	0.293	



--- Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Result for PLT-20A

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in.]:	NA
Height of Top Gauges [in.]: Height of Bottom Gauges [in.]:	6
Height of Applied Load [in.]:	42
Load Cell:	Dillion Ed Junior

Test Date and Representative

Tested By Terracon Rep: CAS Date Tested: 5/2/2024

Pile Information	
Pile ID:	PLT-20A
Latitude [deg.]: Longitude [deg.]: Pile Type:	45.64330
Longitude [deg.]:	-120.6227
Pile Type:	W6x9
Pile Embedment Denth [in.]:	1120
Pile Stick-Up [in.]:	48
Pile Stick-Up [in.]: Lateral Design Load [lbs.]: Drive Time [sec.]:	6,000
Drive Time [sec.]:	9.91

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.088	
17%	1,000	0.183	
0%	0	0.048	
17%	1,000	0.170	
25%	1,500	0.238	
33%	2,000	0.329	
0%	0	0.077	
33%	2,000	0.351	
42%	2,500	0.443	
50%	3,000	0.575	
0%	0	0.108	
50%	3,000	0.623	
58%	3,500	0.770	
67%	4,000	0.995	
0%	0	0.195	
67%	4,000	1.016	
75%	4,500		
0%	0		
75%	4,500		
83%	5,000		
92%	5,500		
0%	0	0.210	



----Lateral - Gauges at 6-inches aboce ground surface



Lateral Load Test Result for PLT-20B

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Lateral Load Test Set Up

Number of Top Gauges:	0
Number of Bottom Gauges:	2
Height of Top Gauges [in.]:	NA
Height of Top Gauges [in.]: Height of Bottom Gauges [in.]:	6
Height of Applied Load [in.]:	42
Load Cell:	Dillion Ed Junior

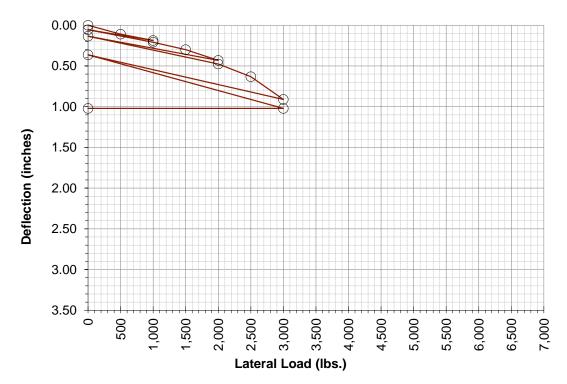
Test Date and Representative

Tested By Terracon Rep:	CAS
Date Tested:	5/2/2024

Pile ID: PLT-20B

Latitude [deg.]:	45.64330
Latitude [deg.]: Longitude [deg.]: Pile Type: Pile Embedment Depth [in.]: Pile Stick-Up [in.]: Lateral Design Load [lbs.]: Drive Time [sec.]:	-120.62276
Pile Type:	W6x9
Pile Embedment Depth [in.]:	84
Pile Stick-Up [in.]:	48
Lateral Design Load [lbs.]:	6,000
Drive Time [sec.]:	4.13

% of Design	Lateral Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.110	
17%	1,000	0.187	
0%	0	0.056	
17%	1,000	0.209	
25%	1,500	0.300	
33%	2,000	0.432	
0%	0	0.135	
33%	2,000	0.476	
42%	2,500	0.633	
50%	3,000	0.911	
0%	0	0.364	
50%	3,000	1.021	
58%	3,500		
67%	4,000		
0%	0		
67%	4,000		
75%	4,500		
0%	0		
75%	4,500		
83%	5,000		
92%	5,500		
0%	0	1.021	



----Lateral - Gauges at 6-inches aboce ground surface

Preliminary Geotechnical Engineering Report

Biglow Solar & BESS | Within 2 miles East to 8 miles NE of Wasco, Sherman County, Oregon November 14, 2024 | Terracon Project No. 82245013



Axial Compression Test Results



Compression Load Test Result for PLT-01C

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in]: 6 Load Cell: Dillion Ed junior

Test Date and Representative

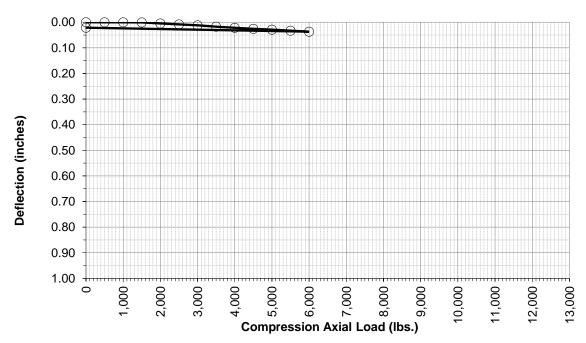
Tested By Terracon Rep: David
Date Tested: 4/11/2024

Pile Information

Pile ID: PLT-01C
Latitude [deg.]: 45.59230
Longitude [deg.]: -120.65048
Pile Type: W6X9

Pile Embedment Depth [in.]: 5.9
Pile Stick-Up [in.]: 24
Axial Design Load [lbs.]: 6,000
Pile Area [sq. in.]: 2.96
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 18.77

	Comp	ression Test Results	
% of	Axial		
Design	Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.001	
17%	1,000	0.001	
25%	1,500	0.001	
33%	2,000	0.005	
42%	2,500	0.009	
50%	3,000	0.012	
58%	3,500	0.018	
67%	4,000	0.022	
75%	4,500	0.026	
83%	5,000	0.029	
92%	5,500	0.033	
100%	6,000	0.037	
108%	6,500		
117%	7,000		
125%	7,500		
133%	8,000		
142%	8,500		
150%	9,000		
158%	9,500		
167%	10,000		
0%	0	0.022	





Compression Load Test Result for PLT-02C

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in]: 6 Load Cell: Dillion Ed junior

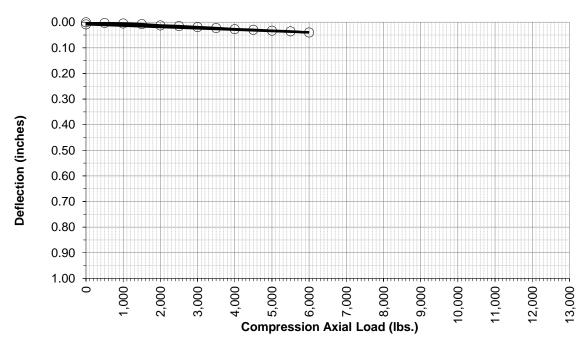
Test Date and Representative

Tested By Terracon Rep: David Date Tested: 4/10/2024

Pile Information

Pile ID: PLT-02C Latitude [deg.]: 45.59809 Longitude [deg.]: -120.63540 Pile Type: W6x9 Pile Embedment Depth [in.]: 60 Pile Diameter [in.]: 5.9 Pile Stick-Up [in.]: 24 Axial Design Load [lbs.]: 6,000 Pile Area [sq. in.]: 2.96 Elastic Modulus [ksi.]: 29,000 Drive Time [sec.]: 3.46

	Comp	ression Test Results	
% of	Axial		
Design	Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.003	
17%	1,000	0.005	
25%	1,500	0.008	
33%	2,000	0.013	
42%	2,500	0.015	
50%	3,000	0.019	
58%	3,500	0.023	
67%	4,000	0.027	
75%	4,500	0.030	
83%	5,000	0.033	
92%	5,500	0.036	
100%	6,000	0.040	
108%	6,500		
117%	7,000		
125%	7,500		
133%	8,000		
142%	8,500		
150%	9,000		
158%	9,500		
167%	10,000		
0%	0	0.009	





Compression Load Test Result for PLT-03C

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in]: 6 Load Cell: Dillion Ed junior

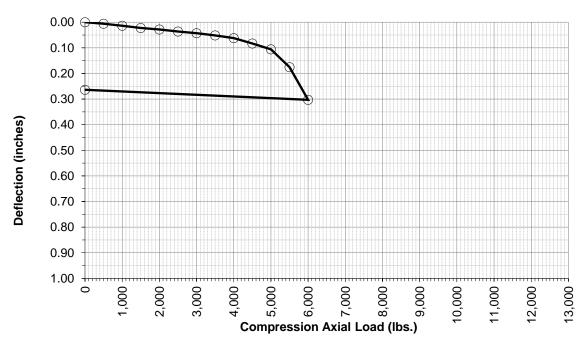
Test Date and Representative

Tested By Terracon Rep: David Date Tested: 4/11/2024

Pile Information

Pile ID: PLT-03C Latitude [deg.]: 45.60511 Longitude [deg.]: -120.65040 Pile Type: W6x9 Pile Embedment Depth [in.]: 84 Pile Diameter [in.]: 5.9 Pile Stick-Up [in.]: 24 Axial Design Load [lbs.]: 6,000 Pile Area [sq. in.]: 2.96 Elastic Modulus [ksi.]: 29,000 Drive Time [sec.]: 6.52

	Carre	ression Test Results	
		ression lest Results	
% of	Axial Load	Defication A (in)	Comments
Design Load		Deflection Δ (in.)	Comments
Load 0%	[lbs.]	Gauges #1 & #2	
0 70	0	0.000	
8%	500	0.006	
17%	1,000	0.014	
25%	1,500	0.023	
33%	2,000	0.029	
42%	2,500	0.037	
50%	3,000	0.043	
58%	3,500	0.052	
67%	4,000	0.062	
75%	4,500	0.083	
83%	5,000	0.106	
92%	5,500	0.176	
100%	6,000	0.303	
108%	6,500		
117%	7,000		
125%	7,500		
133%	8,000		
142%	8,500		
150%	9,000		
158%	9,500		
167%	10,000		
0%	0	0.264	





Compression Load Test Result for PLT-04C

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in]: 6 Load Cell: Dillion Ed junior

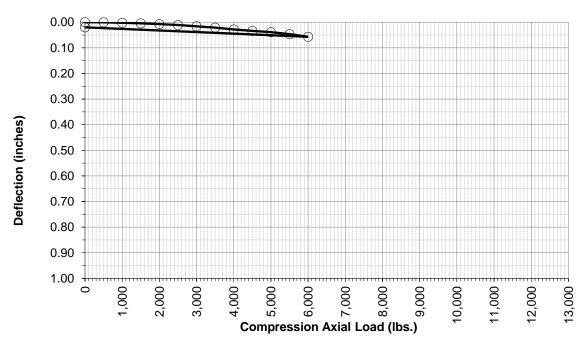
Test Date and Representative

Tested By Terracon Rep: David Date Tested: 4/10/2024

Pile Information

Pile ID: PLT-04C Latitude [deg.]: 45.60197 Longitude [deg.]: -120.62483 Pile Type: W6x9 Pile Embedment Depth [in.]: 84 Pile Diameter [in.]: 5.9 Pile Stick-Up [in.]: 24 Axial Design Load [lbs.]: 6,000 Pile Area [sq. in.]: 2.96 Elastic Modulus [ksi.]: 29,000 Drive Time [sec.]: 7.42

	Comp	ression Test Results	
% of	Axial		
Design	Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.001	
17%	1,000	0.003	
25%	1,500	0.005	
33%	2,000	0.008	
42%	2,500	0.011	
50%	3,000	0.016	
58%	3,500	0.021	
67%	4,000	0.029	
75%	4,500	0.034	
83%	5,000	0.039	
92%	5,500	0.047	
100%	6,000	0.057	
108%	6,500		
117%	7,000		
125%	7,500		
133%	8,000		
142%	8,500		
150%	9,000		
158%	9,500		
167%	10,000		
0%	0	0.020	





Compression Load Test Result for PLT-05C

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in]: 6 Load Cell: Dillion Ed junior

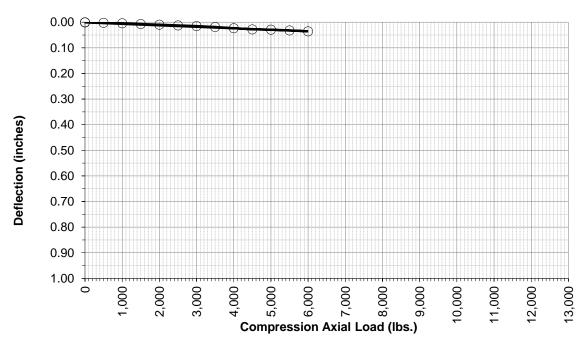
Test Date and Representative

Tested By Terracon Rep: David Date Tested: 4/10/2024

Pile Information

Pile ID: PLT-05C Latitude [deg.]: 45.60946 Longitude [deg.]: -120.62043 Pile Type: W6x9 Pile Embedment Depth [in.]: 84 Pile Diameter [in.]: 5.9 Pile Stick-Up [in.]: 24 Axial Design Load [lbs.]: 6,000 Pile Area [sq. in.]: 2.96 Elastic Modulus [ksi.]: 29,000 Drive Time [sec.]: 26.45

	Comp	ression Test Results	
% of	Axial		
Design	Load	Deflection ∆ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.003	
17%	1,000	0.004	
25%	1,500	0.007	
33%	2,000	0.010	
42%	2,500	0.013	
50%	3,000	0.015	
58%	3,500	0.019	
67%	4,000	0.024	
75%	4,500	0.028	
83%	5,000	0.029	
92%	5,500	0.032	
100%	6,000	0.036	
108%	6,500		
117%	7,000		
125%	7,500		
133%	8,000		
142%	8,500		
150%	9,000		
158%	9,500		
167%	10,000		
0%	0	0.001	





Compression Load Test Result for PLT-06C

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in]: 6 Load Cell: Dillion Ed junior

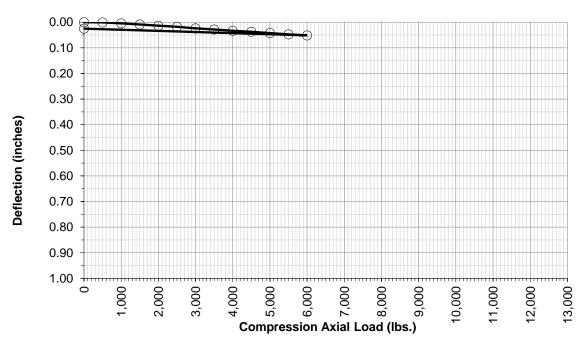
Test Date and Representative

Tested By Terracon Rep: David Date Tested: 4/10/2024

Pile Information

Pile ID: PLT-06C Latitude [deg.]: 45.61345 Longitude [deg.]: -120.63250 Pile Type: W6x9 Pile Embedment Depth [in.]: 84 Pile Diameter [in.]: 5.9 Pile Stick-Up [in.]: 24 Axial Design Load [lbs.]: 6,000 Pile Area [sq. in.]: 2.96 Elastic Modulus [ksi.]: 29,000 Drive Time [sec.]: 14.09

	Comp	ression Test Results	
% of	Axial		
Design	Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.001	
17%	1,000	0.005	
25%	1,500	0.009	
33%	2,000	0.014	
42%	2,500	0.018	
50%	3,000	0.024	
58%	3,500	0.029	
67%	4,000	0.034	
75%	4,500	0.038	
83%	5,000	0.043	
92%	5,500	0.048	
100%	6,000	0.052	
108%	6,500		
117%	7,000		
125%	7,500		
133%	8,000		
142%	8,500		
150%	9,000		
158%	9,500		
167%	10,000		
0%	0	0.025	





Compression Load Test Result for PLT-07C

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in]: 6 Load Cell: Dillion Ed junior

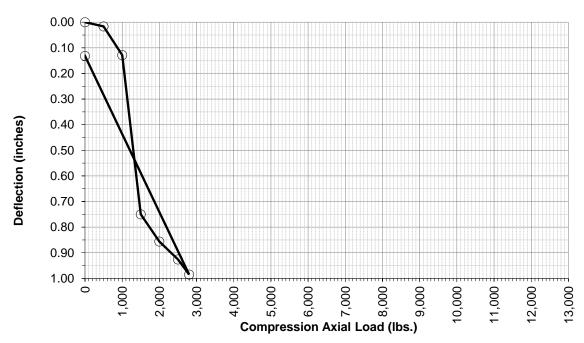
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/11/2024

Pile Information

Pile ID: PLT-07C
Latitude [deg.]: 45.60635
Longitude [deg.]: -120.64196
Pile Type: W6x9
Pile Embedment Depth [in.]: 60
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 24
Axial Design Load [lbs.]: 6,000
Pile Area [sq. in.]: 2.96
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 1.77

	Compression Test Results		
% of	Axial		
Design	Load	Deflection △ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.017	
17%	1,000	0.129	
25%	1,500	0.750	
33%	2,000	0.856	
42%	2,500	0.926	
47%	2,800	0.985	
58%	3,500		
67%	4,000		
75%	4,500		
83%	5,000		
92%	5,500		
100%	6,000		
108%	6,500		
117%	7,000		
125%	7,500		
133%	8,000		
142%	8,500		
150%	9,000		
158%	9,500		
167%	10,000		
0%	0	0.132	





Compression Load Test Result for PLT-08C

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in]: 6 Load Cell: Dillion Ed junior

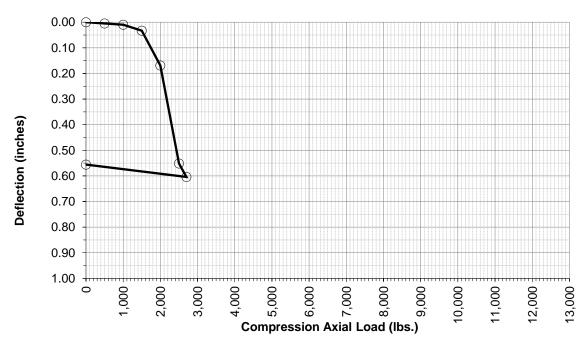
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/11/2024

Pile Information

Pile ID: PLT-08C
Latitude [deg.]: 45.61018
Longitude [deg.]: -120.64516
W6x9
Pile Embedment Depth [in.]: 60
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 24
Axial Design Load [lbs.]: 6,000
Pile Area [sq. in.]: 2.96
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 1.53

	Comp	ression Test Results	
% of	Axial		
Design	Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.005	
17%	1,000	0.010	
25%	1,500	0.033	
33%	2,000	0.169	
42%	2,500	0.552	
45%	2,700	0.604	
58%	3,500		
67%	4,000		
75%	4,500		
83%	5,000		
92%	5,500		
100%	6,000		
108%	6,500		
117%	7,000		
125%	7,500		
133%	8,000		
142%	8,500		
150%	9,000		
158%	9,500		
167%	10,000		
0%	0	0.556	





Compression Load Test Result for PLT-09C

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in]: 6 Load Cell: Dillion Ed junior

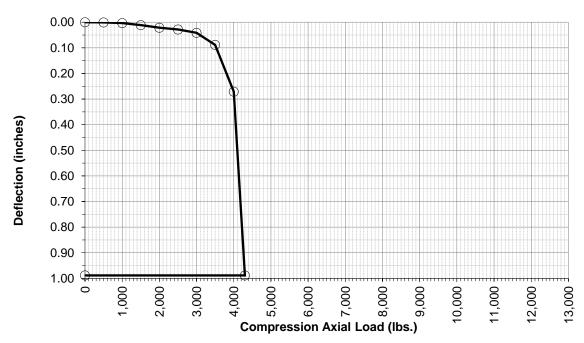
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/11/2024

Pile Information

Pile ID: PLT-09C
Latitude [deg.]: 45.61774
Longitude [deg.]: -120.64554
Pile Type: W6x9
Pile Embedment Depth [in.]: 84
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 24
Axial Design Load [lbs.]: 6,000
Pile Area [sq. in.]: 2.96
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 6.94

	Comp	ression Test Results	
% of	Axial		
Design	Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.001	
17%	1,000	0.004	
25%	1,500	0.012	
33%	2,000	0.022	
42%	2,500	0.029	
50%	3,000	0.042	
58%	3,500	0.089	
67%	4,000	0.271	
72%	4,300	0.989	
83%	5,000		
92%	5,500		
100%	6,000		
108%	6,500		
117%	7,000		
125%	7,500		
133%	8,000		
142%	8,500		
150%	9,000		
158%	9,500		
167%	10,000		
0%	0	0.989	





Compression Load Test Result for PLT-10C

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in]: 6 Load Cell: Dillion Ed junior

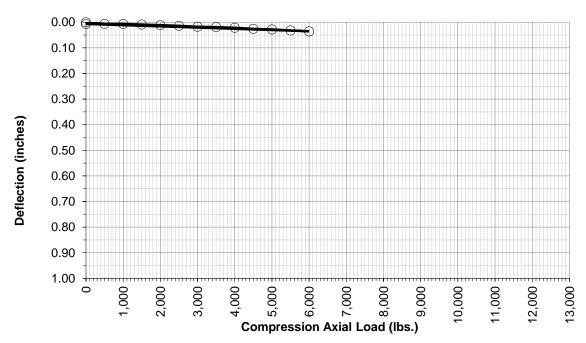
Test Date and Representative

Tested By Terracon Rep: David
Date Tested: 4/10/2024

Pile Information

Pile ID: PLT-10C
Latitude [deg.]: 45.62470
Longitude [deg.]: -120.62967
Pile Type: W6x9
Pile Embedment Depth [in.]: 60
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 24
Axial Design Load [lbs.]: 6,000
Pile Area [sq. in.]: 2.96
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 0.58

	Comp	ression Test Results	
% of	Axial		
Design	Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
8%	500	0.007	
17%	1,000	0.007	
25%	1,500	0.009	
33%	2,000	0.012	
42%	2,500	0.014	
50%	3,000	0.018	
58%	3,500	0.019	
67%	4,000	0.022	
75%	4,500	0.026	
83%	5,000	0.028	
92%	5,500	0.032	
100%	6,000	0.036	
108%	6,500		
117%	7,000		
125%	7,500		
133%	8,000		
142%	8,500		
150%	9,000		
158%	9,500		
167%	10,000		
0%	0	0.007	





Compression Load Test Result for PLT-11C

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in]: 6 Load Cell: Dillon Ed junior

Test Date and Representative

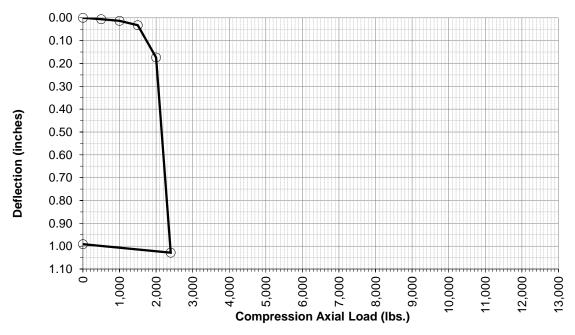
Tested By Terracon Rep: CAS

Date Tested: 5/2/2024

Pile Information

Pile ID: PLT-11C
Latitude [deg.]: 45.59109
Longitude [deg.]: -120.65643
Pile Type: W6x9
Pile Embedment Depth [in.]: 84
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 24
Axial Design Load [lbs.]: 13,000
Pile Area [sq. in.]: 2.68
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 4.15

Compression Test Results				
% of	Axial			
Design	Load	Deflection ∆ (in.)	Comments	
Load	[lbs.]	Gauges #1 & #2		
0%	0	0.000		
4%	500	0.006		
8%	1,000	0.014		
12%	1,500	0.033		
15%	2,000	0.174		
18%	2,400	1.029		
23%	3,000			
27%	3,500			
31%	4,000			
35%	4,500			
38%	5,000			
42%	5,500			
46%	6,000			
50%	6,500			
54%	7,000			
58%	7,500			
62%	8,000			
65%	8,500			
69%	9,000			
73%	9,500			
77%	10,000			
81%	10,500			
85%	11,000			
88%	11,500			
92%	12,000			
96%	12,500			
100%	13,000			
0%	0	0.992		





Compression Load Test Result for PLT-12C

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in]: 6 Load Cell: Dillon Ed junior

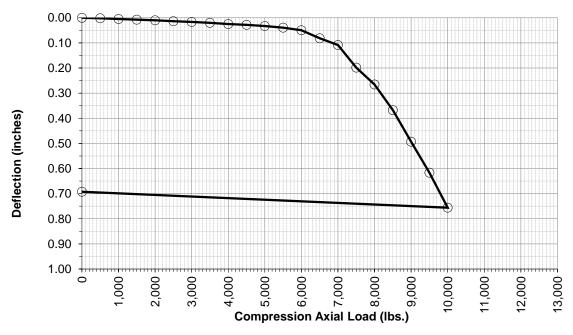
Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/2/2024

Pile Information

Pile ID: PLT-12C
Latitude [deg.]: 45.58466
Longitude [deg.]: -120.64912
Pile Type: W6x9
Pile Embedment Depth [in.]: 5.9
Pile Diameter [in.]: 24
Axial Design Load [lbs.]: 13,000
Pile Area [sq. in.]: 2.68
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 1.2

Compression Test Results				
% of	Axial			
Design	Load	Deflection △ (in.)	Comments	
Load	[lbs.]	Gauges #1 & #2		
0%	0	0.000		
4%	500	0.002		
8%	1,000	0.005		
12%	1,500	0.008		
15%	2,000	0.010		
19%	2,500	0.014		
23%	3,000	0.017		
27%	3,500	0.020		
31%	4,000	0.025		
35%	4,500	0.028		
38%	5,000	0.033		
42%	5,500	0.040		
46%	6,000	0.050		
50%	6,500	0.082		
54%	7,000	0.109		
58%	7,500	0.199		
62%	8,000	0.266		
65%	8,500	0.368		
69%	9,000	0.493		
73%	9,500	0.617		
77%	10,000	0.756		
81%	10,500			
85%	11,000			
88%	11,500			
92%	12,000			
96%	12,500			
100%	13,000			
0%	0	0.693		





Compression Load Test Result for PLT-13C

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in]: 6 Load Cell: Dillon Ed junior

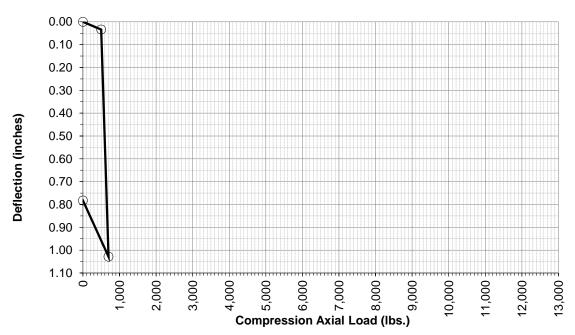
Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/2/2024

Pile Information

Pile ID: PLT-13C
Latitude [deg.]: 45.65586
Longitude [deg.]: -120.62025
Pile Type: W6x9
Pile Embedment Depth [in.]: 84
Pile Diameter [in.]: 24
Axial Design Load [lbs.]: 13,000
Pile Area [sq. in.]: 2.68
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 4.96

Compression Test Results				
% of	Axial			
Design	Load	Deflection ∆ (in.)	Comments	
Load	[lbs.]	Gauges #1 & #2		
0%	0	0.000		
4%	500	0.034		
5%	700	1.029		
12%	1,500			
15%	2,000			
19%	2,500			
23%	3,000			
27%	3,500			
31%	4,000			
35%	4,500			
38%	5,000			
42%	5,500			
46%	6,000			
50%	6,500			
54%	7,000			
58%	7,500			
62%	8,000			
65%	8,500			
69%	9,000			
73%	9,500			
77%	10,000			
81%	10,500			
85%	11,000			
88%	11,500			
92%	12,000			
96%	12,500			
100%	13,000			
0%	0	0.783		





Compression Load Test Result for PLT-14C

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in]: 6 Load Cell: Dillon Ed junior

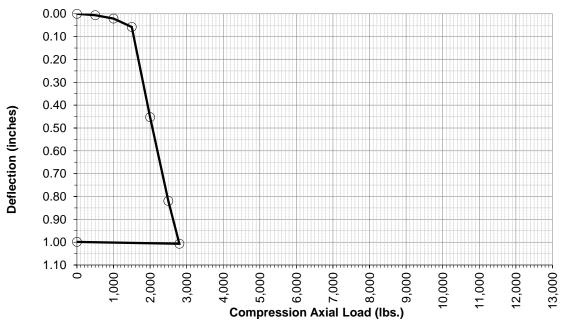
Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/1/2024

Pile Information

Pile ID: PLT-14C
Latitude [deg.]: 45.64247
Longitude [deg.]: -120.60591
Pile Type: W6x9
Pile Embedment Depth [in.]: 60
Pile Diameter [in.]: 24
Axial Design Load [lbs.]: 13,000
Pile Area [sq. in.]: 2.68
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 0.67

Compression Test Results				
% of	Axial			
Design	Load	Deflection ∆ (in.)	Comments	
Load	[lbs.]	Gauges #1 & #2		
0%	0	0.000		
4%	500	0.006		
8%	1,000	0.021		
12%	1,500	0.058		
15%	2,000	0.453		
19%	2,500	0.820		
22%	2,800	1.007		
27%	3,500			
31%	4,000			
35%	4,500			
38%	5,000			
42%	5,500			
46%	6,000			
50%	6,500			
54%	7,000			
58%	7,500			
62%	8,000			
65%	8,500			
69%	9,000			
73%	9,500			
77%	10,000			
81%	10,500			
85%	11,000			
88%	11,500			
92%	12,000			
96%	12,500			
100%	13,000			
0%	0	0.999		





Compression Load Test Result for PLT-15C

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in]: 6 Load Cell: Dillon Ed junior

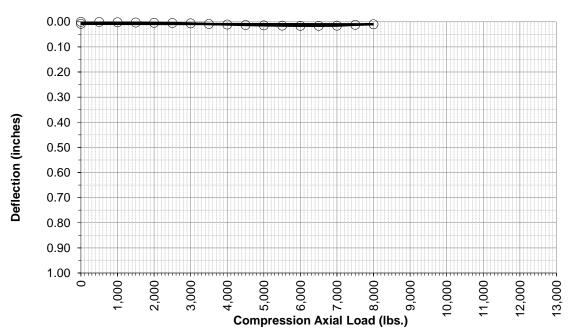
Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/1/2024

Pile Information

Pile ID: PLT-15C
Latitude [deg.]: 45.64248
Longitude [deg.]: -120.59773
Pile Type: W6x9
Pile Embedment Depth [in.]: 54
Pile Diameter [in.]: 24
Axial Design Load [lbs.]: 13,000
Pile Area [sq. in.]: 2.68
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 9.75

Compression Test Results				
% of	Axial			
Design	Load	Deflection Δ (in.)	Comments	
Load	[lbs.]	Gauges #1 & #2		
0%	0	0.000		
4%	500	0.001		
8%	1,000	0.002		
12%	1,500	0.003		
15%	2,000	0.004		
19%	2,500	0.005		
23%	3,000	0.007		
27%	3,500	0.009		
31%	4,000	0.011		
35%	4,500	0.013		
38%	5,000	0.015		
42%	5,500	0.016		
46%	6,000	0.016		
50%	6,500	0.016		
54%	7,000	0.016		
58%	7,500	0.012		
62%	8,000	0.010		
65%	8,500			
69%	9,000			
73%	9,500			
77%	10,000			
81%	10,500			
85%	11,000			
88%	11,500			
92%	12,000			
96%	12,500			
100%	13,000			
0%	0	0.008		





Compression Load Test Result for PLT-16C

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in]: 6 Load Cell: Dillon Ed junior

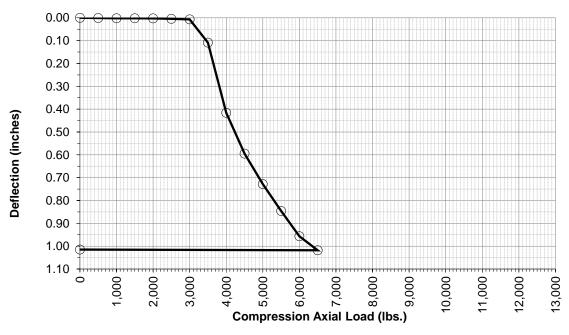
Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/1/2024

Pile Information

Pile ID: PLT-16C
Latitude [deg.]: 45.64944
Longitude [deg.]: -120.59293
Pile Type: W6x9
Pile Embedment Depth [in.]: 5.9
Pile Diameter [in.]: 24
Axial Design Load [ibs.]: 13,000
Pile Area [sq. in.]: 2.68
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 2.09

Compression Test Results				
% of	Axial			
Design	Load	Deflection ∆ (in.)	Comments	
Load	[lbs.]	Gauges #1 & #2		
0%	0	0.000		
4%	500	0.001		
8%	1,000	0.002		
12%	1,500	0.002		
15%	2,000	0.003		
19%	2,500	0.005		
23%	3,000	0.007		
27%	3,500	0.109		
31%	4,000	0.416		
35%	4,500	0.595		
38%	5,000	0.728		
42%	5,500	0.846		
46%	6,000	0.957		
50%	6,500	1.018		
54%	7,000			
58%	7,500			
62%	8,000			
65%	8,500			
69%	9,000			
73%	9,500			
77%	10,000			
81%	10,500			
85%	11,000			
88%	11,500			
92%	12,000			
96%	12,500			
100%	13,000			
0%	0	1.015		





Compression Load Test Result for PLT-17C

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in]: 6 Load Cell: Dillon Ed junior

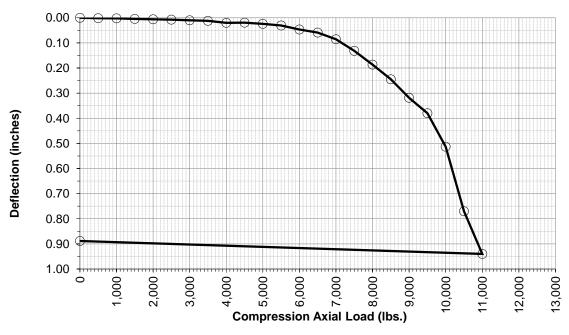
Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/1/2024

Pile Information

Pile ID: PLT-17C
Latitude [deg.]: 45.65780
Longitude [deg.]: -120.59221
Pile Type: W6x9
Pile Embedment Depth [in.]: 84
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 24
Axial Design Load [lbs.]: 13,000
Pile Area [sq. in.]: 2.68
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 3.43

Compression Test Results			
% of	Axial		
Design	Load	Deflection Δ (in.)	Comments
Load	[lbs.]	Gauges #1 & #2	
0%	0	0.000	
4%	500	0.002	
8%	1,000	0.003	
12%	1,500	0.005	
15%	2,000	0.006	
19%	2,500	0.008	
23%	3,000	0.010	
27%	3,500	0.012	
31%	4,000	0.020	
35%	4,500	0.020	
38%	5,000	0.024	
42%	5,500	0.031	
46%	6,000	0.047	
50%	6,500	0.059	
54%	7,000	0.086	
58%	7,500	0.132	
62%	8,000	0.187	
65%	8,500	0.245	
69%	9,000	0.319	
73%	9,500	0.380	
77%	10,000	0.513	
81%	10,500	0.770	
85%	11,000	0.940	
88%	11,500		
92%	12,000		
96%	12,500		
100%	13,000		
0%	0	0.889	





Compression Load Test Result for PLT-18C

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in]: 6 Load Cell: Dillon Ed junior

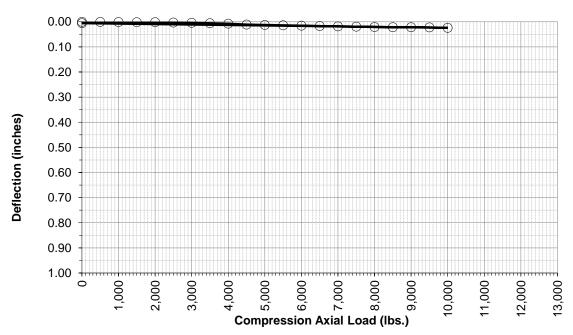
Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/2/2024

Pile Information

Pile ID: PLT-18C
Latitude [deg.]: 45.66467
Longitude [deg.]: -120.58845
Pile Type: W6x9
Pile Embedment Depth [in.]: 5.9
Pile Diameter [in.]: 24
Axial Design Load [ibs.]: 13,000
Pile Area [sq. in.]: 2.68
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 10.05

Compression Test Results				
% of	Axial			
Design	Load	Deflection △ (in.)	Comments	
Load	[lbs.]	Gauges #1 & #2		
0%	0	0.000		
4%	500	0.001		
8%	1,000	0.001		
12%	1,500	0.002		
15%	2,000	0.002		
19%	2,500	0.003		
23%	3,000	0.004		
27%	3,500	0.006		
31%	4,000	0.008		
35%	4,500	0.011		
38%	5,000	0.013		
42%	5,500	0.014		
46%	6,000	0.016		
50%	6,500	0.017		
54%	7,000	0.019		
58%	7,500	0.020		
62%	8,000	0.021		
65%	8,500	0.022		
69%	9,000	0.022		
73%	9,500	0.023		
77%	10,000	0.024		
81%	10,500			
85%	11,000			
88%	11,500			
92%	12,000			
96%	12,500			
100%	13,000			
0%	0	0.006		





Compression Load Test Result for PLT-19C

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in]: 6 Load Cell: Dillon Ed junior

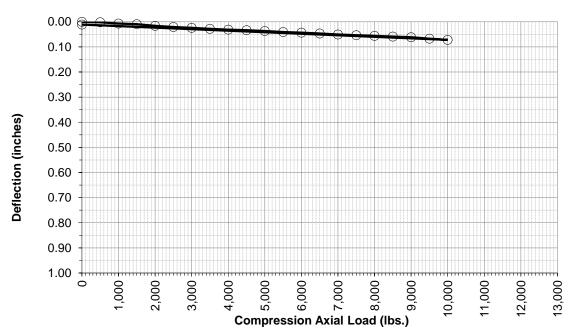
Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/2/2024

Pile Information

Pile ID: PLT-19C
Latitude [deg.]: 45.65705
Longitude [deg.]: -120.60382
Pile Type: W6x9
Pile Embedment Depth [in.]: 84
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 24
Axial Design Load [lbs.]: 13,000
Pile Area [sq. in.]: 2.68
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 5.42

Compression Test Results				
% of	Axial			
Design	Load	Deflection ∆ (in.)	Comments	
Load	[lbs.]	Gauges #1 & #2		
0%	0	0.000		
4%	500	0.002		
8%	1,000	0.007		
12%	1,500	0.010		
15%	2,000	0.016		
19%	2,500	0.021		
23%	3,000	0.024		
27%	3,500	0.028		
31%	4,000	0.032		
35%	4,500	0.034		
38%	5,000	0.037		
42%	5,500	0.041		
46%	6,000	0.044		
50%	6,500	0.047		
54%	7,000	0.051		
58%	7,500	0.054		
62%	8,000	0.056		
65%	8,500	0.059		
69%	9,000	0.062		
73%	9,500	0.068		
77%	10,000	0.072		
81%	10,500			
85%	11,000			
88%	11,500			
92%	12,000			
96%	12,500			
100%	13,000			
0%	0	0.011		





Compression Load Test Result for PLT-20C

Project Information

Project Name: Biglow Solar & BESS Project Location: Wasco, OR Project Number: 82245013

Axial Load Test Set Up

Number of Gauges: 2 Height of Gauges [in]: 6 Load Cell: Dillon Ed junior

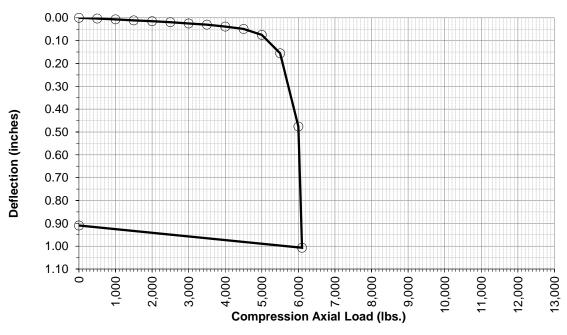
Test Date and Representative

Tested By Terracon Rep: CAS
Date Tested: 5/2/2024

Pile Information

Pile ID: PLT-20C
Latitude [deg.]: 45.64330
Longitude [deg.]: -120.62276
Pile Type: W6x9
Pile Embedment Depth [in.]: 84
Pile Diameter [in.]: 5.9
Pile Stick-Up [in.]: 24
Axial Design Load [lbs.]: 13,000
Pile Area [sq. in.]: 2.68
Elastic Modulus [ksi.]: 29,000
Drive Time [sec.]: 3.47

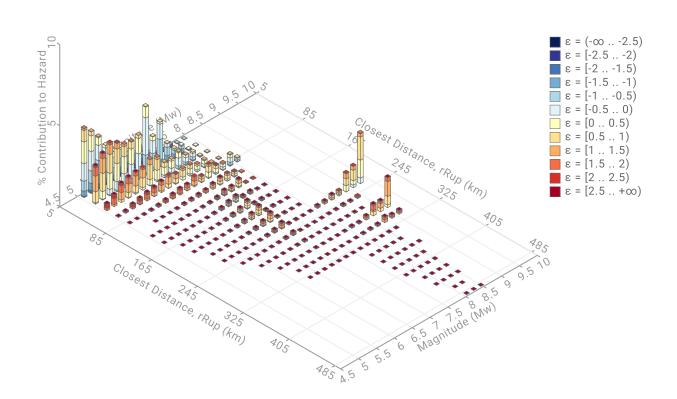
Compression Test Results				
% of	Axial			
Design	Load	Deflection ∆ (in.)	Comments	
Load	[lbs.]	Gauges #1 & #2		
0%	0	0.000		
4%	500	0.004		
8%	1,000	0.007		
12%	1,500	0.012		
15%	2,000	0.015		
19%	2,500	0.020		
23%	3,000	0.025		
27%	3,500	0.030		
31%	4,000	0.039		
35%	4,500	0.049		
38%	5,000	0.075		
42%	5,500	0.156		
46%	6,000	0.476		
47%	6,100	1.007		
54%	7,000			
58%	7,500			
62%	8,000			
65%	8,500			
69%	9,000			
73%	9,500			
77%	10,000			
81%	10,500			
85%	11,000			
88%	11,500			
92%	12,000			
96%	12,500			
100%	13,000			
0%	0	0.910		



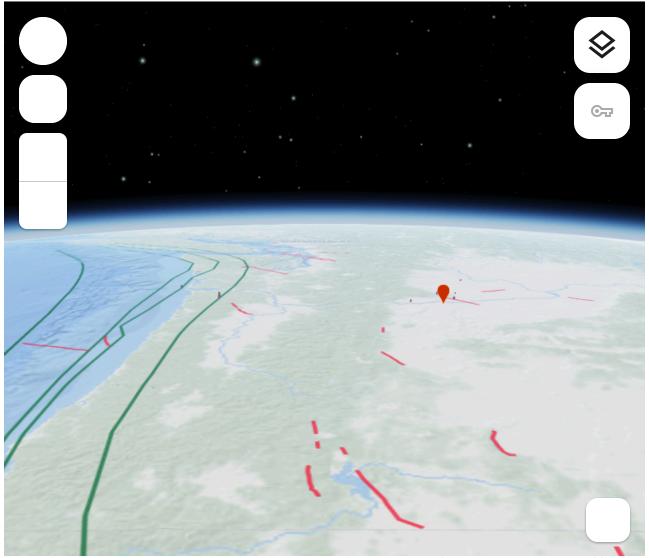
Attachment H-3. Probabilistic Seismic Hazard Disaggregation – 475-Year Return Time

Disaggregation Report

Disaggregation



Geographical Disaggregation



CHS, Esri, GEBCO, Garmin, NaturalVue | Oregon State Parks, WA State Parks GIS, Esri, T... Powered by Esri

Parameter Summary

Model: NSHM Conterminous U.S. 2023

Latitude: 45.648926 °

Longitude: -120.601333 °

Site Class: D (Vs30 260)

Intensity Measure Type: PGA

Return Period: 475 (10% in 50)

Component: Total

Disaggregation Summary: Total

Disaggregation targets

Return period: 475 yrs

Exceedance rate: 2.105e-3 yr⁻¹
PGA ground motion: 1.089e-1 g

Totals

Binned: 100 %

Residual: 0 %

Trace: 1.64 %

Mode (largest m-r bin)

 $\mathbf{m}:5.1$

 \mathbf{r} : 12.24 km $\mathbf{\epsilon_0}$: -0.05 σ

Contribution: 4.25 %

Discretization

 ${f r}$: min = 0.0, max = 1000.0, ${f \Delta}$ = 20.0 km

 \mathbf{m} : min = 4.4, max = 9.4, Δ = 0.2

 ϵ : min = -3.0, max = 3.0, Δ = 0.5 σ

Recovered targets

Return period: 469.68961 yrs

Exceedance rate: 2.129e-3 yr⁻¹

Mean (over all sources)

m: 6.57 r: 74.4 km $ε_0$: 0.32 σ

Mode (largest m-r-ε₀ bin)

m: 6.5

r: 28.51 km

 ϵ_0 : -0.26 σ

Contribution: 2.3 %

Epsilon keys

ε0 : [-∞ .. -2.5)

ε1: [-2.5 .. -2.0)

ε2: [-2.0 .. -1.5)

ε3: [-1.5 .. -1.0)

 $\pmb{\epsilon 4}: [\text{-}1.0\;..\;\text{-}0.5)$

ε5: [-0.5 .. 0.0)

ε6: [0.0 .. 0.5)

ε7: [0.5 .. 1.0)

ε8: [1.0 .. 1.5)

ε9: [1.5 .. 2.0)

ε10: [2.0 .. 2.5)

ε11 : [2.5 .. +∞]

Disaggregation Contributions: Total

Source Set 4 Source	Туре	r	m	ε ₀	lon	lat	az	%
WUS Branch Average (opt)	Grid							68.64
PointSourceFinite: -120.601, 46.022		37.98	6.11	0.55	120.601°W	46.022°N	0.00	1.13
PointSourceFinite: -120.601, 46.022		38.48	6.13	0.55	120.601°W	46.022°N	0.00	1.08
WUS Branch Average	FaultSystem							13.51
Arlington - Shutler Butte (4)		24.89	6.83	-0.78	120.416°W	45.831°N	35.31	2.67
Warwick (4)		32.54	6.64	-0.19	121.006°W	45.722°N	284.67	2.04
Uhtanum Ridge - Gable Mountain (2)		81.07	7.79	-0.12	120.109°W	46.642°N	18.78	1.44
Horse Heaven Hills (0)		46.28	6.99	-0.09	120.343°W	46.052°N	23.99	1.01
Cascadia (full, bottom)	Interface							5.23
Cascadia (full, bottom)		230.42	9.14	0.57	123.515°W	45.866°N	277.13	5.23
WA Intraslab	Slab							4.44
Cascadia (full, middle)	Interface							2.96
Cascadia (full, middle)		283.42	8.96	1.19	124.137°W	46.300°N	286.11	2.96
OR Intraslab	Slab							1.11

Application Metadata

Application: Disaggregation

URL: https://earthquake.usgs.gov/nshmp/hazard/disagg

Repository: nshmp-apps

Version: 20.8.0

URL: https://code.usgs.gov/ghsc/nshmp/nshmp-apps

Repository: nshmp-haz

Version: 2.7.0

URL: https://code.usgs.gov/ghsc/nshmp/nshmp-haz

Repository: nshmp-lib

Version: 1.7.15

URL: https://code.usgs.gov/ghsc/nshmp/nshmp-lib

Repository: nshm-conus

Version: 6.1.1

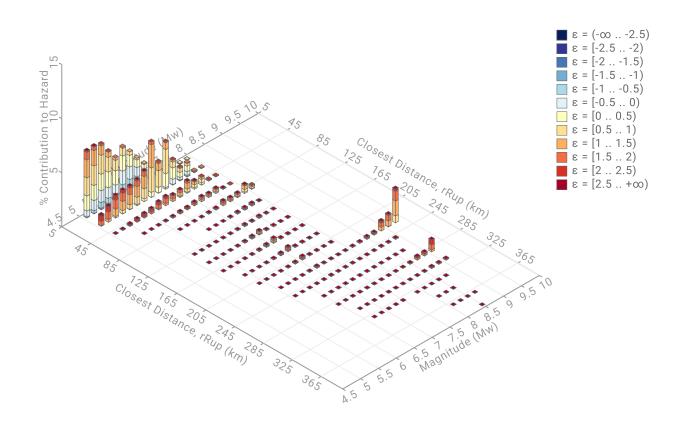
URL: https://code.usgs.gov/ghsc/nshmp/nshms/nshm-conus

November 14, 2025, 12:31 PM

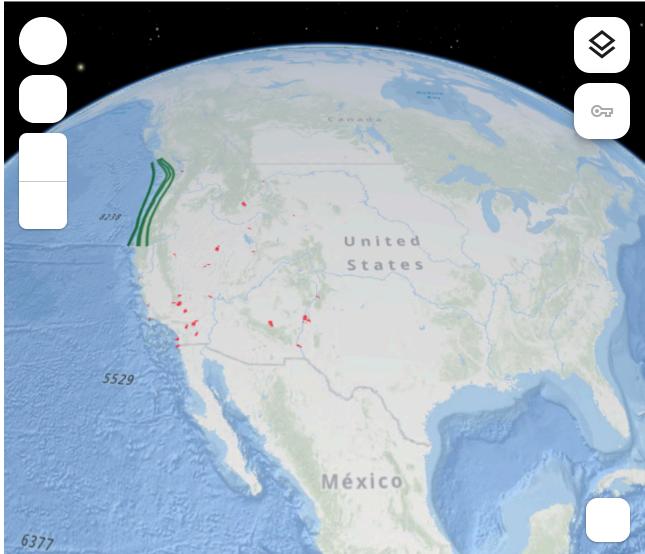
Attachment H-4. Probabilistic Seismic Hazard Disaggregation – 2,475-Year Return Time

Disaggregation Report

Disaggregation



Geographical Disaggregation



Esri, GEBCO, Garmin, NaturalVue | Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, USF... Powered by Esri

Parameter Summary

Model: NSHM Conterminous U.S. 2023

Latitude: 45.648926 °

Longitude: -120.601333 °

Site Class: D (Vs30 260)

Intensity Measure Type: PGA

Return Period: 2475 (2% in 50)

Component: Total

Disaggregation Summary: Total

Disaggregation targets

Return period: 2475 yrs

Exceedance rate : $4.040e-4 \text{ yr}^{-1}$ PGA ground motion : 2.386e-1 g

Totals

Binned : 100 %

Residual : 0 %

Trace : 1.15 %

Mode (largest m-r bin)

m: 5.3

r: 11.18 km $ε_0$: 0.59 σ

Contribution: 6.21 %

Discretization

 ${f r}$: min = 0.0, max = 1000.0, ${f \Delta}$ = 20.0 km

 \mathbf{m} : min = 4.4, max = 9.4, Δ = 0.2

 ϵ : min = -3.0, max = 3.0, Δ = 0.5 σ

Recovered targets

Return period: 2429.4059 yrs

Exceedance rate: 4.116e-4 yr⁻¹

Mean (over all sources)

m: 6.47

r: 47.44 km

 $ε_o$: 0.76 σ

Mode (largest m-r-ε₀ bin)

m: 6.51

r: 26.37 km

 ϵ_o : 0.76 σ

Contribution: 2.26 %

Epsilon keys

ε0 : [-∞ .. -2.5)

ε1: [-2.5 .. -2.0)

ε2: [-2.0 .. -1.5)

ε3: [-1.5 .. -1.0)

ε4: [-1.0 .. -0.5)

ε5: [-0.5 .. 0.0)

ε6: [0.0 .. 0.5)

ε7: [0.5 .. 1.0)

ε8: [1.0 .. 1.5)

ε9: [1.5 .. 2.0)

ε10: [2.0 .. 2.5)

ε11 : [2.5 .. +∞]

Disaggregation Contributions: Total

Source Set > Source	Туре	r	m	ε ₀	lon	lat	az	%
WUS Branch Average (opt)	Grid							74.72
PointSourceFinite: -120.601, 45.734		9.71	5.75	0.07	120.601°W	45.734°N	0.00	1.47
PointSourceFinite: -120.601, 45.725		8.97	5.72	-0.01	120.601°W	45.725°N	0.00	1.45
PointSourceFinite: -120.601, 45.761		11.99	5.83	0.33	120.601°W	45.761°N	0.00	1.43
PointSourceFinite: -120.601, 45.743		10.44	5.78	0.19	120.601°W	45.743°N	0.00	1.43
PointSourceFinite: -120.601, 45.716		8.25	5.70	-0.08	120.601°W	45.716°N	0.00	1.39
PointSourceFinite: -120.601, 45.734		10.77	5.76	0.12	120.601°W	45.734°N	0.00	1.37
PointSourceFinite: -120.601, 45.725		10.02	5.73	0.05	120.601°W	45.725°N	0.00	1.34
PointSourceFinite: -120.601, 45.761		13.07	5.84	0.37	120.601°W	45.761°N	0.00	1.32
PointSourceFinite: -120.601, 45.743		11.52	5.79	0.24	120.601°W	45.743°N	0.00	1.32
PointSourceFinite: -120.601, 45.752		11.21	5.81	0.26	120.601°W	45.752°N	0.00	1.3
PointSourceFinite: -120.601, 45.716		9.29	5.71	-0.03	120.601°W	45.716°N	0.00	1.29
PointSourceFinite: -120.601, 45.707		7.55	5.68	-0.16	120.601°W	45.707°N	0.00	1.27
PointSourceFinite: -120.601, 45.779		13.58	5.88	0.45	120.601°W	45.779°N	0.00	1.24
PointSourceFinite: -120.601, 45.698		6.89	5.66	-0.24	120.601°W	45.698°N	0.00	1.24
PointSourceFinite: -120.601, 45.752		12.29	5.82	0.31	120.601°W	45.752°N	0.00	1.2
PointSourceFinite: -120.601, 45.770		12.79	5.85	0.39	120.601°W	45.770°N	0.00	1.19
PointSourceFinite: -120.601, 45.788		14.38	5.91	0.51	120.601°W	45.788°N	0.00	1.19
PointSourceFinite: -120.601, 45.707		8.58	5.69	-0.10	120.601°W	45.707°N	0.00	1.19
PointSourceFinite: -120.601, 45.797		15.18	5.93	0.56	120.601°W	45.797°N	0.00	1.17
PointSourceFinite: -120.601, 45.698		7.89	5.67	-0.19	120.601°W	45.698°N	0.00	1.16
PointSourceFinite: -120.601, 45.779		14.66	5.89	0.50	120.601°W	45.779°N	0.00	1.14
PointSourceFinite: -120.601, 45.806		15.98	5.96	0.61	120.601°W	45.806°N	0.00	1.1
PointSourceFinite: -120.601, 45.770		13.87	5.86	0.44	120.601°W	45.770°N	0.00	1.1
PointSourceFinite: -120.601, 45.788		15.45	5.92	0.55	120.601°W	45.788°N	0.00	1.09
PointSourceFinite: -120.601, 45.797		16.25	5.94	0.60	120.601°W	45.797°N	0.00	1.08
PointSourceFinite: -120.601, 45.689		6.28	5.64	-0.33	120.601°W	45.689°N	0.00	1.05
PointSourceFinite: -120.601, 45.815		16.80	5.98	0.66	120.601°W	45.815°N	0.00	1.02
PointSourceFinite: -120.601, 45.806		17.04	5.97	0.65	120.601°W	45.806°N	0.00	1.01
PointSourceFinite: -120.601, 45.824		17.60	6.00	0.71	120.601°W	45.824°N	0.00	1
WUS Branch Average	FaultSystem							13.84
Arlington - Shutler Butte (4)	rauntsystem	24.89	6.86	0.53	120.416°W	45.831°N	35.31	4.65
Warwick (4)		32.54	6.66	1.09	121.006°W	45.722°N	284.67	2.15
Uhtanum Ridge - Gable Mountain (2)		81.07		1.06	120.109°W	46.642°N	18.78	1.46
. ,		01.07	7.04	1.00	120.109 W	40.042 N	10.70	
Cascadia (full, bottom)	Interface							4.83
Cascadia (full, bottom)		230.42	9.16	1.44	123.515°W	45.866°N	277.13	4.83
WA Intraslab	Slab							2.16
Cascadia (full, middle)	Interface							1.61
Cascadia (full, middle)		283.42	8.98	1.98	124.137°W	46.300°N	286.11	1.61

Application Metadata

Application: Disaggregation

URL: https://earthquake.usgs.gov/nshmp/hazard/disagg

Repository: nshmp-apps

Version: 20.8.0

URL: https://code.usgs.gov/ghsc/nshmp/nshmp-apps

Repository: nshmp-haz

Version: 2.7.0

URL: https://code.usgs.gov/ghsc/nshmp/nshmp-haz

Repository: nshmp-lib

Version: 1.7.15

URL: https://code.usgs.gov/ghsc/nshmp/nshmp-lib

Repository: nshm-conus

Version: 6.1.1

URL: https://code.usgs.gov/ghsc/nshmp/nshms/nshm-conus

November 14, 2025, 12:31 PM

Attachment H-5. Response Spectrum – Site Class D "Stiff Soil"



ASCE Hazards Report

Address:

No Address at This Location

Standard: ASCE/SEI 41-23 Latitude: 45.659866
Risk Category: NaN Longitude: -120.598516

Soil Class: D - Stiff Soil Elevation: 1424.3205969332446 ft

(NAVD 88)







Seismic

Site Soil Class: D - Stiff Soil

Hazard Level BSE-2N:

S_{xs}: 0.6 S_{X1} : 0.39

Hazard Level BSE-1N:

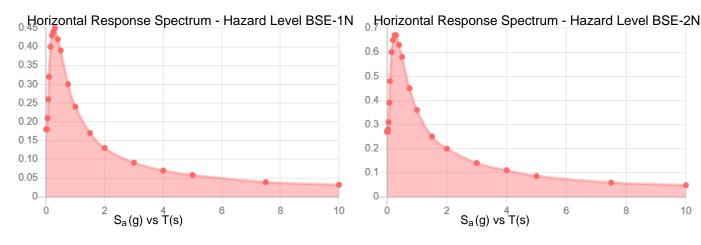
 S_{XS} : 0.4 S_{X1} : 0.26

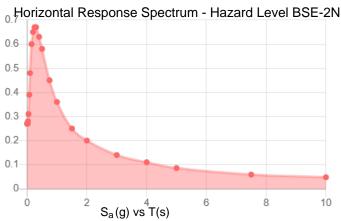
Hazard Level BSE-2E:

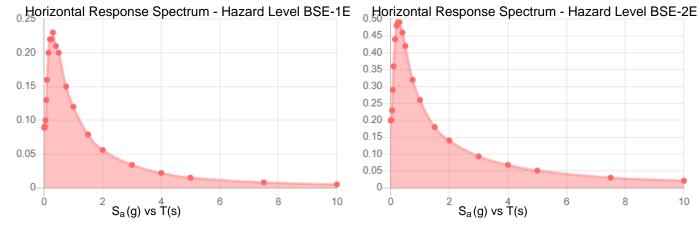
 S_{XS} : 0.44 S_{X1} : 0.26

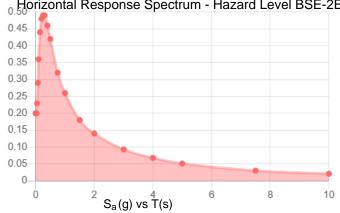
Hazard Level BSE-1E:

 S_{XS} : 0.21 S_{X1} : 0.12









Data Accessed: Sat Nov 15 2025



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